

Ration Balancing: Ensuring Pecuniary Dairy Practices

By

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Current Status

Nutrient requirements are the amount of nutrients the animal needs for a specific purpose. They are influenced by many factors, such as weight of animal, sex, desired rate of growth, stage of lactation, environment and others. The nutrient composition of a feed is the amount of specific nutrients contained in the feed, expressed as a percentage of the dry matter.

Whether feeding pregnant cows, growing calves, finishing animals, bulls, or any other class of livestock, it's important to know what the animal's nutrient requirements are and what nutrients they are provided through the feed.

Formulating a ration can help ensure meeting the nutrient requirements of livestock. The first step to a balanced ration is feed testing. This will determine what levels of protein, energy, minerals and other important nutrients are available in the feed one have. Using these feed values and a ration balancing program can assist in setting up a ration for any specific purpose such as pregnancy and lactation.

There has been only modest improvement in the productivity of indigenous cows, crossbreds or buffaloes over the last two decades in India. The average daily milk production data at 6.52 kg for crossbreds, 2.10 kg for indigenous cattle and 4.44 kg for buffaloes (NSSO, 2007) suggests that the productivity of these animals is far below their genetic potential. Added to this, the in-milk animals as a percentage of the total breedable population is also very low, as noted by Basic Animal Husbandry Statistics (BAHS, 2010), which reported that at any one time an average of 46 percent of the total breedable population were dry. This is attributed in part to the deficiency of critical nutrients in the ration. Low productivity of animals with higher genetic potential can be primarily attributed to the imbalanced and inadequate feeding. According to Cunningham (2005), "genetics has created the potential, nutrition has failed to deliver that potential," irrespective of the type of

system practiced.

Imbalanced feeding leads to excess feeding of some nutrients whilst others remain deficient. This not only reduces milk production and increases costs per kg milk, but also affects various physiological functions including long term animal health, fertility and productivity. To ensure improved productivity it is necessary to augment and secure feed resources through short and long term planning.

It is also essential that milk producers feed their animals the nutrients in amounts that match the physiological needs and objective of keeping the animal. Where possible locally available feeds should be used. Since many smallholder farmers do not have the necessary skills and knowledge to prepare balanced rations, this can be achieved through providing ration balancing advisory services direct to the farmer through village based trained local resource persons.

Ration Balancing Program

Kaira District Co-Operative Milk Producers' Union Ltd., the pioneering co-operative dairy of AMUL umbrella, has operations in Anand, Kheda and Mahisagar districts. The major cattle breeds of the region are Gir and HF Cross, whereas non-descript breed is also predominant. As for buffalo, Murrah and non-descript breeds are most commonly found.

The major crops of the area are cotton, pearl millet, pulses, wheat, paddy, maize, sorghum, sugarcane, tobacco, wheat, sorghum, millet, vegetables, oilseeds, spices and condiments. Cattle owners usually feed the crop-residues and by-products of these crops, with seasonal green grass to their animals which only is not enough to fulfill nutrition requirement of the animals. On one side, when improper feeding can lead to deficiencies in vitamins, minerals and overall energy, over feeding will also lead to increased feed cost. With an intention to help the dairy farmers for proper feeding and cost-effective Animal Husbandry, AMUL has actively taken up RBP program since 2015.

Ration Balancing Program (RBP) is an advisory program, to educate the farmers on optimum feeding

As animals kept by smallholder farmers are rarely fed a balanced ration, a program to feed balanced rations to animals of such farmers was launched by National Dairy Development Board (NDDB). With an intention to help the dairy farmers for proper feeding and cost-effective Animal Husbandry, AMUL has actively taken up Ration Balancing Program (RBP) since 2015. RBP is an advisory program, to educate the farmers on optimum feeding of animals for optimizing milk production by efficient utilization of locally available feed resources at the least possible cost.

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Milch animals produce milk commensurate with their genetic potential only when they are fed a nutritionally balanced ration in an amount that provides nutrients to express their genetic potential. As animals kept by smallholder farmers are rarely fed a balanced ration, a program to feed balanced rations to animals of such farmers was launched in India by National Dairy Development Board (NDDB).

Objectives

The major objective behind RBP at Amul dairy was that it would help:

- To improve the productivity and reproductive efficiency by re-appropriating the available feed resources and use of mineral mixture.

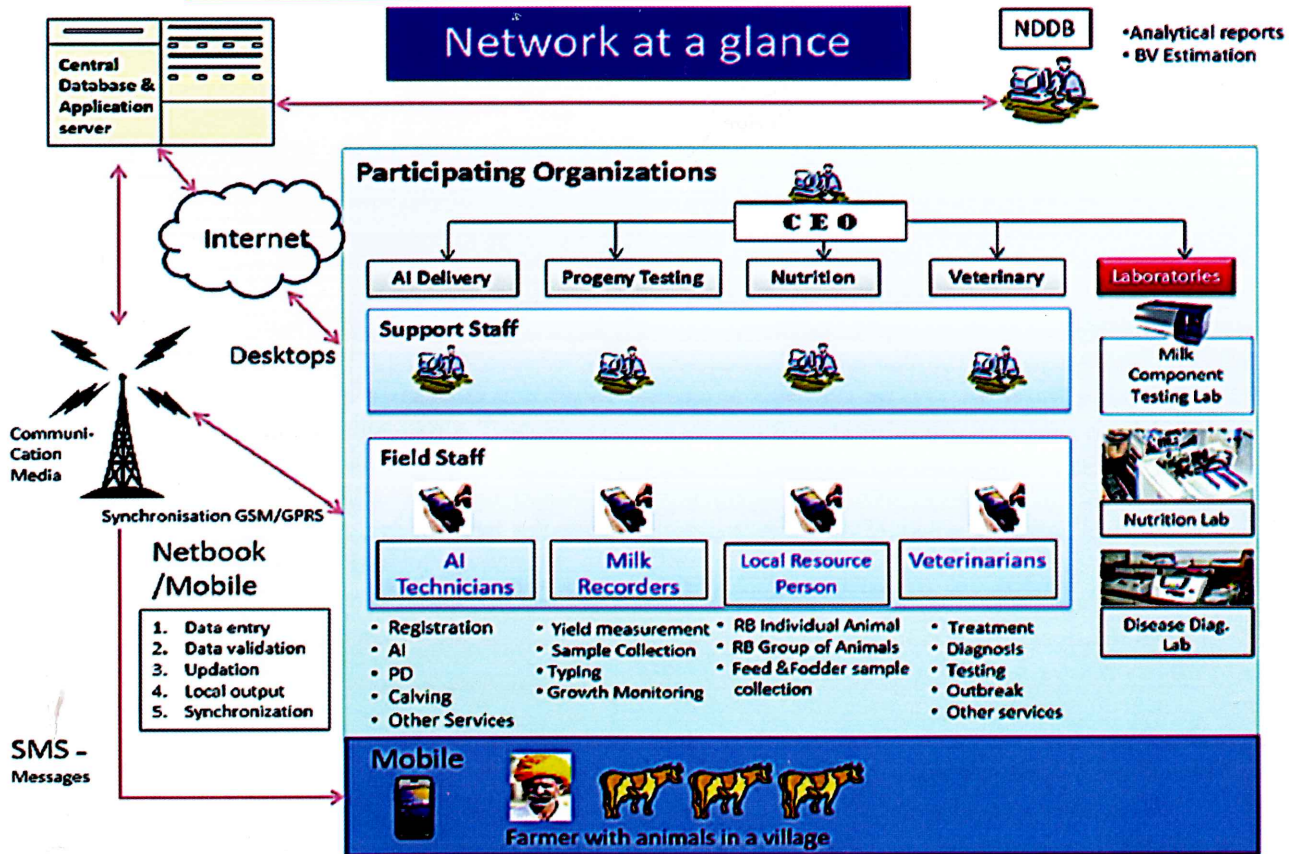
- To bring down the cost of milk production and increasing the net daily income of the farmers.

- To reduce metabolic disorders like milk fever, ketosis and also to reduce the %age of dry animals of total population.

Formulating Rations

A systematic approach will help in ration balancing. First, determine the nutrient requirements of the animal being fed. This means determining the sex, size and production level of the animal. With this information, nutrient requirements are available from a table.

Information Network for Animal Productivity and Health (INAPH) by NDDB



nutrition

The next step is to determine the feeds available for use. List their composition on a dry matter basis from a composition table or a chemical analysis. Now the amounts of the feed necessary to balance the ration can be determined.

The separate parts of feed utilization are treated more closely: digestibility, metabolizable energy (ME) content of the digested energy and the utilization of this ME. It is argued that in lactating cows the ration's ME content can be derived from composition and sheep digestibility data and that the influence on it of feeding level for most rations is moderate and predictable. A survey of most balance trials with lactating cows performed so far in the world — more than 1 000 — shows that 60% of the ME present above the quantity needed for maintenance (117 kcal ME per unit of metabolic weight) was converted into milk and body tissue energy. The efficiency of the ME utilization, both for maintenance and milk production, was slightly higher at higher contents of ME in the ration's gross energy.

Feed shortages notwithstanding, a considerable potential exists to increase production levels across the range of growing, milch and beef animals by addressing the problem of imbalanced nutrition. The limited data on improving milk production efficiency in dairy animals through balanced feeding suggests that there is considerable scope for the enhancement of milk production with the existing feed and animal resources. This can be made possible through the transfer of scientific knowledge, in an easy to use and easy to implement manner to rural milk producers. The ultimate aim is to promote feeding of a balanced ration in sufficient quantities and containing all essential nutrients.

A user friendly software developed by NDDDB for ration balancing, is used by dedicated Local Resource Persons (LRPs), well trained by implementing agencies to effectively use software, in local language. The main objective of RBP is to produce an optimum quantity of milk at the least cost from milch animals by readjusting, wherever required, the proportion of local available dietary feed ingredients, so as to provide them adequate amount of protein, vitamins, minerals as well as energy.

The program comprises a feed data library and various 'Nutrition masters'. Nutrition masters contain information on dry matter requirements, concentrate to forage ratios, and requirements for maintenance, growth, milk production and pregnancy for both cattle and buffaloes. These are developed and loaded onto an Information Network for Animal Productivity and Health (INAPH) by NDDDB.

The LRP advises the milk producer to prepare the least cost ration using feed ingredients in the proportion as indicated by the software. In case there is a change in the feed resources, the LRP formulates the least cost ration through the software. He then revisits the milk producers based on his/their requirements, and keeps record on various observations related to quality and quantity of milk, including cost of milk production before and after the RBP program initiation.



Impact Assessment

The RBP I was rolled out for 2 years and has been extended for another two years whereas, RBP II has been rolled out in year 2017 for two years. A total of 390 villages have been covered under the RBP program, with 200 covered in RBP I and 190 covered in RBP II. A total of 390 LRPs covered 31767 farmers and 41671 animals across the course till date.

An average 0.210 kgs and 0.11% age increase in milk and fat %age per animal has been recorded as an impact of ration balancing in Anand and Kheda district.

The target animals till April'17 were 25,000, against which actual animals covered are a total of 29,584 animals under the project. An average increase of 0.210 Kgs

Success Stories:

Improvement at Sabhasad Level:



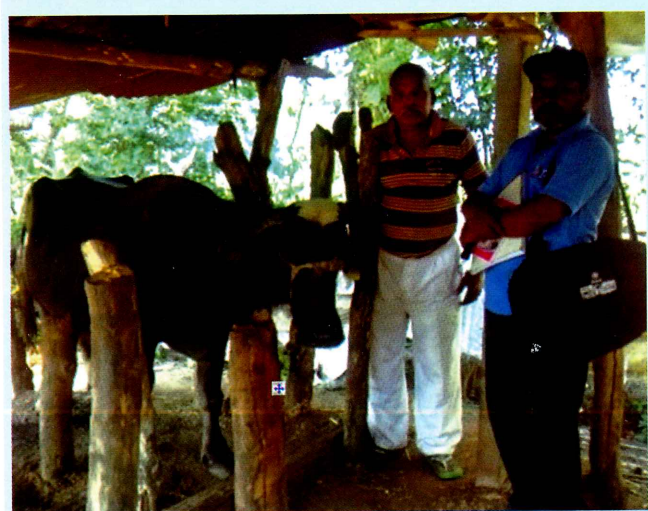
Village: Sanjaya

Ta: Petlad

LRP: ParmarDharmesh F

Farmer:ParmarRamsinhbhaiAmarsinhbhai

	Before RBP	After RBP
Daily Milk Yield (lt/Day)	12	13
Milk Fat %	3.20	4.00
Daily Min. Mix Used (gm)	0	200
Avg. Feed cost/d	156	129



Village: Raghupura

Ta:Nadiad

LRP: VaghelaHitendrabhai G

Farmer:VaghelaNatubhai J

	Before RBP	After RBP
Daily Milk Yield (lt/Day)	09	10
Milk Fat %	5.00	6.00
Daily Min. Mix Used (gm)	0	100

Improvement at Society Level:



Village: Ashipura

Ta:Umreth

LRP: Solanki Pankajbhai J

	Before RBP	After RBP
Daily Milk collected (lt/Day)	1125	1250
Milk Fat %	3.9	4.1
SNF %	8.6	8.8

Table 1: Impact of RBP I & II

RBP	Animals		% of Impact	Avg. Cost per lit			Avg. Ration cost/day			
	Key Performance Indicators	Covered		Under Impact	Before	After	Change	Before	After	Change
RBP-I		25346	19149	75%	18.56	16.11	-2.45	160	139	-21.00
RBP-II		16350	10445	64%	25.07	20.34	-4.73	186.04	150.96	-35.09
Overall		41696	29584	70%	21.81	18.22	-3.6	173.02	145	-28.0
Increase in net daily income (₹/Animal/Day)				38.24						
% cost reduction in Animal ration				16.46						

milk was recorded, which leads to a significant sum of about 1.8 lakh ltrs. per month of additional milk in system:

Avg. increase in milk kg/day X No. of animals under impact = Total additional milk received per day
 0.210 kg X 29,584 = 6212 ltrs per day
 6212 ltrs per day X 30 days = 1,86,379 ltrs per month of additional milk received as an impact of ration balancing.

Benefit from additional milk production to the farmer:

Considering milk rates as ₹ 30/- per ltr, this additional milk received will lead to an additional income of ₹ 55,91,370/-per month at farmer level.

Benefit from reduction in ration cost to the farmer:

Reduction in average ration cost per day of ₹ 28 per animal implies a cost saving in ration of ₹ 2,48,50,560, considering total numbers of animal under impact (29584), and evaluating for 30 days.

The overall impact of RBP can be easily interpreted as shown in Table 1.

Further, as per the studies, feeding balanced rations was estimated to reduce enteric methane emissions by 15-20 percent per kg of milk produced. A study done by NDDDB confirmed an average reduction of 12 and 15 percent methane emissions (g/kg dry matter intake) in lactating cows and buffaloes, respectively.

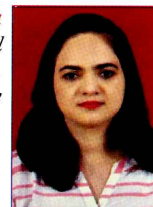
Conclusion

The results achieved till date strongly demonstrate that ration balancing has the potential for improving the overall health and milk production of cattle and buffalo. Large scale and focused implementation of ration balancing program not only helped in increasing milk production and reducing daily feeding cost, but

would also help in curtailing livestock mediated pollutants such as methane in air and nitrogen in manure. We at Amul are committed to uplift the living standards of our member farmers by helping them improve animal productivity at the lowest possible cost, thus making dairying a profitable livelihood proposition.



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