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MINI REVIEW

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Indigenous and exotic cattle breeds in India: utilization patterns, biodiversity significance, and threats to native genetic resources

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ABSTRACT

India has a wide variety of indigenous cattle with rich biodiversity. The Indian cows and their characteristics play an important role in the lives of people. They are widely used in the dairy and draught purposes thus help in the development of the rural economy of the country. Some exotic varieties were also introduced in India from other countries that have adapted and flourished well in India. This review reports and describes some important indigenous and exotic cattle breeds of India and their uses. On the basis of main uses, Indigenous cattle breeds are classified in to milch (cow and buffaloes for milk), draft (load carrying such as ox), and dual purpose (i.e. milk and draft).These important cattle varieties are declining because of the various threats they are facing such as mismanagement, high import of exotic varieties, outdated dairy policies etc. which have also been mentioned in this review. Despite the conservation efforts, the population of some of the breeds have declined over years and reason for such decline in numbers of such breeds is reduced productivity which is an uneconomical proposition for farmers. The solution therefore lies in the genetic improvement of these breeds for milk production. Efforts in improving indigenous varieties rather than importing exotic ones is the need of the hour. This will not only ensure that these breeds become more productive, it will also stop their further decline.

KEY WORDS

Biodiversity; Cattle; Policy; Farmer; Agro-economy; Indigenous livestock

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Introduction

India has been blessed with a large repository of indigenous bovine population with rich bio-diversity. There are 50 well-defined breeds of cattle and 17 breeds of buffaloes. Of the more than 800 cattle breeds recognized worldwide, India had 27 acknowledged indigenous breeds of cattle and 7 breeds of buffaloes. As of 2018 the ICAR recognized 50 breeds that are indigenous in India [1,2]. These breeds have evolved over generations, surviving due to their adaptability to harsh climatic conditions, ability to perform on poor quality feed and fodder, resistance to diseases etc. Adult males of some native breeds are also known for their draft qualities. Thus these Indigenous breeds are well adapted to our existing agro-climatic conditions and are resistant to many tropical diseases and can survive and produce on marginal and poor feed and fodder resources. Some of these breeds are well known for their high milk and fat production. However, the production potential of these animals has deteriorated over a period of time due to lack of selection.

A breed is group of one species of animals, which have the same descent and are similar in body shape, size and structure. Examples: Amrithmahal, Kangayan, Malvi, Siri, Hallikar, Khillari etc. Often, breeds resemble each other with slight morphological differences, but because of constant inbreeding in one locality, independent breeds have evolved. There are total 231 breeds of cattle in the world out of which 37 are in India. Most indigenous cattle breeds in the tropics are multipurpose (milk, draught) and that only a few breeds have good milk potential.

Aim and Purpose of the Review

The present review aims to:

1. Provide a comprehensive overview of indigenous and exotic cattle breeds in India.
2. Classify indigenous breeds based on their utilization patterns.
3. Highlight the importance of cattle biodiversity for India's agro-economy and genetic conservation.
4. Identify major threats contributing to the decline of indigenous cattle breeds.
5. Discuss conservation initiatives and recommend strategies for sustainable utilization and preservation of native cattle genetic resources.

Classification of Indigenous Cattle Breeds Based on Utilization

On the basis of main uses, Indigenous cattle breeds are classified in to milch (cow and buffaloes for milk), draft (load carrying such as ox), and dual purpose (i.e. milk and draft) [3,4].

Milch breeds: The cows of these breeds are high milk yielders and the male animals are slow or poor workers. The milk production of milk breeds is on the average more than 1600 kg. per lactation. The examples of Indian milch breeds are Sahiwal, Red Sindhi, Gir and Deoni.

Dual Purpose breeds: The cows in these breeds are average milk yielder and male animals are very useful for work. Their milk production per lactation is 500 kg to 150 kg. The example of this group are Ongole, Hariana, Kankrej, Deoni, Rathi, Mewathi, Dangi and Nimari.

Draught breeds: The male animals are good for work and cows are poor milk yielders and their milk yield on an average is less than 500 kg per lactation. They are usually white in colour. The example of this group is Hallikar, Amritmahal, Khillari, Bargur, Nagori, Bachaur, Malvi, Kenkatha, Kherigarh, Kangayam, Ponwar, Siri, Gaolao, Krishna Valley.

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India has 37 pure cattle breeds. Five of these - Sahiwal, Gir, Red Sindhi, Tharparkar and Rathi are known for their milking prowess. A few others, such as Kankrej, Ongole and Hariana, belong to dual breeds that have both milch and draught qualities; ie, they are good plough animals. The rest are pure draught breeds. Some breeds of cattle are described here with their potential applications.

Description of Selected Indigenous Cattle Breeds

Indigenous Draught breeds of cattle

They are breeds mainly meant for transport and field work. They originated from the former princely state of Vijayanagaram, presently part of Karnataka. Their colour is grey or dark grey. They are compact, muscular and medium size animal with prominent forehead, long horns and strong legs. The breed is best known for its draught capacity and especially for its trotting ability. Both bulls and cows have horns. The cows are average milk producers andan average can produce about 542kg of milk/lactation. Green fodder, chiefly comprises finger millet, grass sorghum or pearl millet.

Uses

The bulls are known for their strength and endurance and are primarily used for draft purposes. Along with normal draught purpose, the Breed is also used for cart racing. It is considered as one of the premier draft cattle breeds in India. They are also good milk givers.

Red Sindhi

They are breeds mainly meant for milk production. Examples: Gir, Red sindhi, Sahival and Deoni. This breed is otherwise called as Red Karachi and Sindhi and Mahi. Originated in Hyderabad and Karachi (Pakistan) regions of undivided India and also reared in certain organized farms in our country. Colour is red with shades varying from dark red to light, strips of white. They having short, curved, lyre shaped horns. The bulls are usually of a darker colour than the cows.

Uses

Bullocks despite lethargic and slow can be used for road and field work. They are also milk givers. The heritability for milk yield is 0.30 to 0.35. Milk yield ranges per lactation, from 1250 to 1800 kgs.

Ongole (dual purpose breeds)

They are used for both work and production of milk. Examples: Hariana, ongole, etc. Otherwise known as Nellore. Home tract is Ongole taluk in Guntur district of Andhra Pradesh. They have a large muscular developed hump. They are suitable for heavy draught work. They are White or light grey in colour. Average milk yield is 1000 kgs per lactation. Animals of the Ongole breed were extensively exported to USA for beef production and also Brazil for beef and milk, Sri Lanka for drought etc. The Breed produces moderate milk with an average of 798 kg per lactation. In average fat percentage is about 3.79 percent.

Buffalo breeds

Total Buffalo Population in the country is 109.85 Million during 2019. Total Buffalo has increased by 1.1% over previous Livestock Census (2012). Female Buffalo Population increased by 8.61% whereas Male Buffalo is declined by 42.35% over previous census. About 20.5% of the total livestock is contributed by buffaloes.[5]

Surti

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A well-known is Surti also known as Deccani, Gujarati, Talabda, Charator and Nadiadi. Coat colour varies from rusty brown to silver-grey. The breeding tract of this breed is Kaira and Baroda district of Gujarat. Tail is fairly long and back is straight. The horns are sickle shaped, moderately long and flat. The peculiarity of the breed is two white collars, one round the jaw and the other at the brisket region. The milk yield ranges from 1000 to 1300 kgs per lactation. The peculiarity of this breed is very high fat percentage in milk (8-12%).

Uses

They are mainly used for milk production purpose. The bullocks are used for good light work.

Nagpuri

This breed is also called as Elitchpuri or Barari. The breeding tract of this breed is Nagpur, Akola and Amarawati districts of Maharashtra. These are black coloured animal with white patches on face, legs and tail. The horns are long, flat and curved, bending backward on each side of the back. (Swaord shaped horns). The bullocks can be used for heavy work. The milk yield ranges from 700 to 1200 kgs per lactation. The age at first calving is 45 to 50 months with an intercalving period of 450 to 550 days. It is an central Indian breed. They having 7.7% of fat soluble in milk. These breeds are slow movement and less active.

Uses

It is very good for milk production. Male animals are used for draft purposes but it works slow than bull.

Exotic Diary Breed

They are breeds originated outside India and then imported to our country. Examples: Holstein, Ayrshire and Redden etc.

Holstein Friesian

Originated from the northern parts of Netherlands, especially in the province of Friesland. Largest dairy breed and ruggedly built is shape and possess large udder. Breeds have typical marking of black and white that make them easily distinguishable. The average milk production of cow is 6000 to 7000 kg per lactation. The adult males and females about 800 to 900 kg and 500 26 50 kg respectively. The healthy calf weighs 40 to 50 kg or more at birth. Generally breeders plan for Holstein Friesian to calve for the first time between 21 and 24 months of age. The gestation period is about 9 and half month. Breeders important specialised Dairy holstein from the United States to cross with the European black and whites.

Uses

It is an adult purpose breed, used for both dairy and beef. The exotic breed of cattle are high milk production.

Red Dane (Danish red)

Orginated in Denmark. Body colour of this Danish breed is red, reddish brown or even dark brown. It is also a heavy breed. The lactation yield of Red Dane cattle varies from 3000 to 4000 kg. They having great heat tolerance. It having fat content is about 4% and above. The calving interval 13 months. Both bulls and cows usually may have small horns. This breed is disease resistant and we'll adopted to varying climates. Mature males weighing up to 950kg and mature female is about 600kg.

Uses

The Danish red cattle are a dual-purpose animal. They are raised for both milk and meat production.

Importance of Cattle Biodiversity for Agro-Economy and Genetic Conservation

Cattle biodiversity is vital for India's agro-economy, particularly for small and marginal farmers who rely on indigenous breeds for milk, draught power, manure, and income security. Indigenous cattle contribute to climate-resilient agriculture due to their adaptability and low input requirements. Conserving these genetic resources is essential for future breeding programs, food security, and sustainable agricultural development.

Key findings and major threats to Indigenous Cattle

The review highlights a steady decline in indigenous cattle populations due to:

- Indiscriminate crossbreeding with exotic cattle
- Poor productivity and lack of genetic improvement

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- Economic constraints faced by smallholders
- Inadequate and outdated dairy policies

Studies suggest that continued neglect of indigenous breeds could force India to depend on milk imports in the future [6].

Conservation initiatives and policy frameworks

Several initiatives have been launched to conserve indigenous cattle breeds:

- **Rashtriya Gokul Mission:** Focuses on breed improvement, conservation, and establishment of Gokul Grams.
- **ICAR–NBAGR Programs:** Emphasize breed registration, documentation, and germplasm conservation.
- **FAO's DAD-IS Framework:** Provides a global platform for monitoring animal genetic resources.

Recommendations for conservation and sustainable utilization

- Strengthening in situ and ex situ conservation programs
- Promoting selective breeding of indigenous cattle
- Providing economic incentives and awareness to farmers
- Integrating traditional knowledge with modern breeding technologies

Some Interesting Facts about Cow Breeds in India [7]:

The Smallest Cow: The Punganur dwarf cattle of the Chittoor District of Andhra Pradesh. It is the smallest cow in the world.

Best Cow Breed: Sahiwal is the best cow breed in India.

Highest Milk-Producing Cow: The Red Sindhi Cow is the highest milk-producing cow in India.

Most Expensive Cow: The Ongole breed is the most expensive cow in India.

Threats to Indigenous Cattle

A recent investigation reveals that in 10 years, India will be forced to start importing milk, and that Indian cow will cease to exist [6].

Due to several reasons:

First reason is India, over the past few decades, imported several exotic cow varieties to gain a boost in milk production. In Punjab, for example, 80% of the state's one lakh stray cattle are exotic breeds. These breeds theoretically produce a lot of milk, but are not well-adapted to Indian conditions.

Second reason is 69% of Indian cows are owned by the economically poor strata of the society. These folks cannot afford to house these exotic breeds in regulated climate conditions.

Third reason is that the government has significantly mismanaged cow breeding. The average milk yield per animal in India is just 3.2 kgs, compared to a global average of 6.6 kgs.

The dairy policy and outlook are highly outdated and needs to be replaced with modern, evidence-based thinking.

Conclusions

India has a wide variety of indigenous cows with rich biodiversity. The Indian cows and their characteristics play an important role in the lives of people. They are widely used in the dairy and draught purposes thus help in the development of the rural economy of the country. Despite the conservation efforts, the population of some of the breeds have declined over years and reason for such decline in numbers of such breeds is reduced productivity - an uneconomical proposition for farmers. The solution therefore lies in the genetic improvement of these breeds for milk production. Systematic efforts in improving indigenous varieties rather than importing exotic ones is the need of the hour. This will not only ensure that these breeds become more productive, it will also stop their further decline.

Disclosure Statement

No potential conflict of interest was reported by the author.

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