

Review

STATUS OF GREEN & DRY FODDER IN SOUTH-EASTERN RAJASTHAN: A REVIEW

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Abstract

This review paper aims at the status of fodder demand, challenges, and utilization in south-eastern Rajasthan in India. Available literature and reports by government as well as non-govt. organizations have been re-viewed in detail with the collection of data from nearby districts viz., Aklera, Manoharthana, Bakani, Jhalawar, Jhalrapatan, and Sunel as part of the methodology for preparing the manuscript. India contributes approximately 20 per cent of the world's livestock population, out of which Rajasthan contributes 11.6 per cent livestock population. Expansion in the livestock sector will show a great impact in employment generation and improvement in the financial status of the masses in rural areas. The livestock will be much beneficial during unfavorable conditions like, drought and famine and generate gainful employment in rural areas of Rajasthan. It is estimated that approximately 90 per cent of the livestock population in India subsists on natural grasses available in grasslands, meadows, forests, waste, barren, and fallow lands. There is a shortage of green and dry fodder ingredients which forces livestock to have a non-nutritional diet. As per the Five-year plan document, GOI, it has been reported that there is a net deficiency of 61.1 per cent green fodder, 21.9 per cent dry crop residue, and 64 per cent concentrate feed matter in India. Singh, 1995 reported that herbage production has been reduced due to a lack of scientific management practices for fodder production. Presently, livestock is the major source of cash income for subsistence farms and can be beneficial in crop failure or calamity. Livestock-based bioenergy and waste recycling can be utilized for organic manure and forage production. Thus, this paper gives an idea about the gap between fodder availability and its requirements.

Keywords: Fodder, South-east Rajasthan, Hadoti, Agricultural residue, Cattle

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Introduction

Agriculture and animal husbandry have deep-rooted connections with various aspects of human society, such as culture, religion, and the economy. In rural areas, the practice of mixed farming and livestock rearing is essential for maintaining a balanced way of life [1]. Livestock plays a vital role in the lives of subsistence farmers, providing them with multiple benefits. From draught power and rural transportation to manure, fuel, milk, and meat – livestock serves as a valuable source of revenue for these farmers. Furthermore, owning livestock serves as a form of insurance against potential crop failures. This practice not only has a direct impact on the livelihood and food security of nearly a billion people worldwide but also influences the diet and health of many others [2]. Throughout history, livestock has consistently represented wealth and influence

across various civilizations. In this regard, India's fortune truly shines as it boasts the largest and most diverse livestock population in the world. Chauhan [3] also published literature about important ethnobotanical medicinal plants, fodder species, and listing of new plant species utilized for ethnobotanical purpose with their conservation status and strategies. The incredible diversity found within the country not only highlights its robust agricultural prowess but also plays a crucial role in sustaining its economy and preserving its rich cultural heritage. The livestock and agriculture sector play a crucial role in the livelihoods of approximately 70 per cent of households [4]. Recent data from the 20th Livestock Census - 2019 reveals that India's total livestock population has reached an impressive number of 535.82 million, showing a significant growth of 4.6 per cent since the previous Census conducted in 2012. These statistics highlight the importance and steady expansion of this sector in India's economy. India boasts a remarkable bovine population, with cattle, buffalo, Mithun, and yak approximately 302.82 million in total. It is worth noting that the country is home to 57.3 per cent of the global buffalo population and 14.7 per cent of the world's cattle population. Additionally, India houses around 74.26 million sheep and a staggering 148.8 million goats as per the reliable data from the 20th Livestock Census in 2019. India boasts the title of being the global leader in milk production. However, it is important to mention that animal productivity in India is relatively lower at 1538 kg per year compared to the global average of 2238 kg per year. This disparity can be attributed to the significant deficit of animal feed, leading to livestock malnutrition. These findings were highlighted by Vijay [5].

To ensure the sustainability of cattle husbandry, tackling the challenges associated with fodder and feed resource development in our country is crucial. The availability of fodder supplies has been a pressing concern, with the projected figure dropping from over 60 per cent in the 1990s to around 50 per cent of what is currently required. This calls for immediate attention and strategic measures to address this issue for the long-term success of cattle rearing. According to a study by Kumar [6], it is not feasible to further expand the cultivation of fodder crops due to the increasing competition with other land uses. As a result, alternative approaches should be considered to address this challenge and ensure sustainable land utilization. In order to meet the growing demand for cattle fodder, it is crucial to enhance the productivity of cultivated fodder crops within limited land resources. This urgency calls for innovative strategies and methods that can maximize yields without compromising quality. By adopting these practices, we can ensure a sustainable supply of nutritious feed for our expanding cattle population. To address the increasing demand for agricultural land, exploring non-arable areas for pasture utilization is a practical solution. This approach, along with vertical expansion from arable lands, can help strike a balance in meeting agricultural needs [5]. By making use of previously untapped land resources, we can optimize productivity while sustaining our arable lands.

Present status of fodder production in India

Fodder production in India is subject to significant regional variations, dependent on factors such as cropping patterns, climate conditions, socioeconomic factors, and the specific types of cattle being raised. These diverse elements play a crucial role in determining the appropriate use and management of fodder resources throughout the country. Cattle and buffaloes thrive on a balanced diet consisting of fodder from cultivated regions, which is then complemented by a small amount of collected grasses and top feeds. This approach, as supported by Shashikala [7], ensures that these animals receive the essential nutrients they need for optimal

growth and health. Fodder crops play a crucial role in the agricultural industry as they are specifically grown or collected to provide essential nourishment for animals. These crops come in different forms such as forage, silage, and hay, each serving a unique purpose. Forage is cut green and fed fresh to animals, ensuring they receive a balanced diet. Silage is carefully preserved under anaerobic conditions, retaining its nutrients for longer periods of time. Lastly, hay is a dehydrated or dried green crop that serves as an excellent source of nutrition when fresh feed may not be readily available. These versatile fodder options ensure the health and well-being of livestock by providing them with adequate sustenance throughout the year. Sorghum and Egyptian clover, together covering an impressive 4.5 million hectares, dominate over half of the cultivated fodder area in both the kharif and rabi seasons. This statistic, mentioned by Dagar [1], highlights their significant contribution to the agricultural landscape. Farmers are growing grasses and legumes including hybrid Napier, guinea grass, velvet bean, etc. in many areas. Small and marginal farmers with domestic animals, usually harvest branches of trees as fodders during drought or scarce periods. As per records of the Directorate of Economics & Statistics, [8], the area covered by permanent pastures and other grazing land is 10.34 M ha and has been decreasing with time and is gradually becoming less. The productivity of pastures has also been falling due to overgrazing [9]. 54 per cent of total fodder is provided by crop residues, while 18 per cent by rangelands, and only 28 per cent are met from cultivated fodder crops [10].

According to IGFRI Vision, 2050, there is currently a net deficiency of 35.6 per cent green fodder, 10.95 per cent dry fodder, and 44 per cent concentrate feed materials in India. Further, the demand for green and dry feed is expected to rise to 1012 and 631 million tonnes, respectively by 2050. In the year 2050, with the current rate of expansion in forage supplies, there will be an 18.4 per cent deficit in green fodder and a 13.2 per cent shortfall in dry fodder. Green forage supply must rise at a rate of 1.69 per cent per annum to satisfy the deficit; however, the area under cultivated fodder accounts for only 4 per cent of the total cultivated land (8.4 million ha) in the country and has remained unchanged over the last few decades. [1]

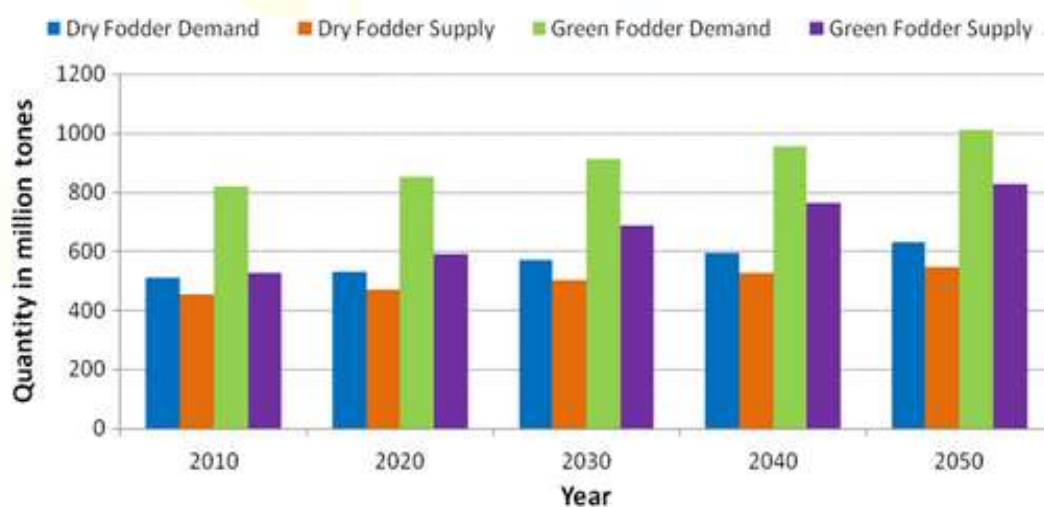


Fig.1. Demand and supply of green and dry fodder in India (Source: IGFRI Vision, 2050)

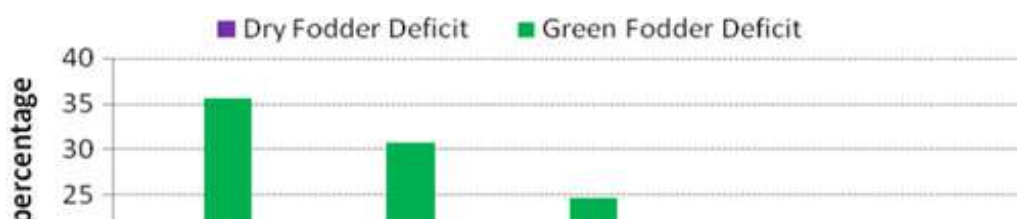


Fig.2. Year-wise green and dry fodder deficit (Source: IGFRI Vision, 2050)

Material and Methods

a) Study area

The region of Hadoti from Rajasthan was chosen as the study area, which is known for its highly varied physi-ographic and biodiversity. The Jhalawar district of Rajasthan lies between $23^{\circ}45'20''$ to $24^{\circ}52'17''$ N latitude and $75^{\circ}27'35''$ to $76^{\circ}56'48''$ E longitude. It is situated in the south-eastern part of Rajasthan and is bounded in the east, south-east and north-west by Kota District and in the south-west by Jhalawar District of Rajasthan. The total area of the district is 6219 Sq. Km. (DSR. 2016). The survey was conducted at six different Tehsil in Jhalawar District of Rajasthan.



Fig 3. Map of different site locations

(b) Methodology

Secondary and primary sources were consulted for gathering data for the study. To assess the status of green and dry fodder demand and availability, communities were interviewed through a questionnaire for the collection and recording of Data. Surveys were confined to various Tehsil of Hadoti region in Rajasthan in 2022-2023. Information regarding details of fodder availability and requirements was documented by interviewing the communities residing in study villages.

Results & Discussion

The present survey for the demand for green and dry fodder was done in 6 Tehsils of Jhalawar viz., Manoharthana, Bakani, Aklera, Jhalrapatan, Sunel, and Jhalawar (Fig.3.). The mean from the collected data revealed that the demand for dry fodder was twice when compared to green fodder (Fig.4.) in each Tehsil which was in conformity with Afzal. The demand for dry fodder, even though costlier is due to the low-grade feedstuffs (rice and wheat straw), which are readily available in the markets but do not meet the requirement of dairy animals. The complete feed is a quantifiable mixture of all dietary elements, which are blended such that to avoid separation, presented as the sole source of nutrients, and designed in the necessary proportion to fulfil the nutrient requirements of animals. Beigh [11] suggested that the proportion of concentrates and roughages varies depending on the nutritional requirements of ruminants for various production goals.

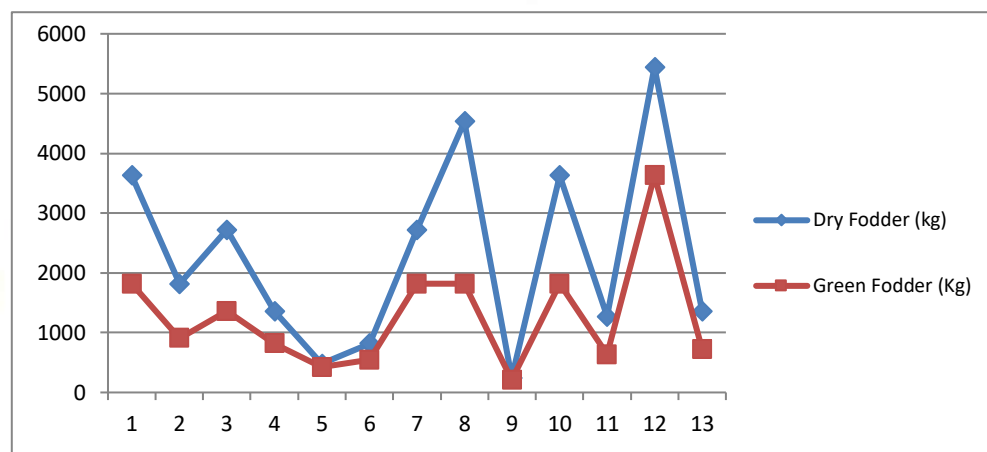


Fig.4. Graphical representation of demand of Dry and Green Fodder in Jhalawar.

According to Bhuvaneshwari [12], over 500 million tonnes of crop residues are produced each year, of which 92 million tonnes are burned, resulting in the emission of harmful greenhouse gases, and contributing to environmental pollution in India. The efficient utilization of such crop residues by using innovative technologies can compete with the problem of dry fodder shortage. Chenost & Kayouli [13] have also recommended the use of chemicals such as sodium hydroxide, urea, or ammonia which react with the lignocellulosic components of the straw to break the ester linkages between lignin, hemicellulose, and cellulose, making the straw available for microbial fermentation. Therefore, familiarity with new techniques among livestock farmers can make them aware of using agricultural residue for enhancing animal production and decreasing the challenges in the demand for dry fodder in Rajasthan.

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