

The Next Agricultural Revolution

Factory farming is a very emotive subject, animal welfare issues and environmental menace are a consequence of the economic evolution of modern farming. Since about the end of the Second World War farming moved into a new era of industrial scale production but many of the best practice methods of production that evolved have recently proved to be environmentally disastrous.

Ploughing land, for example, is now deemed detrimental to soil structure and DEFRA advise against it in the Good Agricultural Environment Condition (GAEC) best practice guidelines.

Keeping livestock outdoors may be perceived to be welfare friendly, but goes against new IPPC regulations, and is likely to become a thing of the past in the next decade. There are also the actual welfare issues of animals giving birth etc in the middle of a field, without supervision and up to their ears in mud, as in modern outdoor pig production. Then there is the worst case scenario – a smelly pig farm where the pig manure is stored in tanks and lagoons until it is spread on land in the district causing considerable, wide travelling odour.

So what's the answer?

A Midlands-based agricultural company has designed a revolutionary new farming system with considerable environmental and animal welfare benefits, meaning that the old smelly farms could be a thing of the past.

The new system involves a new concept of odourless livestock production, harnessing the odour and turning it into energy. It produces odourless fertilizer as a by-product which is used to grow crops. These crops are harvested and then milled on site, utilising some of the energy produced to produce feed for the animals. In addition, traffic movements are hugely reduced using this system and which significantly enhances its carbon footprint.

So how does it work?

Think about the difference between a Portaloo and a bathroom. One retains the waste and odours until emptied, the other flushes the manure regularly, in this case into a sealed biogas reactor (an underground concrete tank) which renders it odourless and produces natural gas (CH₄) which is piped to a generator to produce electricity.

This reduces 75% of the ammonia inside the building and, additionally, the air in the building is extracted through a ventilation shaft and washed with collected rain water to remove dust, to which the smell is attached. These washings are also put into the flushing system to extract energy. The washed air is then filtered through a charcoal chimney to remove any smell that remains and only clean air is then expelled.

The building needs to be welfare friendly and so we have engaged with animal rights groups to design a system that meets their requirements. The main new welfare element of the system is a revolutionary flooring system.

This includes:

- A lying area that has chopped straw trickling down from an overhead conveyor to encourage foraging;
- A loafing area to encourage exercise; and
- A dunging area to encourage cleanliness.

The lying area also includes an under-floor radiator style heating and cooling system, which reduces the need to ventilate heat and extract large amounts of air by fan. Electric fans otherwise reduce the amount of air going through ventilation shafts.

This farm environment will produce at least one major welfare gain, and is radically different to conventional systems as it is believed to be the first system in the world that has the ability to house pigs without the need to tail dock - the holy grail of animal rights groups.

The manure substrate produced in the biogas generator is processed much like a sewage works. The product at this stage is already odourless which allows the water to be recycled and fed back to the pigs (much like modern human water consumption). The solids are dried and bagged to be spread as fertilizer on neighbouring farm land, reducing the need to cart large volumes of slurry around in tankers. Farmers in the district are provided with free seed on a buy-back contract and the free fertilizer.

Since the UK does not manufacture fertilizer in any scale this will reduce the need for imports from Russia and Eastern Europe. In addition, grain transport is local and therefore distances vastly reduced. This grain is milled on site utilising some of the electricity produced thereby reducing the cost of feed, which is the biggest cost of any modern livestock farm system.

The biogas reactor has also been designed to be different from existing models, being a channel design rather than a cylindrical vessel. This gives more control and allows the substrate to be sterilized during the process. The sterilizing effect allows imported kitchen and abattoir waste to be mixed with the slurry to produce more fertilizer which is safe to spread on the land. This waste mix would otherwise be likely to go into landfill. A phenomenal amount of heat is produced during the process which is used to heat the pig farm and can be used on neighbouring facilities.

We are planning the first one in Derbyshire, adjacent to HM Prison Foston and the A50 trunk road. The Ministry of Justice has expressed keen interest in a supply of heat from the proposed development. It is also being seen as a development of possible national importance for DEFRA, the Environment Agency and the NFU. We are seeking financial support from the East Midlands Development Agency and Advantage West Midlands and the latter have been approached for a grant to build a prototype near Stafford.

This could be the Next Agricultural Revolution.