



**Review Article**

## **A Review on Disposal (Culling and Mortality) of Cattle**

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### **Abstract**

*Disposal of cattle is very important in any dairy farm because a producer must be free of those animals that are having poor growth, breeding problems, unproductive, diseased and those that are useless in herd. The decision of producer which cows to cull and which cows to keep in the breeding herd impacts future herd performance and profitability.*

**Key words:** Mortality, Disposal, Culling

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## Introduction

Culling and mortality together constitute disposal pattern among animals. Culling is the removal of undesirable animals from the herd to facilitate the entry of replacement heifers for improving the herd performance or to keep the herd size constant. The removal of animals from the herd is either voluntary on the basis of low milk production or involuntary removal for the reasons such as reproductive problems, teat and udder disorders, diseases or poor growth. The knowledge of mortality rate, its causes and factors affecting it at various ages is very essential in a given herd for producing replacement to maintain proper herd structure. In every farm some calves leave the herd due to death. Such loss of calves not only reduces the economic soundness but also limits the genetic progress by providing fewer replacements. Culling in the herd is practice to remove the unproductive animals and to obtain phenotypic and genetic improvement by retaining the best cows for future lactations and to obtain genetic improvement by breeding replacement stocks only from the selected cows (Hill, 1980). Any individual cow should be culled, regardless of her age, if there is a heifer available which is expected to outperform her. The rate of culling as reported by various workers in different breeds under different sets of managerial and environmental conditions ranged from 11.6 to 33.2 % per year (Augsteburger *et al.*, 1988)

## Ways of disposal of cattle

1. Disposal by culling
2. Disposal by mortality

The disposal of animals by culling comes under two categories, i.e., from birth to first calving and in adult cows i.e., after age of first calving are reviewed separately.

### 1. Disposal by culling

#### A). Disposal of animals before age at first calving

Amble and Jain (1967) obtained 9 % culling rate up to first calving in crossbreds at various military farms whereas, Dutt and Desai (1968) reported a higher culling rate (34 %) up to age at first calving in Haryana cattle. The culling rates in Haryana and deshi cattle in the age groups of one year to first calving were 22.8 and 26.9 %, respectively. (Lemka *et al.*, 1973). Des- Raj (1987) reported higher culling rates (23.09 %) in Kankrej heifers upto first calving .The main reason of culling were dam's low yield (30.7 %), stunted growth (20 % ) and miscellaneous



(30.2 %). Singh *et al.*, (1987) reported the culling rate up to first calving in Red Sindhi, Sahiwal, Tharparkar, Brown Swiss crosses and other crossbreds as 13, 12.3, 13.6, 4.0, and 3.2 % respectively at IVRI, Izatnagar. Jadhav (1990) in Friesian x Sahiwal crossbreds reported 26.46, 25.80 and 17.03 % culling at Amblala, Deharadun and Jalandhar farm with overall culling rate of 22.38 % and highest culling rate (12.82 %) in the age group of 12 months to AFC. Poor growth, poor health, breeding problem and low birth weights were the major causes of culling accounting for 8.18, 3.67, 2.91, 1.90 and 2.00 % respectively. Kulkarni and Sethi (1990) in Karan Fries and Karan Swiss cattle observed 9.9 and 14.3 % culling respectively at NDRI Karnal. Reproductive disorders, health problems and low growth rate accounted for 3.02, 3.16 and 3.67 % in Karan Fries while in Karan Swiss were 5.14, 4.54 and 4.60 % respectively. Mukherji and Tomar (1994) reported 27.0 % culling rate in Sahiwal cows prior to first calving at NDRI Farm, Karnal.

### **B) Disposal of cows after age at first calving**

Runov *et al.* (1986) reported 25 % culling rates in first lactations in Friesian and Ayrshires cows in Canada. Zarnecki and Stolzman (1987) studied lactation specific culling rates up to 3<sup>rd</sup> lactations among Frisian strain in 10 European and North American countries, they reported 18.1, 16.5 and 24.8 % culling rates in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> lactations respectively. The major reasons of culling were breeding problems, low milk yields and teat and udder disorders accounting for 8 to 9.4 %, 2 to 2.3 % and 1 to 2.2 % of herd strength, respectively. The culling due to teat and udder disorder increases significantly as the parity order increases. Danuser and Gailard (1990) reported 20 % culling at first lactation and up to 33 % culling from 4<sup>th</sup> lactation in Brown Swiss, Simmental and Friesian cattle in Switzerland. They also observed that reproductive problems (Silent heat, repeat breeding, ovarian cysts) and acetonemia increased with increased in milk production particularly in high yielding animals. However the occurrence of teat and udder disorders showed no correlation with increase in milk yield. Jadhav (1990) reported 1.73, 4.57, 5.17, 6.01, 5.06 and 4.97 % parity specific culling rates from 1<sup>st</sup> to 6<sup>th</sup> lactations on Friesian x Sahiwal crossbreds at various Military Farms during the periods 1955 to 1983. The corresponding mortality rates were 2.60 %, 4.87 %, 3.96 %, 4.17 %, 4.60 % and 3.0 % respectively. The average herd life and productive life was 7.30 and 4.57 years, respectively. The average number of lactations completed before disposal was 4.02. Mukherjee and Tomar (1994)



reported the culling rates as 29.0%, 39.4%, 29.0%, 25.3%, 17.6 %, 14.1 %, and 14.9 % from 1<sup>st</sup> to 7<sup>th</sup> lactations in Karan Swiss cattle at NDRI, Farm, Karnal during the period 1963 to 1988. The corresponding lactation specific mortality was 2.6 %, 3.2 %, 3.4 %, 5.5 %, 3.8 %, 4.8 % and 3.6 %, respectively.

### **Effect of culling on milk production performance**

Replacement of unproductive animals from the herd is likely to produce genetic improvement in the progeny but significant improvement in the performance is not observed even with intense culling. In view of the rise in the yield with parity, intensive culling is not likely to increase mean yields substantially, it increase the proportion of young cows (Korner and Renkena, 1979). Allairwe and Cunnigham (1980) found the intensity of voluntary culling be at most 3-8 % in addition to involuntary culling to maximize milk yield, where as Allaire (1981) indicated that with 20 % involuntary culling, milk yield was increased by additional 10-15 % of voluntary culling. Kulkarni and Sethi (1990) in a studying Karan Fries and Karan Swiss cows during the periods 1976-84 reported annual culling rates due to various reasons as 18-24 % respectively. However, they could not find consistent trend in milk production throughout the period either due to replaced animal or culled animals. Overall, they observed 6.09 % average annual increase in milk production of Karan Swiss and 0.05 % in Karan Fries for the same period. Beaudéan *et al.* (1993) reviewed the impact of involuntary culling on dairy animals. They reported the level of involuntary culling greatly influenced the genetic gain by reducing the number of replacement and selection are limited by involuntary culling. They also reported that health disorders (specific diseases, infertility etc.) which contributed to nearly 50 % of total culling, increased the risk factor for culling in the subsequent lactation or later age. Overall, the culling pattern of cows revealed a wide variation among the reasons of disposal. In general voluntary culling on the basis of low milk production was responsible for 20 to 50 % of total culling. Reproductive problems i.e. infertility (Ovarian dysfunction, anoestrus, infection of reproductive traits etc.) and metritis were also important reasons of culling. Other important reasons of culling were teat and udder disorders, locomotor problems, age or parity of cows and general health. Removal of cows through culling accounted for nearly 80% of disposal. High involuntary culling reduced genetic



improvement by lowering the selection intensity, increased risk factors for culling in subsequent lactations and by reducing the economic viability of the dairy herds.

## 2. Disposal by mortality

Mortality among dairy cattle results in financial loss, including the value of the lost cattle and milk production and cost of replacement and extra labor (Thomsen *et al.*, 2006). Mortality is more in male as compared to female which may be due to better health care, sanitation and awareness given to females as compared to males due to their profitable importance (French *et al.*, 2001). Adult mortality in general ranged from 2 % to 20 % .The different factors responsible for mortality are housing, feeding, management practices, climate conditions, parasitic and bacterial infections (Blood *et al.*, 1994). In general, mortality rate up to 5% is acceptable to dairy farm. In an organized herd, Prasad *et al.* (2004) have reported mortality rate ranging from 7.21 % to 17.12 % in cattle .The mortality rate from birth to age at first calving varied from 10 % to 30 % and majority of losses occurred in the first month of life .The main causes of calf mortality were Pneumonia, Calf Scours, gastroenteritis, enteritis and septicemia. The culling among female calves was very less up to one year of age and it increases with progress in age. Bangar *et al.* (2013) analyzed morbidity and mortality rate in cattle in village areas of Pune district in the Maharashtra state, digestive (1.43%) and nutritional (0.85%) diseases were major causes of mortality of cattle, the highest mortality rate (16.81%) were observed among calves and male were at higher (17.86%) mortality threat than that of female. Panmei *et al.* (2014 a) studying Karan-Fries cattle at NDRI, Karnal, during the period 1997-2012 reported respiratory problems (3.33%) and enteritis (1.82%) were the main causes of mortality in 0-1 month and 1- 2 month age groups respectively whereas general debility was the main cause of mortality in 2-3 month (1.42 %), 3-6 month (2.14%) and 6-18 month (4.86 %) age groups. Panmei *et al.*(2015 b), reported overall disposal rate for the different age groups of Karan Fries crossbred bull of 0-1 month, 1-2 month, 2-3 month, 3-6 month, 6-18 month, 18 month -3 year and 3-5 year were 17.9 %, 16.3 %, 14.2 %, 25.8 %, 49.0 %, 37.6 % and 51.65 % respectively. The mortality rates of Bovine population present in Himachal Pradesh in three age groups, calves showed highest mortality 21.53% followed by young stocks 9.35 % and adults 4.73 % (Chaudhary *et al.*, 2003).The mortality pattern during the period 1989-90 to 1997-98 at NDRI, Karnal in Sahiwal,



Tharparkar, Karan Swiss, Karan Fries averaged 14.35 %, 7.21%, 17.12 % and 13.46 % respectively (Prasad *et al.*, 2004). From the period 1968-2000, the average mortality in Sahiwal Jersey-Sahiwal crossbred female calf ranges from 0-1 month, 1-3 month, 3-6 month, 6-12 month and 12 month to age at first calving was observed as 5.81%, 2.92 %, 2.06 %, 1.75 % and 5.01 % respectively (Sahai and Kumar, 2014). In Bangladesh, the average, female cattle (55.71%) were found to die more than males (44.29%). Mortality was more in crossbred cattle than in indigenous breed (Hossain *et al.*, 2014)

### **Prevention of mortality in cattle**

Reduction in mortality is the first target of dairy farm management, for this It is important to keep mortality and morbidity records to help identify possible causes their prevention and control. If mortality is high, it is also important to conduct post-mortems and record the results. Prevention and control of livestock diseases lead to lower morbidity as well as mortality. Proper breeding and feeding management, hygienic conditions of farm, prevention against adverse weather conditions through housing modification and cooling, proper exercise of animals, movement restrictions and quarantines when animals are added to the herd. Disease management include testing and screening, veterinary services and vaccination.

### **Conclusion**

Disposal of cattle can happen before age at first calving and after age at first calving. Disposal of animals due to health and breeding problems, reproductive disorders, teat and udder problems, stunted growth and age or parity of cow to reduce mortality by improving disease resistance of animals. Early culling helps in avoiding future costs to farmers and breeders. The genetic improvement in the herd to maintain a high level of herd performance involves not only timely removal of cull animals from the herd, but also proper selection that improves profitability and milk production in the herd.



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