

Cross breeding and Milk Production in Kerala

C.Ibraheemkutty

How Economic is Milk Production in Kerala Situation?

Introduction

Kerala is proud to have two major achievements in milk production sector within a short span of three decades. They are, a ten fold rise in total milk production and conversion of more than two out of three of its cattle herd into cross breeds with high genetic potential for milk production. There are no recent reports on the economic aspects of milk production in the state and is vital especially in the present context that considerable proportion of milk consumed in the state comes from nearby states indicating heavy demand, while there has evinced a decrease in enthusiasm for cattle production from the part of farmers, as reflected by the decline in cattle population (1996 census) , even though there are multifaceted promotion efforts for the same.

Economic analysis

Cost analysis of any economic activity involves consideration of direct, indirect and opportunity cost incurred for the activity. Direct cost means cost incurred on items directly involved in the production process (eg: feed cost), while indirect cost includes the expenses on items which indirectly support the production system (eg: depreciation). Opportunity cost or time cost is the cost of time utilized for the activity which means if the farmer was not involved in milk production activity, he would have spent that time for some other productive activity, and generated some income. Hence loss of such income for milk production forms the opportunity cost of milk production. Thus cost of milk production should include the opportunity cost of person and other resources like land involved in it.

Depending upon the type of person, employment situation and many other factors opportunity cost varies, but never it will be zero. However none of our project proposals take into account this component

of cost, hence fails at analysis of real economic gain. Thus most of our proposals highly profitable in reports, end up quite disappointing upon performance. With this background and in order to explore the reasons for the recent set back in cattle production, an attempt was made to analyse the real economic aspects of milk production in the prevailing situations of Kerala.

Methodology

Direct, indirect and opportunity cost of production on different components needed for establishment and maintenance of various levels of milk production are calculated for single cow dairy units. General assumptions used for calculations includes:-

- 1) Cow belongs to cross bred as recommended for the state.
- 2) Scientific management is assured as per package of practices recommendations for CB cattle in the state.
- 3) Optimum performance is expected for production and reproduction since management offered is ideal.
- 4) Price of each item is arrived at prevailing rates on yearly average basis as obtained from Kozhikode district.
- 5) Price calculation is as on today (inflation is not accounted)
- 6) Cost of shed construction and labour for single cow unit is arrived based on average for production units with few cows . Details of calculation for each component items and related assumptions are given below.
 - a) CAPITAL:- Construction of shed and purchase of cow are taken into consideration. Assumption is that farmer has his own land for shed and surrounding exercise yard and no capital is needed towards land.

Cost of shed for single cow unit (on average basis) =Rs 5000.00

Dr. C.Ibraheemkutty
MVSc., MPH
Assistant Professor-KAU
Regional Cattle Infertility
Research Centre,
Velimadukunnu-
Kozhikode 12.

Cost of purchasing cow varies with level of yield and is arrived at Rs 1000 per litre of daily milk yield.

b) INCOME:- Sale of milk and dung alone are taken into consideration. For dung an yearly sum of Rs 1500 is taken being the cost of 1.5 tonnes of dried dung at Re. 1 per Kg. Price of milk is calculated based on prevailing average rates given on Fat& SNF basis ie; 10-12 per litre. In order to account the higher price of private sale, Rs 12 per litre is used for the calculation.

c) FEED COST:- Ration is calculated based on the standard given as

1) Maintenance allowance-1Kg per day for 365 days

2) Production allowance based on level of production at the rate of 1Kg feed for every 3 litres of milk produced (for 300 days)

3) Pregnancy allowance - 1Kg extra feed for last 6 months of gestation price of feed is taken @ Rs. 7/- per kg.

d) Foder cost : Cost of purchasing fodder and/or cultivating fodder is taken at similar rates since there are limitations for land availability and land under fodder cultivation. Seasonal availability of grazing lads reduce the fodder cost, but the yearly average figure is rather high due to the scarcity and high cost of other seasons. Fodder requirement is as per recommendations and the price is calculated as Rs 30 per day (30 Kg green fodder at Re. 1 per Kg or 3 Kg paddy straw at Rs 10 per Kg) for 365 days. (Cost of fodder can be easily arrived as direct cost if purchased, opportunity cost if collected from natural pastures, direct, indirect and opportunity cost if cultivated by the owner while it is free of cost, if the animal grazes on natural pastures).

e) LABOUR COST:- It is direct cost if employ labourers and opportunity cost if owner himself provides the labour. Labour cost is arrived on average basis as Rs 30 per day per cow for 365 days (The criteria for the figure is that for managing, cleaning, feeding, milking and other routine and special

management of 10 cows, round the clock, round the year, 2 labourers are needed and are paid at Rs 150 per day).

f) BREEDING COST:- Arrived based on the average of 2 services per conception. The cost of service is taken as Rs 100 and each additional service creates economic loss equivalent to Rs 400 due to loss of economic production days and additional breeding cost, thus making the breeding cost Rs. 500 for the normal rate of conception.

g) The cost towards veterinary services increases as yield becomes high. Hence an amount of Rs. 800/- to Rs. 1200/- per year is allotted for different levels of production.

h) Depreciation of capital :-For building and the animal, the depreciation is taken at a uniform rate of 10% per year. This includes maintenance, cost of building, and decrease in value of cow due to age.

i) CONSUMABLES:- Towards water, electricity, rope, equipments, reagents and so on, an amount of Rs 1500 is allotted for one year.

j) OTHERS:- Miscellaneous and unforeseen expenses are accounted by providing an allotment of Rs 260 to 330 with increments according to the level of production.

Limitations

1) Not based on original data - More theoretical orientation.

2) Opportunity cost varies with size of production unit.

3) Optimum performance cannot be expected in the field situations.

4) Cost varies widely with type of managerial practices

Results & Discussions

Capital requirement, total income, production cost arrived based on feed, fodder, labour, breeding cost, veterinary services, consumables, depreciation of capital and other items, and net financial benefit for cows yielding milk at 5-15 litres per day during 300 day lactation period are shown in Table 1. At the level of 10 litres

Table 1: Expenditure and Income details for different levels of average daily milk yield.

Sl. Item	Average daily milk yield in litres										
	5	6	7	8	9	10	11	12	13	14	15
Capital											
1 Cow Shed	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
2 Price of Cow	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
3 Total income	10000	11000	12000	13000	14000	15000	16000	17000	18000	19000	20000
Income											
4 Sale of milk	18000	21600	25200	28800	32400	36000	39600	43200	46800	50400	54000
5 Dung	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
6 Total Expenditure	19500	23100	26700	30300	33900	37500	41100	44700	48300	51900	55500
Expenditure											
7 Feed (milk) kgs	500	600	700	800	900	1000	1100	1200	1300	1400	1500
8 Other allo	545	545	545	545	545	545	545	545	545	545	545
9 Total (kgs)	1045	1145	1245	1345	1445	1545	1645	1745	1845	1945	2045
10 Feed cost Rs	7315	8015	8715	9415	10115	10815	11515	12215	12915	13615	14315
11 Fodder cost	10950	10950	10950	10950	10950	10950	10950	10950	10950	10950	10950
12 Labour cost	9125	9125	9125	9125	10950	10950	10950	10950	12775	12775	12775
13 Breeding	500	500	500	500	500	500	500	500	500	500	500
14 Vety. Serv	800	800	800	800	1000	1000	1000	1000	1200	1200	1200
15 Consumables	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
16 Depreciation	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
17 Others	260	265	270	275	280	285	290	300	310	320	330
18 Total cost	31450	32255	33060	33865	36695	37500	38305	39115	41950	42760	43570
19 Profit/Loss	(-)	(-)	(-)	(-)	(-)		(+)	(+)	(+)	(+)	(+)
	11950	9155	6360	3565	2795	BEP	2795	5585	6350	9140	11930

per day yield there is no loss or no profit out of this production system and can be considered as the break even point of production. All farmers rearing animals yielding less than 10 liters per day (lactation

average) suffers financial loss and for the production to be profitable, lactation average of daily yield should be more than 10 litres. It is really striking that average productivity of cross bred cattle in the state is around 5.6

Figure 1. Lactation curve for a cross bred cow having average yield of 10 litres per day in 305 days

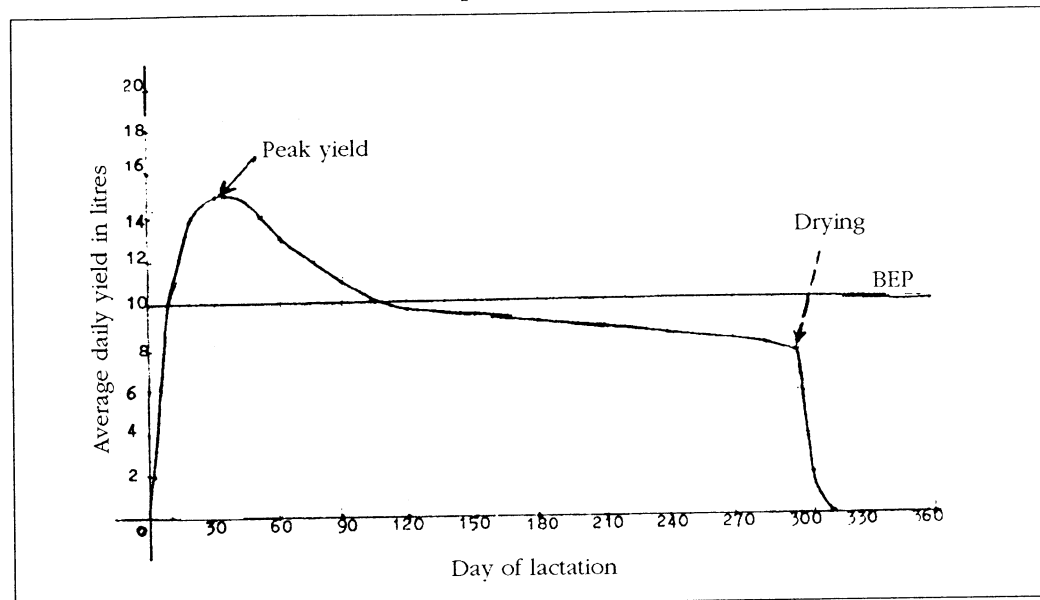


Table 2. A pattern of milk yield for a cow producing 10 litres/day

Stage of lactation (days)	No. of days	Av. daily yield	Total yield
5-10	5	8 litres	40 litres
10-35	25	14litres	350litres
35-60	25	14litres	350litres
60-90	30	12litres	360litres
90-120	30	10litres	300litres
120-270	150	9litres	1350litres
270-300	30	8litres	240litres
300-305	5	4litres	20litres
Total	300		3010 litres

Average=10.03 litres/day

lites thus most of the farmers produce below the break even point and suffers financial loss of around rupees 10, 000 per year.

Lactation curve of a cow producing milk at break even point of production is shown in Figure 1. and the corresponding pattern of milk yield during the lactation period is shown in table 2. It is obvious that in order to maintain average lactation yield at 10 litres per day, the cow must produce upto 15 litres per day during the period of peak milk yield, maintain 14 litres and above for 1 month and above 10 litres per day for 3-4 months

of lactation. Proportion of cows with similar pattern of production is very very small under the field conditions indicating huge economic loss.

Since the figures presented in Table 1 has been arrived on the assumptions of optimum production and reproductive performance, which is often not the reality even under ideal management, poorer managerial standards can further aggravate the economic situation. Death of the animal if happen, can be compensated through insurance, however decrease of loss of

productivity due to diseases, extra cost of treatment, infertility and consequent economic loss- all makes the production more and more uneconomical. Thus results of these calculations, though approximate assessments, will be enlightening regarding how economic is milk production in the prevailing situations of Kerala and automatically answer why there is growing disinterest for farmers in this sector even though there is heavy demand for milk.

Major items of cost being feed, fodder and labour, attempts to make the production profitable should concentrate on those items. There are many limitations on reducing the cost for concentrate feed. However modern nutritional principles will be of some use. Labour cost arrived is mainly based on opportunity cost and in the present labour and employment situation of Kerala. Labour cost also cannot be reduced much. Depending upon the availability of natural pastures such as agricultural fields and forest lands for grazing, cost on fodder can be reduced to certain extent. But there are restrictions like seasonal nature, shrinking land availability, ban on grazing in forests, use of insecticides and pesticides, disease problems so on.

Under the present and anticipated future situations of land, feed and other resources, there are two possible avenues to make milk production sector profitable, and attractive by its own in the state. They are rearing animals having yield above the break even point. This will not be a practical policy in the agro-geo-climatic conditions of Kerala. More practical solution will be to rear more sturdy, resistant cows having wide adaptability to different and even inferior management so as to reduce overall management cost, and thus to reduce the break even point of production so that the production will become economic, attractive and thus promote milk productive sector.

SUMMARY

Economic gain for different levels of milk production has been calculated considering the situations in Kerala. Breakeven point

of production is 10 litres per day and majority of farmers appear to be suffering huge loss, though not apparent. The possible solutions will be to rear animals which does not require costly management so as to reduce the break even point of production so that production will become profitable.

Fate of Cross Breeding - Better or Bitter?

Cost effectiveness, eco-friendliness and thus sustainability being the prime considerations for any of the developmental programmes, the question is very significant and time relevant. ie; are the benefits of cross breeding programme sustainable?. Setting aside our routine claims regarding achievements of cross breeding primafacia the simplest answer would be another question- Have we really achieved anything out of cross breeding? Through the intensive efforts over 3 decades, we could convert more than 3/4 of our animals into cross bred, recording 10 fold rise in total milk production in the state.

Incorporation of exotic germplasm enabled the cross-breds to produce more milk (on an average 6 litres per day as against 2 litres daily of local animals). Simultaneously there occurred many fold rise in the cost of milk production ending up in the present state of only less than 6 litres per day though the break even point of milk production has exceeded 10 litres per day. (Daily production level required to maintain a dairy animal at no loss no profit basis) So can we claim this as an achievement of cross breeding programme?

Cost-effectiveness of cross breeding programme for better milk production does not require any more explanation since it is very obvious from the above two figures alone. ie; while every cow requires to produce more than 10 litres of milk per day, the average productivity of our cross-bred cow is around 6 litres only. The economic loss will be more clear if we compare the total governmental and private expenditures, both direct and indirect, with total cattle

heads we have and with the total quantum of milk produced to get the actual cost of milk produced. This figure will be much more higher than what we expect normally. At the same time milk is available at comparatively lower price from the nearby states, which forms a major source of milk for the state even now. Is this type of a production approach really beneficial especially when the entire world is moving towards market based economies and production systems?

Incorporation of exotic germplasm to our native cattle, though has enhanced milk production, resulted in decrease of disease resistance and adaptability to our climate demanding better managerial standards to maintain the high productivity. Ultimate result is that while our native animals were producing around 2 litres of milk per day at little cost, higher productivity of cross bred cows requires a very high level of cost. Though our managerial standards have improved a lot over the years owing to the extension efforts and better technologies, there exists even now wide discrepancy between the management provided and required to exploit the genetic potential of cross bred cows to the maximum level.

Many constraints of cattle production in the state has limited the possibility of further improvement in the managerial standards followed by our farmers. All the above factors ultimately convict the cross breeding programme or shortsightedness of our breeding policy that we have evolved an animal unsuitable for our managerial situations. Increased demand for quality feed, high prevalence of diseases and alarming rise in infertility are the major barriers making profitable milk production from cross bred cattle impossible.

Reverse Natural Selection

Veterinarians in Kerala might have now realised the fact that better productivity of cross bred cattle was the result of heterosis (additive gene effect in the initial generation) and the productivity is decreasing as generation advances.

Wherever a rise in productivity is recorded in the second or subsequent generations, an increased exotic inheritance can be traced compared to that of the first generation. Thus the theoretical solution for further improvement will be to rise the exotic inheritance level, but has been conclusively proved to be of no use for our usual managerial situations. The only way left is scientific selection among cross breeds, limiting the exotic inheritance at the suggested level of 50%. Even though such selection for improving milk productivity is going on for the last many years, improvement we could achieve is meagre. This is attributable to the phenomenon of Reverse selection or natural selection for survival. This means that by nature first priority of any living creature will be to ensure its own survival over any other human interests.

As we know, as the productivity increases disease resistance and adaptability to adverse climate conditions decreases, since more energy is devoted for production processes. Even though we continuously select and breed for high producing animals, natural selection works against, to decrease production so as to ensure better survival. For example, high producing animals are more prone to various diseases and / or infertility, while low producers have a survival advantage and propagate faster. So natural selection process reversing higher productivity for ensuring better adaptability and survival will continue and is sure to overcome and nullify the benefits of cross breeding in due course. This is more so since natural selection principles are strong, time tested, continuous and free from tiredness. Ultimately what we can expect to be the final product of cross breeding will be an animal inferior than our present non-descript animals and that day is not very far off.

Local Non Descript Cattle-The Neglected Resource!!

Our indigenous cattle-which are on the verge of extinction because of our over ambitious

cross breeding programme, are the products of natural selection, through many years. They have been evolved with qualities such as disease resistance, sturdy nature, better utilisation of available feed resources, thus exactly to suit our climate, geography and management practices. Same time being the cause and effect of above mentioned factors, they have slow growth rate, low body weight, slower reproduction and lower production.

Major reason underlying the poor performance of local animals is nothing but inferior management given to them. What I mean to say is that if we can provide the same management as given to cross bred animals, milk production from local animals will be more cost effective than that from cross bred cattle. In other words, though cross bred animals have better genetic potential for higher productivity, because of the inadequacy of management, we are not able to exploit the same. While production cost progresses geometrically due to poor disease resistance and adaptability. While in the case of local animals optimum management is facilitated by many factors as mentioned earlier, to exploit the full genetic potential and thus economic milk production is possible.

Increased production obtained from cross bred animals is attributable to qualities contributed by local animals than the genetic potential improvement. This is further substantiated by the fact that the productivity of cross breeds decreases as the exotic blood level goes up. The lesson we might have learned is that being the climate, geography and macro environment not much alterable, and increasing constraints limits the possibility of assuring optimum managerial standards, it is the adaptability to adverse climatic and managerial conditions, disease resistance and other favourable factors for better survival more important than genetic potential alone for higher production. Once these traits are assured, there is lot of scope for improvement through scientific selection and breeding.

Our indigenous cattle, though we do not have any distinct breeds, have proved their versatile nature over years and will be the only answer for economic milk production in the prevailing and anticipated situations of Kerala. But our shortsighted ambitious programmes are urging to sweep out even the last non-descript animal without realising their importance and promises for a better future. Being the failure of cross breeding policy already started to evince, it is high time to conserve the local germplasm and to start scientific breeding programmes based on it. However there are no such efforts so far (except Vechur cattle scheme of KAU) and local animals are nearing to extinction.

Under these circumstances, we must forecast and sense the future of cross breeding programme, through scientific thoughts and analysis centered around cost effectiveness and eco-friendliness of crossbred animal production, for milk production in an economic way, and to realise whether it is sustainable by its own for long term. Or else how long we will be able to maintain them incurring huge expenses for no actual benefits, but only-economic loss. But there is no time left to debate on whether local animals has to be conserved or not. We have to do it immediately before the last few are swept off, and we can think later. For the time being let our motto for this be the old phrase "Old is gold" and 'All that glitters is not gold.'

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References:

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