

I N D I A N DAIRYMAN

THE SPIRIT OF THE DAIRY INDUSTRY

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FEEDING

Ration Balancing

BIOTECHNOLOGY

Livestock Improvement

ENVIRONMENT

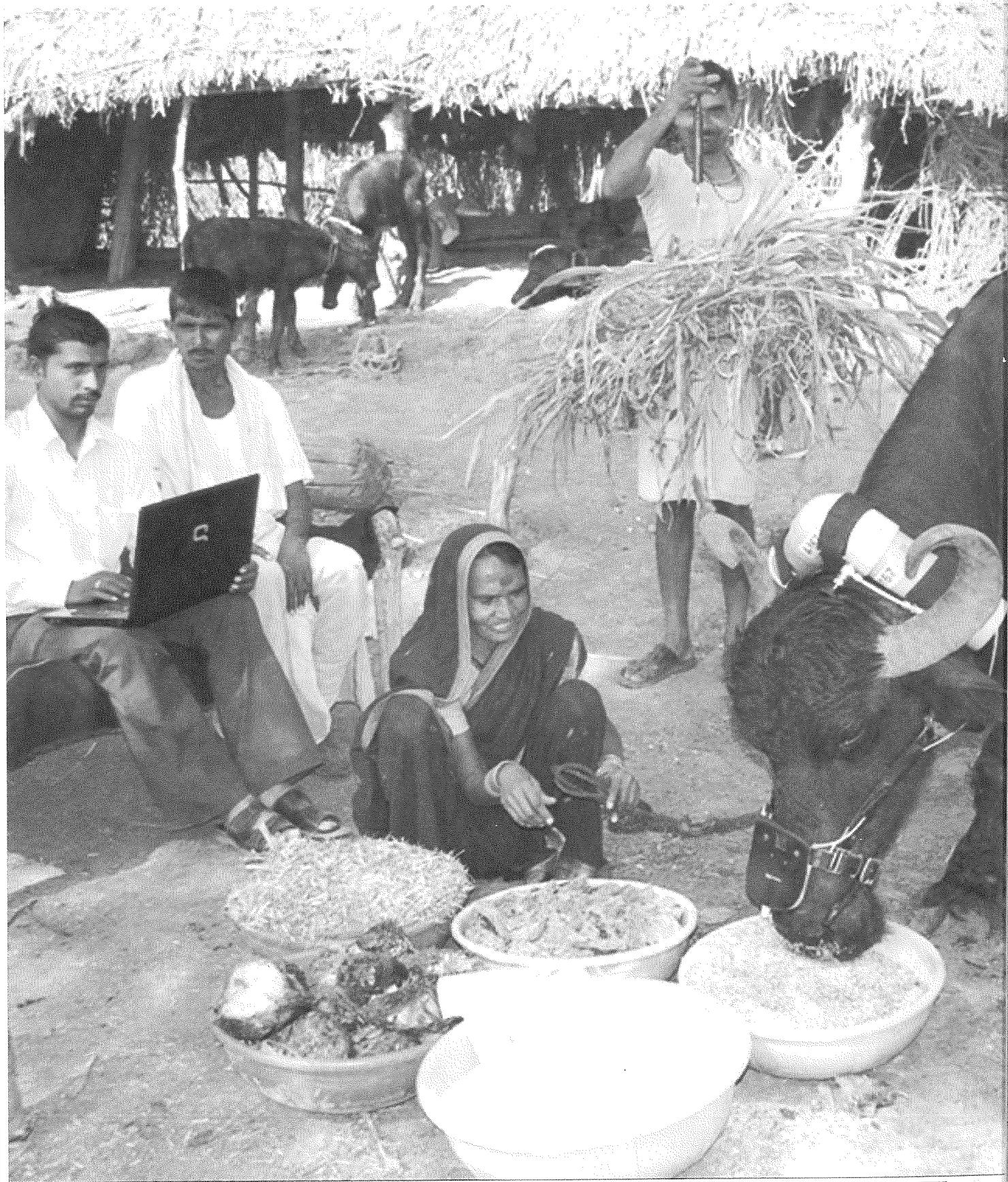
Eco-friendly

Packaging of Dahi



EMPOWERING FARMERS – KEY TO ECONOMIC GROWTH

feeding





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Productivity Enhancement and Methane Emission Reduction through Ration Balancing

Ration balancing is the process of balancing the level of various nutrients for an animal from the available feed resources required for optimum maintenance and production. The Ration Balancing Programme (RBP) tested under field conditions has shown a significant improvement in milk production and reduction in the cost of feeding. This was mainly due to balancing of nutrients, which might have improved microbial protein synthesis and enhanced supply of nutrients for milk production. Moreover, animals fed on an imbalanced ration produce more methane per unit of dry matter intake. Ration balancing has the potential to improve milk production efficiency and reduce methane emission with the increase in net daily income of milk producers.

feeding

In India, most farmers follow traditional feeding practices, causing imbalance of nutrients in terms of energy, protein, minerals and vitamins. Animals fed imbalanced ration not only produce less milk, but also produce more methane per unit of dry matter intake due to reduced efficiency of utilization of organic matter. A pilot ration balancing programme conducted by National Dairy Development Board (NDDB) of India showed improvement in daily milk production by 5 to 10 per cent and reduction in methane emission (g/kg milk yield) by 15 to 20 per cent in cows and buffaloes on balanced ration. Large scale implementation of this programme would help in improving the productivity of milch animals with the available feed resources in an environmentally sustainable manner.

INTRODUCTION

The average daily milk production of our animals is very low, being 6.52 kg for crossbreds, 2.09 kg for indigenous cattle and 4.44 kg for buffaloes (NSSO, 2007). It is mainly due to the fact that most often the ration of our animals is imbalanced in nutrients. Considering the future growth in annual income and human population, it is estimated that the demand for milk by the year 2022 would be more than 200 million tonnes. To reach this level of production, it would be necessary to improve milk production efficiency of our animals through balanced feeding in an environmentally sustainable manner.

IMPORTANCE OF FEEDING BALANCED RATION

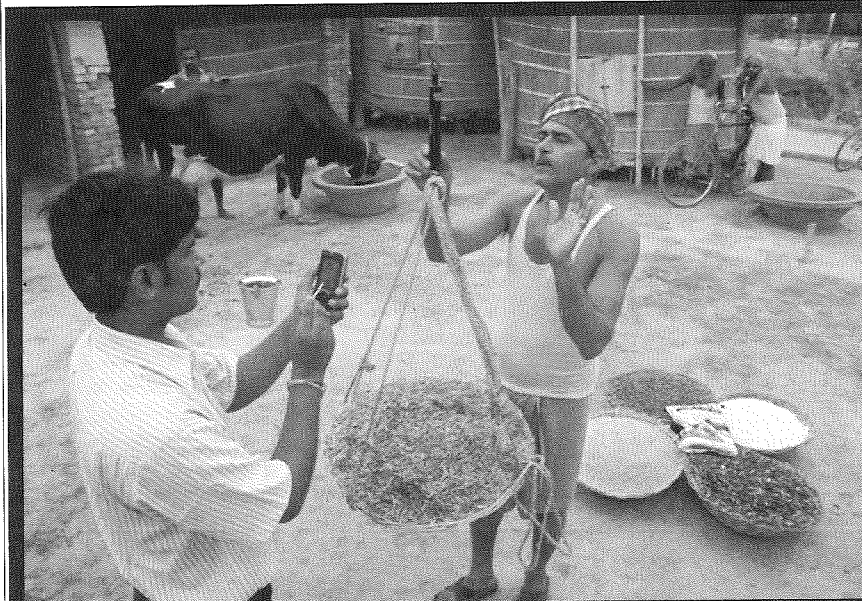
The ration offered to animals by the farmers in our country usually comprises only one or two locally available

concentrate feed ingredients, besides grasses and crop residues. This leads to imbalanced feeding which means that proteins, energy, minerals and vitamins in the ration are either more or less. Imbalanced feeding adversely affects not just productivity but also animals' health. Therefore, milk producers need to understand the implications of imbalanced feeding and recognize the importance of giving a balanced ration to their animals. In this direction National Dairy Development Board (NDDB) of India has made a dent through its ration balancing programme (RBP) under field conditions.

What is Ration Balancing Programme?

Ration balancing is the process to balance the level of various nutrients for an animal from the available feed resources in order to meet its nutrient requirements for maintenance and production. NDDB has developed an Information Network for Animal Productivity and Health (INAPH); windows based internet linked application, to assess the prevailing nutrient status of animals against the requirements and to work out a least cost ration with the available feed resources, which includes mineral mixture. The software is user friendly. The application can also be used on Personal Digital Assistants (PDAs) for areas devoid of internet connectivity. The Local Resource Person (LRP) is trained to efficiently use the software in the local language and least cost rations for different categories of animals can be worked out using the following steps:

- Assessing nutrient requirement of animals, for a particular level of milk production, milk fat per cent, pregnancy status etc.
- Nutrient status of animals with the prevailing feeding practices.



Ration balancing is an important aspect to successful feeding management of a dairy herd. NDDB's National Dairy Plan (NDP-I) aims at increasing productivity of milch animals by implementing ration balancing advisory services in about 40,000 villages spread over 14 major milk producing states. It would cover about 2.7 million milch animals by 2016-17.



Computing a balanced ration through Personal Digital Assistant (PDA)

- Formulating a least cost ration using the available feed resources.

RBP under the National Dairy Plan-I

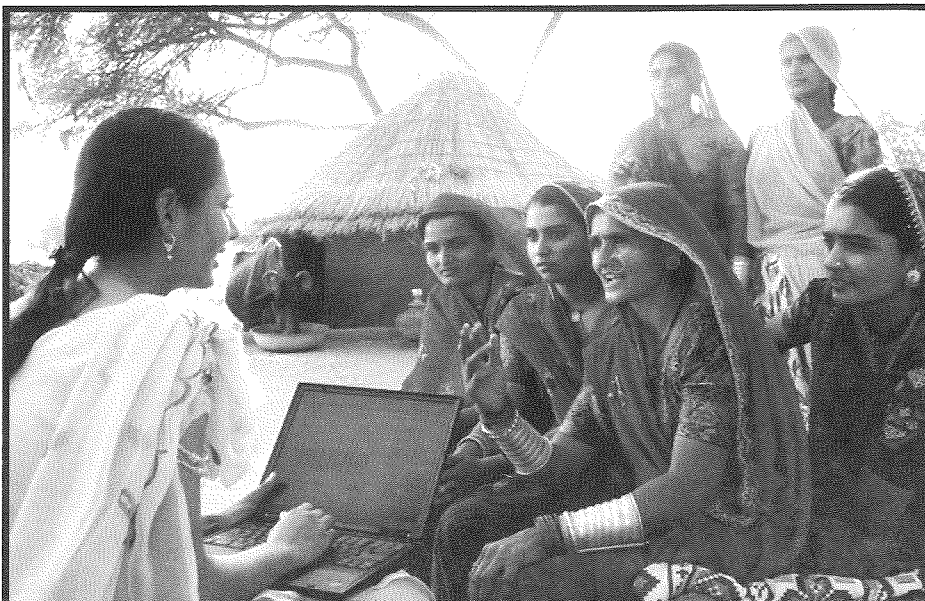
NDDDB's National Dairy Plan (NDP-I) aims at increasing productivity of milch animals by implementing ration balancing advisory services in about 40,000 villages spread over 14 major milk producing states, covering about 2.7 million milch animal by 2016-17. The multi-state ration balancing programme will be implemented on a larger scale through various implementing agencies such as dairy cooperatives, service providing organizations, State Animal Husbandry departments, Producer Companies and NGOs.

A Case Study Implementation of RBP

The RBP is now being implemented in Banaskantha district of Northern Gujarat on 6000 animals in 90 villages. On feeding a balanced ration, there was improvement in daily milk production and reduction in feeding cost per kg of milk. The average daily profitability per animal increased by ₹ 22.82, by way of increase in milk yield, fat per cent and/or reduction in cost of feeding.

EFFECT OF RBP ON MILK PRODUCTION

The RBP tested under field conditions showed a significant ($P < 0.01$) improvement in milk production efficiency in lactating animals. Milk production efficiency of fat corrected milk (FCM kg/kg DMI) of buffaloes ($n=1025$) before and after ration balancing was 0.53 and 0.66, respectively. Similarly, in cows ($n=540$), milk production efficiency (FCM kg/kg DMI) was 0.58 and 0.78 before and after balancing the ration respectively (Garg, 2011). On feeding balanced ration, there was reduction in cost of milk production from ₹ 0.25 to ₹ 2.00 per kg. The increase in daily milk yield is seen from 0.2 to 1.0 kg and milk fat per cent from 0.2 to 0.6. Increase in net daily income is from ₹ 8 to ₹ 26 per animal (Garg *et al*, 2009; Kannan and Garg, 2009; Kannan *et al*, 2010). Significant improvement in milk production and reduction in cost of feeding was mainly due to balancing of nutrients, which might have improved microbial protein synthesis and enhanced supply of nutrients for milk production (Dutta *et al*, 2010; Khochare *et al*, 2010).



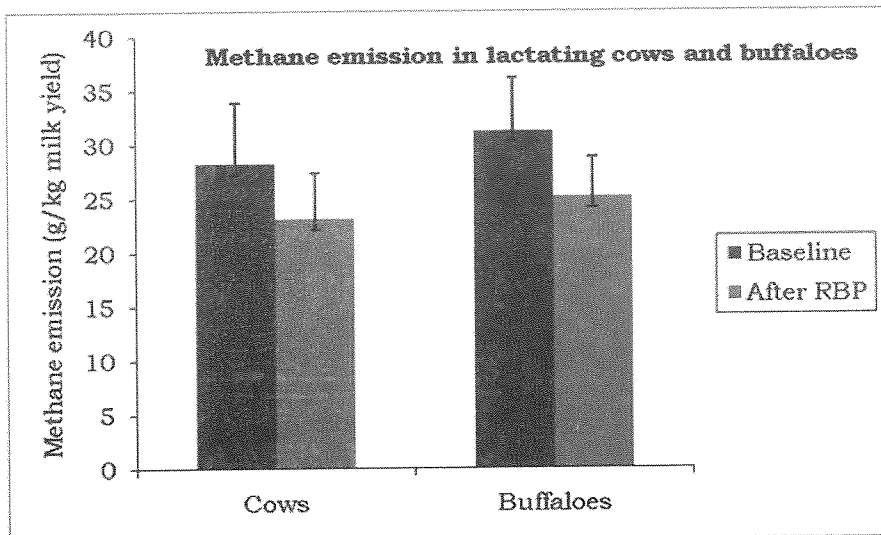
➤ *Ration balancing is an important aspect to successful feeding management of a dairy herd. The best information on feeding and animal profile makes balancing a ration more realistic and ensures better animal performance in an environmentally sustainable manner.*

EFFECT ON METHANE PRODUCTION

Methane is a potent greenhouse gas having global warming potential 25 times that of CO₂ and 11 years of half life in atmosphere. According to the latest report of the Indian Network for Climate Change Assessment (INCCA, 2010), of the total methane emitted by all sectors in India, about 50 per cent is contributed by livestock alone. Ruminant animals loose 4-12% of gross energy intake in the form of methane, which is not only detrimental to environment but also results in energy loss to animals.

Animals fed on imbalanced ration produce more methane per unit of dry matter intake due to lower microbial protein production and higher acetate production, the main substrate for methane production. Methane emission measurements in animals fed balanced ration under field conditions was measured using sulfur hexafluoride (SF₆) tracer technique (Johnson *et al*, 1994). About 30 animals were selected for each study, mostly in the early stage of lactation with daily milk yield in the range 8-12 kg.

Studies conducted in the states of Gujarat, Uttar Pradesh, Andhra Pradesh and Maharashtra indicated that feeding balanced ration reduced methane emission by 15-20 per cent in lactating cows and buffaloes (IDF, 2011; Kannan *et al*, 2010; Kannan *et al*, 2011). The reduction in the methane emission is attributed to the balancing of nutrients, which might have changed rumen



fermentation pattern towards more microbial cell production and lower acetate and butyrate production.

CONCLUSION

Ration balancing has the potential to improve milk production efficiency and reduce methane emission with the increase in net daily income of milk producers. Thus, large scale implementation of this programme can help in improving the productivity of milch animals in an environmentally sustainable manner.

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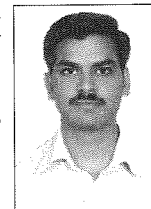
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