

# Adoption of Technologies for Profitable Mithun Husbandry in Northeastern Hills region of India

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Mithun, often called the 'Cattle of the Mountains,' is a unique and valuable bovine species found in the Northeastern Hills region (NEHR) of India-Arunachal Pradesh, Nagaland, Manipur, and Mizoram. It has also been found in China, Myanmar, Bhutan, and Bangladesh. Mithun thrives in these hilly states, challenging terrain and harsh weather conditions at moderate altitudes along the Himalayan slopes. It can thrive in a free-range system within dense forest areas. In addition, Mithun displays remarkable disease resistance compared to cattle, and has distinct feeding habits.

Mithun is the pride of the NEHR of India. This animal holds the distinction of being the state animal in Arunachal Pradesh and Nagaland while also serving as the official state emblem of Nagaland. Traditionally, tribal farmers in the NEHR have reared Mithun in free-range conditions within dense forests at altitudes ranging from 1000 to 3000 meters above sea level.

Mithun holds great significance in the lives of tribal communities in the NEHR, serving as a valued,

versatile animal deeply entwined with their socio-economic, religious, and cultural traditions. It is also used for fieldwork in some parts of Arunachal Pradesh. Ownership of the Mithun herd is considered a sign of prosperity and the highest social status in society, particularly in the states of Nagaland and Arunachal Pradesh. Mithun is also used as a form of 'currency' in trade, for valuable exchanges, penalties, marriage gifts, and more in Nagaland. This

animal is primarily raised for meat, with additional uses for milk and hides. They are frequently sacrificed for meat during significant social ceremonies and festivals.

Recently, Mithun has been included in the Domestic Animal Diversity Information System (DAD-IS) database. Mithun meat, known as 'Weeshi' holds immense potential for creating value-added meat products due to its exceptional tenderness and quality. Notably, the Food Safety and Standards Authority of India (FSSAI) officially recognized Mithun as a food animal. This move not only broadens culinary choices for meat enthusiasts across India but also serves as a catalyst for socio-economic development in the regions where Mithun is raised.

Mithun produces 1–1.5 kg of milk per day with high-fat content (8–13%), solid-not-fat (18–24%), and protein (5–7%), making it ideal for value-added milk products. The ICAR-National Research Centre on Mithun in Nagaland has successfully standardized products such as meat nuggets, meat powder, meat patties, meat blocks, paneers, sweet products, ghee,

cream, cheese barfi, rasgulla, curd, and lassi using Mithun milk (Mondal et al., 2014). Additionally, Mithun hide yields high-quality leather, superior to cattle, and can be processed into various goods such as bags and shoes (Das et al., 2011).

### Semi-Intensive System

In the hilly regions of the NEHR, tribal farmers traditionally reared Mithun under free-grazing conditions within dense forest areas. This traditional approach involves minimal inputs with no additional feed supplementation or housing. Farmers occasionally visit the forest to provide salt to their Mithun. Some farmers have constructed temporary shelters with locally available materials in specific locations for shelter and salt feeding. They train their Mithun to return to these areas daily with a small amount of salt, enabling regular monitoring.

However, several challenges have emerged, including a decline in forest areas due to urbanization, deforestation caused by shifting cultivation (Jhum), village boundary conflicts, difficulties in fencing hilly jungles, hunting by poachers, and predation of Mithun (especially newborn calves) by wild animals. Additionally, the absence of an organized Mithun meat market has contributed to a decline in Mithun husbandry among tribal farmers in the NEHR.

To address these issues, there is a need to promote and practice scientific Mithun husbandry, particularly through semi-intensive methods instead of the traditional free-range approach. The feasibility of semi-intensive Mithun husbandry has been successfully demonstrated by the ICAR-National Research Centre on Mithun, Nagaland, over the past two and a half decades at their institute, Mithun Farm. This shift towards a more structured approach holds promise for revitalizing Mithun husbandry in the region.

In the semi-intensive system of Mithun rearing, farmers constructed shelters using locally available materials, requiring minimal capital investment. These shelters provide a secure place for animals to rest at night after grazing in the forest during the day, offering comfort, protection from harsh weather, and safety from predatory animals. This scientific approach to Mithun husbandry using a

semi-intensive method offers the following advantages.

1. Allow supervision of individual animal care and management.
2. Additional feeding and ad libitum watering of the animals.
3. Proper healthcare, including vaccination and quarantine, to prevent the spread of diseases.
4. Detection of estrus and breeding of either natural service or artificial insemination (AI) with superior germ plasma.

### Feeding Managements

In the traditional method of Mithun rearing under free-range conditions, these animals rely solely on foraging in the jungle for nutrition, consuming tree fodders, shrubs, herbs, and natural vegetation without any additional feed or mineral supplementation. However, this approach has certain limitations. During the rainy season, mineral leaching is common in hilly forest areas, leading to deficiencies in essential minerals within forage. In addition, the availability of nutrients in jungle fodder decreases in terms of both quality and quantity during the lean winter season. This can result in suboptimal growth rates and productivity in Mithun over a short period.

Under these circumstances, and to ensure maximum growth and productivity, a scientific feeding management approach is essential, which can be achieved through a semi-intensive method. In this system, Mithun's nutrient and mineral requirements are met by providing concentrate and mineral mixtures in the shelter during the late evening or early morning, when the animals are tied. In addition, ample drinking water is available to the animals. During the rainy season, when abundant jungle fodders are available, mineral mixtures and salt are the main additional supplements required. However, in the winter or lean season, it is advisable to offer additional concentrate feed (with 15% protein and 70% total digestible nutrients) fortified with a salt and mineral mixture (1 to 2 kg per animal daily for up to 2 years, and 2 to 4 kg per animal daily for those above 2 years) to maintain optimal performance (Das et al., 2011). This approach ensures that Mithun farmers

achieve the best possible results in terms of growth and productivity.

### Breeding Management

Mithun, similar to cattle, is a polyestrous animal capable of breeding year-round, with winter and spring being favorable seasons. Female Mithun calves reach puberty at 27–36 months of age (Mondal et al., 2014). Adult female Mithun exhibit repeated estrus cycles at intervals of 19 to 24 days, unless they are pregnant (Mondal et al., 2014). The gestation period, service period, and calving interval for Mithun typically range from 270 to 290, 50 to 100, and 350 to 400 days, respectively (Mondal et al., 2014).

In a free-range system, one superior and tested bull is typically introduced into a herd of 10 breedable females while simultaneously removing unwanted bulls. To prevent inbreeding depression, it is advisable to replace breeding bulls approximately once every five years. Detecting cows in heat can be challenging because of their silent estrus behavior when relying on visual observations alone.

Semi-intensive farming allows for the improved breeding of estrus cows using superior bull germplasm through methods such as artificial insemination (AI) or natural services, similar to cattle. It also facilitates the effective use of estrus synchronization along with fixed-timed AI and embryo transfer technology (ETT) to enhance Mithun production.

In the semi-intensive method, the identification of estrus females is more manageable. This can be achieved using a vasectomized bull and breeding with superior bulls, either through natural service or artificial insemination (AI). Therefore, the reproductive efficiency of Mithun farming can be improved. The characteristic signs of estrus include the following.

- Soft and slightly swollen vulva with mucus membrane congestion.

- Clear and transparent mucus discharges into the vagina and sometimes hangs from the vulva.
- Tail-raising, frequent urination, and loss of appetite.
- Loose diarrhoea-like feces during estrus
- Showing interest in bulls.

Among all the behavioral signs of estrus, mounting the Mithun bull over the estrous cow was the best indicator of estrus.

### Conclusion

Mithun husbandry has long been a vital part of the local livestock production system in the hilly regions of northeastern India. However, the traditional method of free-range rearing is now facing a critical challenge as dense forest land continues to shrink. In light of evolving socioeconomic dynamics, the infusion of technology into Mithun husbandry serves not only the growing demand for meat protein but also presents an opportunity to generate additional income for the tribal communities that rear Mithun for their livelihoods. Therefore, it is imperative to prioritize and actively promote the dissemination of awareness and technology transfer in these regions. By embracing scientific farming practices in the northeastern hilly states of India, where Mithun rearing has a deep-rooted tradition, we can ensure the sustainability and prosperity of this invaluable practice, while meeting the evolving needs of the times.

### References

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