

How efficiency impacts on profit

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The world's appetite for meat continues unabated, with new records being set – year on year. It is anticipated that the global demand for meat will continue to rise by about nine million tonnes per year from 225 million tonnes today due to the world's increasing population. Pig meat continues to dominate the trade in meat due largely to the preference of the Asian consumer to pork. In the future the pig meat requirement may increase still further due to the improving economic situation in many Asian markets including China.

Although cost of production remains important to the profitability of the sector, if it were just cost of production that determined where pigs were produced there would be a major global change required.

In reality, there are many other forces which effects where pig production takes place. It is, therefore, almost impossible to try to create a 'one size fits all' scenario in an article. I will endeavour to relate this article to the Asian situation using experience gained from Europe and the Americas.

Pork eating quality

Before looking too closely at 'efficiency' it is worth reminding ourselves that the eating quality of pork remains important, indeed it may ultimately determine the continued dominance of pork in the global meat market. The requirement for fresh (wet) pork in many markets particularly in Asia means that the opportunity to freeze pork is reduced; chilled pork is becoming more popular but time constraints means that compared with the frozen product the method of transport needs to be changed and the cost is, therefore, significantly increased.

Another significant 'quality' change is food safety which is now a major factor. BSE, avian flu, Nipah, dioxin, drug and hormone contamination has in many cases shifted the purchases from one country to another, in the worst case scenario from one continent to another.

Animal welfare has taken centre ground in the UK; however, environmental legislation may become the major obstacle to increasing the scale of pig production in many countries of the world. This is particularly

true where the traditional family farm is being replaced by large corporate enterprises where the scale and density of pigs challenges the environmental impact on the surrounding area.

Raw material prices

The increase in the use of crops for alternative uses, especially as alternative fuels, will accelerate further and will challenge the quality and quantity of raw materials available for livestock feeding. The raw material cost increases experienced over the last year are unlikely to be reversed, in reality they may increase further, therefore any efficiency factors will need to concentrate on feed efficiency and also on the use of alternative feeds. High feed costs have been a feature of pig production in the UK for more than 30 years due to the effect of subsidies given to other sectors.

It is against this background that the major pig breeding companies in the UK have focused on 'feed efficiency' and constructed their breeding models accordingly. This increasingly has enabled the UK genetic companies to remain at the forefront of the worldwide genetic programme for pigs.

Overall efficiency

Producers should not focus on micro-management of their farm and miss the big picture of production output efficiency.

Fixed costs make a significant contribution to the overall cost of running a production facility and if the farm is not producing enough output the fixed cost element will ultimately lead to the failure of the system.

Once a simple system is set up to monitor output then adjustments to inputs can be regularly made to maintain results.

Know your production cost

Table 1 is an example of a 1,000 sow facility, showing some variables to performance. Interestingly, many of these variables often occur when the pig price is low and cash flow becomes tight. Old sows are not

replaced, the herd size drops, performance suffers, the cash flow becomes tighter so pigs are sold at a lighter weight; all these things taken together can make losses more serious and recovery will take longer.

What can be done to remedy the situation? Once the information is known then control of the situation is in the farmer's/manager's hands. The following points are almost a check list of potential solutions which can be adjusted to the individual situation. The major factors influencing efficiency are therefore the economics of production measured as overall cost per kg of saleable pig meat. Factors in the breeding herd include:

- Herd size (replacement rate).
- Litters per sow per year.
- Pigs per litter.
- Weight at birth/weaning.

Factors in the finishing herd include:

- Lean tissue growth rate.
- Appetite and growth rate after weaning.
- Ability to grow to higher slaughter weights.
- Meat quality (regional differences are critically important).

The goal, therefore, is to reduce the cost of production and increase the value of the meat in a safe and sustainable way.

Although it has been recognised since the early 1980s the importance of 'dam' line and 'sire' line traits this is still poorly recognised and understood. The result is often parent sows with the conformation of slaughter pigs and slaughter pigs with the conformation of parent breeding stock; both of which are undesirable for optimum efficiency. It is also accepted that to make good breeding sows some of the traits are antagonistic to finishing performance and there is a need to ease back on some traits to ensure economic finishing. One of the most extreme examples of this is the pure Meishan breed with early maturity, large numbers of small but viable piglets and excellent rebreeding performance. If pigs per sow per year was the only requirement then without doubt the Meishan would figure very strongly in most breeding herds.

We need to go back to basic first principles as pig production has become unnecessarily complicated without improved

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Continued from page 13 performance. In reality, in most markets overall performance is worst than a decade ago and this is unacceptable.

Farmers in Asia generally quote a 'national cost price' without giving consideration to the performance of their own herd. This can be very damaging and can either under or over estimate the costs.

Now let us look at how production efficiency impacts on profit and how the producer can influence the result.

Many herd inventories show a 10-15% reduction in breeding herd size compared to target. A 10% herd size reduction will result in 54,000 less margin or 29%. When this is the case it is impossible to correct the loss created by any other efficiency measure. When the price of pig meat is low, gilts are not purchased, old sows are not replaced and thus numbers are reduced and the efficiency of those that remain are adversely compromised. This often takes two to three years of improved prices to enable the herd size and parity distribution to be corrected.

It is critical, therefore, when 'output' monitoring to know the following:

- The exact number of sows in the herd.
 - The percent of sows in each parity.
- Numbers of gilts entering the herd can be adjusted to ensure the correct parity distribution and cater for correct culling of old or unproductive sows.

- The conception/farrowing percentage. If conception is lower than target, herd size should be increased to ensure target farrowings. Culling of sows that return to service more than once is possible and should be encouraged as repeat returns only add to cost. Increased supply of gilts and increasing the target inseminations during period of known conception rate reduction, such as hot weather or times of seasonal infertility.

- The number born alive per litter. If the numbers born alive per litter is lower than target the only way to maintain output is to increase numbers of sows to farrowing. This will require a higher herd size.

- Pigs per sow per year (-3 pigs = 98,000 lost margin or 48%).

- Litters per sow per year. Effected significantly by non-productive days. The number of pigs per litter is an area where a little compromise becomes important. Very high numbers total born (14+) can result in small and variable pigs at birth with some less than 800g. These small pigs result in higher pre and post weaning mortality and are smaller at weaning and take up to 21 days longer to achieve target slaughter weight. Therefore, chasing the ultimate in numbers born without consideration to birthweight can lead to suboptimal results. The ideal therefore is a good average born alive – 11.5 is sufficient coupled with good litters per sow per year.

The ways to improve weight at birth include the following:

- Genetic selection – ensure correct 'dam line' selection.
- Correct culling of old sows and repeat offenders.
- Feeding extra feed 80 days gestation until farrowing.
- Avoid inducing farrowing before the 115th day.
- Avoid induced farrowing on gilts to establish true gestation length as this can vary by up to two days.
- Ways to improve weight at weaning (aim 7kg at 21 days) include:
 - A good fostering regime and foster before malnutrition is seen.
 - Ensure adequate water and give extra if possible.
 - Correct feeding of the sow/gilt, feed each sow individually.
 - Improved lactation feed.
 - Later weaning (wean one week later and the pigs can be 1.5-2kg heavier).

The economics of the finishing herd is all about feed efficiency, whereby one less pig weaned per sow contributes less than 3kg of sow feed for the remaining piglets but 0.1 FCR equates to an extra 18kg of feed per pig sold. It is obvious therefore that the aim will be to do everything possible to improve feed efficiency. The major factors which influence feed efficiency are daily gain, fat and mortality especially at heavier weights.

In this regard it is worth pointing out that if the choice of terminal boar is incorrect or a 'dam line' boar is used it is impossible to correct the inefficiency created by other management measures on the farm.

Table 1. Variation in margin on a 1,000 sow facility, assuming fixed costs remain constant.

Fixed costs	Target	-10% sows	-3PSY	-5kg weight	+0.1 FCR	Actual
1,000 sow farrow to finish						+all
Total fixed costs	350,000	350,000	350,000	350,000	350,000	350,000
Sow herd size	1,000	900	1,000	1,000	1,000	900
Pigs per sow per year	23	23	20	20	20	20
Sow feed cost (average tonne)	170	170	170	170	170	170
Sow feed usage (year)	1.2	1.2	1.2	1.2	1.2	1.2
Finisher feed (average £ tonne)	200	200	200	200	200	200
Feed conversion ratio	2.5	2.5	2.5	2.5	2.6	2.6
Average sale weight (kg)	110	110	110	100	110	100
Weaner weight (kg)	7	7	7	7	7	7
Average meat price	1.05	1.05	1.05	1.05	1.05	1.05
Post weaning mortality (%)	4	4	4	4	4	4
Killing out (%)	76	76	76	75	76	75
Total pigs transferred	23,000	20,700	20,000	20,000	20,000	18,000
Total pigs sold	22,080	19,872	19,200	19,200	19,200	17,280
Total fixed costs	350,000	350,000	35,000	35,000	35,000	35,000
Total costs	1,749,257	1,609,331	1,594,757	1,494,757	1,635,957	1,413,76
Income						
Average sale value of pig	88	88	88	79	88	79
Total sales	1,938,182	1,744,364	1,685,376	1,512,000	1,685,376	1,360,80
Sow feed used	1,200	1,808	1,200	1,200	1,200	1,080
Finisher feed used	5,923	5,330	5,150	4,650	5,356	4,352
Total tonnes	7,123	6,410	6,350	5,850	6,556	5,432
Total kg sold	1,845,888	1,661,299	1,605,120	1,440,000	1,605,120	1,296,000
Break even (pence kg)	0.95	0.97	0.99	1.04	1.02	1.09
Margin over feed	538,926	485,033	440,619	367,243	399,419	297,039
Net margin	188,926	135,033	90,916	17,243	49,419	-52,961
kg feed pig sold	323	323	331	305	341	314

Daily gain

The major area for consideration is slow growth immediately after weaning. This is caused by a variety of factors including weaning weight, feed quality, environment and health.

- **Weaning weight.** Dozens of trials continually prove that the heavier the pig is at weaning the faster it will grow to slaughter. If the weaning weight is sub-optimal (less than 6kg) then it is better to increase weaning age to reduce mortality and improve growth post weaning. The days of cheap milk powder and cheap animal proteins are gone, therefore young/small pigs after weaning are a nightmare to grow on successfully. The move in the EU countries to wean at 28 or even 35 days is not just about animal welfare but a way of improving performance after weaning. The first four or five weeks after weaning is the 'make or break' time for economic finishing.

- **Feed quality.** Diets for piglets immediately post weaning are expensive because they contain high quality raw materials. Trying to save money on these diets is false economy yet time and time again when money is tight the use of these diets comes under close scrutiny. Yet, fed correctly with only a very small number of kg per piglet for the first

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	Poor	Average	Good
Gestation	116	116	116
Weaning age	28	28	28
Non productive days litter	15	10	5
Total	159	154	150
Litters sow/year	2.29	2.37	2.43

Table 2. 15% returns equates to 3.7 non-productive days per litter if all returns are identified at 21 days. However, three sows per 100 going through to farrowing without being identified as non-pregnant will also contribute 3.7 non-productive days per litter. Many herds have 25 non-productive days per litter. In Asia many herds are achieving less than 2.2 litters per sow per year.

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two diets it is the most valuable way of reducing mortality and improving efficient growth.

In Europe specialist piglet feed manufacturers have become established because the farmers recognised that it is not possible to produce diets with the quality of raw materials required on the farm.

Reductions in in-feed antibiotic growth promoters have further challenged the piglet feed companies to come up with alternative strategies, whereby a combination of acids and essential oils replace antibiotics without any adverse effects on performance. In Asia there continues to be too much reliance on antibiotics, which in the longer term will be a problem for the consumer. Farmers must start by monitoring early growth and change feeding, feeding practice and management to improve. Average growth rates of 450-500g per day are possible for the first 28 days post weaning. It is no longer financially viable to accept 200g per day or less.

● **Lean tissue growth rates (LTGR).** With correct genetics LTGR of 450g per day are possible. The piglet with correct feeding and health is capable of maximising this LTGR from the day of weaning onwards; this early growth is very economic and will yield feed efficiency as low as 1.25:1. This makes a huge contribution to feed efficiency right through to slaughter.

● **Appetite and growth rate after weaning.** It is generally accepted that the piglet needs a good appetite to consume enough feed to grow quickly. Breeding companies are now looking much more closely at appetite as a way of improving performance. Historically, selecting for very lean carcasses on ad-libitum feeding has contributed to some appetite problems. This needs to be watched closely as poor appetite pigs grow slowly, are more prone to disease, require more maintenance feed through to slaughter and often the meat quality is adversely affected. Appetite is also influenced by health, if the piglet is suffering even sub-clinical disease it eats less, converts feed poorly and grows slowly.

● **Ability to grow to higher slaughter weights** (-5kg D/Wt per pig = 172,000 lost margin 90%). Very clearly a way of reducing the output effect of lower numbers of pigs in the system is to raise the slaughter weight. After all in reality it is kg of pig meat we are selling. However, the ability to grow to heavier slaughter weights is challenged by:

● **Genetic choice.** Later maturing animals are capable of growing economic lean meat to 150+kg without becoming too fat or creating feed efficiency problems. Selecting the terminal boar most suited to attaining high slaughter weights is therefore of critical importance.

● **Growth rate.** Slow growth means piglets are in the finishing pens for longer periods, uneven growth also means it takes longer to clear finishing pens at slaughter. Growth rates are significantly affected by terminal boar selection, health status and early post weaning growth.

● **Health status.** Sadly the average health in the Asian pig farms is not good enough and could ultimately affect profitability. The pig simply stops growing before it reaches slaughter weight because of the extreme health burden it carries. Biosecurity is poorly understood, vaccination policy is variable and the use of antibiotics is widespread. It is possible to improve health by:

- Closing the herd to live pig imports and visitors.
- Improved vaccination programmes.
- Segregated disease control.
- All in/all out systems.
- Batch farrowing.
- Improved hygiene routines.
- Creating drier environments less conducive to bacteria and virus survival.

● **Meat quality (regional differences are critically important).** Achieving good efficient growth is vitally important but the value of the carcass which is determined by the processor/consumer is also critical. Many farmers in Asia are producing pigs which are too fat, with low lean meat percentage, poor conformation and very variable.

This is caused by variable genetics, poor health and poor feeding. The selection of the terminal boar is important too but make sure that if the terminal boar adds cost to the efficiency on the farm then there is a higher slaughter price to compensate.

The use of the Berkshire, Duroc and Hampshire terminal boars often create lower feed efficiency on the farm. If this is the case the price for the pig at slaughter should be higher. This can be by as much as 10-15% higher in some cases. Breeding companies need to recognise the importance of meat quality, individual tastes and country preferences and be able to supply customised breeding programmes to ensure the exacting demands of customers, processors and consumers worldwide are met. ■