

## **Economics of young stock rearing decisions on Dutch dairy farms**

### **ABSTRACT**

The increasing intensiveness of agriculture has contributed to environmental pollution through a higher production of waste materials. The environmental and economic pressures mean that it is nowadays important that milk is produced in a more sustainable way. The young stock rearing enterprise also contributes to the sustainability of dairy farming. For example, decisions about the number of young stock to retain on the farm have consequences for the amount of waste produced. A more sustainable young stock rearing enterprise can be achieved if the optimal decisions are taken during the rearing period. However, these decisions are very complex because many different factors are involved. For instance, retaining too few young stocks can result in not enough replacement heifers to replace culled dairy cows, and a shorter rearing period might negatively influence the future performance of dairy cows. Therefore, it is necessary to obtain insight into these decisions. The general objective of this thesis was to provide insight in the economic consequences of the decisions taken during young stock rearing. For this thesis, we focused on 2 important decisions that are directly related to the number of animals on the farm, and therefore to waste production. These decisions are about the first calving age and the number of 2-week-old heifer calves to be retained. Results of data analysis on 8,454 heifers showed that the first calving age can be lowered by starting inseminations earlier. However, earlier inseminations need to be accompanied by an adjustment of the rearing management to ensure sufficient development. Otherwise, earlier inseminations will lead to a lower milk production. These findings showed that an economic optimum exists between rearing costs and the first calving age. The decision about the optimal number of 2-week-old heifer calves to be retained is analysed using a stochastic herd level simulation model. In that model, the optimal percentage of 2-week-old heifer calves to be retained was defined as the percentage of heifer calves which minimized the average net cost of rearing replacement heifers. Inputs for this model were based on literature, expert opinion and authors' expertise. In addition, inputs that are important but not readily available for Dutch circumstances were also studied. These were the cost of rearing and the culling rate of dairy cows. The cost of rearing was estimated using a cow level simulation model. The culling rate of dairy cows was studied by using a multivariate regression analysis. The results on costs and culling rate were used as inputs in the stochastic herd level simulation model. Results of the model showed that in a 100-cow herd, the optimal retention of 2-week-old heifer calves in default scenario was 73%. The net cost of rearing when retaining the optimal percentage of heifer calves was estimated at €40,939 per herd per year. This amount is 6.5% lower compared to when a farm retain all heifer calves. In conclusion, for Dutch dairy farms, it is economically optimal not to retain all heifer calves.

**Keyword:** Economics; Young stock Dairy; Calf diseases; Heifer calves