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Study of the Ecosystem of Sirohi District, Rajasthan

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ABSTRACT

Sirohi district in Rajasthan is characterized by a diverse ecosystem that includes arid and semi-arid landscapes, forested regions, and water bodies. The ecological balance in the district is influenced by climatic conditions, natural vegetation, wildlife, and human activities such as agriculture and livestock farming. This paper examines the ecological components of Sirohi, focusing on its biodiversity, water resources, soil characteristics, and the impact of human interventions. The study highlights the importance of sustainable resource management to preserve the region's fragile ecosystem. The ecosystem of Sirohi district, Rajasthan, is a complex interplay of climatic conditions, natural resources, and human activities. Sustainable management strategies, including afforestation, soil conservation, and efficient water use, are vital for preserving the region's ecological health. Future research should focus on adaptive strategies to mitigate climate change impacts and ensure environmental sustainability in the district.

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Introduction

Sirohi district, located in southwestern Rajasthan, has a unique ecological setting influenced by its topography, climate, and human activities. The region comprises a mix of hilly terrain, plains, and drylands, supporting a variety of flora and fauna. Understanding the district's ecosystem is essential for implementing sustainable development strategies and conservation initiatives.
India is currently the world's largest milk producer with an annual growth rate of approximately 4%. The country's milk production was estimated at 110 million tonnes in 2010. The majority of milk produced in the country (more than 46%) is consumed in the form of milk powder. There is considerable interest in the production and use of animal products for human consumption (Singh et al., 2012). Milk production capacities of cows can be increased by appropriate management, feeding, handling etc. which will affect the expression of their genes. Before identifying animals for breeding and production, they should be examined according to their physical characteristics (Singh et al., 2013). While the number of goats in our country was 47.14 million in 1951, it increased to 124.5 million in 2005 (Singh and Sharma, 2013a) and (Singh and Sharma, 2014). Gir breed is considered as a good milk producer among local breeds and its production potential should be investigated to understand its future expectations. Improvement can be achieved by appropriate management, feeding, handling and other environmental conditions affecting behavioral adaptations; however, their limitations are determined by genetics (Singh et al., 2013b). The aim of this study is to investigate the importance and significance of dairy goats in India in terms of region and agriculture. Goat rearing in India is subject to ecological and physiological constraints. Poultry farming is an old industry in India but the science of chicken rearing is very new. It has important industrial, food, commercial, sports and research areas. This also plays an important role in increasing the economic interests of poultry farmers. Many governments and NGOs have also recognized the importance of poultry farming as an economic activity and are working to encourage more and more entrepreneurs to venture into the business (Singh et al., 2014a). Goats play an important role in the Asian agricultural economy, especially for resource-
poor people living in harsh environments (Singh et al., 2014b). There are currently 921 million goats in the world, more than 90% of which are in developing countries. Asia, home to the world's largest goat population, hosts approximately 60% of the world's total goat population, with domestic goats accounting for the largest share at 26%. Goats play an important role in the agricultural economy of Asia, especially for resource-poor people living in harsh environments. Non-
bovine milk accounts for approximately 15% of all human milk consumed worldwide (Singh et al., 2014

c). Goats are often poorly managed because they are prone to stress and rural people often keep goats for family consumption. Such results often do not reflect national estimates due to illegal trade and poachin g (Singh et al., 2014d). Milk protein is always homogenized because it does not contain lectins. This mil k (fat content etc.) is also more similar to human milk than cow's milk. For these reasons, goat's milk ma y be suitable for babies and people who have difficulty digesting cow's milk (Singh et al., 2014e). Goat meat is an excellent source of protein and is the best meat available in the domestic market. It is leaner t han other red meats and its fat contains essential fatty acids. Archaeological remains collected in Wester n Asia (Singh et al., 2014f) prove that goats were domesticated in 6-
7 BC. The daily life of a large section of the Indian population is based on agriculture, including goat rea ring, which is an important rural economy for small farmers and landless labourers (Singh et al., 2014g). The reproductive performance of animals is controlled by many factors such as age at onset of pregnanc y, age at calving, time of first pregnancy, etc. However, this study was applied only to the study of repro ductive performance of animals at first calving (Singh et al., 2014h). Known as ‘baby goats’ in England and ‘poor man’s cattle’ in India, goats were among the first domesticated animals. Goat milk contains le ss lactose than cow milk and is therefore less likely to cause lactose intolerance (Singh and Sharma, 201 5). Goat meat is the best source of protein and the best meat available in the domestic market. It is leaner than other red meats and its fat contains essential fatty acids. Goats were domesticated as early as 6-
7 BC as evidenced by archaeological remains collected in Western Asia. It has played an important role in the social economy in the development of human progress worldwide (Singh and Sharma, 2015a). Mi llet is an important source of energy for animals and is fed during critical periods such as lactation, illnes s and weight gain. Farmers prefer hay as feed because they believe that grass is more nutritious for anim als. Farmers prefer Deda over Kona because Deda has a higher biomass yield (Singh and Sharma, 2015b). This also explains why goat farmers rarely consider the potential for increased production through cro ssbreeding or hybridization. A very important factor in this is the risk perception and emphasis on low ri sk among resource-
poor farmers (Singh and Sharma, 2016). Goats are a diverse animal species that produce meat, milk, leat her, fiber and dung. The country is rich in biodiversity due to its large population (Singh and Sharma, 20 16a).

The nutritional value of milk is closely related to its composition and is affected by factors such as breed ing, nutrition, lactation period and season. Livestock is the backbone of Indian agriculture, contributing 7% of the country’s GDP and providing employment and livelihood to 70% of the rural population. Indi a ranks first in milk production (129.7 million tonnes), but production is very low mainly due to lack of f

odder and animal feed (Singh et al., 2017). Animals reared in production systems consume large amount s of protein and other nitrogenous substances in their diets (Singh et al., 2017a). Small ruminants have p ositive impacts on the economy and human nutrition in tropical and subtropical countries. Such results o ften do not reflect national estimates due to illegal trade and poaching (Singh and Sharma, 2017b). Jamn apari (or Jamunapari) is a breed of goat native to the Indian subcontinent. They have been imported to In donesia since 1953 (cross-

breeding with local goats to become known as "PE", Peranakan Etawa goats or Etawa) and are very succ essful there. This breed of cattle is raised for milk and meat production. It is named after the Yamuna Ri ver in India and the Yamuna (West Bengal) and Yamuna (Bangladesh) in Bangladesh. The coat color is very variable, but is usually white with small brown markings on the head and neck. The breed is usuall y characterized by a large, feathered nose, giving it the appearance of a parrot's beak (Singh et al., 2007). (2017c). Domestication has resulted in changes in the phenotypic traits of wild goats, leading to the eme rgence of various goat breeds or species. These species or species have been distributed globally, primar ily due to human migration and displacement due to changes in climate and natural resources (Singh and Sharma, 2017d). Goats play an important role in the agricultural economy of Asia, especially for resour ce-

poor people living in harsh environmental conditions. Approximately 15% of human milk consumed wo rldwide is derived from milk other than bovine milk. Approximately 59% of the world's goat production comes from Asia (Singh et al., 2018). There is a large poultry industry that provides us with eggs and chi cken. One of the biggest limitations in poultry farming is the emphasis on plant production rather than a nimal production. In recent years, the poultry industry has begun to adapt to meet the demand for afford able and safe meat and egg sources (Singh, G. 2019). India accounts for a significant portion of the worl d's livestock, and this number continues to increase. Bison are usually found in poor countries where liv estock and human populations are high and food resources are scarce. In tropical and subtropical regions , dairy cattle often rely on native or introduced pastures as a food source, especially during critical times of the year such as winter or the dry season, when cattle are unable to meet their nutritional needs due to scarcity or poor quality of feed (Singh, G., 2019a and Singh et al. 2020). The milk tissue and various duc ts in the udder can be damaged by bacterial toxins, sometimes resulting in udder damage. Severe cases c an be fatal, but even in healthy cows, there are consequences for the remainder of the lactation and post-lactation (Singh and Singh, 2020). Livestock farming has become an integral part of all interventions to r educe rural poverty and improve food and nutritional security. Cattle and buffalo farmers are still unawa re of scientific management practices (Singh and Somvanshi, 2020a and Singh, G., 2024). Humans, ani

mals and nature live in a symbiotic relationship for survival and reproduction. To meet the demands of i ncreasing population and livestock, natural resources are being overexploited and our resource balance, which has been maintained for thousands of years, is being disrupted (Singh et al., 2024a). The nutrition al value of milk is closely related to its composition, which is affected by factors such as birth, nutrition, lactation period and season. Goat milk contains more calcium (Ca), phosphorus (P), potassium (K), mag nesium (Mg) and chloride (Cl) and less sodium (Na) and sulfur (S) compared to cow milk (Singh et al. 2 024b) and (Singh et al. 2025a). Dairy cows need nutrients to maintain their metabolic functions, growth, milk production, development, and health. Animals cannot produce food in their bodies, and the food an d feed often given to cattle does not contain all the nutrients they need (Singh et al. 2024c). Goats are co nsidered the first domesticated animals and have the widest range of all domesticated species except dog s (Singh et al. 2024d and Singh et al. There is great interest in the production and use of animal products for human consumption (Singh et al., 2025 and Singh et al., 2025a). In today's competitive business wor ld, all organizations are dependent on the environment to achieve their advertising goals, and advertising through advertising provides both commercial and non-

commercial organizations with the opportunity to respond to rapid changes and spread relevant message s (Sharma and Mehta, 2020). Management and organization are an important part of any business and in clude activities such as setting goals, deciding on actions, planning and implementing organizational ser vices through the coordination of skilled and unskilled labor (Sharma, K.2019). With the development o f the economy, knowledge workers, as carriers of knowledge capital, have become important skills to cr eate and sustain good results in the business world (Sharma and Mehta, 2020a).

Environmental sustainability is promoted by making sound decisions and creating policies that protect th e environment and nature around us, ensure the preservation of natural vegetation, and give more import ance to the preservation of natural support systems necessary for human survival (Sharma et al., 2020b). Human resource management helps in implementing various HR functions such as recruitment, orientati on, training, performance appraisal, and includes planning and development of employees or retention of intellectual capital (Sharma and Agrawal, 2020c). Environmental sustainability means preserving the en vironment for future generations and supporting human life. It is an action that involves making decision s to protect the natural world and recognizing the impact of business organizations on the environment (Sharma and Agrawal, 2021). Environmental changes and increasing interest in learning have eliminated the difficulties and challenges of distance learning and online learning has become a popular tool for lear ning in remote environments due to the importance of lifelong learning (Sharma and Choudhary, 2020d)

. Digital education is one of the top priorities for the Indian government and is essential to provide educa tion to students who are not interested in rural schools (Sharma and Choudhary, 2020e).

Organization have grown interest in strategies which address environmental aspects and pursue new opportunities for sustainability creating a competitive landscape to comeback the effect of environmental destruction and take into consideration organization practices for initiating environment protection (Sharma and Agrawal, 2019a). Education system in historical times was sound enough to impart knowledge through practical training and building a strong relationship between Guru and Shishya (Sharma, et al. 2020f). Health care Services are the primary need and is very crucial for an economy like India where a large population to serve the increasing demand for high quality health care services (Sharma and Jain, 2021a). The competitive business environment around the globe has made advertisement an important tool for every organization to create a buzz in the society (Sharma and Gupta, 2017). Advertisements to spread information regarding social issues are known as social advertisements. In recent times, many commercial organizations have initiated advertising their brands accompanying with a social message which was earlier done only by government and non-government organizations with an objective of social welfare (Sharma and Gupta, 2020g). Sirohi, known as the "Land of Monasteries," has a rich agricultural and dairy heritage. Goat milk, a traditional product in the region, is highly nutritious and hypoallergenic, making it an attractive choice for health-conscious consumers. (Sharma, et al. 2025).

Components of the Ecosystem in Sirohi District

1. Climate and Weather Patterns

Sirohi experiences a semi-arid climate with hot summers and mild winters. The average annual rainfall is approximately 600 mm, with monsoonal variations influencing vegetation and water availability.

2. Soil Types and Land Use

The district has diverse soil types, including sandy, loamy, and black soils. Agriculture is a primary land-use activity, with crops such as bajra, wheat, and pulses being cultivated. However, soil erosion and degradation remain significant concerns due to deforestation and overgrazing.

3. Water Resources and Conservation

Major rivers such as the West Banas and Sukli contribute to the district's hydrological system. Traditional water conservation techniques, including stepwells and rainwater harvesting structures, play a crucial role in maintaining water availability in this drought-prone region.

4. Flora and Fauna

Sirohi district hosts a variety of vegetation types, ranging from dry deciduous forests in the Aravalli Hills to scrublands in lower elevations. Notable wildlife species include leopards, hyenas, deer, and various bird species. Conservation efforts are essential to maintain the district's biodiversity.

Human Impact on the Ecosystem

1. Agriculture and Livestock Farming

Farming and livestock rearing, particularly goat husbandry, are critical economic activities. However, overgrazing and improper land-use practices contribute to land degradation and biodiversity loss.

2. Deforestation and Land Degradation

The demand for fuelwood and timber has led to deforestation, reducing forest cover and affecting soil quality. Conservation strategies, such as afforestation and controlled grazing, are needed to mitigate these impacts.

3. Water Scarcity and Management

Groundwater depletion and irregular rainfall patterns challenge the region's water security. Sustainable water management practices, including watershed development and improved irrigation techniques, are crucial for long-term ecological stability.

Conservation and Sustainable Development Strategies

1. Reforestation and Agroforestry

Planting native tree species and integrating agroforestry practices can enhance soil fertility and prevent erosion.

2. Community-Led Resource Management

Empowering local communities through education and participation in conservation programs ensures the sustainable use of natural resources.

3. Policy and Government Support

Effective policies and government initiatives promoting sustainable agriculture, water conservation, and biodiversity protection are essential for maintaining ecological balance in Sirohi.

Conclusion

The ecosystem of Sirohi district, Rajasthan, is a complex interplay of climatic conditions, natural resources, and human activities. Sustainable management strategies, including afforestation, soil conservation, and efficient water use, are vital for preserving the region's ecological health. Future research should focus on adaptive strategies to mitigate climate change impacts and ensure environmental sustainability in the district.

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