3 Questions based on Lifecycle Assessment/Analysis (LCA), and why I ask them.

1. Do you know the average Weight to Time Conversion Ratio (W2TCR) scale (Min/Max) in your batches of feeding herd pigs?

The reason I ask is this.

Within a computer pig performance recording system there must be a means of calculating the average liveweight of the total feeding herd at two key points in time to be able to create and opening and closing average weight of the feeding herd population. Between these two weights the computer system receives data entries for the number of pigs entering, and leaving, the weight of all feed recorded as being delivered, and (optional) a feedstock retained on the start and end of period dates, (this is to calculate a more accurate level of consumption). Some producers choose simply to accrue the rolling figure over time.

To calculate the average liveweight requires the input data to inform a growth curve calculation table from which the average weight can be reported. This growth curve also reports the daily liveweight gain (DLwtGn) and the feed conversion ratio (FCR).

The growth curve enables further understanding of the lifecycle assessment/analysis (LCA) of the individual feeding herd pig. Employing 3E LCA Precision Metrics enables the growth curve to consider a hypothetical adjustment of the average entry weight and subsequent response in the growth response of DLwtGn. The FCR remains constant as the adjustment is solely based on the original average DLwtGn as a percentage of the original average entry weight.

The weighting of the W2TCR calculation produces a value against Time as the value of 1. The higher the (Live) weight gained in the time period the greater the value of Weight to the value (1) of Time.

In table **1**. the feeding herd batch subjected to the 3E LCA Precision Metrics is adjusted to four possible entry liveweights within the total population of the batch, lightest pigs to heaviest pigs at weaning.

Table 1. **Weight to Time Conversion Ratio**

	A	B	C	D
Weaning Weight (kg)	6.00	7.00	8.00	9.00
Sale Live-weight (kg)	90.80	105.93	121.06	136.19
Age at Sale (Days)	158	158	158	158
W2TCR	**1.82:1**	**2.12:1**	**2.42:1**	**2.72:1**

Time is not an economic factor usually considered in the reporting of herd performance. However, I believe that it should be because it is a resource with significant cost and efficiency potential as a value proposition.

2. Do you know the scale (Min/Max) of individual liveweights at each ration transition (changeover) point in your feeding herd diet strategy schedule?

The reason I ask is this.

The growth curve reports the average age of all the pigs in the batch at the start as the weaning age. In table **2.** This is reported also as day 1 for the introduction of the first (post weaning) ration of the entire population. Obviously, the distribution of entry weight from 6.00 through to 9.00 kilograms will cover the variation of every individual pig's liveweight. The object of the table is to penetrate the variation to create performance information and precision husbandry insight from the original data. The shaded data rows entitled Liveweight (kg) are the approximate target weights of the point of transition from one ration formulation to another.

The Min/Max range in the age and the stage at which the four category start weights report a growing differential between the pigs in the population. The lightest pigs do not reach the average liveweight of the commercial supply contract, which for this population is 121.06kg which category C reaches in 134 days and category D reaches in 122 days. Categories A and B do not reach the processor supply contract liveweight so will probably accrue financial penalties or be sold on alternative lower weight contracts.

Table **2.** is a blunt illustration of the complexity of feeding herd management of the ultimate economic output of a pig production Breed to Finish herd.

Table 2.	**Ration Transition Point ~ Day & Weight**				
Ration Change	**A**	**B**	**C**	**D**	MIN / MAX
Ration 1 Start (Day)	1	1	1	1	Range
Age (Days)	25	25	25	25	0
Ration 2 Start (Day)	15	11	7	4	11
Liveweight kg)	9.81	10.01	9.97	10.06	
Age (Days)	39	35	31	28	11
Ration 3 Start (Day)	26	21	17	13	13
Liveweight kg)	13.77	13.83	13.95	13.78	
Age (Days)	50	45	41	37	13
Ration 4 Start (Day)	65	57	51	46	19
Liveweight kg)	34.98	34.72	34.82	34.92	
Age (Days)	89	81	75	70	19
Ration 5 Start (Day)	N/A	119	107	98	21
Liveweight kg)	N/A	89.96	90.17	90.14	
Age (Days)	N/A	142	131	122	20
Ration 6 Start (Day)	N/A	N/A	124	113	11
Liveweight kg)	N/A	N/A	109.59	109.10	
Age (Days)	N/A	N/A	148	137	11

3. What are the 3E economic, ethical, and environmental implications of the above LCA based answers to the questions posed?

The reason I ask is this.

The economic impact of the focus on precision management of the pig production feeding herd can be seen in the tables above to benefit from the information accessed by the penetrating lifecycle assessment/analysis (LCA) of conventional data which, I believe, is not currently being made available in pig recording systems. This information could bring greater insight to farming intelligence, and the marketing and distribution structures, of 'commodity pork'.

The ethical impact is focussed on the physiology of the individual pig and the arbitrary nature of feeding a range of diet formulations aimed primarily at the weight of the pig and not its age. The variations in table **2.** may contribute to significant inefficiency in the feeding pig performance, in both growth FCR, and wellbeing health. Furthermore, the motivation of the husbandry team could be reduced by the impact of variation on performance bonuses as well as affecting job satisfaction.

The environmental impact is rooted in the level of wasted resources that include, but are not exclusive to animals, feed, and within the time waste of the work, the excess carbon footprint of the husbandry team.