

Case study

Innovative pig farming: boosting yields and improving animal welfare in Colombia

The deep-bedding system allows natural behaviour: pigs can root, manipulate the material and roll around

Pig farming has undergone major changes as a result of industrialised methods that seek to improve productivity for reduced cost. But conventional industrialised methods, in which pigs are raised on concrete floors, can compromise animal health and welfare and carry an environmental cost. This case study describes an innovative approach that overcomes these challenges while increasing yield and profit.

Industrial farming has changed the nature of food production, and has a major impact on the lives of billions of animals. Industrial pig production usually involves raising pigs in large groups and high densities, indoors, either on concrete or slatted floors to help with removing manure. But the barren conditions and high density of animals mean that pigs are unable to root – an important natural behaviour for the species. This results in increased aggressive behaviour and impacts on animal health and welfare.

These conventional approaches also carry environmental risk. Where concrete floors are used in tropical conditions, such as in Colombia, producers have to use large quantities of water to remove the manure and keep the area clean. If this process is poorly managed, water and manure run-off can pollute surface and groundwater resources.



El Recuerdo's open sheds and surrounding vegetation are beneficial for air quality and avoids direct sun exposure and high temperatures for the animals

Pig farming in Colombia: the context

Colombia produces around 4.2 million pigs annually, mainly in the states of Antioquia, Cundinamarca and Valle del Cauca. The Porcícola El Recuerdo company (the focus of this case study) is located in Cundinamarca – Colombia's second-largest pig production state, in the Orinoco region – producing around 570,000 animals in 2010.¹

In this region, many small-scale farmers have gone out of business in recent decades as a result of the industrialisation of pig farming. Many are unable to compete with the low-price pork from the industrial farms and the high investment costs needed to set up or modernise barns.

Designing a new system

Porcícola El Recuerdo Ltda has been in the Colombian pig farming business since the mid 1990s. When the company first started, it was growing and finishing about 300 pigs a year, in small pens with concrete floors. In 2007, wanting to see higher standards of animal welfare and lower environmental impacts, the owners decided to implement a deep-bedding system.

The company began by providing its pigs with bedding made of wood chip. Although extremely absorbent, this material often became compacted and developed into

clods that were difficult to break, making it hard to handle. After researching other natural, sustainable materials that would avoid this problem, the company decided to try mixing rice hulls in with the wood chip. Rice hulls are a by-product of rice production, and are widely available in the region. They are also a low-cost material, as they have few other uses. The new mix overcame the previous compacting issues to produce outstanding results.

In the new system, the piglets are transferred into pens covered with a wood chip layer about 10cm thick; staff then add a further 40kg of rice hulls to the pen each week. This combination of materials allows the pigs to behave naturally – to root, manipulate and roll in the bedding. This is not only beneficial for the health and wellbeing of the pigs; their activity mixes the wood chip and rice hulls into a more uniform bedding.

Unlike with concrete flooring, in the deep-bedding system pens do not need to be washed out. This saves high volumes of water and reduces the risk of polluting local streams and groundwater. The pigs' faeces are deposited and incorporated in the bedding before being covered by new layers of rice hulls. When the pens are emptied, the bedding is piled into the centre of the pen to continue its natural heat-generating degradation process, where it remains for about eight days before being removed. It can then be used as a compost to fertilise crops.

After implementation

Since converting to a deep-bedding system Porcícola El Recuerdo has expanded and now finishes 1,500 pigs a year. All pens of the twelve sheds owned by the farm now have deep bedding. In the process of changing the system, the producer also increased the space allowance from 0.9 to 1.5 square metres per pig. This resulted in better animal health and welfare and farm productivity.

Porcícola El Recuerdo's experience shows that **a deep-bedding system has many advantages over the traditional approach of growing and finishing pigs on concrete floors**, as summarised in the box below and detailed in the rest of this case study.

Deep-bedding systems for pigs

Advantages

- + Reduces the presence of flies and rodents
- + Reduces bad odours
- + Limits the need to use water and the possibility of water pollution
- + Improves quality and conformation of the carcass, with better fat distribution
- + Generates additional income through the sale of bedding as fertiliser
- + Allows pigs to root and roll around – a natural behaviour that improves animal welfare, reduces conflicts between animals, and helps regulate body temperature
- + Improves health and decreases mortality rates

Disadvantages

- Requires bedding materials that need to be bought if they are not produced on site, and may not be available locally
- Requires more labour per animal

Greater productivity and sustainability

Moving from a high-density system with a concrete floor to a deep-bedding system with more space allowance per animal has improved overall productivity, with increased daily weight gain, lower mortality rate, and improved carcass conformation (i.e. a good proportion of muscle and fat, ensuring a better price for the product). El Recuerdo is weaning piglets later, at 28 days, compared to 21 days in many conventional farms. This means that the piglets are heavier, with stronger immune systems, when they are moved into group pens. This brings improvements in the pigs' health, welfare and subsequent development.

After they are weaned, the pigs are moved to a plastic-floored group housing system for a few weeks, until they reach the target weight of 30kg. At this point, they are moved to the deep-bedding system until they reach slaughter age and a target weight of 110kg.

In the new system, the pigs are more active and mobile, so they need more feed. But despite this, the producer still sees better returns overall, because the advantages (in terms of lower mortality rate and higher daily weight gain) exceed the poorer feed conversion rates. There are also fewer incidences of stress-induced ulcers or injury resulting from aggressive behaviour. As of 2012, pig tails are no longer cut. The deep-bedding system and higher space allowance per pig ensure that cannibalism and tail biting incidents are now memories from the past.



One of El Recuerdo's pig pens with freshly laid deep-bedding materials

Greater profit and employment

Together, these improvements to the farming system mean that **pigs in the deep-bedding system result in a better cost-benefit ratio**. Taking into account all variables, the new system results in higher profit – a difference of around 1.6 kilograms and \$8,103 Colombian Pesos per animal (US\$4.56) compared to the old system.

Table 1. Deep-bedding versus concrete floor pig production: productivity indicators²

Indicator	Concrete floor	Deep-bedding
Mortality (%)	0.47	0.24
Fattening and finishing (days)	98.89	92.47
Initial weight (kg)	24.63	30.13
Final weight (kg)	110.32	112.00
Feed consumption per animal (kg)	208.01	210.68
Daily weight gain per animal (kg)	0.87	0.89
Feed conversion rate	2.43	2.57
Profit per pig (US\$)	114	116.3
Difference (US\$)	–	2.06
Income per pig/manure production (US\$)	–	2.5

In addition, the sale of 18,000 kilograms of compost produced by the farm every month generates an extra \$4,480 Pesos or US\$2.5 per pig.

These higher returns per pig, combined with the extra source of income from the sale of manure, result in attractive economic returns from the activity, even considering the extra labour required to manage the deep-bedding system. In fact, in the Ubaque region, the extra labour requirements could be considered an advantage in a region where pig farmers have been adversely affected by industrialisation (see 'context' box opposite).

The deep-bedding system has the potential to **provide higher returns to small-scale farmers and provide more employment** in the region, as extra labour is needed for handling the bedding and tasks such as mixing the bedding materials, adding rice hulls, and moving the debris to the manure site.



Amido León, Technical Manager of El Recuerdo, at a restaurant that serves pork from the farm. The restaurant promotes the high welfare conditions of the pigs, providing information to diners

World Society for the Protection of Animals

Protection for the environment

The benefits of the new system extend beyond the farm itself. To prevent groundwater and soil pollution, Porcícola El Recuerdo designed a system of pipes and filters that collect liquid waste such as urine and water spilt from the nipple drinkers. The liquid filters through the bedding into the pipes, and is stored in a main storage tank. It can then be distributed and applied to pasture land as fertiliser, minimising the risk of groundwater pollution.

When the pens are emptied, about 20 per cent of the bedding is dried, composted, milled, packed, and is sold to neighbouring ranches as fertiliser for crops and pasture. The remaining 80 per cent is reincorporated into the bedding for the next litter of pigs. This is an efficient use of resources, recycling the manure and converting it into an extra source of income for the producer (see above). Amido León, the farm's Technical Manager, explains: "In this farm, manure is no longer waste: we convert it to money."

The deep-bedding system, along with the filter system and a decision to use live fences, has also helped control odours. The new sheds are open and surrounded by vegetation which is beneficial for air quality – maintaining low ammonia concentrations. This is especially important when pig production takes place in densely populated areas.

Porcícola El Recuerdo's sound approach to environmental management has led to widespread recognition. The company has received environmental certification from the Colombian Association of Pork Producers, the Colombian Agriculture and Livestock Institute (the national authority for agriculture and livestock) and the Autonomous Regional Corporation of the Orinoco – the regional environmental authority.

Adding value: a mark of quality

About 35 per cent of El Recuerdo's pork is sold to a chain of restaurants owned by the same parent company; the other 65 per cent is sold to various retailers.

At the restaurant chain, management and customers are very happy with the quality. The chain has built a strong brand identity around the pork's superior quality and higher animal welfare, and advertises the meat as coming from 'happy pigs'. This seems to attract and retain customers who are faithful to the brand. But it would be even better, says Amido León, if these attributes were recognised with a formal seal.

Elsewhere, despite its advantages in terms of animal welfare, meat quality and robust environmental management, the product is not sold under a differentiated label. Amido is proud of the pigs' welfare conditions, and promotes the system at every opportunity, such as livestock events. The next step, he says, is to differentiate the product with a specific label that describes the unique attributes of the product.



Diners can enjoy meals with pork from El Recuerdo's 'happy pigs' at one of the restaurant chains

Conclusions

- Compared to concrete floors, deep-bedding systems result in improved animal health and welfare and greater daily weight gain and carcass conformation – amounting to better returns for producers.
- The sale of composted bedding generates extra income for producers.
- Deep-bedding systems can contribute to reduce surface and groundwater pollution and save water.
- Deep-bedding systems require more labour but the higher returns mean they can help to keep small-scale farmers in business and create rural employment.
- There is a proven retail and consumer market for high-welfare meat products.

References

1. ICA & DANE (2010). Consolidado Nacional por Especies – Censo 2010
2. Source: Technical comparison from Porcícola El Recuerdo Ltda. Exchange rate as of April 2012: Col\$1,777 = US\$1