

PRODUCTIVITY MONITORING FOR SOW FARMS

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1. Know how many weaned pigs per week a sow farm should be producing.

There is a simple formula:

$$\text{Sow Inventory} * \text{Index} = \text{Weaned Pigs per Week}$$

$$2,500 \text{ sows (average sow inventory)} * 0.50 = 1,250 \text{ weaned pigs per week}$$

The Index (0.50) in this case corresponds to a sow farm with average productivity levels. In other words, a 2,500-sow farm with average productivity (26 PWSY, 22-day average weaning age) should be producing 1,250 weaned pigs each week.

This formula works for all weekly breeding-weekly farrowing sow farms, no matter how many sows they have.

$$600 \text{ sows} * (0.50) = 300 \text{ weaned pigs per week}$$

$$5,600 \text{ sows} * (0.50) = 2,800 \text{ weaned pigs per week}$$

The Index is a single number that contains all the information having to do with sow farm productivity. It's the combination of biological performance measured by pigs weaned/sow/year and throughput performance measured by pigs weaned/crate/year. The worst sow farms are below 0.35, the best are above 0.62. Here's a table that shows the index compared with PWSY.

<u>PWSY</u>	<u>Maximus Index</u>
32	0.61
31	0.59
30	0.57
29	0.55
28	0.54
27	0.52
26	0.50
25	0.48
24	0.46
23	0.44
22	0.42
21	0.40
20	0.38

When you are doing a quick analysis, you find out the number of pigs being weaned each week and the sow inventory, then reverse the formula and calculate the Index.

Pigs weaned per week / Average sow inventory = Index

450 pigs weaned per week / 1,200 sows = 0.375 (not very good)

3,000 pigs weaned per week / 5,200 sows = 0.577 (excellent)

2. Know how many sows should farrow each week, and what the weekly breeding targets should be.

A. How many sows are needed to farrow each week? It's determined by a farm's Pigs Weaned/Sow and the Farrowing Rate:

Target is 1,250 pigs weaned/week. 12.0 pigs weaned/sow. Formula: (Pigs Weaned/Week) / (Pigs Weaned/Sow) = $1,250/12 = 104$ sows farrowed each week.

This target will be somewhere between 8% to 9% of the target for pigs weaned/week, depending on the average pigs weaned/sow. $(1,250)(.08) = 100$ or $(1,250)(.09) = 113$ so in this example the target for sows farrowed each week would be somewhere between 100 and 113. The actual target would be set based on the farm's historic average for pigs weaned/sow.

B. How many sows (plus gilts) are needed to breed each week? That is determined by a farm's historic Farrowing Rate, adjusted for seasonal effects on fertility.

Target is 1,250 pigs weaned/week. 12.0 pigs weaned/sow. 85% farrowing rate.

Formula: (Pigs Weaned/Week / Pigs Weaned/Sow) / Farrowing Rate =

$(1,250/12)/0.85 = 123$ sows (plus gilts) to breed each week.

It's about 10% of the target for pigs weaned/week, which is a rough but quick estimate for weekly breeding targets.

You need to adjust the weekly breeding targets for seasonal improvements or depressions in fertility (farrowing rate). It should be farm-specific and based on the farm's historic data by week of farrowing. Use this data to back-calculate (lagged 17 weeks) the breeding targets for each week.

Not meeting the weekly target for sows farrowed is the number one reason for not producing enough pigs weaned each week. The key point is you want the number of sows farrowed each week to be consistently similar or stable over time, no matter how much seasonality affects farrowing rates.

Likewise, not meeting the weekly target for breedings is the number one reason a farm won't meet its farrowing targets and therefore its target for pigs weaned/week. Like the point earlier about sows farrowed each week, you want the number of sows (plus gilts) bred each week to be consistently similar or stable over time, no matter how much seasonality affects farrowing rates.

If a breeding herd manager tells you “My breeding target is 125, I breed 125 each week”, then you have a problem. What she should say is “My average is 125 each week but we target 135 in the hot months and 115 the rest of the year.” The details will depend on how big the seasonal effect on fertility is for that particular farm. The farm’s historic farrowing rate data provides the answer.

3. Have software that helps you plan and set targets using the farm’s historic performance.

Here’s an example of how we’ve done it in our Maximus Sow software.

Maximus Target entry and calculation sheet

Calculate targets based on		<div style="border: 1px solid black; padding: 2px;">Weaned pigs</div> <div style="border: 1px solid black; padding: 2px; background-color: #e0e0e0;">Calculate Targets</div>										
Target	<div style="border: 1px solid black; padding: 2px;">Weaned pigs</div> <div style="border: 1px solid black; padding: 2px;">Farrowings</div> <div style="border: 1px solid black; padding: 2px;">Breeding</div>	1	2	3	4	5	6	7	8	9	10	
# of females bred	Weekly	115	115	115	115	115	115	115	115	115	115	
Repeat services %	Single	10.0										
Farrowing rate %	Single	88.0										
Total born	Single	15.2										
Liveborn pigs	Single	14.1										
Stillborns	Single	0.9										
Mummies	Single	0.2										
Weaned pigs/sow	Single	11.2										
Pre-Wean Mortality %	Single	15.0										
Annual Cull rate %	Single	52.0										
Annual Death + Euthanized rate %	Single	10.0										
Sows farrowed/week	Weekly	101	96	96	96	96	96	96	96	96	96	
Weaned pigs/week	Weekly	1131	1131	1131	1131	1075	1075	1075	1075	1075	1075	

We set it up so a producer can set their targets based on three different (mutually exclusive) starting points: Either (1) Start with the desired number of breedings each week; Or, (2) Start with desired number of farrowings each week; Or, (3) Start with the desired number of weaned pigs each week.

If you start with the Weaned Pigs, the software will back-calculate the weekly breeding and weekly farrowing targets based on the underlying performance numbers (pigs weaned/sow and farrowing rate). For example, starting with a target of say, 1,200 weaned pigs in 2017 Week 4, the software will automatically calculate the breeding target for 2016 Week 36.

For each target you’re setting, you can choose ‘Single’ to set a single number which is then posted across all production weeks. For items not affected by season, this is fine. Or, you can choose ‘Weekly-Manual’ and enter the numbers manually for every week of the year (a lot of work!). Or you can choose ‘Weekly-Historic’ where you can have the software analyze the farm’s database and fill the weeks automatically with the calculated data (much easier!).

Of course, you have to be able to manually edit the targets that are automatically filled in by the software because there may be times in the past that were affected by a disease or

other problems, for example an acute PRRS problem. You don't want to have past events bias the targets you want for the future.

4. Have a report that quickly shows how a sow farm is performing against the key targets.

For our Maximus Sow software, we created a simple yet comprehensive production monitoring report (Figure 1). We call it the Weekly Breed/Farrow/Wean report. It highlights the three key items essential for running a sow farm, showing actual performance against targets. To hit your target for pigs weaned/week, you must hit your weekly targets for sows farrowed and sows+gilts served. The example report is from a 2,250-sow farm in the US (Midwest, Iowa).

Figure 1. Breed-Farrow-Wean report (Maximus Sow™ software)

Breeding Actual v Targets					Farrowing Actual v Targets					Weaned Actual v Targets				
CV	4.1%				Target Farrowing Rate	86.3%				CV	7.5%			
SD	4.9				Actual Farrowing Rate	89.9%				SD	92			
Target	122				Target No. Farrowed	104		13.0		Target	1,203	11.6		
Actual	120				Actual Avg No. Farrowed	108		13.2		Actual	1,234	11.4		
										Index	0.55			

Week No.	Week Begin	Services Actual	Services Target	Actual v Target	Net Ahead/Behind	Week No.	Week Begin	Farrow Rate	Actual Farrow	Actual v Target	Net Ahead/Behind	Avg Live Born	Week No.	Week Begin	No. Pigs Weaned Actual	Avg Pigs Weaned per Sow	Total Weaned Actual v Target	Net Ahead/Behind
36	4-Sep-2016	128	125	3	3	1	1-Jan-2017	84.8%	109	5	5	13.8	4	22-Jan-2017	1,248	11.5	45	45
37	11-Sep-2016	129	125	4	7	2	8-Jan-2017	88.3%	114	10	14	12.3	5	29-Jan-2017	1,207	10.6	4	50
38	18-Sep-2016	119	125	(6)	1	3	15-Jan-2017	87.3%	104	(0)	14	13.4	6	5-Feb-2017	1,236	11.9	33	83
39	25-Sep-2016	123	125	(2)	(1)	4	22-Jan-2017	80.8%	99	(5)	10	12.9	7	12-Feb-2017	1,103	11.1	(100)	(17)
40	2-Oct-2016	118	122	(4)	(5)	5	29-Jan-2017	83.6%	99	(5)	4	12.9	8	19-Feb-2017	1,115	11.3	(88)	(105)
41	9-Oct-2016	117	122	(5)	(10)	6	5-Feb-2017	80.4%	94	(10)	(6)	13.4	9	26-Feb-2017	1,119	11.9	(84)	(189)
42	16-Oct-2016	131	122	9	(1)	7	12-Feb-2017	84.1%	110	6	1	12.5	10	5-Mar-2017	1,333	12.1	130	(59)
43	23-Oct-2016	120	122	(2)	(3)	8	19-Feb-2017	94.2%	113	9	10	13.2	11	12-Mar-2017	1,356	12.0	153	95
44	30-Oct-2016	121	122	(1)	(4)	9	26-Feb-2017	93.7%	113	9	19	13.1	12	19-Mar-2017	1,236	10.9	33	128
45	6-Nov-2016	120	122	(2)	(6)	10	5-Mar-2017	87.1%	105	1	20	12.7	13	26-Mar-2017	1,139	10.9	(64)	64
46	13-Nov-2016	122	122	0	(6)	11	12-Mar-2017	91.6%	112	8	27	13.8	14	2-Apr-2017	1,307	11.7	104	168
47	20-Nov-2016	120	122	(2)	(8)	12	19-Mar-2017	89.6%	108	4	31	12.9	15	9-Apr-2017	1,247	11.6	44	213
48	27-Nov-2016	108	122	(14)	(22)	13	26-Mar-2017	84.1%	91	(13)	18	14.1	16	16-Apr-2017	1,081	11.9	(122)	90
49	4-Dec-2016	114	122	(8)	(30)	14	2-Apr-2017	89.5%	102	(2)	16	13.5	17	23-Apr-2017	1,184	11.6	(19)	71
50	11-Dec-2016	121	122	(1)	(31)	15	9-Apr-2017	92.2%	112	8	23	13.4	18	30-Apr-2017	1,316	11.8	113	184
51	18-Dec-2016	111	122	(11)	(42)	16	16-Apr-2017	92.7%	103	(1)	22	13.6	19	7-May-2017	1,091	10.6	(112)	72
52	25-Dec-2016	115	122	(7)	(49)	17	23-Apr-2017	92.8%	107	3	25	13.5	20	14-May-2017	1,153	10.8	(50)	22
1	1-Jan-2017	124	120	4	(45)	18	30-Apr-2017	83.2%	103	(1)	24	13.9	21	21-May-2017	1,145	11.1	(58)	(36)
2	8-Jan-2017	121	120	1	(44)	19	7-May-2017	92.3%	112	8	32	13.2	22	28-May-2017	1,262	11.3	59	23
3	15-Jan-2017	121	120	1	(43)	20	14-May-2017	94.6%	114	10	42	13.2	23	4-Jun-2017	1,351	11.8	148	171
4	22-Jan-2017	118	120	(2)	(45)	21	21-May-2017	90.5%	107	3	45	13.2	24	11-Jun-2017	1,303	12.2	100	270
5	29-Jan-2017	121	120	1	(44)	22	28-May-2017	92.0%	111	7	52	13.5	25	18-Jun-2017	1,369	12.3	166	437
6	5-Feb-2017	122	120	2	(42)	23	4-Jun-2017	90.5%	110	6	59	13.2	26	25-Jun-2017	1,270	11.5	67	503
7	12-Feb-2017	111	120	(9)	(51)	24	11-Jun-2017	92.5%	103	(1)	57	13.0	27	2-Jul-2017	1,068	10.4	(135)	368
8	19-Feb-2017	122	120	2	(49)	25	18-Jun-2017	93.8%	114	10	68	12.7	28	9-Jul-2017	1,270	11.1	67	435
9	26-Feb-2017	123	120	3	(46)	26	25-Jun-2017	99.1%	122	18	86	12.9	29	16-Jul-2017	1,402	11.5	199	634
10	5-Mar-2017	125	120	5	(41)	27	2-Jul-2017	90.9%	114	10	95	13.1	30	23-Jul-2017	1,341	11.8	138	772
11	12-Mar-2017	120	120	0	(41)	28	9-Jul-2017	92.8%	111	7	103	12.9	31	30-Jul-2017	1,258	11.3	55	827
12	19-Mar-2017	116	120	(4)	(45)	29	16-Jul-2017	91.0%	106	2	104	12.6	32	6-Aug-2017	1,193	11.3	(10)	817
13	26-Mar-2017	121	120	1	(44)	30	23-Jul-2017	94.1%	114	10	114	12.9	33	13-Aug-2017	1,196	10.5	(7)	810
14	2-Apr-2017	120	122	(2)	(46)	31	30-Jul-2017	91.8%	110	6	120	13.0	34	20-Aug-2017	1,201	10.9	(2)	807
15	9-Apr-2017	126	122	4	(42)	32	6-Aug-2017	91.4%	115	11	131	12.8	35	27-Aug-2017	1,347	11.7	144	952
16	16-Apr-2017	123	122	1	(41)	33	13-Aug-2017	90.7%	112	8	139	12.9	36	3-Sep-2017	1,283	11.5	80	1,032

This format is sometimes called a 'cohort' report because it tracks groups of sows forward from an event, in this case Breeding. The first row shows that 128 sows+gilts were served in Week 36. Seventeen weeks later, 109 farrowed (84.8%), and three-and-a-half weeks later, they weaned 1,248 pigs.

This sow farm should wean somewhere between 1,150 and 1,350 pigs per week (index 0.50 to 0.60). Given the farm's goals and historic performance (86% farrowing rate, 11.6 pigs weaned/sow), the manager set a target of 1,200 weaned pigs per week (index target 0.53).

On the report, you can see the actual number of pigs weaned each week (average 1,234) and pigs weaned/sow (11.4). The Net Ahead/Behind column is a cumulative sum. Although they did not hit their expected performance for pigs weaned/sow (11.4 v 11.6), they produced

more weaned pigs each week than they targeted. In fact, the last row shows they were over 1,000 weaned pigs ahead.

That's because they farrowed more sows than they expected (90% actual v. 86% target) and had a higher average pig born live (13.2 actual v. 13.0 target). They were actually below the breeding target (120 actual v 122 target) and were Net Behind by 40 sows overall. They were 'saved' from missing the weaned pig target because the actual farrowing rate was much better than what they expected. They farrowed more sows and ended up far ahead of their weaned pig target.

They based their weaned pig target on an index of 0.53 and ended up better than expected at 0.55. This is a good example of over-performing against a set of reasonable targets based on the farm's historic performance as well as a thoughtful look into the future. Not only managers and barn staff but especially owners, investors, and lenders are all happy when it works out like that.

5. Remember that targets are the minimum numbers that must be hit.

Forward-looking targets are the assumptions used in budgeting and cash flow projections. Keep in mind that targets set a minimum threshold to be met. For example, a weekly breeding target of 140 sows/gilts served means that at a minimum the farm needs to breed 140 sows/gilts. And that means they will (should) always end up breeding more (but not too much more) than the target. This leads to the understanding that the average will (should) always be higher than the target. In this example, the target is 140 services/week, but the average should be more like 143 to 145. In my experience, many producers don't understand this concept and end up having to explain to owners, investors, and lenders why they didn't meet the budget and cash flow projections.

6. Create a steady and consistent weaned pig flow by reducing week-to-week variation.

In our Maximus Sow software, we created a KPI Variation report that provides analysis and feedback on three key performance indicators (KPI) focused on weaned pig consistency (Figure 2). The idea is that by reducing the variation in sows/gilts bred each week, you reduce variation in sows farrowed/week which in turn reduces the variation in pigs weaned/week. Our Weekly Breed/Farrow/Wean report (Figure 1) is used to manage and track the weekly results on the farm, and our KPI Variation report provides the bigger-picture feedback and results over a longer time period.

You can measure variability in weaned pigs/week and average weaning weight (and other items such as sows/gilts served or sows farrowed each week) by calculating a standard deviation and the coefficient of variation ($CV = SD/Average$). For any given year, you would have 52 (or 53) weaned pig data points, one for each week, and that's the data set that gives you the standard deviation. That's how it's done in the example KPI Variation report. On the Weekly Breed/Farrow/Wean report example (Figure 1), you can also see the SD and CV.

Figure 2. KPI Variation report

KPI Variation & Year-Over-Year Monitoring Report

Start Date: 1-Jan-2014
End Date: Dec 31 2017

Weaned Pigs/Week								
Sow Farm	2014		2015		2016		2017	
	Average	CV	Average	CV	Average	CV	Average	CV
Farm 1	1,386	8.6%	1,468	6.3%	1,380	6.0%	1,367	2.7%
Farm 2	558	17.1%	489	18.8%	619	14.0%	676	6.9%
Farm 3	1,416	4.1%	1,404	4.9%	1,347	6.0%	1,372	5.0%
Farm 4	1,385	6.7%	1,415	6.6%	1,351	5.9%	1,389	3.2%
Farm 5	1,476	5.6%	1,489	5.9%	1,416	6.0%	1,362	5.5%
Total/Avg	6,221	7.2%	6,265	6.9%	6,113	6.8%	6,166	4.4%

Average Weaning Weight, kg								
Sow Farm	2014		2015		2016		2017	
	Average	CV	Average	CV	Average	CV	Average	CV
Farm 1	6.18	10.0%	5.73	4.5%	6.26	5.5%	6.24	2.3%
Farm 2	5.69	9.3%	6.37	8.7%	6.17	8.2%	6.36	5.6%
Farm 3	5.31	3.2%	5.62	2.8%	5.88	3.1%	6.13	3.3%
Farm 4	5.38	3.6%	5.76	2.8%	6.28	2.3%	6.50	2.2%
Farm 5	5.71	6.7%	5.77	6.4%	6.35	3.2%	6.02	4.6%
Total/Avg	5.65	6.2%	5.77	4.5%	6.19	4.0%	6.24	3.4%

Pigs Weaned/Sow (YOY = Year-Over-Year Change)								
Sow Farm	2014		2015		2016		2017	
	Average	YOY	Average	YOY	Average	YOY	Average	YOY
Farm 1	9.16	-	9.94	4.5%	10.46	5.2%	10.56	0.9%
Farm 2	9.16	-	9.49	8.7%	9.11	-3.9%	9.85	8.1%
Farm 3	9.70	-	9.52	2.8%	10.00	5.0%	10.26	2.6%
Farm 4	9.47	-	9.58	2.8%	9.97	4.0%	10.14	1.8%
Farm 5	9.27	-	9.57	6.4%	10.21	6.6%	10.20	-0.1%
Total/Avg	9.38	-	9.64	4.5%	10.06	4.3%	10.24	2.0%

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Here’s how the General Manager whose numbers I’m showing in the KPI Variation report explained how and why they use it (DK, personal communication):

“One of the first things we saw when we began using the Weekly Breed/Farrow/Wean Report was that our production was quite volatile. Volumes were frequently higher than our nursery capacity could ideally accommodate, and this had adverse effects on feeder pig (and downstream market hog quality). In the sow barn, we were finding variable wean weights

and age as capacity was being pushed. This led to uneven flow of hogs to market, and more mixed source fills (poorer results). We created a bonus program for the sow barns to help manage wean numbers to create even filling of nursery rooms. We established breeding target monitoring and used the weekly report to provide feedback.

The KPI Variation report shows the results of our efforts to reduce production variation in the sow barn. Variability in our weekly wean numbers [measured by Coefficient of Variation, CV] dropped over four years from 7.2% to 4.4%. This means consistency of weekly wean number volume is almost 40% better. CV for wean weight dropped from 6.2% to 3.4%, meaning consistency of weekly wean weights is 45% better. Weights also increased 0.6 kg or 10.6%. Pigs weaned/sow farrowed is 9% better (10.24 v 9.38).

These flow consistency changes have made a significant difference in light hog volumes, feeder pig place weights, age at market and wean to finish mortality.”

7. Use Top v Bottom (point-in-time) sow farm benchmarking to understand how a farm ranks against others.

Figure 3 shows recent sow farm performance benchmarks from an analysis of over 400 sow farms representing over 1.2 million sows for the US (Midwest, mainly) and Canada. Keep in mind how this ranking of performance by Top and Bottom was done. First, we rank all the sow farms from best to worst on pigs weaned/sow/year (or to be technical, pigs weaned/mated female/year). Next, in each category (like Top 33%, for example), we determine the averages for all the components of overall productivity (like pigs born alive, pre-weaning mortality, etc.). This approach tells you how sow farms, say, in the Top 33%, perform when looking at the farm as a whole.

This is not the same as Percentile Benchmarking, which we'll get to next.

8. Use Percentile Benchmarking to understand a farm's strengths and weaknesses relative to all other sow farms in the benchmarking database.

Figure 4 shows percentile distributions for sow farm key performance indicators. This is not the same as what we just talked about where you benchmark by ranking farms on overall productivity using PWSY. In percentile analysis, each item is ranked by itself from best to worst. That means you can look at a KPI on its own and say “How does this one KPI, say farrowing rate, on my farm compare with everyone else's farrowing rate. You can use percentiles to create report cards for sow farms, highlighting a farm's strengths and weaknesses (Figure 5).

Figure 3. Benchmarks for Sow Farm Performance

Sow Farms Ranked on Pigs Weaned/Mated Female/Year
Farms in the United States & Canada

	Bottom 10%	Bottom 33%	Avg	Top 33%	Top 10%
Maximus Production Index	0.37	0.41	0.45	0.49	0.55
Pigs weaned / mated female / yr (PWMFY)	19.0	21.1	24.0	26.9	28.3
Litters / mated female / yr (LMFY)	2.09	2.20	2.30	2.40	2.45
Non-Productive days (w/o gilt pool)	60.4	52.0	41.5	31.0	28.9
% Repeats	14.3%	11.4%	9.0%	5.9%	1.0%
% Abort	1.4%	1.5%	1.1%	1.0%	1.1%
Wean-1st service	9.0	8.3	7.5	6.7	6.0
Farrowing rate	79.9%	82.2%	85.2%	89.0%	89.2%
Average total born	13.1	13.3	13.5	14.0	14.1
Average live born	11.7	11.9	12.2	12.7	12.9
Average Stillborn	1.0	1.0	1.0	0.9	0.8
Stillborn %	7.8%	7.9%	7.4%	6.5%	5.9%
Average Mummified	0.3	0.3	0.3	0.3	0.3
Mummified %	2.1%	2.5%	2.3%	2.2%	2.4%
Pre-wean mortality %	19.0%	17.5%	14.7%	12.4%	11.4%
Pigs weaned / sow	9.3	9.5	10.2	10.9	11.1
Wean age	21.0	20.1	20.1	20.3	20.2
Wean weight (pig)	6.6	6.5	6.2	6.0	6.0
Culling %	42.2%	42.8%	43.4%	44.7%	45.7%
Death %	10.2%	10.8%	9.3%	8.0%	7.1%
Gilt arrival age (days)	233.0	236.6	219.5	204.0	198.4
Gilt arrival weight	131.5	133.9	132.5	129.5	128.7
Entry - 1st serv interval	38.5	37.0	36.1	36.2	34.5
Weight per day-of-age at arrival, g/day	565	566	604	635	649

- Use Internal Benchmarking with Scorecard Ranking to compare all the sow farms owned by the same organization against each other. You should be able to rank the farms based on a criterion of your choice (such as Pigs Weaned/Sow/Year or Maximus Production Index). Or create an index yourself that takes into account the factors most important to your organization. For example, an index that uses both PWSY and Weaning Weight together, with each item being given a weight relative to its importance, i.e. $(PWSY * .66) + (Weaning\ Weight * .34)$.

Figure 6 shows an example of a Scorecard Ranking report from the Maximus Sow software.

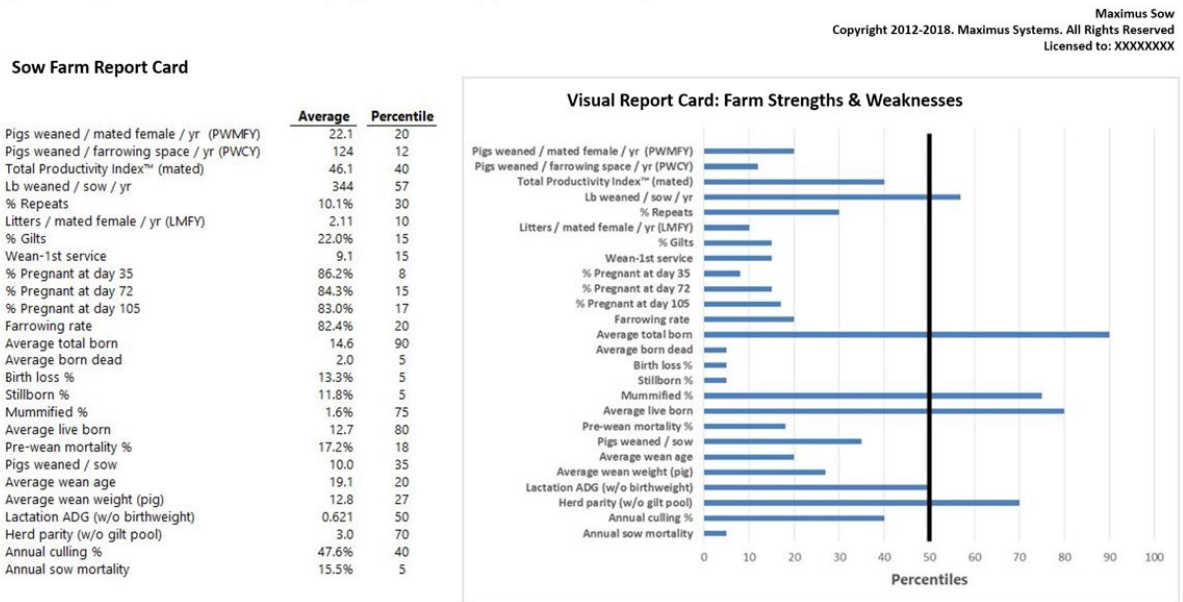
Notice that to be ranked highest, a sow farm doesn't necessarily have to be the best in each individual KPI. But to rank high, a farm needs to be very good in the most important items (Pigs Born Live, Pigs Weaned/Sow, and Farrowing Rate).

Figure 4.

Percentile Distributions for Sow Farm Performance

	Percentiles								
	10	20	30	40	50	60	70	80	90
Pigs weaned / mated female / yr (PWFY)	20.1	21.9	22.8	23.5	24.0	24.9	25.6	26.4	27.3
Litters / mated female / yr (LMFY)	2.12	2.23	2.26	2.30	2.33	2.34	2.37	2.41	2.45
Non-Productive days (w/o gilt pool)	25.9	28.8	33.0	35.7	38.8	43.0	46.5	51.4	61.6
% Repeats	14%	12%	11%	10%	9%	8%	6%	5%	4%
% Abort	2.9%	1.9%	1.1%	0.9%	0.6%	0.5%	0.3%	0.1%	0.0%
Wean-1st service	9.7	8.7	8.0	7.5	7.1	6.7	6.4	6.1	5.7
Farrowing rate	79.0%	81.3%	83.1%	84.5%	85.4%	86.8%	88.1%	89.5%	91.3%
Average total born	12.5	12.9	13.1	13.3	13.6	13.8	13.9	14.1	14.5
Average live born	11.3	11.6	11.8	12.0	12.3	12.5	12.6	12.8	13.1
Stillborn %	10.5%	8.9%	7.9%	7.3%	7.0%	6.7%	6.3%	5.7%	4.5%
Mummified %	3.5%	3.1%	2.8%	2.5%	2.2%	2.0%	1.7%	1.3%	1.0%
Pre-wean mortality %	21.0%	18.5%	16.4%	15.3%	14.4%	13.3%	11.8%	10.4%	9.1%
Pigs weaned / sow	9.1	9.5	9.8	10.1	10.3	10.5	10.6	10.8	11.1
Wean age	18.2	18.9	19.3	19.6	20.0	20.4	20.7	21.2	21.8
Culling %	58.7%	50.7%	47.4%	45.4%	42.5%	41.1%	37.4%	34.3%	30.4%
Death %	14.0%	11.8%	10.6%	9.6%	8.9%	7.7%	7.2%	6.6%	5.2%

Figure 5. Using Percentiles to create a strengths/weaknesses report card of sow farm performance.



10. Use Rate-of-Improvement Benchmarking to understand whether a farm or production system is keeping up with the rate of change in the industry.

For average sow farms, the annual rate of improvement overall productivity (PWSY) is 0.14 units/year. In other words, by 2025, an average farm will produce between 25 and 26 pigs weaned/sow/year. Sow farms ranked in the Top 10% are increasing PWSY by 1.0 pig/year. By 2025, a Top 10% farm will be close to 36 PWSY.

If you're not keeping up, you're falling behind. If you're falling behind, you're becoming less and less competitive against your peers. Not a happy ending.

Figure 6. Internal benchmarking using a Scorecard

Sow Farm Ranking -- Scoreboard

Maximus Sow
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Start Year/Week: 2017/1
End Year/Week: 2017/52
Ranking By: Maximus Index

	RANK								
	1	2	3	4	5	6	7	8	9
Sow Farm Manager	E2	B2	B3	A1	D1	E1	B1	F1	C1
Sow Inventory	1,289	662	549	823	1,700	2,581	351	1,363	379
SCOREBOARD -- PERFORMANCE NUMBERS									
Pigs weaned/week	738	352	289	418	832	1,241	162	620	141
Maximus Index (index * 100)	57.3	53.2	52.7	50.8	48.9	48.1	46.1	45.5	37.2
Pigs weaned/sow/yr	29.0	28.5	28.8	26.8	27.4	25.2	22.1	24.8	19.5
Litters/sow/yr	2.37	2.50	2.51	2.38	2.36	2.31	2.11	2.29	1.71
% Repeat services	4.4%	8.6%	3.1%	10.1%	7.2%	9.0%	11.1%	6.1%	29.8%
Farrowing rate %	92.1%	83.4%	90.0%	84.3%	87.1%	84.7%	82.4%	86.0%	69.6%
Wean to 1st serv int	4.9	5.5	6.2	6.7	6.6	5.5	9.1	8.6	5.3
Average total born	15.3	14.6	14.1	14.2	14.1	14.2	14.6	14.0	14.6
Average born dead	2.05	1.48	1.36	1.56	1.43	1.67	1.95	1.25	2.16
Average live bom	13.3	13.1	12.8	12.6	12.7	12.6	12.7	12.8	12.4
Pre-wean mortality %	8.1%	10.1%	10.2%	12.2%	10.5%	17.2%	17.2%	19.5%	15.8%
Pigs weaned/sow	11.9	11.7	11.5	11.1	11.3	10.4	10.5	10.3	10.5
Average wean age	16.5	19.7	18.5	17.5	20.8	20.1	19.1	21.0	23.1
Weaning weight, kg	6.6	5.8	5.6			7.8	5.8		6.6
Herd parity	2.9	2.7	3.1	2.6	3.0	3.7	3.0	2.6	2.8
Culling %	22.7%	40.9%	53.3%	40.9%	45.2%	30.3%	47.6%	49.2%	20.7%
Death %	2.8%	7.5%	7.3%	6.7%	8.1%	8.6%	15.5%	6.9%	5.2%