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Introductory Chapter: Bovine Science - A Key to Sustainable Development

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<http://dx.doi.org/10.5772/intechopen.83723>

1. Introduction

1.1. Livestock

Livestock animals play vital role in socio-economic, cultural and these animals serve as a function for rural households. Livestock helps in food supply, family nutrition, quality savings, family financial gain, increase in soil productivity, livelihoods, transport, agricultural diversification and production, family and community employment, ritual functions, and social station. As per the Food and Agriculture Organization (FAO), two widely used classifications are supported the forms of output created or inside the uses [1].

Among output uses, maintenance and consumption by the farm holder's house, direct offer of inputs, financial gain through sales of the live animals or their output, savings investment and social functions like paying bride wealth, or in other way providing animals for communal feasts or sacrifices will be distinguished. Another classification divides animal functions in the economic role like supply of financial gain and mean of savings accumulation, direct feed use for family subsistence, additional benefits like fertilizer and animal draught, and capability to accommodate a collection of social rules and obligations. Livestock has a crucial contribution to the food chain of rural and urban areas and contributes to family nutrition. As a social unit, financial gain will increase and consumption of product will increase, mainly from animal origin, permitting the substitution of vegetal diet by animal supermolecule. Apart from milk, eggs, and meat used in food, skins, hides, and horns are also used for domestic purposes.

Livestock production is closely reticulated with crop production. The employment of livestock and its by-product manure are widely used in crop production. It may be a supply of

energy, providing draught animal power, and manure improves soil structure and fertility and also increases water retention. Each use is environmentally friendly and yields more energy and nutrient support. Its production is a very important mean of exchange between rural households and, when sold, contributes to spice up and strengthen the rural markets. Rural markets are very important areas within the operation mode of rural communities and play a big contribution for rural families in the upgradation of wealth. Livestock may feature as savings and may be regenerated into money whenever the family desires it; also it may act as a security, influencing access to informal credits and loans and being conjointly a supply of collateral for loans. In many rural regions, wherever monetary markets are absent or nonexistent, livestock's or herds are a supply of plus accumulation and live of prosperity. Livestock or assets may be mobilized at any time, satisfying planned expenditures, for example, kids' fees and bride wealth, or many unplanned expenses like the unhealthiness and death of members of the family. These animals may well be seen as a "bank account," and they are conjointly a very important supply of family savings that may be employed in years of low crop production, reducing financial insecurity and social unit vulnerability, being a very important supply of risk reduction and security increase.

Animal health greatly affects the farm animal functions, not solely by direct effects on animal productivity but also by indirect effects, specifically regarding human health, costs associated to disease management, and international movement restrictions of animals on animal merchandise and animal welfare [2]. The existence of an excellent variety of parasitary, infectious, or metabolic diseases that have an effect on fertility cannot be underestimated. Besides the positive effects of stock to human welfare, stock production and consumption may be associated with some risks, specifically the transmission of vital diseases that are transmitted from animals to humans (zoonosis). The absence of rigorous animal health management programs represents a high risk to the human health. Furthermore, the rigorous management and restrictions to animal movement and to exportation of animal merchandise, related to the existence of disease, makes the existence of national animal health programs indispensable so as to permit international trade.

2. Bovine mastitis

Bovine mastitis in farm cows may be a significant issue because it is an economically devastating sickness inflicting large economic losses within the farm trade and is the worldwide costliest production unwellness in dairy farm herds. It stands second to foot and mouth disease as the most difficult disease in high-yielding dairy farm animals in Asian countries; however, as per reports of the prevalence of mastitis in dairy farm animals, it stands on initial position and had been reported quite in a high rate in crossbred dairy farms. Field surveys of major placental mammal diseases have indicated that inflammation is one of the foremost major diseases of farm animals [3].

Mastitis is the outcome of interaction of assorted factors related to the host, pathogen(s), and therefore the atmosphere. Infectious agents, particularly varied species of bacterium, are the foremost vital etiologic agents of inflammation. The association of some host, management,

and housing determinants with inflammation is well-established and was the subject of investigation. Bovine inflammation is caused by the entry of bacterium within the mammary gland resulting in inflammation. This illness, characterized by a rise in the cells, particularly leukocytes, within the milk and by pathological changes within the mammary gland tissue, causes large economic losses and additionally holds the danger for the transmission of animal diseases like TB, brucellosis, and zoonotic disease. Bovine mastitis is generally classified into clinical and subclinical mastitis. Clinical mastitis is characterized by local (e.g., swelling of the udder, heat, and pain) or systemic (e.g., fever, anorexia, depression) symptoms with milk abnormalities (e.g., milk clots, flakes, watery secretions, blood). Subclinical redness is that the most serious kind because the infected animal shows no obvious symptoms and secretes apparently traditional milk for an extended time, therefore it is a crucial feature of the medical specialty of bovine inflammation.

The consumption of dairy farm product has additionally magnified at similar levels with a great increase in recent years, primarily because of a bigger income base for people. Improving udder health and decreasing the incidence of udder infection and inflammation in dairy farm herds can end in augmented milk production. Even though advanced technology is created, mastitis continues to be a significant economic issue for dairy farm producers. Thus, researchers and dairy farm advisors still refine the National Mastitis Council (NMC) and regularly they counsel farm producers on mastitis management program.

Increase in the prevalence of mastitis might be due to the absence of udder washing and milking of cows with common milkers which have cuts and chaps on their hands and using of common udder cloths, which could be vectors of spread especially for contagious mastitis. In the preparation for milking, teats and udder should be properly washed with suitable sanitizing agent and completely dried, even before and after milking to control mastitis effectively. In order to reduce the high prevalence of bovine mastitis, improved milking hygiene, hindrance of skin lesions, culling of chronic mastitis carriers, and treating of clinically infected herds must be practiced. Improper hygiene and poor farm management practices contributed to the presence of many pathogenic bacteria in milk. Improving the hygienic conditions of the milking environment and utensils may reduce the prevalence of many pathogens in milk, and also implementation of a systematic application of an in vitro antibiotic susceptibility test, earlier to the use of antibiotics in both treatment and prevention of bovine mastitis, is recommended [4].

3. Feed and fodder management

The previous report of five year plan of the animal husbandry, agriculture, horticulture and forestry departments, with slight intersectoral conversation between these departments in around the world for the fodder production and management. Livestock farming is one of the major occupations of farmers along with or without agriculture and entrepreneurs to produce various products for the tremendous input to the country's gross domestic product (GDP). Livestock farming is one of the important livestock activities worldwide to produce and provide milk, meat, manure, leather, wool, energy for agriculture, basic transportation,

and many useful food sources and income-generating works for millions of households throughout the world [5].

The number of livestock from the past few years has increased in all the conditions, in the form of two levels, i.e., (i) maximum number of farmers practicing extensive stall feeding in different breeds of hybrid cattle and (ii) similarly also increased grazing of local variety livestock population to depend their survival on the natural sources. Increasing livestock population without information is against to the animal husbandry policies, without attention of their feed and fodder sources, production of feed and fodder should be in farms by scientific management, otherwise, it is stress on the livestock and if sources are limited, poor fodder production technologies and storage methods in the developed country to depleting productivity sources of the farming area.

The annual estimated growth and income depends on urbanization, globalization, and civilization of the countries, demand for the livestock resources also increased subsequently, and further research is required for future advancements in production of animal products to meet the demand of global population. In 2050, the global demand for dairy and meat products are expected to increase by 74 % and 58 %, respectively, by the choice of developing countries. The cattle global population in 2000 was 1.5 billion and many model projects by the government are helping to the increase by 2050 at around 2.7 and 2.6 billion, respectively. For this, animal feed ingredient requirement is estimated to increase annually by 553 million tonnes; it was also reported by the FAO in 2009 that 50% of the demand were met in that year [6]. To meet the future demands of global population, the production of milk and meat strategies need to be depends on animal health, food & nutrition and scientific management by using available feed and fodder resources, also they are monitored all the time for serve the livestock sufficient and significantly [7].

Strategies are also required to improve feed quality, fodder resources, and sustainability in management of livestock production. It is necessary to adopt newer technology of fodder production to utilize it efficiently and effectively without wasting the available natural resources for improvement in productivity of the future food security of the country. Management and practices came through traditional approach, they are modified into modern technologies for high yield variety of green fodder production, different strategies to enhance fodder production/unit land area and using locally available resources. To livestock farmers, encourage and promote high yield varieties for fodder production in integrated farming systems along with agriculture and horticulture practices. Livestock farmers adopt the waste and barren land resources for cultivation of fodders, it will shows the conservation strategies of the biodiversity for the establishment of diverse agro-forest ecosystem. Available resources of agriculture like crop residues and by products of the agriculture and horticulture utilize it as a feeds and fodders. Introduce the newer technologies of research institutes/industries in the field level to manage systematically and to enhance the fodder production. Governments organization like FAO, ICRISAT, ILRI, IFAD, ICAR, CABI, IRRI, IRRD working on feed and fodder resources for scale up as per the requirement and modification in the fodder production processes, come out with best viable and economic products. There is a proper attention in the area of fodder production by introducing improved variety of high-yielding fodders

(varieties of grasses and leguminous), perennial fodder trees and shrubs & herbs to make sure there is sufficiently available food to feed for livestock across the year. In this context, the production of feed and fodder depends on quality seeds sapling material and scientific information and there availability to the farmers.

The concept of conservation of feed and fodder for sustainable development seems to be a newer approach for most of the farmers. Application of new technologies to make the feed and fodder to store in limited spaces and equipped with low cost conservation strategies like box baling, silage making to use it in scarcity time for livestock [8]. For dry fodder, conserve as feed block preparation using different dry fodders with enriched nutrients or balanced ration, urea treatment of straws, degradation by enzymatic action, etc.

The recently investigated newer technique called “hydroponics” means growing fodder plant material using the required environment with nutrients, desired temperature, and humidity in water without soil. Hydroponics is an easier and faster technology to produce green fodder to maintain livestock production all the time. Maize is the potential seed source for hydroponics, and even cowpea, chickpea, grams, humps, and any millet seeds can be grown in very limited amount of time with maximum production. By the literature, hydroponics yield differs with the type of crop, for example, ragi and bajra ranging from 300%, maize, cowpea, and grams were 600%, and sun hemp was 800%. Based on nutritional parameters, a leguminous crop was used for production and it is encouraging as rich fodder crop with high crude content of protein than the cereal and millet crops. Hydroponic fodder is a highly enriched nutritional feed to livestock and is found to be highly palatable with 100% utilization with proper management [9].

These management plans will useful for bovines and it is depends on utilization of the available feed and fodder resources timely to get quality products and supply for the use of human population.

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