# Impact of culling cows as per livestock breeding policy

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In kerala Cattle breeding policy 1994 was replaced by Livestock breeding policy 1998. In this article, the new clause under (6.1.7) on elimination of genetically poor stock is discussed. "A large variation between animals will be there for characters controlled by quantitative genes. All through the years genetic improvement in the population was attempted only through introduction of superior germplasm from outside sources and selection among males used in AI programme.The culling and elimination of poor milk producers owned by millions of farmers were never attempted. It is needless to mention that substantial gains both in genetic and economic terms can be obtained by culling and elimination of poor milk producers and reproducers. As such the committee recommends to cull 2% of Sunandini population for poor milk production and 1% for delayed calving age adequately compensating the owners. Government will draw up a suitable programme to this effect."

The contention is that female selection from which substantial gain expected is overdue. Culling based on two traits -milk production and age at first calving- is to be undertaken.

It is stated in the breeding policy 1998 that Kerala has 17.96 lakhs cows with an average daily production of 6.5 lit./day (quick estimate 1996) and an age at first calving of 39.6 months.

Culling is for the genetically poor females. Some questions naturally arise.

1. Is it possible to identify whether the poor performance -milk production /age at first calving -is due to genetic make up or due to environment?

Can the contribution of (1) inadequate feeding and management (2) Diseases and (3) Stress the crossbreds experience in the hot humid climate,towards poor phenotype be quantified ?If the performance is high it is due to a good genotype and an optimum environment. But when the performance is low it could be due to a poor genotype or a good genotype denied of an optimum environment. So identifying poor genotypes for culling is not practical under field conditions .

2. What is the basis of culling for milk yield ? Is it 305 day milk production or production/day? If daily milk production is the criterion then at what stage of lactation?

3. What are the minimum standards for culling for milk production ? Heifers not conceiving to what age are to be culled ?

4. In a situation where recording system does not exist for the 'cows with millions of farmers' is it possible to find out the production and reproduction performance of individual cows ?

**Now imagine a dairy situation with**

(a) similar managemental conditions with different farmers,

(b) a perfect recording system and

© availability of records on milk production and

age at first calving for all the cows in the State.

Let us examine the impact of culling 2% for milk production on genetic improvement .

**Genetic improvement depends on 3 components**

Viz 1) Intensity of selection - depends on the proportion of animals selected.-With fewer individuals selected, the intensity is more and vice versa-

2)Phenotypic variance-Phenotypic standard deviation is the square root of Variance-

3)Heritability -the proportion of additive genetic variance in the total observed variance-

Response ® =intensity of selection(i) X Phenotypic standard deviation P X heritability ($h^2$)

Intensity of selection* is. 0.0498 with 2% culling which means 98% selection

2.44 with 2% selection ie 98% culling.

As female contribution is half and selcction of only female is considered here the response becomes half. So 0.5 is used in the formula.

Assuming phenotypic standard deviation of 300 kg for 305 day milk production and a heritability of 20 % ,the response of selection for 305 day milk yield would be

R =0.5 X 0.0498 X 300 X 0.2 =1.49 kg milk.

This response is in one generation. What is the generation interval for cows? Approximately 5 years (this is not age at first calving, but the average age at which progenies are born ). So the annual improvement in milk yield from the two percent culling of females is 0.298 kg in 305 days lactation!! **The genetic gain would be zero** and not even 1.49 kg milk for 305 days milk production in 5 year interval as this estimate is based on perfect recording of the performance of cows under similar managemental conditions making comparisons valid . But this situation is non existing.

The response from selection for age at first calving is still poorer.

**Now look into the compensations to be paid.**

Kerala has 18 lakhs breedable cows. 2% of these cows comes to 36,000.

Compensation @Rs.10,000 comes up to Rs.36 crores

If another 1% culled on the basis of age at first calving another 18 crores of rupees totaling to 54 crores.

So what would be the final outcome of the female culling envisaged in clause 6.1.7?

*Statistical tables on normal frequency distribution are used to estimate.*

*Note: Had Dr. M.K. Rao, Head, SRC, NDRI, Bangalore and the author seen the draft, probably the inclusion of this clause could have been avoided.*

*continued from 18*

**Conclusion:**

Adoption of modern technologies and rapid access to genetic information has made many countries to increase their milk production and to increase efficiency of their dairy cows. The global dominance of US Holsteins has made them to have progenies in different parts of the world. But all the importing countries are carefully applying the US Holstein genetics. India has made the mark as highest milk producer in world but still long way to go in genetic improvement of dairy cattle to stand on par with USA or Israel.

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