

# The cost of non-productive days

The objective of this article is to identify non-productive periods to try to minimise them and thus, reduce their productive and economic consequences.

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Pig farming sometimes enters an undesirable production phase, although it is not always inevitable: non-productive days (NPDs), also known as 'empty days'.

In economic terms, NPDs are days when the sows present on the farm only incur expenses and do not generate income for the production system.

## Pig farming is dynamic and unstable

The pig sector has been experiencing a time of expansion and continuous growth in recent years in most of the main producing countries, known as *players* in the world market. Nonetheless, we must mention African swine fever (ASF) this point.

Because of increased exports, in 2017, the pig sector in Spain reached a turnover close to 15,000 million euros. Thus, Spain is:

- A *player* in the world market. It is the third largest producer in terms of global trade in pork products and is present in more than 130 countries.
- Number of heads: in terms of the actual number of animals, data from 2017 show that Spain ranked first in Europe and third in the world, with some 30 million pigs (2.48 million breeding females), which has reached record figures over the last 4 intervening years.

**However, there are management measures and tools that can help to minimise the impact of NPDs.**

### Non-productive days

Non-productive days are considered those in which the sow is not in the process of gestation or lactation; that is, all the time they are on farms without producing. These days have an associated cost because the sows are not producing income or benefits during these times, at least in the short term.

For example:

- The days from the time of weaning until the sow is mated or sent to the slaughterhouse.
- The days from the birth of the piglet until its reproductive cycle begins.

## African swine fever

The ASF virus has caused the direct and indirect death of more than 100 million pigs in China and other countries including Vietnam, Hong Kong, Cambodia, Laos, Mongolia, and North Korea.

In addition to these countries in Asia, where it has the greatest impact, ASF has been detected in 50 other countries (including some European countries) and has killed hundreds of millions of pigs, thus reshaping the world's meat markets for pork and other foods.

## How to identify non-productive days

In terms of finding better production opportunities on farms, it is of utmost importance that producers clearly understand NPDs on their farms.

In that sense, we can apply a very old concept first mentioned by Allen D. Leman which tells us that excellence in pig production is achieved by considering three factors:

- Increasing the number of piglets per litter.
- Minimising preweaning mortality.
- Reducing NPDs.

In summary, by optimising farm production.



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## The importance of interpreting NPDs

It is not only important to know the definition of NPDs but to understand how to identify, calculate, and avoid their excess.

NPDs increase production costs in the following ways:

- Fixed costs.
- Feeding costs.
- Labour.
- Interest and returns.
- Etc.

If viewed from another perspective, a particularly important factor to consider is that the problem is not only affects the outlaid cost, but also the lost earnings, which is called the 'opportunity cost'. The opportunity cost is that related to the lost opportunity to generate income and, on the contrary, having to still outlay for expenses.

To increase efficiency and reduce NPDs, we must consider all the factors involved:

- The limitations for the litter or number of pigs when the weaning-mating interval exceeds 7 days.
- The summer months.
- Primiparous sows (first farrowing).
- Farrowing age (parity).
- Duration of lactation.
- Breed.
- Genetics.
- Health.
- Handling.

 **It is not only important to know the definition of NPDs but to understand how to identify, calculate, and avoid their excess.**

There is an inverse relationship between NPDs and production: increasing NPDs reduces piglet production (*figure 1*).

Several limiting factors are related to NPDs.

### How can we optimise production?

The most important thing is to determine how many of the piglets born are eventually sent to the slaughterhouse because, in the end, this is the reason for pig production: producing kilos of meat.

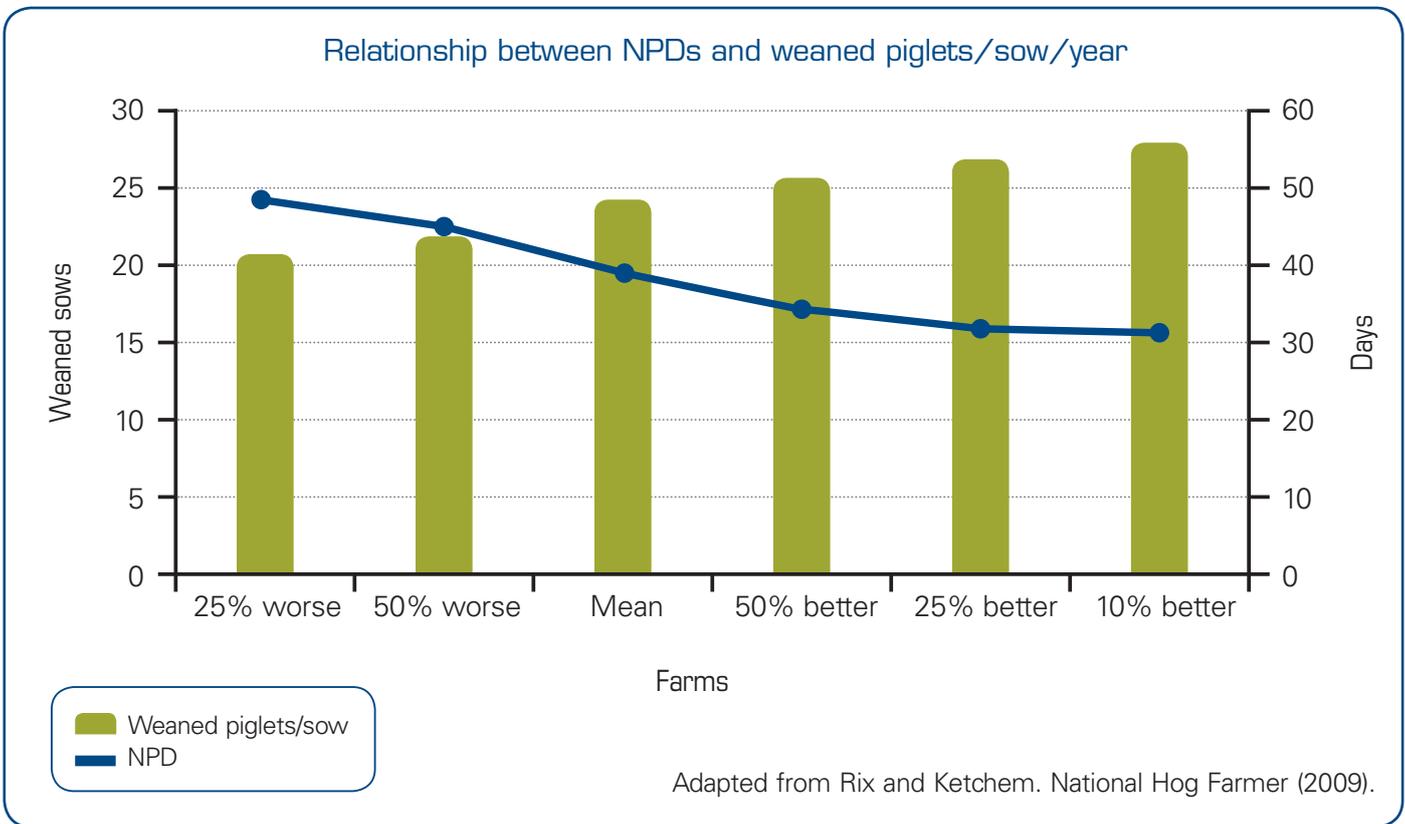
To optimise production, we must:

- Increase the number of fattening pigs per female per year.
- Minimise NPDs.
- Increase the number of litters per sow per year (which will increase by reducing NPDs).

### Limiting factors

Once weaned, sows need time to recover before they can be mated again. This point is especially important because implementing adequate management at this point will have a greater or lesser impact on:

- How we use the facilities.
- Productive development.
- Productivity.



**Figure 1.** Relationship between non-productive days and piglet production.

## The economic cost of NPDs

The monetary value of loss per cost/day in NPDs depends on:

- The market.
- The type of farm.

However, practically all of the cost of NPDs is related to food consumption.

In addition, this cost considerably increases according to the type of NPD:

- For missed heat.
- For a repetition in a cycling sow.
- For a repetition in an acyclic sow.

In addition to the ↑ NPDs, ↓ the number of piglets produced must also be considered. In other words, unless the female is lactating or pregnant, she will produce fewer piglets.

There are two ways to calculate this cost:

- Production cost.
- The midway balance point in our production as well as the cost of the money not generated.

The cost of production is over €1.8/day when considering a low cost for feed (the variability of this factor depends on the cost of raw materials) in a given season.

When comparing the farms with highest production to those with the lowest production, we can observe differences in the cost/farrowing of each sow/year, the NPDs (almost 1 month), and the cost demanded by production.

### For missed heats

If we have NPDs as the result of 'lost' heats (either because of lack of detection or because the sow does not physically show signs of heat), the losses will increase.

For this reason, we must be extremely thorough when managing sows.

In some markets this cost can exceed €38.

### For a repetition in a cycling sow

In the case of regular repetition, the cost of food ↑ €1.8/day will reach around €57 in overall production loss.

### For a repetition in an acyclic sow

The expense can increase if we have an irregular return to heat (35–42 days), even reaching up to €90.

Each NPD increases the loss of piglets by 0.05. Therefore, if we lower the figure by 10 NPDs, we will see an increase of 0.5 piglets per sow per year.

The opportunity cost is the difference between a sow that is producing piglets and another that is recovering but without producing, and thus, is only generating expense.



To calculate the cost of NPDs, we must know the costs of production, feed, financial, medicine, veterinary, etc.

## An example of NPD calculation

Calculation of productive days versus non-productive days.

Number of weaned piglets/sow/year \* value of pig at weaning = productive day

Average farm:

- Weaned piglet value: €34
- 43 NPDs
- 25 piglets/sow/year (2.3 litters/year)
- 135 productive days per cycle (115 + 20)
- $25 \text{ p/s/y} * € 34 = € 2.64/\text{productive day}$  (vs. €0 per NPD) = 320 days

When the price of piglets is high (it can range between €7 and €27), the NPDs will have a lower extra cost, but when piglet sales fall, NPDs can cost between €2.54 and €3.4 per day.

On the other hand, it is important to select replacement females as soon as possible because there is a noticeable difference between selecting them at 240 days compared to choosing them at 210 days. These 30 days of difference add an additional cost of €22 per sow to account for the cost of feed.

In reality, there is an increase of €0.45 for each piglet weaned. How is this calculated? We must divide it by the expected productivity of the sows (55 piglets).

For each day that passes before a gilt enters production, the cost per piglet produced throughout her productive life increases.



**The cost of NPDs depends on the number of piglets weaned per sow.**

## Hormonal treatments

To avoid the cost of NPDs, if the sow has lactation problems or if she has lost a lot of weight, there are several ways to recover her, including the use of hormonal treatments.

PG 600® contains the active substances hCG and PMSG that stimulate the following hormones naturally produced by sows:

- FSH: follicle-stimulating hormone.
- LH: luteinising hormone.

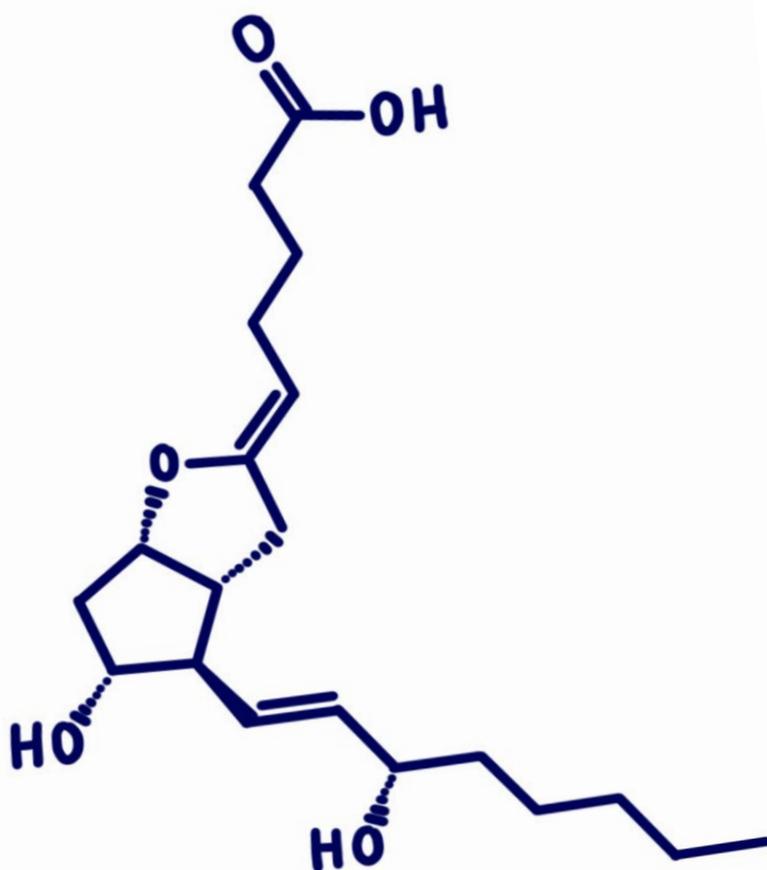
Sow treatment:

- Sows after their first farrowing: recommended on days 0-2 post weaning.
- Multiparous sows: recommended 8-10 days after weaning if she has not naturally presented heat.

This practice considerably reduces non-productive days.



**PG 600® is a hormone registered for use in heat stimulation.**



## PG 600®

PG 600® associates the two hormones that play a primary role in the development of follicles and in the appearance of ovulation (both stimulate the production of follicles and their maturation), allowing the restoration of a fertile sexual cycle in sows:

- Serum gonadotropin (PMSG) stimulates the development of the ovarian follicles.
- Chorionic gonadotropin (HCG) triggers ovulation and the formation of corpora lutea.

## Gilts

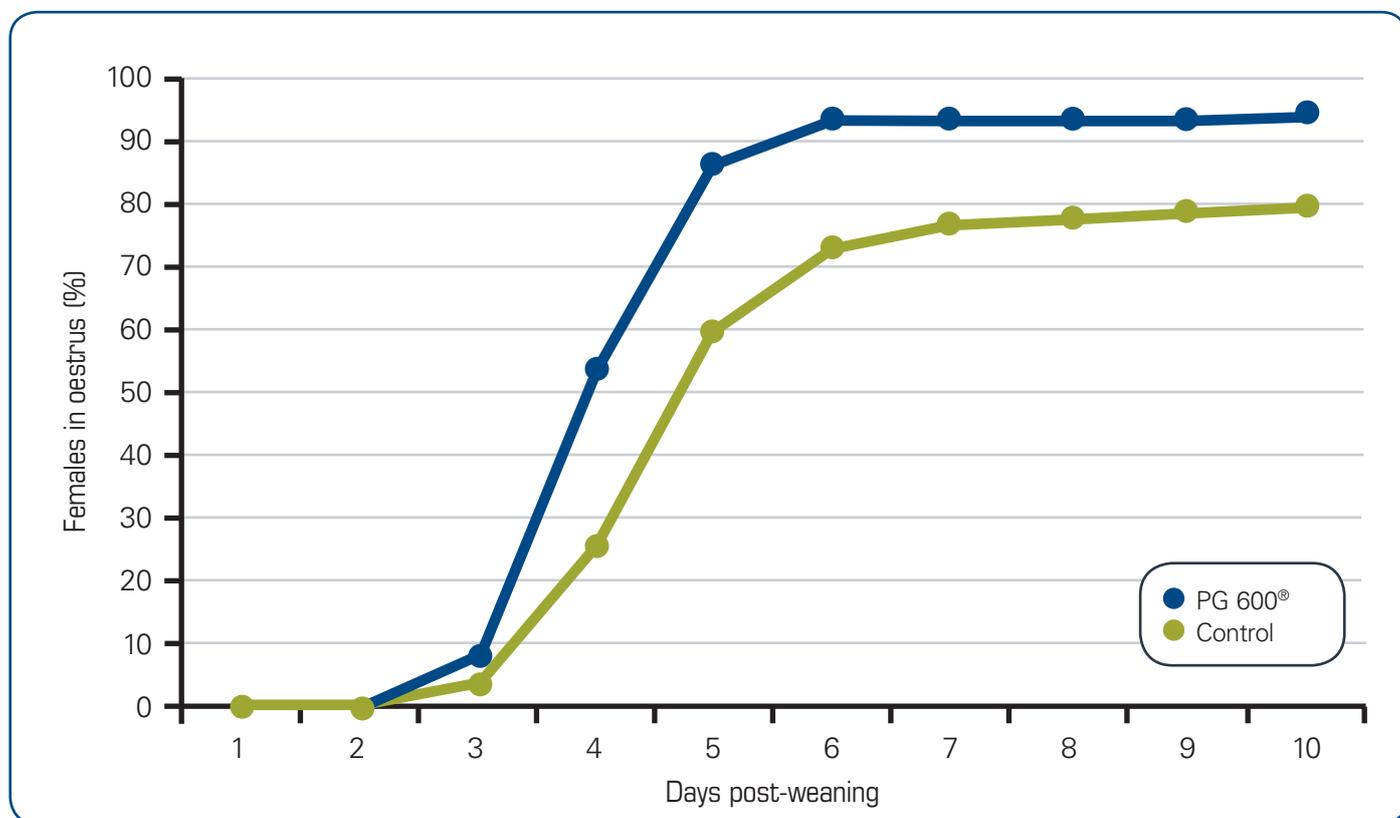
In gilts, this treatment is recommended when temperatures are high to avoid summer anestrus in the first year.

The [article](#) by Vargas *et al.* (2006) performed in Brazil with more than 800 sows, showed a significant reduction ( $p < 0.05$ ) in the weaning-heat interval in the group of gilts treated with PG 600® ( $n = 420$ ) the day after weaning compared to the control group ( $n = 408$ ) of untreated sows (see *table* and *figure 2*).

In addition, the total number of piglets born in the following farrowing increased by more than 0.8 piglets in sows that had received PG 600®.

	PG 600®	Control	p value
<b>Weaning-to-mating interval (IDC) - days</b>	5.3 ± 4.1	8.0 ± 7.1	< 0.0001

Weaning-to-mating interval (IDC) in days in gilts after administration of PG 600® compared to untreated females (control)



**Figure 2.** The cumulative percentage of gilts showing heat in response to PG 600® compared those not treated (control) 24 hours after weaning.

## Multiparas

For the treatment of postpartum anestrus in multiparous sows, it is possible to:

- Delay the appearance of heat after weaning by using a synthetic progesterone-like hormone, altrenogest (Regumate®).
- Carry out the practice known as 'heat skipping' (omitting a heat mating) to let the sow recover.

The difference between one or the other represents the maximum number of NPDs:

- 12 days if hormones are used.
- At least 21 days if the female cycles naturally.

A [study](#) by Boyer *et al.* (2014) also demonstrated the benefit of reducing the weaning-mating interval and, therefore, reducing the NPD in gilts by using Regumate®.

This study compared sows after their first farrowing treated for 7 consecutive days with Regumate® after weaning with untreated sows weaned after their first farrowing (control group).

Results show that 91% of the former came into heat during the first 7 days after Regumate® treatment while only 77% in the latter control group showed signs of heat in the first week after weaning ( $p < 0.05$ ).

This product is indicated and designed for use in the synchronisation of sows, therefore the aforementioned treatment is an experimental use and employing it in this way for commercial purposes is considered *off label*. It

is important to remember that the use of altrenogest must be recommended by the veterinarian.

## Using boars in the return-to-oestrus stage

The best stimulus that females have to start their post-weaning cycle or to go into puberty is the presence of a boar. This is because boars produce special pheromones in their saliva. The heat induction must be performed twice a day and at least 10 minutes of physical contact must be provided.

Artificial hormones are available as a spray, but there is nothing more effective than a mature male older than six months of age to do this job.

Unfortunately, hormones are commonly used to compensate for poor management. Therefore, it is important to recognise that hormones must be used responsibly as a production tool.

## Conclusion

In conclusion, pig production is a high-risk activity, and if we do not take the necessary precautions, we will lose a lot of money on our farms. To do this, we must reduce non-productive days, have adequate reproductive management, use the available tools, and carefully select females.

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