NATIONAL ENVIRONMENTAL SCIENCE ACADEMY (NESA)

International Journal on Agricultural Sciences
http://nesa-india.org | http://journal.nesa-india.org/index/IJAS
IJAS 16(1): 1-11 **(2025)** • ISSN: 0976-450X
https://doi.org/10.53390/IJAS.2025.16101

OSTRICH FARMING IN INDIA

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Review Paper

Received: **12.11.2024** Revised: **16.01.2025** Accepted: **27.02.2025**

ABSTRACT

Ostrich farming is a relatively new and niche industry in India. As the country looks for alternative livestock farming options to meet the growing demand for protein and exotic meats, ostrich farming is gaining traction, though it is still limited compared to traditional poultry or livestock farming. Ostriches are native to Africa but can adapt to various climates, making India a suitable location, especially in regions with dry or semi-arid climates. Indian states like Maharashtra, Tamil Nadu, and Andhra Pradesh have shown interest in ostrich farming due to the suitable environment and demand for alternative meats. Ostrich meat is lean, low in cholesterol, and high in protein, making it an attractive choice for health-conscious consumers. It's often marketed as a healthier alternative to red meats like beef and mutton. With an increasing demand for exotic meats, especially in urban areas, ostrich farming in India could expand. Industry experts suggest that partnerships with food-processing companies and targeted marketing could help make ostrich products more mainstream. There is also potential for export to meet global demand for exotic meats and leather. Ostrich farming in India remains an emerging industry with substantial potential, especially in niche and export markets. While it faces challenges in consumer acceptance, infrastructure, and investment, growing interest in diverse food sources and sustainable farming may boost its prospects in the coming years.

No. of Pages: 11 **References: 37**

Keywords: Ostrich, India, farm, production, meat, eggs.

INTRODUCTION

An ostrich (Fig 1) is the world's largest bird, native to Africa. It belongs to the species *Struthio camelus* Linnaeus, 1758 and is known for its distinctive appearance, long legs, and large size (King and Mclelland, 1984). Ostriches cannot fly, but they are extremely fast runners, capable of reaching speeds up to 70 km/h (43 mph) (Osterhoff, 1979). They are also known for their large, powerful legs, which they use for defence, and their long necks, which help them spot predators from a distance (Synders, 2020). Ostriches have a diet that consists mostly of plants, seeds, and occasionally insects. They lay the largest eggs of any bird species, and these eggs are highly prized for their size (de Mosethal and Harting, 1879; Duerden, 1920). Despite their size, ostriches are very well adapted to survive in hot, arid environments, like savannas and deserts (Osterhoff, 1979).

As of the latest scientific consensus, there are two primary species of ostriches, each with distinct geographical distributions across Africa:

1. Common Ostrich (*Struthio camelus* Linnaeus, 1758): Widely found in Southern African countries such as South Africa, Namibia, Botswana, Zimbabwe,

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and parts of Mozambique; and can also be seen in East African regions of Kenya, Tanzania, and Uganda (Duerden, 1920). They inhabit a variety of environments including savannas, semi-deserts, and open woodlands (Shanawany, 1994a,b). They prefer areas with ample space to roam and access to water sources (Mac Alister, 1964). They are generally classified by IUCN as Least Concern; although certain subspecies may face localized threats (King and Mclelland, 1984).

2. Somali Ostrich (*Struthio molybdophanes* Reichenow, 1883): Primarily located in Somalia, but also found in parts of Ethiopia, Djibouti, and north eastern Kenya. They are adapted to arid and semi-arid regions, including dry savannas and scrublands (Mac Alister, 1964). They thrive in areas with sparse vegetation and limited water availability (Cilliers and Angel, 1999). While both species share common ostrich characteristics-such as large size, flightlessness, and long legs-the Somali ostrich typically has a lighter plumage and may exhibit slight variations in size and coloration compared to the common ostrich (King and Mclelland, 1984). Listed by IUCN as Least Concern; but, due to habitat degradation and hunting pressures local populations can be impacted (Shanawany, 1994a,b).

3. Arabian Ostrich († *Struthio camelus syriacus* Rothschild, 1919): Once native to the Arabian Peninsula, this subspecies is now extinct. Its extinction was primarily due to overhunting and habitat loss (Duerden, 1920; Mac Alister, 1964).

The life cycle of an ostrich consists of several stages, from the egg to adulthood. Here is a breakdown of the main phases: Ostriches lay their eggs in communal nests, called "dump nests," where multiple females may lay their eggs (Shanawany, 1994a). The dominant female usually lays around 7-10 eggs, and other females may add more (Mac Alister, 1964). The eggs are large, weighing about 1.4 kg (3 pounds) each. Both the male and the dominant female take turns incubating the eggs, with the female typically sitting on them during the day and the male taking over at night. This period lasts for about 42 days (Shanawany, 1994b).

Once the eggs hatch, the chicks emerge with a coat of downy feathers. They are well-developed at birth and can walk within hours. The chicks are cared for by both parents and may form larger groups called "creches," where multiple families of ostriches look after the young collectively (Shanawany, 1993). This improves their chances of survival. Ostrich chicks grow rapidly, reaching about half their adult size in six months. They primarily feed on vegetation, insects, and small animals, gradually becoming more independent as they grow (Duerden, 1920). Juvenile ostriches develop adult feathers after about 4-5 months, though they remain smaller and less vibrant than fully grown adults (Osterhoff, 1979). At around 12-18 months, ostriches reach near adult size. Their feathers continue to mature, and their legs and necks grow longer (Mac Alister, 1964). They still rely on their group for protection from predators during this period (Swart and Rahn, 1988).

Ostriches reach sexual maturity between 2 and 4 years old, with females maturing slightly earlier than males. At this stage, the male develops distinctive black and white plumage, while the female remains a more subdued brown (Siegfried, 1984). Once mature, ostriches begin to mate. Males perform elaborate courtship displays to attract females. After mating, the life cycle begins anew with the laying of eggs (Shanawany, 1993). Ostriches in the wild typically live for about 30-40 years, though they can live longer in captivity, sometimes up to 50 years. Throughout their life, they face challenges such as predation, competition for mates, and environmental changes (Van Schalkwyk et al, 1994).

Ecological role played by **ostriches in the nature**

Ostriches play an important ecological role in their habitats, primarily in the savannas and arid regions of Africa. As herbivores, ostriches consume a variety of plants and fruits. The seeds they ingest pass through their digestive systems and are dispersed over wide areas in their droppings. This helps in the regeneration of plant life and promotes biodiversity. Ostriches use their strong legs to scratch and dig into the soil while searching for food. This behaviour helps aerate the soil, improving its structure and promoting water infiltration, which benefits the ecosystem (Samour *et al*., 1984). Ostriches serve as prey for large African predators such as lions, hyenas, and cheetahs. This makes them a key part of the food web, supporting the survival of predators. Additionally, ostrich eggs and chicks are a food source for smaller predators. Through their feeding and excretion, ostriches contribute to nutrient cycling (Siegfried, 1984). Their droppings return vital nutrients to the soil, enriching the environment for plants and other organisms (Mac Alister, 1964). In some regions, ostriches can be considered a keystone species because their presence and activities can influence the structure of the

ecosystem, benefiting other species that share their habitat. These factors make ostriches important contributors to the health and balance of their ecosystems (Saur, 1966).

Economic importance of ostriches

Ostriches have significant economic importance in several sectors. Ostrich meat is considered a healthy alternative to red meat due to its low fat and high protein content (Abbas *et al*., 1993). It is becoming increasingly popular in health-conscious markets and gourmet cuisine, particularly in regions such as the US, Europe, and parts of Africa (de Mosethal and Harting, 1879). Ostrich leather is a highly sought-after material in the luxury goods market (Levy *et al*., 1990). It is prized for its durability, softness, and unique pattern (King and Mclelland, 1984). This leather is used to make a wide variety of products, including handbags, shoes, and belts. The feathers are used in the fashion industry, in decorations, and for making feather dusters. They have also been used in traditional costumes and cultural events (Sanawany, 1994a). Ostrich eggs are the largest of any bird species and are used for consumption or in arts and crafts due to their size and sturdy shells. They are popular in gourmet cooking and are also sold as novelty items (Shanawany, 1994b). Ostrich farms attract tourists, and many people visit these farms to see the birds up close, learn about ostrich farming, or even participate in ostrich rides in certain regions (Samour et al., 1984). Ostrich oil, derived from the fat, is sometimes used in cosmetics and skincare products due to its moisturizing properties (Snyders, 2020). The combination of these factors makes ostrich farming a potentially lucrative enterprise, especially in countries with suitable climates such as South Africa, Namibia, and Australia (Yagil *et al*., 1999).

Figure 1. Top panel: Ostrich farming in India; Second panel: Male ostrich bird highlighted living in their paddock with paired females; Third panel: Ostrich family feeding in a commercial farm India and ostrich eggs in a display gallery; Bottom panel: Close up of ostrich eggs. Location: Hyderabad, Telengana, India. Photo credit: Saikat Kumar Basu.

Ostrich farming practices around the world

Ostrich farming has expanded beyond the African continent (Fig. 2) and is successfully established in various countries around the world. These farms typically focus on producing ostrich meat, leather, feathers, and other by-products (Dubravak, 2003). Here are some notable regions and countries where ostrich farming is thriving outside Africa:

Australia: Predominantly in South Australia, Queensland, and Western Australia. Australia has a well-developed ostrich farming industry. Farmers raise ostriches for their high-quality leather, which is used in fashion and automotive industries, as well as for meat production. The favourable climate and advanced agricultural practices contribute to the success of ostrich farms.

United States: In the U.S., mostly across the states of Texas, California, Florida, and Arizona; ostrich farming is a niche but growing industry. Farms produce ostrich meat, which is marketed as a healthy alternative to traditional red meats due to its low fat and cholesterol content. Additionally, ostrich leather and feathers are utilized in various products.

Spain: The Andalusia and Catalonia in Spain have embraced ostrich farming to diversify its agricultural sector. Spanish ostrich farms supply both domestic and European markets with ostrich meat and leather. The country's Mediterranean climate is conducive to raising ostriches efficiently.

Israel: In Israel, predominantly in the Negev Desert and other arid areas; leverage its desert climate to farm ostriches, utilizing innovative irrigation and farming technologies. The focus is on sustainable meat and leather production, with farms implementing advanced breeding and management practices.

New Zealand: In New Zealand lands across the South Island, particularly in Canterbury and Otago; ostrich farms benefit from the country's extensive pasturelands and favourable climate. The industry produces high-quality ostrich products for both local consumption and export, including meat, leather, and feathers.

Argentina: In the Buenos Aires and Córdoba provinces. has seen growth in ostrich farming as part of its efforts to diversify agriculture. Farms focus on producing ostrich meat and leather, catering to both domestic markets and international exports.

China: Inner Mongolia, Xinjiang, and other northern provinces of China are showing promises to commercial ostrich farming. Although still emerging, ostrich farming in China is expanding due to increasing demand for exotic meats and high-quality leather. Chinese farms are adopting modern farming techniques to improve productivity and product quality.

Brazil: Mato Grosso, São Paulo, and Rio Grande do Sul in Brazil are important centres of ostrich farming. Brazil is investing in ostrich farming as a means to diversify its agricultural outputs. The country's vast land resources and varied climates support ostrich farming, with a focus on meat and leather production for both local use and export.

Mexico: Ostrich farming in Mexico is developing, around Baja California, Sonora, and Chihuahua with farms targeting niche markets for ostrich meat and leather. The country's diverse climates allow for effective ostrich rearing, and there is potential for growth in both domestic and export markets.

United Kingdom: Limited presence, primarily in England and Scotland.While not as widespread as in other countries, ostrich farming exists in the UK on a smaller scale. Farms focus on specialty markets, offering ostrich meat and leather to gourmet restaurants and fashion industries.

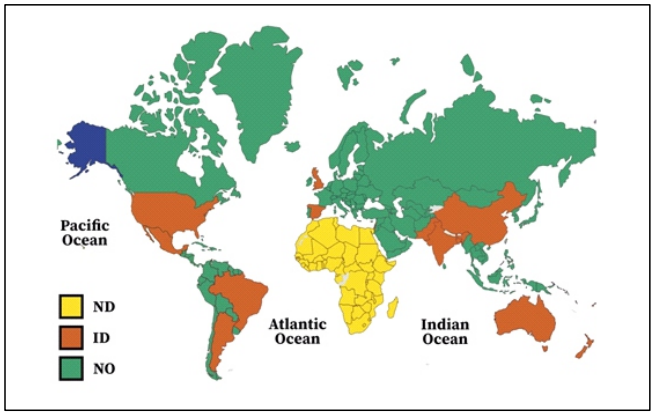

Fig. 2: Distribution of ostrich farm outside the continent of Africa.
ND = Natural distribution; ID = Introduced distribution; & NO = Not observed.

Ostrich farming is more favourable

Ostrich farming is generally considered more commercially successful than farming other flightless terrestrial bird species like emus, rheas, or cassowaries (Horbanczukel *et al*., 2008). Several factors contribute

to this success. Ostrich meat is lean, low in cholesterol, and considered a delicacy in many markets (Levy *et al*., 1990). There is a growing demand for healthier meat alternatives, which boosts ostrich farming's viability (Douglas, 1995). The skin is highly prized for leather goods, and their feathers are used in fashion and decoration. This adds additional revenue streams beyond just meat production Ostriches are larger than emus and rheas, which means they yield more meat per bird. An adult ostrich can weigh between 220 to 350 pounds, significantly higher than emus (100 to 130 pounds) and rheas (55 to 90 pounds) (Horbanczukel *et al*., 2008). The ostrich farming industry has been established for longer and has more developed market channels compared to emu and rhea farming. There are more resources, support, and market infrastructure for ostrich farmers.

Ostriches typically grow faster than emus and rheas, which can lead to quicker returns on investment. They reach market weight in about 12-14 months. Ostriches can thrive in various climates and conditions, making them suitable for farming in diverse regions. While emu farming can also be profitable, especially for niche markets like oil and feathers, and rhea farming has its advantages in certain areas, the overall commercial success of ostrich farming tends to be higher (Banks and Alexander, 1998). Cassowary farming, on the other hand, is less common and not typically pursued for commercial purposes due to their more specialized care needs and lower market demand (Horbanczukel *et al*., 2008).

Ostrich farming currently stands out as the most commercially successful option among flightless birds around the planet. It can have both positive and negative impacts on the conservation of wild ostrich populations. As farms expand, they can encroach on natural habitats, leading to habitat degradation and loss for wild ostrich populations (Snyders, 2020). Farming can lead to inbreeding or the selection of specific traits that may not be favourable for wild populations, potentially impacting their genetic diversity. Domesticated ostriches can transmit diseases to wild populations, which may have devastating effects on their health and survival (Osterhoff, 1979). Domesticated ostriches may compete for resources (like food and nesting sites) with wild ostrich populations, impacting their survival (Shannawany, 1993).

Profits from ostrich farming can be reinvested into conservation programs aimed at protecting wild ostrich habitats. Farms can serve as educational platforms, raising awareness about the importance of ostrich conservation and the threats they face. If managed sustainably, ostrich farms can provide a means of livelihood for local communities while promoting conservation efforts. The impact of ostrich farming on wild populations largely depends on how the farming practices are managed and integrated into conservation strategies. Sustainable practices that prioritize habitat preservation, genetic diversity, and disease management can help mitigate negative effects while supporting conservation efforts (Rodrigues *et al*., 2008).

Ostrich farming can contribute to the conservation of wild ostriches in several ways:

By providing a sustainable source of meat, feathers, and other products, ostrich farming can reduce the demand for wild-caught ostriches. This alleviates hunting pressure on wild populations, allowing them to recover (Pendian and Selvan, 2018). Farmed ostriches can serve as a genetic reservoir for wild populations, particularly if they are bred with conservation in mind. This could help maintain genetic diversity and assist in breeding programs for endangered species. Profits from ostrich farming can be reinvested into conservation programs aimed at protecting wild habitats and populations. This includes habitat restoration, anti-poaching efforts, and public education campaigns (Saif *et al*., 2003).

Farms can provide opportunities for research on ostrich behaviour, health, and genetics. This research can inform conservation strategies and enhance our understanding of the species. Ostrich farming can raise awareness about the importance of ostriches and their habitats, fostering a conservation ethic among consumers and the public (Horbanczukel *et al*., 2008). Sustainable ostrich farming can provide economic benefits to local communities, promoting livelihoods that are dependent on the conservation of natural resources rather than their exploitation. However, the effectiveness of ostrich farming in contributing to conservation depends on proper management practices, ethical breeding, and ensuring that farming does not negatively impact wild populations or habitats (Rodrigues *et al*., 2008).

The key factors necessary for successful growth of Ostrich farms outside Africa

Successful ostrich farms adapt their practices to suit local climates, whether arid, temperate, or otherwise. High demand for ostrich products, such as lean meat and durable leather, drives the profitability of farms

(Abbas *et al*., 2018). Implementation of modern breeding, feeding, and disease management practices enhance productivity and product quality. In some countries, agricultural policies and subsidies support the establishment and growth of ostrich farms. Ostrich farming outside Africa continues to grow as global demand for its products increases. Countries investing in this sector benefit from the unique advantages ostriches offer, such as sustainable meat production and versatile by-products (Miljkovic *et al*., 2011). Commercial farming of ostriches, known for producing valuable products like meat, leather, feathers, and eggs, has garnered interest globally due to its potential profitability and sustainability. In the context of India, the feasibility and popularity of ostrich farming involve evaluating various factors such as climate suitability, economic viability, infrastructure, and market demand (Nicholas *et al*., 1977).

Current Status of Ostrich Farming in India

Ostrich farming in India is relatively nascent compared to traditional livestock farming. While not widespread, there has been a gradual increase in interest among farmers and entrepreneurs exploring alternative and high-value livestock ventures (Pendian and Selvan, 2018). Several pilot projects and small-scale farms have been established in states like Rajasthan, Maharashtra, and Karnataka, where the climate conditions are more conducive to ostrich farming (Chandrasekhar *et al*., 2021). The Indian government has shown interest in promoting ostrich farming through agricultural extension services and providing information on best practices, though comprehensive policy support is still developing (Selvan *et al*., 2012).

Feasibility under Indian Conditions

Ostriches thrive in semi-arid and arid climates, which align well with regions in India such as Rajasthan and parts of Maharashtra and Karnataka. These areas offer the hot and dry conditions ostriches prefer, reducing the need for intensive climate control. Ostriches require ample space for grazing and exercise (Chandrasekhar *et al*., 2021). India's vast agricultural lands can accommodate ostrich farms, provided that the land is managed properly to prevent overgrazing and ensure sustainability. Adequate water supply is crucial for ostrich farming (Adams and Brian, 2023). While ostriches are more drought-resistant compared to other livestock, ensuring consistent water availability is essential for their health and productivity. Ostriches primarily consume grasses, seeds, and certain grains, which can be cultivated locally in India. However, the cost and availability of supplementary feed must be considered to maintain optimal growth and egg production (Pendian and Selvan, 2018).

Economic Product and Market and Viability

Ostrich meat is lean, high in protein, and has a growing market both domestically and internationally. In India, awareness and demand for ostrich meat are increasing, especially in urban centres (Swart *et al*., 1993). Ostrich leather is prized for its durability and unique texture, making it a lucrative product for the fashion and accessories industry. Feathers are used in decorative items and fashion, while ostrich eggs, although not as widely consumed, can find niche markets (Pendian and Selvan, 2018). Initial investment in ostrich farming can be significant due to the cost of acquiring birds, setting up proper housing, and ensuring adequate feed and healthcare. However, with proper management, the returns from multiple revenue streams can make it a profitable venture in the long run. Skilled labour familiar with ostrich care is limited in India, potentially increasing operational costs. Training and education are essential to ensure efficient farm management (Adams and Brian, 2023).

Challenges

Ostrich farming requires specialized knowledge in breeding, healthcare, and nutrition, which is not widely available in India. Ostriches are susceptible to specific diseases and parasites. Implementing effective health management practices is crucial to prevent outbreaks that can devastate flocks (Saif *et al*., 2003). Developing a robust market for ostrich products requires investment in marketing, establishing supply chains, and educating consumers about the benefits and uses of ostrich products. Navigating the regulatory landscape for livestock farming, including import restrictions on ostrich breeds and compliance with animal welfare standards, can pose challenges (Miljkovic *et al*., 2011).

Opportunities

For farmers looking to diversify beyond traditional livestock, ostrich farming offers a unique opportunity with high-value returns. With increasing global demand for ostrich products, there is significant potential for India to tap into export markets, especially if quality standards are met. Lower environmental footprint compared to other livestock, as they require less water and produce fewer greenhouse gases, aligning with sustainable farming practices (Horbanczukel *et al*., 2008).

Government and Institutional Support

Collaboration with agricultural universities and research institutions can foster innovation and improve farming practices; and potential for government subsidies or incentives to promote ostrich farming, though this area may require more development to support farmers effectively. Establishing training programs and extension services can help disseminate knowledge and best practices among prospective ostrich farmers. While commercial ostrich farming is not yet widespread in India, it holds considerable promise under the right conditions. The suitability of certain regions' climates, coupled with the growing market for high-value ostrich products, makes it a viable venture. However, success depends on overcoming challenges related to clear objectives and expertise, education and training, disease management, market development, appropriate support, investment strategies, market analysis, and risk management plans (Selvan and Pandian, 2018). By exploring available government schemes and support mechanisms that can aid in establishing and expanding ostrich farms; and by building a strong brand and market presence to create demand for ostrich products locally and potentially internationally (Horbanczukel *et al*., 2008). Ostrich farming can transition from an emerging niche to a significant agricultural enterprise in India by addressing these factors effectively (Chandrasekhar *et al*., 2021).

Potential of ostrich farming in India

Ostrich farming in India, though offering lucrative potential due to the high value of ostrich meat, leather, and eggs, faces several challenges (Horbanczukel *et al*., 2008). Ostriches are native to arid African regions, and although they can adapt to various climates, certain parts of India, especially with extreme humidity or rainfall, may not be ideal for their health and productivity (Chandrasekhar *et al*., 2021). Setting up an ostrich farm requires a significant financial investment in land, infrastructure, and birds, which can be cost-prohibitive for small-scale farmers (Snyders, 2020). Ostrich farming is relatively new in India. There is limited expertise on managing ostrich health, breeding, and feeding. Farmers need specific knowledge on ostrich behaviour and diet, which is not widely available (Van Schalkwyk *et al*., 1998).

Ostriches require a specialized diet that may be hard to source or expensive in India. Providing a nutritionally balanced feed is essential for their growth and productivity, and deviations can impact their health (Adams and Brain, 2023). Ostrich farming might face regulatory hurdles as exotic species farming regulations are not clearly defined in all Indian states. Farmers might have to navigate complex legal frameworks regarding wildlife and livestock farming (Banks and Alexander, 1998). Ostrich meat and products are not widely consumed or recognized in India, leading to a limited domestic market. Farmers may have to invest in awareness campaigns or focus on export markets, which come with their own challenges like certifications and logistics (Abbas *et al*., 2018).

Ostriches have specific breeding seasons, and managing the reproduction process is complex. Ensuring a high hatch rate requires expertise in egg incubation, and failure in this process can affect the farm's productivity (Samour *et al*., 1984). Since ostrich farming is still niche, there is a lack of specialized veterinary care and medicines for ostriches, making it difficult to handle diseases or health issues that may arise (Snyders, 2020). Being large and strong, need secure enclosures to protect them from predators and prevent them from escaping. Setting up such secure environments is another cost and operational challenge (Adams and Brain, 2023). If farmers wish to sell ostrich products (meat, leather, etc.), they need access to proper processing facilities, which may not be widely available in India (Abbas *et al*., 2018). Additionally, transporting large birds requires specialized vehicles and handling. These challenges mean that ostrich farming in India requires careful planning, knowledge, and resources to succeed (Chandrasekhar *et al*., 2021).

How to farm ostrich in India

Ostrich farming in India presents a unique and promising agricultural venture with multiple streams of revenue and various benefits. As India continues to diversify its agricultural portfolio, ostrich farming stands out due to its adaptability, profitability, and contribution to sustainable farming practices (Miah *et al*., 2020). Below is an in-depth exploration of the opportunities, benefits, and considerations for ostrich farming in India. Ostriches are the largest living birds, native to Africa, known for their impressive size, speed, and valuable by-products (Mitrovic *et al*., 2009). Ostrich farming involves rearing these birds for their meat, leather, feathers, and other products (Siegfried, 1984). Unlike traditional poultry farming, ostriches require specific care, making it a specialized but lucrative venture. While ostrich farming is still in its nascent stages in India compared to countries like South Africa or Australia, interest is growing due to increasing awareness of the benefits and profitability associated with ostrich products (Van Schalkwyk *et*

al., 1998). Several farms have been established across states like Rajasthan, Maharashtra, and Karnataka, focusing on different aspects of ostrich production (Chandrasekhar *et al*., 2021).

Ostrich meat is lean, high in protein, and low in cholesterol, making it a healthier alternative to red meat (King and Mclelland, 1984). With the rising health consciousness among Indian consumers, the demand for such meat is expected to increase. Additionally, ostrich meat has a longer shelf life compared to traditional poultry, reducing wastage (Levy *et al*., 1990). Ostrich leather is highly prized in the fashion industry for its unique texture and durability. The global market for ostrich leather is robust, with opportunities for exports (Miah *et al*., 20200. Besides leather, other by-products like oil (used in cosmetics and pharmaceuticals) and fertilizer can add to the revenue streams (Pndian and Selvan, 2018).

Ostrich eggs are large and nutrient-rich, finding applications in both culinary and cosmetic industries. While the primary focus is often on meat and leather, egg production can serve as an additional income sources (Miah *et al*., 2020). The feathers are sought after for decorative purposes, fashion accessories, and in the event industry. Additionally, ostrich down is used in bedding and insulation materials. Ostrich farms can serve as tourist attractions, offering educational tours and interactive experiences. This not only diversifies income but also promotes awareness and acceptance of ostrich farming (Mac Alister, 1964; Saif *et al*., 2003). With increasing urbanization and a growing middle class, there is a rising demand for exotic meats and high-quality leather products within India (Pendian and Selvan, 2018). Ostrich products cater to niche markets that are willing to pay a premium for quality and uniqueness. India's strategic location and trade agreements can facilitate the export of ostrich products to international markets. Countries in the Middle East, Southeast Asia, and Europe present viable export destinations (Levy *et al*., 1990; Saif *et al*., 2003).

Ostriches can adapt to a range of climatic conditions, making various regions in India suitable for farming (Miah *et al*., 2020). Ostriches require less land compared to traditional livestock, allowing farmers with limited space to engage in ostrich farming (Yagil *et al*., 1998). Ostriches have a lower environmental footprint, producing less methane and requiring less water, aligning with sustainable farming practices (Osterhoft, 1984; Cilliers and Angel, 1999; Saif *et al*., 2003). Setting up an ostrich farm requires significant initial capital for land, housing, fencing, and specialized equipment (Dubravka, 2003). Additionally, ongoing costs for feed, healthcare, and maintenance need to be considered (Miah *et al*., 2020).

Ostrich farming is specialized, and there is a limited pool of experts in India. Farmers may need to invest in training or consult with international experts to ensure best practices (Levy *et al*., 1990). Navigating the regulatory landscape for livestock farming, obtaining necessary licenses, and adhering to biosecurity measures can be complex (Abbas *et al*., 2018). Establishing reliable channels for distributing ostrich products, both domestically and internationally, is crucial for profitability; together with better understanding of the demand, pricing, and competition for ostrich products (Osterhoft, 1984; Douglas, 1995). Outline the goals, investment, operational plan, and financial projections by developing proper business plans and exploring options like loans, grants, or investor funding (Miah *et al*., 2020; Chandrasekhar *et al*., 2021).

Selecting a site with suitable climate, access to water, adequate space, appropriate housing, fencing, and facilities for breeding and rearing are important for successful ostrich farming levy et al., 1990; Miah *et al*., 2020). Sourcing healthy ostrich chicks or adult birds from reputable suppliers, adopting best practices for feeding, healthcare, and breeding is important for farming success (Banks and Alexander, 1998). Creating a brand, establish distribution channels, and promote your products and ensuring all legal requirements are met, including animal welfare standards (Douglas, 1995; Saif *et al*., 2003). The Indian government has been promoting diversification in agriculture, which includes support for unconventional farming practices (Osterhoft, 1984).

Ostrich farming in India offers a multifaceted opportunity for farmers seeking diversification and higher profitability. With the right planning, investment, and expertise, ostrich farming can tap into various markets, from meat and leather to tourism and beyond (Shannawany, 1993). While challenges exist, especially in terms of initial setup and expertise, the growing demand for high-quality and sustainable products positions ostrich farming as a viable and lucrative venture in the Indian agricultural landscape (Levy et al., 1990; Douglas, 1995). Before embarking on this journey, prospective farmers should conduct thorough research, seek expert advice, and possibly start on a smaller scale to understand the intricacies of

ostrich farming (Saif *et al*., 2003). With dedication and strategic planning, ostrich farming can become a rewarding addition to India's diverse agricultural economy (Rodrigues *et al*., 2008; Abbas *et al*., 2018; Chandrasekhar *et al*., 2021).

CONCLUSIONS

Ostrich farming in India is an emerging industry with potential for growth, though it faces unique challenges. The global market for ostrich products-including meat, leather, and feathers is growing due to the bird's efficient meat-to-feed conversion ratio, lean meat, and the high demand for exotic leather. In India, interest in ostrich farming has been on the rise due to these factors and the adaptability of ostriches to semi-arid and arid climates, which are prevalent in many Indian states. The meat is lean and high in protein, fitting well with health-conscious consumers. It can be an alternative to red meats like beef and mutton. Ostrich leather is durable and luxurious, and feathers have uses in fashion, decor, and dusting products. Ostrich oil and other by products are used for their potential medicinal benefits.

Setting up ostrich farms requires significant capital for infrastructure, feeding, and health maintenance. While ostriches are hardy, their health can be affected by India's monsoons and high humidity levels in some regions. The Indian government classifies ostriches under exotic animal categories, which means regulatory frameworks are still evolving. Educating Indian consumers about ostrich meat and by products will be essential for establishing demand. These birds have a lower environmental footprint compared to cattle, appealing to the sustainability-driven. If recognized as a viable agricultural business, it may receive subsidies and policy support similar to livestock farming.

However, due to the novelty of the product, there is still a need for more awareness and demand in the general. Besides meat, ostrich farms also produce other valuable products, such as leather, feathers, and eggs. Ostrich leather is prized for its durability and unique texture, finding a niche market in fashion and accessories. Ostrich eggs, being large and nutrient-dense, also have potential as a specialty item. Initial costs in ostrich farming are relatively high compared to other livestock. The expenses include acquiring land, building specialized enclosures, and managing food and healthcare. In India, the lack of established infrastructure and skilled professionals in ostrich husbandry has created additional challenges for early adopters. Though the demand is gradually increasing, ostrich meat and products remain unfamiliar to most Indian consumers. Price sensitivity, limited availability of processing units, and inadequate marketing are some obstacles that the industry faces. The lack of regulatory standards and limited government support also slow down growth in this sector.

With growing interest in alternative meats and exotic leather, ostrich farming has the potential to become a niche but profitable industry in India. Successful farms in South Africa, Australia, and the U.S. can serve as models for Indian entrepreneurs. The sector could gain momentum with better regulation, R&D, consumer awareness campaigns, and financial support for farmers.

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