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Dairy Farming: Nutrition, Breeding and Health Management

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Abstract

Dairy Farming plays a very important role in ensuring food security, ensuring ruler livelihood and in the field of the agriculture correct management of nutrition, Breeding and animal health is essential for overall milk productivity and overall work profitability proper nutrition management ensures high Nutritional value of meat and proteins in animals Breeding practices focuses on genetic improvement in animals so that in animals in Dairy so that they can provide good quality and nutritional milk for genetic Breeding methods like insemination is used so that new variety can be developed so that it can increase their milk production, adaptability and life of Dairy animals health management includes steps like vaccination and regular monitoring of animals so to prevent them from disease and pests adapting these scientific things like genetic Breeding and effective health care can improve Dairy management and can leads to sustainable Dairy farming, it is the farming that combine practices like genetic Breeding, health management etc leads to sustainability and it contributes to the long term growth of this sector and can improve the livelihood of ruler people.

Keywords: Genetic Breeding, Health Management, Disease Prevention, Nutrition Ration.

Introduction

Dairy has a long history in the Indian subcontinent dating approximately 8,000 years, to the time when zebu cattle were first domesticated, possibly in India. Although wild populations existed for a very long time prior to domestication, by the time of the Indus Valley civilization, they had been domesticated and were used for milking and plowing. In the Indus valley, sheep and goats were also domesticated, however it's unclear if they were milked.

Throughout the time of the Vedic Empire, which extended around 1500–500 BCE, milk was a staple food item. The Vedas contain nearly 700 references to cows, who are held in high respect, including multiple chapters that address milk and called aghnya, literally "not to be killed." Another way that milk was consumed during this time was as yoghurt, or curd. The Vedas describe how to curdle milk by infusing additional sour milk into it. They also engaged about incorporating substances from plants, which involves the fruit of the jujube tree and the bark of the palash tree, which may have consisted of rennet-like enzymes, to create curdled milk. These are some of the earliest recorded occurrences regarding making cheese with catalysts.

Objectives and Scope in Dairy Sector

- Dairy manufacturing profit maximization.
- The state's dairy manufactures' socioeconomic stability.
- Stimulate milk production to ensure an adequate supply of indicated minimum dietary consumption.
- Conformity to the Food Safety and Standards Act of 2006.
- To guarantee that the state's milk consumers obtain safe and fresh milk.
- Stimulate Entrepreneurship for Growing Employment Opportunities in Rural Regions.
- Sustainable development inside the Organization.
- Cooperatives are implemented to strengthen the organized dairy farming sector.
- Improving value alongside improving marketing by offering farmers a fair price.
- Innovation, research, and development for production that is efficient.
- Offering adequate and outstanding amenities straight to farmers' curbs.
- Technology transfer includes efficient extension initiatives.
- Automate the dairy cooperatives' pricing and milk collection procedures.
- Integrate the dairy cooperatives' leadership and accounting platforms.

Scope in Dairy Farming: The production of dairy products is one of India's biggest agribusiness enterprises and makes a major contribution to the GDP of the country. It holds the highest economic share of any agricultural item, at 4%. India

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is going to be the world's largest producer of milk in 2020, with an output of over 180 million MT. The proliferation of private dairy companies, which currently comprise over 60% of the country's dairy processing capacity, has been a significant contributing contributor. In the five most recent years, the Indian dairy farming industry expanded at a rate of 12%, principally due to the rise in value-added products. Dairy farming is an active economy that engages about 70 million farmers and contributes enormous revenue for the nation. India nourishes an enormous fraction of the world's livestock population, encompassing 14.7% of all global cattle and around 57.3% of all buffalo. Approximately 84.6 million MT of milk were produced in the whole nation during 2001 and 2002. Its per capita availability at this production was to be 226 grams per day, as opposed to the ICMR's suggested minimum of 250 grams per day. As consequently, dairy farming presents an enormous amount of potential and potential for enhancing milk productivity.

Colonial Influence

During the colonial era, India's animal husbandry flourished to correspond with the military and financial constraints of the British Empire. Initially, they were focused mainly with the breeding and health maintenance of horses, as they were necessary to the cavalry's existence. Later, as military establishments' requirement for animal feed (beef and milk) boosted military dairy farms popped up, paying attention to the custom of cow breeding. From these farms, plenty of scientific progress in the Indian dairy industry were made. The basic necessities of the average Indian were of least significance to the British, yet if their priorities aligned with those of ordinary individuals, they had to do for the country's general growth.

The Britishers established military dairy farms in order to serve sufficient supplies of outstanding milk and milk products for military and British households in India. In 1889, an initial military dairy farm had been established in Allahabad. Afterwards, likewise farms have been built across the nation; by the time of independence in 1947, there were approximately one hundred such farms.

Due to their wider quantity of milk and higher fat content, buffalo became formerly recommended by the common people of colonial India over cows for dairying. The average daily consumption by buffaloes was around 2.27 liters. Specifically in places where pastures were present, cows were determined. The nation's average milk output for cows varied from 0.4 to 1.8 liters per day according on the breed, rearing place of residence, and management strategies. Further, their lactation period lasted for barely six months. Ongole, Sind, Gujarat, and Nellore were some the breeds of cattle whose were thought to be preferable to others, yet there was still much room for development with other native animals. Oilcake and cotton seed were fed to good milking cows in order to render them productive. In 1882, the initial veterinary college opened its doors in Lahore. A three-year veterinary professionals program was authorized to start in Parel, Mumbai, two years later. Three moreover veterinary colleges later appeared in Madras, Calcutta, and Bihar.

Post-Independence Development

In the field of milk production, India has become nearly self-sufficient currently. Dairy manufacturing and exports occurred primarily in the household sector preceding to the nation's independence in 1947. In the 1930s and 1940s, there had been occasional efforts to create coops for the production of milk, but these data were only successful after independence. Between 1968 and 2001, India's milk production exceeded increased by threefold topping 80 million metric tonnes annum. The projected quantity of milk manufactured during 2004–05 was 90.7 million tonnes. 20% of the nation's overall agricultural output as of 2010 originated via the dairy segment.

Launched on January 13, 1970, the White Revolution, formerly referred to as Operation Flood, was a landmark project of India's National Dairy Development Board (NDDB) and the largest dairy development program in the world [1]. It developed India, which was previously a country deficient in milk, the world's top producer of the dairy product, preceding the US in 1998 and finances for over 22.29 percent of internationally consumption in 2018.

Prime Minister Lal Bahadur Shastri nominated Dr. Varghese Kumarien, the founder and chairman of Amul, as the chairman of the NDDB.

Establishment of Dairy Cooperatives

Considering dairy bringing up roughly seventeen percent of the value of the output from agriculture and its associated activities, dairy is a prominent subsector of Indian agriculture. Especially for marginal and small farmers—who regulate roughly 33 percent of the country's cultivable land but almost 60% of its female cattle and buffaloes—dairying has become an essential source of income and work in rural geographic areas. For rural households, dairy contributes to one-third of their gross income; for landless households, it contributes for nearly half. India is currently holding the title of world's largest milk producer attributed to its impressive record of milk production. From 17.0 million tons in 1950–1951 to 88.1 million tonnes in 2003–2004, India manufactured more milk. Milk availability per person increased from 112 grams per day in 1968–1969 to 231 grams per day now. The rate of raised milk production from 1975–1976 to 1979–1980 under the Fifth Five Year Plans 2.91 percent yearly while beneath the Ninth Five Year Plan (1997–98 to 2001– 02), it increased to 4.13 percent yearly. Since "the Co-operative Credit Societies Act, 1904 (Act 10 of 1904)" established cooperatives under British control relying on the Raiffeisen model, which originates from Germany, the cooperative movement emerged in India in the last decade of the 19th century. The largest food products manufacturer in India, GCMMF, is now controlled by these Gujarati milk cooperatives. In addition, GCMMF is India's major exporter of dairy products, with the globally renowned Amul brand. After acknowledging the successful outcome of this plan of action, the government constituted the National Dairy Development Board (NDDB) in 1965, which developed a national milk revolution blueprint. This countrywide operation, also known as Operation Flood, was started in 1970. With an an unprecedented output of 88.1 million tons in 2003–04, India arose as the world's greatest milk producer attributable to one of the largest rural development projects in history, which extended 26 years. The Dairy Cooperative Network is owned by approximately 12 million farmer members, comprises 170 milk unions, functions in over 338 districts, and embraces roughly 1,08574 village level societies.

Uttar Pradesh has a larger number of dairy cooperative societies (18104). The second highest was in Gujarat. It was relatively lesser of such organizations in the eastern states of the nation. Societies in the states of Karnataka, Tamil Nadu, Maharashtra, Punjab, and Rajasthan expanded successfully.

Gujarat became the most successful state in terms of membership in these societies. Maharashtra, Karnataka, and Tamil Nadu came followed. In each state in eastern India, the membership was minimal. In terms of milk procurement, Gujarat occupies almost one-third of the total milk that these cooperatives purchase. Tamil Nadu, Karnataka, and Maharashtra emerged followed.

Current Status of Dairy Farming

As of precisely now, dairy is India's significantly prevalent commodity. Millions of small-scale and marginal farmers, each possessing two to five animals, produce an average of five litres of milk per day. Small-scale milk producers in rural regions considering for 62% of the nation's total milk manufacture. The National Dairy Development Board assignments that the country's milk demand will likely reach 180 million tonnes by 2022. This immediately modifying countryside is a result of the quantity of variables, such as population growth and urbanization, both of which enhance demand for livestock products.

Since cooperatives potential wealth distribution rather than revenue on investment, they have secured the greatest agricultural involvement (ILO 2002: 2). In India alongside other rural nonfarm categories, cooperatives are the most widespread category of producer association. The sugar, dairy, and handloom manufacturing sectors may be the primary causes of Indian cooperatives' economic growth. With an exception of the milk and sugar enterprises in Gujarat and Maharashtra, a great deal of cooperatives are not performing up to par. With reference to milk cooperatives, the shareholder base is extremely dense. Gujarat alone encompasses 3.18 million producers as the member base of the Anand Milk Union Limited (AMUL), followed by Nandini, Karnataka milk federation, encompassing 2.22 million members. As outcome, an attempt has been made to explore the dairy businesses, specifically milk cooperatives.

Milk Production Volumes as Per State

Table 1: State/UT-Wise Estimates of Milk Production ('000 Tonnes)

State	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
All India	84,406	86,159	88,082	92,484	97,066	1,02,580	1,07,934	1,12,183	1,16,425	1,21,848	1,27,904	1,32,431	1,37,685	1,46,314	1,55,491	1,65,404	1,76,347	1,87,749	1,98,440	2,09,960	2,22,069	2,30,577
Andhra Pradesh	5,814	6,584	6,959	7,257	7,624	7,938	8,925	9,570	10,429	11,203	12,088	12,762	13,007	9,656	10,817	12,178	13,725	15,044	15,263	14,714	15,403	15,448
Arunachal Pradesh	42	46	46	48	48	49	32	24	26	28	22	23	43	46	50	53	54	55	61	44	46	46
Assam	682	705	727	739	747	750	752	753	756	790	796	800	815	829	843	861	872	882	920	954	982	1,006
Bihar	2,664	2,869	3,180	4,743	5,060	5,451	5,783	5,934	6,124	6,517	6,643	6,845	7,197	7,775	8,288	8,711	9,242	9,818	10,480	11,502	12,253	12,503
Chhattisgarh	795	804	812	831	839	849	866	908	956	1,029	1,119	1,164	1,209	1,232	1,277	1,374	1,469	1,567	1,676	1,747	1,848	1,956
Goa	45	46	48	57	56	57	58	59	59	60	60	61	68	67	54	51	55	57	61	60	63	64
Gujarat	5,862	6,089	6,421	6,745	6,960	7,533	7,911	8,386	8,844	9,321	9,817	10,315	11,112	11,691	12,262	12,784	13,569	14,493	15,292	15,853	16,722	17,281
Haryana	4,978	5,124	5,221	5,222	5,299	5,366	5,442	5,745	6,006	6,267	6,661	7,040	7,442	7,901	8,381	8,975	9,809	10,726	11,735	11,284	11,630	11,966
Himachal Pradesh	756	773	786	870	869	933	1,007	1,026	971	1,102	1,120	1,139	1,151	1,172	1,283	1,329	1,392	1,460	1,531	1,576	1,615	1,617
J & K	1,360	1,389	1,414	1,422	1,400	1,400	1,519	1,565	1,592	1,609	1,614	1,631	1,615	1,951	2,273	2,376	2,460	2,540	2,506	2,595	2,727	2,817
Jharkhand	940	952	954	1,330	1,335	1,401	1,442	1,466	1,463	1,555	1,745	1,679	1,700	1,734	1,812	1,894	2,016	2,183	2,321	2,434	2,629	2,774
Karnataka	4,797	4,539	3,857	3,917	4,022	4,124	4,244	4,538	4,822	5,114	5,447	5,718	5,997	6,121	6,344	6,562	7,137	7,901	9,031	10,936	11,796	12,829
Kerala	2,718	2,419	2,111	2,025	2,063	2,119	2,253	2,441	2,509	2,645	2,716	2,791	2,655	2,711	2,650	2,520	2,576	2,548	2,544	2,534	2,532	2,580
Madhya Pradesh	5,283	5,343	5,388	5,506	6,283	6,374	6,572	6,855	7,167	7,514	8,149	8,838	9,599	10,779	12,148	13,445	14,713	15,911	17,109	17,999	19,004	20,122
Maharashtra	6,094	6,238	6,379	6,567	6,769	6,978	7,210	7,455	7,679	8,044	8,469	8,734	9,089	9,542	10,153	10,402	11,102	11,655	12,024	13,703	14,305	15,042
Manipur	68	69	71	75	77	77	78	78	78	78	79	80	82	82	79	79	82	86	90	71	76	72
Meghalaya	66	68	69	71	73	74	77	77	78	79	80	81	82	83	84	84	85	87	88	89	90	
Mizoram	14	15	15	16	15	16	17	17	11	11	14	14	15	20	22	24	25	26	24	25	25	
Nagaland	57	58	63	69	74	67	45	53	78	76	78	79	81	76	77	79	74	73	62	56	61	
Odisha	929	941	997	1,283	1,342	1,431	1,625	1,598	1,651	1,671	1,721	1,724	1,861	1,903	1,930	2,003	2,088	2,311	2,370	2,373	2,402	
Punjab	7,932	8,173	8,391	8,554	8,909	9,168	9,282	9,387	9,389	9,423	9,551	9,724	10,011	10,351	10,774	11,282	11,855	12,599	13,348	13,394	14,077	
Rajasthan	7,758	7,789	8,054	8,310	8,713	10,309	11,377	11,931	12,330	13,234	13,512	13,946	14,573	16,934	18,500	20,850	22,427	23,668	25,573	30,723	33,265	
Sikkim	37	45	48	46	48	49	42	42	44	43	45	42	46	50	67	54	59	61	84	74	87	
Tamil Nadu	4,988	4,622	4,752	4,784	5,474	6,277	6,540	6,651	6,787	6,831	6,968	7,005	7,049	7,132	7,244	7,556	7,742	8,362	8,759	9,790	10,107	
Telangana													4,207	4,442	4,681	4,965	5,416	5,590	5,765	5,808	5,855	
Tripura	90	79	84	86	87	89	91	96	100	104	111	118	130	141	152	160	174	185	199	206	217	
Uttar Pradesh	14,648	15,288	15,943	16,512	17,356	18,094	18,861	19,537	20,203	21,031	22,556	23,330	24,194	25,198	26,387	27,770	29,052	30,519	31,864	31,359	33,874	
Uttarakhand	1,066	1,079	1,188	1,195	1,206	1,213	1,221	1,230	1,377	1,383	1,417	1,478	1,550	1,565	1,656	1,692	1,742	1,792	1,845	1,797	1,856	
West Bengal	3,515	3,600	3,686	3,790	3,891	3,983	4,087	4,176	4,300	4,471	4,672	4,859	4,906	4,961	5,038	5,183	5,389	5,607	5,869	6,165	6,414	
A&N Islands	23	26	25	24	20	23	24	26	24	25	26	21	14	16	15	16	17	18	19	15	17	
Chandigarh	43	43	44	43	46	46	47	47	46	45	45	44	44	44	43	36	42	45	49	52	57	
Ladakh																			15	29	31	

Dairy Farming Practices

Breeds of Dairy Cattle

Indigenous Breed: Indigenous breed are those breed which are native to India and developed in India.

Indigenous Breeds are classified under three groups based on utility/purpose.

a) Milch breeds/Milk breeds
b) Dual Purpose breeds
c) Draught breeds

***Milch Breeds*:** also referred to as milk breeds, are distinguished by slower or inferior functioning males and high milk production cows. Indian Milch breeds consist of Shahiwal, Red Sindhi, Gir, and Deoni. Breeds of cattle

frequently yield over 1600 kg of milk during a lactation.

Draught Breeds: The male animals are appropriate for labor, yet the cows contribute to less than 500 kg of milk on average each lactation, leading to them being poor milk yielders. On average, they have a white shade. Bullocks can pull 1000 kg in tandem. Cover a distance of 30 to 40 kilometers each day whereas walking at a walking pace of 5 to 7 km/h while using an iron-typed cart on an appropriate road. A pneumatic rubber tube cart may hold twice as much weight. This group's instances include Hallikar, Umblacherry, Amritmahal, and Kangayam.

Milch Breed

Red Shindig: Originating from the Sindh province of modern-day Pakistan, the Red Sindhi breed is one of the most unique cattle breeds in India. Mostly found in Punjab, Haryana, Karnataka, Tamil Nadu, Kerala, and Orissa, the Red Sindhi can yield up to 3400 kg of milk per lactation under ideal conditions, but under good management conditions, they can yield up to 1700 kg on average.

Sahiwal

- Originally Belonging to the Montgomery district of Present Pakistan
- Mainly found in Punjab, Haryana, U.P., Delhi, Bihar and M.P.
- Milk yield – Under village condition :1350 kg
- Milk yield – Under commercial farms: 2100 kg
- Age at first calving – 32-36 months
- Calving interval – 15 month

Milch and draught breed

Hariana

- Mainly found in Karnal, Hisar and Gurgaon district of Haryana, Delhi and Western M.P
- Milk yield –1140-4500 kgs
- Bullocks are powerful for road transport and rapid ploughing

Kankrej

- Mainly found in Gujarat
- Milk yield – Under village condition :1300 kg
- Milk yield– Under commercial farms : 3600 kg
- Age at first calving – 36 to 42 months
- Calving interval – 15 to 16 months
- Bullocks are fast, active and strong. Good for plough and cart purpose

Drought Breed

Kangayam

- This breed, in its native area, is also known by other names of Kanganad and Kongu though the name Kangayam is well-known. These cattle are bred in the southern and southeastern area of the Erode district of Tamilnadu in India.
- Mainly found in Coimbatore, Erode, Namakkal, Karur and Dindigul districts of Tamil Nadu.
- Best suited for ploughing and transport. Withstands hardy conditions

***Exotic Breed*:** exotic breed are those breed which are not native to a particular country or region those type of breed are import from other countries.

***Jersey* Origin:** The breed originated in the French island of Jersey, which is situated in the English Channel.

Dividing Characters: One of the oldest dairy breeds is the Jersey, and authorities claim has currently been purebred for approximately 600 years. Jerseys might vary in color from a very light shade to mouse or gray to a very dark shade of fawn or nearly black. Both the bulls and females are commonly darker about the hips and about the head and shoulders than on the body.

Optimal Calving Age: 26–30 months, 13–14 months during inter calving

Milk Yield: 5000-8000 kg, the production of milk and milk products is determined to be 20 litters, whereas cross-bred jersey cows yield 8 to 10 litters every day.

Holstein Friesian:

Origin: Holland was the place this breed originally appeared.

Dividing Characters: Large, elegant animals with black and white or red and white color patterns are called Holsteins. Holstein heifers averaging around 800 pounds at 15 months of age can be used for breeding. It is optimal for Holstein females to give delivery to their firstborn between the ages of 24 and 27 months.

Yield of Milk: 7200–9000 kg. While regards to milk production, this exotic cattle breed is by far the most powerful dairy breed. It yields 25 liters of milk on average per day, as compared with 10 to 15 liters per day from a cross-breed H.F. cow. It is efficient in the delta and coastline areas.

Cross Breeding: It includes the mating of animals from numerous breeds. Although breeding animals for milk and meat production, cross breeding is practiced. To boost the potential for milk production in their progeny, exotic breeds including Holstein Friesian, Brown Swiss, and Jersey bulls or their semen are crossed with zebu breeds of cows and nondescript cows in India. The exotic pedigree of the crossbreeds is derived from an interaction of numerous breeds, including the Holstein Friesian, Brown Swiss, or Jersey. The Jersey breed has become known for its milk fat percent, while Holstein is admired for its enormous yield of milk.

Feeding and Nutrition: A diet which fulfils the nutritional needs for high milk production is essential for the high-producing dairy cow. The nursing department dairy cow requires a range of nutrients, such as water, minerals, vitamins, fatty acids, amino acids, and carbohydrates, to meet the nutritional needs of her mammary gland that generates milk and milk components.

Carbohydrates

Simple sugars and complex polysaccharides are only a few of the numerous molecules that make up dietary carbs. They contribute between 60 and 80 percent of dairy cows' diet in dry matter. The division of carbohydrate fractions is done according to chemical parameters and nutritional effects. To determine the total amount of non-fibre carbohydrates (NFC), eliminate 100% from the dry matter amounts of NDF, crude protein, fat, and ash. The primary elements of non-fibre carbohydrates consist of starch, sugars, and organic acids, as well as neutral detergent soluble fibre (NDSF Non-structural carbohydrates (NSCs) are the total of sugars and starch; these are not to be confused with NFCs. NDSF refers to fiber elements associated to the secondary plant cell wall that are solubility in neutral detergent but difficult to digest by mammalian enzymes. The range of maximum recommended NFC concentrations is 38%–44%. More NDF derived from pasture sources will be beneficial for diets with higher NFC

contents.

Fats

Due to the adverse effects that fatty acids, particularly polyunsaturated fatty acids, have on the fermentation of microbial fiber, ruminant diets typically consist of a small amount of total fat.

Dietary fats include 3 sources of fat:

i). Endogenous fats (which include glycolipids, pigments, cutins and waxes.
ii). Rumen inert fats (which include saturated animals fats, prilled fats and calcium soaps)
iii). Vegetables fats (which include polyunsaturated fats)

Generally, the diet can supply 2%–3% of dry matter for each type of fat source, up to 8%– 9% of total fat.

Protein

The amino acids necessary for maintenance and the production of milk proteins determine the quantity of protein that healthcare dairy cows require. The vast majority of the amino acids required by ruminant animals to maintain body metabolism come from microbial protein. Microbial protein is highly digestible and has a high biological value. Crude protein amount in mixed microorganisms varies from 45% to 60%. As a result, the objective of food formulations is to optimize microbial improvement in order to minimize the necessity of pricey dietary protein supplements. There are two widely accepted ways for characterizing the amount of protein in dairy cows' diets and their needs:

Crude Protein System: Protein is assumed to be 16% nitrogen in the crude protein system, which is based on dietary nitrogen transformed to protein equivalent using a 6.25 multiplier factor and does not take into consideration variations in availability to cows or rumen.

Metabolizable Protein System: based on a model that predicts the availability of carbohydrates and nitrogen in food to the rumen microflora, as well as the projected flow of microbes' proteins and the amount of undigested protein in food that is digestible to account for all of the protein that is accessible and absorb.

The Material which is used to feed in the Dairy Farming are:

i). Plant Residue: The residue of plant is used in dairy farming such as straw, de oiled rice bran, wheat bran, rice polish, molasses, dried stem of rice plant (purali) and many related materials.
ii). Extract of oil Seed: It is include the oil cakes of mustard, groundnut oilcakes, sunflower oilcake, cotton seed meal, coconut mea, linseed meal, sesame seed meal and chunks of soyabean.
iii). Green Fodder: It include the grass, upper part of sugarcane and few part of trees such as leaves, besan, and bajra.
iv). Vegetables Fat: Corn oil, groundnut oil, and sunflower oil.
v). Cereal Grains: Maize, bajra, sorghum, broken rice, oats, barley and wheat.

Note: We need to feed the 1.5 kg more concentrate to the pregnant dairy animal for better health of new one and mother and it also increase the production of the milk in milching animals.

Housing and Management

For dairy cows for milk production as much as feasible, proper housing that is based on scientific principles is important. Dairy animals must be maintained in accordance to particular key requirements, such as animal comfort and health, sanitation, protection from illnesses and predators, cost-effective and efficient labor usage, and the supply of a proper environment for the production of hygienic milk.

The Following are Six Key Elements of Cattle Housing

i). Space: When an adequate amount of room is available, animals may move around without restriction and have simple access to food and water.
ii). Meal: Accommodations are provided in housing to allow animals to have a tasty and well planned meal.
iii). Every day, the feed is accessible for a minimum of 21 hours.
iv). Water: Utilizing access to clean water for at least twenty-one hours per day.
v). Air: Abundance of clean, fresh air.
vi). Light: For farm animals to produce at their best, there must be sufficient sunlight available and sufficient darkness to allow them to sleep for six hours per day.
vii). Rest: Ample area that is dry and relaxing to lie down for at least thirteen hours per day.

Types of Housing System

Loose Housing System: area is open where the animals are free in day and night time.

Conventional Housing: animals are tied in stall for feeding and milking purpose.

a) Single row system
b) Double row system
   i). Tail to tail system
   ii). Head to head system

Waste Management System: it is a system in which the dairy waste is used for making the byproducts of dairy farming and economical purpose. Waste is used in purpose, in the pesticide, in the coloured industry, in domestic purpose for preparing food, and for the production of methane gas.

Milking Practices Including Traditional and Modern Methods and Milking Hygiene:

i). Hand Method*:* this method is either done by striping and full hand method. In stripping method, the hand figure is work in steps moving from upper to downward. In full hand method whole hand is work and make pressure for milk production.

ii). Machine Milking

If installed correctly, kept in top functioning condition, and worked, modern milking machines may milk cows fast and efficiently while avoiding damage to the udder.

Steps of Production of Clean Milk:

a) Washed the animal before the production of milk that help to control the disease and minimize the bacterial entry.
b) Nails should be trimmed and milker is free from all disease.
c) Dusty feed and contaminated feed or fodder should be avoid.
d) If the calf is sucking the milk than wash and moist the udder.

e) Utensil should be clean.
f) Flavor producing feeds should provide the animal after the milking.
g) Milk is kept in the cool place for maintain the quality and flavour of the milk and covered with lid for avoiding the dust and contaminated practice.

Dairy Farming Investment Breakdown

A dairy farm required a number that are major initial investments. Following is a summary of the average costs:

Building a Cow Protection: Both the productivity and health of the cows depend on a well-built cow shelter. Building a shed may cost ranging between ₹50,000 and ₹1.5 lakh, depending on how many cows it has to house.

Buying a Cow: Nearly ₹1.5 lakh is needed to buying a cow, particularly where it is a high-yielding breed such as the Holstein Friesian (HF).

Medication: The herd's health requires regular medical attention and vaccinations, which run around ₹10,000.

Feeds: Around ₹40,000 is spent on feed, which is necessary for optimal nutrition.

Profits from the Dairy Industry

Dairy farming generates a monthly profit that varies but frequently lies between ₹10,000 and ₹15,000. The selling of milk is the main source of this earnings. A liter of milk typically ranges between ₹30 and ₹32 at the dairy.

Government Schemes and Policies: There are some policies of government are:

i). Rashtriya Gokul mission (RGM)
ii). National programme for dairy development (NPDD)
iii). Dairy infrastructure development fund (DIDF)
iv). National livestock mission (NLM)
v). Animal husbandry infrastructure development (AHIDF)
vi). National animal disease control programme (NADCP)
vii). Supporting dairy cooperatives & farmer producers organizations (SDCFPO)

Major Challenges and Opportunities in Dairy Farming

Among the Major Difficulties These Startups Face Are:

Dairy startups possess numerous tasks on the agenda as they make their way through an elaborate business that brings together traditional approaches with innovative technology.

Typical challenges that these startups have include:

Supply Chain Management: To ensure the freshness and nutritional value of dairy products, the dairy supply chain must be managed efficiently. Startups must maintain an appropriate cold chain infrastructure while coordinating with farmers, processors, distributors, and retailers.

Quality Control: Keeping dairy products consistently high-quality is difficult since they must adhere to difficult hygienic regulations all the way through the supply chain and are perishable.

Regulatory Compliance: Food Safety and guidelines Authority of India (FSSAI) and other regulatory bodies have established a number of norms and laws associated with food safety that dairy startups need to follow. It takes time and money to understand these rules and get the necessary permits.

Competition: Market share is highly volatile in the dairy industry, as both long-standing enterprises and recent arrivals are fighting for market share. To get traction in the market, startups need to set themselves apart through innovative products, strong branding, or superior customer support.

Scalability: Expanding a firm in the dairy industry is difficult due to the industry's strong globalization. Achieving scale depends on a number of factors, including properly managed operational costs, long product life, and efficient distribution networks.

Opportunities in Dairy Farming:

i). **Market Capacity:** For a number of years, India was the world's top producer of milk. With 198 million metric tons produced in 2021, the nation made up almost 22% of the world's total milk output.

The largest agricultural goods, dairy contributes to 5% of the country's GDP and has grown at a compound annual growth rate (CAGR) of 6.4% during the previous five years. The dairy business employs around 80 million people either directly or indirectly.

ii). Production of artificial insemination.
iii). Income opportunity in dairy sector.

References

1. Dairy Development Department, Government of Kerala. Thiruvananthapuram: The Department. Available from: https://www.dairydevelopment.kerala.gov.in
2. SwadeshiVIP. What is the scope of dairy farming in India and how to do it? Noida: SwadeshiVIP; 2023 Jan 19. Available from: https://swadeshivip.com/blog/what-is-the-scope-of-dairy-farming-in-india-and-how-to-do-it/
3. Pathak H, Mishra JP, Mohapatra T, editors. *Indian agriculture after independence*. New Delhi: Indian Council of Agricultural Research; 2022. 424 p.
4. Pathak H, Mishra JP, Mohapatra T. *Animal husbandry in pre-independent India*. ResearchGate; 2022. Available from: https://www.researchgate.net/publication/362060024_Animal_Husbandry_in_Pre-Independent_India
5. Wikipedia contributors. *Dairy in India*. Wikipedia, The Free Encyclopedia; 2024 Sep 21. Available from: https://en.wikipedia.org/wiki/Dairy_in_India
6. Wikipedia contributors. *White Revolution (India)*. Wikipedia, The Free Encyclopedia; 2024 Sep 2. Available from: (https://en.wikipedia.org/wiki/White_revolution_(India)
7. Shah P. *Exploring the cost of milk production & potential economies of scale in a dairy cooperative*. Philadelphia: Wharton Research Scholars; 2012 May 22. Available from: http://repository.upenn.edu/wharton_research_scholars/93
8. Seilan A. Dairy cooperatives and dairy development in India. In: Sundararaj P, editor. *Non-farm sector and rural development*. Chennai: Noval Corporation; 2011. p. 428-440.
9. National Dairy Development Board. Milk production by state. Anand: NDDB; 2023. Available from: https://www.nddb.coop/information/stats/milkprodstate
10. Invest India. Dairy: India is the largest dairy producer. New Delhi: Invest India. Available from: https://www.investindia.gov.in/sector/animal-husbandry-and-dairying/dairy
11. Kaushik R. Dairy cooperatives in India. *Economic and Political Weekly*. 2024 Mar 9;59(9). Available from: https://www.epw.in/journal/2024/9/insight/dairy-cooperatives-india.html
12. TNAU Agritech Portal. *Livestock :: Cattle :: Breed*. Coimbatore: Tamil Nadu Agricultural University.

Available from: https://agritech.tnau.ac.in/ta/animal_husbandry/animhus_cattle%20_breed.html
13. Van Saun RJ. *Nutritional requirements of dairy cattle*. Rahway (NJ): Merck Veterinary Manual; 2022 Jul. Available from: https://www.merckvetmanual.com/management-and-nutrition/nutrition-dairy-cattle/nutritional-requirements-of-dairy-cattle
14. Bob the Builder. Dairy industry in India: challenges, opportunities, and solutions. LinkedIn; 2023 Apr 11. Available from: https://www.linkedin.com/pulse/dairy-industry-india-challenges-opportunities