

## Livestock Super Farms



UK dairy and pig farmers have recently put forward plans to establish very large livestock facilities or super farms. Such proposals have proven to be controversial. This POSTnote examines the current issues surrounding intensification of livestock production in the UK.

### Background

Intensive livestock systems house large numbers of animals using a relatively small area of land. The UK poultry industry has been operating large-scale, highly intensive farming systems over the past 50 years. Over the same period, more intensive production systems have evolved in the UK pig and dairy sectors (Box 1), but not on the same scale. However, more recently, planning applications have been submitted to introduce larger and more highly intensive systems to these sectors. The media has coined the term “super farms” to describe such facilities. While there is no specific definition of the term, it is used to describe livestock facilities that are much larger than the UK average (see Table 1).

To date, super farm applications in the UK have been confined to the pig and dairy sectors. Sheep are not well suited to intensive production systems. Large-scale systems for beef production are used elsewhere in the world where grazing is limited. However, such systems are unlikely to prove economic in a UK context and are thus not further addressed. This briefing:

- examines recent trends and economic factors in UK agriculture that are driving intensification;
- describes examples of proposed UK super farms;
- discusses potential issues concerning intensification.

### Overview

- Farmers will have to increase production levels to provide food for a growing population, while meeting the current and future welfare and environmental targets and legislation.
- There has been a steady decline in the number of farms, farmers and livestock in the UK, with an increase in the average farm size.
- Proposed UK super farms are smaller in scale compared to some of the world’s largest livestock facilities.
- They may have potential impacts (both good and bad) for animal welfare and the environment.

Table 1. Industry Numbers for UK and World Examples

Industry	UK average 2010 <sup>1</sup>	Proposed UK super farms	Global examples
Dairy (no. of cows in herd)	113	1,000 (Powys)	37,000 in Saudi Arabia
Pigs (no. of sows in herd)	148	2,500+(Foston)	10,000+ in USA

### UK Agriculture and Intensification

Over the past two decades, the farming industry has faced many challenges. These have ranged from dealing with disease outbreaks, to meeting increased demands and legislation to improve animal welfare and to promote environmentally friendly practices. These challenges combined with the increase of costs (fuel, feed, electricity and fertilizer) and the drive to produce food more cheaply, have contributed to the changes in the UK farming landscape outlined in Table 2. The general trend has been a decline in the number of farm holdings and farmers, with a steady increase in farm size. This trend started long before super farms were proposed.

### Economies of Scale

If production output is increased, farmers can achieve lower costs per unit of milk or meat. This has proven successful for integrated businesses such as the poultry industry<sup>2</sup>, where the profit is kept within one company. This is unlike most other livestock production systems, where the

**Table 2. Changes in the UK Farming Industry**

UK Farming Statistic	2006	2010	Difference
No. of full time farmers	146,000	134,000	-12,000
No. of commercial holdings	248,000	222,000	-26,000
Average area (ha) of holdings	69.3	76.7	+7.4

farm is an independent link in the supply chain, in which each link needs to make a profit (Box 1).

#### *Milk Production*

Dairy farming is subject to European milk quotas to control production under the Common Agricultural Policy (CAP). A UK farm can increase milk production beyond its quota without incurring a levy, only by purchasing or renting quota from another farmer. The UK is under-producing milk according to the allocated quota. Milk quotas are set to be abolished in 2015. The EU has announced a Dairy Package which aims to strengthen the farmer's position in the supply chain in preparation for 2015, although the success of this package will not be apparent for some time.

Since 2006 the number of dairy cows in the UK has decreased by 6.7%<sup>1</sup>. However, this has been offset by an increase in the average annual yield of a dairy cow from 6,977 to 7,315 litres over the same period<sup>1</sup>. National Farmers Union (2010/11) data indicates that, on average, it costs 29.1p to produce a litre of milk, and the farmer receives 25.94p per litre, a difference of 3.16p<sup>3</sup>. However, there is a wide range in profitability across dairy enterprises, even across small herds<sup>4</sup>. As part of the CAP, farmers are eligible to apply for a Single Farm Payment, a system of subsidy payments to landowners. However, this payment may not be enough to keep a farm financially viable.

#### *Pork Production*

Pig farmers are not restricted by production quotas and do not receive any state or EU subsidies. The number of sows in the UK herd has been in decline since 1999 after the introduction of a UK ban on sow stalls. Between 2006 and 2010 numbers dropped by 9.6%<sup>1</sup>. Through selective breeding, better nutrition and management the average carcass weight has increased by 4.0% over the same period<sup>1,5</sup>. However, a recent increase in the prices of cereals used to make concentrated feed has had serious effects on profit margins, as approximately 60-70% of the cost of production is feed. The industry body BPEX calculates that it costs a farmer 164p to produce each kg of pork, with a farm-gate price in February 2011 of 135p/kg<sup>5</sup>. BPEX suggests that while food processors and retailers profit from such prices, the farmer loses around £20 on each animal<sup>5</sup>. In a recent BPEX poll, 77% of pig producers indicated they would quit the industry if the current situation continues<sup>5</sup>.

### **Proposals for UK Super Farms**

As outlined in Box 2, recent applications for super farms in the UK include an 8,000 cow dairy at Nocton in Lincolnshire and a 2,500 indoor sow unit at Foston in Derbyshire. The Nocton plans were withdrawn following local opposition,

### **Box 1. Current Systems of Production in the UK**

#### **Dairy Farming**

The vast majority of dairy farmers in the UK operate a mixture of extensive and intensive production systems. In the summer the cattle are 'turned out' to graze grass (extensive) and brought in twice a day to be milked. During the winter months, times of grass shortage or high temperatures, cows are housed indoors. When the cows are indoors they are fed forage (grass/maize silage) and a mixed concentrated ration. This is considered the traditional system. A small number of dairy farmers now choose to house their cows all year round (with the possible exception of the 3 month dry period of the lactation cycle where the cows are allowed outside depending on climatic conditions). This is called 'fully housed' and is the system chosen by the proposed super farms (Box 2).

#### **Pig Farming**

In the UK 40% of sows are kept outdoors with around 26 sows per hectare, on well-draining soil and are fed concentrate rations. When the piglets reach weaning age (4 weeks old) they are transferred to an indoor system to be fed until finishing. This is commonly perceived as the 'traditional' system, but it still involves an intensive component. Fully intensive systems keep all pigs indoors, without access to the outside environment. Pigs that are housed indoors are kept on slats or solid floors with straw bedding (60% are straw bedded in the UK) and fed concentrate rations. In 2003, EU legislation was introduced that required pigs to be supplied with environmental enrichment and banned routine teeth clipping and tail docking.

#### **Integrated Poultry Farming**

Almost all poultry farms are excluded from existing CAP payments. On average, each UK broiler house has a throughput of 150,000 birds per year. Birds are kept in a barn-style house that may include windows and environmental enrichments and have freedom to move around and to interact with other birds. Free range systems allow the birds access to an outside area. Battery cages, once widely used for egg production, have been illegal since January 2012 and largely replaced by new, larger enriched, cage systems.

A key feature of the UK poultry industry is that it is largely operated by companies which integrate farming, processing, product development, packaging and distribution. Such companies will own poultry houses (or contract farmers with acceptable housing), hatcheries, feed mills, specialist transportation and processing plants. They provide everything the birds need, employing stockmen to look after the day-to-day care of the birds. They also employ specialists to evaluate their operation to improve efficiency of management, and to oversee health and welfare standards as well as the take up of new technologies, investment and resource use.

campaigns by the World Society for the Protection of Animals and concerns regarding risk of water pollution. However, a proposed development for a large dairy in Powys in Wales is under consideration (see Box 2). The proposal for a pig unit at Foston has also received widespread criticism from the public and groups such as the Soil Association despite being smaller in scale than some other units in the UK, one of which keeps 3,500 sows outdoors.

### **Intensification: Potential Issues**

The intensification of UK agriculture implicit in the emergence of super farms raises a number of potential issues. These include possible local environmental impacts, effects on animal welfare, implications for small farms and rural communities, planning considerations, consumer attitudes and wider environmental issues.

## Box 2. Super Farm Systems in the UK

### Super Dairies

The first and biggest proposed UK super dairy was at Nocton for a system with around 8,000 cows. Following public opposition, the plan was reduced to 3,770 cows. However, the application was withdrawn in February 2011 following concerns raised by the Environment Agency. These focused on the pollution risk to a nearby aquifer, and the extent of the benefits associated with the change in land use.

Powys Dairy in Wales has been identified in the media as another UK super dairy. Currently the Powys farm has a herd of 270 Holstein Friesians and a sheep flock, on 287 hectares. However in 2008, the farmer submitted a planning application to increase the herd to 1,000 cows, using a fully housed system. The fodder needed would be grown on the farm, and the slurry produced applied to the land to reduce the need for inorganic fertilizer. New buildings have been designed to maximise cow welfare and include areas where cows are free to move, socialise and groom. A new milking parlour would reduce milking time despite the increase in the number of cows and the dairy would employ specialised stockmen to maximise welfare. The application was conditionally approved in 2011 by Powys Council planning committee, but in January 2012 the Welsh government pulled in the application for consideration.

### Midland Pig Producers (MPP) – Foston, Derbyshire

MPP currently manages 3,000 sows across seven farms and plans to build one 2,500 indoor sow unit incorporating all the technologies operating on the other farms. Derbyshire County Council is considering the planning application, which includes features designed to maximise pig welfare. For instance, sows are allowed to move around freely, piglets are protected from being crushed and straw containing food treats to forage for is introduced at timed intervals. The accommodation uses temperature controlled solid flooring and has space allowances above statutory requirements. On-site anaerobic digestion (Box 3) will be used to process slurry into methane which will be stored and used to power the site, while air scrubbers prevent ammonia escaping. MPP has access to over 2,000 hectares which is enough to produce all feed locally, instead of buying it in or importing it.

## Local Environmental Impacts

The main pollution concerns raised by super farms are ammonia, manure/slurry, effluent discharges, dust, odour and noise. The impacts of such factors are considered during the planning process. As issues concerning the environment and agriculture are the responsibilities of the devolved administrations, regulations may vary in different parts of the UK. In addition, pig and poultry farmers may need to obtain an Environmental Permit (England and Wales) or a Pollution Prevention and Control permit (Northern Ireland and Scotland) by meeting criteria enforced by one of the devolved environment agencies<sup>6</sup> or a local council. In England a permit is needed if livestock capacity exceeds<sup>7</sup>:

- 750 sows;
- 2,000 production pigs over 30kg;
- 40,000 poultry (includes chickens, layers, pullets, turkeys, ducks and guinea fowl).

### Slurry/Manure

With a large number of animals concentrated on one site, there are concerns surrounding waste storage and disposal. All current farms and proposed developments have strict and inspected regulations on slurry/manure storage and spreading. The regulations stipulate months of the year

## Box 3. Anaerobic Digestion

Anaerobic digestion (see POSTnote 387) of animal waste produces energy that can be used on the farm, by local services or houses and/or sold to the national grid. The process is said to reduce slurry odour, and to kill fly eggs and pathogens such as *E. coli*, and *Salmonella spp.*, which addresses some concerns regarding human health<sup>8</sup>. The digest from the digester is a valuable fertilizer, and can be spread instead of inorganic fertilizer, which requires large amounts of non-renewable resources to produce and transport. Installing these systems becomes financially viable only on bigger facilities. In the 2011 autumn statement, the Chancellor announced the availability of £15 million for the Rural Community Renewable Energy Fund, to help communities initiate the development of renewable projects.

when spreading slurry is not permitted and this may vary with ground condition and slurry type. It is also possible to treat pig slurry to reduce odour or to process it by anaerobic digestion (Box 3). Worst case scenarios for pollution risks are considered during the planning process with an Environmental Impact Assessment usually conducted by a consultant.

### Greenhouse Gases (GHGs)

In 2008, the UK Climate Change Act set targets to reduce GHG by at least 80% by 2050 compared with 1990 levels<sup>9</sup>. These targets were set for the economy as a whole, with none specifically for agriculture<sup>9</sup>. Agriculture generates GHGs (methane, carbon dioxide and nitrous oxide) from a variety of sources, such as cow and sheep digestion and the decomposition of manure. UK agricultural GHG emissions decreased between 1990 and 2007. This was mainly due to reduction in livestock numbers and fertilizer use, rather than mitigation strategies<sup>9</sup>. Fewer, more productive animals reduce emission per unit of meat or milk produced.

## Farm Animal Welfare

Welfare concerns about the Nocton, Powys, and Foston developments centre on the continual indoor housing (Box 4) of a large number of animals. However, these developments may have both advantages and disadvantages for animal welfare (Table 3). The costs of increasing welfare and environmental standards are borne by the farmer. Financial incentives available from retailers or stewardships schemes may not cover the cost to update farming practices. This results in lower farm profits, affects the ability of farmers to get loans and reduces the money available for improvements and reinvestment.

Many of the concerns surrounding UK super farms are based on comparisons with well established Concentrated Animal Feeding Operations in the USA. However such comparisons are difficult because the UK is generally considered to have higher animal welfare standards than the USA, where no criteria referring to welfare are required for a planning application to be valid. In the UK there are minimum legal requirements that must be met to allow animals to be kept in any buildings for commercial purposes (Animal Welfare Act 2006 England and Wales).

**Table 3. Welfare pros and cons of indoor housing<sup>10</sup>**

Welfare Concerns	Welfare Advantages
Animals prevented from expressing natural behaviour and access to natural surfaces	New facilities built with specific welfare considerations
With large numbers, subtle indicators of an individual's ill health or distress may be missed	Larger facilities include vets, nutritionists and specialist stockmen to meet the specific needs of individuals and the herd
If a disease enters the herd /flock it can spread quickly and more animals contract it	Protection from inclement weather. Reduces piglet mortality and nutrition stress for dairy cows
Concerns over reduced longevity of sows and cows due to the drive to increase production at the cost of fertility	Greater biosecurity by reducing exposure and transmission to and from wildlife. Reduce incidence of avian and swine flu

**Box 4. Welfare of Dairy Cows in Fully Housed Systems**

High-yielding Holstein Friesians (the most common dairy breed) need to be carefully managed to ensure their nutrition is adequate to meet the metabolic demand of producing thousands of litres of milk. A large herd requires a large area for grazing. This can mean cows walking large distances between the milking parlour and field; badly maintained laneways can cause lameness. Grazing grass in summer may not meet the nutritional demands of the cow causing nutritional stress; resulting in loss of condition/milk yields and increasing the incidence of summer mastitis. Housing cows all year, in groups with matched animals, may allow greater control over the cow's diet reducing nutritional stress. There are concerns that in these systems there will be an increase in the incidence of certain types of mastitis and lameness as cows are constantly on manmade surfaces. Defra has commissioned research to investigate cow health, welfare and behaviour in these systems. Results from the Scottish Agricultural College are due to be published early in 2012.

Small traditional farms do not necessarily have higher levels of welfare than large farms. For instance they may have old buildings that were designed around maximising production and lack money for improvements.

**Effects on Small Farms and Rural Communities**

There are fears that the trend towards large-scale intensification will result in more small farms going out of business. However, some small farms can thrive by finding a niche in the market to provide a specialist or premium product such as certain cheeses or organic products, which can be sold for a higher price. Concerns have also been raised that fewer, larger farms will erode rural communities with indirect consequences for local services such as schools and other businesses. However, developers argue that larger facilities will create employment opportunities, albeit of a different nature to those found on a small, traditional, family run farm. Farms with large or small numbers of animals both face significant challenges.

**Planning**

The legislation surrounding planning is complex. Decisions to grant or reject planning applications for large livestock facilities are made at a local level. Devolved environment agencies<sup>6</sup> along with other agencies such as the Food Standards Agency and Highways Agency can provide

advice to planning authorities. However, some planning applicants have questioned whether local planning authorities have a clear and balanced understanding of the complex issues surrounding modern agriculture.

**Consumer Attitudes**

Supermarkets compete with each other to keep prices as low as possible. This constant downwards pressure on pricing results in strain further down the supply chain and affects the economic viability of farms<sup>8</sup>. However, price is not the only consideration that consumers take into account when purchasing products. For instance, consumers may value products that are ethically-sourced, welfare-friendly or organically produced. Packaging information is thus important for consumer purchasing decisions. Food assurance schemes such as Red Tractor or Freedom Foods are recognised and trusted by consumers. Such schemes allow consumers to decide if a product meets desired levels of safety and ethics at an acceptable price.

**Future Challenges**

The current proposals for CAP reform deal with the twin challenges of managing international food production and preserving the environment. Proposed reforms for 2014 and beyond include "greening" of the CAP. This is in reference to the inclusion of compulsory environmental targets to be eligible for direct payments, such as maintaining an "ecological focus area" of at least 7% of farmland. Proposed reforms may also affect the largest UK farms, with a proposed cap on the maximum basic payment of €300,000 a year which would be phased in. In practice, this is likely to reduce the amount paid to the biggest farms, which is currently calculated on a per hectare basis. The details of the current reforms are still being negotiated. However early indications are that larger farms could be disproportionately affected.

These challenges were also highlighted in the Future of Food and Farming Foresight report in 2011<sup>11</sup>. This proposed that "sustainable intensification" would be needed to tackle these challenges. It defined this as being "the pursuit of the dual goals of higher yields with fewer negative consequences for the environment".

**Endnotes**

- 1 DEFRA *Agriculture in the United Kingdom* 2010
- 2 [www.thepoultrysite.com/articles/587/report-british-chicken-what-price](http://www.thepoultrysite.com/articles/587/report-british-chicken-what-price)
- 3 NFU *Cost of Milk Production Report 2010/2011*
- 4 [www.dairyco.net/library/market-information/milkbenchplus/milkbench-report-2012.aspx](http://www.dairyco.net/library/market-information/milkbenchplus/milkbench-report-2012.aspx)
- 5 BPEX *Profitability in the Pig Supply Chain* 2011
- 6 The Environment Agency (England), Scottish Environment Protection Agency, Environment Agency Wales and the Northern Ireland Environment Agency.
- 7 [www.environment-agency.gov.uk/business/sectors/32795.aspx](http://www.environment-agency.gov.uk/business/sectors/32795.aspx)
- 8 [www.mrec.org/pubs/2100502623renewables-manure.NEW.pdf](http://www.mrec.org/pubs/2100502623renewables-manure.NEW.pdf)
- 9 FAPFI *UK Greenhouse Gas Emission Modelling System for England, Wales, Scotland and Northern Ireland* 2010
- 10 [www.defra.gov.uk/fawc/](http://www.defra.gov.uk/fawc/)
- 11 Foresight: *The Future of Food and Farming*, BIS, 2011