



## Impact Factors of Days Open Cost on Dairy Profitability

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### Abstract

Effort to decrease cost of production is a mainly step to improve profitability at the farm. Hidden cost, specifically, days open cost as a huge part of operation cost in dairy herd is one of important task of the managers. The aim of this study investigate of days open cost to identify, assess and control it. Pregnancy rate, culling rate, death rate, mastitis, lameness and also milk price, feed cost, heifer price, cull price, calf price and veterinary cost are included the fundamental costs which has been considered.

**Keywords:** Days open, profitability, dairy herd management, livestock economics

### Introduction

Breeding of livestock in Iran is a fundamental sector of the Iranian agriculture industry and rearing cattle especially dairy cattle for milk production is of strategic importance. It is then clear that this industry plays a great role in the economy of the villages making the economic aspect of the dairy herd a focus of particular interest.

The main task of keeping dairy herd is for it to generate money so profitability is an important benchmark for measuring its success. Closely related to this goal are the different reasons for culling cows which in turn impacts costs and profits thus making judgments and decisions to remove cows a burdensome task. In addition, the market price of the supplies and products are affected with this plan simply because of its influence on revenue and expenditures at the farm.

Furthermore, economic yield of the herd could be taken as a fundamental point to continue the farm business and recognize the points of weakness. In line with this is attention given to costs specifically production costs as compared to assets being used on the farm. Based on this there is a need for the creation of a tool to evaluate and assess the cow's performance and indulge on the decision to keep or cull the cows. Given the importance of the livestock industry and its association with the economics of agricultural and that of dairy farming and milk production. The use of new tools and methods to increase productivity and performance are indispensable. One of the factors to reduce production costs while raising dairy cattle is livestock identification and distinguishing high-quality or low productivity animals and removing them from the herd. Once the decision is taken to reduce production costs and use capital efficiently, improvements show in terms of riding capital. Livestock identification and its assessment should be based on the economic conditions of the market and biological characteristics of the affected animal. Based on the current

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economic conditions and the absence of a practical system of assessment and decision making, related operations are not being carried out properly on the farms.

**Material and method**

Gap days from calving to conception (days open) is normally linked with reduced profitability in dairy cows. One of the major but mainly hidden costs which affect cow’s performance is days open cost (DOC). Previous studies confirm that any delay in cow’s pregnancy can adversely impact the income. This is simply because, the maintenance cost of the cow will be amplified and the pregnancy income as a partial revenue will decline dramatically. Moreover, any pregnancy delay has an inverse influence on milk production. The results indicate a clear trend of greater risks of death and culling rate for the increasing number of days open. It follows that the odds of death and culling rate were reduced for cows with fewer days open in the previous parity when compared with cows with lengthy days open (Table 1) (Pinedo *et al.*, 2010).

**Table 1: Risk (%) of death or live culling of days open**

Days Open	Death (%)	Live culling(%)
1 to 45	2.48 ± 0.14	4.51 ± 0.21
46 to 90	2.52 ± 0.07	5.00 ± 0.12
91 to 150	2.89 ± 0.08	5.41 ± 0.13
151 to 210	3.60 ± 0.11	6.05 ± 0.15
211 to 300	4.36 ± 0.14	6.87 ± 0.19
301 to 600	5.79 ± 0.22	8.06 ± 0.27

Several factors such as voluntary waiting period, AI techniques, management policies, herd size, and production levels are

influenced after calving (Oseni *et al.*, 2003). Days open have been widely used as a success measure of reproductive programs. Dairy farmers are conscious that cows with extra days open get more harmed and become potentially more at risk of being culled. Extended days open may increase the risk of over conditioning of cows at the end of their lactation because milk yield is then typically lower and feed intake is less reduced (Pinedo and De Vries, 2010). In line with this, some factors such as days open, milk production, lactation, veterinary cost, breeding cost, replacement cost, feed cost, calf price, milk price, culling rate and death rate affect days open cost and based on this formula DOC can be computed (Groenendaal *et al.*, 2004).

$$Days\ Open\ Cost = \frac{(Net\ Income_{CI} - Net\ Income_{CI+1})}{30.4} \dots \dots \dots (1)$$

Where DOC = Days OpenCosts, CI = Calving Interval (month), CI = Net Income in the first month of lactation with a CI measured in months, and CI + 1 = Net Income in the first month of lactation with a CI of CI+1 month.

De Vries (2006a) has demonstrated that one of the important factors affecting DOC is the cow replacement cost (CRC) that will be discussed in the next section. Furthermore, some diseases like Lameness, Ketosis, Milk Fever, and LAD (Leukocyte adhesion deficiency) cause that extra days open (Table 2). One more interesting thing is that mastitis not only influences milk production but it also affects the culling rate, death rate and extra days open as shown in Table 2 (De Vries, 2009b).

**Table 2: Effects of common diseases on risk of leaving the herd, milk sales, days open, farmer labour and veterinary costs**

	%Death /case	%Culled /case	Milk Not Made lb/case	Milk Discard lb/case	Extra Days Open /case	Farmer Labour hr/case	Vet & Drug USD/case
Mastitis	1.1	7	275	300	0	1	15
Lameness	1	12	330	66	12	0.5	26
LDA	2	8	840	77	12	1	86

Ketosis	0.5	5	506	0	10	0.67	19
RP/Metritis	1.5	6	550	248	15	0.67	20
Milk Fever	4	5	286	0	13	0.5	25
Dystocia	1	2.2	390	90	12	1	44

### Results and discussions

In this and previous studies, one of the most important costs after feed cost is DOC (about 24.31% of cow operating cost) (51.88, 24.31, 11.22, 6.33, 4.41, 1.84 % involved feed cost, Days open cost,

replacement cost, breeding cost, lameness cost, mastitis cost respectively). As it has been implied, pregnancy has its own revenue with two different costs that can be included in the fertilization cost (Breeding Cost) and pregnancy delay cost (Days Open Cost).

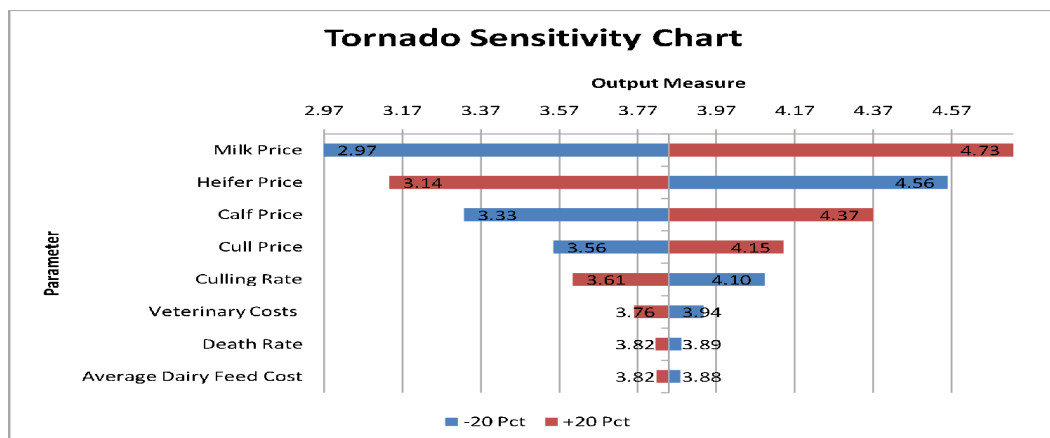


Figure 1: Sensitivity analyses of average days open cost

According to Formula (1) the results represent the average DOC in the herd with sensitivity to milk price, heifer price, calf price, herd turnover rate, cull price, veterinary cost, and feed cost (Figure 1). However, the sensitivity analysis shows that milk price and heifer price (30.31% and 25.41% respectively) have the largest effect on daily days open cost though with some differences because milk price affects the annually revenue of the cow but heifer price impacts the yearly expenditures of the herd. On the other hand, according to the Figure 3 20% changes the parameters such as milk price, calf price and cull price, the average daily DOC has been improved (31.37%, 18.60%, 10.49% of total changes respectively), whereas, heifer price, culling rate, Vet cost, death rate and dairy feed cost have influenced inversely on the DOC (25.41%, 8.73%, 3.16%, 1.18% and 1.06% of total changes respectively).

Moreover, studies show that DOC in the different month is, from 12 to 13 month is USD 3.164, from 13 to 14 month USD 3.774, from 14 to 15 month USD3.832, and from 15 to 16 month USD 4.638. Past studies mentioned that increasing days open affects the probability of culling and death rates, so it is one main individual replacement cost for each cow (Oseni *et al.*, 2003). Base on the outputs of calculated 16.30% of total days open cost has been impacted by replacement cost of cows influenced by days open cows (USD 94.07 of USD 577.24 average per head). Moreover, delay of pregnancy is very costly for the farmers, and it will improve the expenditures of maintain cow cost.

Finally, according to the analysis, DOC has changed from USD 159.97 to USD 2291.09 with 23 to 549 days open respectively emphasis that the main costs and reasons to

cull the dairy cows are delay in pregnancy and farmers need to focus on these programs.

### Conclusion

According to this study and results days open cost as a huge hidden operation cost should monitor by management to control the herd profitability, albeit, all factors that can impact on it which has been mentioned before need to access and evaluate to analysis of herd total cost.

### References

- De Vries, A. (2006). Determinants of the cost of days open in dairy cattle. *In proceedings of the 11th international symposium on veterinary epidemiology and economics*, Cairns, Australia, August, pp. 6-11, 19-20.
- De Vries, A. (2009). Ranking cows for culling decisions. *In southeast dairy herd management conference, November 11& 12, 2009*, Georgia farm bureau building, Macon, GA, 1-10.
- Groenendaal, H., Galligan, D. T., & Mulder, H. A. (2004). An economic spreadsheet model to determine optimal breeding and replacement decisions for dairy cattle. *Journal of Dairy Science*, 87, 2146-2157.
- Oseni, S., Misztal, I., Tsuruta, S., & Rekaya, R. (2003). Seasonality of days open in US Holsteins. *Journal of Dairy Science*, 86(11), 3718-3725.
- Pinedo, P. J., & De Vries, A. (2010). Effect of days to conception in the previous lactation on the risk of death and live culling around calving. *Journal of Dairy Science*, 93(3), 968-977.