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Investment requirements for layer housing

For production-technical reasons in particular, the major proportion of laying hens has been kept in cage systems for over three decades now. However, the development of new forms of housing offers the possibility of linking economic production with animal welfare demands and thus being in a position to meet the rising demand for eggs and poultry from type-specific welfare systems. In order to be able to substantiate the economical efficiency of alternative systems, not only production values such as labour/time requirement and bird performance are required but also figures covering fixed, especially housing, costs.

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Urgent action was required for the determination of a solid data fundement. The data that have been given in relation to the investment requirements of layer buildings swings between 2 and 70 DM/LH (LH= laying hen).

Since the end of the 1970s the Institute for Agricultural Building Research has calculated building cost data for cost estimates of agricultural buildings. These cost-oriented values were calculated from housing that had been completed and written off. Also brought in to help determine the investment requirements for laying hen housing were realistic quotes from leading housing and equipment suppliers.

Selection of investigated housing systems

In order to accurately allow for the impressive influence of building geometry in the different sizes of unit, three different sizes of every house type were investigated (*tab. 1*). The evaluated data for each building of a particular size was used towards the calculations for alternative house sizes and solutions. Thus, it's possible to establish cost comparisons based on a uniform price basis.

In total there were 15 variations of on-floor, aviary and battery housing investigated. This was made up from five different housing systems each with three flock sizes. These included nine variations of on-floor systems with and without manure conveyor belts or open ground scratching area. The aviary systems were represented by three variations. Three different sizes of units featuring battery accommodation were taken for comparison.

Figure 1 shows a house (on-floor system) exemplary in layout and plan. The length comprises the actual length in the poultry accommodation, 2.50 m for the feed equipment and feeding system and 3.50 m for the cross belt for transporting manure out of the house. Also envisaged is additional room at the front of the building adding another 3.00 m.

The chosen eve height of 3 m means that tractors can be used in-house (fig. 1).

The on-floor system has installed heating (gas radiator) which is not necessary in the aviary and battery systems because of the higher stocking rates. A third of floor are is

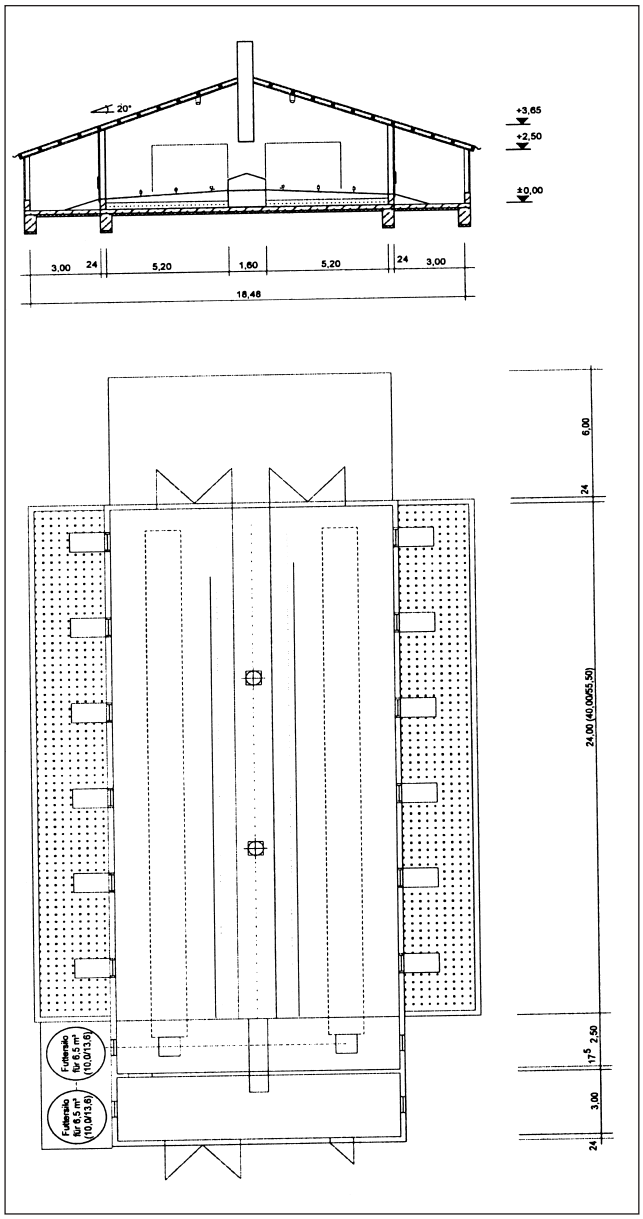


Fig. 1: Variant LH 02001 – LH 02003 - floor housing with winter garden and manure removal by tractor (the data in brackets are for the variants LH 02002 and 02003)

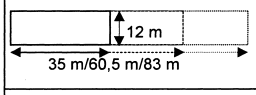
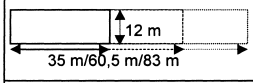
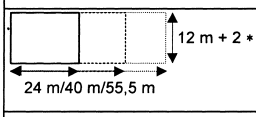
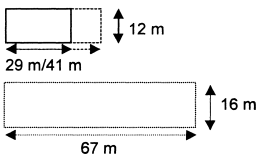
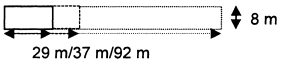
Legehenne – Varianten hen – variant	LH - - - - - LH - - - - -	Anzahl number	Stalltyp housing	Eientnahme take away of eggs	Entmistung manure technique
	01001 01002 01003	3000 LH 5000 LH 7000 LH	Bodenhaltung 7 LH/m²	Legenester mit automatischer Austreibvorrichtung, Eiförderband	Traktor
	01004 01005 01006	3000 LH 5000 LH 7000 LH	Bodenhaltung 7 LH/m²	Legenester mit automatischer Austreibvorrichtung, Eiförderband	Kotband
	02001 02002 02003	3000 LH 5000 LH 7000 LH	Bodenhaltung mit Kaltscharrraum 10,5 LH/m²	Legenester mit automatischer Austreibvorrichtung, Eiförderband	Traktor
	03001 03002 03003	5000 LH 7000 LH 20000 LH	Voliere/Etagensystem 15 LH/m² Voliere/Etagensystem 19 LH/m²	Legenester mit automatischer Austreibvorrichtung, Eiförderband	belüftetes Kotband
	04001 04002 04003	5000 LH 7000 LH 20000 LH	Käfig 22 LH/m²	Eiförderband	belüftetes Kotband
Die angegebene Stalllänge ist die Stalllänge im Tierbereich					

Table 1: Analyzed alternative laying hen houses

envisaged for ground pecking, according to legal regulations.

Having an open ground scratching area means stocking rate can be increased. In the on-floor system the number of birds increased from 7 to 10.5 LH/m2 floor area.

Analogous to the on-floor system a scratching area was also planned in the aviary housing. This is, however, not yet legally compulsory. The etage system chosen by us (Nature – 3-etage – Big Dutchman) allowed for 15 layers /m2 of floor. The variety with 20,000 hens (LH 03003) could be calculated for 19 LH/m2. In the battery systems 4-tier cage units were featured in calculations. Economically efficient housing was achieved with a stocking rate of 22 LH/m2 and the prearranged flock size only when the building width was 8 m.

In the cost investigations two different ways of dealing with the manure were considered. Either the manure was taken out at the end of a production period (13 to 14 months) by tractor (ground system) Up until then the manure was to be stored in-house (manure crates). Otherwise, removal took place weekly with the aid of a belt system. In both cases the manure was taken away directly so that no dung storage was required.

All variations had full automatic chain feeding and nipple drinkers with drip bowls. The feed storage is envisaged in silos that would be part of the outer equipment.

Nest boxes also belonged to the house equipment: In this case these were envisaged as communal nests fitted with an automatic conveyor system. According to the flock size, one row/one etage or two row/two etage nest systems of the same type were chosen.

Investment requirement for layer houses

The investment requirement ranged from 162 to 50 DM/LH (fig. 2). Markedly noticeable was a cost digression from the small (3000 LH) up to the larger sizes of flocks from 7000 or 20,000 LH.

The most expensive variation is the on-floor system with manure belt. The difference between on-floor systems with manure belt and on-floor systems with manure crates of from 11 to 26 DM/LH can be explained through the manure belt equipment being counted in the house cost calculations whilst the tractor used for removing the manure (LH 01001 to 3 and LH 02001 to 3) was not charged to the enterprises.

With on-floor, the cheapest variation was a building with the open floor sratching space system because the building would be shorter. For the scratching area can be envisaged only a simple construction with no walls and with a wire grid as flooring.

Already with the smallest unit size investigated, the aviary system proved to be equally economical compared with the cheapest on-floor system, and with larger units was even cheaper. The difference between aviary and battery systems stayed around the same at 20 DM/LH. In that the housing for the battery systems can be smaller than with the alternatives, this system is the most economically efficient.

Where the share of the building costs are smaller, then the investment requirements per animal place are also reduced. This saving is, therefore, not compensated for by a rise in the required investments in technology and equipment, so that aviary and batteries are the most economical systems.

Conclusion

The investment requirements for layer buildings came to between 49.84 and 162.40 DM/LH according to housing system. Nearest to the battery accommodation came the aviary system. The determined costs (fig. 2) endorse that increasing the flock size and the stocking rate offers cost digressions and with it brings a reduction in production costs.

When one bases calculations on the willingness of the customer to buy eggs out of on-floor or etage production systems, and also to pay more for them than for the battery products, the models investigated here offer an economic alternative. The extra costs per egg related to the fixed costs (buildings) run from 0.03 to 1.6 pfennigs.

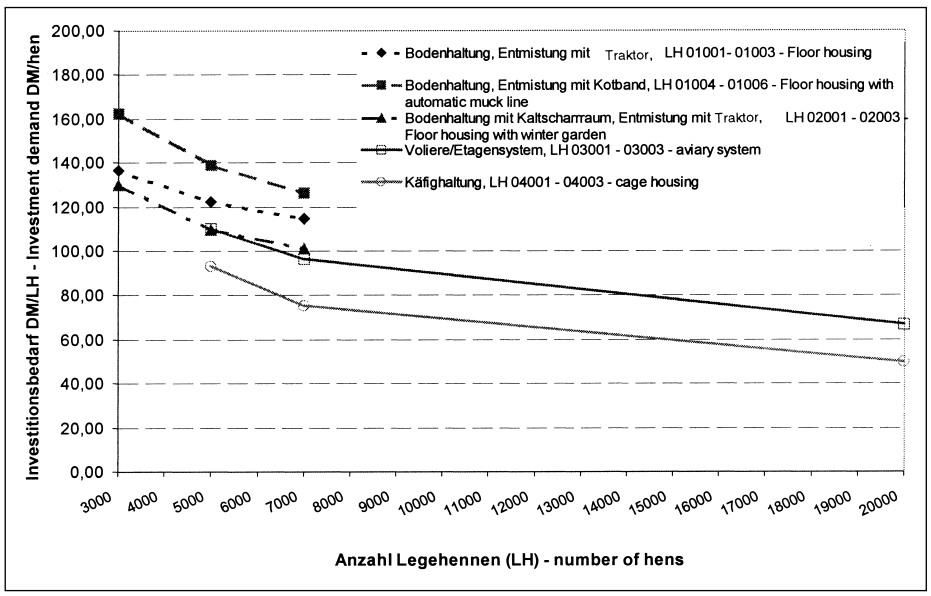


Fig. 2: Investment requirements for alternative laying hen houses