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## An overview of feeding management practices followed by the dairy farmers in a different state of India

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**Abstract**

This review focus on the feeding system of dairy animals varied in different states within the region. The composition of feed varied depending on the availability of crop residues and by products, socioeconomic conditions of farmers and availability of common grazing land. On average, a dairy animal was offered 6 kg dry roughage, 5 kg green fodder and 1.6 kg concentrate feed in the region, though the amount of feed differed in different states depending on the production level and economic conditions of farmers. The dairy farmers of North Bihar were fed on average dry roughages 8.85 kg, green fodder 5.33kg and concentrate feed 0.77kg per head per day <sup>[13]</sup>. Rice straw was found most common dry roughage in all states except Eastern UP and Bihar where wheat straw is preferred. Grazing is practiced in all most all states by the resource poor farmers. In Chhattisgarh 100% of surveyed households practiced grazing of animals due to the abundant availability of common property resources and nearby forest areas. As a result, farmers did not cultivate green fodder. In other states more than 60% households practiced grazing except for Bihar and Eastern UP where rice-wheat crop was prevalent with abundant availability of crop residues. So far as the method of feeding is concerned, separate feeding of dry & green roughage and concentrates was practiced by farmers of Odisha (94%), Assam (86%) and West Bengal (74%). In states like Chhattisgarh (100%), Eastern UP (90%), Bihar (94%) and Jharkhand (46%), a mixed feeding system was followed where dry & green fodder was mixed with concentrates and water. A combination of dry and green fodder together was fed by the farmers of West Bengal (26%), Jharkhand (18%), Assam (14%) and Eastern UP (10%).

**Keywords:** feeding practices, dairy farmers, green fodder, grazing

**Introduction**

One of the most significant changes in India's agricultural economy over the past three and half decades has been the rising contribution of the livestock sector in the agricultural gross domestic product (Ag. GDP). Between 1970 and 2019, the share of livestock in Ag GDP has risen from 17 per cent to 25.6 per cent <sup>[3]</sup>. Dairying accounts for more than two-thirds of the livestock output and is largely responsible for the rising importance of the livestock sector in the country <sup>[14]</sup>. India has emerged as the world's largest milk producer and milk production continues to grow at a high rate.

The Indian dairy framework is one of the greatest on the planet comprising more than 74,000 essential dairy social orders with a membership of over 10 million milk makers and giving solid showcasing administration to all milk makers regardless of their group, position, the economy of scale through the nation <sup>[11]</sup>. It additionally gives fundamental dairy augmentation administrations, for example, Supply of cattle feed, grain seed, creature wellbeing administrations, managed impregnation for both cattle and buffaloes to the individuals from dairy cooperative societies <sup>[28]</sup>. Farmers produce food grains as well as oversee Livestock. Farmer's income, agribusiness, and provincial economy are vigorously snared into animals. Contaminate domesticated animals might be a significant instrument of the creation of little farmers. India has the main cattle populace in the world. Pretty much every provincial family in India, regardless of whether landed or landless, claims animals. The animal's populace of India is around 535 million involving 199 million cows, 105 million buffaloes, 140 million goats, 71 million sheep, and 11 million pigs and positions first in buffalo while second in cattle and goat populace <sup>[38]</sup>. Of the complete animals in the nation, around 38.2% are cows, 20.2% are buffaloes, 12.75 are sheep, 25.6% are goats and just 2.8% are pigs. India has a huge hereditary variety of domesticated animals containing 26 types of cattle, 8 types of buffaloes,

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40 types of sheep, 20 types of goats, and 7 types of camels<sup>[10]</sup>. The nation has 13 percent of the world's cattle populace and 57% of the world's buffalo populace. The milk creation inside the nation is 187 million tons being contributed by 199 million cows and 105 million buffaloes<sup>[3]</sup>.

Indian Arid zone, where animal raising is by and large the principle control of provincial masses, comprises 12 percent of the nation's geological territory and 61 percent of India's bone-dry zone is Rajasthan<sup>[18]</sup>. The atmosphere of this zone isn't reasonable for crop rising. The yearly precipitation here is less than 300 mm for each year that excessively unpredictable during storm season, which frequently prompts far and wide dry spell conditions. Milk creation is impacted by and large by the taking care of example, the nature of feed and the fixings in the feed. The feeds and grain represent 50 to 75 percent of the all-out expense contingent on the condition under which the milch animals are saved for milk production. The feed comprises green fodder, including field grass and tree cutting, dry feed, concentrates, and balanced cattle feed. During the 1950s and 1960s, India was perhaps the biggest merchant of dairy items, bringing in more than 40% of milk solids in the dairy business. The business import of milk powder arrived at its top at around 53 thousand tons in 1963-64<sup>[12]</sup>. This made caution policymakers and a choice was made to accomplish independence in milk production. The significant advance forward, came during the sixties with the foundation of the National Dairy Development Board (NDDB) to see over dairy improvement in the nation. The Operation Flood Program, one of the world's biggest and best dairy improvement developers, was dispatched in 1970. Its primary purpose was to arrange farmer's cooperatives in country zones and connect them with metropolitan customers. Activity Flood has prompted the modernization of India's dairy area and has made a solid organization for the acquirement, preparation, and dissemination of milk by the agreeable area. In 1989, the Government of India dispatched the Technology Mission on Dairy Development (TMDD) program to help and enhance the endeavours of Operation Flood and to upgrade rustic business openings and pay age through dairying<sup>[18]</sup>.

In the economic development of the farmers in most of the developing countries, livestock plays a vital role by providing its contribution through draft power, manure, fuel, and fertilizers in addition to different animal products like meat, milk, egg, wool, etc. Unlike western countries, we are unable to provide cereals to our livestock and fed mainly on low-quality roughages with natural grazing with supplementation of some agro-industrial by-products like cereal straws, sugarcane by-products, etc are deficient in protein, energy, minerals, and vitamins. Sometimes, due to seasonal influences also the quality of grazing gets low and livestock productivity gradually declines. An animal's diet must contain the essential nutrients in appropriate amounts and ratios for achieving proper maintenance and productivity<sup>[21]</sup>. Feeding a balanced diet, avoiding over or underfeeding with abundant supplies of cool and clean water will help to optimize feed and nutrient use on an animal, which also reflects on their productivity. The diets of ruminant normally consist mainly of fibrous plant material that requires prolonged chewing, fermentation, and soaking before its nutrients available for digestion and absorption and their rumen acts as a huge fermentation vat where the fibrous plant materials processed for digestion and broken down into a mixture of volatile fatty acids (VFA), that absorbed into the body. Besides, energy and

protein their diets must consist of different types of minerals and vitamins to perform various vital activities and protect their body against diseases. However, a single feed ingredient cannot provide all the nutrients required for their body maintenance and productivity hence needs to provide a combination of different ingredients<sup>[21]</sup>.

#### **Feedstuffs available for livestock:**

**Roughages:** Roughages are cumbersome feeds containing a generally huge measure of less digestible material for example crude fiber over 18% and low (about 60%) in total digestible nutrients (TDN) on an air-dry basis. These are partitioned into two significant gatherings (succulent and dry) because of their damp content. Succulent feeds normally contain dampness from 60-90%, while dry roughages contain just 10-15% dampness. For accommodation, succulent feeds are again characterized into pastures, cultivated fodder crops, tree leaves, silage, and root crops.

**Concentrates:** Are the feed or feed blend which supplies essential supplement (proteins, sugars, and fat) at more elevated levels however contains fewer than 18% crude fiber and over 60% TDN. It very well may be delegated energy-rich and protein-rich concentrates. The crude protein is under 18% in energy-rich concentrates and over 18% in protein-rich concentrates.

**Mineral Supplements:** Based on the work done in India on the mineral components profile in the feeds and fodders, ISI has suggested the mineral combination for taking care of dairy cattle and poultry. Numerous mineral combinations are showcased under various business trademarks. For the most part, salt, calcium carbonate, zinc sulphate, and copper sulphate supplements improve production and reproduction.

**Vitamin Supplements:** Various vitamin enhancements for poultry, pigs and cows are showcased in India under various trademarks like Rovimix for cattle's, Vit.AB2D3 for poultry etc.

**Feed added substances:** Feed added substances like hormones, anti-infection agents, proteins, probiotics, and so on are likewise utilized these days in animals feed as a growth promoter and to increase milk production.

Even though as of late in certain parts a few protests have been raised for employments of specific added substances no enactment has been passed on limiting their utilization in our nation to date. Dairy advancement in India has assumed an indispensable job in improving the healthful norms, producing work openings, and expanding the income of dairy farmers in rustic regions. It is for the most part concurred that a creature neglects to communicate its hereditary potential for high milk creation when deprived. Starving of young stock prompts hindered, delay in maturity, and lower efficiency in the wake of accomplishing the breedable age. Determination of appropriate taking care of norms, utilizing the correct blend of feeds insufficient amount alongside other related practices are a portion of the manners in which will empower the farmers to expand the milk production and make dairying more productive. Subsequently, the current review was attempted to decide the prevailing feeding practices of dairy animals in various states of India.

## Feeding Management Practices followed by dairy farmers in India

The feeding practices of dairy animals fluctuated in various states inside the district. The composition of feed changed relying upon the accessibility of crop residues and by-products, financial states of farmers and accessibility of normal grazing land. On a normal, a dairy animal was offered 6 kg dry roughage, 5 kg green feed and 1.6 kg concentrate feed in the area, however, the measure of feed contrasted in various states relying upon creation level and financial states of farmers. The dairy farmers of North Bihar were fed on average dry roughages 8.85 kg, green fodder 5.33kg and concentrate feed 0.77kg per head every day [13]. Rice straw was discovered most basic dry roughage in all states aside from Eastern UP and Bihar where wheat straw is liked. Grazing is practiced in all most all states by the asset helpless farmers. In Chhattisgarh 100% overviewed families working on grazing of animals because of plentiful accessibility of regular property assets and close by forest zone. Therefore, farmers didn't develop green fodder. In different states over 60% of families practiced grazing except for Bihar and Eastern UP where the rice-wheat crop was common with bountiful accessibility of crop residues. Most definitely, separate feeding of dry and green roughage and concentrates was practiced by farmers of Odisha (94%), Assam (86%) and West Bengal (74%). In states like Chhattisgarh (100%), Eastern UP (90%), Bihar (94%) and Jharkhand (46%), a mixed feeding system was followed where dry and green fodder was blended in with concentrates and water. Blend of dry and green fodder together was taken care of by the farmers of West Bengal (26%), Jharkhand (18%), Assam (14%) and Eastern UP (10%). The greater part of the farmers (56-90%) of the eastern region used to feed self-created dry roughages (rice or potentially wheat straw) and just 3-30% of farmers procured dry roughages from different farmers in a

similar town or business sectors in seven states considered. Essentially, 72-98% of farmers developed green fodder saving their land occasionally.

In Chhattisgarh, no family surveyed cultivated green fodder as it was gathered from normal property assets or the animals were kept on grazing. Nonetheless, not many family units (5%) in the locale secured green fodder for the taking care of dairy animals. Undoubtedly, just 16-50% of farmers bought adjusted feed in various states. Be that as it may, the greater part of family units (53%) arranged to gather combination at home by utilizing maize/wheat/rice in grain or powdered structure, wheat or potentially rice-wheat, mustard and linseed cake, beats chunnies, etc. resulting imbalances of nutrients as in most of the cases proper formulation was not followed. An almost similar trend of consumption in adult buffalo during milking and dry period in India for green fodder, dry-roughages and concentrate feed were reported by [8]. This means an intense lack of concentrates and green fodder, bringing about animals being deprived. [26] Ramachandra *et al.*, 2007 likewise detailed stock of feed has consistently stayed shy of regulating necessities which confining acknowledgment of the genuine creation capability of domesticated animals under field conditions. [36] Thorpe *et al.*, 2007 additionally detailed the issue of inadequate grain and its poor nutritive incentive in the Indo-Gangetic plain district of India. Besides, the majority of farmers were not produced grain because of little land holding, subsequently, the majority of them gathered feed from close by local area land. In India, 15 percent of the land to the topographical region is under normal property assets [2]. Aside from this, farmers were having less interest in fodder production and equilibrium taking care of because of lack of knowledge. Comparable perceptions were additionally recorded among the farmers of the Belgaum region of Karnataka [24].

**Table 1:** Feeding Management Practices followed by dairy farmers in a different state/region of India

State/region	Feeding Management Practices
Gujarat [34]	<ul style="list-style-type: none"> <li>The majority of farmers (92.14%) followed the stall feeding system for their animals.</li> <li>Dairy farmers (78.57 %) give concentrate to their animals based on no criteria &amp; a flat rate.</li> <li>The majority of dairy farmers (75.71%) didn't follow chaffing the green &amp; dry fodder.</li> <li>More than half of the farmers did not give the mineral mixture to their animals.</li> <li>The majority of farmers (77.14%) did not give salt to their animals.</li> </ul>
South Gujarat [27]	<ul style="list-style-type: none"> <li>All farmers adopted individual feeding systems for their milch animals as well as others.</li> <li>It was observed that to maintain the uniform plane of nutrition for milk production, despite having forest areas all around, the animal owners are normally not sending them for grazing but fed individually.</li> </ul>
West Bengal [37] (Nadia)	<ul style="list-style-type: none"> <li>All the farmers provided green natural border grasses of cultivated plots and grasses from fellow land. In addition to this 75% of farmers grew fodder crops.</li> <li>None of the farmers practiced silage making.</li> <li>Concentrates were fed to the animals after milking by 91% of the farmers.</li> <li>Mineral supplements were provided by only 30.5% of farmers to their milch animals.</li> <li>Home prepared concentrate mixture (60.50%) with soaking (78.50%) was prevalent in the area. Only 17.25 and 32.25% of the respondents incorporated mineral mixture and common salt in concentrate mixture, respectively.</li> </ul>
Uttar Pradesh [16] (Firozabad)	<ul style="list-style-type: none"> <li>The majority of the households (82.50%) provide homemade concentrate mixture primarily consist of bran and chuni as major ingredients and 68.33 percent of households provide common salts in concentrate mixture to buffaloes.</li> <li>The major proportion of the farmers (78.33%) fed concentrate to buffaloes daily before milking.</li> <li>The majority (66.67%) of buffalo owners in the district provide green fodder to their animals keeping the bodyweight while remaining i.e. 33.33 per cent farmers do green feeding based on the milk yield of the buffaloes.</li> </ul>
Uttar Pradesh [15] (Saharanpur)	<ul style="list-style-type: none"> <li>The majority of respondents (86.00 percent) followed the stall feeding system, while only 14.00 percent of the respondents followed stall feeding as well as grazing system for their animals.</li> <li>The majority of respondents (89.00 percent) followed the individual feeding system, while only 11.00 percent of the respondents followed Group feeding.</li> <li>The majority of the respondents (84.00 percent) provided non-leguminous green fodder to their animals, while</li> </ul>

	<p>only 37.00 percent of the respondents provided non-leguminous + leguminous green fodder to their animals. However, 63.50 percent of the respondents provided non-cultivated green 'shedha' grass and 80.50 percent of the respondents provided sugarcane tops.</p> <ul style="list-style-type: none"> <li>The majority of farmers fed straw to their animals as a by-product available from paddy (<i>Oriza sativa</i> L.) crop. In addition to paddy straw and paddy straw with jowar 83.50 percent of the respondents provided the dry bund grasses to their animals as dry fodder.</li> </ul>
Telangana <sup>[31]</sup> (Hyderabad)	<ul style="list-style-type: none"> <li>A majority (78.0%) of dairy farmers in urban and peri-urban areas are feeding medium (4.79 to 6.72 kg) quantity of dry roughages followed by 17.0 per cent of high and 5.0 per cent of low quantity of dry fodder to dairy animals in the study area with an average quantity of 5.76 Kg/day.</li> <li>The major source of dry fodder in the urban and peri-urban area was Kutti i.e. chopped dry Jowar straw.</li> <li>A majority (92.0%) of the dairy farmers were feeding roughages in combined form (Dry + Green). Among the farmers practicing chaffing, a majority (56.0%) of the dairy farmers were utilizing mechanical chaff cutters for chaffing of roughages.</li> <li>Extra concentrate feeding during advanced pregnancy and early lactation was adopted by overall 28.0 and 75.0 per cent of the dairy farmers, respectively.</li> </ul>
Tamil Nadu <sup>[25]</sup> (Villupuram)	<ul style="list-style-type: none"> <li>All dairy farmers purchased feed ingredients from the market and rice mill and mixed them to formulate their feed.</li> <li>The majority of the dairy farmers (78.60 per cent) were using common salt during concentrate feeding, whereas, salt and mineral mixture usage was 81.40 per cent. The majority of dairy farmers (61 per cent) were feeding green fodder as a whole.</li> <li>A majority (89 per cent) of the dairy farmers were following green fodder as well as dry fodder in the morning and evening.</li> <li>The majority of the dairy farmers used to cultivate (66 per cent) followed by common property resources (22 per cent) to collect green fodder followed by private fields (12 per cent).</li> </ul>
Rajasthan <sup>[20]</sup> (Jaipur)	<ul style="list-style-type: none"> <li>The majority (71.87 per cent) of the respondents fed their animals in groups, while 28.12 per cent of the buffalo keepers fed their animals individually.</li> <li>Pearl millet stover (bajra karbi) and wheat straw were the main dry fodder with some quantity of grass collected during crop weeding.</li> <li>The majority of the respondents fed green fodder only for 2-3 months in the monsoon season (July to September). Half (45 per cent) of the respondents fed home-prepared concentrate mixture to their animals followed by readymade (41.87 per cent) and a mixture of home-prepared and readymade (13.12 per cent). Home prepared concentrate mixture constituted crushed grain of bajra, barley and guar mixed with cottonseed cake.</li> <li>The majority of the buffalo owners (65.62 per cent) were not feeding salt regularly to their animals.</li> </ul>
Punjab <sup>[7]</sup> (Bathinda)	<ul style="list-style-type: none"> <li>The legume fodder data revealed that 25 percent in rural areas and 22 percent in urban areas cultivate and purchase legume fodder for feeding to dairy animals.</li> <li>A small proportion of respondents used a mixture of leguminous and non-leguminous green fodder for feeding to the dairy animals. It was found that the dry matter requirement of dairy animals met out by feeding the wheat straw in the whole district of Bathinda.</li> <li>Eighty-nine percent of respondents in rural areas and 92 percent in urban areas used wheat straw to fulfil the requirement of dry matter. The rest of the respondents (11 percent from rural areas and 8 percent of urban areas) used paddy straw and other brans to fulfil the dry matter requirement.</li> <li>As for the feeding of concentrates on the milk production basis was concerned, it was adopted by 65 per cent of dairy farmers from rural areas and 85 per cent in urban areas.</li> </ul>
Andhra Pradesh <sup>[33]</sup> (Guntur and Prakasam)	<ul style="list-style-type: none"> <li>Green fodder feeding was adopted by 87 per cent of buffalo farmers.</li> <li>The majority of buffalo farmers adopted the colostrum feeding to calves within an hour of calving.</li> <li>About half of the buffalo farmers adopted concentrate feeding during the last trimester of pregnancy (53%) and concentrate feeding on basis of milk production.</li> <li>Feeding of a mineral mixture, incorporation of common salt and concentrate feeding to calves was adopted only 26, 23 and 16 per cent respectively.</li> </ul>
Assam <sup>[32]</sup> (Sonitpur)	<ul style="list-style-type: none"> <li>The majority of dairy farmers fed concentrate based on their milk production.</li> <li>The entire dairy farmers in this region fed mineral mixture and salt on basis of the requirement of the animal.</li> <li>In this region, most of the dairy farmers did not follow silage or haymaking practices.</li> <li>The entire dairy farmer offered feed material after chaffing to the animal.</li> </ul>
Bihar <sup>[6]</sup> (Patna)	<ul style="list-style-type: none"> <li>The majority of dairy farmer provides feed components were only green fodder and a limited quantity of concentrates into the animal.</li> <li>Multi-cut fodder maize was the primary green fodder cultivated in this region.</li> <li>Apart from these, 17.8% of farmers sent their buffaloes for grazing during the daytime.</li> <li>Feeding of a mineral mixture, incorporation of common salt and concentrate feeding to calves was adopted only 26, 23 and 16 per cent respectively.</li> </ul>
Chhattisgarh <sup>[5]</sup> (Koriya and Surguja)	<ul style="list-style-type: none"> <li>The major source of feed and fodder was through grazing as stall-feeding was limited in this region.</li> <li>Paddy and wheat straw was used as dry fodder. In the winter season, maize stalk was fed to animals.</li> <li>The cultivated green fodder was limited to maize in the summer and winter seasons.</li> <li>Concentrates that were fed to pregnant and in-milk animals only comprised cottonseed cake, mustard cake and also broken grains of rice and wheat.</li> <li>The roughage to concentrate ratio may even go up to 40% for enhancing yield, provided the animal has the genetic potential to give more milk.</li> </ul>
Odisha <sup>[9]</sup>	<ul style="list-style-type: none"> <li>So far as the method of feeding is concerned, separate feeding of dry and green roughage and concentrates was practiced by farmers of Odisha.</li> <li>A combination of dry and green fodder together was fed by the farmers.</li> </ul>

	<ul style="list-style-type: none"> <li>The majority of the farmers (56-90%) of the Odisha region used to feed self-produced dry roughages (rice and/ or wheat straw).</li> <li>The majority of households (53%) prepared concentrate mixture at home by using maize/ wheat/ rice in grain or powdered form, wheat and/or rice bran, mustard and linseed cake, pulses chunnies etc.</li> </ul>
Jharkhand <sup>[17]</sup> (Dumka)	<ul style="list-style-type: none"> <li>In this region, most of the dairy farmers' mixed feeding system was followed where dry and green fodder was mixed with concentrates and water.</li> <li>Rice straw was found most common dry roughage.</li> <li>The major source of feed and fodder was through grazing as stall-feeding was limited in this region.</li> <li>A combination of dry and green fodder together was fed by the farmers.</li> <li>Lactating cows and buffaloes are provided linseed cake and gur @ 1kg and 250 g respectively per animal</li> </ul>
Goa <sup>[23]</sup> (Goa)	<ul style="list-style-type: none"> <li>The feeding traditions by the dairy farmers were either stall feeding or grazing or both.</li> <li>Exclusive stall feeding was practiced by 68.2% of dairy farmers, while others allowed their animals to graze for 5–8 h/day.</li> <li>The concentrate feeds were either purchased (ready-made) or home-made. Only 24.2% of dairy farmers were using exclusively purchased concentrate feed, which was in pellet form and 1.5% of the dairy farmers were using exclusively home-made concentrate feeds.</li> <li>Adequate feeding of green fodders decreases the dependence on concentrate feeds, keeps dairy animals healthy and reduces the cost of milk production.</li> <li>The feeds offered to the milking animals were higher than the dry animals. The concentrate feed offered varied from 2–8 kg/animal/day for milch animals and 0–2 kg/animal/day for dry animals.</li> </ul>
Uttarkhand <sup>[22]</sup> (Kumaon region)	<ul style="list-style-type: none"> <li>Farmers offer oak tree leaves and grasses to an animal without chaffing in this region.</li> <li>Very few farmers (14%) arranges wheat straw for crossbred cattle and high yielding buffaloes and only 24 percent of farmers offered salt and mineral mixture to their animals.</li> <li>Concentrate mixture, made at home is being given only to lactating animals.</li> <li>Stall feeding is common for buffaloes around the year.</li> <li>Hay is the only method for fodder conservation for feeding animals in the lean period.</li> </ul>
Himachal Pradesh <sup>[35]</sup> (Una, Hamirpur, Bilaspur)	<ul style="list-style-type: none"> <li>After artificial insemination (A.I.) or natural service of the animals, farmers offer mustard oil (250 ml) to an animal.</li> <li>Avoid feeding concentrate to dry animals.</li> <li>About 1 month before the expected date of calving farmers start offering a boiled mixture of broken wheat and cottonseed meal.</li> <li>Immediately after calving about 250 ml of Ghee plus Jaggery is offered to the animal.</li> </ul>
Karnataka <sup>[29]</sup> (Kolar, Chikkaballapura and Ramnagara)	<ul style="list-style-type: none"> <li>Ensuring the nutritional needs of animals.</li> <li>Providing good quality of feed and water.</li> <li>Using of different utensils for chemical &amp; feed.</li> <li>Proper storage of feed</li> </ul>
Kerala <sup>[30]</sup> (Wayanad)	<ul style="list-style-type: none"> <li>Cultivated land with crops and fodders.</li> <li>Almost all farmers fed their animals with green roughages and concentrate feeding practice on daily basis.</li> <li>Preparation of own feed for feeding animals.</li> </ul>
Madhya Pradesh <sup>[1]</sup> (Indore)	<ul style="list-style-type: none"> <li>A majority of farmers in both urban and rural areas provided green fodder throughout the year.</li> <li>The majority of the farmers cultivated green fodder in rural areas and farmers provided green fodder to pregnant and productive animals.</li> <li>The majority (70%) of the rural farmers did not provide a balanced ration to their animals, whereas a significantly higher percentage (88%) of urban farmers provided their animal's balanced ration.</li> <li>Most of the farmers in rural areas (75.33%) provided home-grown concentrate like wheat bran; gram/chunie etc. but urban farmers purchased concentrate from the market.</li> </ul>
Maharashtra <sup>[4]</sup> (Buldana)	<ul style="list-style-type: none"> <li>The results indicated that the majority (70.00 per cent) of the dairy farmers emphasized grazing of their buffaloes instead of adopting stall feeding.</li> <li>With regards to feeding roughages, it was observed that a practically equal number of dairy farmers followed the practice of feeding cereal + legume straws and alone cereal straws to their buffaloes.</li> <li>Despite the awareness about the chaffing of the fodders for feeding the animals, the majority of the dairy farmers did not adopt this practice.</li> <li>All the dairy farmers fed the concentrates to buffaloes at the time of milking.</li> </ul>
Mizoram <sup>[19]</sup> (Aizawl and Kolasib district)	<ul style="list-style-type: none"> <li>All the respondents practiced a stall-fed feeding system. It can also be seen that Green fodder + concentrate feeding was practiced by the majority (95.00%) of the dairy farmers while only 5.00 per cent of the respondents practiced Green fodder + concentrate + dry fodder feeding as a ration for their dairy cattle.</li> <li>The most common concentrate mixture consisted mainly of wheat bran, wheat flour, oil cakes and salt.</li> <li>It was observed that the amount of green fodder fed to the adult stock at each feeding time weigh about 20-25 Kg which consisted mainly of broom, Banana leaves some tree leaves like Jack fruit, etc.</li> </ul>

### Nutritional Strategy for improving livestock production

We shall be able to enhance the productivity of the dairy animals (targeting cross-breeds/improved indigenous breeds/ buffaloes) in the above mention state or region has implemented some feeding strategies as under,

- Judicious use of available degraded/poor soil for grassland development/silvi-pasture/horti-

pasture/agroforestry development to enhance the fodder production per unit of land.

- Conservation of monsoon herbage with suitable processing and storage for use during the lean period.
- Implementation of complete feeding technology with block/pellet/Total Mixed Ration (TMR) making to enhance milk production/growth by using locally

available feed resources (including paddy straw).

- Due to the gradual shrinking of land-intensive/semi-intensive production of dairy animals should be given more emphasis by implementing on scientific breeding, feeding and other management practices.
- It is important, therefore, that improved feeding systems and improved efficiency of feed use are viewed clearly from a farming systems perspective. In this context, the following prerequisites are considered important:
  1. Knowledge of availability of all feeds (forages, crop residues, agro-industrial by-products and non-conventional feed resources) throughout the year.
  2. Synchronization of feed availability to requirement by animal species.
  3. Assessment of the extent of feed surpluses and deficits.
  4. Development of strategies to cope with the shortfalls.
  5. Increased feed production (e.g. production of multipurpose tree legumes and development of food-feed systems).
  6. Priorities for use of crop residues with proper processing to enhance the utilization of nutrients. Development of feed conservation measures and strategic supplementation for milk production.

### Conclusion

In above following region in India dairy farmers are well aware of certain practices like colostrum feeding, feeding balanced ration, chaffing of roughage, feeding of extra concentrate feed during advance pregnancy, provision of extra concentrate allowance during early lactation, and feeding of mineral supplements but certain practices like silage making, special treatment methods to feed and fodder are neglected. Hence, there is a need to guide livestock farmers regarding the conservation of fodders through demonstration and awareness programs for the best use of available resources. It can be concluded that scientific interventions are needed in the traditional feeding of the dairy animals to make the dairy farming more profitable venture. In the present situation enhancement of green fodder production, feeding strategies for high yielding dairy animals including bypass protein and bypass fat feeding technologies and development of complete feed block using locally available roughages should be emphasized. Besides, the farmers should be made aware of scientific feeding practices of their animals to improve the productive and reproductive performance of their animals.

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