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Investment Requirements in Piglet Production

Calculating investments for buildings is more difficult than for machines, because they involve individual designs and not ready-made products. To get at least a target value for animal housing for the KTBL database, models were created for which investments and annual costs were calculated. For these calculations to remain up to date, they must be adjusted to technical developments and new regulations. Especially because of federal regulations on Farm Animal Protection (TierSchNutzV), new stable models for breeding pigs were determined and the corresponding investment requirements ascertained.

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Ten common models with stock sizes from 252 to 1176 productive sows and differing occupancy, suckling period and housing system in the gestating section were selected (*Table 1*).

All models concern insulated stables in massive construction with mating, gestating and farrowing section as well as a central unit with a loading ramp, an office and a sow shower. The manure removal is carried out in each case in flushed channels with two alternately used gate valves.

Higher demand for floor space

A relevant expense factor is the stable area per animal place. It had to be raised compared to the previous stable models. A higher demand of useable area per animal place in particular in the gestating section results from the national directive "Farm Animal Protection" (TierSchNutzV). The directive demands group housing for gestating sows and fixes minimum useable areas for every sow place, graded after the group size in 2.5 m^2 (up to 5 sows), 2.25 m^2 (from 6 to 39 sows) and 2.05 m^2 (from 40 sows). The present standard solution, single stalling with single crates needs about 1.6 m^2 area for each sow place (2.3 m • 0.7 m) and needs about 2.7 m^2 stable area per animal place in the compartment, including the corridors for supply in front and between the crates.

For the group housing of gestating sows with crates the area for every sow place increases about 0.2 m^2 per sow to 2.9 m^2 / sow, with a useable area of 2.25 m^2 / sow and dimensions of 2.4 m • 0.7 m for the crate and 2.4 m width for the corridor for movement between two rows of crates. This is an increase of 8 %. This solution was assumed here as the new standard.

More favourably in stable area per animal place is the variant housing in small groups with liquid feeding and without crates. The proportionate stable area for the corridors and the feeding facilities is lower and there are about 2.7 m^2 per sow place required. The group housing with the feeding-on-demand system needs the lowest requirement for stable area. At least 2.1 m^2 per sow are needed for a pen with 60 gestating sows. By including the area for selecting and training of the gilts the demand of stable area can increase up to be 2.5 m^2 / sow.

In the other housing sections no higher demands for useable area per sow place are required by the national directive "Farm Animal Protection." Otherwise the recommendation values of the pen dimensions are increased due to the rising size of the sows and the higher number of piglets per birth. With the stable models the dimensions of crates for the mating and gestating sows have increased by 10 cm to 2.4 m length. Pens for farrowing sows are dimensioned with 1.9 m width and 2.4 m length, also the corridors are partially wider. All together the stable area in these housing sections also increases by 8 to 10 %.

However, regarding the area requirement it is to be noted that there are nearly always compromises with the stable dimensions, due to the combination of the different housing sections needed for breeding sow keeping. In particular size and cut of the se-

Table 1: Criteria for stable models investigated

Prod. sows	Suckling period	Occupancy cycle	Housing system in gestation section
320	21 days	1 week	small groups with self-closing crates
720	21 days	1 week	small groups with self-closing crates
1120	21 days	1 week	small groups with self-closing crates
336	28 days	1 week	small groups with self-closing crates
735	28 days	1 week	small groups with self-closing crates
1176	28 days	1 week	small groups with self-closing crates
1176	28 days	1 week	large groups with feeding-on-demand system
1176	28 days	1 week	small groups with liquid feeding
252	28 days	3 weeks	small groups with self-closing crates
252	28 days	3 weeks	large groups with feeding-on-demand system

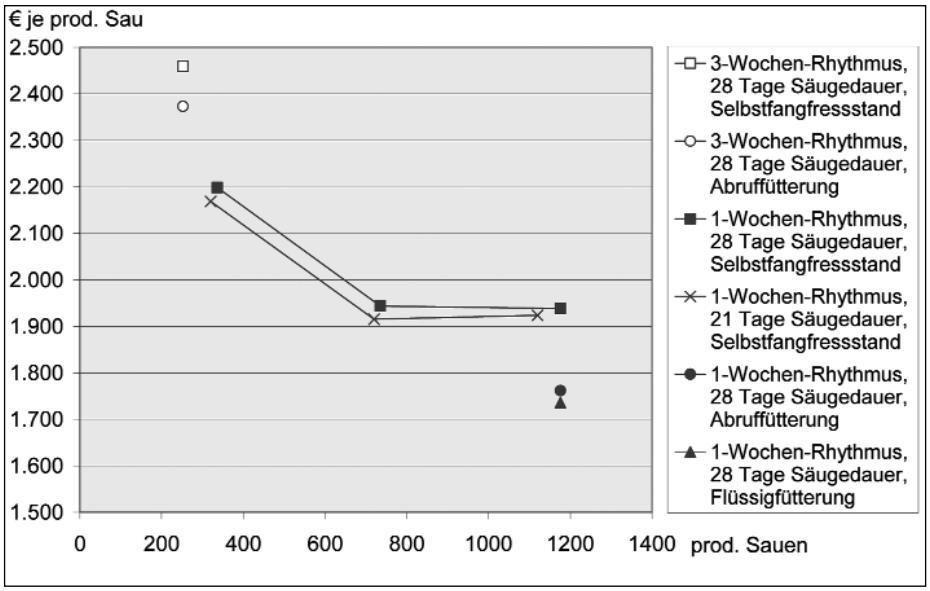

Fig 1: Investment requirements for breeding sow houses in € per productive sow for differing occupancy, suckling periods and keeping systems in the gestating section

condary rooms, like hygiene sluice, office, sow shower must adapt to the dimensions, which result from the definitions for the gestating, mating and farrowing sows sections. With the here selected models here, it was attempted to have for each case a comparable equipment level, however, smaller deviations are unavoidable.

Effects on Investments

Not only has the higher requirements for stable area has made the stables more expensive. For the period from 1999, when the last calculations of sow housings were done, to 2007 the federal statistical office reports a price increase of about 13 % for industrial buildings and it should have affected animal housings in a similar dimension.

Against this background it is nearly a bargain that a stable for 320 sows in spite of more stable area, price increase and an additional loading ramp costs only 18 % more than in 1999.

More important than comparing with the past are the effects by alternative solutions of today's standard (*Fig. 1*).

Comparing different stock sizes confirms the expected degression of costs. A stable designed for 720 instead of 320 sows saves approximately 10 % or about 25 € per productive sow. By further enlargement, however, no noteworthy reduction can be observed.

By increasing the suckling period from three to four weeks, 16 additional farrowing pens are required for 320 sows. In consequence the investment increases by almost 45,000 €. But as also more sow places are installed and the unproductive secondary rooms are unchanged, only additional investment of about 30 € per productive sow respectively annual costs of ~ 3,5 €/(a • sow).

The different stable sections

The investment need for a sow place including the proportionate expenditures for supply facilities and corridors of the stable lies between 2,800 € for a stable place for farrowing sows and about 1,000 € for a place for gestating sows (*Fig. 2*). The area for mating sows lies, due to including the housing for the boars, still about 70 € above the costs for the otherwise comparable area of gestating sows with crates. Decisively for the high investment need for the farrowing sows is the high need of 5.5 m^2 stable area and the complex stable equipment for the single pens with crates. For the total investments of the stable there must be additionally calculated the secondary rooms like hygiene sluice area, office and sow shower on about 120 € for every sow's place.

For gestating sows three variations of group housing can be compared. Housing in small groups with crates and movement corridor is the most expensive with 1,230 € per sow place. Housing in small groups with liquid feeding without crates reduces the investment about 60 € per animal place, because less required stable area and stable equipment. Housing in big groups with feeding stations with about 920 € per animal place is most favourable. The high investment for the feeding stations is shared by 60 animal places and the low need of stable area reduces investments.

The housing of gilts before mating in small groups needs about 1200 € per animal place,. This is comparable with housing of gestating sows with crates. The need of area for housing in groups to five animals is with 1.85 m^2 per sow above the need of area for housing with single crates. The proportionate expenditures for corridors and the stable equipment for the group pen are favourable in investment.

The checked models with the calculated investment requirements will probably be available on CD Baukost 2.3 and in the internet under *daten.ktbl.de/baukost/* at summer 2008.

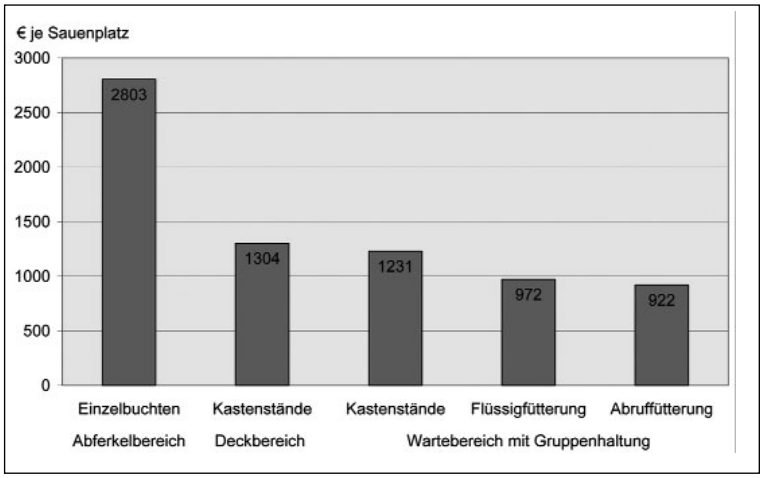

Fig 2: Investment requirements for breeding sow houses with 1176 sows in € per sow place for the housing sections, with different keeping systems in the gestating section