



LEARNING AREA « DARTMOOR » (United Kingdom)

A BASELINE ASSESSMENT

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The area

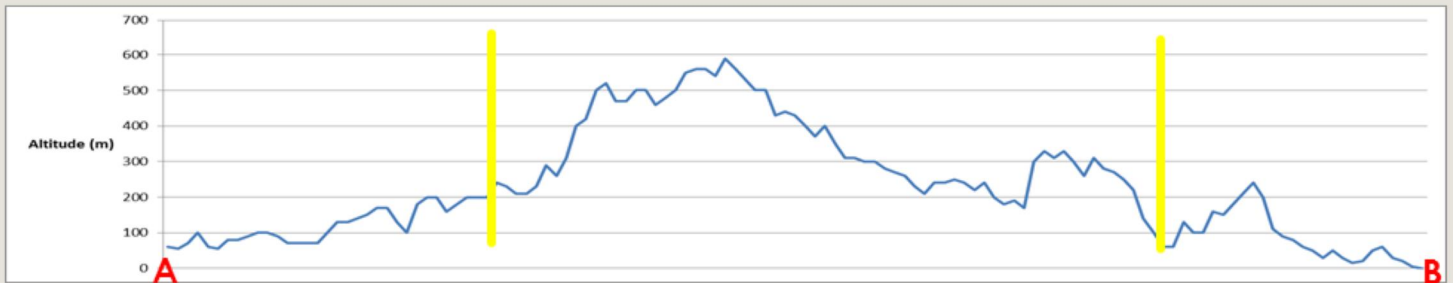
A portrait



Boundaries and key characteristics



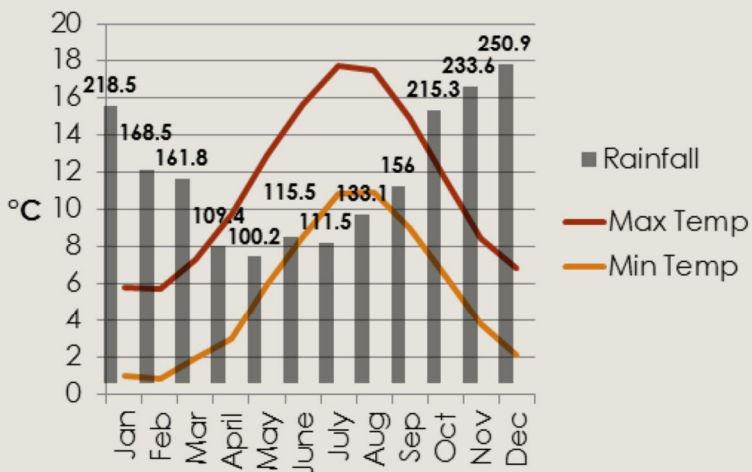
- The Learning Area consists of the 35,000 ha of common land in Dartmoor National Park (DNP) and the farms which use that common land
- Dartmoor's 46,000 ha of moorland is by far the largest area of unenclosed land in SW England
- Farmland, including common land, makes up 85% of the area, with woodland/forestry 11%, reservoirs 1% and urban areas 3%



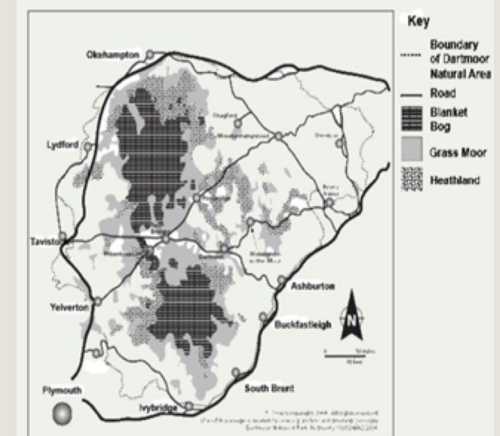
The Learning Area consists of the 30,000+ ha of registered common land within the granite upland block of Dartmoor National Park (DNP) in SW England and the farms which actively use their pasture rights on those commons – currently around 500 farms.

These farms are located overwhelmingly within the DNP, but don't include all farms within the Park. The area of the farms using the moorland is not known. Some hill farms also have their own sole use moorland – around 1/3 of the total moorland in DNP. This is also HNV and shares some, but not all, of the issues facing common land within the Park.

Climate and vegetation



Moorland Habitats of Dartmoor



- Oceanic climate, deteriorating rapidly with altitude. Precipitation up to 2000 mm/yr.
- Southernmost blanket bogs in British Isles; extensive areas of dry and wet heath and grassy moorland
- Significant, but limited, areas of semi-natural deciduous woodland

Dartmoor is the largest granite massif and most southerly upland area in the UK. Situated in the middle of the county of Devon in SW England, its highest point is High Willhays at 621m and 51% of DNP is above 300m. It lies south of the maximum extent of the Pleistocene glaciations – the largest upland in the UK to have been ice-free – and so the valleys surrounding the central core are narrow and deeply-incised.

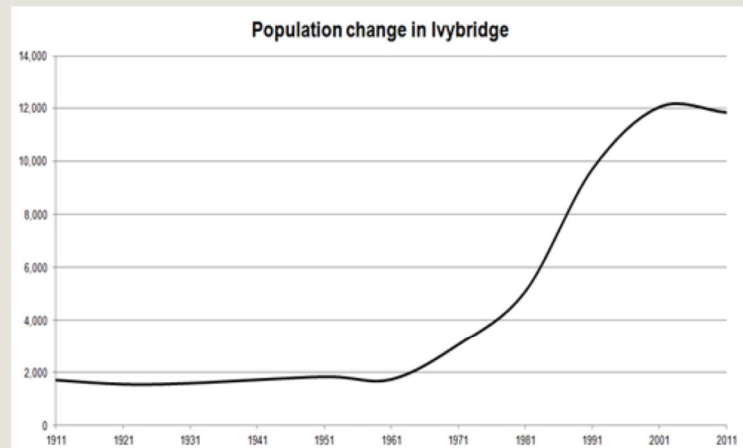
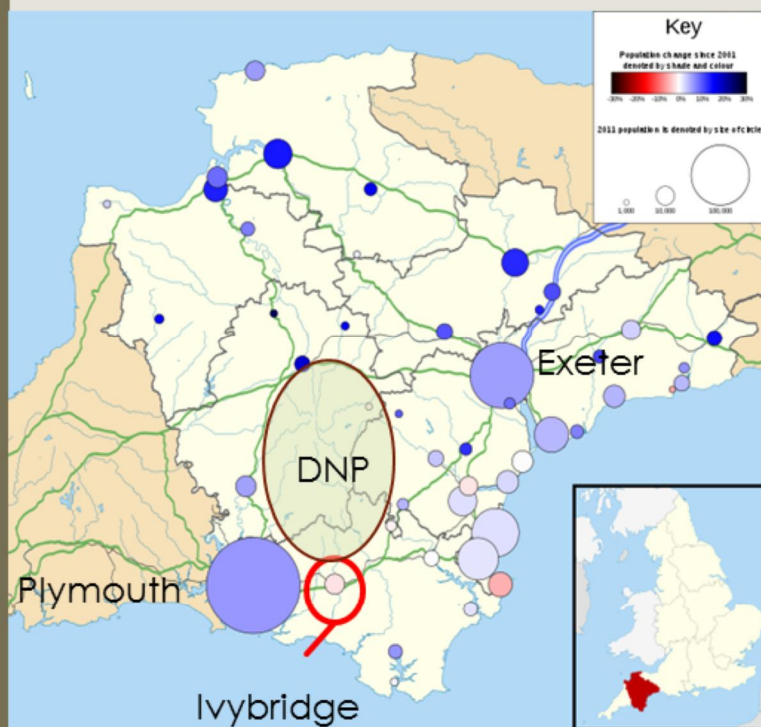
Dartmoor's climate is Oceanic - cool and wet and lacking in extremes. Rainfall averages reach a maximum of around 2150mm. Climatic conditions worsen rapidly with altitude, allowing the formation of stagic podzols, stagnosols and, covering large areas of the moorland, blanket bog histosols. Similar poorly drained conditions occur in many valley bottoms. These climatic and pedological conditions are severely limiting factors for the growing season and for agriculture, with the best land being in general found on the lower slopes and at lower altitudes. In this climate, grass has always had advantages over arable crops for supporting livestock.

The semi-natural pastures fundamental to the High Nature Value of Dartmoor can be found in three types of farmland context:

- The unenclosed moor, much of which is still common land
- 'Newtakes' (land enclosed from the moor) of various ages and are not common land
- Long-established inbye (enclosed) land predominantly permanent grassland with little floristic interest

The unenclosed moor is almost wholly semi-natural, with a spectrum of habitats ranging from bracken to dry grass moor to wet grass moor to blanket bog to wet heath to dry heath, depending on the combination of grazing history and soil conditions. As well as having some of the most southerly blanket bogs in the northern hemisphere, Dartmoor's *Calluna vulgaris* – *Ulex gallii* dry heath communities are rare outwith Britain and Ireland.

Human geography



- Dartmoor NP has a population of c. 34,000, with the largest town having only 4,000 people, but experiences high people pressure
- The area attracts at least 10 million visits a year
- Farmers make up just around 2.6% of the population,

Dartmoor experiences considerable non-agricultural human pressure. It has two significant urban areas, Plymouth (262,700) and Exeter (127,300), on its doorstep. Plymouth, extends almost as far as the nearest common land.

2 major road corridors run to the N and S of the moorland core – villages in those corridors especially have grown in population (see the example graph of Ivybridge above), with workers in Plymouth and Exeter often commuting from homes in the more desirable country villages.

It experiences a large volume of both local and national tourism in its own right and is also on the tourist route to Cornwall to the west. It is an area considered desirable for house buying, including for second homes, holiday letting and retirement.

Farmers are very much a minority, making up just 2.6% of the Park population in communities which nowadays have large non-rural elements.

Western moorland fringe

– abrupt transition within one farm's width;
larger holdings, many with fields outwith the Park boundary



Eastern moorland fringe

– less abrupt;
smaller field structure; more diverse farm structure

DNP boundary

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Google

2002

Imagery Date: 8/8/2015 50°38'55.77" N 3°49'18.84" W elev 277 m eye

On this side of the Park, there is a considerable area of land away from the moor included within the designated area.



Land cover in the National Park

Predominately a farmed landscape

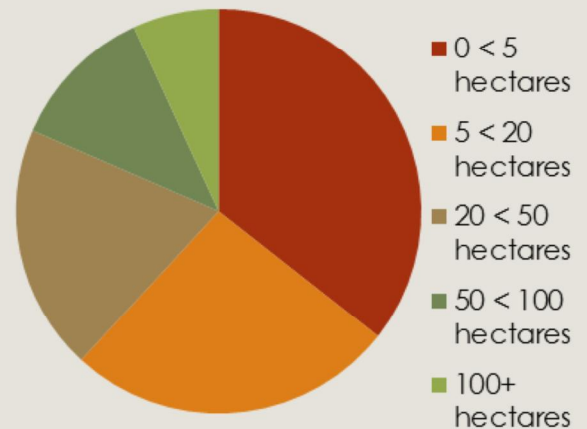
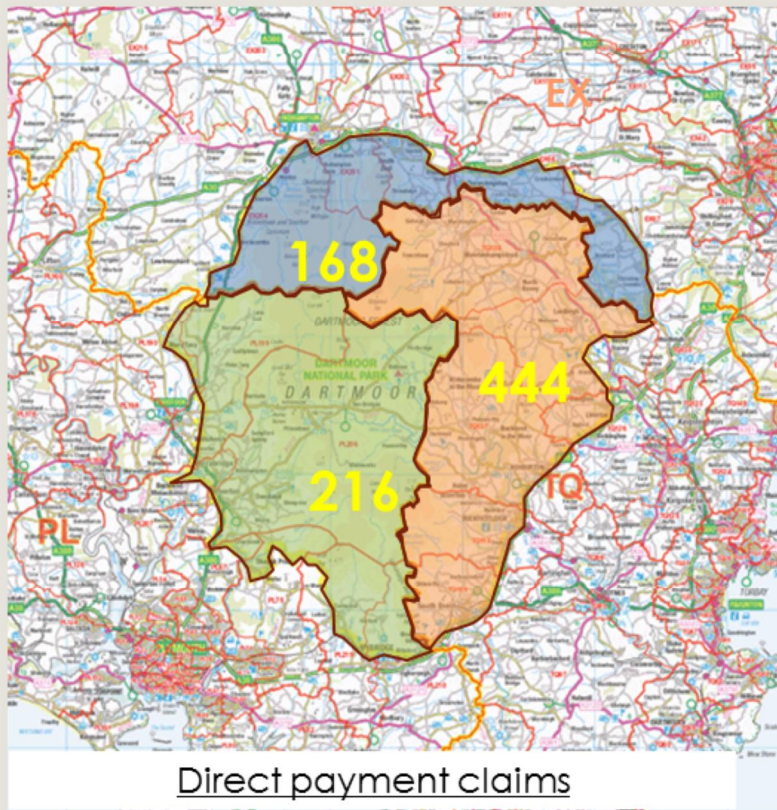
- Livestock farming; cattle, sheep and ponies

Key: Moorland – un-enclosed grass and heath dominated rough pasture

In-bye land = farmland, enclosed by stone walls and occasionally fences. Predominately improved reseeded grassland.

Woods and Forests = predominately deciduous woodland, some ancient and conifer plantations.

Agriculture: holdings



Size distribution of holdings

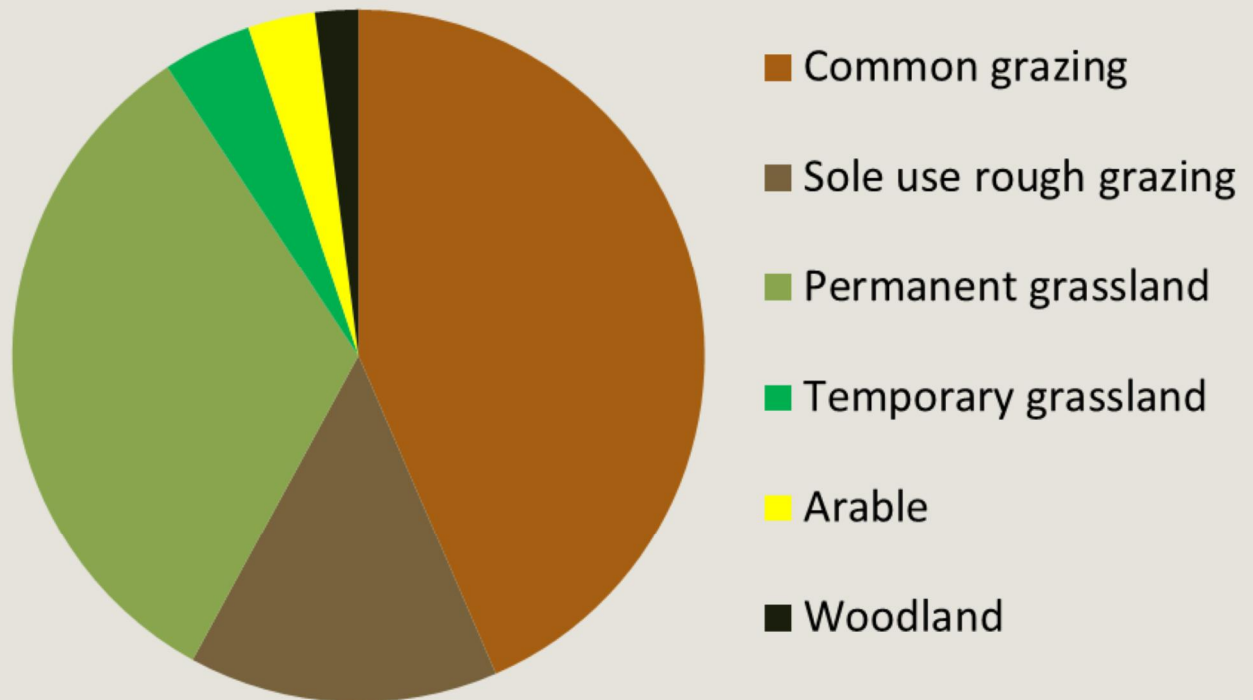
- Almost 1300 holdings, of which around 900 'major holdings'
- 800+ direct payments claimants

As in many parts of the UK, there is a surprisingly high number of smaller holdings, with half the 800+ direct payments claimants receiving less than around €4000 in 2015.

Hill farms are more likely to be large, and larger holdings more frequent on the western side of the moor, where the transition between upland and lowland is more abrupt (see following two slides). The eastern side, in contrast, is more hilly, with a series of deep valleys where smaller holdings can persist. The east side also has many more settlements, and small holdings are considered attractive properties to purchase by the less agriculturally-inclined.

Expert opinion is that the farms which use their common rights are disproportionately large.

Overall land cover on Dartmoor farms



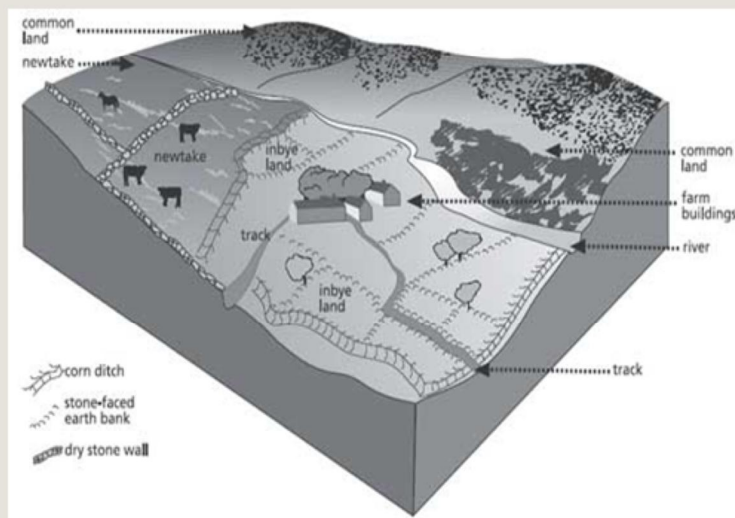
Taking Dartmoor farmland as a whole, the predominance of permanent pastures is striking, as is the fact that over half the farmed area remains semi-natural grassland. No rigorous data is available just for those farms which actually use the commons, but the predominance of this resource in their farmed assets will be even higher (we estimate that permanent pasture:sole use rough grazings:common grazing ratios of the order of 1:1:2 are representative).

The moorland is used for grazing livestock – cattle, sheep and ponies. How it is integrated (or not) into the wider farm system varies significantly from holding to holding. Examples include:

- Providing a free summer grazing resource, freeing up the inbye land for the growing of winter fodder
- Providing a cheap grazing resource for the use of less demanding animals, e.g. Dry cows, young stock
- A source of progeny, some of which is sold fat, some of which is sold store for fattening elsewhere (on-farm or by other farms), and some of which is used as breeding stock for the inbye system (perhaps as cross-breeds). This is especially the case for sheep systems.

Many of the larger farms now own or rent ground on the lowland outwith DNP.

The hill farm in the landscape



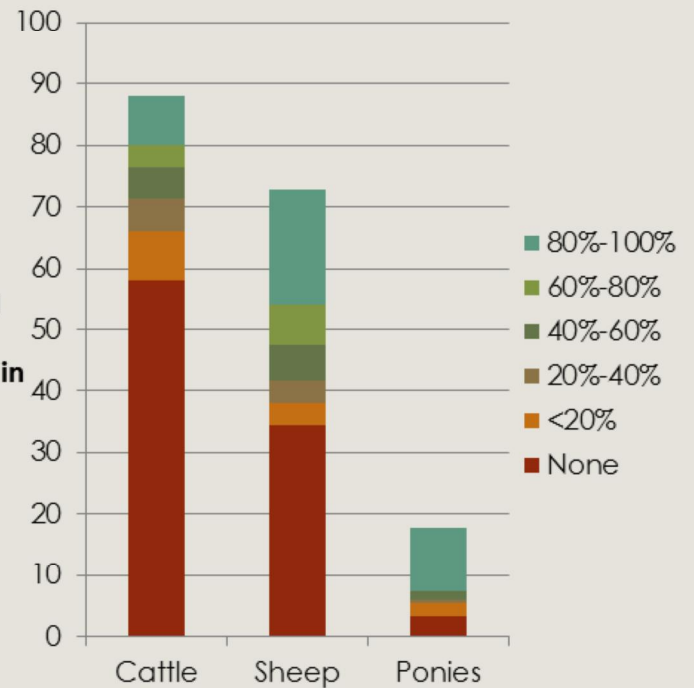
- Unenclosed moorland and many 'newtakes' (enclosed sole use rough grazings) are semi-natural and extensively managed
- Inbye land overwhelmingly improved grassland, with small % of arable. Remaining semi-natural of high nature value, but trivial on landscape scale
- Farm often has large number of sheds for inwintering (and sometimes finishing) stock

Agriculture: common land



- Around 500 holdings have pasturing rights on common land
- C. 35,000 ha of common land – dominates semi-natural vegetation of Dartmoor
- 37 commons associations, overseen by Dartmoor Commoners' Council
- It is thought that around 200 holdings actually depasture livestock on the commons

% of all Major Holdings in DNP

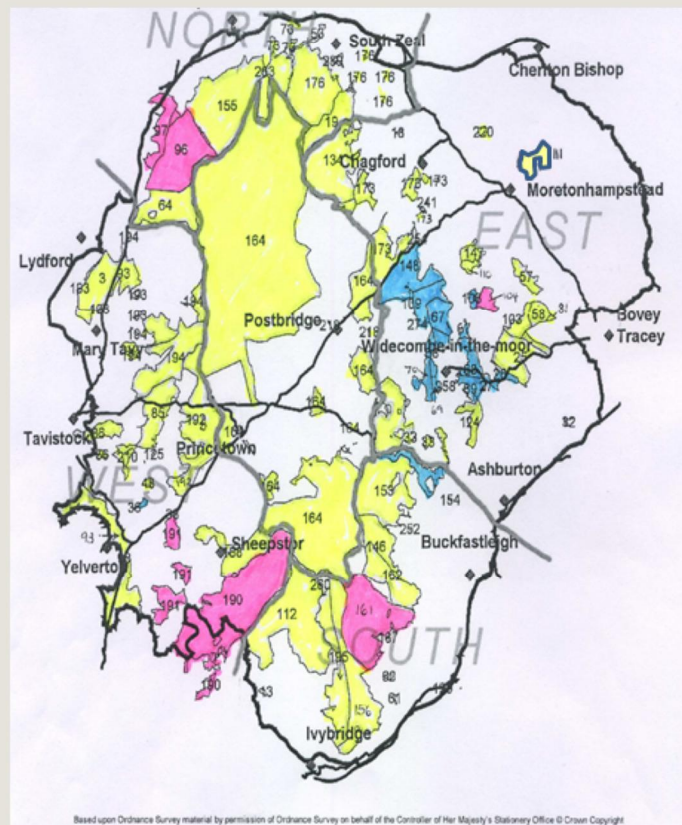


% of livestock using the commons per holding and type of livestock c.2005

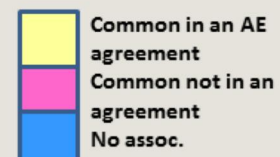
Common land is a very important feature of the Dartmoor landscape, but is only used today by a proportion of farms, even within the National Park. Within that cohort of holdings, the proportion of the different livestock sent to the moor also varies considerably, with ponies and, to a lesser extent sheep being more likely to go to the moor than cattle.

In historic terms (see following slides) the present day is probably most unusual in terms of the proportion of farms using the commons resource – in former times, even holdings at some distance from the moor would send summering cattle there.

Commons self-governance and agri-environment



(2016 data)

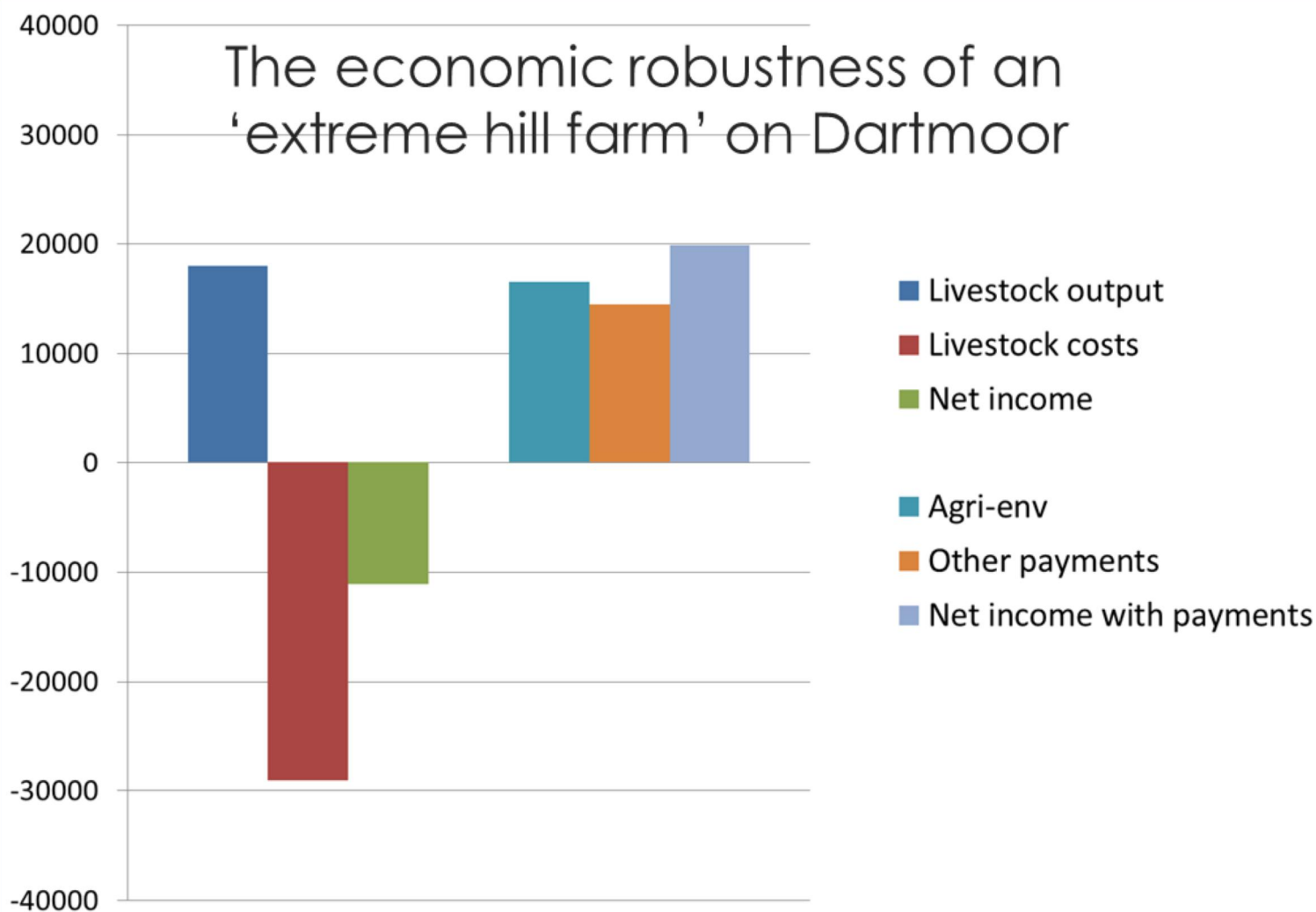


This map shows the distribution of the commons. Each common is registered as a separate common although many are contiguous with other areas of common land without a physical boundary. The majority of commons have an association elected by those farmers and non-farmers with grazing rights on that common and an association is required to access an agri-environment agreement for the common. Where a common fails to create an association it is unable to enter that common into an agri-environment (AE) agreement.

Stock numbers are regulated by the AE agreements to ensure the grazing pressure is compatible with the ecological requirements.

Where a common is not in an agreement the stocking regime is controlled by overgrazing regulations that are linked to the support payments (Basic Payment Scheme payments) and breaches of the regulations can incur a financial penalty.

The economic robustness of an 'extreme hill farm' on Dartmoor



Current systems of hill farming on Dartmoor are loss-making in the absence of support payments. If all unpaid family labour and family capital invested in the business (including land and buildings) is included in the calculation then the average hill farm has an income deficit of the order of €20,000.

Furthermore, the size of the net profit is small compared to that of both the output and expenditure, making the economics very vulnerable to small changes in either or both.

Support payments can account for 60% of total output, and 150% of net income, if family labour is properly costed and a return to investment is assumed.



	Common	Newtakes	Inbye
Area ha	150	75	75
Stocking (LU)	60	135	
Est. BPS	8925	4462	15555
Est. Agri-env.	9000	3000	
Livestock & misc. output	60900		
Livestock & misc. costs	-80850		
Livestock net profit	-19950		
Livestock net profit allocated by LU	-6138	-13811	
Overall net income split	11786	9205	

Agriculture: an attempt at allocating output and costs

Within the overall farm economy, a crucial question is the competition between different systems for the farm's resources – capital (farm infrastructure, ongoing expenditure) and labour (not least the unpaid family labour). Factors which are important considerations might include not only the rate of return, but the total amount of profit generated and even things like the feeling that resources should be put to full use.

The decoupling of support payments makes understanding the relative economics of the potentially competing systems very important – unlike in the past, it is at least possible for the part of the farm economy bringing in most of the payments to be the area with fewest livestock, for example. However, estimating the partial budgets for sub-subsystems or sub-areas within the farm is far from easy. In this slide we present a first attempt which we know is unlikely to give the full picture, but nevertheless raises some of the difficult questions farmers have to answer in their own business decisions.

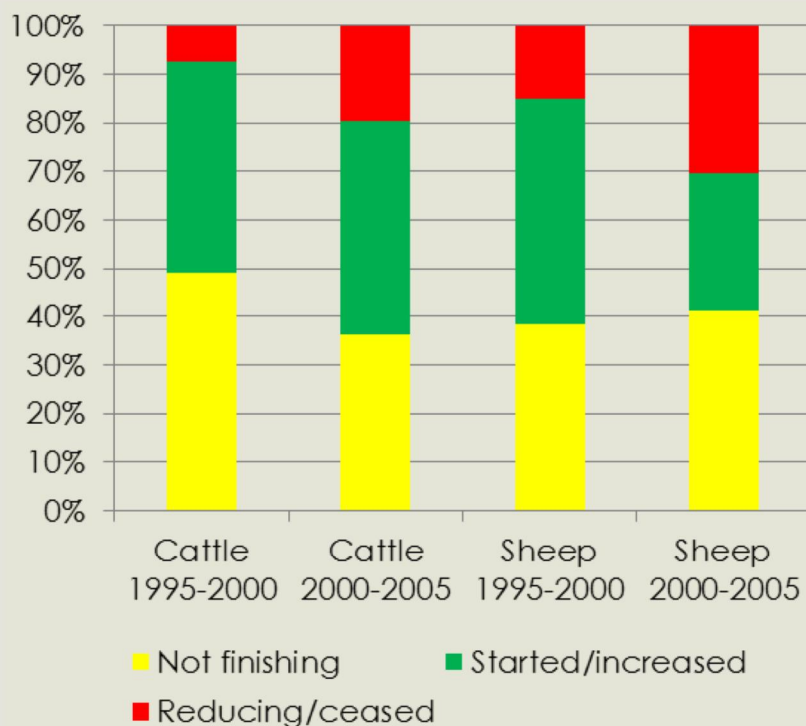
We imagine a model Dartmoor farm (areas and stocking based on various reports from the last 15 years). BPS data can be estimated with some degree of confidence; the figure for agri-environment payments on the common is broadly representative; the agri-environment figure for the inbye is more of an educated guess (and is decreasing annually as the withdrawal of the entry-level scheme works itself through). Output and cost data for the actual livestock system are taken from an 'extreme Dartmoor hill farm' example from the literature.

The big question is how to allocate the output and cost figures to the different parts of the farm. The inbye land is likely to account for a disproportionately large amount of both variable and fixed costs, but probably for a larger fraction of the output. As a first estimate we have assumed that both costs and output vary with the livestock numbers, i.e. The net profit from livestock is allocated according to the total number of livestock on the common and enclosed land respectively.

The results are intriguing, suggesting that the half of the farmed resource which is the share of common land may actually generate more than half of the net profit, despite having only 30% of the farm's livestock. However, the total income generated from the moor is still modest – it might be argued that the farm needs the income from the enclosed land to generate the amount of money desired. We aim to discuss these findings further with the LA farmers and others.

It is important to note however that the value of the moor to at least some farms may not be expressed in sales from the moor, but rather as a source of breeding stock for more intensive elements of the system on the inbye land.

Agriculture: fattening / adding value



All holdings with animals are livestock breeders - the main variable is what proportion of the progeny are fattened on the holding. Most holdings are attempting to add value by fattening at least some of their calves and/or lambs and/or ponies, and the number doing so has increased in recent years. In 2000-5, 70-80% of holdings fatten at least some of their lambs and calves, but anecdotal evidence suggests that this proportion may have increased more recently, driven in part by the uncertainty caused by TB – the farm system has to be able to cope with standstills, so a default which makes the most of livestock kept at home minimises risk. Nevertheless, it would be surprising if farmers were not still sensitive to the price of store (unfattened) beasts, selling animals store if the prices are good.

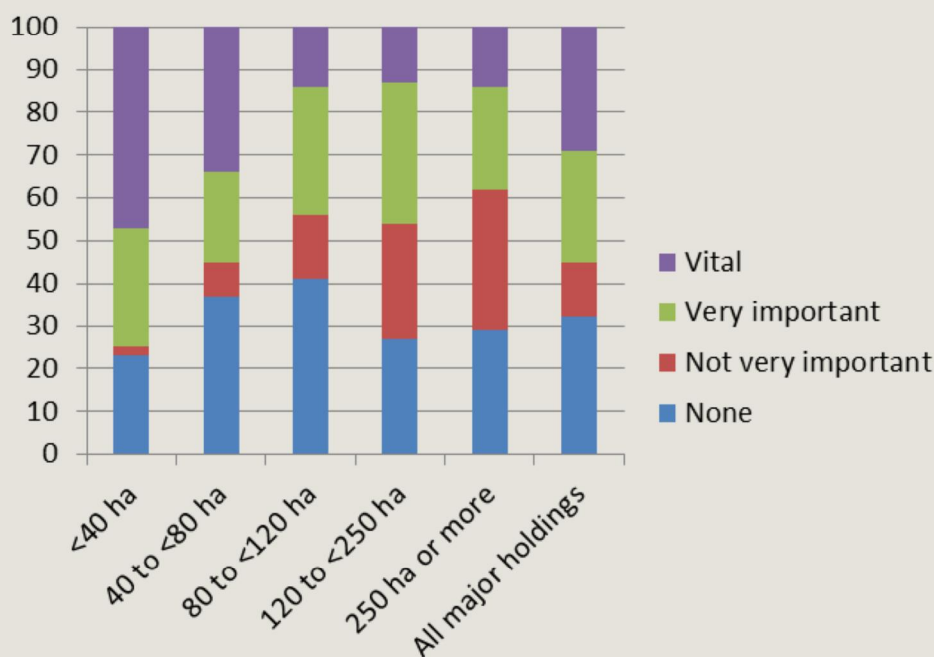
Local marketing groups have developed to sell branded produce - shortening the supply chain and adding value by direct selling are both things which have been encouraged nationally by bodies such as EBLEX, and locally by the Duchy of Cornwall and DNPA. But note that despite the existence of the local meat marketing groups, most finished livestock is sold to intermediate buyers, whether through private contracts or through the local livestock markets.

There are 3 group marketing initiatives on Dartmoor:

- The earliest is Meat Dartmoor, which is little more than an umbrella organisation to link consumers to individual farms which carry out direct sales of meat. The 'guarantee' is farm-specific and the trading is carried out by the farm concerned.
- Dartmoor Farmers is a real denomination of origin, albeit not registered as a PDO. It is a limited company of around 30 shareholding farmers. It has a detailed specification, which includes rules about the source of feed, the breeds used, the ownership and birth holding of the animals etc. The organisation markets the meat collectively.
- Dartmoor Conservation Meat is an initiative to add value to ponies by selling horseflesh (an unusual product in the UK).

From talking to farmers, it sounds however as if none of these initiatives are having anything like a systemic impact. The largest and most organised of these initiatives, Dartmoor Farmers, has not made a profit in any year in which it has been trading. Farmers say that individuals can make a go of direct selling at least a proportion of their output to specific markets, as long as they use their own labour and have the right mindset for the job (though whether they properly cost their own time is the subject of speculation). But anything which attempts to scale up comes up against not only competition from the 'big boys', but the market's expectations of continuity of supply, uniformity of product etc.. 'People want something special and like the story, but they're not prepared to pay for it.'

Agriculture: non-farming income



Importance of non-farm income on a sample of major holdings c.2005

Principal farmer(s) and spouse(s) – nature of work	% of 100 FTE
Full time farming	58
Part-time farming	26
On farm, non-farming, FT	2
On farm, non-farming, PT	3
Off farm, FT	4
Off farm, PT	6

Reported employment situation in same sample

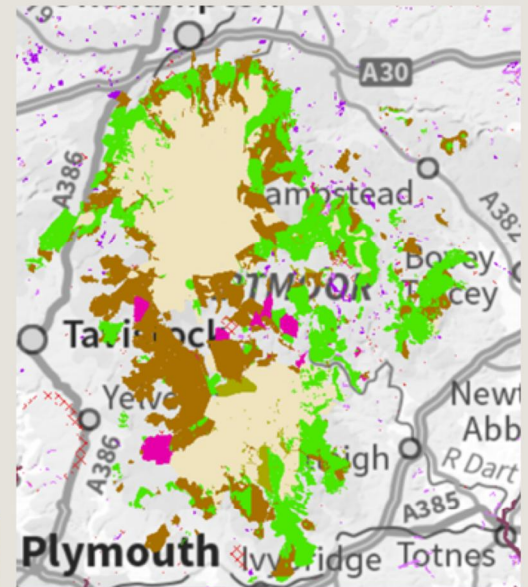
The dominant narrative is still that of the 'family farm'. But even in a sample of major holdings, non-farm income is earned on two thirds of all farms and is considered 'vital' on 1 in every 8 of the largest holdings. Overall, around 15% of the output (not the net income) on Dartmoor farms is earned from non-farming activity, whether on-farm or off-farm.

42% of farmers and their spouses are at most 'part-time' (many will not work on the farm), but getting a clear picture of the farm economy is difficult. 58% of farmers and their spouses work full-time on the farm, but in no size class of farm is the proportion of family farm income from farming more than 40% - it is less than a quarter in the case of farms <40ha.

Other data from the same report suggests that the major sources of non-farming income in order of importance are: 'off-farm income' (1/3 of holdings); rents other than tourist; processing and retailing; contracting; tourist accommodation (fewer than 20%).

The High Nature Value of the area

- The overwhelming proportion of semi-natural habitats are 'upland' plant communities – blanket bog, wet and dry heath and acid grasslands
- Few inbye habitats have survived intensification, making the surviving ones, more valuable



Priority semi-natural habitats in the Dartmoor region – English Nature data

Dartmoor's blanket bogs are some of the southernmost in the Northern Hemisphere. The *Calluna vulgaris* – *Ulex gallii* dry heath communities are rare outwith Britain and Ireland. The structure of vegetation on these habitats is heavily influenced by livestock grazing.

Significant species include the southernmost nesting dunlin *Calidris alpina* in Europe. The Annex II marsh fritillary butterfly (*Euphydryas aurinia*) is found on wet pastures with *Succisa pratensis* whose structure is maintained by grazing. The national priority high brown and heath fritillaries (*Argynnis ardisippe*, *Melitaea athalia*) and other declining butterfly species are found on bracken slopes, which are the interface of open and wooded habitats; while grazing is not essential for the maintenance of this habitat in the short term, it prevents it eventually reverting to closed woodland.

Only about 20 ha of species-rich hay meadow communities survive.

Mapped data from Natural England's online MAGIC maps shows how rare semi-natural pastures of any sort are outwith the moorland core of Dartmoor, even in inbye areas within the DNP.

The time line

Explaining the present with the past

An overall view of the time line

1000 CE

1700 CE

1939 CE

1990 CE

Prehistoric
settlement

Mediaeval
transhumance

Age of
'improvement'

Production
support

Marginalisation
or new
purpose?



Prehistory

Farms on the high moor; subsequent abandonment

Pre-history - Roman

- Grimspound Bronze Age settlement – 24 huts within a protective enclosure



10000 BC	8000 BC	4500 BC	2300BC	1000 BC	700 BC	AD 50
← End of ice age →	← Mesolithic →	← Early - Neolithic - Late →	← Early - Bronze Age - Late →	← Iron Age →	← Roman →	
	Stone and flint tools from the moor	Stone and flint tools found on the moor	irregular field systems	regular and extensive field systems (reaves)		
		chambered tombs	stone circles	stone rows & standing stones		
			round cairns and cists	hut circles		
			enclosures	hill fort		

Settlement of the high moor reached a crescendo in the Bronze Age – one never attained since and followed by a period of abandonment, as witnessed by the survival of extensive Bronze Age remains to the present day.

By about 2000 to 1500 BC most of the tree cover had been cleared and Dartmoor had become an important area for the grazing of sheep and cattle. People lived either permanently or seasonally in circular stone huts whose remains can be seen on the moor. Some are associated with small, irregular fields, some lie within stone wall enclosures and others are in amongst large areas of rectangular fields known as reave systems.

Reaves are low, stony, earth covered banks which were built around 1200 BC to divide all but the highest parts of Dartmoor, first into territories (a little like our present day parishes), and within those into long, narrow, parallel fields. Their main function was probably to control the movement of stock, but there is some evidence that prehistoric people were also growing cereals here.

A climatic deterioration and the spread of peat during the first millennium BC (1000 - 1 BC), both resulting in poorer grazing vegetation, contributed to the abandonment of the higher part of Dartmoor during the later prehistoric period. Land use on the moor in Late Antiquity is something on which we have very little information.

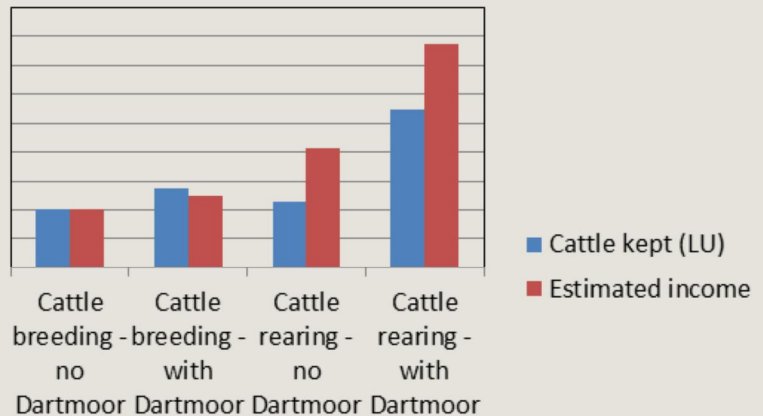
Medieval Times

Regional and local transhumance; gradual piecemeal enclosure

A resource for the whole county



- South Devon cattle on the moor – descendants of the medieval cattle types



- Impact of having access to Dartmoor for Harold Fox's imaginary Devon farm, showing cattle breeding and rearing scenarios

Dartmoor at this period was a grazing resource for the whole county of Devon, particularly for cattle in summer. Somewhere around early mediaeval times, there was a shift from seasonal transhumance involving the livestock owner and milking stock to one where animals from more distant locations, mostly non-milking, were sent to the moor to be cared for by 'agisters', who were tenants of farms in the heart of the moor – the so-called 'ancient tenements'. Farms from parishes adjoining the moor also had rights to use certain grazings. A complex system of fees grew up to pay for the agisters' work and to regulate the use of the moor by outsiders.

Harold Fox, an historian, shows how beneficial it would be to an imaginary lowland Devon farm to be able to send drystock to the moor in Medieval times. Technical limitations to production on the home farm and the need to provide room for grazing draught animals and for the production of winter keep made the moor's burst of summer growth into a real boon, worth walking the animals miles for. It is estimated that perhaps 10,000 bullocks and young stock were grazed on the moor each summer in this period.

At the same time, it is likely that sheep were the most numerous type of livestock on the moor. Wool was a source of great wealth in the county, not least for the local monasteries. The emphasis on wool led to the keeping of wethers, many of which were, it seems, outwintered. The dominant hill sheep type kept for its wool developed into what became known as the white-faced Dartmoor breed.

Goats and sheep were present, but were frowned upon, at least in later years. Ponies were certainly present, but there is little detailed information on their numbers etc.

Enclosure was limited in its effect. The Crown, the major landowner, had its own hunting interests, and the moor had an important tin mining industry throughout the mediaeval period. The tenants of the ancient tenements were allowed to enclose limited areas of land, but they also had a financial interest in keeping lowland cattle summering on the moor, since their own farms were in any case limited in terms of winter keep.

Late 17th to early 20th centuries

The 'Age of Improvement' and specialisation; responding to growing markets; the growth of non-farming stakeholders; depression

Improvement and specialisation on the moor



The Enlightenment and resulting industrial and agricultural revolutions had massive impacts on Devon agriculture, and thereby on the use of Dartmoor's commons. It is not clear to what extent developments on the moor were a reaction to changes on the lowland or were positive developments happening in parallel to them; for convenience we separate them here, but it must be stressed that they were all inter-related.

As elsewhere in the UK, there was a drive for the inclosure (privatisation) of common land. A new settlement, Princetown, was founded in 1785, and a substantial area of the surrounding moor enclosed and improved. Progressive inclosure eventually led to a public backlash (see following slides).

A new approach to the rational use of the moor led to the introduction of specialised, hardy, cattle and sheep breeds from Scotland, notably the Blackface and the Galloway. Even breeding animals of these breeds could be outwintered, weakening the link between moor and inbye and between Dartmoor and lowland Devon (though summering lowland cattle was still common in the 1920s), but potentially strengthening the autonomy of the hill farms. In the case of the Blackface, the wool was of low quality; production put more stress on the lamb, sold store off the moor.

Expanding markets for ponies



- The huge growth in coal mining in the UK to almost 300 million tonnes by 1914 was almost all produced using horses
- The Polo Pony Society was founded in 1893, reflecting the interest in that sport, imported from India, and leading to a demand for ponies for that purpose



While it is not clear what the historic numbers of ponies was, it is clear that by the end of the 19th century they numbered at least 30,000. The trade in ponies was dominated by the needs of the UK's coal mines, but Dartmoor animals were also favoured by the wealthy classes as polo ponies.

Interestingly, the distinct characteristics demanded by those two markets set in place a split in the 'breed' between hardier and more fancy types which is still seen today. "Just over one hundred years ago, the pony breed showed a split into two categories. One group began to concentrate on breeding for the show ring (where appearance is most important) and the other group work on breeding for purpose (where adaptability and suitability for work is most important)." Note that this had already happened by the time the Dartmoor Pony Society was founded in 1925.

Expanding opportunities for lowland systems



COMMERCIAL DIRECTORY AND SHIPPERS' GUIDE—Advertisements.

CHARLES MASSEY,
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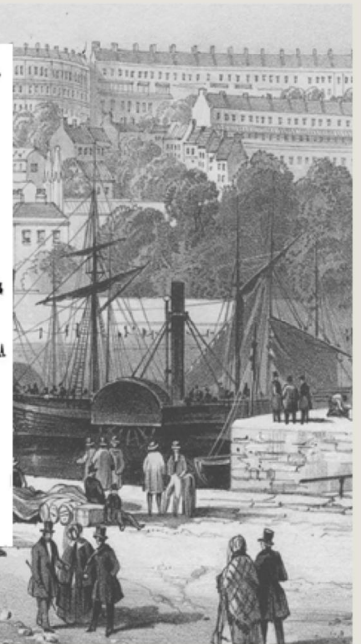
MANURES
OF THE HIGHEST CLASS,
Specially manufactured for Grass, Clover, Rye Grass, Wheat, Barley, Oats,
Turnips, Mangold Wurzels, Potatoes, Vetches, Beans, and Peas.

SUPERPHOSPHATE OF LIME, PERUVIAN GUANO, NITRATE OF SODA

STEAMED BONES ground $\frac{1}{2}$ inch, $\frac{1}{4}$ inch, and fine.
RAW BONES ground $\frac{1}{2}$ inch, $\frac{1}{4}$ inch, and fine.

PREPARED OR DISSOLVED BONES.
BONE MEAL.
BONES SPECIALLY SORTED AND PREPARED FOR VINERIES

Prices on application at the Works.



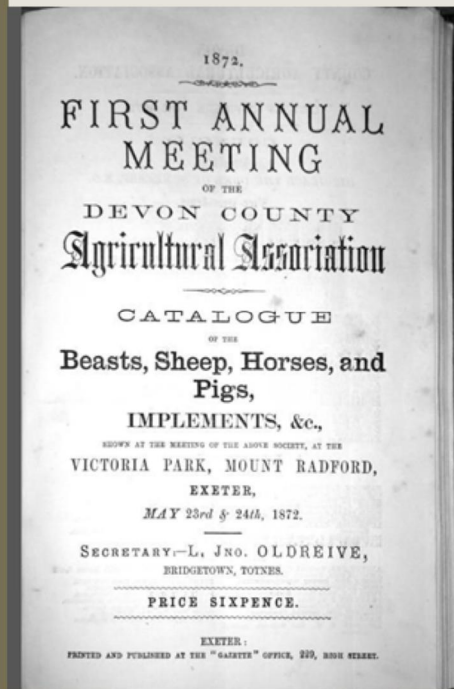
- The railway arrived in the region in the late 1840s, connecting it to the booming markets of Bristol and London and allowing access to the fruits of science and trade, not least fertilisers

Devon was fully connected to industrial Britain with the arrival of the railways to Bristol, London and beyond in the 1840s and 50s. There was now easy access to these burgeoning markets (Bristol grew from 68,000 in 1801 to 323,000 in 1901; London from 1 million to 6 million in the same period).

The speed of travel allowed the development of regional specialisation – Devon's lowland pastures were ideally suited to dairy farming. Lowland systems were developed which were more difficult to fit into the traditional transhumance pattern.

Previous limitations on stocking rates (and therefore nutrient cycling/input) on the lowland were loosened by the advent of imported fertilisers (natural and manufactured); eventually the advent of mechanical traction would free up the land formerly dedicated to draught horses.

Innovation in lowland systems



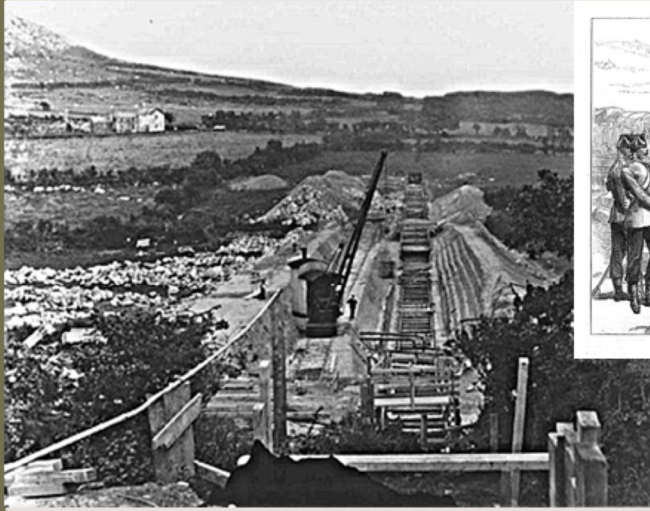
- Local livestock types were formalised into ever more specialised 'breeds', such as the Dartmoor greyface sheep, with breed societies for their promotion and protection
- A Devon Agricultural Association was founded in 1872, running an Agricultural Show to promote good quality livestock
- Money was set aside for an agricultural college in 1903; Seale Hayne was founded in 1920

Innovation both led to and was led by a plethora of improvement societies. The old types of livestock were converted into new formal breeds by cross-breeding and selection. A new lowland wool breed, the Dartmoor greyface, was developed, for example. At the same time, these societies, once formed, also promoted a certain stifling of innovation - the Devon Cattle Breeders Society was formed in 1884 'to promote and *maintain the purity* of the Red Ruby Devon breed.'

The Devon Agricultural Show was started in 1872 by a dedicated County Agricultural Association. The aim was to promote agriculture in the county; the first show had 500 animals entered, mostly of the newly-recognised local breeds. But there were also 800 different items of new machinery on display.

Even the laissez-faire State had started to take an interest in the development of agriculture by the turn of the 20th century. A private bequest was made in 1903 to found an agricultural college, but by 1909, the Board of Agriculture had decided that this would be a way of furthering its objective of expanding the education of science and practice of agriculture in the South-West; after a delay due to the First World War, Seale Hayne Agricultural College was opened in 1920. It did not however provide much training on hill farming systems, with local students travelling to northern England for relevant experience.

The appearance of new stakeholders – protecting the moor

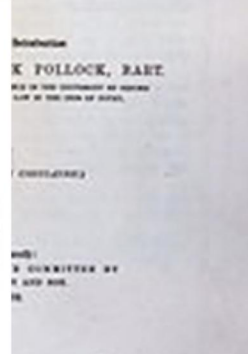


The Dartmoor Preservation Association.

A SHORT HISTORY
OF
THE RIGHTS OF COMMON UPON THE
FOREST OF DARTMOOR AND
THE COMMONS OF DEVON.

REPORT OF MR. STUART A. MOORE TO THE
COMMITTEE.

AND APPENDIX OF DOCUMENTS.



- From left: Burrator – one of a series of new reservoirs built on the moor; Soldiers on manoeuvres on Dartmoor in the 19th century; the new popularity of landscape prints reflected the growth of tourism; the Dartmoor Preservation Association was founded in 1883

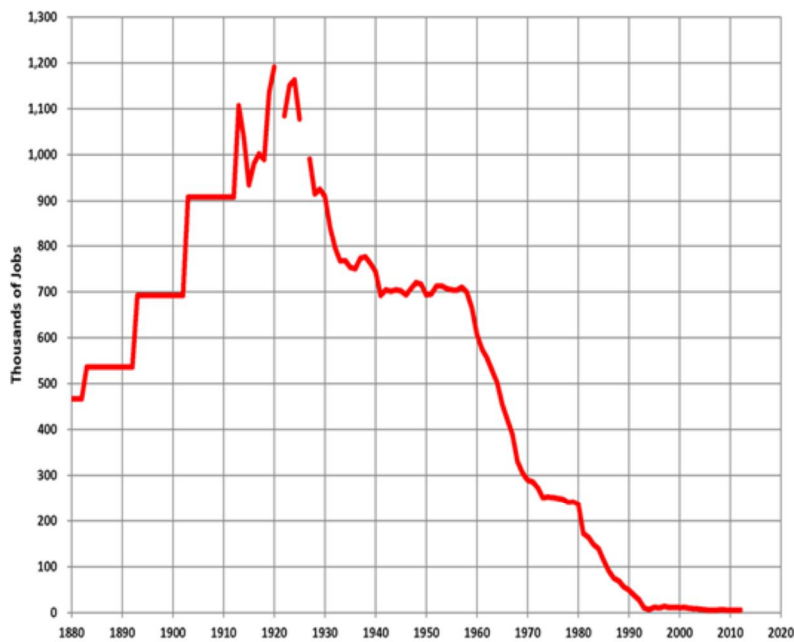
The demand for better conditions in the growing towns around Dartmoor led to the construction of a series of water supply reservoirs on the moor.

Dartmoor had been used for military training exercises since the Napoleonic and Crimean Wars, being conveniently located to the major naval base of Plymouth. However in 1873, regular training started on the Dartmoor Training Area in the northern part of the moor.

Afforestation was another innovation – the first plantings were in 1862.

All of these, as well as insensitive quarrying of popular tors (granite exposures on the hilltops) and the continuing trend towards inclosure, provided the motivation for the creation of the Dartmoor Preservation Association in 1883. Whereas in previous times, Dartmoor had been thought of as a desolate and somewhat frightening wasteland, the 19th century saw the growth of a tourist industry and of interest in all aspects of the landscape, from archaeology to wildlife. Now even the 'wildness' was romanticised in *The Hound of the Baskervilles*. And the politically active middle classes set out to prevent all manner of 'undesirable' developments – quarrying in 1881; use of the military ranges on Saturdays in 1883; reservoirs from 1894 (for London!! But it also opposed reservoirs for local towns); inclosure in 1897 and afforestation in the 1920s and 30s.

Globalisation, shifting policy and depression



- Left: Decline in coal production from 1920 (as well as mechanisation) led to a collapse in the demand for pit ponies
- Above: SS Dunedin (sailed 1876-82) – the first refrigerated transporter of meat from New Zealand to the UK

Globalisation's impact came early to the UK. Domestic wool production suffered competition not only from Australian and Argentinian flocks, but from the booming cotton trade. And while the domestic meat trade remained dominant, the first refrigerated meat from New Zealand arrived as long ago as 1876.

UK coal production started its long decline soon after the First World War; combined with mechanisation underground, the result was a collapse in the demand for pit ponies.

Agriculture production was regulated and subsidised during the 1914-8 war, but the cost of subsidies and the artificially high price of food led to the wartime Agriculture Act being repealed in 1921. This led to an immediate collapse in prices. Though these subsequently recovered, the wider Depression of the early 1930s set things back again (though in dairy farming, it led to a structural shift to regionalised industrialised specialisation, which benefitted lowland Devon).

Agriculture didn't fully recover until the Second World War; the success of emergency State control during that period, as well as the memory of the recent hardships of the 1920s and 30s led to the new post-war redirection of policy.

Consequences of historic land use change on biodiversity



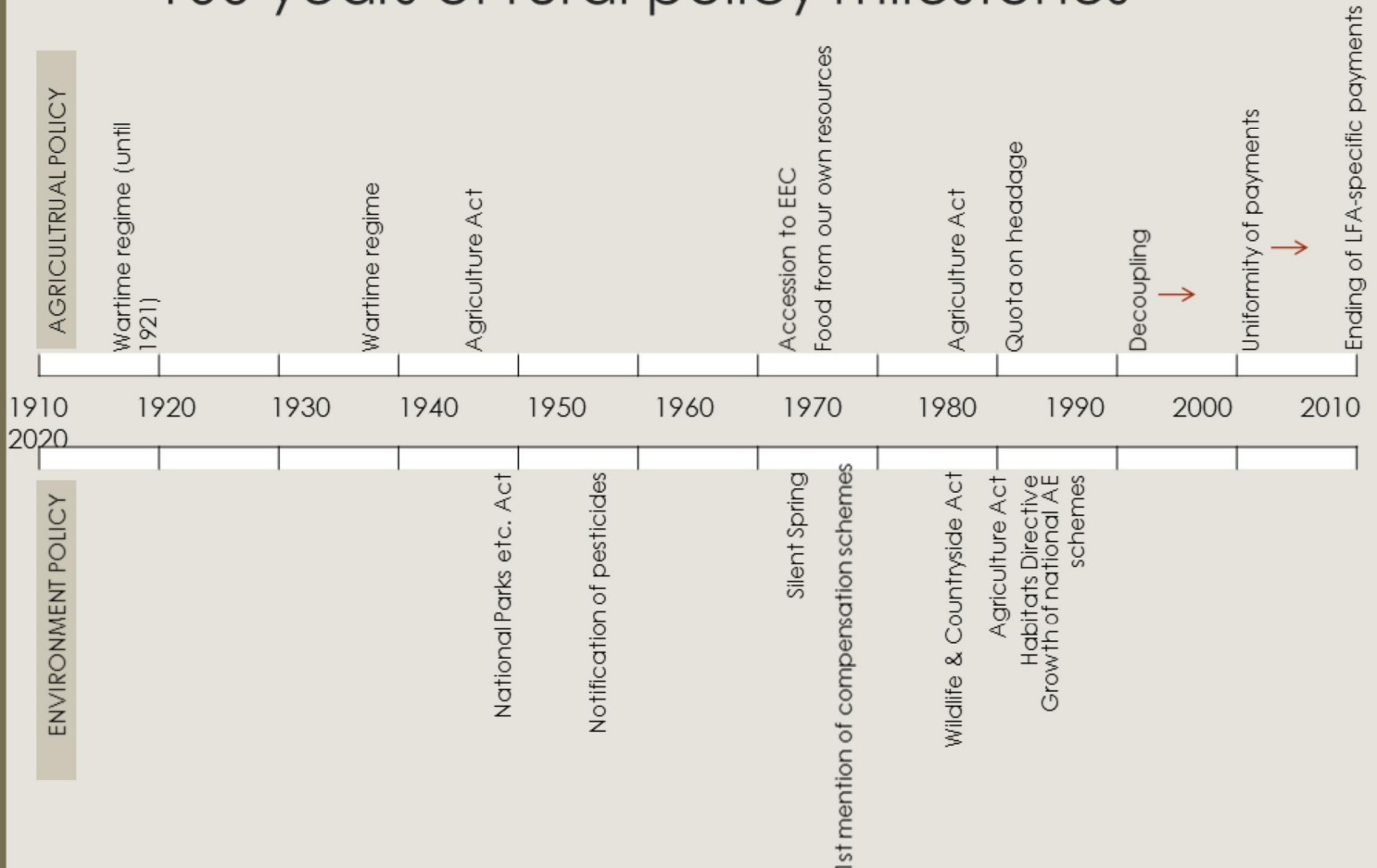
The short answer is that we don't know, until well into the 20th century (and present-day memory). It is next to impossible to reconstruct either past grazing densities on the moor itself, whether or average or over the year, or the historic balance of various types of grazing livestock and how that changed over time. Moreover, we know that the responses of vegetation communities to those pressures are not simply reversible – effects that have been seen in recent years in response to major changes in livestock patterns may result in vegetation types which are nothing like any that have occurred in the past and the effects of reviving what are assumed to be previous practices may not be to resurrect the previous landscape.

We know also that some external factors have changed massively. On the moor, the presence of metalliferous mining, with its attendant population and pollution, is gone after hundreds of years. Airborne pollution levels have changed, even here in Atlantic SW England – acid deposition is thought to have exceeded the tolerance of blanket bog at times in the past, and nitrate deposition levels even now may be having serious impacts on upland habitats. Climate change is a factor which has had major influence in the past (leading to settlements being abandoned in the Bronze Age which were never resettled since, for example). It seems likely to impact on present-day habitats as well, with possible knock-on effects on management.

However, the survival of habitats and (probably) species into the present day illustrates that whatever the changes in terms of land cover patterns and land use intensity, there was, despite a history of seemingly constant intensive use, sufficient resilience in the landscape and sufficient refugia for species to allow it to respond to those changes (and the others in the wider environment) and 'recover' where necessary.

Failure to address the question of what favourable status looks like for Dartmoor's habitats and what systems are likely to deliver – or did in the past deliver – this condition is a major weakness of agri-environment policy and a source of great uncertainty for farmers.

100 years of rural policy milestones



The current concern (as evidenced by this project) to integrate agricultural and environmental policy into a coherent, realistic, objective-led whole is something very recent. 100 years ago, the very idea of long-term intervention in agriculture by the State was anathema – there certainly had been State control and direction during the First World War, but this was lifted again in the 1920s. Combined with the vagaries of monetary policy, it left agriculture open to a severe depression in the early 1930s.

After 1945, the effectiveness of wartime State direction and memories of the 1930s consequences of laissez-faire policy led to a huge change in approach from the new Labour government – one which has remained with us in some form ever since. The State intervened in agriculture in a multitude of ways. Efficiency and competitiveness were to be improved by free training, enhanced education and capital grants, with prices buffered by deficiency payments when agreed prices were not met in the market. Initially at least, the idea was that this would be a temporary policy, recognising the lack of capital etc. in rural areas. However, even from the start the upland Less Favoured Areas were recognised as needing special (and ongoing?) help in the form of headage-based Hill Livestock Compensatory Allowances. Soon it became clear that the whole policy would have to be a permanent feature of rural life. Tariffs became an important part of the toolkit, so that by the time the UK joined the EU in 1973, its policies and the CAP were quite similar. Horses were not included in the new support framework, putting them into a policy vacuum where they remain today.

At the same time, technical development continued, in part independently of grants and payments. This period saw the final destruction of almost all of the semi-natural inbye grasslands as well as a huge expansion in the number of sheds and the quantity and power of agricultural machinery.

While joining the CAP in 1973 did not lead to an increase in total real terms price and direct financial support to farmers, it did lead to a large increase in production. A policy paper produced in 1975, after the UK joined the EU, was entitled 'Food from our own resources' (though the resulting intensive agriculture was in fact eventually became highly dependent on imported, often non-renewable, resources).

In the case of Dartmoor, the rise in sheep numbers was particularly stark – rising from 56,000 in 1972 to over 200,000 in 2002 (compare pre- and post-WW2 figures of 108,000 and 98,000). Numbers stabilised when quotas were introduced in the 1993 McSharry reforms, but at the new elevated level.

Up until the 1980s, there was hardly an environmental policy to speak of, especially in the field of agriculture. A landmark Act of 1949 set up National Parks and a Nature Conservancy (the first such agency) and designated good examples of habitats as Sites of Special Scientific Interest. However, the emphasis was not on the protection of biodiversity from agriculture, but rather on having somewhere to study ecology on a long-term basis, and having an body to do it. In the case of the Parks, the emphasis was on public enjoyment and landscape protection.

Environmental concerns started to impact in the 1950s in the field of agrochemicals, in part flowing from the work of the Nature Conservancy. But when awareness arose of the wider impacts of the 1970s and 1980s drive to increase production – the loss of habitats and declines in species on a massive scale – the impact on agricultural policy was minimal, thanks to the power of the farming lobby within and outwith Parliament and the civil service. The response was not to regulate agriculture, or steer it using the mainstream payments, but to compensate farmers for deviating not just from their current management but from their claimed future plans.

Agri-environment in England developed in this environment, but was surprisingly positively received from the start, despite the obvious tensions within the overall agricultural support framework – agri-environment paid for sheep removal from the moor, Sheep Annual Premium and Hill Livestock Compensatory Allowances paid for having them there. Most of these contradictory signals would survive until decoupling, first of LFA payments and finally of the

main direct payment supports. However, by that time, it became a given that the mainstream schemes could never be made to work for nature conservation. The HLCA was converted into a decoupled area payment (the Hill Farm Allowance), but with no extra environmental rationale; it was abolished soon thereafter, to be replaced by a 'broad and shallow' agri-environment scheme (UELS), itself also to be abolished as a waste of money.

The last period of laissez-faire was the 1930s; we may be about to embark on another one. But unlike the 1930s, the public now make a broad raft of demands on farmers - they are asked to deliver a more complex range of outputs than they were in 1945, for example. At that time the State considered that they needed a broad range of advice, support and financial assistance. Today, they are expected to deliver in response to an ever-decreasing basket of incentives and supports – one which may soon contain little more than agri-environment. Whether this is realistic remains to be seen, but one thing is certain - it has never been tried before.

Mid XXth Century: UK support for the livestock sector



- Left: 'Revival of a rundown mountain farm' – a meeting of the National Agricultural Advisory Service
- Above: Bickton College – Devon's new agricultural further education establishment

Post-war legislation introduced price support in most sectors and headage payments for breeding ewes and cows (Hill Livestock Compensatory Allowances) in the less-favoured areas. There was support for a whole range of capital works and improvements, underpinned by free extension advice from the National Agricultural Advisory Service. And Devon got another agricultural college, this time at the more vocational 'further education' level – Bickton College. Interestingly, it has never delivered training on hill farming systems, neither has nearby Duchy College in Cornwall.

The CAP regime for present-day Dartmoor

■ Pillar 1:

- Basic Payment Scheme paid at 2 rates – moorland and the rest
- No coupled schemes

■ Pillar 2:

- No ANC/LFA payments; no Natura 2000 payments
- Agri-environment
 - Countryside Stewardship is the currently-open scheme. Operates 2 Tiers – high priority Tier 1 includes all common land on Dartmoor; criteria for accessing lower priority Tier 2 are in general not conducive to farmed land in the rest of DNP
 - There are still some legacy agreements in place from previous agri-environment schemes – Higher Level Stewardship and Upland Entry Level Stewardship
- Other Pillar 2 instruments are hardly used at all to benefit Dartmoor farming, including HNV moorland systems

Dartmoor National Park, access, landscape and nature conservation



➤ A busy day even by Dartmoor standards – the 90km Ten Tors endurance event (NOT a DNPA event!)

Parallel to the establishment of permanent State intervention in agriculture, but completely separate from it, the 1945 Labour government also introduced the National Parks and Access to the Countryside Act 1949. The National Parks – Dartmoor was set up in 1951 - were designated in order to preserve and enhance natural beauty and or to encourage the provision or improvement of facilities for the enjoyment of the National Parks and for the enjoyment of the opportunities for open air recreation and the study of nature afforded by them. This was partly to be achieved by means of the planning process and by targeted investment in facilities etc. While land purchase was permitted in some circumstances, land ownership within and existing land use within the designated area was largely left unchanged.

The same Act provided for the formation of a Nature Conservancy – the first nature conservation agency in the UK, though its powers were limited in practice – and for the formal registration of public rights of way.

Changing commons governance



- A perception that a lot of livestock management on Dartmoor was poor led local farmers' organisations to found the Dartmoor Commoners' Association in 1953
- While central Dartmoor had not previously been considered common land in the strict legal sense, the land was registered under the Commons Act 1965
- The Dartmoor Commons Act 1985, created the first Commoners Council in England for self-governance of the commons

In 1953, the Dartmoor Commoners' Association was formed as a federation of the commons associations, with the aim of:

- protecting and regulating the interests of all entitled to graze Dartmoor's commons, subject to the rights of the constituent associations
- taking all necessary steps as may be necessary to further those objects

It was considered that the quality and quantity of stock produced from Dartmoor had been falling for some time and that improvement could only be effected by coordinated control by the commoners themselves. The Association was therefore concerned with both the standards of animal husbandry and the quality of the grazings. Progress on the latter was thought to be limited, with allegations of poor husbandry practice emerging in the harsh winter of 1962/3.

In response, the Association produced a set of recommendations, subsequently adopted by all the constituent associations, called the Nine Point Plan:

- Culling of old ewes
- Autumn dipping of all sheep
- Culling of old and unthrifty cows
- Weaning of calves at reasonable age
- Provision of fodder as conditions warrant
- Voluntary attestation of hill cattle as being free from disease
- Keeping of whatever pony type which suits the commoner, providing they are hardy
- Proper feeding and watering of ponies in severe weather
- Paying closer attention to the breeding of stallions and limiting of their numbers

Problems persisted however - over-grazing and under-grazing, poor animal health and husbandry, the incorrect use of grazing by right holders and the abuse of rights were widespread. At the same time pressures of public access and increased recreation were rising and there was a need to legalize such access with appropriate controls. Thus in 1974 the Dartmoor Commoners' Association approached the Dartmoor National Park Authority expressing a wish to see discipline imposed by law.

This legislation took eleven years to pass and the Dartmoor Commons Act was finally enacted in 1985. It provided for the creation of a Commoners' Council, which came into existence the following year. The Council is largely composed of farmers who have common rights and who are elected from within their local community (see fiche), and in the wake of its creation, the Association went out of existence.

The Council has to take such steps as appear to them to be necessary and reasonably practicable for the maintenance of the commons and the promotion of proper standards of livestock husbandry thereon (including the assessment of the number of animals which can properly be depastured on the commons from time to time); and in discharging that duty the Commoners' Council shall have regard to the conservation and enhancement of the natural beauty of the commons and its use as a place of resort and recreation for enjoyment by the public.

In carrying out those duties, it can engage in a very wide spectrum of activities, including the setting of regulations and entering into management agreements. It must keep an up to date register of commoners and their rights.

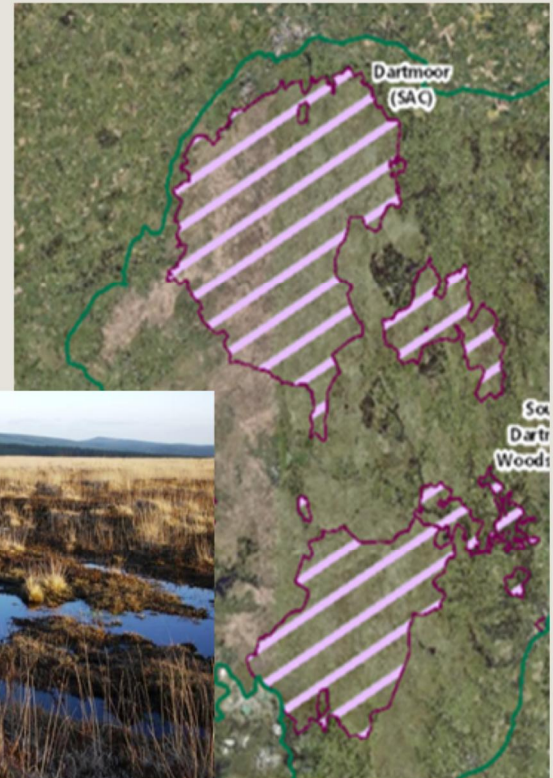
1990 to present day

Multiple pressures; new approaches; marginalisation or renewed purpose?

UK and European designations



■ Dartmoor SAC:
Qualifying Features
include blanket bog
(below) and European
dry heaths (left)



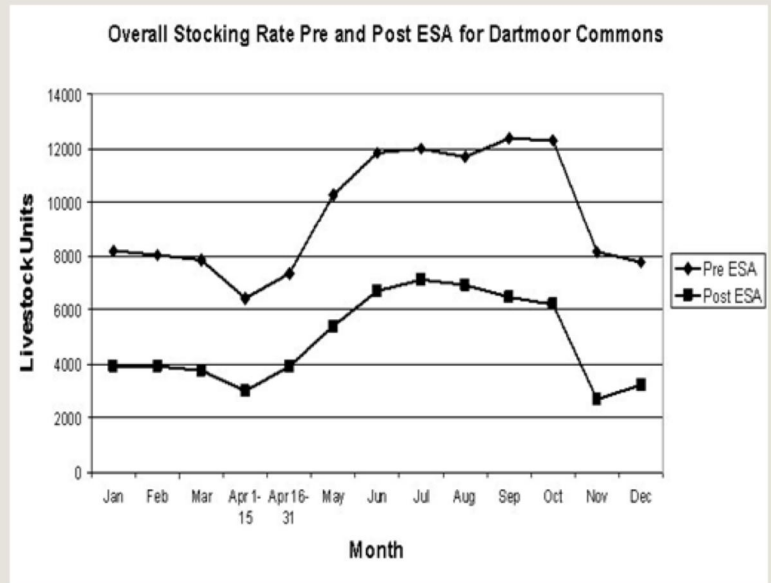
Although the designation of Sites of Special Scientific Interest had been possible under earlier legislation, the implications of designation for site protection was considerably enhanced under the Wildlife and Countryside Act 1981. Occupiers now had to seek consent before undertaking any one of a list of Potentially Damaging Operations. But while the State could enter into management agreements with occupiers, their logic was frequently based on compensation for not damaging the sites.

All terrestrial SACs under the Habitats Directive were, at least in England, underpinned by the SSSI designation (the UK never used the term SCI, even for sites still awaiting management plans). It took until well into the late 1980s and early 1990s for the legislation and designations to impact substantially on farming. Now there was to be no compensation for not damaging the site, while the authorities for the first time had a duty not only to protect the site but to define its Favourable Condition and to work towards achieving that through a management plan.

It could be argued that the main impact of designation has been to make it more likely that the moors will be targeted in agri-environment schemes, but even the full integration of these into a co-ordinated plan for improving site condition has proved surprisingly difficult; there are still no comprehensive management plans for all the sites.

Agri-environment

- First Environmentally Sensitive Area scheme under national legislation (before EU Regulation enacted)
- General trend since to national, less locally-adapted schemes, and to targeting to national priorities
- On the moor, agri-environment has been rather a 'one-trick pony', with tools primarily geared to overgrazing issues.
- Big success in reducing stock numbers, but less successful in promoting a positive vision
- Dartmoor Farming Futures pilot developed to increase local relevance by focusing on outcomes



In 1987 the first pilot Environmentally Sensitive Area schemes were launched and in 1994 the Dartmoor ESA scheme was made available to all farmers on Dartmoor. Cross compliance, introduced alongside the quota in 1992, had started to drive livestock numbers down to a more sustainable level and was applied in those areas where overstocking was evident. The ESA was offered, in part, to compensate for the stock reductions, and take up, slow at the start, was soon impressive, with almost 80% of the eligible land under an agreement by 2004.

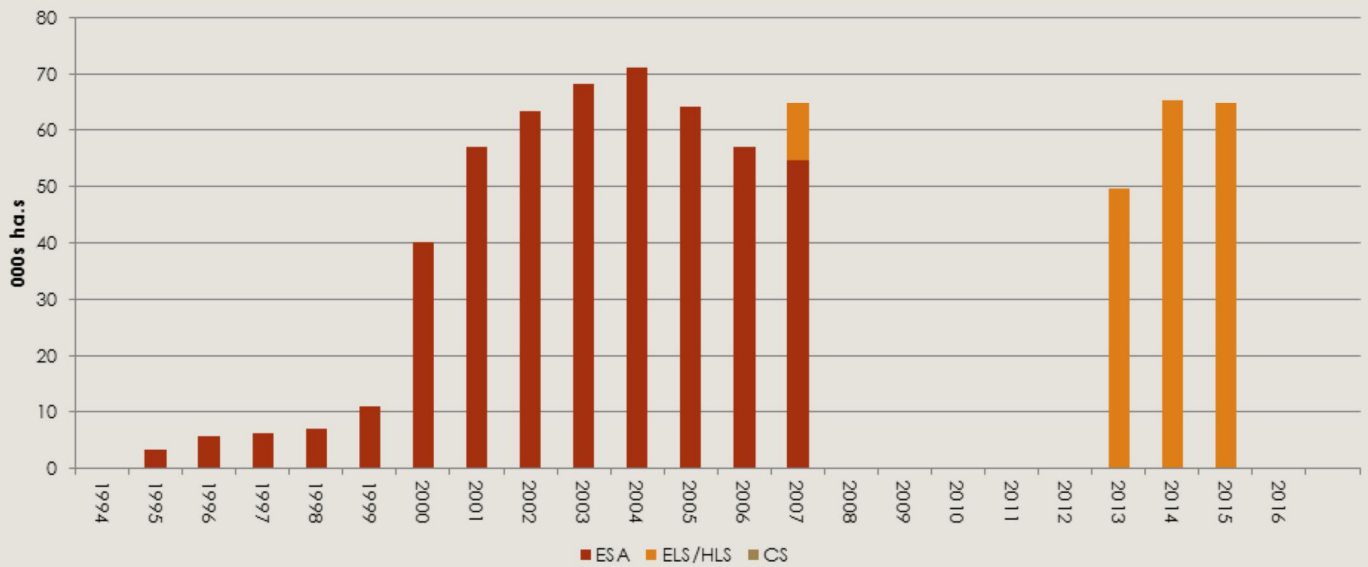
The ESA and subsequent schemes (Environmental Stewardship and Countryside Stewardship) all sought to reduce stocking levels, especially for sheep. There was a focus on heather recovery and sheep, and to some extent cattle, were thought to be preventing heather recovery due to the grazing of new heather shoots in the winter, so most agreements were predicated on winter stock removal or a significant reduction in numbers.

One of the most significant benefits to arise from the AE agreements was the reduction in wild fires. Whilst the threat of penalties for those suspected of starting a wild fire increased for those party to an agri-environment agreement (and especially when cross-compliance was introduced as a condition of receiving direct payments), the training encouraged by the agreements together with a fire plan being required to accompany each agreement has contributed to a marked reduction in the number of fires. Commoners are now trained to work alongside the fire fighters and capital items such as foggers can be purchased with AE money.

Concerns over the effectiveness of current prescriptive, management-based agri-environment models led to the innovative Dartmoor Farming Futures pilot project in 2004/5. The project:

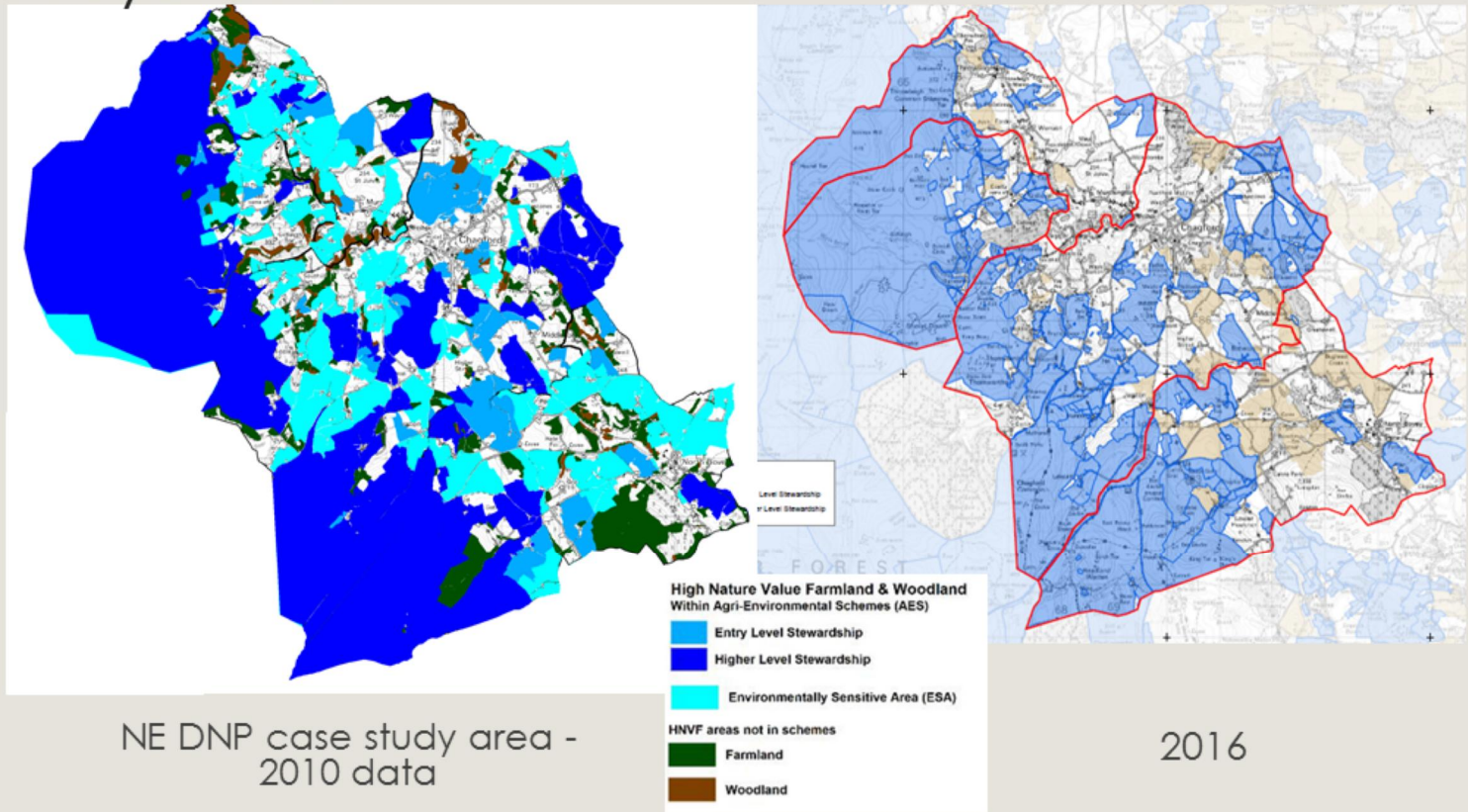
- Offers farmers and landowners more responsibility for the design and delivery of agri-environment schemes;
- Focuses on the complete range of public benefits (ecosystem services) that are associated with upland farming (from food production to carbon sequestration) and identifies priorities for particular spatial areas; and
- Facilitates a collaborative approach to agreeing the outcomes sought, delivering the management required and assisting with the monitoring of the process.

Area of Dartmoor under an agri-environment agreement from 1994 to 2016



Graph to be completed

The effects of increased 'targeting' of agri-environment payments – loss of coverage of inbye land

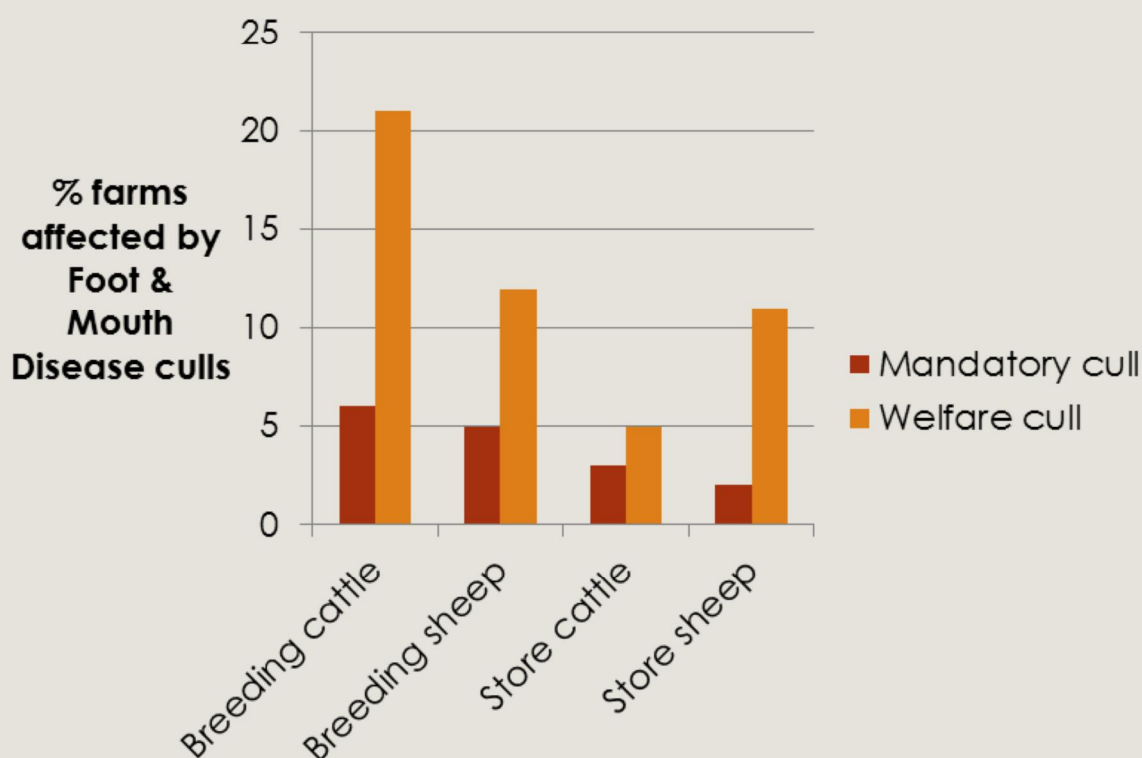


The trend in recent years has been firstly towards fewer and fewer schemes and then towards ever-greater 'targeting' of schemes. Support for the uplands used to be delivered by LFA and agri-environment measures (themselves regionally differentiated in their first incarnation, later being split into a more general level and a higher level for priority areas).

More recently, both LFA and the upland entry level agri-environment meant to replace it have been abolished, and while the current agri-environment scheme (the only Pillar 2 area payment now available) has in theory got a high and a medium priority targeting system, only the former seems to be accessible in practice for farmers in DNP.

The result is that common land in Dartmoor remains in schemes and is able to access new contracts when the old ones expire, other land is gradually falling out of AE as old Upland Entry Level Stewardship contracts come to the end of their lives.

Impact of livestock diseases



The extensive grazing of the commons is considered by most farmers to be a healthy place for their stock. The exception is the tick borne diseases, particularly red-water fever, that affect cattle that are new to the moor and have little resistance. The really significant impact of animal diseases is most usually apparent when livestock are wintering away from the moorland in sheds, or lowland fields where they are more likely to come into contact with infected livestock and wild animals. The impact in recent years of animal disease, especially bovine TB and control regulations on moorland farms has been huge.

In early 2001, Foot and Mouth Disease (FMD) was recorded on a farm in the north of England; by March of that year, it had been reported in Devon and before long many livestock farms had all their cattle and sheep culled. The loss of herds and flocks that were hefted to the moor was an additional burden for the hill farms on Dartmoor and many farmers considered giving up farming. After the outbreak was almost all affected farmers continued to farm although the replacement of culled animals was for some farmers an opportunity to change breed type and make changes to their farming system. The impact of this disease outbreak was very significant and the real fear that farmers would abandon the moorland led to several studies intended to help the farmers remain, leading directly to the Dartmoor Vision and indirectly to initiatives such as the Hill Farming Project and Farming Futures.

Dartmoor, and the rest of Devon, is in the high risk area for bovine tuberculosis (TB). The direct impact of this disease on cattle is significant, but so also are the consequent restrictions on cattle movements, including between common land and the farm. In addition, such a high risk area has a complex testing regime, the burden of which impacts on the number of cattle on the moorland. In 2010 a survey of farmers in SW England, including Dartmoor, established that 75% of hill farmers had been under TB restriction at some time during the previous two years. At that time there were over 500 TB restricted herds identified in Devon. When under restriction farmers are unable to sell their cattle and calves through the usual livestock auctions and markets. The farmers may have to retain their cattle on the farm until the animals have tested clear. This situation has led to farmers keeping fewer cattle to avoid have animals in excess of the carrying capacity of their available land or buildings.

Ironically, most of the key players in disease control locally now recognise that the commons are the area of lowest infection and transmission risk, so a control system which keeps livestock inbye works against biosecurity. To enable the state veterinary inspectors to carry out a risk based analysis for each common, a TB Control Plan has been designed and implemented for each common on Dartmoor. This has reduced the potential testing burden whilst ensuring the cattle were not subject to increased risk of exposure to the disease. It is however a continuing struggle to keep an awareness of the special circumstances of common land use alive in the mind of senior administrators centrally; for them, simplicity and uniformity too often seem to be ends in themselves.

TB has had some impact on farming systems, for example, in encouraging farmers to finish livestock at home instead of depending on a strategy of selling store cattle, which could be heavily impacted by movement restrictions and where the presence of TB in the area will reduce the number of potential buyers.

Livestock numbers on the moor today



➤ Cattle:

Late summer peak
number = 5100

Few (c.50) winter on the
moor

(10,000 in 1985)



➤ Sheep:

Mid summer peak
number = 26,000

Wintering number
approx. = 10,000.

(51,188 in 1985)



➤ Ponies:

Present all year
=1200.

(2,250 in 1985)

Farming systems on hill farms – back to the future?

- Use of the moor much more seasonal, as it was before the 19th innovations
- Significant differences:
 - Extremely low sheep numbers, but ewes not wethers, geared to lambs not wool and still dominated by the 'new' hardy breeds
 - Extremely low cattle numbers, but breeding cows not drystock, with a higher proportion of hardy breeds
 - Almost certainly the lowest numbers of ponies ever
- To the extent to which the moorland has a separate system, it competes with the inbye system for resources
- There is a substantial inheritance of buildings and other capital investments from the last 40 years which still influence decision making
- High dependency on subsidies, but based on rewarding the delivery of public goods (natural capital).

In some ways, the situation created by agri-environment schemes and decoupling of direct payments (there is no LFA/ANC scheme in England) seems familiar – a much more seasonal system than had developed in the early 20th century, harking back to the previous traditions of transhumance.

However, the current system is different in some important ways:

- Total numbers of sheep on the moor are at an all-time low, and is dominated by ewes rather than wethers
- Total numbers of cattle on the moor are at an all-time low, and is dominated by breeding cows rather than drystock
- Number of ponies is extremely low, with clear impacts visible on the vegetation they formerly kept in check
- Proportion of hardy, low-productivity breeds depastured on the moor much higher than in old system

There has been intensive management of the inbye system (and its infrastructure), so that the common is less of an opportunity for cheap summer pasture for animals which are part of the most productive system on the farm and more of a low-productivity competitor for scarce and/or expensive winter resources (see below)

There is little incentive for change. The capital investment made under different circumstances to house cattle in winter has in some instances reduced the desire for new approaches or alternative farming systems.

Summer grazing of cattle on the moorland and winter destocking of sheep requires alternative housing or grazing during the winter months. Increasingly the cattle, and to some extent sheep, that graze the moorland are additional to the animals kept on the farm inbye, often for finishing. When livestock leave the moor, there are a number of options (inwintering using farm-produced fodder; wintering using bought-in fodder; away wintering...), but all of these have a cost, including in some cases the opportunity cost of not using those resources for the inbye livestock further afield onto rented grassland or, in the case of cattle, into specially-erected buildings.

The focus on the high ecological value of the moorland has repeatedly seen each generation of agri-environment schemes targeted to the moorland. Achieving the prescriptions required by these schemes has often come at a cost to the farm land around the moorland. These farms, providing grazing livestock on the common land often have separate flocks of sheep and herds of cattle separate from the moorland stock. The farm stock are usually animals with the potential to be finished (fattened) on the farm; a more profitable practice and one that can reduce the adverse impact of animal disease, especially bovine TB. However finishing stock comes at a price and requires intensification of the grassland resulting in impoverished environmental condition.

The farms are highly dependent on subsidy. Formerly a significant fraction of those were linked to livestock numbers; now they are all decoupled. It is likely that farmers are having to make decisions as to whether and how to cross-subsidise the various system on the farm, but the details of these considerations are far from clear (and worth investigating).

Implications for moorland habitats



- The very significant destocking of the moor has led to an increase in the growth of vigorous, dominating species including purple moor-grass *Molinia caerulea*, western gorse *Ulex gallii* and bracken *Pteridium aquilinum*,
- This is potentially inconsistent with achieving a Favourable Conservation Status for Dartmoor's designated habitats
- It could also create a vicious spiral of decline and underuse for hill farming, especially if the economics of using the moorland are unattractive

Picture: rank *Molinia* on wet heath

If grazing the moorland is not financially viable then farmers will eventually focus on their farmland and the moors will be under-grazed. This is beginning to happen. Link back to decline in animal numbers = increase in vegetation that soon becomes less palatable which increases change whilst causing some areas to be over-grazed. Nitrogen deposition may be exasperating the situation and working against heathy plants.

Molinia caerulea is a vigorous deciduous grass only palatable in the spring (May/June), which tends to grow into tall tussocks which come to dominate large areas of wet moorland if left unchecked by cattle or pony grazing.

Ulex gallii is a characteristic plant of western heathlands for which Dartmoor is of global significance. However, if left ungrazed its hummocks expand until they take over almost the whole area, shutting out further grazing and becoming a fire hazard. In the past, areas with lots of gorse were favoured as leas for ponies, since it would maintain them over winter. The collapse in pony numbers is likely to lead to a significant expansion in areas of rank gorse.

Pteridium aquilinum is not palatable to livestock, but is useful as livestock bedding. It is susceptible to control by trampling. Destocking, especially of the heavier cattle and horses, coupled with a reduction in the area mown for bedding, has led to an expansion in the bracken area and to the vigour of the bracken. Bracken areas do have some conservation value, not least for some are butterflies, but the wider issue, as with the other dominant species, is the apparent lack of vision and objectives for land cover and land use.

Responding to the challenges – Dartmoor Hill Farm Project



- Developed as a result of the post-foot and mouth disease reports commissioned by the DNPA
- Responds to a perceived need for information, assistance, training and support for innovation and skills development
- Also carries out a range of temporary projects
- Initially funded by Rural Development Programme, but for a fixed term. Now largely dependent on Prince's Countryside Trust and National Park funding and is financially vulnerable

The post-war state National Agricultural Advisory Service was rebranded as ADAS in 1971 and was privatised in 1997 and worked only on twelve themes, of which only animal health had any relevance to livestock farming. The loss of a comprehensive advice provision for hill farmers was a significant blow; in 2002 a farmer survey on Dartmoor found that 30% thought the availability (or lack of) appropriate advice was a major issue.

The survey of Dartmoor's farmers in 2002, commissioned by the DNPA was a pivotal moment for farming on Dartmoor. The DNPA required information and evidence to ensure that farming within the National Park continued whilst recognising the significant challenges that the agricultural industry faced; lack of policy support, struggling farm businesses and tourism damaged by the recent outbreak of foot and mouth disease (FMD). Along with the findings previously mentioned the recommendations included developing the "Moor Futures" initiative to address many of the problems facing hill farmers that were identified during the survey.

The DNPA had promoted "Moor Futures" as a description of a range of initiatives targeted at and for the benefit of hill farmers. In response to the recommendations the Moor Futures developed into two initiatives, including the formation in 2003 of the Dartmoor Hill Farm Project (DHFP) with a specific remit to offer advice to hill farmers. [The other strand led to the Moorland vision and Dartmoor Farming Futures - see Vision, below.]

Part of a wider suite of three similar projects in the South West uplands, the DHFP was funded under the 2007-13 Rural Development Plan and by contributions from the DNPA, Duchy of Cornwall, The Prince's Countryside Trust and the now-defunct Regional Development Agency. The broad objectives of the DHFP have been:

- to bring about improvements in the competitiveness of each individual livestock sector to help them compete in the marketplace
- to assist farmers in meeting their changing responsibilities and facilitate improved animal health and welfare
- to provide support for farmers in enhancing the efficiency and effectiveness of on-farm management

Current DHFP activities include:

- Acting as a central hub for Dartmoor farmers for a wide range of enquiries and assistance
- Sending out regular newsletters with relevant information and topical issues to 400 farms
- Offering information, advice and signposting on funding and training
- Organising training and farm walks and talks for farmers on Dartmoor
- Organising study tours to see best practice elsewhere
- Developing projects to benefit Dartmoor farmers and support the farmers to develop their own projects
- Supporting farmer networks, such as the Dartmoor Women in Farming
- Development of Moorskills, an apprentice training scheme for young farmers

Unfortunately, when it came to funding, the Project has been treated as just that – a time-limited 'project' rather than an essential on-going service for Dartmoor farming. Rural Development funding finished and the project had to depend on the DNPA, charitable trusts and funds (again, 'project'-related) from the state lottery. The result is a cut in funding in real terms and a scaling back of its activities.

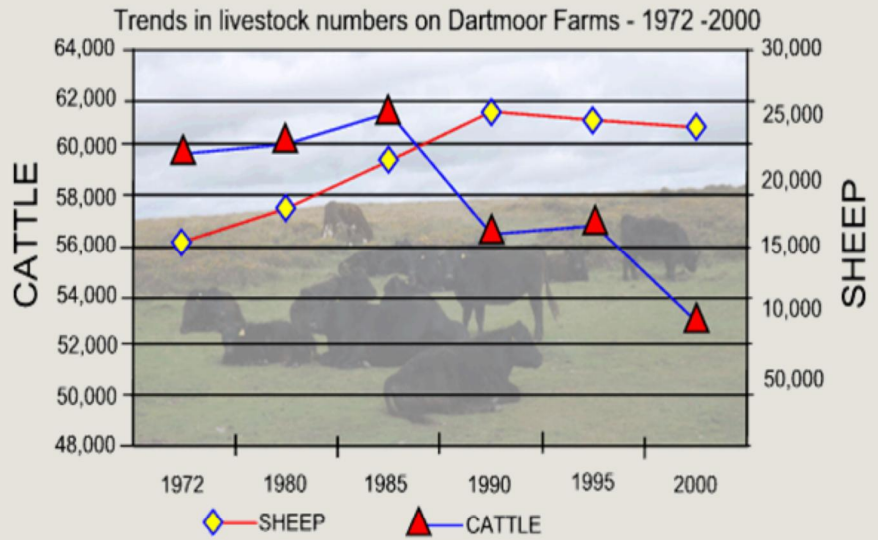
Further information and newsletters at this and associated web pages:

<http://www.dartmoor.gov.uk/livingin/li-hillfarmproject>

The business as usual scenario

(unlikely)

- High reliance on support
- Fewer grazing animals on the moorland, and possibly fewer active graziers
- Significant changes (adverse) to the moorland's vegetation and biodiversity
- Further intensification of home farm and enclosed land where feasible, but few areas left where this is possible



Data from 'The State of Farming on Dartmoor 2002 - The University of Exeter

Brexit means change is inevitable...

Possibly, further uniformity of policy, often inappropriate to moor
Possibly, continuing lack of clarity on desirable stock numbers, mix etc.
Possibly, further separation of inbye and moor system
Possibly, more marketing of produce but with what safeguards?
Possibly, continuing vegetation change
Possibly, continuing lack of advice & appropriate education and moor-relevant narrative of 'good farming'
Possibly, continuing policy limbo for ponies
Possibly, loss of critical mass for various services etc.

The immediate crisis – what world post-Brexit?



- Possibility of tariff and non-tariff barriers to trade with the EU
- Possibility of lower tariff and non-tariff barriers to trade with global competitors, particularly New Zealand lamb
- High probability of loss of direct payments
- All ongoing financial supports potentially put into agri-environment
- Agri-environment itself likely to be 'targeted', possibly so tightly as to exclude even inbye on hill farms

It has been calculated that trading with the EU at WTO tariff levels could add up to 40% to the cost of lamb exports. Lamb imports from New Zealand are already a focus of loud complaints; in a free trade agreement, the UK could be tempted to free up import controls and tariff barriers, further increasing the competition in the UK domestic market.

In the UK, and England especially, the narrative seems to have moved firmly to one where no direct payments are available as of right; their importance to farm output and especially to net income on hill farms on Dartmoor was demonstrated previously.

Payments for services would seem to be the main focus of discussion on policy going forward. However, Dartmoor's experience shows not only how inappropriate and ineffective some of the existing models traditionally used in England can be, but how 'targeting' – likely to be another major theme of policy – can lead to the exclusion of all but a small proportion of the farmed countryside, even inside a National Park.

The social and rural development driving forces



- Continuing high desirability of living and retiring in Devon and of commuting from rural villages to work in the towns and of rural homes with 'paddocks' – affordability continues to drop
- Continuing growth in rural tourism but with minimal benefit to farming on the moor

At least 4 important issues –

1. increase in recreational activity = impact on farming/stock.
2. Ever more unaffordable housing = less people to work on farm & succession
3. tourism impacts but no reward to farmers for disruption etc. and
4. high land prices prevent young farmers starting up their own business.

Also significant is the poor internet service, which reduces employment opportunities

The economic driving forces: food chains and markets



- Continuing reduction in consumption of red meat (esp. lamb) in favour of white meat
- Lack of differentiation of product produced locally and especially of meat produced extensively
- Continuing domination of agri-food business in meat food chain; low impact of farmer groups

Conformation score	Fat class				Overall
	2	3	4L	4H	
U-	76.5	73.8	71.7	70.4	73.1
R	74.8	72.1	70.0	68.7	71.4
O+	73.1	70.4	68.3	67.0	69.7
O-	71.7	69.0	66.9	65.6	68.3
P	70.8	68.1	66.1	64.7	67.4
Overall	74.1	71.4	69.4	68.0	70.7



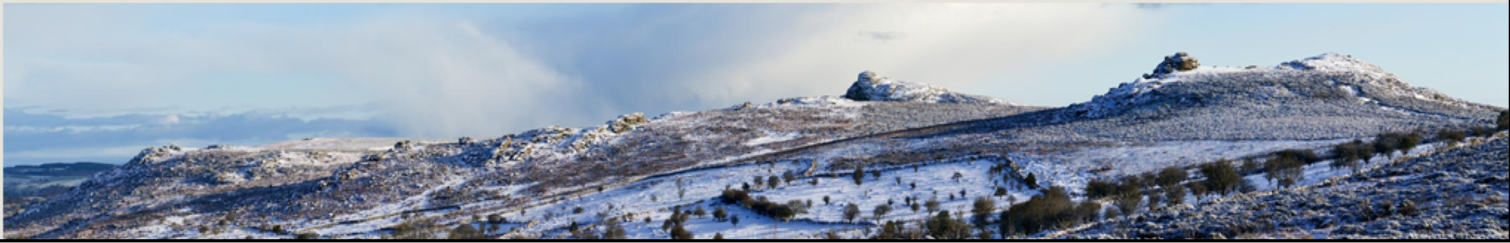
The whole SW England region, not just Dartmoor, is a meat exporter, producing very high volumes of generally undifferentiated product. Specifications from the slaughterhouses and butchers and wholesalers are generally uniform and, in the case of beef, are difficult to achieve on a Dartmoor hill farm without feeding at least some concentrates.

Farmers are 'price-takers', whether at the abattoir or at the fatstock or store mart – the price is very much set by the bulk-buying purchaser. Farmer attempts to overcome this by working together have thus far not succeeded and there is no sign that this will change (at least at 'big picture' level).

The (lack of) economic driving forces: public goods and farming



- A range of ecosystem services at least partly provided by appropriate farming remain public goods including:
- Clean reliable drinking water; flood prevention; carbon storage; cultural landscape



The farmed landscape of Dartmoor's moorland provides array of public goods & benefits, including: 6% of England's archaeology, 92 million tonnes = stored carbon, drinking water to 1million people in 2007 and public access over 47,000 ha. Tourism is hard to measure, but is undoubtedly substantial. None of these are directly (and largely not even indirectly) rewarded in agri-environment or other forms of public financial support. There has been much talk in policy circles of Payment for Ecosystem Services (not least perhaps as a way of reducing the expectation that Government is the only possible source of support for the otherwise unviable providers of those services), but there are few if any examples of successful implementation of PES schemes.

The policies and political driving forces



- Lack of political interest in rural issues and farming.
- Some appreciation within Government that upland farmers (including hill farmers on Dartmoor) provide an array of public benefits alongside their farming activity that may lead to some continuation of support (though at reduced levels).
- Animal diseases, especially TB, may drive cattle farmers from the moorland unless the regulations are more sympathetic to extensive grazing systems.
- Delivering good condition of Natura 2000 sites and UK designated wildlife sites requires land management delivered by farmers. This is poorly reflected in policy and Government action.






Brexit will expose the level and nature of engagement with, understanding of, interest in and value given to hill farming on Dartmoor, whether from a more traditional farming/food perspective or the more recent public goods/ecosystems services point of view. Everyone seems to have accepted that support for farming will drop markedly; still unresolved are whether that means a drop for 'high priority' areas (of which Dartmoor's moorlands will surely be one) and whether the form any support would have would be appropriate and workable – potentially, a lot of eggs would be put in just one basket, and a basket with a rather uneven delivery record at best.

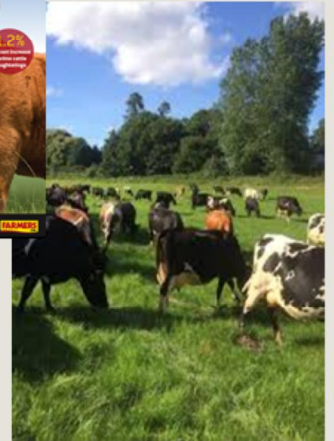
TB illustrates many of the fears of the friends of HNV farming. Farmers say that the problem is not so much the disease, but the measures put in place to try to control it, which are often unworkable and unrealistic while at the same time making little or no biosecurity sense. Regulatory impact assessments (for example, in the context of environmental and other wider policies) seem not to feature in decision making, while 'simplification' takes on a totemic role, undercutting local solutions which work for both farming systems and disease control, prompting suspicions that decisions are actually motivated by the desire to cut spending, and adding to the feeling that Government doesn't understand nor want to understand.

If Government does know what it wants, it is often poor at communicating it and at providing the means to delivery it. The Favourable Status of sites designated for nature conservation is a case in point. It has failed to build on the excellent Dartmoor Farming Futures initiative, which both engaged with farmers to describe and agree desired outcomes and provided a flexible framework within which that could happen.

The farming narrative as a driving force

Carcase conformation

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- Received wisdom of what 'good farming' is continues to glorify the intensive lowland farm, its products, its inputs, its machinery
- This continues to be the message given by the agricultural press, agricultural education and training; agricultural shows; Young Farmers' Clubs etc.

A certain type of farming is essential to provide public benefits in DNP. It imposes constraints on farmers' aspirations or at least on how economically-realistic it is to achieve them. Those aspirations are sometimes driven by the market – the specifications demanded by slaughterhouses, for example. But many are driven by the mentality of farmers, the social pressures of their peers and the process by which they came to that way of thinking, including the farming press, agricultural education, agricultural shows, Young Farmers' Clubs' activities, and so on. Given the lack of sharing opportunities provided in other places by things like farm discussion groups and monitor farms, the danger is that the discussions held with the accountant about the realities of farm economics and the choices facing the farm are hard to fit into the 'default mode' of farming thinking. This is a real challenge for hill farming on Dartmoor.

Consequences for farm economy

- Assuming Business as Usual before Brexit:
 - Relief but extremely discontent?
- Assuming Brexit leads to substantial change in agricultural support:
 - Scary, especially if everything else remains constant
- Assuming Brexit also causes huge disruption to trade, esp. of sheep meat:
 - Nightmare – something would have to change! Wouldn't it....?

It is very difficult to get a clear picture from farmers, since their mental approach (optimism, determination, for example) is hard to disentangle from their actual situation and from the range of possible options which are realistically open to them. One farmer admitted that what he and members of his family felt and aspire to varies considerably, and all find it difficult to grapple with what their accountant tells them is the actual situation. Someone said that it's very difficult to know what to think when one farmer says that his hill cow is making him a massive loss, while his neighbour says that she is an extremely valuable asset which he can't afford to lose.

Farmers admitted to us that they value things like:

- Adapting to survive, as all their antecedents had done
- Maintaining or increasing stock numbers (to reduce them is a sign of decline, pure and simple)
- Farming all the land 'properly' (which can be a safeguard against abandonment, but also make deintensification difficult)
- The price they obtain from slaughterhouses/at the mart

Farmers are clearly not 'economic men' in many of their decision-making. They are certainly adaptable and many of them are very determined; this determination may yet pass to yet another generation. Yet it is difficult to ignore the evidence of history and of other areas and to conclude that Dartmoor hill farming won't be severely threatened by the potential impact of Brexit.

Farmers told us that a loss of support and/or increased competition would force them to look to their technical laurels and become more efficient, cutting any superfluous spending. We asked them why, if they could imagine such a viable system, they didn't implement it now, alongside the support payments; they were unable to explain this to us. But the answer perhaps lies in the non-financial things they value – they could potentially give up on some of these, 'cashing them in' for extra finance. We find it difficult to believe that the tens of thousands of pounds of savings it would need in some cases to make up for the loss of direct payments could be so easily found.

Another big unknown is what would happen to costs. At present, land prices are seemingly irrationally high – would they drop in the worst Brexit scenario? On Dartmoor, rents are a big issue – rents are increased everytime a tenant goes into agri-environment, for example; will they be decreased if direct payments are lost?

And finally, farmers are not at all clear what would happen to regulation. Some, probably more in hope than expectation, say that without payments there is no justification for high standards, especially if there is freer trade with the rest of the world. But while some regulation is undoubtedly linked to the post-CAP settlement, others, such as for TB, are very much home-grown, addressing a real issue but imposing very high – possibly unnecessarily high – costs on Dartmoor hill farming.

Consequences for land-use and biodiversity

- Rewilding/abandonment unlikely
- 'Rational' stocking rate on moorland far from clear – could depend on TB rules as much as anything
- Lot depends on what AE measures are available and how well they work
- High possibility that vegetation change will continue otherwise – perhaps towards polarisation
- Very unclear on implications for inbye, but unlikely to have any marked positive for biodiversity given low starting point and not clear whether inbye changes would impact on moor

The starting point for the moor is the 'free' summer growth. We suspect that there will always be systems which take advantage of this, but without taking on any additional costs if possible. The one big caveat is the TB testing/movement regime – this has the potential to be a major disruptive influence if not handled appropriately.

This implies that rewilding and large-scale abandonment is unlikely; where abandonment has taken place, it tends to be where smaller farms have been sold out of farming families. But it may still imply a continuation of present negative trends in *Molinia*, *Ulex* and *Pteridium* and, if agri-environment is lost, possibly an increased pressure in some areas, possibly creating an even more polarised land use, probably to the detriment of biodiversity.

If agri-environment is retained, it seems likely that all of the policy eggs will be in that basket, so the pressure on it to succeed is high and its vulnerability to its current weaknesses is also enhanced.

While we are not sure that farmers would agree with us, it seems to us that the inbye would probably see more change, since that's where the cuttable costs are higher. It is quite possible that the inbye systems will become less intensive, though not necessarily more linked to the moor than at present (some are, some aren't...). But the likely positive impact on biodiversity should not be overstated, given the inertia in highly-fertilised permanent pastures on heavy soils.

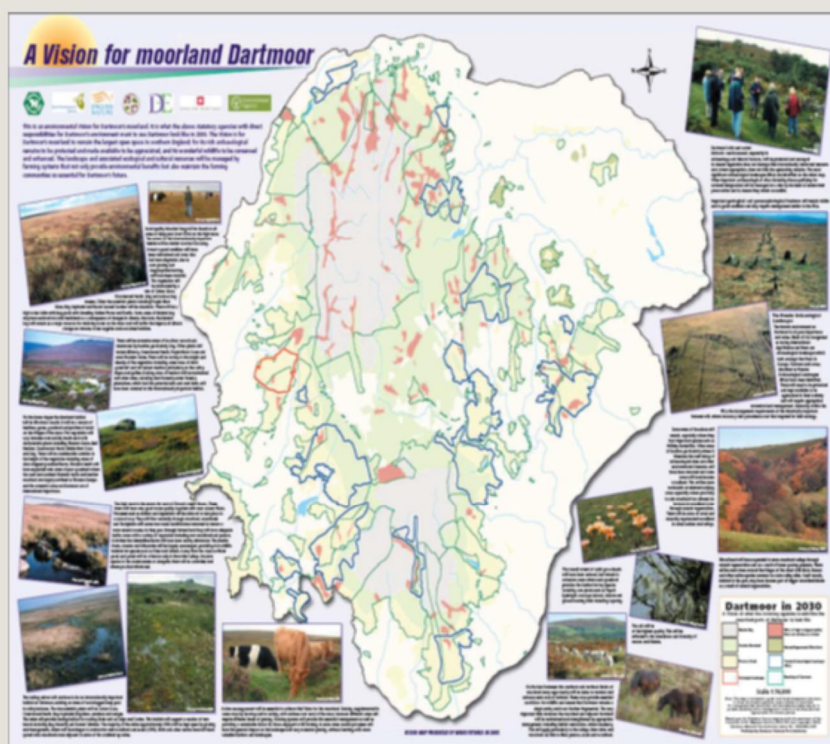
One thing which might be forced to emerge is more part-time farming, which could bring with it a new set of aspirations and evaluation criteria. This could be a double-edged sword for low-output systems, however low-cost they may be.

The HNV vision

Economically and socially viable HNV systems

Farmed biodiversity-rich landscapes: the Dartmoor Vision for 2030

- The agreed vision for 2030 already exists and was meant to guide delivery, especially AE agreements and resolve potential conflicts over what was to be delivered on each area.
- Includes:
 - Selected Habitats & geology
 - Water
 - Carbon
 - Archaeology
 - Landscape and access
- It describes a farmed landscape, delivered through active, viable farming systems producing food.
- Endorsed by all the relevant Government agencies and Dartmoor Commoners' Council representing the farmers.



The Dartmoor Moorland Vision was produced in 2005 following consultation with all the relevant statutory agencies following concerns amongst the farmers that there was a lack of a long term vision and the potential for conflicting demands on areas of moorland. An independent facilitator secured agreement between the agencies on the principle outcome for all the moorland (usually nature conservation and/or archaeology). Described further in the innovation fiches, it includes broad objectives for all of the moorland habitats; though not informing policy as clearly and directly as it might be, the Vision and its elements remain valid today and are taken by this project as the HNV Vision for the Dartmoor LA.

What needs to be addressed?

Techniques and technologies

- This has *not* been the focus of innovation in recent years but
 - Is seen as central to the next few years by farmers
 - Fits in well with their narrative of individuality and determination, and of 'every farm is different'
- Appropriate technologies and techniques appropriately applied need to be developed, disseminated and nurtured
- 'Appropriate' means enhancing the economic and social viability of systems using semi-natural vegetation, maximising their positive ecological impacts while minimising any negative impacts
- To what extent is the limited application of new technology and techniques a reflection of the needs of the system and to what extent the limitations of R&D focus etc.?
- Clear link to idea development and knowledge transfer structures

In the 18th-early 20th century, innovation on Dartmoor was very much focussed on techniques and technologies – the introduction and development of new breeds and of systems to make best use of them, for example. However, in recent years, at least for the moor-based systems, the innovation, for better or worse, has all been on things like regulations, schemes, institutions, with a modest amount of activity on products and markets.

It was therefore very surprising to us that our focus group of farmers stressed first and foremost the need to innovate technically in the years ahead, seeing this as the only way to improve efficiency and (with the exception of the one-off investment grants they thought should return) to be free of the tyranny of schemes and their restrictions.

It has not so far been possible to make an organised list of innovations desired under this heading (perhaps it was in part a wish to see such appropriate innovations emerging that was being expressed, rather than an awareness that they exist and need to be transferred), but examples given included flock genetics testing and virtual fencing using phone apps and livestock collars.

What needs to be addressed?

Schemes and regulations

- Maximum clarity of vision, integrating objectives on a local scale and with reference to real farms and their social and economic circumstances
- Risk-based regulatory environment, internalising former negative externalities but not imposing pointless burdens
- Less atomised approach to policy needs (e.g. Integrating not just agriculture and environment, but advice, education, research and other activity of the wider state in the locale)
- Encouragement using a variety of mechanisms for the internalisation of positive externalities, especially where they have a real financial benefit to society and are delivered at a real financial cost to farmers
- Net aim is to ensure farmers are adequately rewarded for the achievement of biodiversity and other 'public good' objectives, so payments 'fill the gap' where and for as long as above steps are inadequate

When it came to what needs to be changed, the farmers' message was very clear – the way current scheme rules and other regulations impact on their management decisions and farm economies. However, it was not so clear that they thought of this as a possible focus for innovation, despite the progress made in quite a few policy areas on Dartmoor. This possibly reflects a failure to mainstream some innovations (Dartmoor's Farming Futures), or a perceived tendency to roll back on others (TB plans?). Others were valued and recognised as being good (fire plans and associated activity), but were perhaps not seen as addressing the fundamental issues.

Our perspective is that there is much scope for major and positive improvements, not least by rolling out properly the excellent pilots and experimental approaches which have been trialled on Dartmoor. Given that farmers often do not disagree with the objectives of schemes and that agri-environment income is not only important at present, but likely to become even more so in the near future, it seems to us that this has to be one of the major focusses of the project.

What needs to be addressed?

Social and institutional

- Only seen as important by farmers when pressed – they are used to not having a well-functioning system, but also maybe in reality don't see the value for them?
- Some farming advice is provided by the DHFP but this resource is vulnerable and does not address all issues
- Education suitable for hill farmers and potential hill farmers is very limited. Research into farming in the uplands is almost non-existent.
- In the recent past Dartmoor farmers have used existing organisations (NFU & CLA) and new locally formed groups (SWUF) to lobby politicians and Government for appropriate policies. The DNPA and the Dartmoor Commoners Council may have a role in the future.

In our discussions, it seemed that farmers are clearly not used to thinking in terms of institutions, but are very individualistic. For example, the picture as regards collective learning was very confused. The Dartmoor Hill Farm Project was set up partly to fulfil this perceived need, but many training courses fail to attract attendees – are these the wrong format, or addressing the wrong questions? The Moor Skills apprenticeship programme was much praised, and seen as delivering benefits for the farmer hosts who had to start discussing their farms with each other, yet the idea of a farm discussion group or series of monitor farms where farm accounts and management decisions are discussed was treated with suspicion – perhaps something new would benefit from visiting elsewhere? The experience of the study tour to Lenk in Switzerland many years ago clearly continues to inspire farmers, but no one seems able to take this forward, if only to organise further exchanges.

Dartmoor Commoners' Council was an extremely innovative development, albeit one which settled into a modus operandi which was much more limited in scope than its founding Act allowed for. On occasion, farmers seemed to have aspirations for that to be the focus of more social and institutional innovation, developing innovation in other areas as well, but they seem unable to grapple with how to take it from what it is now, with the capacity in terms of staff and governance that it has now, and change it into something more.

Dartmoor National Park has been a real driver of positive innovation, sometimes backed by funding from various funding streams associated with the Duke of Cornwall, but it is regarded with suspicion, even open resentment, by many farmers. As well as complementing the DCC on aspects of management and use of the moor which don't come under that body's responsibilities, it covers the areas of the park, including the hill farms themselves, where DCC's writ does not run. There is clearly an opportunity to do more and better, and in a way which better engages the farmers.

The State is another potential source of innovation, but seems to be becoming ever more centralised, with apparently-efficient standardised approaches. However, the search for value for money could bring a renewed appreciation of approaches which are tailored to local circumstances, local costs and impediments and which not

only work towards locally-appropriate results but actually tries to deliver them. If so, improving the way farmers and others interact with the agricultural, animal health and environmental would seem essential; perhaps innovative models of joint working are needed and can be seen elsewhere?



What needs to be addressed? Markets and their underpinning

- Increased returns from truly HNV systems are a key factor in their survival, development and blossoming
- Increasing demand for properly and meaningfully differentiated products is vital
- Non-farming or ancillary products, including the internalisation of positive externalities into the farm economy, should be encouraged where consistent with wider policy goals
- The internalisation of negative externalities into farming systems in general is a necessary complementary measure in the long term

Before meeting with the farmers to discuss this Baseline Assessment, we thought that while we would focus on regulations, schemes and institutions, their first thought would be on obtaining a better price for their product through marketing initiatives of various types. Nothing could have been further from the truth; while there would be agreement on the need for a better price in general, we were surprised with the lack of focus on local (individual, group marketing etc.) initiatives. It became clear that this was not for the want of trying them, but reflected a feeling that the effort was not rewarded – it was just too difficult and did not repay with extra work.

What is clear however is that a large amount of money is being spent in and around Dartmoor every year, capitalising on the activities of farming in the countryside, and that very little of this returns not just to farms, but especially to the farming system itself. Various non-farming 'stakeholders' beat the drum of 'payment for public goods', but there is next to no action in making this happen in the wider economy. There will be better examples of working together from which Dartmoor can draw inspiration.

Who are the actors to get involved in the process? How?

- Farmers
- Extension/advice services and other animators(in practice, individuals in colleges and universities?)DNPA, Devon County Council, DHFP
- Those in the State who design policies (including support measures) at whatever level that happens Defra & NE
- Those in the State who design the regulatory framework at whatever level that happens
- Businesses in the food chain
- How? is the challenge of the remaining 18 months of HNV LINK!

The social cohesion provided by the Dartmoor Commoners' Council, the Dartmoor Hill Farm Project and to some extent the Dartmoor National Park Authority should enable and encourage innovation to continue to evolve and develop but farmers face an uncertain future following the decision to leave the EU. Whilst farmers are focused on the future they may try to make their businesses more resilient but this may stifle innovation apart from that linked to improving productivity. This may not be good for HNV farmland and the environment generally.

The HNV-LINK initiative could evolve to provide a steer and/or platform to encourage innovation. This will need to be considered and developed to complement the existing support.

Selected reference list

- This presentation is based on a large number of books, reports, articles and web pages, few if any of which are peer-reviewed. The list below represents only a selection of the material consulted in printed or pdf format.

- Anonymous (2008) The uplands of South West England – an audit of key facts and figures. Report to Cornwall AONB, Dartmoor NPA, Exmoor NPA & RSPB
- Bonn, A; Allott, T; Hubacek, K & Stewart, J (eds.) (2009) Drivers of environmental change in uplands. Routledge
- Butler, A & Lobley, M (2007) Farming in Devon: changes since 2002 and developments in the near future. CRPR Research Report No. 22. University of Exeter
- Cumulus Consultants (2011) High Nature Value farmland in Rural Development policy – Dartmoor Case Study. Report for the European Forum on Nature Conservation and Pastoralism
- Cumulus Consultants (2013) Dartmoor Farming Futures Project independent project evaluation – final report for Dartmoor NPA & Natural England
- Dartmoor Biodiversity Steering Group (2007) Dartmoor Habitat Action Plan for moorland
- Dartmoor Hill Farm Project (2013) Review 2003-2013
- Dartmoor National Park Authority (2006) Dartmoor commons factsheet
- Dartmoor Vision Group (2008) Moor farming – delivering the Dartmoor Vision. Dartmoor NPA
- Denman, DR; Roberts, RA & Smith, HJF (1967) Commons and village greens. Leonard Hill

- Fox, H (2012) Dartmoor's alluring uplands – transhumance and pastoral management in the Middle Ages. University of Exeter Press
- Gaskell, P; Mills, J; Lewis, N & Curzon, S (2013) South West Uplands Initiative evaluation – final report to South West Initiative Partners. University of Gloucestershire
- Harvey, D & Scott, C (2016) Farm Business Survey 2014/2015 – Hill farming in England. University of Newcastle
- Lake, S (2016) Upland pony grazing: a review. Report for Dartmoor's Pony Action Group
- Lobley, M; Winter, M; Butler, A & Fish, R (2012) Farming in the South West uplands. CRPR Research Paper No. 33. University of Exeter
- Manning, J (2017) Dartmoor Farming Futures evaluation report. Report to Natural England, Duchy of Cornwall, Dartmoor NPA & Dartmoor Commoners' Council
- Mercer, I (2009) Dartmoor. Harper Collins
- Palmer, J (1990) The Dartmoor pony – a history of the breed. Devon Books
- Pearse, C (2004) The whitefaced drift of Dartmoor's "prapper" sheep. Short-run Press
- Petrie-Ritchie, R (2015) An investigation into the management options available to secure a future for the pony on Dartmoor: a behavioural and opinion based evaluation. MSc thesis, Plymouth University
- Procter, M (2013) Vegetation of Britain and Ireland. Collins
- Turner, M; Barr, D; Fogerty, M; Hart, K & Winter, M (2002) The state of farming on Dartmoor 2002. Report for Dartmoor NPA. CRR Research Report No. 2. University of Exeter
- Turner, M; Robbins, K & Silcock, P (2008) Hill farming systems in South West England: economic viability and the delivery of public goods. Final report for the Duchy of Cornwall & the Dartmoor & Exmoor NPAs. University of Exeter
- Waldon, J (2011) Dartmoor Farming Futures. Report to Dartmoor NPA, Dartmoor Commoners' Council & Natural England
- Winter, M; Lobley, M; Chiswell, H; Howe, K; Wilkinson, T & Wilson, P (2016) Is there a future for the small family farm in the UK? Report to the Prince's Countryside Fund