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Investment Requirements for Pig Fattening Houses

Within the framework of the KTBL Work Program on Calculation Standards, the FAL Institute of Process Engineering and Building Research calculated the investment requirements for various pig fattening houses. Just before the national directive "Farm Animal Protection (TierSchNutzV)" was enacted, the figures for conventional pig fattening facilities were updated, based on current stabling areas per animal. Furthermore, the available data were supplemented with an "Automatic Sorting Stable" and "Outdoor Climate Stable" with the "Neuland" and "Pig-Port" systems. According to TierSchNutzV, the new comparative calculations show the effects of more generous area offerings on the costs per fattening place.

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Keywords

Investment requirements, annual costs, functional cost pool, fattening pigs, outdoor climate houses, automatic sorting

Literature

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At the Institute for Production Engineering and Building Research cost values for standard construction solutions were calculated on the basis of actually constructed and paid buildings [1]. Divided into Functional areas (Cost Block: stable, slurry/manure, feed, additional facilities); Building Elements and Cost Groups (according to DIN 276) cost values (cost per fattening place, fattening place), Building Use Costs (costs per year) and Normal Manufacturing Costs (costs per m² gross ground area) for the different housing concepts were derived (including 16% VAT). The variants consider:

- fully automatic (VAF) and sensor (SEN) liquid feeding, dry feeding with a automated pipe feeder (RBA)
- conventional fattening stables and automatic sorting stables (insulated, ventilated single row comb and double comb stables), as well as outdoor climate stables with insulated lying boxes (System Neuland and Pig Port III)
- changing dam process for fully slatted (conventional and automatic sorting stables) or for partially slatted floors (Pig Port), or solid manure practices (Neuland)
- small groups (10 to 11 animals), mid-sized groups (20 to 22 animals) and large groups (35 to 42 animals), as well as mega-groups in the automatic sorting stable (300 animals)
- different livestock sizes (< 400 to > 2000 fattening places)

Data

The complete construction cost data are available on the Internet page of the KTBL (www.ktbl.de/baukost). There you will find an extensive description of building types, livestock sizes and husbandry systems (overall 25 variants). With the program "BAUKOST – investment requirements and annual costs for agricultural farm buildings," the user can calculate other stable types online.

Comparison of Models

An overview of the investment requirements for the calculated models is found in *Figure 1*. The investment requirements per fattening place are presented dependent on farm size.

In addition, the values for a previously calculated outside climate stable model (MS 27) according to the Nuertinger System, as well as data on different actually built stables (Pig Port I-111, automatic sorting stable) are also included. Summarized briefly, it can be said the larger the livestock size, the less expensive the building (effect of cost degression) and the larger the group, the less expensive the animal place. Accordingly the least expensive fattening facilities are for large groups and automatic sorting stables. Here it is assumed, as in practice, that the animals in large groups share the same areas and equipment. The floor area in an automatic sorting stable, for example, is reduced in practice in groups of 300 animals to only 0.60 m²/animal. Accordingly, the investment requirements for this model are low. Automated pipe feeders (RBA) are less expensive than fully automatic liquid feeders (VAF) or sensor feeding (SEN). Since they make more area available to each animal, the outdoor climate stables are much more expensive than conventional stables when considered from the perspective of fattening place.

As can be seen in numerous practical examples, stable facilities can be built much less expensively as the calculated models with own farm labour and constructions that do not meet the standards (see example in the graphic), but even much more expensive variation are realized (see example Pig Port II).

Investment Requirements in the Cost Blocks

Depending on the herd size, stable system and technical equipment, a fattening place costs between 340 to 610 in total, and the entire stable from between 188,000 to 804,000 € in total.

The auxiliary facilities (hygiene passages, office rooms, loading ramps) make up a very small part of the costs at a maximum of 26 €/fattening place (5%). Feeding "swallows," in contrast, between 6 and 15 % of the investment requirements, depending on the system (RBA ~ 20 to 40, SEN 30 to 60, VAF 70 to 90 €/fattening place).

The manure removal is the least expensive in the paved, littered Neuland System (85 to 110 €/fattening place) at about 18%. Due to the labour requirements and the subsequent

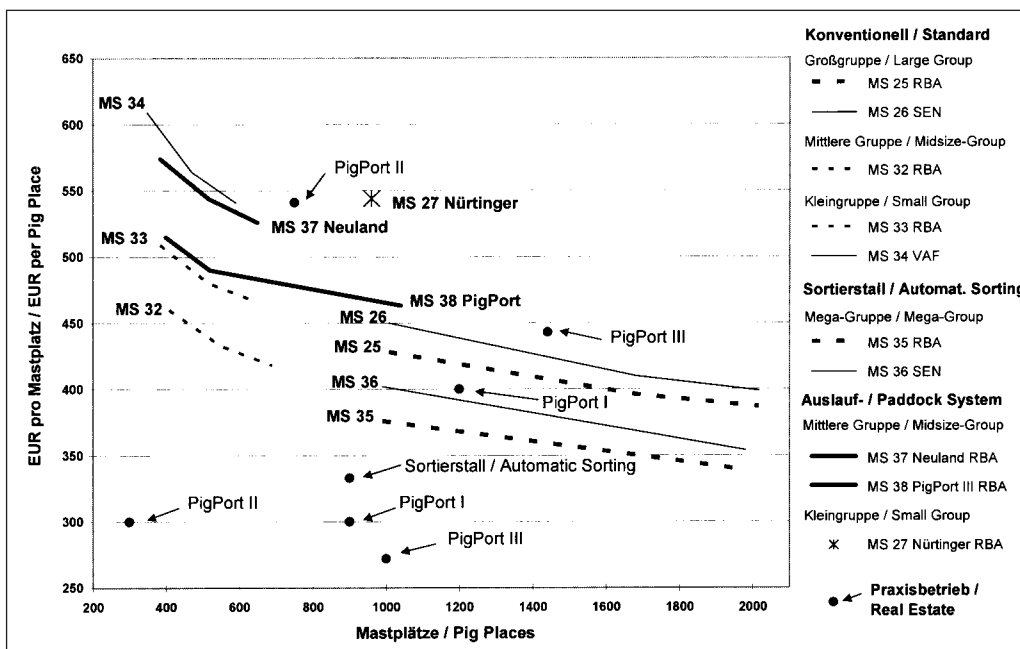


Fig. 1: Investment requirement [per fattening place] for various housing systems depending on stock-size

technical equipment in the automatic sorting unit.

Strongly affected by the area allotment increase are also existing farms with small groups, which as a rule are mostly small farms themselves (see MS 33): In the current 0,65 m² (12 T/B, 420 fattening place) are nonetheless 17% less animals to house (minus 2 T/B, 70 fattening place less). The costs per fattening place thus increase mathematically to up to 50 €.

As the Institute of Animal Production in Dummerstorf was able to prove, an larger space allotment for fattening pigs leads to higher yields (Study: 0.6 ⇒ 0.8 m²/animal, Result: plus 1.7 % weight gain increase per day, plus 0.6 % higher yield per pig, meaning 70 Cents more per animal). The higher performance is not worth the additional costs per animal place.

Outdoor climate stable as an alternative?

According to the guidelines for organic farming (EG-VO Nr. 2092/91), a minimum of 1.3 m² stable area must be maintained per pig up to 110 kg live weight, plus 1 m² yard area per fattening pig. The old pig husbandry regulations (from 1994) required in contrast only 0.65 m² per animal and since August 2006 the new regulations require 0.75 m².

In order to inexpensively construct a greater area allotment per animal, alternative stable concepts such as outdoor climate stables are a topic to be considered by “conventional” farmers.

Generally it holds true that the more area per animal, the higher the construction costs. If I offer my pigs 1 m² stable area per animal (Neuland) instead of only 0.75 m² (conventional), then the stall must be more expensive. With 650 fattening places, feeding with a pipe mash automat and mid-sized groups, the Neuland Stable (MS 37) costs about 306,000 €, while a comparable conventional stable with small groups (MS 33) costs “only” about 250,000 €. With standardized building practices, the much larger fattening places in outdoor climate stables cannot be less expensive than in a conventional stable. With 25 % more area pre animal, the individual fattening places are about 100 € more expensive (related to the much larger main use area the outdoor climate stable is then, however, about 190 €/m² cheaper).

These types of stables can only be made less expensively with own farm labour and

costs for the removal, solid manure systems are, on the whole, evaluated at worse, as can be seen by the investment requirements. In Pig Port stables with partially slatted floors, 36% of the costs are incurred in the manure removal sector (90 to 190 €/fattening place). For label producers it is of interest that this system can tolerate minimal litter amounts in the lying area. With about 30 to 40 % (110 to 210 €/fattening place), the manure removal in the fully slatted floor is comparable to the Pig Port, but less labour intensive, since it is not littered.

The greater part of the investment requirements fall to the Cost Block Stable (Buildings and Equipment in the Animal Area). The stable costs of the Neuland model are, with more than 70%, (about 400 €/fattening place) well above the similarly equipped Pig Port and conventional stable systems (50 to 60 % or rather 200 to 300 €/fattening place).

More Space Available

At the beginning of the updating, according to the pig housing regulation from 1994, a minimum area of 0.65 m²/animal and the commonly recommended practice of 0.70 as well as a 0.60 m²/animal reduced area for sorting stables were assumed.

With the new animal protection laws, enacted in August 2006, conventional fattening pig farms must recalculate their herd size: fattening pigs up to 110 kg live weight are now entitled to 10 cm² more space than in the old regulations.

Up until now, one generally assumed that in large groups the space requirements could in part be lessened, since more animals share the equipment or rather functional areas, or use them better. Now, it is legally required to provide each animal with 0.75 m² area per animal, for the mega groups in the automatic sorting stables, too. The number of animals per place or group is to be reduced appropriately in existing stables and in

the FAL models. Newly constructed stables are to be built with larger boxes for the same number of animals. This means that the costs per fattening place increase, while productivity and income will be reduced. Only outdoor climate stables, which follow the more severe requirements of the still valid ecological regulations or the guidelines for quality labeling (i.e., Neuland guidelines for animal appropriate pig husbandry) are not affected by this.

Farms with < 1000 fattening places are depicted in the graph with conventional fattening stables with small group husbandry (MS 33) or rather mid-sized groups (MS 3). For farms with more than 1000 fattening places, a conventional fattening facility with large groups (MS 25) and a modern automatic sorting stable with mega groups (MS 35) were selected. It was assumed that an area allotment of 0.65 square meters per pig (m²/animal) reflect the pig husbandry regulations of 1994, the recommended area allotment of 0.70 m² for “normal” practicing fattening facilities, and an area reduced to 0.60 m²/animal for automatic sorting stables. In accordance with the new regulations, the area allotment was increased to 0.75 m².

In new constructions each fattening place costs 30 to 90 € more than before the animal protection laws were enacted.

If a minimum area allotment of 0.65 m² is planned for each animal for larger groups and mega groups in automatic sorting stables, the number of animal in existing facilities must be reduced by a total of 13 % (1000 ⇒ 870 fattening place, Large group: 45 ⇒ 39 T/B, 1000 ⇒ 810 fattening place). The costs per fattening place thus increase by 80 to 90 €/animal. With the same area allotment per animal, the investment requirements for automatic sorting stables are about the same as those of a common fattening facility with large group husbandry and the same size. The cost advantage of the mega groups is lost through the complicated and expensive

the use of alternative, less expensive construction materials (the safety of which for animals, durability and appropriateness are not to be discussed further here). To produce in a cost covering manner in the fattening pig field, today means not only “mass” but also to follow wise strategies. Better marketing opportunities, higher purchase prices and quotas in production for organic or quality labels, in some cases tied to promotional funds for old races, are arguments for outdoor climate stables that are not reflected in the investment requirements.

Summary

The investment requirements of the calculated models are, independent of construction form, equipment and herd size, between 340 and 620 € per fattening place. The new farm animal husbandry regulations increase the investment requirements per fattening place by at least 30 €. Under unfavorable conditions (i.e., in small group husbandry) in operating farms, up to 17 % fewer fattening places are available for final fattening as previously, meaning accordingly fewer animals can be kept. The only alternative is to sell the animals much earlier with a much lower slaughter weight. Regardless of what the fattener decides, he faces significant financial losses.

Outdoor climate stables can be a real alternative to the new construction of a stable facility under given conditions and consideration of own performance, marketing opportunities, etc. The changes in the farm concept tied to these changes must be thought out carefully.