Pig Development Department

Pig Farmers' Conference, 2016

Conference Proceedings

Horse & Jockey Hotel, 18th October, 2016
Cavan Crystal Hotel, 19th October, 2016

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Tackling some of the puzzling grower health disorders

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Pigs are susceptible to a number of health disorders throughout the growing period. For many of these disorders their identification and treatment can be quite obvious and their effect on pig performance well established. However unfortunately not all of them are so well understood and they can be increasingly frustrating to get to the bottom of. This paper will look at rectal prolapses, rectal stricture, umbilical and inguinal hernias and ear necrosis to see if we can remove some of the mystery behind the cause, prevention and treatment of these disorders.

Rectal Prolapse

A rectal prolapse occurs when part of the rectum protrudes outside the body of the pig through the anus. Frustratingly, rectal prolapses can occur quite rapidly and unexpectedly, in what seems like a very healthy pig. Prolapses can occur sporadically, affecting very few pigs or may occur frequently, affecting a large number of pigs and may even be a persistent problem on farms. Rectal prolapses are caused by a number of different factors so it can often be difficult to pinpoint the exact cause. Their complicated nature makes rectal prolapses one of the most frustrating disorders of growing pigs. Its occurrence can vary greatly between farms (from 0.7 to 15%) and it is related to 8% of grower mortality.

Physiology: Rectal prolapses can occur at any age but most commonly occur in pigs aged 8 to 20 weeks, more often in males. While a number of factors can cause rectal prolapses the main cause is generally related to factors that increase gut pressure which damages the complex combination of muscles, ligaments and connective tissue fibres that hold the rectum in place.

Negative impact: Rectal prolapses have a number of negative side effects. They are painful for the affected pig, reduce feed intake and feed conversion efficiency. It obviously impairs a pigs ability to defecate, which is problematic as the rectum has an unselective absorption capacity. Thus if the pig does not defecate it can result in toxins being absorbed into the bloodstream. Furthermore, a large proportion of prolapses can cause rectal stricture subsequent to treatment due to damage to the tissue of the rectum.

Causes: There are several identified causes associated with rectal prolapse. The table below outlines the main causes.

Table 1. Most common causes of rectal prolapse in growing pigs.

Cause	Details
Diarrhoea	The increased acidic nature of diarrhoea inflames the rectum and may increase risk of rectal prolapse (e.g. often associated with Salmonella, Swine Fever, Swine Dysentery)
Overstocking	Pigs stepping on one another can cause muscle damage resulting in rectal prolapse
Constipation	Rectal swelling and straining may result in rectal prolapse
Nutrition	Sudden diet changes can rapidly increase pressure in the rectum resulting in prolapse. Low fibre levels, high lysine levels and severe shortages of water are associated with rectal prolapses
Birth weight	Piglets of less than 1kg are more prone to rectal prolapse in later life due to reduced levels of muscle fibres at birth followed by period of rapid growth
Tail docking & Tail biting	Physical damage or infection can damage pelvic nerves resulting in rectal prolapse
Coughing	Increased pressure in the abdomen as a result of severe coughing
Antibiotics	Therapeutic use can be associated with increased levels of prolapses
Mycotoxins	Rectal swelling and straining may result in rectal prolapse

Treatments: The main outcomes are; (1) treatment resulting in a full recovery, (2) treatment to ensure the pig is suitable for transport and slaughter or (3) euthanasia. The outcomes are dependent on the level of damage to the prolapse, the age relative to slaughter and overall health status of the pig. Rapid identification and treatment is key to the successful treatment of rectal prolapses. A pig with a prolapse should immediately be removed from the pen, both for the immediate welfare of the pig and to improve the likelihood of recovery. Ideally the pig should be housed individually rather than in a group hospital pen, to avoid further damage. The pig should then be carefully inspected on a daily basis to monitor recovery and revaluate the treatment options if necessary.

In very few cases a small prolapse can repair itself, whereby it will spontaneously go back into the rectum unaided. However once a portion of the rectum is outside the body it begins to swell and fill with fluid, and it is then vulnerable to damage from both its environment and pen mates. If there is no tissue damage manual replacement may be successful. Often a purse string suture around the anus may be placed to retain the rectum, although the success of this method is limited. Once damage to the rectal tissue occurs the chance of recovery is dramatically reduced as the vast

majority will result in complications such as infection and rectal stricture; therefore, euthanasia is the more humane option. If tissue damage has occurred amputation of the prolapsed section is occasionally carried out. Amputation is commonly associated with rectal stricture. Therefore a decision has to be made based on welfare, time management and cost effectiveness grounds, if it is better to euthanise the pig once damage has occurred to the tissue rather than experiencing these difficulties subsequently.

It can be extremely difficult to determine the financial losses associated with rectal prolapse due to the number of different causes, several of which are associated with underlying diseases. However rectal prolapses can result in reduced performance, increased risk of infection and rectal stricture, increased mortality and is associated with increased treatment costs and time investment.

Rectal Stricture ('Pot-bellied' pigs)

Rectal stricture occurs when the tissue of the rectum shrinks and scar tissue develops in a ring at the end of the rectum, slowly (2-3 weeks) narrowing the rectum. It initially causes a partial blockage whereby some ribbon like faecal material can pass. It can further develop into a complete blockage whereby no faecal material can pass. Faeces then collects in the colon causing the abdomen to bloat severely.

Physiology: Identification of rectal stricture is quite easy due to the physical changes that occur. Pigs become pale, hairy, and perhaps yellowish in colour. They then become constipated, stop growing, and may even lose body condition, appear gaunt and the abdomen becomes severely distended (bloated). In the early development of rectal stricture very loose diarrhoea can occur and the abdomen will start to distend gradually until it appears obviously distorted ("pot-bellied").

Negative impacts: When a pig develops rectal stricture the passage of material through the rectum is almost entirely or fully restricted thus the pig should be euthanised.

Causes: In many cases the development of rectal stricture follows a rectal prolapse. However it can also follow infections associated with irritation of the rectum. The site where rectal stricture occurs is supplied by two very small arteries so it has a limited blood supply. Infections causing chronic rectum irritation can damage this already limited blood supply which can result in rectal stricture.

Salmonella, Haemophilus parasuis (Glassers disease) and *Streptococci* infections have been associated with rectal strictures. If rectal stricture affects numerous pigs at the same time, when rectal prolapse is not common, it is likely to be of infectious causes (particularly *Salmonella*).

Treatments: Pigs that develop a visible rectal stricture should be euthanised as soon as possible as there is no feasible treatment for "pot-bellied" pigs. Pigs affected by rectal stricture are deemed not suitable for human consumption and therefore sending to the factory is not an option.

If a farm has an issue with frequent cases of rectal stricture efforts should concentrate on prevention. This involves identifying the initial cause and administering the most appropriate treatment. As rectal strictures likely take 2-3 weeks to develop focusing on this period of the pigs life is key in identifying the cause. As mentioned, rectal structures often follow an untreated or damaged prolapse so rapid assessment and treatment of prolapses is essential. Also it is useful to tag rectal prolapses (cases of all severities) to see if they develop into strictures. Following the same line of thought, rectal strictures can also follow infections or gut irritation therefore monitoring/recording prior health issues in the weeks prior to stricture development may help identify the initial infectious cause. Appropriate treatment of the initial prolapse/infection will reduce the number of cases of rectal stricture. Other general preventative actions include good hygiene practices and moving pigs on an "all-in/all-out" basis.

Umbilical and Inguinal Hernias

Hernias are one of the more obvious physical defects of growing pigs. They occur when there is a weakness somewhere in the abdominal wall, through which intestine can emerge through. There are two main types, inguinal (generally scrotal) hernias, which mainly affect male pigs, and umbilical hernias, which affect both males and females, but females having a higher risk.

The frequency of umbilical hernias ranges from about 0.4% to 1.2% of pigs. Umbilical hernias occur when the supportive muscles around the navel area of the pig are weakened and the intestines of the pig bulge out through the intestinal wall forming ball shaped sac that can vary substantially in size. Usually with umbilical hernias the intestine of the pig is in direct contact with the skin and adhesion can occur (scar tissue connects intestine and skin). This can affect digestion of feed and make the hernia more vulnerable to being ruptured during slaughter risking carcass contamination.

The frequency of inguinal hernias ranges from about 1% to 5%. Inguinal hernias are congenital, i.e. they are predisposed from birth, although it may only become apparent in the subsequent weeks. They are caused when part of the intestines go into the scrotum. This can be more problematic in countries that castrate as intestines can become ruptured. Interestingly scrotal hernias are five times more likely in the left scrotal sac than the right.

Physiology: While the tissue weakness exists from early life the issue of herniation only arises in the growing period. Umbilical ruptures usually develop between 9 – 14 weeks of age and inguinal hernias as early as week 1. It is thought they are related to the rapid growth rates during this growing phase in conjunction with rapid weight gain of the intestines.

As mentioned, inguinal hernias are congenital. For umbilical hernias genetics and environment are the central causes. Genetics may predispose a pig to a musculature weakness which could result in rupture or be exacerbated by environmental conditions resulting in a rupture. The main environmental causes of umbilical hernias are stretching of the umbilical cord at birth or umbilical cord infection or abscessation.

Negative impacts: When hernias are present they provide permanent location for risk of injury and source of infection. They can restrict the normal movement of the pig and cause discomfort. Umbilical hernias result in reduced growth rates and increased mortality, irrespective of the size of the hernia. Mortality occurs due to intestinal strangulation, and rupture of infected hernias. Intestinal strangulation occurs when the part of the intestine that is poking through has its blood supply cut off, so the tissue begins to die. The risk of this happening is actually higher with a small hernia (i.e. smaller than 8 cm). Pigs with hernias also have a lower slaughter value as they require special attention to prevent carcass contamination. Hernias represented 7.4% of cases of pigs detained for special attention prior to slaughter an Irish study.

Prevention and treatment: Treatment involves surgery, which is not cost effective, so pigs should be sent to slaughter within a month of detection, due to the reduced production efficiency and secondary complications (hernia rupture, intestinal strangulation and death). Pigs with large hernias which touch the ground, hernias that impede movement, and hernias that have an open wound or obvious infection should be euthanised immediately as they are at a high risk of serious infection and suffering and will be condemned at slaughter.

Once again prevention strategies are key to controlling hernias. For umbilical hernia birth is the key time period to target for prevention. Farrowing house hygiene is essential and all crates should be thoroughly cleaned disinfected and dried before the sows are moved in. Drying powders on the heat pads can also be beneficial as this will dry out the umbilical cord preventing bacterial growth. Disinfection of the umbilical cord (i.e. iodine) soon after birth should be practiced. Additionally, do not stretch the umbilical cord if moving new-born piglets from behind the sow.

The occurrence of hernias cannot be controlled purely by genetics, as a combination of genetics and management is required. If it's thought that the occurrence of hernias on a farm is associated with genetics, farms should work with their genetic suppliers. However preventive management practices mentioned above should be followed also to eliminate the issue.

Ear necrosis

Ear necrosis in pigs is a disorder that largely appears shortly after weaning or post remixing, and generally affects pigs from 4 to 10 weeks of age. It occurs sporadically in weaned and growing pigs under all management systems. Initially it appears as small black scab-like lesions on the tips of the ears. The black lesions normally cover a split in the skin or a small ulcer, which is visible if the black area is scraped off. The lesions may spread along the edge of the ear, which in serious cases can result in ear flap gradually eroding, with potentially more than half of the ear flap being lost. Outbreaks are often related to individual pens, with up to 80% of pigs affected. The lesions usually resolve themselves, with the skin healing and repairing after several weeks.

Physiology: It is thought that minor breaks in the skin allow access to bacteria, which can become "sealed in" under a greasy film. This then then allows the bacteria to multiply. It is thought that poor blood supply to the ear flap limits the immune response which allows bacterial growth. This leads to blockage of small blood vessels starving the tissue of oxygen and leading to tissue necrosis (death). As the ear erodes away, the infection then reaches areas with better blood supply allowing the immune reaction to fight the infection and healing to occur. There are two main aspects to the physiology of ear necrosis: the actual effects on the ear, and the presence of causative bacteria.

The majority of affected pigs have crusting dermatitis (skin), which can appear like skin wearing away or be severe enough that there is ulcer formation. There are various levels of severity when it comes to the number of immune cells present and there are large numbers of bacteria present in the

lesions. It has been found that the lesions begin on the surface and progress to deeper layers, causing inflammation of the blood vessels and formation of blood clots.

Two bacterial strains are the most commonly associated with ear necrosis; Staphylococcus aureus and Staphylococcus hyicus (the cause of greasy pig disease). In some cases previous episodes of greasy pig are associated with subsequent ear necrosis outbreaks. It is though that S. hyicus is the bacterium that initially sets in, followed by more invasive bacteria, which can cause the more serious ulcers and necrosis (dying of the tissue).

Negative impacts: In general, ear necrosis is considered to have little effect on pig performance when the lesions are mild to moderate. Pigs with ear tip necrosis usually continue to grow well and appetite is unaffected. There are also no issues with condemnation of heads at slaughter suggesting that infection is confined to the ear. However, pigs with ear necrosis can fail to thrive, and high levels of ear necrosis lesions have been observed when there is a high seroprevalence of PCV2 infection. Moreover, there is a risk of developing septic arthritis or death from secondary bacterial septicaemia. A secondary effect is that if the affected ears are knocked or damaged they can start to bleed, which can then stimulate outbreaks of ear-biting amongst the pigs. Thus ear necrosis can be considered to be primarily a health and welfare problem on the farm, rather than a production issue.

Causes: Ear necrosis appears to be influenced by both environmental and management factors. In general the evidence points towards infection with bacteria setting in after the ears have been damaged (e.g. fighting or ear biting). This could be why it develops shortly after weaning, due to the fighting associated with mixing of pigs. It is seen in both sexes, and mixed and single sex pens are equally affected. There is often long term persistence of the problem, which implies that there is little influence of season or weather conditions. Ear tip necrosis is often evident when other disease issues affect the pigs e.g. respiratory disease. Immunosuppressive diseases, such as Porcine Circovirus type 2 (PCV2), Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), and mycotoxins are associated with its occurrence.

Some of the other risk factors that have been identified in various studies include:

- Environment: Humid environment, poor air quality, fully slatted flooring without straw, high stocking density of newly weaned pigs
- Ear biting present on the farm
- Mange
- Early weaning
- Feed and dirt on the tip of the ears

Prevention and treatment: Ear necrosis can be difficult to prevent and treat. Assessment of the above risk factors should be a first step in evaluating how to deal with repeated or continuous occurrence of outbreaks within a farm. Minimising damage to the ear is essential. Stressful events for the pigs should be minimized, and appropriate management practices should be followed. Increasing space allowance, providing additional environmental enrichment, and ensuring easy access to feed and water are additional strategies that can help reduce its occurrence. The washing of sows prior to entry to the farrowing house, particularly if there is a large proportion of gilts, has been found to reduce outbreaks of ear necrosis. The spraying of pigs with Savlon or Virkon S at weaning as a prevention method has a mixed response rate. If undertaken needs to be carried out for 3 consecutive days after weaning. Hygienic routines should also be assessed; the age of the pig means that there tends to be a relatively high level of grease in the environment due to being fed creep and starter feed, so use of a detergent to clean pens could be considered. Particular attention could be given to areas that could harbour bacteria, such as around drinkers. Proper immunization against PCV2 is also important. Where other disease is also occurring on the farm (pneumonia, colitis etc.) effective treatment of these conditions will often help to reduce the occurrence of ear necrosis.

For severe lesions, tincture of iodine, applied topically for 1 week can reduce the incidence and severity of the disease. Recent work in Moorepark found antimicrobials included in feed reduced ear necrosis even though they performed more ear directed behaviour. The antimicrobials may have provided some protection from the establishment of bacteria within the wounds. The problem however, with excessive use of antimicrobials, is that they are often not effective, likely due to drug resistance. Analysis of bacteria found in necrotic ear lesions has found very high levels of antimicrobial resistance, so their use should not be encouraged unless absolutely necessary.

Summary

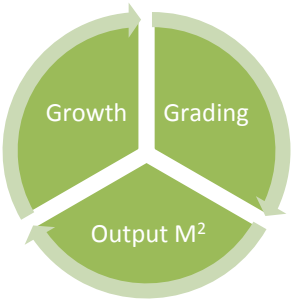
- Rectal prolapse: Full recovery is limited. Prolapse may not reoccur but it can subsequently lead to rectal stricture or infection. Early identification, isolation and treatment are essential if recovery is to occur.
- Rectal stricture ("pot-bellied"): Caused by a previous rectal prolapse or irritation/damage to the rectum. There is no treatment for rectal stricture thus a pig should be euthanised once it is detected. Prevention strategies are essential in management of rectal stricture.
- Hernias: Causes reduced growth rates and increased mortality. Pigs are susceptible to infection and intestinal rupture. Umbilical hernias can be caused by environmental and genetic factors while inguinal hernias are congenital. Careful management to prevent occurrence is the most effective control strategy.
- Ear necrosis: Caused by minor breaks in the skin allowing access to bacteria. Mild to moderate lesions have little effect on pig performance but pigs with severe ear necrosis can fail to thrive and can stimulate ear-biting outbreaks and infection. Ear necrosis can be difficult to prevent and treat. Good environmental and management factors key to control.

References available on request

Optimising your finisher sales strategy

Michael McKeon, Teagasc Moorepark

The average Irish sale weight per pig has increased steadily by 1 kg per year over the last decade. Traditionally this would have resulted in a pro-rata increase in finisher accommodation. However low profit margins and a dramatic increase in sow prolificacy has resulted in some pig units being stocked within the legal limits but at sub –optimum levels for maximum performance. The result is an invisible loss of much needed profitability. The three areas that are leaking profit potential are:



Growth rates

The legal floor space requirements for growing pigs are illustrated in Table 1 but pigs stocked at these levels are unlikely to grow to their maximum efficiency between 85-110 kg. Reduced floor area/space in the weeks prior to slaughter will result in increased competition and stress thereby reducing the average daily gain (ADG) and increasing the feed conversion efficiency (FCE) of the pigs.

Table 1: *Minimum legal floor space allowances for different weights of pigs*

Average Pen Liveweight	M^2	Ft^2
10kg or less	0.15	1.61
Between 10kg & 20kg	0.20	2.15
Between 20kg & 30kg	0.3	3.23
Between 30kg & 50kg	0.4	4.3
Between 50kg & 85kg	0.55	5.9
Between 85kg & 110kg	0.65	7.0
More than 110kg	1.0	10.75

A study by Gonyou et al estimated the optimum space requirement per pig and the space reduction required to give a 5% decrease in growth rates. The average sale weight in Ireland (ePM 2015) was

108kgs which according to Gonyou requires 0.78M^2 (8.4ft^2) to achieve optimum growth rates. Many units in Ireland in recent years are struggling to achieve this space allowance.

Table 2: *Recommended floor space allowance for different weights of pig*

Average pen weight Kg	Optimum		5% reduction in ADG	
	FT^2	M^2	FT^2	M^2
46	2.9	0.269	2.5	0.232
68	4.6	0.427	3.9	0.362
92	6.1	0.566	5.2	0.483
108	**8.38**	**0.778**	7.12	0.661
113	8.61	0.799	7.32	0.680
117	8.84	0.821	7.52	0.698
123	9.07	0.842	7.71	0.716
127	9.29	0.863	7.9	0.733
132	9.51	0.883	8.09	0.751
136	9.73	0.903	8.27	0.768

The floor space requirement becomes a limiting factor in the last weeks before sale. If pigs have sub-optimum floor area at this stage their growth rates decrease significantly, reducing the overall efficiency of the finishing unit.

Grading

The higher the stocking rate above the optimum then the greater the increase in weight variation within the pen as there is less feeding time per pig as the number of pigs per feeder increases. Larger pigs are better able to cope by eating faster but unfortunately smaller pigs suffer reduced feed intakes. In long-trough feeding systems the small pigs may be squeezed out at feeding time but even on ad-lib feed systems the reduced feeding time for small/timid pig's results in a reduction in daily feed intake with a consequential reduction in growth rate. These reduced growth rates generate an increased variation in sale weights within pens.

Research by Georgsson using either one or two ad-lib feeders for a pen of 16 pigs revealed that the smallest pigs suffered a significant decrease in daily growth rates (70 g/day) when reduced to one feeder, while the mid-sized pigs were unaffected and the largest pigs actually increased their growth rates.

Table 3: *Effect of increased pen competition on growth performance*

	2 feeders	**1 feeder**
Small pigs		
Start wt Kg	61	55
Finish wt Kg	110	110
Daily Feed Intake Kg/day	2.62	2.29
ADG g/day	**830**	**761**
Medium pigs		
Start wt	69	68
Finish wt	110	110
Daily Feed Intake Kg/day	2.8	2.77
ADG g/day	**861**	**883**
Large pigs		
Start wt	75	79
Finish wt	110	110
Daily Feed Intake Kg/day	2.79	3.15
ADG g/day	**872**	**940**

The reduced growth rates of small pigs when the stocking rates are high leads to increased sale weight variation within pens. This increased variation inevitably leads to more slaughter pigs falling out of the premium price brackets (either too heavy or too light) with a resultant decrease in the average price/kg. This weight variation on some units is reducing the average price per kg sold by 3 cent due to over-weights and underweight penalties. On an average 500 sow unit this is an annual loss of €32,700.

Output per M^2

Pig performance must be balanced with generating the maximum output of pigmeat that the buildings can produce. However it is difficult to maximise output while not compromising the growth and feed efficiency of the pig. Highly stocked pens will generate high output per M^2 of floor space but it may be at the expense of FCE, conversely lowly stocked pens may produce the best growth and feed efficiency but the accommodation cost is too high.

If your unit is stocked above the optimum then obviously the medium term solution is to decrease sow numbers to the required number or build extra weaner and finisher accommodation. However these two options can take time to fund, plan and build. In the short term the most effective strategy is to ensure that finisher pigs are unsorted into the finisher accommodation and then remove the heaviest 15-20% of pigs three weeks before their expected pen slaughter date. Numerous studies show that when the heaviest pigs are removed from a pen, in a single selection, the remaining pigs experience increased performance due to higher feed intake and better feed utilisation (less stress).

A trial by DeDecker illustrates the effect of removing the biggest pigs three weeks before sale. In this trial 52 pigs per pen were left either: completely intact until sale, numbers were reduced by 25%, numbers reduced by 50%, three weeks before sale. The subsequent higher performance of the remaining pigs illustrates the benefit of this program.

Table 4: *Effect of selection of 'Tops' on remaining pen-mates (DeDecker)*

	% Pigs removed from pen		
	0	**25%**	**50%**
Live wt. of all pigs before removal	113	113.7	113.3
Live wt. remaining pigs - Start	113	110.5	105.8
Live wt. remaining pigs – Finish (19 days)	126	126.5	122.2
Daily Feed Intake Kg	2.8	3.1	3.0
ADG g/day (113-126)	**659**	**829**	**834**
FCE (113-126 kg)	**4.2**	**3.8**	**3.6**

However does the higher ADG and FCE compensate for the requirement to sell a percentage of the pigs three weeks earlier? The calculated pigmeat output per M^2 shown below illustrates that by selling 25% of the pigs in advance the output/m^2 can still be maintained while still benefiting from the superior ADG & FCE.

Table 5: *Effect of 'Top' selection on overall liveweight output per M^2*

	% Pigs removed from pen		
	0	**25%**	**50%**
No. of pigs per pen	52	52	52
No. of pigs sold at 113kg	0	13	26
No. of pigs sold at 126kg	52	39	26
Av. number of days / pig	116.65	111.90	107.15
Finish wt / pig (kg)	126	126.5	122.2
Total weight gain/pen (kg)	4992	4972.5	4763.2
Weight gain per M2 (kgs)	142.59	142.03	136.05
Days per cycle	119	119	119
Cycles per year	3.06	3.06	3.06
Liveweight gain /M^2/Year (kgs)	**436.32**	**434.61**	**416.32**

If implementing this policy it is important to ensure that the three week pre-sale selection is taken from all pens of the same age – hence the importance of the pigs being unsorted entering the finisher accommodation. Otherwise only a few pens will benefit from improved performance rather than the whole week's sale.

Actions Points:

- Stocking at sub-optimum stocking rates may be causing a loss of profit potential
- Calculate the required finisher stocking levels for your unit
- If your stocking rate is too high, in the medium-term plan to add extra finisher accommodation or reduce sow herd size.
- In the short term, stop grading finishers into the finisher house
- Begin taking the 'tops' of all finisher pens three weeks prior to expected sale date.

Optimising the flow of pigs for better health and feed efficiency

Dr. Edgar Garcia Manzanilla, Teagasc Moorepark

In coordination with the paper in the same volume "Optimising Your Finisher Sales Strategy" by Michael McKeon, here we cover issues related to the creation of the groups of pigs in earlier stages to decrease health issues and improve feed efficiency. Two main strategies are used in Irish farms when it comes to creating groups of piglets and finishers; some farmers want to create homogeneous groups early in the production cycle and then send the whole pen to the abattoir with no selection, and some others do a few changes in the early stages and select animals to be sent to the abattoir from different pens. The first option often does not allow proper all-in-all-out management and has consequences for pig growth if not done properly. In the worst case scenario both strategies are combined which results in lots of extra work and no real benefit.

The importance of immune system and stress

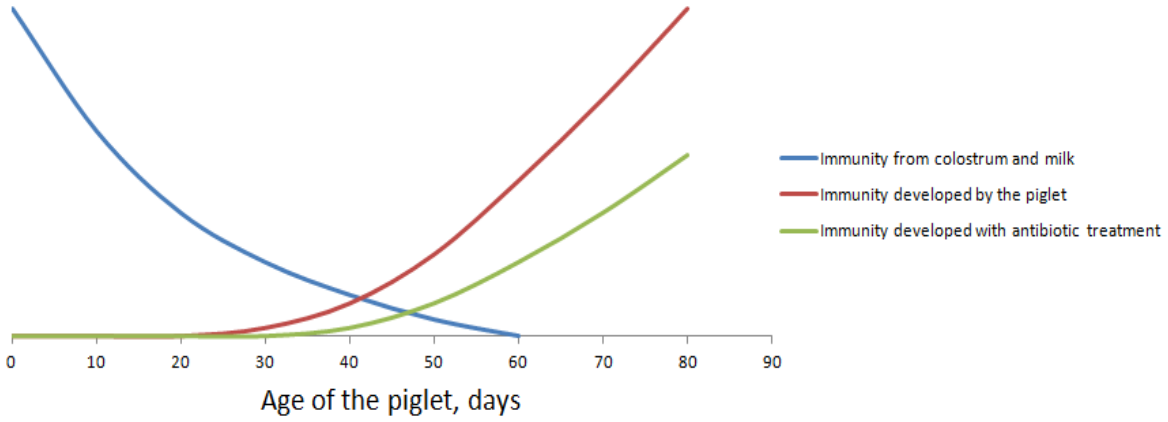
Every stress you place on your animals affects their ability to cope with disease. It is a physiological response. When animals suffer a stress their bodies prepare to escape. When animals have a disease their bodies prepare to rest. Both responses cannot go together. Thus, stress has to inactivate the immune response to disease because escaping is a priority. When the piglet is separated from the sow several stressors happen together. Removal of milk, a colder environment and mixing with other litters are the main ones. If we are able to separate these stressors over time we can minimise their effect. That is, for example, the idea behind creep feeding, to have the change from milk to feed separated from the mixing and cold environment.

In order to minimise health issues and heterogeneity of the pig groups, mixing of animals has to be reduced and done under the best conditions. Animals will run out of maternal immunity shortly after weaning. That is not a good time to remix animals because any disease will spread fast. It will be much better if you can mix whole litters than trying to arrange all animals by size. Remember also that date of birth has an important effect on weight at weaning and should be considered when grouping litters. Thus animals that are smaller at weaning because they were born later may still catch up with apparently heavier animals. A difference of a week in birth date can comprise 2kg in average body weight of the animals in a litter. Give them time. There are systems that allow litters to mingle together before they are moved. Removing separations between sow pens, for example, is proven to be an easy and effective way to get piglets used to each other but is rarely practiced in

farms. This removes one of the sources of stress at weaning. With creep feeding and allowing the piglets to mingle in the farrowing room, piglets will be much more competent to face the new environment in the weaning stage.

The development of the immune response

There is a period of time when the piglet will be unprotected from disease shortly after weaning. Between 40 and 60 days of age approximately, pigs lose the immunity they got from colostrum and milk and they are developing their own.



LACTATION	1st St WEANER	2nd St WEANER

Pigs have to be exposed to certain pathogens in order to develop their immunity. That is why you vaccinate them many times. Mixing animals during this time will again create an unnecessary stress that will not allow them to produce the appropriate immune response and will spread any pathogen that is circulating. Keep the groups you created at weaning at least until the end of 2nd stage when the pigs will be better prepared to face disease.

An important point to consider is the use of antibiotics. If you are treating your animals with antibiotics for the whole weaning period (1st and 2nd) you are protecting them from bacterial disease but you are also inhibiting the development of their own natural immunity. Sooner or later you will have to remove the antibiotics and the pigs will have to face the disease by themselves. Try to use antibiotics, if necessary, only one week after they are moved to first and second stage and then allow them to develop their own immune system before they are moved again.

Creating a separated flow of animals

If you still want to have groups for big and small animals there are a couple of options you can use. If your farm is big enough you will have a significant number of animals that will fall behind the main group and will be going to the slaughter house up to 6 weeks later. Generally, these animals are 10 to 20% of the total weekly batch. You will rarely have a hospital this size and hospitals do not have a weekly organisation. Consider creating a slow flow within your farm in a separate facility.

These pigs can be kept in the same systems you were using until then. Then you can take advantage of this change and reorganise the farm to move the rest of the animals faster to a finisher diet. In many cases pigs are kept on weaner diets and/or medicated diets because some of them have issues. However there is a majority of pigs that would do fine with cheaper diets and no antibiotics. Remember that in the rest of the world pigs are moved to growing phase as soon as they are 20-25kg. This difference is the single major reason why Ireland has such high feed costs compared to other countries.

Table 1. *Cost of the feed per pig in the different stages of production (Interpig 2015)*

	Denmark	France	Spain	Germany	Netherlands	Ireland
Sow feed cost/pig	10.9	12.8	11.3	11.3	11.0	13.9
Weaner feed cost/pig	13.1	10.1	9.00	13.8	12.0	22.5
Finisher feed cost/pig	48.9	61.4	58.9	58.6	55.8	53.9

Changing your system

Small farms are the ones more affected whenever a crisis hits the sector. These farms have high costs for staff and logistics and many of them disappear in each pig price crisis. For small farms that would like to decrease the workload, working in a 3-week farrowing system instead of a 1-week system may be a good solution. It pools the work by weeks, decreases the work load, but also makes a clear separation between the batches and allows a better organisation of the animals.

As an example let's suppose you have a 300 sow farm producing 160 animals a week. You will have 15-30 animals that are smaller than the rest. Probably not even enough for a pen, and not worth keeping them for longer time as they are more a logistics problem than anything else. The batch will still be quite heterogeneous and you have to select the animals from different rooms every week to send them to slaughter house. In a 3 week system, the batch would be almost 480 pigs and you can

organize them by weight. You can do that even when pooling litters at weaning. You still will have variability between the groups and will have a weekly batch for the slaughter house but management of the groups will be much easier. And the group of small pigs will be bigger and will have more time to develop. This is especially suitable for farms that have finishers in Trowbridge systems because this allows for more flexibility when sending animals to slaughter.

Dealing with the sow repeats may be an issue initially and you have to pay attention to non-productive days, however it can be a more sustainable system.

Conclusions

- Minimise mixing of pigs and try to separate stressors to reduce their effect.
- Remember the critical times for immune response of piglets and do not mix them then.
- Consider adapting your farm to your particular situation and creating separated management for small pigs. Not all farms can use the same working system.

A new meat inspection system incorporating measures of pig health and welfare for Ireland

Dr. Laura Boyle, Teagasc Moorepark

Introduction

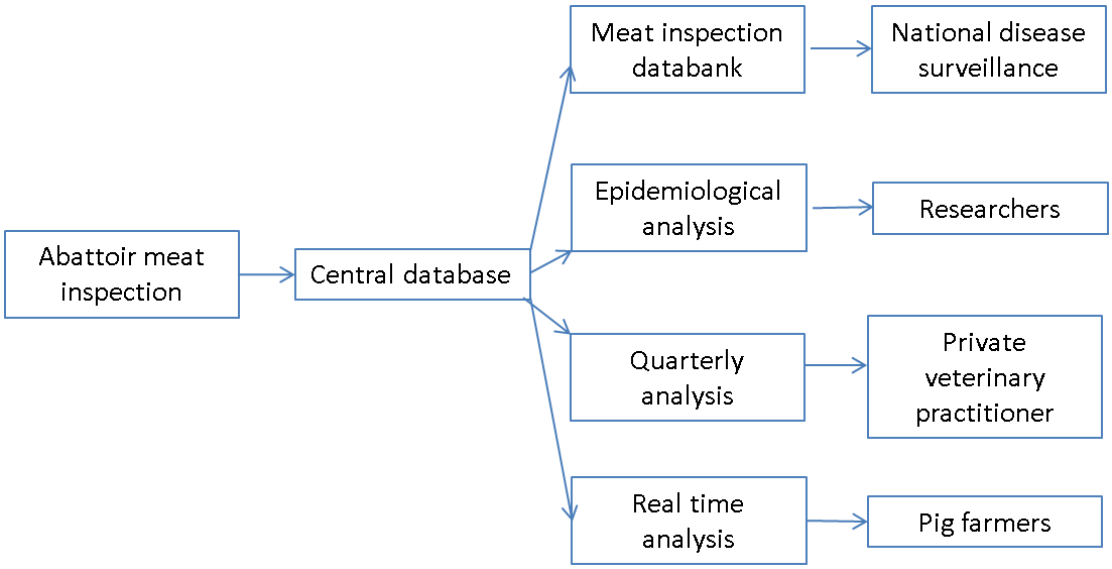
The main purpose of meat inspection (MI) is to protect public health such that consumers are assured about the safety and hygiene of their food. Through checks on the live animal (ante-mortem), the carcase and viscera (post-mortem), MI can also help detect and prevent public health hazards such as food-borne pathogens or chemical contaminants in food of animal origin. It is now well recognised that such inspections also play an important role in assessment of animal health as well as detection of certain welfare conditions. MI includes inspections conducted ante mortem and post mortem to check for signs of abnormalities such as pathological lesions resulting from disease or injury, that would present a public health risk or indicate animal health or welfare concerns. If such abnormalities are observed, the meat and/or viscera is declared unfit for human consumption i.e. partially or fully rejected/condemned.

EU Meat Hygiene Package

In April 2004, Regulation (EC) No. 854/2004 of the European Parliament and of the Council of 29 April 2004 was introduced as part of the 'EU Hygiene Package' laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption. This regulation details conditions to be detected by MI and which might result in carcass condemnation but there is no legal requirement to employ a standardised recording system (e.g. checklist). Nevertheless the regulation demands that significant findings from MI affecting public and animal health are supplied to the producer and where necessary his/her private veterinary practitioner (PVP). EU law further requires 'factory returns' to be sent to producers detailing the following information: carcass number and weight, estimated lean meat content and total price paid. However, Regulation (EC) 854/2004 does not require reasons for or the anatomical location of partial carcass condemnations to be reported back to producers and veterinarians.

Standardised computerised MI data capture in EU countries

Some (EU) member states go beyond EU requirements for MI data capture and utilisation. The Netherlands and Denmark were foremost in developing standardised, computer-based systems for recording and utilisation of pig MI data in the EU. Such computerised databases facilitate the use of information for national disease surveillance (Figure 1). For example, the Danish pig health scheme aims to identify farms with particularly high prevalences of carcass condemnations and subsequently provide them with the opportunity for expert veterinary assistance. This stimulates the development of animal disease prevention strategies at producer level, also promoting improvements in productivity and animal welfare. The UK has recently introduced similar initiatives for the same reason. Computerised systems offer additional benefits to disease surveillance facilitating different types of analysis by different stakeholders with the overall aim of improving the health and welfare of the national pig herd (Figure 1), and as a consequence the sustainability of the industry.



In Northern Ireland (NI) the specific cause and anatomical location of pig carcass damage leading to condemnation has been recorded in all abattoirs since 1969. Currently all meat plants in NI use touch screens for data collection; each condition is coded and entered in the screen for carcasses or viscera as appropriate. This is uploaded to APHIS (the Department of Agriculture and Rural Development's Animal and Public Health Information System) from which it can be accessed by producers and their production advisers (via APHIS–on-Line), and by their private veterinary practitioners (via an internet-based system known as "e-PVP"). In NI pig MI and carcass quality (e.g. carcass grading, fat

class etc.) results are also automatically uploaded from processing plants to an online database through the free Pig Grading Information Scheme (PiGIS), introduced in 2007. Producers registered with the scheme can access real time results of MI for each batch of their animals as regards carcass weight, number of condemnations and quality. Access to records of previous batches and the top producers enables comparison of performance over time and at industry level for individual producers.

What is the current situation in Ireland?

In Ireland the situation is very different and there is currently no standardised or computerised system of reporting the findings of MI to producers (Harley et al., 2012). This is in spite of considerable discussion and debate on the topic and even the identification by the Federal Veterinary Office of non-compliance with EU regulations on recording and communication of MI results in Ireland (FVO, 2006). DAFM responded at the time that a system for feedback of relevant information was in development. However, in 2008 the urgent need for a National Pig Health Monitoring Scheme was again highlighted in a Development Strategy Document for the Irish pig industry (Teagasc, 2008).

The Strategy Document also noted that inadequate feedback from meat plants to producers was fuelling high levels of distrust for abattoirs by producers. These communication difficulties and distrust were confirmed in social science research conducted under the DAFM funded PIGWELFIND project (Devitt et al., 2016). The authors called for positive relationships to be built across the supply chain based on trust, commitment and satisfaction in order to make progress in developing meat inspection as a tool to improve pig health and welfare.

At the 2010 Teagasc pig farmer's conference a paper by the British Pig Executive (BPEX) lead veterinarian Derek Armstrong on the BPEX Pig Health Scheme (BPHS) ignited significant interest amongst producers in obtaining information on a range of health conditions from their pigs in abattoirs. Derek outlined how the BPHS reports the results to participating abattoirs, producers and vets and how the reports are being used routinely to tackle health issues on farm and to guide the selection of control strategies, such as vaccine and worming policies. He presented results from the University of Cambridge which evaluated the BPHS and found that where 10% of the pigs in a batch had pleurisy the associated costs to the producer were 226p/pig and to the abattoir were 29p/pig

associated with higher processing costs. Management factors were also identified that differed on units that had a consistent pleurisy problem from those that did not.

In January 2016, ten years on from the FVO inspection identifying areas of non-compliance, the Report of the Pig Industry Stakeholder Group recommended that the 'implementation of the programme involving feedback of real time post mortem data from factories to producers via touch screen technology…….be expedited and prioritised'. The report stressed how the potential benefits of such feedback to pig production (with its shorter lifecycle and intensive systems) are far greater than the potential benefits in less intensive, longer cycle sectors such as beef (DAFM, 2016). Most importantly pig producers would be able to establish the health and disease status of their pigs, monitor their herds for emerging diseases and for the effect of interventions, vaccination or worming programmes and benchmark potential improvements/deteriorations in the health of their pigs against themselves over time and against other pig producers.

The PIGWELFIND prototype

Since the publication of the stakeholder report mentioned above the DAFM funded PIGWELFIND project completed in June this year. The outputs of that project brought the possibility of computerising and standardising the process of meat inspection a little closer to reality. Firstly a standardised protocol was developed for recording MI findings at both ante and post mortem MI. The protocol was informed not only by three years of farm and factory based research but also stakeholder interviews and workshops as well as reviews of existing systems (e.g. Beef Health Check and PIGiS and CIA in Northern Ireland). It includes classification and/or scoring systems for the carcass (abscessation, arthritis and plural adhesions to the rib cage (parietal pleurisy)) and the viscera (visceral pleurisy, pneumonia, pericarditis, peritonitis, ascariasis and visceral abscesses) as well as an identification and scoring system for the skin and tail carcass lesions which were the focus of much of the PIGWELFIND research. The PIGWELFIND project brought the protocol to life in the form of a touchscreen computerised prototype thanks to the involvement of two companies involved in the development of software and hardware solutions (GS1 and Globeweigh).

The resulting PIGWELFND prototype we developed would facilitate:

- Sensitive and specific detection and anatomical location of carcass and viscera lesions and condemnations
- Computerised data capture
- Linking of the captured data to the farm of origin and providing 'live' access to MI findings
- Analysis of the captured data such that benchmarking is possible
- Communication of the captured data/results to pig producers and PVPs

In practice the system is designed for use by the temporary veterinary inspectors (TVIs) who conduct ante and post mortem MI in the lairage and on the factory floor. To support TVIs in adapting the PIGWELFIND prototype for recording the findings of MI the project team also developed associated training webinars which are hosted on the UCD website.

Chinese pigmeat industry adapting to shifting dynamics

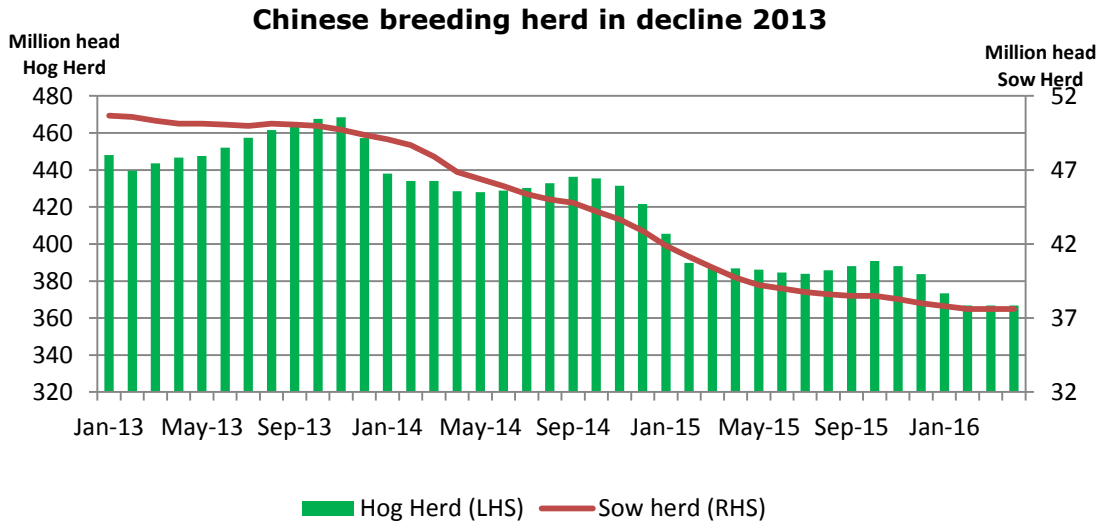
Peter Duggan, Bord Bia-Dublin

Background

China is one of the most important meat markets amongst the major world economies. This market is characterised by an ongoing strengthening in demand for protein based products against a background where agricultural production is falling due to environmental and profitability reasons. Overall, meat consumption in China has quadrupled over the past thirty years due to population growth combined with rising incomes and urbanisation where 320 million consumers are considered middle class; this population segment is larger than the entire population of the USA.

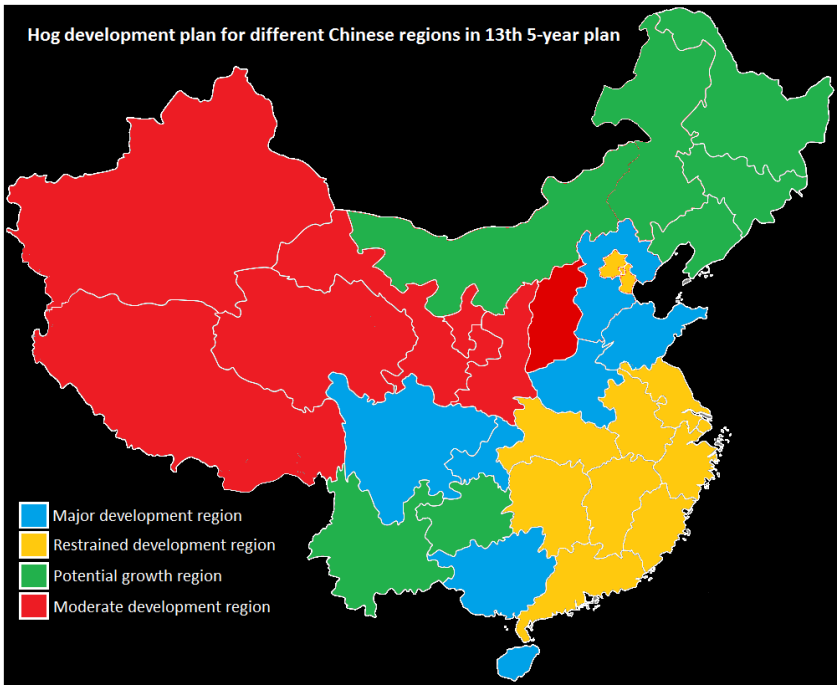
Declining Chinese Pigmeat Production

Chinese pigmeat production is expected to fall by almost 3% during 2016 to 53.5 million tonnes compared to 2015 levels reflecting lower breeding herd numbers, high internal grain prices and environmental challenges. Widespread culling of the Chinese herd since the beginning of 2013 has seen the latest breeding herd numbers fall by 27 per cent to 37.6 million head in March 2016. Some replenishment in the Chinese breeding herd is expected to materialise in the coming months, but at a slower pace, as producers cautiously rebuild due to current price fluctuations and environmental challenges. Government crackdowns on unsafe backyard pigmeat production which were introduced in January 2015 have led to many closures of smaller farms and abattoirs.

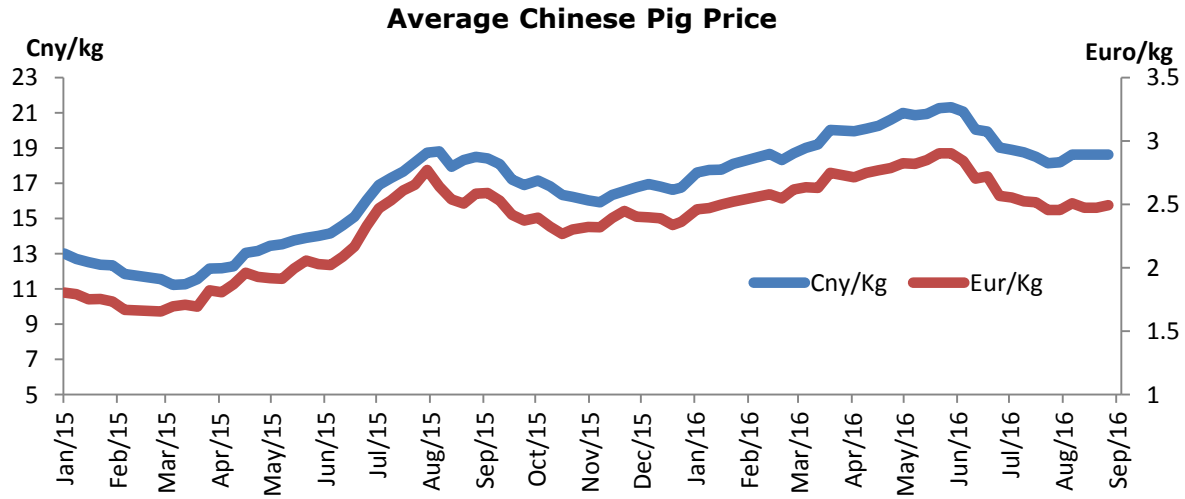


In the latest 13th five year plan, Chinese government policy is targeting a switch in pig production away from major centres of population. Instead, future development will be concentrated in some

traditional regions and a number of potential growth regions in the North and South of the country. This, along with other factors, may limit the ability of the Chinese industry to recover from the decline in the pig herd which occurred from 2014, despite record pig prices.



Chinese pig prices in Euro terms have risen significantly since January 2015 when they were €1.80/kg before peaking at €2.90/kg during the Summer of 2016. However, prices have been in decline with the latest prices around 45 cent lower at €2.45/kg.

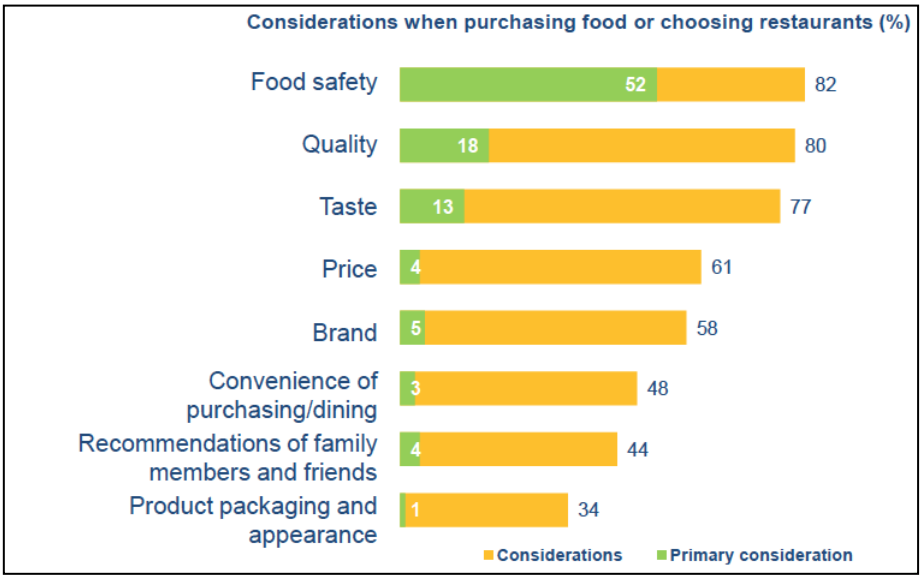


Market Trends & Opportunities

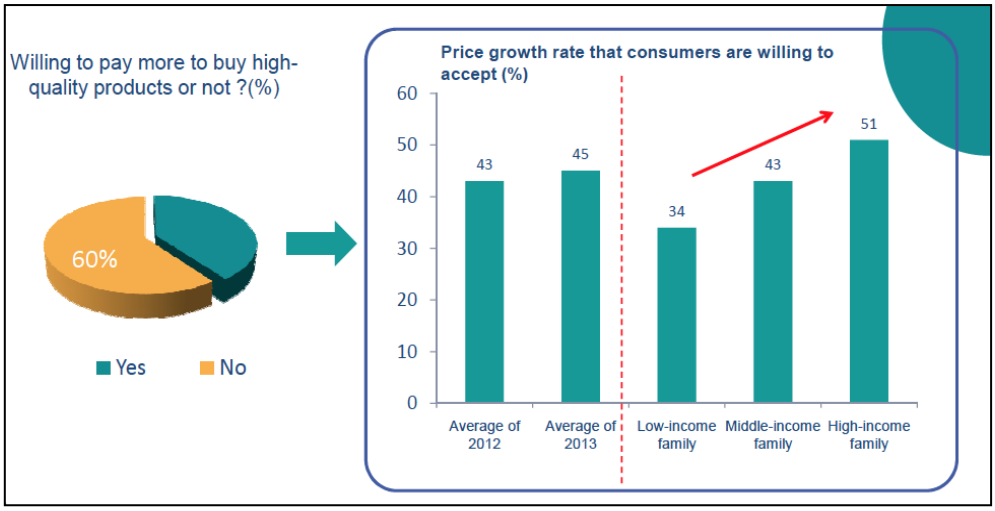
It is expected that Chinese per capita consumption of pigmeat will continue to grow over the next 5 and 10 years, but will be slower than in the past, with strongest growth in rural communities, which still lags well behind urban centres in terms of wealth and disposable income. In addition to the main drivers of increased meat consumption there are a number of specific trends which offer opportunities for increasing market share for Irish pigmeat.

Increasing demand for improved quality & optimise food safety

There has been a long standing association of Chinese consumers wanting premium products from well-known brands for their luxury attributes that reflect an individuals' status. When it comes to the meat category this is no exception with quality of paramount importance to consumers. Having seen what their Western counterparts have become accustomed to, there are many consumers in China, especially the more affluent middle classes, that want products of a similar standard and quality in terms of meat being safe, trustworthy and of high quality. Recent food scares in China have also influenced consumer behaviour, attitudes and purchasing habits and as a result food safety is the greatest concern for Chinese consumers in urban areas when purchasing food as well as quality among other factors.



Chinese consumers, especially middle and high income families, are also increasingly willing to pay a price premium for high quality food.

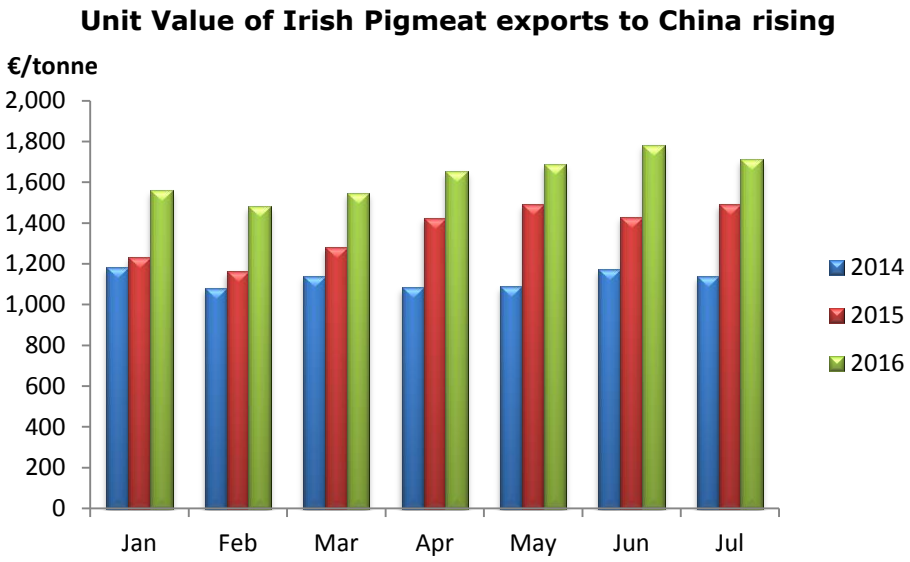


With increasing disposable incomes, the demand for improved quality is increasing which is reflected in awareness of cuts and quality differences. The overwhelming majority (98%) of Chinese grocery shoppers, who participated in a Bord Bia commissioned PERIscope survey, check for a symbol or certificate of quality when buying food produce. This will facilitate the marketing of better quality products to a vast group of new consumers, notwithstanding the fact that value-conscious consumers will still represent a large percentage of the market, as they look for cheaper alternatives.

Chinese import demand building

Rabobank expect that Chinese pigmeat imports will increase by around 29 per cent to 2 million tonnes during 2016 compared to 2015 levels. It appears increasingly likely that Chinese demand for imported pork will remain strong well into 2017 and probably beyond.

For the first seven months of 2016, Irish pigmeat exports to China have increased by 14 per cent to 150,000 tonnes compared to the corresponding period in 2015. A significant increase in shipments to the Chinese market has offset lower volumes to the UK and some International markets. The unit value of Irish pigmeat shipped to China continues to rise reflecting an increased demand for more sophisticated products than have traditionally been exported. The 2016 year to date figure shows that the unit value has risen by around 20 per cent compared to 2015 levels


Unit Value of Irish Pigmeat exports to China rising
€/tonne
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
2014
2015
2016

Investing in people – Why bother?

Ashley Hughes, Associate Professor at Michael Smurfit Graduate School of Business

Introduction

At its core, management means achieving goals and delivering results, but the responsibility entails so much more. Managers have to get people to pull together, figure out a workable process, think strategically and deliver operationally, manage the highs and lows and keep the current show on the road while simultaneously planning for the future. It's a lot to juggle.

So given this landscape, what makes for a good people manager? Is it something to do with inward characteristics, such as self-confidence and determination? Is it more about outward presence, being able to communicate effectively and garner support? Or is it about the ability to take the right decisions and smooth the path for implementation? The answer is all of the above, plus so much more.

In many ways it's far easier to manage work than it is to manage people which may explain why many managers place the emphasis on their systems and processes. Focusing on the people often comes further down the priority list and managers may be unsure how to engage effectively. The good news is that the soft skills required for effective people management can be learnt and applied by everyone.

Why focus on people?

Why bother?

"There may ultimately be no long-term sustainable advantage except the ability to organise and manage"

Galbraith and Lawler

The above quotation is at the heart of why you need to be interested in how you manage your employees. In times past a firm could build a competitive advantage in any number of ways; new products, new markets, new technologies, efficient processes, streamlined logistics and distribution - basically efficient supply chain management. So long as a firm had a clear advantage it could lead out until the competitors eventually caught up and levelled the playing field, at least until the next innovation took hold. The challenge in the current

competitive environment is that most innovations are rapidly copied by competitors thereby reducing the lifetime of any real advantage. If one firms develops a new product range that captures the consumers' attention, then it's not long before all players are bringing their 'me too' product to the market. Everyone copies a good idea.

So why bother with the people side? In the intensity of competition for market advantage and differentiation, the one aspect of business that is virtually impossible to replicate is the dynamic within your workforce. This dynamic has been referred to as ***social engineering***, implying the relationships between colleagues and their manager which can deliver a significant impact to the overall business performance. One management guru explained this by saying 'Look after your people, they look after your customers and your customers look after your profit'. The logic is elegant in its simplicity, however, it represents a mind-set in viewing employees as a potential source of value to a firm. Until such time as the world resorts to robots to do everything then employers need to garner the willing co-operation of people to get the job done. It's a two-way street, employers need the workforce to deliver the outputs and employees need worthwhile employment to feel that they are making a contribution and clearly to put food on the table. If we view employment purely in terms of a financial contract, 'if you do X, I will pay Y', then it's no surprise that people work within the limits of that narrow definition and potential value creation is lost.

Everyone is a volunteer!

Initially it sounds odd, but it's absolutely true. Every day in firms up and down the length of Ireland employees are making decisions about how much to give to their work. How much effort, whether to help a struggling trainee, whether to share knowledge or offer a good suggestion to resolve a problem? Our old friend research tells us that people tend to hold back when (1) they believe their extra contributions will go unnoticed and (2) their managers do not believe they have anything worthwhile to contribute in the first place. Numerous studies have shown that the most critical relationship at work is that between a manager and his or her immediate direct reports – when this is positive people thrive, when its negative people eventually walk. Replacing skilled workers is a costly and disruptive affair and does nothing to enhance the reputation of your business in the industry. Business owners ***who invest and are invested*** in their people tend to reap the rewards of loyalty, commitment and co-operation.

What people want at work:

- To make a contribution
- To feel their jobs matter and the work they are doing is worthwhile
- To apply their skills & knowledge
- To learn more & be challenged so they can develop their skills
- To feel good about the day job
- To see a future with their employer.

Different strokes for different folks

One size does not fit all

It's a case of different strokes for different folks and in truth that's what can make managing people a challenge. There is no one silver bullet that will be effective with all people in all situations. The challenge is then how do you modify your approach to get the best out of individuals? Let's look at the different ways in which people learn as a starting point:

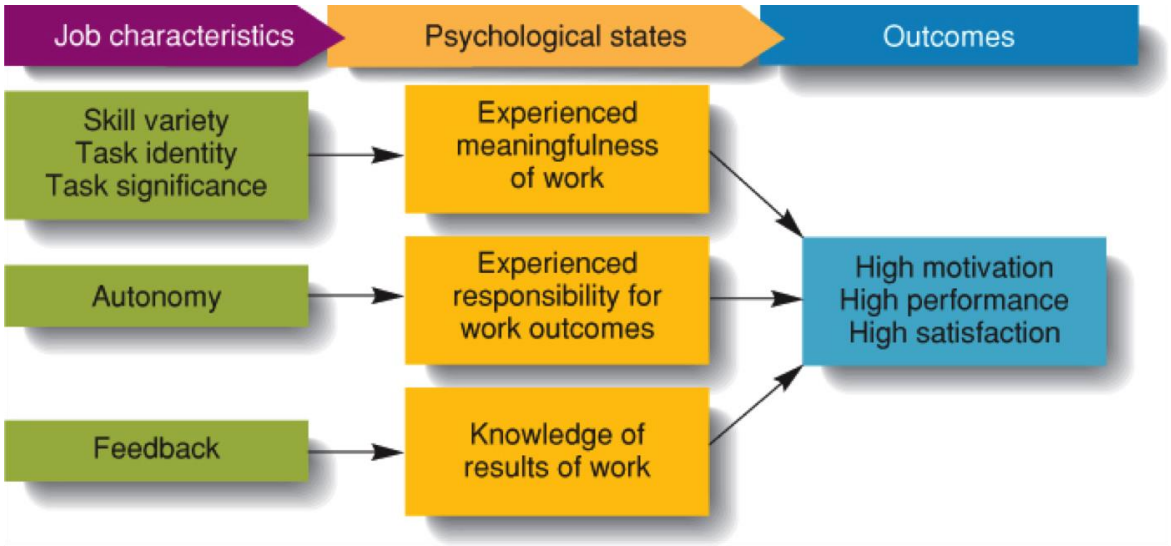
Style	Attributes	Activities
Activist's	Activists are those people who learn by doing. Activists need to get their hands dirty, to dive in with both feet first. Have an open-minded approach to learning, involving themselves fully and without bias in new experiences.	• Brainstorming Problem solving • Group discussion • Competitions
Pragmatists	These people need to be able to see how to put the learning into practice in the real world. Abstract concepts and games are of limited use unless they can see a way to put the ideas into action in their lives. Experimenters, trying out new ideas, theories and techniques to see if they work.	• Time to think about how to apply learning in reality • Real-world scenarios • Problem solving Discussion
Reflectors	These people learn by observing and thinking about what happened. They may avoid leaping in and prefer to watch from the sidelines. Prefer to stand back and view experiences from a number of different perspectives, collecting data and taking the time to work towards an appropriate conclusion.	• Paired discussions • Self-analysis questionnaires • Time out to think • Observing activities • Feedback from others • Coaching
Theorists	These learners like to understand the theory behind the actions. They need models, concepts and facts in order to engage in the learning process. Prefer to analyse and synthesise, drawing new information into a systematic and logical 'theory'.	• Models • Statistics & metrics • Stories • Background information • Applying theories

Generally in competitive business environments it's the activists and pragmatists who tend to take over with their very 'hands-on' style, devising solutions, sometimes on the fly. Theorists and reflectors learn differently, but often produce more sustaining & robust solutions if given the time and space they require to engage fully.

A questionnaire to determine your learning style is attached in the Appendix. If may be useful to copy and distribute this to your fellow workers to better understand their approach to learning?

Designing interesting jobs

What Makes Work Stimulating?



The model above explains the characteristics of a stimulating and interesting job that will lead people to be motivated, perform well and experience a personal sense of satisfaction at work. The key terms:-

Skill variety: The degree to which the job offers the opportunity to use a range of different skills and capabilities. Working on a narrow and repetitive skill set leads to boredom. Cross-training people to undertake a variety of tasks stimulates employees and provides flexibility to a business.

Task identity: People need to understand and see how their particular work fits into the big picture. Workers experience more meaningfulness when they can see the end to end result of the entire process rather than just seeing their own outputs.

Task significance: The degree to which the job affects other people's lives. The influence can be either in the immediate organisation or in the external environment. Employees feel more meaningfulness in a job that substantially improves either psychological or physical well-being of others than a job that has limited effect on anyone else.

Autonomy: The degree to which the job provides the employee with significant freedom, independence, and discretion to plan out the work and determine the procedures in the job. People who are trusted to plan and manage their own work experience greater personal responsibility for their own actions which is very motivational.

Feedback: The degree to which the worker has knowledge of results. This is clear, specific, detailed, *actionable* information about the effectiveness of his or her job performance. When workers receive clear, actionable information about their work performance, they have better overall knowledge of the effect of their work activities, and what specific actions they need to take (if any) to improve their productivity.

A practical way to manage feedback is to share the EPM reports that are produced quarterly. Sharing the performance metrics affords an opportunity to open a discussion around performance across the various functions of the business. Sharing information helps employees to take a more macro perspective and understand the linkages between different activities. When people don't see progress or see results, they quickly become detached and can lose motivation.

Recognition & appreciation

How to bring out the best in others

"A person who feels appreciated will always do more than what is expected"

Culturally we don't have a good track record of appreciating people here. For generations most folk have worked off the theory that if they hear nothing then things are ok. It's hardly motivational! What we know is that people respond to genuine appreciation much in the same way a plant responds to water!

- Catch people doing 'the right thing' & tell them
- Never take experience & performance for granted
    - Express the *difference* it makes
- Ask for input, suggestions & listen
- Give credit where due, share around the successes
- Small gestures go a long way, an unexpected treat of cakes during a busy period can create a lot of goodwill
- Remembering what's important to people makes them feel valued:

"I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel" *Maya Angelou.*

Motivation – The Energy and Commitment a Person is prepared to dedicate to a task.

Motivation starts within the person, however, it is the manager's role to create the conditions where motivated behaviour can occur.

Many years ago a study was conducted among workers to identify the factors in their workday that contributed to the greatest sense of personal satisfaction and motivation. Despite the passage of time, this study has been found to have enduring applicability and is as valid today for understanding the drivers of motivation in the workplace.

Hygiene Factors: **May cause dissatisfaction in the workplace but cannot motivate by themselves**	**Motivators:** **Factors which motivate & make workers more productive**
Examples include: • Pay & status • Working conditions • Company policy & procedures • Job Security	Examples include: • Recognition of effort • Responsibility • Interesting work • Opportunities for self-improvement

At first glance some of the results are quite surprising, surely pay is the key motivator? Yet again our friend research has something to say on this theme. When pay is poor then evidently people will be demotivated but paying way over the odds will not compensate if other motivational factors are missing (recognition, responsibility, interesting work,

opportunities to develop). High levels of pay bring people so far but is unable to sustain motivation and performance on its own.

The list on the left are referred to as Hygiene factors – they need to be pitched at a reasonable level but alone will not motivate people. Hygiene prevents us getting sick but it doesn't make us better – we clean our teeth to prevent decay but cleaning does not make our teeth any better. It's the same with human motivation, if hygiene factors are poor then people will be demotivated but once they are in place people need the motivators on the right to experience a positive effect at work.

The interesting thing about the motivators is that many of them are virtually cost free. It costs nothing to offer some recognition or to trust an individual with added responsibility. Facilitating opportunities for self-improvement is a win/win for the employee and the firm. The person develops and the firm benefits from that development too.

Most business owners tend to focus on the hygiene factors but as noted, these alone will not motivate. Managers need to actively engage in building in opportunities to address the points on the right-hand side of the model.

Engagement

"The psychological and emotional attachment people feel for their workplaces".

The Gallup Organisation has developed a series of questions to help managers assess the engagement of their workforce. Each statement is rated on a scale from 1 (poor) through to 5 (excellent):

1. I know what is expected of me at work
2. I have the materials and equipment I need to do my work right
3. At work, I have the opportunity to do what I do best every day
4. In the last seven days, I have received recognition or praise for my work
5. My supervisor, or someone at work, seems to care about me as a person
6. There is someone at work who encourages my development
7. At work, my opinion seem to count
8. The mission or purpose of my firm makes me feel like my job is important
9. My fellow workers are committed to doing quality work
10. I have a trusted friend at work
11. In the last six months, someone at work has talked to me about my progress
12. In last year I have had opportunities at work to learn and grow

How to apply gallup:

Put yourself in the shoes of your staff and answer the questions as you believe your staff would respond. Clearly you will have much better information if you actually share the questionnaire with your workforce and see how they genuinely respond. The answers should help you focus your attention on those areas which show the lowest scores.

Don't boil the ocean!

This paper has presented a range of ideas and suggestions for ways in which you can improve the application of soft skills within your business. It's generally not effective to try changing everything at once, it becomes overwhelming and often nothing sustainable is achieved. It's far more effective to set 2 short terms goals (things you can action quite easily within days, 2 medium terms goals and then 2 long term goals.

Put your people plan into action!

Efficient production is good for the environment

Gerard McCutcheon, Teagasc Oak Park

World Population

Global demand for food production is growing. It is hard to believe that the world population has risen from three billion in 1960 to over seven billion at present. It continues to rise by 83 million people each year and is expected to hit eight billion by 2030. As the world population edges towards nine billion people by 2050 it is important that a sustainable and safe food chain is developed.

Sustainability

We hear a lot about "sustainable food production" in the world today. What does the term "sustainable" mean and how can we assess whether pigmeat production in Ireland is sustainable? A useful definition of "sustainable" is "meeting the needs of today without compromising the ability of future generations to meet their own needs" (Bruntland Report, 1987). This is consistent with one of the four Goals in the "Teagasc Statement of Strategy (2012 to 2015) which stated that "future food production systems must be sustainable in terms of delivering a supply of safe, healthy food with low environmental impacts in terms of emissions and biodiversity. This will require a hugely enhanced level of innovation and involve major improvements in efficiency and waste reduction and access to new types of technology". Sustainability must be in economic, social and environmental terms. Some people associate "sustainability" with the three Ps - profit, people and planet.

Economic sustainability means that there is an economic reason to continue the production system. Therefore it must be profitable to continue to produce food in this system. In pig production this means knowing your production costs and over time making a profit to sustain and perhaps grow the business. The long-term management of the business requires research and development to devise new improved ways of achieving the business performance.

Social sustainability refers to what society or people want in terms of the product being produced. In pigmeat production we have the owners and employees of pig units, service providers and of course we have consumers. The needs and wants of each group may differ. It is important that producers of pigmeat can demonstrate that standards are upheld and that social aspects of production are important in the local economy (e.g. benefits of employing staff at local level). The

concerns of consumers (e.g. animal welfare standards) should also be understood and addressed in an ever changing marketplace.

Environmental sustainability deals with ensuring that land, air and water are not negatively impacted upon by the production system. No farmer sets out to cause a negative effect on the environment and there are regulations (e.g. Good Agricultural Practice Regulations/Nitrate Regulations) to ensure that anyone who may cause pollution is prosecuted. It is worth remembering that company directors may be personally liable under environmental legislation.

The area of environmental sustainability that we hear a lot about is in relation to Greenhouse Gas (GHGs) Emissions and Carbon Footprints. This is a method of measuring the environmental impact of production systems in relation to the potential impact on climate change. It is something that is becoming more important in food marketing on a global basis.

Agriculture & greenhouse gases

In Ireland GHG emissions from agriculture represent 29.1% of total national GHG emissions. Thankfully the pig sector contributes a small portion to this figure. The main gases from pig production are methane (CH_4) and nitrous oxide (N_2O) from buildings, slurry/manure storage and spreading. The third GHG from pig production is carbon dioxide (CO_2) which is produced from respiration. One key method in reducing GHG emissions is to formulate diets to match nutritional requirements as much as possible. This helps minimise the loss of excess protein in the slurry/manure.

GHG emissions are recorded as carbon dioxide equivalents which measure how much heat is retained by the earths' ecosystem with the addition of a particular gas to the atmosphere. Nitrous oxide and methane are 310 and 21 times more powerful respectively than carbon dioxide at trapping heat in the earths' atmosphere.

Various models have been developed to measure the total carbon footprint of many production systems. For pig production these take account of the feed ingredients used, the transport of the feed, the pigs produced per sow per year and the various inputs (feed type and ingredients, energy inputs, manure storage and management etc.) as well as the amount of pigmeat produced.

This model which has been developed by the Carbon Trust in the UK is currently being used by Bord Bia to support the claims made by the Origin Green initiative on Irish beef production. The process of developing a model for the Irish pig sector is well underway. This was done by collaboration between Bord Bia (who engaged The Carbon Trust to develop and validate the Model) and Teagasc. The aim is to demonstrate the environmental sustainability of the system used to produce pigmeat in Ireland, and, that the sector is committed to improving this further in the years ahead.

Energy and water are two inputs that are important in the production of pigs. The monitoring and usage of these inputs will be part of the Carbon Navigator that is being designed. The main aim of the Carbon Navigator is to benchmark against the best achievable performance to focus on helping all producers make sensible and economic improvements to their business.

Environmental sustainability in many instances equates to using inputs (such as feed, energy, water etc.) as efficiently as possible and producing a quality product for the market. Tools such as the Carbon Navigator assist in benchmarking farm performance against best practice.

There are still challenges to be dealt with but we must focus on improving efficiency at all stages of the food supply chain while not compromising food quality.

Efficiency improvements over the years

It is important to recognise the achievements of the past and build upon those achievements. It is useful to look at 1990 as a base year (because it is a reference year in terms of the Kyoto Agreement which is often cited in relation to green-house gas emission targets) and compare current productivity and input usage.

Irish pig producers produced 1350kg of pigmeat per sow in 1990 (with an FCE from weaning to sale of 2.45). This figure has improved to 2058 kg of pig carcase weight/sow in 2015 and an average FCE of 2.43 from weaning to sale. This was achieved by increased output/sow/year (i.e. 21.9 up to 24.8 pigs produced/sow/year) and increased slaughter weights (82 kg liveweight in 1990 up to 108.7kg liveweight in 2015).

Teagasc's target for the Irish pigmeat production sector is to achieve 2 tonnes of carcase from 7 tonnes of feed (i.e. which would require a FCE of 2.35:1 from weaning to sale on a carcase weight

basis). This efficiency target is being achieved on some farms. Improvements in genetics, nutrition, healthcare and management can have a huge impact on achieving this target.

The output of pigmeat produced per sow has increased greatly between 1990 and 2015 as shown above. During this time there has also been a strong focus on reducing inputs, in particular reducing feed nutrient usage per kg of pigmeat produced along with achieving greater efficiency in the use of other inputs (such as energy, healthcare products, etc.). This is evident in the reduced crude protein levels in diets used in 1990 in comparison to current levels which has resulted in reduced excretion of surplus organic nitrogen in the pig manure. Also the level of phosphorus (P) excreted by pigs has greatly reduced from a figure of 26kg/sow plus progeny / annum in the early 1990s to a current level of 17 kg/sow plus progeny/annum. This has been achieved through more accurate formulation of diets on a digestible P rather than a total P basis and through the use of phytase enzyme to improve the digestibility of plant bound P in the feed ingredients.

These improvements have been achieved and are demonstrated at national level. The Carbon Navigator aims to demonstrate best practice at farm level.

Conclusion:

Food production systems must be competitive, profitable and sustainable to survive in the future. The purpose of the C Navigator currently being developed is to assess the impact of your farming system on the climate by modelling the carbon footprint. It will benchmark feed performance, energy performance and water usage for your farm while highlighting any areas that may be improved upon for the future. Measuring the carbon footprint of each integrated herd will help improve efficiency and reduce the carbon footprint of your herd.

We need to use the C Navigator to gain market advantage, and to highlight the sustainability of the production of pigmeat in Ireland.

More efficient pig production is good for the environment!

Making the most of your farm records

Shane Brady and Emer McCrum, Teagasc Ballyhaise

Introduction

Performance measurement is an effective management tool on farms because it provides the information that decision makers require to accurately monitor farm goals, development and quality. Measurement of performance also provides objective information to help managers ask the right questions, and to make the right decisions, to improve performance. The aim of this paper is to help the pig farmer make the link between the performance measurements taken on farm, and the farm's quarterly calculated figures on the Teagasc ePM report, to increase productivity and maximize efficiency.

Within Teagasc we have a huge resource at our finger tips in the Teagasc ePM database as it comprises a total of 129 herds representing over 96,000 sows or 65% of the national commercial sow herd. Herds participating in the ePM recording system and engaging with the advisory support of the staff in the Teagasc Pig Development Department continue to demonstrate year on year improvements in technical performance. Herds that routinely record both production and financial performance continue to be the herds with the highest levels of technical efficiency. This suggests that herds recording information accurately and contributing to the Teagasc ePM database, and who then have access to this resource, are able to measure, manage and make decisions more effectively.

Aims

One of the fundamental objectives of any farm is to maximize the output and throughput efficiency of the unit. A critical first step in achieving this is to first identify the farms production potential relative to its capacity. In doing so, we can make the best use of the resources that are available to us on farm. The most efficient method of optimising the throughput of any unit is to match the pigs supplied to the capacity of the finisher accommodation. By doing this, we can track the supply of animals back to source and set targets to suit the farms resources to ensure an optimum volume of pigs throughout the system, and a consistent supply of pigs for sale. In order to achieve this, accurate recording keeping is essential to allow targets to be set and to ensure that the targets are being reached on a continuing basis.

Understanding the link between biological performance and profitability is a crucial step in optimizing the efficiency of a unit. Once targets are set that match pig numbers supplied through the unit to the capacity of the farm, we can go back to the source and focus on our supply- sow productivity. In order to guarantee this supply, production targets such as gilt services, sow services, farrowing rate etc. must be set. As we are dealing with animals there will of course be a certain level of fluctuation in performance but our aim is to meet targets and control variation so we can maintain a consistent supply of pigs for the factory.

Accurate record keeping is essential and there are a number of tools available to assist farmers and managers to keep an eye on productivity. The Teagasc Target Board is a very effective method of monitoring a unit's performance in terms of weekly targets over a 13 week period. This tool is beneficial for both staff and managers alike as it clearly records whether or not a weekly target has been met and any areas of the farm that may need attention. The Target Board, when used in conjunction with the Teagasc quarterly ePM report, can help assess a farm's continuing performance and can be used to identify strengths and weaknesses of the unit in real time.

Case Study

Here we will use a farm's data from the Teagasc ePM system in order to show how on farm records and daily measurements can be used in identifying areas for attention highlighted in the ePM report.

If we break the farm down to an average of a 550 sow herd example, we can clearly see that areas that do not meet the farm targets negatively affect pig supply and productivity. We can use farrowing rate (FR) as the first example as an area that warrants investigation:

Teagasc ePM report		**Q1**	**Q2**	**Q3**	**Q4**	**Yearly**	**Target**
LITTERS PER SOW PER YEAR		2.1	2.52	2.32	2.23	2.3	2.38
NO. EMPTY DAYS PER LITTER		20	14	8	13	14	12
AVERAGE WEANING AGE	Days	30	31	32	29	31	26
CONCEPTION RATE	%	90.2	90.7	89.1	93.1	90.7	93
FARROWING RATE APPROX.	%	85	81	86	80	83	88
BORN ALIVE PER LITTER		12.8	13.1	12.9	13.3	13.02	12.3
BORN DEAD PER LITTER		1.09	0.86	0.93	0.62	0.87	0.8
PRE-WEANING MORTALITY	%	12	12.5	14	10	12.2	8
NO. WEANED PER LITTER		11.2	11.4	11.3	11.5	11.35	11.3

In this example the Target FR is 88%, which is what is needed to ensure a constant supply of pigs to the finisher accommodation. However the actual Farm FR is only 83%. This means that the farm is

off target by 5%, with the most significant consequence being athat empty days will be higher than they should be. Attempting to reach the Target FR, while not addressing the factors causing the reduced farrowing rate, could lead to variation in supply by over compensation. This will make it very difficult to predict and plan for the number of pigs that will reach the finishing stages.

Teagasc target Board

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	*Avg*
Target services/wk	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	***27***
Actual services/wk	29	32	29	30	25	23	27	22	22	27	23	25	30	29	32	29	***27***
Target farrowings/wk	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	***24***
Actual farrowing/wk	25	19	31	27	22	27	21	18	18	21	27	22	27	31	19	25	***24***

It is thus essential that the problem area is identified and this can be done through futher investigation of sow herd records. Use of a parity analysis report can help identify the problem parity, or other areas of weakness.

Some of the main avenues to be investigated should be:

1. Gilt Mangement: gilt pool supply, puberty development, heat detection, age and weight at service, use of vasectomised boars and overall herd health.
2. Regular and irregular repeats: lactation feeding, mixing of sows, heat detection, inseminator fatigue, movement of sows after service, pregnancy testing and overall herd health.
3. NIP's: heat detection, herd health and sow mixing management.

A poor FR will increse empty days, which cost approximately €3/day. If we take a 550 sow herd as an example, an increse of just one empty day on the ePM report amounts to a cost of €1600/day. By identifying and correcting on farm procedures in order to get FR back on target we will reduce our empty days and better manage the supply of pigs on farm. Our 5 % diversion off target on the farm above results in 1.3 fewer sows per week farrowing, which means 17.5 less born alive per week. Using the figures above, this results in a reduction of 15.4 pigs weaned in a months time, which will then affect the sales week as sales will be down by 15 pigs. Any attempt to over compensate and add on 5% more services at the next service date to balance the numbers, without making allowances for extra accomodation or facilities, could cause significant problems further down the line when it comes to space and management (*see papers by Edgar Garcia Manzanilla and Michael McKeon*). An average irish herd size of 550 sows running at 5% extra production can amount to in excess of over

330 pigs. These pigs are absorbed through the weekly batches as required but they have a huge impact on stocking rate, feeder spaces and weaning to sale preformance. Using the average herd size in Ireland of 550 sow a 0.1 increase in FCE amounts to €20,000/year.

By recording and investigating production measurements we can delve deeper into performance data so we can be proactive and effective in our mangement of the farm. This will help to control the variation in supply to maximise the pig farms potential with the use current available resources.

Conclusions - Take home points

- Maintaining physical and financial records of the farm's performance is essential to make good informed decisions and to implement those decisions properly.
- Use Teagasc ePM reports to set targets and to ensure efficient utilisation of farm capacity (flow of pigs)
- Use the Teagasc Target Board to monitor and address weekly targets. Use this data to make changes quicker at farm level in order to stabilise and maintain the supply of pigs
- Get involved in Discussion groups - Discussion group members are up to 20% more likely to adopt best management practices and new technologies. Involvement in discussion groups can improve on farm technical performance by circa 12%.

Is my lactation diet suitable anymore?

Dr. Peadar Lawlor, Teagasc Moorepark

Summary

The number of piglets born alive per litter has increased by 2 pigs in the past 15 years, from 10.9 in 2000 to 12.9 in 2015 (Teagasc PIGSYS, 2015). This trend is set to continue. Interpig (2015) showed that in 2015 the number born alive per litter was 15.9, 14.4 and 13.6 for Denmark, The Netherlands and France, respectively. As we approach these levels of productivity the importance of optimum nutrition during lactation becomes even more critical. The energy and nutrient requirements of lactating sows are calculated from the body weight of the sow (maintenance component), milk yield, loss in body weight (mobilisation of body tissue) during lactation and the litter's intake of creep feed while suckling. The energy or lysine intake is calculated by multiplying their content in the diet by the kg of lactation diet consumed. Much effort has been exerted in increasing lactation feed intake over the past 10 years and lactation feeding curves on most units have increased as a consequence. However, even with these high intakes and at the high level of productivity now being seen, commonly used lactation diets (14.2 MJ DE/kg and 0.91% Lys/kg) will in most cases not have sufficient energy and amino acids to meet requirements. This failure to meet the sow's nutritional requirements means that sows and gilts will lose excessive weight during lactation and/or milk yield will be depressed. This paper aims to determine the optimum energy (digestible energy) and lysine density for sow lactation diets at a range of feed intakes.

A. Calculation of energy requirement of lactating sow

Sow weight (maintenance energy requirement)

This is calculated as **0.492 MJ DE/kg body weight$^{0.75}$ /day.** Assuming a post farrowing weight of 220kg and 180kg for sows and gilts, respectively they will have a maintenance energy requirement of 28.1 and 24.2 MJ DE/day, respectively.

Milk production

The energy requirement for milk production can be calculated from litter weight gain by assuming that 1 kg of piglet weight gain during lactation requires a maternal intake of 30.4 MJ DE. For this reason, it depends on a number of factors such as piglet weaning weight,

number of piglets weaned per litter and lactation length which is assumed here at 28 days. Assuming that piglets are 1.4 kg at birth and that the target at weaning is 8 kg then sows weaning 12.5 and 13 piglets will have an energy requirement for milk production of 89.6 and 93.2 MJ DE/day, respectively.

Every 0.5 kg change in the average pig weight at weaning increases the energy requirement for milk production by **5.4 MJ DE/day**. Likewise, every extra pig weaned per litter increases the energy requirement for milk production by **7 MJ DE/day**. Encouraging increased creep feed intake can help to reduce the sow's energy requirement for milk production but the effect is modest at a 1.1 MJ DE/day reduction for every 1 kg increase in creep feed consumed per litter and therefore is largely ignored here.

Sow weight loss

Each 1 kg of body weight loss will contribute **12.5 MJ DE** to the energy requirements of the sow over an entire lactation. Therefore, for every 10 kg weight loss in a sow during lactation there is reduction in the sow feed energy requirement of **~4.5 MJ DE/day**. Although, this is an important source of energy for the sow during lactation, it is important that weight loss during lactation should not be greater than 5% (~10 kg) for first parity sows and 10% (~22 kg) for older parities if early return to oestrus, high farrowing rate and a high subsequent litter size are to be achieved (Thaker and Bilkei, 2005). Gilts are most affected by lactation weight loss because of their inherent drive to achieve their target lean body mass (Foxcroft *et al*., 1997).

B. Calculation of energy intake of a lactating sow

The energy intake of a lactating sow is simply calculated as the kg of feed consumed per day multiplied by the energy density of the diet. If this fails to meet or exceed the energy requirement of the sow then she will lose weight in an attempt to maintain milk yield.

C. Are our diet specifications suitable anymore?

The simple answer is 'no, if we are to meet the targets associated with recent increases in litter size'. Tables 1 and 2 show the effect of feed intake and the energy density of the lactation diet on sow weight loss during lactation for both high performing sows and gilts.

From these tables it is very evident that feeding a diet with an energy density of 14.2 MJ DE will result in excessive weight loss in both sows and gilts even at average lactation intakes as high as 7.5 kg/day. If intakes as high as 7.5 kg per day can be achieved then a diet of 15.2 MJ DE/kg will be necessary to avoid excessive weight loss in sows and gilts. If intakes of 7.0 kg are achieved then the energy density of the diet needs to be between 15.2 and 16.2 MJ DE/kg. Failure to achieve intakes of 7 kg or greater would mean feeding very expensive diets of greater than 17.2 MJ DE/kg. Failure to meet the requirements of the sow/gilt will result in weaning weight targets for piglets not being achieved and excessive weight loss in gilts and sows resulting in poor reproductive performance at the next farrowing.

D. What will this cost me?

On the 19th of September 2016 the ingredient cost per tonne of the 14.2, 15.2. 16.2 and 17.2 MJ DE/kg diets were €260, €293, €329 and €366, respectively. Assuming a switch from a 14.2 MJ DE/kg diet to one of 15.2 MJ DE/kg the additional cost per tonne is €33 or assuming 210 kg is consumed per lactation then the additional cost per sow per lactation is €6.93. At 2.35 litters per sow per year this equates to an additional feed cost per sow per year of €16.29. Assuming a value for each piglet born of €50 then an additional 0.33 of a pig produced per sow per year would cover this additional cost. This would be achieved through a reduction in empty days, increased subsequent born alive as well as likely increases in sow longevity within the herd.

Table 1. *Effect of feed intake and energy density of the lactation diet on sow weight loss during lactation*[1,2]

DE of diet (MJ DE/kg)	Feed (MJ DE)	Total Requirement (MJ DE/day)	Shortfall (MJ DE/day)	Weight loss (MJ DE)	Sow weight loss (kg)	% weight loss[3]
5.5 Kg/day						
14.2	78.1	121.3	43.2	42.9	96	**44**
15.2	83.6	121.3	37.7	37.5	84	**38**
16.2	89.1	121.3	32.2	32.1	72	**33**
17.2	94.6	121.3	26.7	26.8	60	**27**
18.2	100.1	121.3	21.2	21.4	48	**22**
6.0 Kg/day						
14.2	85.2	121.3	36.1	36.2	81	**37**
15.2	91.2	121.3	30.1	30.4	68	**31**
16.2	97.2	121.3	24.1	24.1	54	**25**
17.2	103.2	121.3	18.1	18.3	41	**19**
18.2	**109.2**	**121.3**	**12.1**	**12.1**	**27**	**12**
6.5 Kg/day						
14.2	92.3	121.3	29.0	29.0	65	**30**
15.2	98.8	121.3	22.5	22.3	50	**23**
16.2	105.3	121.3	16.0	16.1	36	**16**
17.2	**111.8**	**121.3**	**9.5**	**9.4**	**21**	**10**
18.2	**118.3**	**121.3**	**3.0**	**2.7**	**6**	**3**
7.0 Kg/day						
14.2	99.4	121.3	21.9	21.9	49	**22**
15.2	106.4	121.3	14.9	15.2	34	**15**
16.2	**113.4**	**121.3**	**7.9**	**8.0**	**18**	**8**
17.2	**120.4**	**121.3**	**0.9**	**0.9**	**2**	**1**
18.2	**127.4**	**121.3**	**-6.1**	**0.0**	**0**	**0**
7.5 Kg/day						
14.2	106.5	121.3	14.8	14.7	33	**15**
15.2	**114.0**	**121.3**	**7.3**	**7.1**	**16**	**7**
16.2	**121.5**	**121.3**	**-0.2**	**0.0**	**0**	**0**
17.2	**129.0**	**121.3**	**-7.7**	**0.0**	**0**	**0**
18.2	**136.5**	**121.3**	**-15.2**	**0.0**	**0**	**0**

[1] Assumes a sow with an empty weight of 220 kg, weaning a litter of 13 piglets at 28 days with an average birth weight of 1.4 kg and an average weaning weight of 8.0 kg. [2] Red, orange and green shading indicates excessive, borderline and acceptable weight loss. [3] A % weight loss in excess of 10% and 5% is excessive for sows and gilts, respectively

Table 2. *Effect of feed intake and energy density of the lactation diet on gilt weight loss during lactation*[1,2]

DE of diet (MJ DE/kg)	Feed (MJ DE)	Total Requirement (MJ DE/day)	Shortfall (MJ DE/day)	Weight loss (MJ DE)	Sow weight loss (kg)	% weight loss[3]
5.5 Kg/day						
14.2	78.1	113.7	35.6	35.7	80	44
15.2	83.6	113.7	30.1	29.9	67	37
16.2	89.1	113.7	24.6	24.6	55	31
17.2	94.6	113.7	19.1	19.2	43	24
18.2	100.1	113.7	13.6	13.8	31	17
6.0 Kg/day						
14.2	85.2	113.7	28.5	28.6	64	36
15.2	91.2	113.7	22.5	22.8	51	28
16.2	97.2	113.7	16.5	16.5	37	21
17.2	103.2	113.7	10.5	10.7	24	13
18.2	109.2	113.7	4.5	4.5	10	6
6.5 Kg/day						
14.2	92.3	113.7	21.4	22.3	50	28
15.2	98.8	113.7	14.9	14.7	33	18
16.2	105.3	113.7	8.4	8.5	19	11
17.2	111.8	113.7	1.9	1.8	4	2
18.2	118.3	113.7	-4.6	0.0	0	0
7.0 Kg/day						
14.2	99.4	113.7	14.3	14.3	32	18
15.2	106.4	113.7	7.3	7.6	17	9
16.2	113.4	113.7	0.3	0.0	0	0
17.2	120.4	113.7	-6.7	0.0	0	0
18.2	127.4	113.7	-13.7	0.0	0	0
7.5 Kg/day						
14.2	106.5	113.7	7.2	6.7	15	8
15.2	114.0	113.7	-0.3	0.0	0	0
16.2	121.5	113.7	-7.8	0.0	0	0
17.2	129.0	113.7	-15.3	0.0	0	0
18.2	136.5	113.7	-22.8	0.0	0	0

[1] Assumes a gilt with an empty weight of 180 kg, weaning a litter of 12.5 piglets at 28 days with an average birth weight of 1.4 kg and an average weaning weight of 8.0 kg. [2] Red, orange and green shading indicates excessive, borderline and acceptable weight loss. [3] A % weight loss in excess of 10% and 5% is excessive for sows and gilts, respectively

E. Pointers to increase lactation feed intake

- Do not inadvertently restrict feed intake by feeding less than sows can eat
- Over-feeding sows in gestation will reduce lactation feed intake
- Maintain farrowing rooms at 18-20^{0}C. High farrowing house temperatures depress feed intake
- The intake of wet-fed sows is higher (12%) than that of *ad-libitum* dry-fed sows
- *Ad-libitum* wet/dry feeding is a good alternative to wet feeding to promote increased feed intake
- Dry feed is eaten more readily in pelleted than meal form
- The higher the energy density of the sow's diet, the greater the energy intake of the sow will be
- Feed liquid fed lactating sows 3 times daily to encourage increased feed intake.
- Ensure that the feed in front of the sow is fresh
- Ensure that supplementary water is provided to match the sow's needs. Wet fed sows may not be getting sufficient water from the feed mix in the days after farrowing but depending on water to meal ratio, excess water in the mix may limit intake late in lactation.
- High feed intake in the first 2 weeks of lactation is very important if high average lactation feed intakes are to be realised.
- Ensure that there is sufficient capacity in troughs. This is particularly important when wet feeding sows at high feed allocation levels to prevent wastage while feeding.

Summary

The sow's requirement for feed is determined principally by the number of piglets reared by the sow and their weaning weight. Producers have greatly increased lactation feed intakes in sows in recent years; however, at the same time litter size has increased bringing with it much higher targets for the number of piglets weaned per litter. The density of the lactation diet that we have used for the past decade is no longer adequate and must be increased. However, to avoid excessive cost associated with very high density diets, producers must also continue to focus on increasing lactation feed intake in their sows. If high feed intakes can be achieved, then excellent targets can be achieved by feeding a diet of ~15.2 MJ DE/kg and a total lysine content of 1%.

References available on request

APPENDIX 1

Learning Styles Questionnaire

This questionnaire is designed to find your preferred learning style(s). Over the years you have probably developed learning 'habits' that help you benefit more from some experiences than others. Since you are probably unaware of this, this questionnaire will help you pinpoint your learning preferences so that you are in a better position to select learning experiences that suit your style.

There is no time limit to this questionnaire. It will probably take you 10-15 minutes. The accuracy of the results depends on how honest you can be. There are no right or wrong answers. If you agree more than disagree with a statement put a tick by it (√). If you disagree more than you agree put a cross by it (X). Be sure to mark each item with either a tick or a cross.

❑	1	I have strong beliefs about what is right and wrong, good and bad.
❑	2	I often 'throw caution to the winds'.
❑	3	I tend to solve problems using a step-by-step approach, avoiding any 'flights-of-fancy.
❑	4	I believe that formal procedures and policies cramp people's style.
❑	5	I have a reputation for having a no-nonsense, 'call a spade a spade' style.
❑	6	I often find that actions based on 'gut feel' are as sound as those based on careful thought and analysis.
❑	7	I like to do the sort of work where I have time to 'leave no stone unturned'.
❑	8	I regularly question people about their basic assumptions.
❑	9	What matters most is whether something works in practice.
❑	10	I actively seek out new experiences.
❑	11	When I hear about a new idea or approach I immediately start working out how to apply it in practice.
❑	12	I am keen on self-discipline such as watching my diet, taking regular exercise, sticking to a fixed routine, etc.
❑	13	I take pride in doing a thorough job.
❑	14	I get on best with logical, analytical people and less well with spontaneous, 'irrational' people.
❑	15	I take care over the interpretation of data available to me and avoid jumping to conclusions.
❑	16	I like to reach a decision carefully after weighing up many alternatives.

❑	17 I'm attracted more to novel, unusual ideas than to practical ones.
❑	18 I don't like 'loose-ends' and prefer to fit things into a coherent pattern.
❑	19 I accept and stick to laid down procedures and policies so long as 1 regard them as an efficient way of getting the job done.
❑	20 I like to relate my actions to a general principle.
❑	21 In discussions I like to get straight to the point.
❑	22 I tend to have distant, rather formal relationships with people at work.
❑	23 I thrive on the challenge of tackling something new and different.
❑	24 I enjoy fun-loving, spontaneous people.
❑	25 I pay meticulous attention to detail before coming to a conclusion.
❑	26 I find it difficult to come up with wild, off-the-top-of-the-head ideas.
❑	27 I don't believe in wasting time by 'beating around the bush'.
❑	28 I am careful not to jump to conclusions too quickly.
❑	29 I prefer to have as many sources of information as possible - the more data to mull over the better.
❑	30 Flippant people who don't take things seriously enough usually irritate me.
❑	31 I listen to other people's point of view before putting my own forward.
❑	32 I tend to be open about how I'm feeling.
❑	33 In discussions I enjoy watching the manoeuvrings of the other participants.
❑	34 I prefer to respond to events on a spontaneous, flexible basis rather than plan things out in advance.
❑	35 I tend to be attracted to techniques such as network analysis, flow charts, branching programmes, contingency planning, etc.
❑	36 It worries me if I have to rush out a piece of work to meet a tight deadline.
❑	37 I tend to judge people's ideas on their practical merits.
❑	38 Quiet, thoughtful people tend to make me feel uneasy.
❑	39 I often get irritated by people who want to rush headlong into things.
❑	40 It is more important to enjoy the present moment than to think about the past or future.
❑	41 I think that decisions based on a thorough analysis of all the information are sounder than those based on intuition.
❑	42 I tend to be a perfectionist.

❑	43 In discussions I usually pitch in with lots of off-the-top-of-the-head ideas.
❑	44 In meetings I put forward practical realistic ideas.
❑	45 More often than not, rules are there to be broken.
❑	46 I prefer to stand back from a situation and consider all the perspectives.
❑	47 I can often see inconsistencies and weaknesses in other people's arguments.
❑	48 On balance I talk more than I listen.
❑	49 I can often see better, more practical ways to get things done.
❑	50 I think written reports should be short, punchy and to the point.
❑	51 1 believe that rational, logical thinking should win the day.
❑	52 I tend to discuss specific things with people rather than engaging in 'small talk'.
❑	53 I like people who have both feet firmly on the ground.
❑	54 In discussions I get impatient with irrelevancies and 'red herrings'.
❑	55 If I have a report to write I tend to produce lots of drafts before settling on the final version.
❑	56 I am keen to try things out to see if they work in practice.
❑	57 I am keen to reach answers via a logical approach.
❑	58 1 enjoy being the one that talks a lot.
❑	59 In discussions I often find I am the realist, keeping people to the point and avoiding 'cloud nine' speculations.
❑	60 I like to ponder many alternatives before making up my mind.
❑	61 In discussions with people I often find I am the most dispassionate and objective.
❑	62 In discussions I'm more likely to adopt a 'low profile' than to take the lead and do most of the talking.
❑	63 I like to be able to relate current actions to a longer-term bigger picture.
❑	64 When things go wrong I am happy to shrug it off and 'put it down to experience'.
❑	65 I tend to reject wild, off-the-top-off-the-head ideas as being impractical.
❑	66 It's best to 'look before you leap'.
❑	67 On balance I do the listening rather than the talking.
❑	68 I tend to be tough on people who find it difficult to adopt a logical approach.

❑	69 Most times I believe the end justifies the means.
❑	70 I don't mind hurting people's feelings so long as the job gets done.
❑	71 I find the formality of having specific objectives and plans stifling.
❑	72 I'm usually the 'life and soul' of the party.
❑	73 I do whatever is expedient to get the job done.
❑	74 I quickly get bored with methodical, detailed work.
❑	75 I am keen on exploring the basic assumptions, principles and theories underpinning things and events.
❑	76 I'm always interested to find out what other people think.
❑	77 I like meetings to be run on methodical lines, sticking to laid down agenda, etc.
❑	78 I steer clear of subjective or ambiguous topics.
❑	79 I enjoy the drama and excitement of a crisis situation.
❑	80 People often find me insensitive to their feelings.

LEARNING STYLES QUESTIONEER – SCORING

You score one point for each item you ticked (√). There are no points for items you crossed (x). Simply indicate on the lists below which items were ticked.

2	7	1	5
4	13	3	9
6	15	8	11
10	16	12	19
17	25	14	21
23	28	18	27
24	29	20	35
32	31	22	37
34	33	26	44
38	36	30	49
40	39	42	50
43	41	47	53
45	46	51	54
48	52	57	56
58	55	61	59
64	60	63	65
71	62	68	69
72	66	75	70
74	67	77	73
79	76	78	80
Activist	**Reflector**	**Theorist**	**Pragmatist**

Learning Styles – all equally valuable

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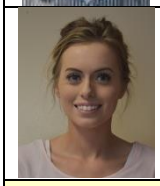	**Emer McCrum,** Teagasc, Ballyhaise, Co. Cavan Tel: 049-4338640| Mob: 087-7940974 Email: emer.mccrum@teagasc.ie
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Notes