IS THERE AN 'OPTIMUM' PRODUCTION SYSTEM?

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INTRODUCTION

Increasingly, the US and Canadian pork production industries are linked, both because of the linkages of costs for such inputs as feed grains and because of the large numbers of Canadian weaned pigs transported to US sites for growth to slaughter. Many Canadians have even taken to retaining ownership of weaned pigs in US facilities. This suggests that an 'optimum' production system now must include management of financial risks that include currency exchange rates.

As North American production reacts to the latest round of very high priced feed grains and a very weak US dollar, there are expectations that Canadian producers will be the ones who reduce their production capacity first. In the next round of profitable pork production, what will 'optimum' production systems have in common?

IS THERE AN OPTIMUM SYSTEM FOR NORTH AMERICA?

The quick and easy answer to this question is no – there is no single optimum production system. The more appropriate question is – what do 'optimum' systems have in common? If we can answer this question, even partially, we then have to look at what direction the pork industry in North America is heading.

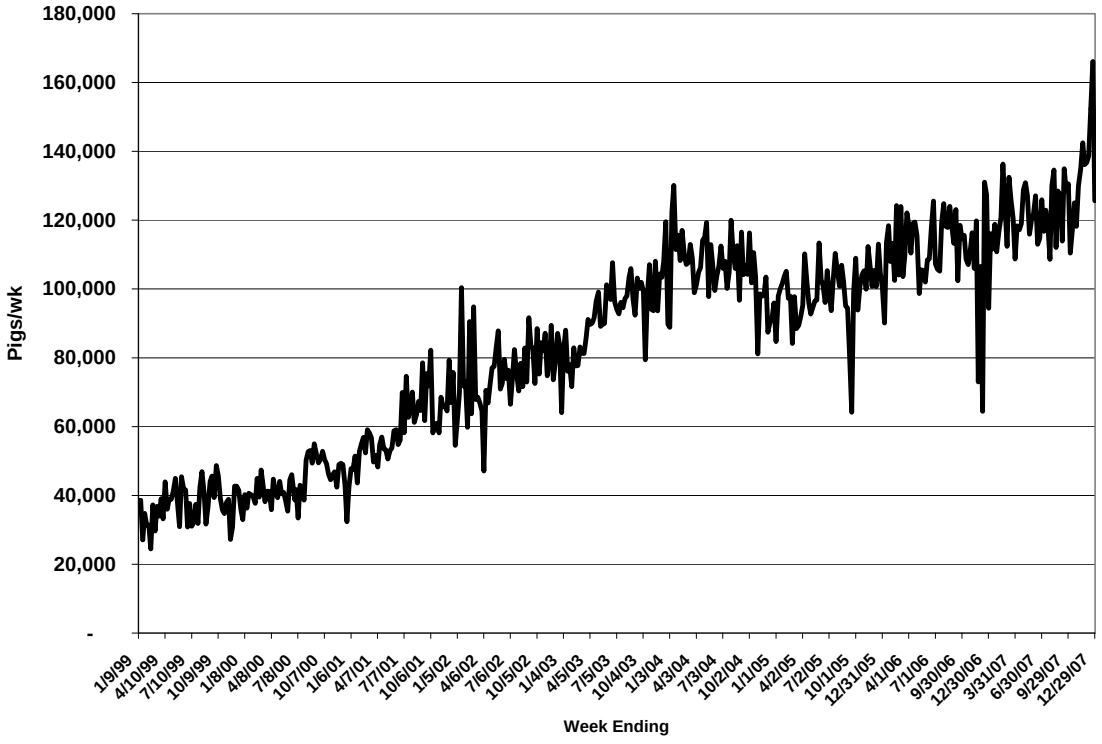
The North American System of Production

Notice that I begin by saying the pork industry in North America, not the industry in Canada or the industry in the United States. This past year has demonstrated to Canadian producers with harsh economic reality the complete linkages of the US and Canadian industries and the risks currency exchange rates add to this linkage. As market hog prices sank in response to record supplies in late fall and early winter of 2007-08, feed grain prices in both countries soared in response to increased demand. This demand is being driven by the large inventory of livestock in the US (feedlot cattle, pork and poultry), the rapid growth of the bio-fuels segment of the economy and the weak US dollar which is causing a very large export demand for US sourced feed grains.

Canadian producers have built an industry that is increasing linked to US production sites. Imports of Canadian born feeder pigs (defined by USDA as live pigs weighing <55 kg) have steadily increased in the past 9 years, reaching record numbers in 2007 (Figure 1). In 2007, 6.47 million feeder pigs entered US production systems from Canada. At 22 weaned pigs per

sow per year, this represents the output of 294,000 females. Given that the October 1, 2007 sows and bred gilt inventory in Canada was 1,560,000 head, export of feeder pigs to US systems in 2007 accounted for almost 19% of all pigs weaned in Canada.

Figure 1. Weekly US imports of Canadian feeder pigs . (http://www.ams.usda.gov/mnreports/WA_LS637.TXT)



A combination of demand by US producers for feeder pigs and economic conditions in Canada is the driver of this importation demand. Demand in the US is being fueled further by the regulatory climate facing owners considering construction of new farrowing and growing facilities and the continued evolution of the US industry.

In many instances, wean-finish barns are being constructed by former farrow-finish producers who have sold off their breeding herd, but want to continue to have pigs as part of their agricultural production system, in part because swine manure is viewed as a valuable contributor to corn and soybean cropping systems.

For many finishers of pigs, the opportunity to participate as owners in large farrowing sites is limited, or the finisher perceives the risks as too large, or the finishers long term plan is to exit the swine industry at a future date. Thus, a demand was created for feeder pigs that are not tied to ownership of the breeding herd that generated the pigs.

By sourcing pigs from Canadian producers, these Midwest US producers avoid the long term financial commitment associated with ownership of sows in a production network while retaining pork production as a contributor to their economic well-being.

Recently, US cash grain farmers have been investing in pork production facilities with the intent of having access to large amounts of manure as a fertilizer resource. In many cases, the cash grain farmer owns the facility with a management firm hired to coordinate pig ownership and labor for daily pig care activities.

It is interesting to note how the changing regulatory process has directed the evolution of the production process. Over the past 10-15 years, regulation of pork production sites via zoning ordinances and pollution control permitting has been touted by opponents as one way that large production systems would be limited in scope. The regulatory process has imposed large costs to production systems of all sizes. Not only is the process of siting and constructing new facilities more complicated, but the record keeping requirements and the risks of non-compliance with pollution control permits are an on-going expense. The net result is that many small and even medium size operations in both Canada and the US have chosen to either not expand production or to quit production. The regulatory process has in fact favored large production sites/systems due to the ability to spread the regulatory costs over large numbers of pigs and the ability to be large enough to have one or more employees dedicated to meeting the regulatory paperwork and filings requirements.

In Iowa and southern Minnesota wean-finish sites are very often sized for capacities of 2400 pigs. This size is chosen in that it is just small enough to not require application for a state operating permit but is large enough to capture some of the economies of scale.

On the economic side, the exchange rate for the Canadian-US dollar was an early driving force linking Canadian and US production systems. In the late 1990's and early in this century, the Canadian dollar traded as low as $.67US per $1CA. This meant that producers selling weaned pigs delivered to US buyers at $32/pig were receiving $47.75CA for these pigs, a strong incentive to expand farrowing. At the end of 2007, the exchange rate was $.98US per $1CA. The same $32 delivered price now returned only $32.65CA, a 32% drop in income just due to the change in exchange rate. On the other hand, the US producer pays $32US at all times since the Canadian pigs have been a relatively small segment of the US total industry, meaning they don't warrant a major price differential.

What Will the Next Generation of Production Systems Look Like?

While current economic conditions don't support investment in production facilities, at some point reinvestment in production facilities will occur. This reinvestment will be done with an eye towards producing pigs in an 'optimum' system. These 'optimum' systems will have production goals that were thought to be unattainable a few years ago (Table 1).

The question then becomes - how do production systems attain these goals? The answer lies in how these systems apply the resources of females, facilities, people and dollars to the production process.

Table 1. Attainable production goals in 2008.

- 24 pigs sold to slaughter per female/year
- 6500 pounds sold to slaughter/female/yr
- 1.7 lb/d daily gain wean-finish
- >75 pounds of gain per ft^2 of pen space wean-finish/yr
- <3.0 whole herd feed conversion farrow-finish
- <2.55 feed conversion wean-finish on mash diets with minimal added fat
- <4% post weaning mortality
- <4% lights and culls at slaughter

In the production process, the key component is people. While the industry talks about the 'science' of pork production, the best production systems put in place people who practice the 'husbandry' of pork production. Successful production systems have procedures in place to not only hire the right people, but they also spend considerable amounts of time and money on training and assessing these people.

The second component of successful production systems is the matching of facilities with the realities of pig flow. In the case of facilities, as discussed earlier, the trend in Iowa and Southern Minnesota (which have 40% of the US growing pig inventory) is to construct wean-finish facilities sized for 2400 pigs. Wean-finish facilities are now costing over $250/pig space when you add up the site development fees (site preparation, well, road, electricity, etc.), permitting fees (zoning hearings, permit application fees, etc.) and construction costs. The larger the facility, the lower the per pig costs of site development and permitting as these tend to be the same total dollars regardless of facility size. On the other hand, no state construction or operating permits are necessary for most sites as long as they contain fewer than 2500 pigs.

At one time there was considerable debate regarding the pros and cons of using nurseries and finishers versus using wean-finish facilities. The industry has made the clear choice with wean-finish as the preferred housing option. This choice has been driven in large part by lenders.

If lenders loan money to producers for construction of swine nurseries and finishers, they feel they have increased risks since there currently is very limited demand for swine nurseries. That is, if the lender is forced to assume a swine facility loan for a swine nursery, what are the options to generate enough monies to pay off the loan? Is there someone willing to place pigs in the nursery unit, either as a buyer of the facility or as a contract user of the facility? On the other hand, if the lender has to assume a swine facility loan for a wean-finish facility, the option to utilize the facility as a contract finisher is very attractive. The demand for contract finishing space in the upper Midwest remains very strong. Cash income is readily generated to pay off the debt.

Because of cost considerations, wean-finish barns are routinely overstocked, most often as a double-stock. The extra pigs are removed at 5-8 weeks post weaning. While different economic models exist, a common estimate is that double-stocking lowers the per pig facility

expense by $3/pig or more versus single stocking. This means that the 2400 head wean-finish facility must source approximately 4800 pigs at the time of pig placement. To minimize age variation and the management issues associated with this variation, including ventilation and weaned pig diet budgeting, sites most often want to have the full complement of pigs delivered in less than a 2 week period. Minimizing age spread due to weaning to less than 2 weeks also limits the duration of marketing to slaughter, maximizing the utilization of the facility for gain.

This need for large numbers of weaned pigs with minimal variation in age is one of the driving forces in the sizing of farrowing sites. To deliver 4800 weaned pigs within 2 weeks to a wean-finish site requires pigs from 516 litters at 9.3 pigs weaned/litter. To get this many litters, one can either co-mingle pigs from a number of farrowing sites, or have a farrowing site that farrows 260 litters per week. In order to minimize health risks from PRRSV, PCVAD, swine influenza, etc. production systems are choosing to not co-mingle pigs whenever possible. This means the farrowing site needs to have approximately 6000 females, not counting replacement gilts. It turns out that a common size many systems are considering is 6500 female places which includes room for the replacement gilt inventory.

Batch farrowing is an option to these very large farrowing sites. Four 1500+ female sites that each farrow 260 females/week on a 4 week rotation achieve similar weaned pig numbers. Weaned pigs at any wean-finish site are limited to being sourced from 2 farrowing sites. As most large wean-finish facilities are comprised of 2 rooms, all pigs within one room are often from a single farrowing site, reducing the co-mingling of sources effect. Of course, batch farrowing carries with it the scheduling difficulties of females (re)cycling off-schedule, etc. and work loads that are very intense for 2 weeks and then relatively lax for 2 weeks. At least one production system in the US with a number of farrowing sites located relatively nearby rotates specialized production staff such as farrowing and breeding technicians between 4 sites on a weekly basis to address this challenge.

This evolution in size and scale is not recent (Key and McBride, 2007). In the late 1970's and early 1980's a common production system was the 100 sow farrow-finish producer. In this system, the basic unit of production was the 20 crate farrowing house. Often times, there was a 180 pig nursery associated with the farrowing house. The move to confinement finishing meant the addition of a 4-500 head continuous flow grower-finisher.

In many instances, in the late 1980's and early 1990's, the sows were sold with the producer seeking a source of weaned or feeder pigs to continue in pork production with existing facilities. As the benefits of all-in/all-out pig flow became recognized, this meant sourcing 4-500 pigs with minimal age variation, preferably from a single source to minimize the risks of diseases due to co-mingling. This meant that the preferred sources for pigs were sites that farrowed 50 or more litters per week. This translated into farrowing sites with approximately 1200 females farrowing weekly, or sites with 350 females batch farrowing once every 4 weeks.

In the mid 90's, the common investment in finishing facilities was a 1000 head facility, meaning it took 2 weeks to fill with weaned pigs from a 1250 female site or from 2 350 sow

sites batch farrowing. This makes it very clear that the evolution of swine production facilities, especially as related to size, is clearly tied to the health benefits of all-in/all-out flows and minimal age differences. It is also clear that the sizes of today's production facilities are a result of the first confinement facilities built to accommodate pig flows from 20-crate farrowing facilities.

Because of the large investments associated with both farrowing and growing pig sites, the swine industry has started to focus more attention to the impact of variation in pig numbers (as reflected in pigs weaned/week) on costs of production. It is one thing to plan production flows with spreadsheets and financial budgets for 260 litters of 9.3 pigs per litter per week. The reality is that pork production is a biological process with considerable potential for variation in the biological process. The 'optimal' production system puts in place people and production practices that minimize variation. These practices include information systems that serve not only to document what has happened but to also be useful in predicting future production variations.

The 'optimum' production system does not make decisions in a vacuum. The successful production system utilizes a team of advisors. Note that I said a team, not a series of individual advisors. It is important that the animal health advisor sit at the same table as the financial advisor, along with the legal advisor, nutritionist, etc. The complex interactions between production, finances and legal requirements means that all members of the team need to be informed about the impact their recommendation(s) have on other team member's recommendations. All too often an advisor or consultant is brought into a production system or site and is forced to make a recommendation without having full knowledge of the limits to implementation of the recommendation or causes for the situation. Information sharing between members of the advisory team is critical to the success of the swine enterprise.

Also note that as public support for University and USDA research and extension outreach decreases in the US (Fuglie and Heisey, 2007), with a similar decline in related services for Canadian producers, access to new technology and information will become fee based. Increasingly producers will have to pay an advisor for information that is relative to a production need whereas this information was publicly available in the past via university research reports and extension specialists. Look for this trend of less public access to information to continue as politicians wrestle with budget deficits and an agricultural production system that is an ever smaller segment of the Canadian and US economy. This limit to public funding of information ultimately benefits those production systems which access information. This information access may be thru investment in specialized research facilities or it may be thru information sharing in peer-to-peer discussion groups.

CONCLUSIONS

The many factors that go into an 'optimum' production system often are only slightly related to individual pig performance. The economics of facility and site sizes, when combined with the growing number of regulatory requirements has meant that the 'optimum' production system is much larger than in the past. While production systems have added science-based

information to their decision process, quality people involved in the daily care of pigs remains a key component of successful production.

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