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Enhancing Milk Productivity of Dairy Cattle and Buffaloes in Uttarakhand through Scientific Feeding and Management Practices

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INTRODUCTION

In the villages of Uttarakhand, a cow or buffalo is far more than a farm animal. It supplies milk for the family, manure for terrace fields and a small but steady cash income for households that have few other options. The state produced about 18.98 lakh tonnes of milk in 2023-24 (Ministry of Fisheries, Animal Husbandry and Dairying [MoFAHD], n.d.), yet the output of each animal remains low. Native hill cattle such as the Badri cow yield only about 1.6 litres a day (Joshi et al., 2018), while well-fed crossbred cows in the Terai plains can give 15 to 25 litres.

The gap between what animals can produce and what they actually produce is largely a gap in feeding and care. Poor quality and inadequate fodder alone account for about half of the productivity loss in the state's livestock sector (Uttarakhand Gramya Vikas Samiti [UGVS], 2024). The good news is that most of this loss can be recovered with simple, low-cost scientific practices that any farmer can adopt.



Figure 1: A hill cow grazing on terraced land in Uttarakhand. Small, hardy hill cattle survive on forest grasses and tree leaves but give little milk without supplementary feeding.

The Fodder Problem in the Hills

Hill farmers depend heavily on forests, grasslands and crop residues. Nearly half the fodder supply in the hills comes from forest resources, and green fodder is plentiful mainly during the monsoon (UGVS, 2024). In winter and summer, animals often survive on dry straw and oak leaves, and milk yield drops sharply. The state needs about 251.7 lakh tonnes of fodder every year but has only about 143 lakh tonnes of green and dry fodder combined (UGVS, 2024).

The situation is getting harder. In Chamoli district, overall fodder availability has fallen by 37% since 1990, the daily time spent collecting fodder has doubled to over four hours, and periods of acute shortage now last nearly five months a year (Kumar et al., 2026). This burden falls mostly on women, who carry heavy loads of grass and leaves over steep slopes.

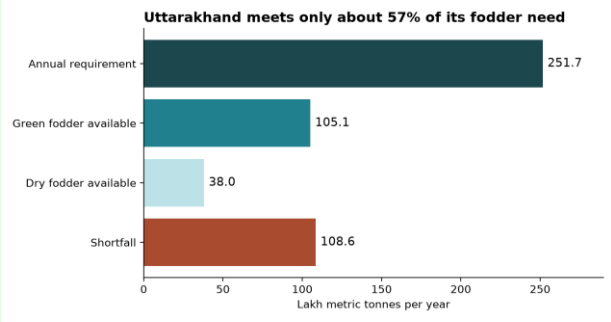


Figure 2: Annual fodder requirement and availability in Uttarakhand. Green and dry fodder together cover only about 57% of the need. Data: UGVS (2024), citing Uttarakhand Livestock Development Board

Scientific Feeding Practices

Feed a balanced ration

A balanced ration supplies the right amounts of energy, protein, minerals and vitamins for an animal's body weight, milk yield and stage of pregnancy. Feed makes up about 70% of the cost of producing milk, so feeding correctly is the single biggest lever a dairy farmer has (National Dairy Development Board [NDDB], n.d.-b). Under NDDB's Ration Balancing Programme, which covered 28.65 lakh animals across 18 states, farmers saw higher milk yield and fat content while their feed cost fell by Rs 2.30 per kg of milk (NDDB, n.d.-a). Large field trials have recorded milk yield gains of 2 to 14% and ration cost savings of 5 to 11% (Garg et al., 2013). Farmers can now get these recommendations through the free 'Pashu Poshan' mobile app.

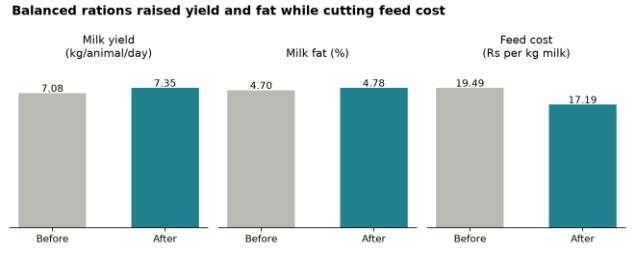


Figure 3: Average results before and after balanced feeding under NDDB's Ration Balancing Programme. Yield and fat rose while feed cost per kg of milk fell by about 12%. Data: NDDB (n.d.-a)

Simple thumb rules for daily feeding

Extension scientists recommend a few easy rules (Indian Council of Agricultural Research – Central Research Institute for Dryland Agriculture [ICAR-CRIDA], n.d.; Tamil Nadu Agricultural University [TNAU], n.d.):

- **Maintenance:** about 1 kg of concentrate a day for a desi cow and 1.5 to 2 kg for a crossbred cow or buffalo.
- **Milk production:** an extra 1 kg of concentrate for every 2.5 litres of cow milk, or every 2 litres of buffalo milk.
- **Pregnancy:** an extra 1.5 kg of concentrate a day in the last two months of pregnancy.
- **Minerals and salt:** 30 to 50 g of area-specific mineral mixture and about 30 g of common salt every day.
- **Water:** clean drinking water at all times; a milking animal needs 4 to 6 litres for each kg of dry feed eaten (Food and Agriculture Organization [FAO], n.d.).



Figure 4: A Murrah buffalo. High-yielding buffaloes need about 1 kg of concentrate for every 2 litres of milk, in addition to good roughage.

Grow and conserve your own fodder

Home-grown fodder is the cheapest feed. Farmers can plant hybrid Napier and other perennial grasses on terrace risers and field bunds, grow oats and berseem on winter terraces, and plant fodder trees such as bhimal (Grewia optiva) and oak. In the Thouldar area, supplying improved fodder seed, year-round cropping plans, mineral mixture and deworming together improved productive and reproductive performance of animals by 30 to 45% ("Livestock Interventions," 2017). Extra monsoon grass should be dried as hay or packed into silage bags so that animals are fed well in the lean months.

Hill farmers should also plan ahead for winter. Roads in higher districts can close for weeks during landslides and snowfall, so storing a month or more of concentrate, hay and mineral mixture before the cold season prevents sudden drops in milk yield. Chaffing straw and soaking it, or treating it with urea under expert guidance, also makes poor roughage more palatable and nutritious.



Figure 5: Napier grass (Cenchrus purpureus) growing on field edges. This perennial grass can be cut several times a year and suits field bunds and terrace risers.

Sound Management Practices

Feeding alone will not raise yields if animals are sick, stressed or not calving regularly. Farmers should follow these practices:

- **Breeding:** use artificial insemination with semen from proven bulls, and aim for one calf every 13 to 14 months by detecting heat on time.
- **Health:** vaccinate against foot-and-mouth disease and haemorrhagic septicaemia, and deworm every three to four months.
- **Housing:** keep sheds dry, well-ventilated and protected from cold winds, with a sloping floor for drainage.
- **Clean milking:** wash hands and udders, milk quickly with full hand, and dip teats after milking to prevent mastitis.
- **Calf care:** feed colostrum within the first hour of birth, as healthy calves become the next productive herd.
- **Records and cooperatives:** keep simple records of milk, breeding and treatment, and sell through village dairy cooperatives for a fair, regular price.



Figure 6: Hygienic hand milking in an open shed while the cow eats concentrate. Clean hands, a clean udder and a calm animal give more milk and better quality.

CONCLUSION

Uttarakhand's dairy animals are not producing at their potential because they are underfed for much of the year and their health and breeding are often neglected. Balanced rations, home-grown and conserved fodder, mineral supplements, timely breeding, vaccination and clean milking can each add a little milk; together they can transform the income of a hill household. With support from veterinary services, Krishi Vigyan Kendras and dairy cooperatives, every farmer can get more milk from the same animal at a lower cost.

REFERENCES

Food and Agriculture Organization. (n.d.). Small-scale dairy farming manual: Vol. 3. Husbandry unit 2: Feeding dairy buffaloes. https://www.fao.org/4/t1265e/t1275e01.htm

Garg, M. R., Sherasia, P. L., Bhanderi, B. M., Phondba, B. T., Shelke, S. K., & Makkar, H. P. S. (2013). Effects of feeding nutritionally balanced rations on animal productivity, feed conversion efficiency, feed nitrogen use efficiency, rumen microbial protein supply, parasitic load, immunity and enteric methane emissions of milking animals under field conditions. Animal Feed Science and Technology, 179(1–4), 24–35.

Indian Council of Agricultural Research – Central Research Institute for Dryland Agriculture. (n.d.). Thumb rules of feeding (KVK Bulletin No. 10). https://www.icar-crida.res.in/KVK/assets/publications/bulletins/bulletin_10.pdf

Joshi, P., Tiwari, R., & Dutt, T. (2018). Performance evaluation of Badri cattle. Indian Journal of Animal Sciences, 88(9), 1090–1093. https://epubs.icar.org.in/index.php/IJAnS/article/view/83565

Kumar, R., Kumari, V., Sharma, C., & Pandey, B. W. (2026). Decline in traditional fodder availability and shift to alternative fodder supplements for livestock in Chamoli district, Uttarakhand, India. Geography, Environment, Sustainability. https://doi.org/10.24057/2071-9388-2026-3968

Livestock interventions for improving the livelihood in Thouldar block of Uttarakhand. (2017). International Journal of Agricultural Science and Research, 7(1). https://www.scribd.com/document/342071621/60-IJASRFEB201760

Ministry of Fisheries, Animal Husbandry and Dairying. (n.d.). State-wise milk production (Lok Sabha Unstarred Question No. 2769, annexure). Government of India. https://sansad.in/getFile/loksabhaquestions/annex/187/AU2769_t7yXmT.pdf

National Dairy Development Board. (n.d.-a). Ration balancing programme. https://www.nddb.coop/services/animalnutrition/programmes/ration-balancing-programme

National Dairy Development Board. (n.d.-b). Ration balancing programme: National Dairy Plan I. https://www.nddb.coop/ndpi/focus/ration

Tamil Nadu Agricultural University. (n.d.). Feeding management of cattle and buffalo. TNAU Agritech Portal. https://agritech.tnau.ac.in/expert_system/cattlebuffalo/Feeding%20management.html

Uttarakhand Gramya Vikas Samiti. (2024). Fodder production: Modern techniques. https://ugvs.in/wp-content/uploads/2024/08/0_Fodder_Complete_Book_Merged.pdf