Pig Development Department

# Teagasc Pig Farmers' Conference, 2024

*Conference Proceedings*

*October 22nd, Horse and Jockey Hotel, Co. Tipperary*
*October 23rd, Farnham Estate, Co. Cavan*

Teagasc
Agriculture and Food Development Authority

PIG FARMERS' CONFERENCE 2024
OCTOBER 22nd & 23rd

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Event Proceedings

Horse & Jockey Hotel, Co. Tipperary.

22nd October

Farnham Estate, Co. Cavan.

23rd October

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# Thirty years of the Teagasc Pig Farmers' Conference

**Ciarán Carroll & Amy Quinn, Teagasc**

This year marks the 30th anniversary of the Teagasc Pig Farmers' Conference. The brainchild of Teagasc Pig Specialists Michael Martin, Pat Tuite (RIP) and Dr. Brendan Lynch, the conferences sought to bring the latest research and information to the broader pig sector in Ireland via a roadshow of conferences at specific geographical locations where there was a large number of pig farms operating. In the early days, these roadshows took place over three days, a tiring but very worthwhile exercise. It entailed conferences at venues in West Cork, Kilkenny and Cavan/Longford. In later years, we moved to a two-day conference at Kilkenny or Moorepark and Cavan or Longford, up until our more recent venues of the Horse & Jockey in Tipperary and Cavan. These events provided a great opportunity for pig farmers and their staff from across the country to gather to hear the latest research results from National (Moorepark) and International research centres, and also the latest news and information that our Advisory Service had to share.

As well as providing a great networking opportunity for pig farmers to meet and discuss their issues with other farmers, it also provided a great social occasion, with many farmers staying long after hours to discuss their problems and solutions with their peers in farming.

*Teagasc Pig Farmers Conferences 1994.*

*Dates:* Macroom, Coolcower House, October 11.
Kilkenny, Springhill Hotel, October 12.
Cavan, Hotel Kilmore, October 13.

*Programme:*

| | | |
|---|---|---|
| Registration | : 2.00 - 3.00 pm | |
| Session 1 | : 3.00 - 5.30 pm | |
| Computerised wet feeding systems | | P. Tuite |
| Wet-dry (single space) feeders | | N. Walker, Hillsborough |
| Water and pig performance | | B.K. Pedersen, Denmark |
| Revised carcass grading system | | B. Lynch |
| Slaughter weight | | M. Martin |
| Break | : 5.30 - 7.00 pm | |
| Session 2 | : 7.00 - 9.00 pm | |
| Feed specification and performance | | B. Lynch |
| Making optimum use of AI | | J. Finn and G. McCutcheon |
| Dry sow housing after tethers | | B. K. Pedersen |
| Control of parasites in pigs | | S. O'Dowd and E. Lambert and C. Carroll |
| Close | : 9.00 pm | |

*Conference fee (including proceedings).*
Teagasc clients (with card) . . . . . . . . . . . . . £10
Non-clients . . . . . . . . . . . . . . . . . . . . . . £30
*Everybody welcome especially producers and staff.*

An important, and to this day, well-regarded part of the conference was the Guest International speaker who visited with us for the few days of the conference to share their research and thoughts with the conference attendees. This really helped to put the annual conference on the map as one of the key meetings to attend in your pig calendar year. The value of having an expert from abroad to take the time to come and share their knowledge with our "small" (internationally) pig sector cannot be overstated. Since 1994, we have had international guest speakers from the US, the Netherlands, Denmark, France, Canada, NI, the UK, Australia, Spain, and Finland.

In addition to the International Guest Speakers, we have regularly invited more "local" guests from the associated sectors including Bord Bia, DAFM, DAERA/CAFRE NI, BPEX (AHDB), Banks, Mills & Merchants, Pigmeat Processors, PVPs, Teagasc National Food Centre, Teagasc Health & Safety, Teagasc Farm Management & Rural Innovation Department, University College Dublin, Trinity College Dublin and Queens University Belfast.

The conference provided an invaluable platform to many of our postgrad students and postdocs in the Pig Development Department to showcase their findings from our research programme. This opportunity to present to a farmer audience, not something they would regularly get the opportunity to do helped to bridge the gap between the research programme being conducted and practical farming and it also helped to highlight the talents of these speakers, many of who thankfully have gone on to work in the Irish pig sector.

Of course, not every year went as planned, with Covid-19 presenting significant challenges. So in 2020 and 2021 we adapted by hosting the conference virtually through "Virtual Pig Week", a four-day event featuring a mix of international and national speakers via webinars. These sessions included interviews, discussions with Teagasc Advisors and Researchers, and virtual tours of pig farms followed by insightful farmer discussions. This format successfully bridged the gap during those challenging years.

The first conference took place at the Coolcower House Hotel in Macroom, the Springhill Hotel, Kilkenny and the Hotel Kilmore, Cavan and included papers from Teagasc on Computerised Wet Feed Systems, the Carcase Grading System, Slaughter Weights, Feed Specifications & Performance, Making Optimum Use of Artificial Insemination and Control of Parasites. The Guest Speakers included Dr. Norman Walker from AFBI, Hillsborough, NI who presented on Wet/Dry Single Spaced Feeders and Dr. Bjarne K. Pedersen, Denmark who presented two papers, one on Water & Pig Performance and the other on Dry Sow Housing after Tethers.

As you can see from the titles, many things have changed over the years while we continue to revisit some topics, "*the more things change the more they stay the same!*" As a sector we've come a long way in those 30 years as can be seen in some of the production performance figures in Table 1 below (from the original Teagasc PigSys Herd Performance Monitor to the current Teagasc Profit Monitor). While the Pig Farmers' Conference cannot take credit for all the improvements over the thirty years, we would like to think that some of the take-home messages had an impact and brought about some improvements. Here's to the next thirty!

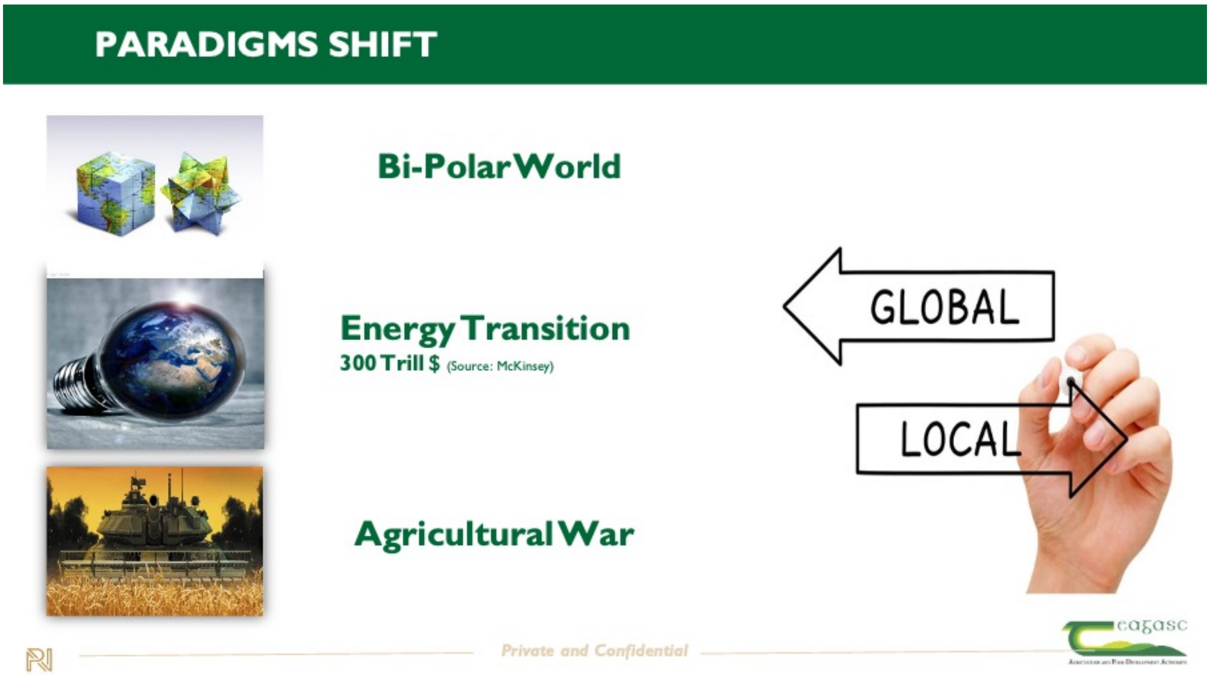
**Table 1.** *Pig Production Performance 1994 to 2023 (Teagasc PigSys & Profit Monitor).*

| Sow Productivity | 1994 | 2004 | 2014 | 2023 |
|---|---|---|---|---|
| No. Herds | 154 | 112 | 113 | 91 |
| Ave. Herd Size | 233 | 491 | 752 | 864 |
| Litters Per Sow Per Year | 2.29 | 2.28 | 2.35 | 2.26 |
| Ave. Weaning Age – days | 27 | 28 | 28 | 31 |
| No. Born Alive Per Litter | 10.78 | 11.16 | 12.73 | 14.94 |
| No. Born Dead Per Litter | 0.7 | 0.74 | 0.85 | 1.15 |
| Piglet Mortality % | 8.9 | 9.1 | 11.3 | 11.3 |
| Weaner Mortality % | 2.28 | 3.17 | 2.56 | 3.42 |
| Finisher Mortality % | 1.84 | 2.41 | 2.43 | 3.2 |
| No. Pigs Produced Per Sow Per Year | 21.7 | 21.9 | 25.3 | 27.9 |
| Sow Culling Rate Per Year % | 42.4 | 42.2 | 49.3 | 52.4 |
| Sow Mortality Per Annum % | 4.0 | 5.7 | 5.1 | 8.4 |
| Feed Per Sow Per Year t | 1.16 | 1.21 | 1.27 | 1.41 |
| **Weaner Performance** | | | | |
| Ave. Weaning Weight kg | | 6.7 | 7.0 | 7.2 |
| Ave. Weight Weaners Sold/Transferred kg | 34.7 | 36.2 | 36.8 | 38.4 |
| Daily Feed Intake g | 790 | 774 | 842 | 924 |
| Average Daily Gain g | 444 | 434 | 465 | 494 |
| Feed Conversion | 1.79 | 1.82 | 1.84 | 1.87 |
| **Finisher Performance** | | | | |
| Ave. Liveweight Sold kg | 85.6 | 96.5 | 106.2 | 116.8 |
| Ave. Deadweight Sold kg | 64.7 | 73.0 | 81.0 | 89.3 |
| Kill Out % | 75.6 | 75.7 | 76.3 | 76.4 |
| Daily Feed Intake g | 1869 | 2024 | 2308 | 2482 |
| Average Daily Gain g | 703 | 738 | 824 | 940 |
| Feed Conversion | 2.69 | 2.79 | 2.81 | 2.64 |
| **Grower (Wean to Sale) Performance** | | | | |
| Daily Feed Intake g | | 1431 | 1670 | 1832 |
| Ave. Daily Gain g | | 598 | 670 | 757 |
| Feed Conversion | 2.34 | 2.46 | 2.49 | 2.42 |

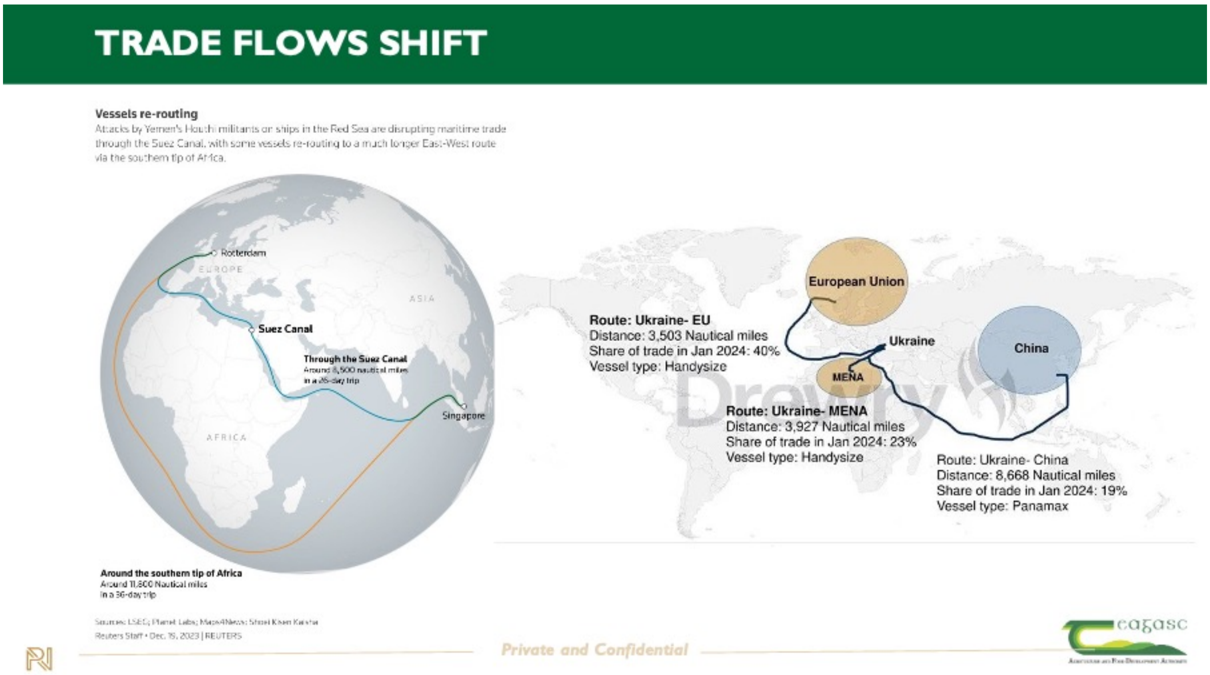
# Geopolitics & agri-commodities

**Pedro Nonay, Global Commodity Expert**

This presentation explores the impact of political conflicts on agri-commodity trade, highlighting the industry's ongoing global consolidation and the rise of regional champions driven by food security policies. There are three major Paradigms shifts setting the critical trends:




It addresses the effects of the COVID-19 pandemic and the ongoing Russia-Ukraine conflict, both of which have reshaped global trade flows, created significant uncertainties, and prompted protective measures such as food nationalism.



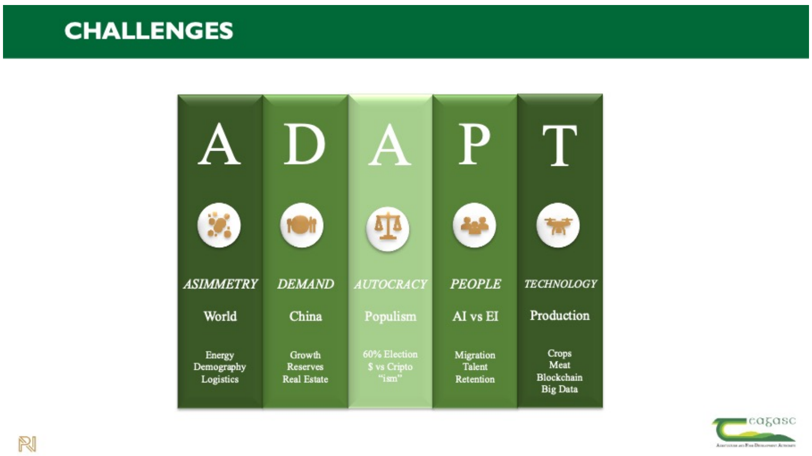

This presentation explains how the Russia-Ukraine conflict forms part of a broader geopolitical struggle involving both emerging and established global powers, particularly the U.S. and China. This conflict exerts far-reaching effects on trade dynamics, food security, and regulatory policies. It stresses, "This is not just a war; it's a battle within a larger geopolitical conflict involving emerging and existing global powers."

To succeed in the future, industries must adapt to emerging challenges, particularly in areas like energy asymmetry, demographics, and logistics.

- **Energy Asymmetry:** The global energy landscape is uneven, requiring industries to innovate and adopt sustainable practices to address disparities and ensure efficiency.
- **Demographic Changes:** Shifting population dynamics demand that industries adjust their strategies to meet varying consumer needs and workforce availability.
- **Logistics Sector:** Asymmetries in logistics necessitate adopting advanced technologies like AI and IoT for improved supply chain management and operational efficiency.

By embracing adaptability, industries can navigate these challenges effectively. Industries must also consider several trends to remain competitive:

- **Demand Fluctuations:** The slowdown in China's growth is leading to weakening demand, impacting global markets.
- **Autocracy and Populism:** The rise of autocracy worldwide is fuelling populism, which can degrade democratic norms and increase political instability.
- **AI vs. Emotional Intelligence:** The balance between artificial intelligence and emotional intelligence will be crucial as technology advances.
- **Technological Impact:** Technological advancements are significantly affecting crop production and process improvements, driving efficiency and innovation.




In conclusion, this presentation addresses the critical challenge of attracting new talent to the agriculture sector and emphasizes the role of technological innovation in meeting the industry's increasing demands. It also examines the evolving financial landscape, where challenges to the current dollar-dominated system may redefine global trade and financial paradigms.

# Empty days & the missed opportunities - Reviewing your breeding & reproductive performance

**Louise Clarke, Teagasc**

Breeding and reproductive performance are important factors of any successful pig unit. Achieving a consistent flow of sows and litters through the unit is paramount to the smooth operation of a pig farm. As we know, breeding KPIs can be notorious for seasonal fluctuations and it is not uncommon for units to go through periods of excellent performance followed by periods of below average performance. Tracking your breeding herd performance by actively and continuously examining your performance reports helps you to identify; where and how to concentrate your time, effort, and investment to improve efficiencies and reduce the cost of production.

## Empty days-what do they tell us?

Empty days or non-productive days (NPD) can be biologically defined as "any day a sow or gilt of breeding age is present in the herd and is not either gestating or lactating". The empty day calculation is taking the cycle from start to finish rather than certain aspects in isolation. Therefore, empty days should be considered as one of the most important influences on breeding herd efficiency as they can directly affect unit profitability due to their influence on the volume of pigmeat sold. If overall output is reduced, the pigmeat sale volume will decrease and therefore the overhead cost per pig will increase. Therefore, it is imperative to pay particular attention to the number of empty days. Current statistics reveal that the average number of empty days per litter stands at 15, surpassing the ideal target of 10-12.

## Cost associated with increase in empty days?

In financial terms, there is a direct cost associated with empty days. This is currently calculated at **€2.96 per day** and it is based on the direct cost of keeping extra sows in the herd including the extra feed, housing, healthcare, and all other costs associated with keeping non-productive sows. Moreover, this can translate into lost revenue, as farms miss the potential of more pig sales each year due to fewer productive days.

*Example*

Below is an example to show the opportunity loss of an increase in empty days by not identifying NIPs early while still having a good farrowing rate.

If we analyse a single week of services through to farrowing on two units; unit A has a poor/high number of empty days and unit B has a good/low number of empty days. On both units, 30 sows were served and if we assume that they will have a gestation length of 115 days, a lactation period of 30 days and a weaning to service interval of 6 days, this gives a total of 151 days in a sow's cycle. On both units, 27 of the 30 served sows farrowed giving a 90% farrowing rate.

| Poor Herd – Unit A | | | | | | |
|---|---|---|---|---|---|---|
| Number of Sows | Gestation days/ sow | Lactation days/ sow | Return to service days/ sow | Other empty days/ sow | Total days/ sow/ litter | Farrowed |
| 27 | 115 | 30 | 6 | - | 151 | Yes |
| 3* | 115 | 30 | 6 | 90 | 241 | No |
| Ave/sow | 115 | 30 | 6 | | 160 | - |
| **Ave Litters /sow/year** | | | | | **2.28 (365/160)** | |
| **Ave empty days per litter** | | | | | **15** | |

**NIPS at 90 days*

| Good Herd – Unit B | | | | | | |
|---|---|---|---|---|---|---|
| Number of Sows | Gestation days/ sow | Lactation days/ sow | Return to service days/ sow | Other empty days/ sow | Total days/ sow/ litter | Farrowed |
| 27 | 115 | 30 | 6 | - | 151 | Yes |
| 3* | 115 | 30 | 6 | 42 | 193 | No |
| Ave/sow | 115 | 30 | 6 | | 155.2 | - |
| **Ave Litters /sow/year** | | | | | **2.35 (365/155.2)** | |
| **Ave empty days per litter** | | | | | **10.2** | |

**regular repeats at 42 days*

This results in litter per sow per year of 2.28 and 2.35 respectively even though both herds have an excellent farrowing rate of 90%. So what will be the cost of this difference?

| Pigs Sold Per Year for 670 sow herd* | |
|---|---|
| **Herd A @ 2.28 litters/ sow / yr.** | **18,942 pigs sold** |
| **Herd B @ 2.35 litters / sow / yr.** | **19,534 pigs sold** |

** based on 13.2 pigs weaned/litter less 6% post weaning mortality = 12.4 pigs sold/litter*

This is a difference of 582 pigs (51, 798kg dwt) sold per year!

If these missing pigs had been brought to slaughter (89kg dwt. @ €2.28/kg at time of writing), then this equates to **€118,510** in lost sales revenue on an annualised basis.

## What can you do?

- **Accurate record keeping:** Accurate individual identification of sows & sow groups allows you to concentrate on these pens at 21 & 42 days post service. Some of the information you need to record on your service record card includes; Sow no., date weaned, date served, expected farrow date. Any other observations (e.g. bleeding, previous abortions etc.). Consider investing in a recording system that allows you to dive deeper into your breeding performance and generating and studying these reports regularly can help identify any issue early on.
- **Gilt condition:** Are you optimising the performance of your gilts? Are you using a gilt rearer diet as opposed to a finisher ration? Have all gilts presenting at service at a minimum of 33-34 weeks of age but not over 38 weeks. Have a backfat cover of 14-15mm. Make body condition scoring part of your breeding protocol. Fine-tune your synchronisation methods to improve your services.
- **AI storage & handling:** Storage temperature should be within the range of 15–19°C. Semen is extremely temperature sensitive and shelf life is significantly shortened above 19°C. Store semen doses horizontally, not in an upright position and rotate packs twice daily. This ensures maximum contact between sperm and the diluent in which it is preserved, which maintains nutrient availability to the sperm, and is important to protect semen viability and maximise shelf life.
- **Observation throughout gestation:** Attention to service must include ensuring that mating is successful and occurs at the correct time, that semen quality is adequate and that no post-mating discharges occur. Carefully observe sows from day 14-15 after service for signs of slight discharge or sticky mucus and identify or highlight any sows in which this is seen, as they are likely to return. Walk a teaser boar through the dry sow house daily to check for served females on-heat/repeating, concentrating in particular on served gilt pens and groups three & six weeks post service.
- **Pregnancy testing:** Early and accurate identification of pregnant and non-pregnant sows and gilts in combination with accurate individual sow recording can allow earlier identification of repeats or abortions, which will help to improves reproductive efficiency in your herd.
- **Repeats and abortions:** Ideally, less than 10-12 % of sows/gilts served should be repeats, with less than 5% being due to failure in detection. A high level of repeats may be associated with urogenital tract infection in sows seen as discharge about 2 week after service. Problems with a high level of repeats should be considered in conjunction with the assessment of sow condition at different stages but especially at weaning. With abortions, there are numerous reasons why a sow may abort but

some of the most common are cause by disease, injury and environmental stress. Lameness and pain, particularly from abscesses in the feet or leg weakness can also cause abortions due to stress. Sow mortality in late pregnancy has major implications on empty days, as the entirety of her pregnancy will be classed as empty days because no litter was produced.

- **Lighting:** Low lighting will trigger higher level of repeats and abortions at any time but especially in the autumn as the pineal gland (light sensor) within the sow's brain has an effect on the progesterone hormone. Lighting in female pig housing should be at 300 lux. To maintain a viable pregnancy requires constant daylight length. Ideally, this should be 12-16 hours per day, beginning at 6am. It is important that the covers of the lights are regularly cleaned (every 6 months) as dirty covers can reduce the effective light intensity by 50%.

- **Temperature:** Wet, damp environments or high air movement cause chilling and increase demands for energy. Ensure that the service house is dry and warm (21-22$^{o}$C). Use a min/max to assess the room temperature at night. Remembering that if the tank is deep and empty, which may cause under slat air drafts this will not be picked up by min/max thermometer. On a windy day do a smoke test over some of the slats to see if there is upward draft from tank.

- **Aggression:** Aggression between unfamiliar pigs is a natural behaviour and will establish and maintain dominance in relationships. However, during the formation of the new social groups aggression can be intense and may result in stress and injuries (lameness). High levels of aggression may occur when mixing your sows in the dry sow house and can negatively affect your NIPs. Only move sows and gilts within 2 days or after 28 days post-service. Ensuring that the sows have feed in the trough on entry into the dry sow house may reduce the level of aggression. To help identify if aggression after mixing is having a negative impact pregnancy scan to assess the effect of fighting/mixing – ideally at feeding time to make the job easier.

## Conclusion

While the days involved in gestation and lactation are effectively fixed, the key to increasing your efficiency is to improve your NPDs and management plays a vital role in doing this. Minimising NPDs is therefore one of the most important aspect of sow management after breeding. Reducing empty days is essential not only for cutting costs but also for boosting overall productivity. Implementing effective strategies to address this issue can have a significant impact on farm performance.

# WelFarmers: A bottom up approach to future challenges

**Amy Quinn, Ciarán Carroll & Edgar Garcia Manzanilla, Teagasc**

With continued focus on pig welfare at EU level and the expected changes to EU legislation, the WelFarmers project is designed to help farmers address the challenges associated with these potential changes. Funded by Horizon Europe, WelFarmers brings together pig farmers, pig farming organisations, advisors, researchers, veterinarians, and other industry stakeholders to identify key welfare challenges and on-farm Good Practices (GPs). The project uses a bottom-up approach, focusing on four key areas: the cage ban, managing pigs with undocked tails, space allowance, and pain avoidance during castration. By addressing the critical issues identified in the 2022 EFSA report, WelFarmers aims to equip farmers with practical solutions, to best prepare them for impending regulatory changes.

## Key Focus Areas

WelFarmers addresses four main topics:


## Regional Networks & Thematic Groups

WelFarmers has eight Regional Networks (RNs) one from each participating country: Ireland, Portugal, Spain, France, Denmark, Finland, Italy, and Romania. These networks include pig farmers, pig farming organisations, advisors, veterinarians, researchers, and other stakeholders. RNs play a critical role in identifying on-farm challenges and GPs. They will hold four meetings to discuss and vote on the top three Best Practices in each focus area, which are then compiled by Thematic Groups (TGs).

The four TGs, made up of experts from each country, focus on the four key welfare areas. The TGs work alongside the RNs, reviewing challenges and GPs identified by each network. TGs meet to evaluate these practices, using a Good Practice Evaluation Tool (GPET). The GPET will assess technical quality, impact on pig welfare and farm economics (cost/benefit), and the ease of implementation, scalability, and success potential of innovative practices. The top GPs are then voted on by the RNs, with the best being named "WelFarmers Champions" and promoted across Europe as exemplary solutions. The identifying of challenges, GP's and awarding of "WelFarmers Champions" will happen twice over the course of the three-year project.

## Challenges & Good Practices

- **Challenges:** The main on-farm issues facing farmers related to the four welfare areas in the eight participating countries.
- **Good Practices:** The practices and approaches used or developed by farmer's on-farm to overcome one or more of the identified challenges. These practices should be ready for practical application on farms.

## Challenges Identified by the Irish RN

The first of four Irish RN meetings has taken place, where the initial round of challenges facing pig farmers in Ireland was identified. Similar challenges were identified by the other seven RNs, and all challenges have now been compiled by the TGs. In the next phase, over the next 6-7 months, Good Practices (GPs) will be identified throughout Europe to address the challenges highlighted by the eight RNs. The Irish RN did not collect challenges on the topic of avoiding pain in castration, as pig castration is not practiced in Ireland. Below is a summary of the challenges identified by the Irish RN

### *Ban of cages*

Members of the Irish RN highlighted several perceived challenges when transitioning to free farrowing or free lactation systems. A major concern is the lack of clarity around specifications for either retrofitting these systems into existing buildings or constructing new buildings to house these systems. Decisions on this also directly negatively affect herd size and farm layout. Farms are currently unsure whether to consider free farrowing or lactation systems when trying to predict the future legislation. This uncertainty is compounded by the high costs of transitioning to these systems, with limited suitable funding, and doubts over whether consumers will accept higher prices to offset the costs. Planning permission and EPA licenses are additional obstacles when it comes to building.

Network members also raised concerns about animal welfare, particularly the potential for increased mortality, injury, and stress for both sows and piglets. There are concerns regarding staff safety and the challenges associated with operating these systems, which may require additional training and it was felt temporary confinement might be necessary to mitigate risks. Maintaining hygiene in free or loose farrowing systems was felt to be critical, as concerns were expressed that larger pens can become dirtier and could increase the risk of disease. Cost competitiveness is another concern voiced, as the shift to these systems may increase operating expenses. They also question the sustainability of such changes, particularly regarding the potential waste of existing equipment and flooring that may not be that old but will become redundant due to transitioning. Additionally, uncertainties were raised around the suitability of current pig genetics for free/loose farrowing systems that present further challenges.

### *Space allowance & flooring*

Network members identified several challenges related to space allowance and flooring. High costs and the difficulty in obtaining planning permission for additional space is a big concern. Although all members agreed that providing additional space benefits both animal welfare and performance, it was felt that providing additional space could result in hygiene and labour challenges, such as the need for more cleaning and could increase disease risk. In addition, it was felt that the uncertainty regarding space and flooring specifications and the design of such pens, particularly in relation to incorporating solid areas and stocking densities, would complicate effective and practical planning of these pens, with existing specifications such as TAMS 3 perceived as overly prescriptive and un-implementable. Maintaining the optimal environmental conditions in larger spaces or with solid flooring could add to the complexity of caring for the pigs in these systems. Additionally, the management of larger spaces brought up concerns about injuries, lameness, and aggression in pigs.

### *Rearing pigs with undocked tails*

Many network members queried the feasibility of raising pigs with undocked tails, "Is it possible and why are we doing it?", raising concerns about increased injuries, mortalities, associated production costs, medical costs, antibiotic use, labour requirement and staff stress. Furthermore, the costs of preventative measures for tail biting, including necessary space and enrichment, would present significant financial burdens for farmers. Associated with this is the concerns raised about the lack of financial support or subsidies compared to other countries. Some believed that financial assistance alone might not resolve the underlying issues. Some feel that current infrastructure of the Irish pig industry is not suitable to implement the required changes, especially in our predominantly fully slatted systems and the challenge of sourcing appropriate enrichment materials for this system. Limited knowledge on which breeding lines might reduce tail biting complicates the situation further.

### Irish Partners: Teagasc and IFA

WelFarmers benefits greatly from the involvement of two key Irish partners:

- Teagasc: Teagasc leads the TG on space allowance and stocking density and manages the Irish RN. Teagasc's Pig Development Department also plays a crucial role in facilitating knowledge transfer to ensure the information gathered by the project is disseminated as efficiently and effectively as possible for maximum impact at ground level
- Irish Farmers' Association (IFA): The IFA connects the project directly to the Irish pig farming community and will work with Teagasc to organise Knowledge Exchange Tours, enabling the sharing of welfare solutions across partner countries. The IFA can ensure that these solutions are practical and economically viable for farmers and plays a key role in disseminating information across the Irish pig farming sector.

### Knowledge Transfer

A key feature of the WelFarmers project lies in is effective knowledge sharing. Teagasc, the IFA, and other European partners are dedicated to ensuring that farmers receive information in clear, practical formats. This will be achieved through virtual tours, abstracts, factsheets, infographics, news articles, video knowledge pills, webinars, podcasts, online training material, social media channels, project website (https://www.welfarmers.com/) and its presence at national and European pig events. Platforms such as the Teagasc Pig Farmers' Conference, The Pig Edge Podcast, and the Teagasc Pig Newsletter will be instrumental in disseminating these outputs also.

### Conclusion

The WelFarmers project aims to significantly advance pig welfare across Europe. Its bottom-up, farmer-led approach ensures that solutions are practical and ready for implementation on farm. Our hope is that its focus on farmer-driven innovation and knowledge sharing will help enhance welfare standards on-farm without compromising farm profitability.

# Lowering nitrogen excretion from pig production

**Elizabeth Ball, Agri-Food and Biosciences Institute (AFBI)**

One of the major challenges facing the agriculture industry is ensuring sustainable production is achieved with minimal emissions of environmental pollutants. While emissions from pig production are relatively small in relation to emissions from total agricultural production, the intensive nature of pig production, and in many cases, the concentration of production in specific geographic areas, mean that there is a particular problem of nitrogen and ammonia emissions in local areas. Pollution from nitrogen and ammonia results in significant environmental damage within waterways and surrounding areas. Leaching of nitrogen (nitrates) from soil from excess slurry or fertiliser application may lead to eutrophication of fresh waterways and coastal areas. In addition, a proportion of N excretion is converted to ammonia, which causes acidification of soil and water and has harmful effects on biodiversity in sensitive sites, resulting in a reduction in ability to capture carbon and thus increasing total greenhouse gas emissions. Ammonia is also a source of nitrous oxide, which is a potent greenhouse gas and thereby can further exacerbate greenhouse gas release from livestock production. Obviously, reducing nitrogen excretion (and hence ammonia) is an objective within pig production, but how can this be achieved in practice?

### Reducing N excretion through nutrition

Research at AFBI, as part of the Pig Research Consortium (AFBI, Devenish Nutrition Ltd., John Thompson and Sons Ltd. and Preferred Capital Management), has focussed on identifying strategies to reduce the environmental impact of pig production through targeted nutrition. Nitrogen, in the form of dietary crude protein (CP) and amino acids, are essential for growth although it is not just a simple case of reducing nitrogen intake to reduce nitrogen output. Maintaining the optimum supply to achieve optimum production is paramount to the sustainability of the industry as well ensuring that nitrogen and ammonia excretion does not increase due to poor production performance and efficiency. There have been a series of trials conducted, which have aimed at maintaining or improving production efficiency while reducing overall excretion from pig production. As a result of the work by the Consortium, dietary CP levels can be safely reduced to 15% in finishing diets for pigs from 60kg, if amino acids are balanced and adequately supplied. On the strength of this research, many producers in Northern Ireland have already adopted the use of 15% dietary CP diets, which has reduced N excretion by 20% from finishing pigs, and demonstrates the pig industry's ability and commitment to respond positively to environmental challenges.

Phase feeding is one method to target nutrition to the requirement of the pig. As the pig matures its nutrient requirement changes, hence it seems logical to change the diet to suit the need. However, with every diet change there is an inevitable hit to intake and feed efficiency, which needs to be considered. While it is very true that dietary requirements for nutrients reduce as the pig ages due to a higher intake capacity, the majority of pig producers offer one finisher diet from approximately 60 kg through to finishing. Slaughter liveweight has increased significantly in recent years and questions have arisen around introducing an additional finisher diet at approximately 100 kg to take pigs to the higher slaughter liveweight of around 135 kg. The theoretical benefits of such phase feeding in finishing are reductions in diet costs and less nitrogen excretion. The theory was tested by our study, which offered pigs (both boars and gilts) a 15% CP diet from ~60-100 kg and then a 13% CP from ~100-140 kg in a trial on the AFBI Hillsborough farm and on a commercial farm. This phase feeding regime was compared with the performance of pigs offered either a 15% CP or a 13% throughout from ~60-140 kg. As can be seen from Table 2, results of both trials were similar in that there was no benefit to phase feeding at this later stage. In the trial at AFBI, changing the diet at 100 kg from 15% to 13% CP, resulted in a significantly poorer growth rate than offering a 15% CP throughout. Performance on the 13% CP diet was intermediate. Performance on the commercial farm was similar, where it was also observed that changing the diet from 15% to 13% at 100 kg was detrimental to performance, but on the commercial farm, the 13% CP diet resulted in the poorer performance. Table 2 also presents N excretion resulting from each dietary regime and again shows that there was no benefit to phase feeding in terms of N excretion. *Therefore, the first practical message from this work is that a single diet should be offered throughout the late finishing stage from approximately 60kg onwards.*

Table 2. *The effect of diet change on performance and N excretion from ~60-140kg*

| | 13:13 | 15:15 | 15:13 | Statistically different? |
|---|---|---|---|---|
| **AFBI trial** | | | | |
| Feed intake (g/d) | 3053 | 2960 | 2944 | No |
| Growth rate (g/d) | 1249 | 1282 | 1209 | Yes (P<0.05) |
| FCR | 2.46 | 2.34 | 2.45 | Yes (P<0.05) |
| N excretion/pig (kg) | 2.2 | 2.4 | 2.3 | Yes (P<0.01) |
| **Commercial farm trial** | | | | |
| Feed intake (g/d) | 2539 | 2663 | 2569 | No |
| Growth rate (g/d) | 968 | 1052 | 1000 | Yes (P<0.05) |
| FCR | 2.62 | 2.53 | 2.57 | No |
| N excretion/pig (kg) | 2.3 | 2.4 | 2.4 | No |

As can be clearly seen from the results in Table 2, offering a 13% CP diet reduced performance (especially on the commercial farm) but when we consider the performance of boars and gilts separately, our evidence indicates that this poorer performance on a 13% CP diet is because of the reduced performance of boars. In the AFBI trial, we offered the 15% and 13% diet separately to boars and gilts. The 13% diet not only contained a lower level of CP but also a lower level of lysine (0.9%) and other essential amino acids to test "how low we can go" in terms of reducing CP and in producing a diet with lower levels of expensive supplemental amino acids. Regardless of the dietary CP content, and as expected, boars significantly outperformed gilts at all stages in terms of growth rate and feed conversion efficiency due to their higher genetic capacity to lay down lean growth. As a result of this, boars excrete less nitrogen on a per pig basis, on average 350 g less nitrogen than gilts during the finishing period. Hence, *the second key recommendation from this work is to split-sex pigs to reduce nitrogen excretion*. This allows dietary nutrient levels to be targeted for boars and gilts when housed separately, which is essential as boars have a higher requirement for amino acids to drive their higher genetic deposition to grow. The benefit of this is highlighted in Figure 1. It can be observed that boars offered the lower CP/lower lysine diet grew significantly slower (1248 vs. 1347 g/d) and were less efficient (FCR 2.38 vs. 2.17) than boars offered the higher CP/higher lysine diet. On the other hand, there was no difference in the performance of gilts offered either 15% or 13% crude protein diets. Therefore, it can be concluded that a 13% CP/lower lysine diet is adequate to drive optimum performance in gilts but not in boars. The reduction in dietary CP offered to gilts, while maintaining their performance, resulted in an 18.5% reduction in nitrogen excretion per pig due to their lower nitrogen intake. *The work has shown that it is possible to offer finishing gilts a lower cost, lower CP/lower lysine (0.9%) diet more suited to their requirements, which will lower N excretion. On the other hand, finishing boars should be offered a 15% CP/higher lysine (1.1%) diet to drive their higher growth rate otherwise performance will be adversely affected, and N excretion will increase.*

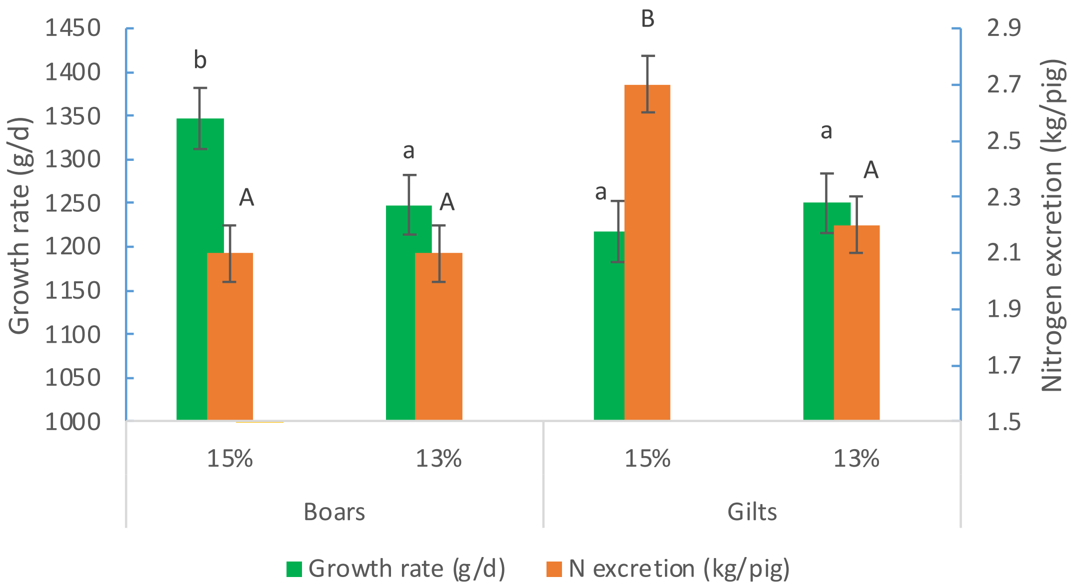



Figure 1. *The effect of dietary CP on growth rate (g/d) and nitrogen excretion (kg/pig) of finishing pigs from ~60-140kg (A,B and a,b indicate statistical difference)*

## Going lower in CP?

It has been established that a 13% CP diet containing 0.9% total lysine is not adequate for boars from 60 kg. However, as amino acids are the essential component and not CP *per se*, our next step was to test if we could "go lower" by conducting a trial with boars and gilts offered either a 13% CP containing either 0.9% or a higher level of 1% lysine (and correspondingly higher levels of other essential amino acids).

The performance of boars and gilts from 60-115 kg offered these diets was compared with those offered the 15% CP/1% lysine control diet. Table 3 shows that the performance of boars offered the 13%/ low lysine was significantly lower than those offered the 13%/higher lysine diet (1.18 vs. 1.27 kg/d growth rate and 2.37 vs. 2.18 FCR). This drop in performance would reduce return over feed costs and increased nitrogen excretion by 20%, which again stresses the need to maintain production performance to minimise emissions.

**Table 3.** *The effect of gender and dietary lysine level of finishing pig performance and N excretion*

| | 13% CP / low lysine | | 13% CP / higher lysine | | Statistically different? |
|---|---|---|---|---|---|
| | Boar | Gilt | Boar | Gilt | |
| Intake (65-115kg) (kg/d) | 2.79 | 2.91 | 2.77 | 2.77 | No |
| ADG (65-115 kg) (kg/d) | 1.18 | 1.18 | 1.27 | 1.15 | Yes ($P<0.05$) |
| FCR (65-115 kg) | 2.37 | 2.48 | 2.18 | 2.42 | Yes ($P<0.05$) |
| N excretion (kg/pig) | 1.25 | 1.40 | 1.04 | 1.33 | Yes ($P<0.05$) |

Interestingly, when the performance of boars offered the 13%/higher lysine diet was compared with those offered the 15% CP diet, there was no difference in growth rate or FCR indicating that the 13% CP/ higher lysine diet was adequate to drive optimum performance (Table 4).

As a consequence of the similar performance and the reduced nitrogen intake of pigs offered the 13% CP/higher lysine diet, nitrogen excretion was reduced by 23% when compared with pigs offered the 15% CP diet. However, while the thought of moving all finishing pigs from 60 kg upwards to a 13% CP diet is tempting in our drive to reduce nitrogen excretion, certain caveats must be highlighted, or nitrogen excretion could increase rather than decrease.

**Table 4.** *The effect of gender and dietary CP level on finishing pig performance and N excretion*

| | 13% CP | | 15% CP | | Statistically different? |
|---|---|---|---|---|---|
| | Boar | Gilt | Boar | Gilt | |
| Intake (65-115 kg) (kg/d) | 2.77 | 2.77 | 2.65 | 2.73 | No |
| ADG (65-115 kg) (kg/d) | 1.27 | 1.15 | 1.23 | 1.13 | No |
| FCR (65-115 kg) | 2.18 | 2.42 | 2.18 | 2.42 | No |
| N excretion (kg/pig) | 1.04 | 1.32 | 1.39 | 1.69 | Yes ($P<0.05$) |

One reason that a blanket reduction to 13% CP in later finishing diets is not recommended is the variability in intake and growth rate across farms. It is well known that some farms support higher levels of intake and growth than others and it is these farms that could potentially reduce to 13% CP/higher lysine diet. However, offering this diet on farms where intake is lower, would limit the intake of lysine and other essential amino acids causing a further reduction in performance and more nitrogen excretion as was observed when the lower lysine 13% CP diet was offered to boars in this study.

It is essential to understand your on-farm performance, and then with careful formulation, dietary CP could potentially be lowered to below 15% for boars in the late finishing stage. Finishing gilts can be offered a 13% CP diet with no adverse effects on performance.

## What about ammonia?

Lowering dietary CP whilst maintaining performance will lower nitrogen excretion and also ammonia emissions. However, the magnitude of reduction in ammonia emissions from more efficient dietary CP diets has never been quantified at a local practical level or the effects on odour fully understood. To address this, a specialised trial was conducted at AFBI, using pigs housed in environmental units where gas and odour emissions were measured. Finishing pigs were offered one of three experimental diets that differed in dietary CP content (18%, 15%, 13% CP). Ammonia emissions, odour emissions, water usage, slurry output and slurry dry matter content were measured. The 18% CP diet representing more typical or historic pig finisher dietary protein levels, the 15% representing the level of CP in diets recommended from our research and the 13% CP level to investigate the potential for further emission reduction. As can be seen from Table 5, ammonia emissions were lowered by offering diets with reduced dietary CP. On average, ammonia emissions were reduced by 10% for every 1% unit decrease in dietary CP. Reducing dietary CP can also have positive benefits on slurry handling as water intake and hence slurry output, were both significantly reduced. The reduction observed in slurry output is equivalent to 58 tankers (1300-gallon tanker) for a 2000 finisher place house.

In terms of odour, it was found that lowering dietary CP, lowered odour emissions and the production of hydrogen sulphide, which is a potent contributor to odour. While not statistically different, the numerical reduction is important where the need to manage and reduce odour from pig farms exist. There was a significant relationship between ammonia emissions and odour emissions pointing to the fact that if there are effective strategies to lower ammonia emissions, odour emissions will also be reduced.

**Table 5.** *The effect of reducing dietary CP on ammonia emissions, slurry output and odour.*

| | 18% CP | 15% CP | 13% CP | 18% → 13%* |
|---|---|---|---|---|
| Ammonia emission (mg/h) | 430 | 378 | 223 | 48% reduction |
| Slurry output (L/day) | 3.4 | 2.1 | 2.1 | 38% reduction |
| Odour emission ($Ou_E$/Sec) | 2.2 | 1.9 | 1.8 | 19% reduction |
| Hydrogen Sulphide (ppm) | 2.3 | 1.6 | 1.3 | 41% reduction |

**The reduction in ammonia emissions was significant at P<0.05 and the reductions in odour emissions and hydrogen sulphide were numerical but non-significant*

Given the relationship between ammonia and dietary CP and the fact that the industry have moved to lower dietary CP, combined with advancements in genetics and management that have increased N efficiency, it was agreed that work was needed to ascertain the levels of ammonia being produced from modern pig units with a view to updating ammonia emission factor standards in the UK Ammonia Inventory. This work, funded by the Department of Agriculture, Environment and Rural Affairs for Northern Ireland has been conducted at AFBI. The research study followed the principles of international guidelines (Verification of Environmental Technologies for Agricultural Production) to ensure the results were applicable locally, nationally and internationally. It was found that ammonia emission was 1.55 kg/pig place/year for finishing pigs in Northern Ireland, which is 46% lower than the current UK ammonia Inventory (2022). This reduction is in keeping with reduction in dietary CP and the advancements in genetics achieved from the time the historic value in the current standards was determined. This updated figure provides an accurate baseline of ammonia emissions from modern finishing pig production and will enable more effective implementation of mitigation strategies.

## Summary points and practical implications

- House, manage and feed boars and gilts separately. This can be best achieved at weaning when pigs are easier to handle.
- Offer finishing boars a 15% CP diet and gilts a 13% CP diet from ~60kg onwards. This strategy will reduce N excretion from gilts by 18.5% while ensuring boars continue to be at their most efficient and achieve their production performance potential.
- Know the performance of your pigs – if intake rates are high consider moving all pigs in late finishing (~60kg onwards) to 13% CP/ 1% lysine diet.
- This work does not support a change of diet in the late finishing period. A change at 100kg liveweight has potential to negatively impact performance, reduce your economic return over feed and will have no effect on N excretion.
- Reducing dietary CP by 1% can reduce ammonia emissions by 10% if production performance is maintained.
- Reducing ammonia emissions will also have a positive impact on odour emissions and slurry output.

# Lowering Feed Cost: Picking the low hanging 'FCE' fruit

**Gerard McCutcheon, Michael McKeon and Laura Boyle, Teagasc**

One of the four pillars of sustainability is financial sustainability and a key component of financial stability is cost competiveness. Pigmeat exports are a key element of the Irish pig sector giving it a strong foundation of cost competiveness and scale. Feed is the largest single cost in pig production (~75%) and therefore has the biggest impact on competiveness. However, a pig farm or country with very good KPI's may generate very high output but this may not be achieved at the optimum economic efficiency.

A recent Teagasc *Pig Feed Cost Competiveness Report* highlighted that Ireland, when compared to Denmark, Spain and the Netherlands, had a higher feed cost of between 8 to 13 cent in feed cost per kg of pigmeat produced, when the *feed cost per tonne* was equalised. Pigmeat is now a global commodity and Ireland exports a high percentage of its output (63%) on the International market. Therefore, an 8 to 13 cent / kg cost differential against our major international competitors places the Irish pig producer/sector at a significant competitive disadvantage. One of the paths to reduce this differential is to improve Feed Conversion Efficiency (FCE) at farm level. However, there are many factors affecting FCE, so which area should you target?

It is important to quantify the potential FCE savings arising from some of the main factors and to rank these by potential impact. Using Teagasc research trial data and commercial on-farm case studies, data was modelled against the average national pig performance output (Teagasc Profit Monitor Report, 2023). The factors were then ranked numerically according to their impact on wean-sale feed conversion (Figure 1).


**Figure 1.** *Effect of selected factors on Wean-Sale FCE.*

In this modelling 'Health' & 'Feeder type' are shown to have the largest negative effect / highest ranking, and mortality/condemnations the lowest. However the FCE deterioration for condemnations and mortality, of 0.02 and 0.015 respectively, is based on a per 1% change in the mortality / condemnation rate. Therefore, a spike in the incidence of mortality for a period of time on your pig unit, could move mortality significantly up the rankings to one of the biggest factors that negatively affects the feed efficiency on your unit. In the interest of brevity, this paper will address three factors, which the authors believe are readily obtainable 'low hanging FCE fruit' (figure. 2).


**Figure 2.** *Selected 'low hanging FCE' factors.*

## Herd Health

Of the eight factors listed above, 'herd health' had the largest negative effect on FCE. Surveillance and performance data from the Teagasc *PathSurvPig* research project, indicated a wean-sale FCE deterioration of 0.16, when negative swine influenza herds were compared to positive-vaccinating herds. Herds that were positive and vaccinating for PRRS and Pneumonia (M.Hyo.) also showed a significant deterioration in FCE when compared to negative herds. The scale of the FCE deterioration will depend on the clinical stage/ effects of the disease and the level of control. In general, the FCE deterioration indicates that monitoring and controlling herd health, or ideally having a negative herd, for these three diseases will generate the greatest improvement in feed conversion. Can your herd's immunity be boosted by better colostrum intake and a flexible/responsive vaccination program? Are all sows given pain relief medication at the end of farrowing to stimulate colostrum let-down, and do piglets get a colostrum suckle within 6 hours of birth? Could your piglets be pre-mixed into their post weaning batches in the 2 weeks prior to weaning, to reduce stress and aggression at weaning?

Vaccination programs play a huge role in controlling these diseases but these programs need to be fine-tuned on a continuous basis as infection levels can rise and fall. Monitoring and controlling the herd health requires slaughter-line checks, PCR blood sampling and blood / saliva rope sampling at regular intervals throughout the year to obtain a continuous herd health profile, rather than just blood testing when a spike/outbreak occurs. Being pro-active rather than reactive helps to identify potential health problems. Active implementation of 'Bio-Check' recommendation, especially for internal biosecurity, could also help to control/minimise disease transfer, this includes strict all-in and all-out.

## Feed Access

If pigs do not have optimum access to feed then their growth, rates could decrease with a corresponding deterioration in feed efficiency. In recent years, the increase in the prolificacy of the Irish sow herd and higher finisher sale weights has resulted in pigs on some units having sub-optimum access to feed.

A recent case study on a commercial pig unit illustrated this point sub-optimum feed access leading to a deterioration in feed efficiency. The pig unit was an average size herd, with very good feed, housing and management, but a disappointing finisher feed efficiency of 2.81 (figure 3). To pinpoint the issue on this unit pigs were weighed on-trial at the start of the finisher period, at the midpoint and the day prior to sale. In addition, the feed dispensed through the wet feed valves were also recorded during this period. This illustrated that pigs performed well in the grower stage (FCE 2.3) but there was a performance decrease in the latter half of the finisher stage (FCE 3.24). The latter period corresponded with the finisher pigs moving from grower feed to a lower specification finisher feed (figure. 4). The blame was initially attributed to this finisher diet. However, in a subsequent trial when the pigs were kept on the grower diet for the total finisher period, the FCE was still poor in the latter stage.

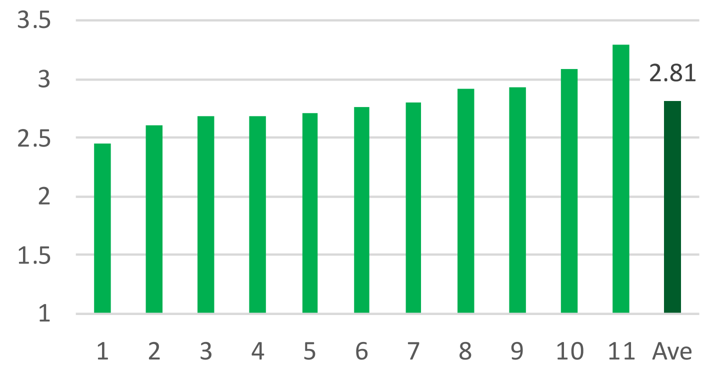



**Figure 3.** *Finisher FCE in the total finisher period.*

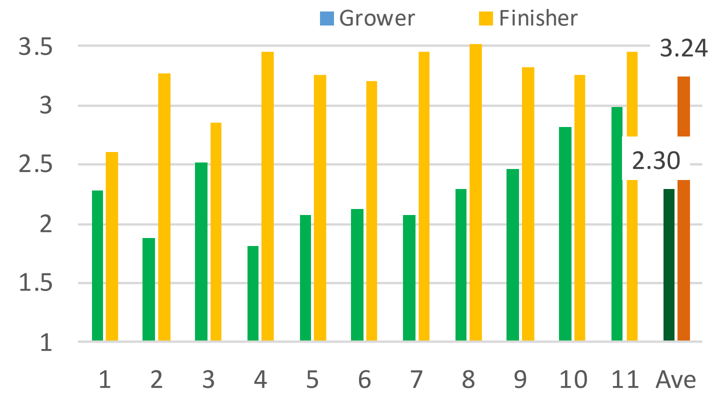



**Figure 4.** *FCE in the grower & finisher period respectively.*

To obtain more data, the pigs were weighed more often and feed allowance per valve was recorded weekly. When the subsequent feed intake was allied to the growth data, this indicated a severe deterioration in FCE in the last 3 weeks prior to sale (figure 5).

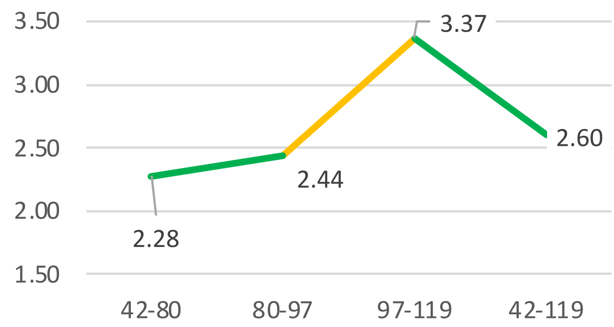



**Figure 5.** *Finisher FCE during finisher stage 42-119kg.*

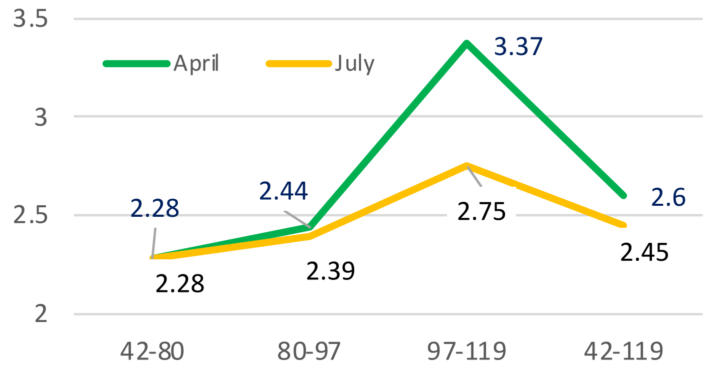



**Figure 6.** *Comparison of April vs Jul finisher FCE trial.*

It was determined that the reduction in feed intake, reduced performance and higher FCE, was due to sub-optimum feed trough access. Therefore, a second trial was undertake in July and the number of pigs per pen was reduced by 15% on transfer into the finisher stage (Figure 6). This resulted in a dramatic improvement in feed intake, growth and FCE performance in the weeks prior to sale and improved the overall finisher FCE from 2.6 to 2.45. When this was translated into an overall wean-sale FCE the improvement was 0.07.

The case study on this unit illustrated how important accurate data is when trying to improve FCE. Many units have access to this data but may not be fully utilising it to resolve performance issues. It also demonstrates how a relatively small production change can save over €100,000 in feed costs on an annualised basis.

## Mixing in finisher / split selling

We all know that mixing pens of pigs is not a good idea and should be avoided due to the associated fighting after mixing to establish their hierarchy/ pecking order. However, some people do not realise that reducing / 'splitting' a pen of pigs has the same effect – fighting, reduced growth rate and a deterioration in FCE. When pigs are mixed on entry into the finisher stage, Moorepark trial work (Montoro *et al,* 2021) has demonstrated a finisher and weaning-sale FCE deterioration of 0.08 and 0.03 respectively. If these pigs were prior mixed on entry to 2$^{nd}$ stage weaners, then the negative effect on FCE would have been even higher.

Any pig removed from a pen could cause the remaining pigs to establish a new pecking order and affect FCE. e.g. at transfer to finisher & prior to sale

Transfer to Finisher: Many pig units could house their weaners in large group sizes and then split/reduce the pen size when transferring into finisher e.g. pen of 60 weaners divided into 2 X 30 finishers. Any pen mixing as discussed is not ideal but the older the pigs at mixing the worse the effects as they may fight for longer with increased risk of injury. Also the older the pig the higher their daily feed intake, which may be burnt-up by the increased stress and fighting activity, thereby having a larger adverse effect on FCE. A pig mixed at weaning may have a feed intake of 250-280g/day but a 40kg weaner on entry into finisher may be closer to 2kg per day. On this basis, if it's 48 hours before the pen settles-down after mixing, then the waste of feed may be ~ 4kgs for finishers versus ~ 0.5kg at weaning. The Moorepark trial showed the performance effect of mixing or not-mixing pigs on entry into the finisher stage.

**Table 6.** *Effect of mixing on entry into the finisher stage and space allowance on performance.*

| | Space Allowance | | | |
|---|---|---|---|---|
| | 0.96 m$^2$/ pig | | 0.78 m$^2$/ pig | |
| | Mixed | Non-mixed | Mixed | Non-mixed |
| Sale wt, 21 wk, kg | 102.1 | 106.4 | 101.7 | 108.2 |
| ADG g | 983 | 1,034 | 955 | 1,052 |
| ADFI g | 2,150 | 2,222 | 2,125 | 2,257 |
| FCE | 2.18 | 2.12 | 2.19 | 2.11 |

This trial shows that when pigs were unmixed on-entry (same pen mates as in weaner stage) they had a better ADG and finisher FCE (2.12 vs 2.18). Interestingly, it also showed that when they were mixed on entry the ADG of pigs with the greater space allowance (0.96m2) only fell by 50g/day. This indicates that if pigs must be mixed then the larger the space allowance per pig the less effect on growth rate. If pens on your unit must be 'split' (not ideal), you should do it on entry into second stage weaners rather than at the finisher stage, thereby minimising the adverse performance, injury and FCE effects.

Prior to Sale: The other area that 'splitting' of pens occur is prior to sale when the heaviest/'Tops' are taken from the pen to minimise the number of overweight pigs at sale. As discussed, each time you remove a pig the remaining pigs must re-establish the pecking order. Each time this occurs, it may probably cost a minimum of one days feed intake, approximately 2.8-3kgs per pig. On some pig units 'Tops' are taken from a pen on two different weeks before sale which results in a waste of 6kgs of feed for the remaining pigs and an increased risk of injury/tail biting. In addition, if 'Tops' are removed just a week before sale the remaining pigs may only get the benefit of greater space allowance and feeder access for 6 days. Whereas if 'Tops' are removed 3 weeks prior to sale then the remaining pigs get 20 days of benefit.

Research by John Deen illustrated this problem very well. The trial compared pen performance when some 'Tops' were removed prior to sale; at 20 days (d0) & 10 days (d10).

**Table 7.** *Effect on Performance from the sale of 'Tops'.*

| | Pens | | | | |
|---|---|---|---|---|---|
| Pigs / Pen | 25 | 25 | 25 | 25 | 25 |
| Removed on day 0 | 0 | 2 | 2 | 2 | 2 |
| Renoved on day 10 | 0 | 0 | 2 | 4 | 6 |
| Space/pig m2 | 0.67 | 0.72 | 0.8 | 0.88 | 0.98 |
| Tottal pen gain (kg) | 458.1 | 465.8 | 459 | 446 | 442 |
| Total pen feed (kg) | 1,320 | 1,261 | 1,251 | 1,226 | 1,168 |
| Total wt marketed (kg) | 3,128 | 3,139 | 3,124 | 3,123 | 3,123 |
| Marginal ADG (kg) | 0.92 | 1.01 | 1.04 | 1.06 | 1.11 |
| Marginal Average Daily Intake (Kg) | 2.64 | 2.74 | 2.84 | 2.92 | 2.92 |
| Marginal Gain:Feed ratio | 2.88 | 2.71 | 2.73 | 2.75 | 2.64 |

In the first column no 'Tops' were removed, in the second column 2 were removed at day 20 pre-sale and none after that. In the 3rd to 5th column, 'Tops' were removed at day 20 and day 10. The trial shows that the highest performance for the **whole pen** (*Total Pen Gain*) was when 'Tops' were removed just once at 3 wks (20 days) prior to sale. If you are selecting 'Tops' on your pig unit then '**do it once & do it right**' at 3wks pre-sale to reduce the negative effects on FCE. Never, ever, re-mix the pigs remaining in pens after the tops are removed i.e. amalgamate the stragglers from a number of pens.

## Conclusion

Many factors affect your FCE and therefore your feed cost and competiveness. To improve your FCE requires assessing the negative FCE factors that are pertinent to your unit, quantifying the potential savings arising from each factor and then selecting which factors are the '*low hanging FCE fruit*' that you can readily tackle.

# Crossfostering & nurse sow management

## Hans Bundgaard, Porcus Veterinary Consultants

Crossfostering and nurse-sow management are implemented on farms to reduce pre-weaning mortality. In this presentation and the various systems of fostering piglets are outlined, and the optimum reason to use some of these methods on farms is explained.

- When you crossfoster individual piglets or complete litters, you must ensure that all sows rear as many piglets as possible and that piglets are nursed by the right sows.
- The type of crossfostering can have a huge impact on the infection pressure in the farm.
- Provided that piglets are assured of colostrum, their survival is not affected by whether they are reared by their own mother or another sow (once the sow has a good supply of milk).
- Make sure to keep workload to a minimum by leaving as many piglets as possible with their own mother.
- Up to 3-8 hours may pass before piglets take in milk from the new sow. The piglets that are moved must therefore be viable enough to manage the move. Generally, piglets have had sufficient colostrum intake if the umbilical cord is dry all the way up to the umbilicus. Ideally piglets should ingest 250 ml of colostrum from their mother and be fostered on the second day of life (24 to 48 hours old).
- Large and old sows need a large degree of stimulation of the udder to nurse optimally. Consequently, at the time of crossfostering they must always be given large piglets.
- Do not exchange piglets that are more than 48 hours old as this increases the transmission of infection and causes disruption in the litter leading to a drop in daily gain.

### Crossfostering procedure:

- Count the new-born piglets by the sows
- Move the smallest piglets (below 700 g) to a nurse sow for underweight piglets
- Start crossfostering when the piglets have had sufficient colostrum intake
- Count the sows' functioning teats – ideally, do this before farrowing to know how many piglets the sow can nurse *
- Move the largest excess piglets to nurse sows
- Move as few piglets between litters.

** If you use a milk cup system, crossfoster +2 piglets more than the number of functioning teats.*

It is a fact that for up to 48 hours post weaning you can add piglets to available teats without risking the teat drying up.

### Managing the nurse sow

Nurse sows are used to manage sows with large litter sizes on pig farms. Suitable nurse sows are selected in order to increase the milk supply (and allow crossfostering of piglets that may not be getting adequate milk) to wean more and heavier piglets.

- If the nurse sow lies sternally 3-5 hours after receiving a new litter of piglets, and milk let-down is not observed:
    - Administer pain relief according to vet's instructions before placing the piglets by the sow
    - Supply straw, hay or similar material.
- If, after 8 hours, the sow has not accepted the piglets, move the piglets to another nurse sow. Give the nurse sow piglets of the same size and age as the ones it handed over to the intermediate nurse sow.

- If you generally experience problems with nurse sows failing to accept the piglets, try leaving the newborn piglets and the sow's own piglets in the farrowing pen for 1 hour before separating the litters.

Do not:

- Leave the nurse sow without piglets for 1-2 hours – this will not make the nurse sow accept the new piglets any faster.
- Leave 2 of the nurse sow's own piglets with the new piglets for 12 hours, as that will cause unrest in the litter because there are too many piglets by the udder for too long. It may possibly work if the number of teats correspond with the number of piglets it is nursing.

### The nurse sow and the intermediate nurse sow

Intermediate sows may come on heat in the farrowing facility if, for a period of time, they have no piglets to nurse. Identify these sows to be able to pay extra attention to them in the last week before weaning and in the service facility (after weaning).

In sectioned systems (i.e. All-in , All-out or AIAO), move the nurse sow and the intermediate nurse sow to a pen in the room where the piglets are born, as nurse sows transmit fewer pathogen bacteria than piglets (move the nurse sows in, rather than moving the piglets into a different farrowing room/section). Once the piglets are ready for weaning, they should be weaned at the same time as the rest of the piglets in the section. Therefore, you should allow for a number of empty pens in the farrowing room/section if you intend to use nurse sows.

***Nurse sow procedure:***

Pig producers are advised to use two-step nurse sows. It is useful to identify potential nurse sows and intermediate nurse sows the day before you expect to use them.

The nurse sow:

- Receives excess new-born piglets
- Is a young sow in medium body condition that nursed its own piglets well
- Finished farrowing 4-8 days ago
- Does not receive more piglets than it has given up
- Is moved to the piglets' section if sectioned management is practised.
- The 4-8 day old piglets are moved to an intermediate nurse sow that has nursed for a minimum of 21 days.

***The intermediate nurse sow:***

- The intermediate nurse sow weans piglets that are min. 21 days old and receives 4-8-day old piglets from the nurse sow.
- Is in medium body condition with teats accessible to the piglets
- Nursed its own piglets well
- Does not receive more piglets than it has given up
- Is moved to the piglets' section if sectioned (AIAO) management is practiced.

### Conclusion

The use of fostering and nurse sows is to ensure piglets have the best chance of surviving, and, of obtaining, sows milk to achieve a reasonable weight at weaning. Implement AIAO to ensure that piglets are not mixed with pigs born a week later – so that all pigs weaned are a similar age and can be moved through the weaner and finisher sections together. This will reduce the disease pressure on the farm.

# Department Staff

## Head of Pig Development Department

**Dr. Edgar Garcia Manzanilla,**
Teagasc, Fermoy, Co. Cork
Tel: 025 42299 | Mob: 087 9614454
Email: edgar.garciamanzanilla@teagasc.ie

## Head of Pig Development Department Knowledge Transfer

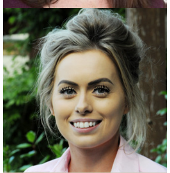
**Ciarán Carroll,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42388 | Mob: 087 2462925
Email: ciaran.carroll@teagasc.ie

## Knowledge Transfer Personnel

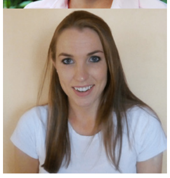
**Gerard McCutcheon,**
Teagasc, Oak Park, Carlow
Tel: 059 9183503 | Mob: 087 8303969
Email: gerard.mccutcheon@teagasc.ie

**Michael McKeon,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42259 | Mob: 087 6739178
Email: michael.mckeon@teagasc.ie

**Dr. Amy Quinn,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42251 | Mob: 087 3779015
Email: amy.quinn@teagasc.ie



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



**Dr. Louise Clarke,**
Teagasc, Ballyhaise, Co. Cavan,
Tel: 049 4338634 | Mob: 087 6177268
Email: louise.clarke@teagasc.ie

## Researchers

**Dr. Peadar Lawlor,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42217 | Mob: 086 8214671
Email: peadar.lawlor@teagasc.ie

**Dr. Laura Boyle,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42389 | Mob: 087 9295364
Email: laura.boyle@teagasc.ie

**Dr. Keelin O'Driscoll,**
Teagasc, Moorepark, Fermoy, Co. Cork
Tel: 025 42289
Email: keelin.odriscoll@teagasc.ie

Agriculture and Food Development Authority