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RESEARCH ARTICLE

EMU FARMING: A PROFIT MAKING ENTERPRISE

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ABSTRACT

Emu is considered one of the latest emerging species in the Indian poultry industry. Emu is the second largest flightless bird and scientifically known as *Dromaius noveahollandiae*. Emu also can be called as " million dollar birds " and its farming is getting great economic importance. Emus belong to ratite group and have high economic value for their meat, eggs, oil, skin and feathers. Although emu and ostrich were introduced in India, emu farming has gained much importance. Emu and ostrich are reared commercially in many parts of the world for their meat, oil, skin and feathers, which are of high economic value. In India, Emu farming will be a booming agri-business due to their valuable products. Emu is becoming popular for having 98% fat free red meat. Emu oil act as wound healing agent. The anatomical and physiological features of these birds appear to be suitable for temperate and tropical climatic conditions. These birds are adaptable to varied climatic conditions. Emu birds are well adapted to Indian climatic conditions. Major constraints of emu farming are the (1)getting low price for egg and other products (2) lower productivity of the bird (3) Lack of support from developmental agencies (4) lack of scientific information about emu farming (5) lack of good breeding stock (6) emu chick mortality (7) slow growth rate (8) lack of knowledge in management practices. Emu rearing is not as labour intensive as other traditional livestock. Emu farming in India is still in a primitive stage and the available literature is scanty. Day by day if it is possible to remove the problems of emu farming as usual and as reported by emu farmers, in coming future emu farming will be a profitable enterprise in Indian arena.

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INTRODUCTION

Emus belong to ratite group and have high economic value for their meat, eggs, oil, skin and feathers. These birds are adaptable to varied climatic conditions. Although emu and ostrich were introduced in India, emu farming has gained much importance. When the first flock of emus — flightless birds native to Australia — landed at Perundurai in Tamil Nadu's Erode district in 2006, they drew the attention of only curious onlookers. Then they drew the attention of investors, enabling firms and businessmen offering schemes on the birds to rake in huge money. Six years on, the emus and the investors have been left in the lurch and the businessmen have allegedly taken flight with the invested money as emu contract farming joined the list of dubious investment schemes after a few years of roaring business. According to reports of Beauty Without Cruelty India, farming emu – the second largest bird of Australian origin (after the generally shorter, but heavier-set cassowary) – began decades ago in Andhra Pradesh and spread gradually to other states.

According to estimates, in 2012 there were about 8,000 emu farmers in the country rearing around 1 million birds. Although most of the farms have never appeared in any government record, a few large farms have been supported by India's National Bank for Agriculture and Rural Development (NABARD) under the "Establishment and Modernisation of Slaughterhouse Scheme" run by the Department of Agriculture and Animal Husbandry. As news of farmers being duped by promoters came in, such schemes were stopped and many of the state governments cautioned farmers against investing in culturing or rearing emu. Most of the states in Northeast India have been practicing hunting for food and as well as in cultural associations during festival. However, the age old hunting practice has now become a threat to several endangered species in the region. Birds like the Hornbill are now rarely found, in regions where they once frequented in huge numbers. The biodiversity of this biodiversity hotspot is under threat of extinction and something surely needs to be done before its too late.

One such sustainable way of preserving many 'endangered' species is to promote poultry initiatives in an economically viable and socially beneficial manner. The Emu bird is from a family of large birds which mainly originated in Australia. Emu farming in India was established during the mid 1990's and has been a growing business ever since then. It is estimated that there are about 2,500 emu farms in India and the number of emu farms is rapidly increasing. This has been mainly due to the fact that emu farming in India is a very lucrative business and a variety of emu products are being sold in the market as well as exported all over the world.

SCIENTIFIC CLASSIFICATION

Domain-Eukaryota
Kingdom:- Animalia
Phylum-Chordata
Class:- Aves
Infraclass:- Palaeognathae
Order:- Casuariiformes
Family:- Casuariidae
Genus:- *Dromaius*
Species:- *Novaehollandiae*
Binomial name:- *Dromaius novaehollandiae*

ETYMOLOGY:-The etymology of the common name "emu" is uncertain, but is thought to have come from an Arabic word for large bird that was later used by Portuguese explorers to describe the related cassowary in Australia and New Guinea. Another theory is that it comes from the word "ema", which is used in Portuguese to denote a large bird akin to an ostrich or crane.

FEATURES OF EMU:-Emu has long neck, relatively small naked head, three toes and body covered with feathers Birds initially have longitudinal stripes on body (0-3 months age) then gradually turn to brown by 4-12 months age. Mature birds have bare blue neck and mottled body feathers. Adult bird height is about 6 feet with a weight of 45-60 kg. Legs are long covered with scaly skin adaptable to hardy and dry soil. Natural food of emu is insects, tender leaves of plant and forages. It also eats different kinds of vegetables and fruits like carrot, cucumber, papaya etc. Female is the larger of the two, especially during breeding season when the male may fast. The female is the dominant member of the pair. Emus live for about 30 years. It may produce eggs for more than 16 years. Birds can be maintained as flock or pair.

BEHAVIOUR OF EMU AND ECOLOGY

- Emus are diurnal birds and spend their day foraging, preening their plumage with their beak, dust bathing and resting.
- They are generally gregarious birds apart from the breeding season, and while some forage, others remain vigilant to their mutual benefit.
- They are able to swim when necessary, although they rarely do so unless the area is flooded or they need to cross a river.

Emus begin to settle down at sunset and sleep during the night. They do not sleep continuously but rouse themselves several times during the night. When falling asleep, emus first squat on their tarsi and enter a drowsy state during which they are alert enough to react to stimuli and quickly return to a fully awakened state if disturbed. As they fall into deeper sleep, their neck droops closer to the body and the eyelids begin to close. If there are no disturbances, they fall into a deeper sleep after about twenty minutes. During this phase, the body is gradually lowered until it is touching the ground with the legs folded underneath. The beak is turned down so that the whole neck becomes S-shaped and folded onto itself. The feathers direct any rain downwards onto the ground. It has been suggested that the sleeping position is a type of camouflage, mimicking a small mound. Emus typically awake from deep sleep once every ninety minutes or so and stand upright to feed briefly or defecate. This period of wakefulness lasts for ten to twenty minutes, after which they return to slumber. Overall, an emu sleeps for around seven hours in each twenty-four-hour period. Young emus usually sleep with their neck flat and stretched forward along the ground surface.

The vocalisations of emus mostly consist of various booming and grunting sounds. The booming is created by the inflatable throat pouch; the pitch can be regulated by the bird and depends on the size of the aperture. Most of the booming is done by females; it is part of the courtship ritual, is used to announce the holding of territory and is issued as a threat to rivals. A high-intensity boom is audible 2 kilometres away, while a low, more resonant call, produced during the breeding season, may at first attract mates and peaks while the male is incubating the eggs. Most of the grunting is done by males. It is used principally during the breeding season in territorial defence, as a threat to other males, during courtship and while the female is laying. Both sexes sometimes boom or grunt during threat displays or on encountering strange objects. On very hot days, emus pant to maintain their body temperature. Their lungs work as evaporative coolers and, unlike some other species, the resulting low levels of carbon dioxide in the blood do not appear to cause alkalosis. For normal breathing in cooler weather, they have large, multifolded nasal passages. Cool air warms as it passes through into the lungs, extracting heat from the nasal region. On exhalation, the emu's cold nasal turbinates condense moisture back out of the air and absorb it for reuse. As with other ratites, the emu has great homeothermic ability, and can maintain this status from −5 to 45 °C. The thermoneutral zone of emus lies between 10 and 30 °C. As with other ratites, emus have a relatively low basal metabolic rate compared to other types of birds. At −5 °C, the metabolic rate of an emu sitting down is about 60% of that when standing, partly because the lack of feathers under the stomach leads to a higher rate of heat loss when standing from the exposed underbelly.

DIET: Emus forage in a diurnal pattern and eat a variety of native and introduced plant species. The diet depends on seasonal availability with such plants as Acacia, Casuarina and grasses being favoured. They also eat insects and other arthropods, including grasshoppers and crickets, beetles, cockroaches, ladybirds, bogong and cotton-boll moth larvae, ants, spiders and millipedes. This provides a large part of their protein requirements. In Western Australia, food preferences have been observed in travelling emus; they eat seeds from Acacia aneura until the rains arrive, after which they move on to fresh grass shoots and caterpillars; in winter they feed on the leaves and pods of Cassia and in spring, they consume grasshoppers and the fruit of Santalum acuminatum, a sort of quandong. They are also known to feed on wheat, and any fruit or other crops that they can access, easily climbing over high fences if necessary.

Emus serve as an important agent for the dispersal of large viable seeds, which contributes to floral biodiversity. One undesirable effect of this occurred in Queensland in the early twentieth century when emus fed on the fruit of prickly pears in the outback. They defecated the seeds in various places as they moved around, and this led to a series of campaigns to hunt emus and prevent the seeds of the invasive cactus being spread. The cacti were eventually controlled by an introduced moth (*Cactoblastis cactorum*) whose larvae fed on the plant, one of the earliest examples of biological control.

Small stones are swallowed to assist in the grinding up and digestion of the plant material. They also eat charcoal, although the reason for this is unclear. Captive emus have been known to eat shards of glass, marbles, car keys, jewellery and nuts and bolts. Emus drink infrequently but ingest large amounts when the opportunity arises. They typically drink once a day, first inspecting the water body and surrounding area in groups before kneeling down at the edge to drink. They prefer being on firm ground while drinking, rather than on rocks or mud, but if they sense danger, they often stand rather than kneel. If not disturbed, they may drink continuously for ten minutes. Due to the scarcity of water sources, emus are sometimes forced to go without water for several days. In the wild, they often share water holes with other animals such as kangaroos; they are wary and tend to wait for the other animals to leave before drinking.

BREEDING

Emus form breeding pairs during the summer months of December and January and may remain together for about five months. During this time, they stay in an area a few kilometres in diameter and it is believed they find and defend territory within this area. Both males and females put on weight during the breeding season, with the female becoming slightly heavier at between 45 and 58 kg. Mating usually takes place between April and June; the exact timing is determined by the climate as the birds nest during the coolest part of the year. During the breeding season, males experience hormonal changes, including an increase in luteinising hormone and testosterone levels, and their testicles double in size. Males construct a rough nest in a semi-sheltered hollow on the ground, using bark, grass, sticks and leaves to line it. The nest is almost always a flat surface rather than a segment of a sphere, although in cold conditions the nest is taller, up to 2.8 in tall, and more spherical to provide some extra heat retention. When other material is lacking, the bird sometimes uses a spinifex tussock a metre or so across, despite the prickly nature of the foliage. The nest can be placed on open ground or near a shrub or rock. The nest is usually placed in an area where the emu has a clear view of its surroundings and can detect approaching predators. The nest can contain eggs from multiple emus the number is usually between 15 and 25 eggs.

Female emus court the males; the female's plumage darkens slightly and the small patches of bare, featherless skin just below the eyes and near the beak turn turquoise-blue. The colour of the male's plumage remains unchanged, although the bare patches of skin also turn light blue. When courting, females stride around, pulling their neck back while puffing out their feathers and emitting low, monosyllabic calls that have been compared to drum beats. This calling can occur when males are out of sight or more than 50 metres away.

Once the male's attention has been gained, the female circles her prospective mate at a distance of 10 to 40 metres. As she does this, she looks at him by turning her neck, while at the same time keeping her rump facing towards him. If the male shows interest in the parading female, he will move closer; the female continues the courtship by shuffling further away but continuing to circle him. If a male is interested, he will stretch his neck and erect his feathers, then bend over and peck at the ground. He will circle around and sidle up to the female, swaying his body and neck from side to side, and rubbing his breast against his partner's rump. Often the female will reject his advances with aggression, but if amenable, she signals acceptance by squatting down and raising her rump.

NEST AND EGGS: Females are more aggressive than males during the courtship period, often fighting for access to mates, with fights among females accounting for more than half the aggressive interactions during this period. If females court a male that already has a partner, the incumbent female will try to repel the competitor, usually by chasing and kicking. These interactions can be prolonged, lasting up to five hours, especially when the male being fought over is single and neither female has the advantage of incumbency. In these cases, the females typically intensify their calls and displays. The sperm from a mating is stored by the female and can suffice to fertilise about six eggs. The pair mate every day or two, and every second or third day the female lays one of a clutch of five to fifteen very large, thick-shelled, green eggs. The shell is around 1 mm thick, but rather thinner in northern regions according to indigenous Australians The shell is substantially composed of calcite. The eggs are on average 5.1 in × 3.5 in and weigh between 450 and 650 g. The maternal investment in the egg is considerable, and the proportion of yolk to albumen, at about 50%, is greater than would be predicted for a precocial egg of this size. This probably relates to the long incubation period which means the developing chick must consume greater resources before hatching. The first verified occurrence of genetically identical avian twins was demonstrated in the emu. The egg surface is granulated and pale green. During the incubation period, the egg turns dark green, although if the egg never hatches, it will turn white from the bleaching effect of the sun.

The male becomes broody after his mate starts laying, and may begin to incubate the eggs before the clutch is complete. From this time on, he does not eat, drink, or defecate, and stands only to turn the eggs, which he does about ten times a day. He develops a brood patch, a bare area of wrinkled skin which is in intimate contact with the eggs. Over the course of the eight-week incubation period, he will lose a third of his weight and will survive on stored body fat and on any morning dew that he can reach from the nest. As with many other Australian birds, such as the superb fairywren, infidelity is the norm for emus, despite the initial pair bond: once the male starts brooding, the female usually wanders off, and may mate with other males and lay in multiple nests; thus, as many as half the chicks in a brood may not be fathered by the incubating male, or even by either parent, as emus also exhibit brood parasitism. Some females stay and defend the nest until the chicks start hatching, but most leave the nesting area completely to nest again; in a good season, a female emu may nest three times. If the parents stay together during the incubation period, they will take turns standing guard over the eggs while the other drinks and feeds within earshot.If it perceives a threat during this period, it will lie down on top of the nest and try to blend

in with the similar-looking surrounds, and suddenly stand up to confront and scare the other party if it comes close. Incubation takes 56 days, and the male stops incubating the eggs shortly before they hatch.The temperature of the nest rises slightly during the eight-week period. Although the eggs are laid sequentially, they tend to hatch within two days of one another, as the eggs that were laid later experienced higher temperatures and developed more rapidly.During the process, the precocial emu chicks need to develop a capacity for thermoregulation. During incubation, the embryos are kept at a constant temperature but the chicks will need to be able to cope with varying external temperatures by the time they hatch. Newly hatched chicks are active and can leave the nest within a few days of hatching. They stand about 5 in tall at first, weigh 0.5 kg, and have distinctive brown and cream stripes for camouflage, which fade after three months or so. The male guards the growing chicks for up to seven months, teaching them how to find food. Chicks grow very quickly and are fully grown in five to six months; they may remain with their family group for another six months or so before they split up to breed in their second season. During their early life, the young emus are defended by their father, who adopts a belligerent stance towards other emus, including the mother. He does this by ruffling his feathers, emitting sharp grunts, and kicking his legs to drive off other animals. He can also bend his knees to crouch over smaller chicks to protect them. At night, he envelops his young with his feathers.As the young emus cannot travel far, the parents must choose an area with plentiful food in which to breed. In the wild, emus can live for upwards of 10 years but in captivity, they can live up to 20 years.

OPENING OF AN EMU FARM:-There's no doubt that starting an emu farm requires a lot of work, but with expert planning, you'll be well on your way to creating a profitable business venture. This guide will give you a low down on all of the major steps involved, from choosing a legal structure to creating a financial forecast and registering your business. We will also walk you through the process of checking whether or not your idea can be viable given market conditions.

In this guide

- Learn how an emu farm works
- Assemble your emu farm's founding team
- Undertake market research for an emu farm
- Choose the right concept and position your emu farm on the market
- Explore the ideal location to start your emu farm
- Decide on a legal form for your emu farm
- Assess the startup costs for an emu farm
- Create a sales & marketing plan for your emu farm
- Build your emu farm's financial forecast
- Choose a name and register your emu farm
- Develop your emu farm's corporate identity
- Navigate the legal and regulatory requirements for launching your emu farm
- Create a business plan for your emu farm
- Raise the financing needed to launch your emu farm
- Track your actuals against your forecast
- Key takeaways

START-UP COST OF AN EMU FARM:-The next step in creating an emu farm involves thinking about the equipment and staff needed for the business to operate. After figuring out what you need for your business, your financial plan will reveal how much money you'll need to start and how much you might make. Because every venture is distinctive, providing a reliable one-size-fits-all budget for launching an emu farm without knowing the specifics of your project is not feasible. Each project has its own particularities (size, concept, location), and only a forecast can show the exact amount required for the initial investment. The first thing you'll need to consider is the equipment and investments you'll need to get your business up and running. For an emu farm, the initial working capital requirements (WCR) and investments could include the following elements:

- **Land and Property:** This includes purchasing or leasing land for your emu farm, as well as any necessary buildings such as barns, shelters, and fences.
- **Equipment:** Emus require specific equipment for their care and maintenance, such as feeders, waterers, incubators, and handling tools.
- **Breeding Stock:** The initial purchase of breeding stock is a significant capital expenditure for an emu farm. You will need to consider the cost of purchasing quality breeding birds and their transportation to your farm.
- **Transportation:** Emus may need to be transported for various reasons, such as sales, shows, or veterinary visits.
- **Infrastructure:** This includes any necessary infrastructure to support your emu farm, such as electricity, water, plumbing systems, irrigation system etc.

STAFFING PLAN OF AN EMU FARM:- In addition to equipment, you'll also need to consider the human resources required to run the emu farm on a day-to-day basis. The number of recruitments you need to plan will depend mainly on the size of your company. For example, you could recruit a farm manager who will oversee the overall operations of the emu farm, including managing the staff, overseeing the breeding and care of the emus, and maintaining the facilities. You could also hire a veterinarian to ensure the health and well-being of the emus, as well as handle any medical issues that may arise. Additionally, you may want to consider hiring a marketing specialist to help promote your farm and its products, as well as handle any sales or marketing strategies. These three key staff members can help ensure the smooth and successful operation of your emu farm on a day-to-day basis.

OTHER OPERATING EXPENSES FOR AN EMU FARM

The main operating costs for an emu farm may include

- **Staff Costs:** This includes salaries, wages, and benefits for your employees, such as farm hands, veterinarians, and office staff.
- **Feed:** Emus require a specialized diet, so you will need to budget for feed costs.
- **Veterinary Expenses:** As with any livestock, you will need to factor in regular check-ups, vaccinations, and potential emergency care for your emus.
- **Utilities:** This covers your farm's electricity, water, and gas expenses.
- **Rent or Mortgage:** If you do not own the land your emu farm is on, you will need to budget for rent or mortgage payments.

- **Equipment and Supplies:** This includes the purchase and maintenance of equipment such as incubators, feeders, and fencing, as well as supplies like bedding and cleaning materials.
- **Marketing and Advertising:** You will need to promote your emu farm to attract customers, so budget for expenses such as website development, print ads, and social media marketing.
- **Accountancy Fees:** You may need to hire an accountant to help with tax preparation and financial planning for your emu farm.
- **Insurance Costs:** Protect your farm and its assets with insurance coverage for liability, property damage, and livestock.
- **Software Licenses:** Emu farming may require specialized software for record-keeping, inventory management, and sales, so budget for these expenses.
- **Transportation:** You may need to transport your emus to shows, auctions, or other events, so consider the costs of fuel, vehicle maintenance, and insurance.
- **Banking Fees:** You will likely have business accounts for your emu farm, so budget for fees such as ATM withdrawals and wire transfers.
- **Legal Fees:** Consult with a lawyer to ensure you have all necessary permits and contracts in place for your emu farm.
- **Taxes:** As with any business, you will need to pay taxes on your emu farm's income.
- **Training and Education:** Stay up-to-date on best practices for emu farming by attending conferences, workshops, and courses, and budget for these expenses.

MANGEMENT OF EMU BIRD

Management of Chicks:-Emu chicks weigh about 370 to 450 g (about 67% of egg weight) depending on the size of egg. First 48-72 hours, emu chicks are restricted to incubator for quick absorption of the yolk and proper drying. Clean and disinfect brooding shed thoroughly and well in advance of receiving chicks, spread litter (paddy husk) and cover new gunny bags or burlap over the litter. Arrange a set of brooder for about 25-40 chicks giving 4 sft per chick for first 3 weeks. Provide brooding temperature of 90^0F at first 10 days and 85^0F till 3-4 weeks.

Proper temperature makes the brood successful. Provide sufficient water mugs of a liter capacity and equal number of feeder troughs under the brooder. A chick guard must be 2.5 feet height to avoid jumping and straying of chicks. A 40 watt bulb should burn in the brooder shed throughout the day for every 100 sft area. After 3 weeks of age, slowly extend the brooder area by widening the chick guard circle and later remove it by the time chicks attain 6 weeks.

Feed starter mash for the first 14 weeks or till attaining standard body weight of 10 kg. Ensure proper floor space for the birds housed, as these birds require run space for their healthy life. 30 ft run space is required; hence floor space of 40ft x 30ft is required for about 40 chicks, if out door space is provided. Floor must be easily drained and free from dampness.

Do's

- For the first few days, provide sanitized water and anti-stress agents
- Clean the waters daily, otherwise automatic waters are preferable
- Birds easily excite. Hence, calm and quite environment in the pen is required
- Monitor the birds daily for their comfort, feed intake, water intake, litter condition etc
- Ensure proper mineral and vitamins in the feed for healthy growth of chicks and to avoid leg deformities.
- Practice all- in -all -out rearing to maintain better biosecurity

Don'ts

- Never over crowd the pen
- Never handle the birds during hot hours.
- Birds easily grab any item, so avoid certain objects like nails, pebbles etc in the vicinity of birds
- Avoid unauthorized persons, material into the farm. Proper bio-security must be ensured
- Never keep the birds on smooth surface, as the young chicks easily excite, run and break their legs due to slipperiness. Hence, spread paddy husk on smoother surface.

Grower management:-Emu chicks grow, they require bigger size waterers and feeders and increased floor space. Identify sexes and rear them separately. If necessary, place sufficient paddy husk in the pen to manage the litter in good and dry condition. Feed the birds on grower mash till birds attain 34 weeks age or 25 kg body weight. Offer greens to about 10% of diet particularly different kinds of leaf meals for making the birds adapt to fibrous diets. Provide clean water all the time and offer feed as much as they want. Ensure dry litter condition throughout the grower stage. If necessary, add required quantity of paddy husk to the pen. Provide 40ft x 100 ft space for 40 birds if outdoor space is considered. Floor must be easily drained and avoid dampness. Restrain the younger birds by securing the body by side ways and hold the body firmly. Sub adults and adults can be secured by holding the wing by side way and by grabbing both the wings and place by dragging closely to handling person's legs. Never allow bird to kick. Bird can kick sideways and front ways. Hence, better securing and firm holding is necessary to avoid harming the bird as well as person.

Do's:

- Monitor flock at least once daily for alertness of birds, feeding and watering troughs
- Notice leg deformities and droppings. Identify and isolate ailing birds
- Practice all- in –all- out system. Never keep in the vicinity of the adult birds
- Provide cool and clean water throughout the day.

Don'ts

- Never keep sharp objects, pebbles in the vicinity of the birds. Birds are mischievous and grab anything that comes in their vicinity.
- Never handle or disturb the birds for restraining or vaccination during the hot weather conditions.

Breeder management:-Emu birds attain sexual maturity by 18- 24 months age. Keep sex ratio of male to female as 1:1. In case of pen mating, pairing should be done based on the compatibility. During mating, offer floor space of about 2500 sft per pair. Trees and shrubs may be provided for privacy and to induce mating. Offer breeder diet well in advance i.e 3- 4 weeks prior to breeding programme, and fortify with minerals and vitamins to ensure better fertility and hatchability in birds. Normally, adult bird consumes 1 kg feed /day. But during breeding season, feed intake will be drastically reduced. Hence intake of nutrients must be ensured. First egg is laid at around two and half years age. Eggs will be laid during October to February, particularly cooler days of the year. The time of egg laying is around 5.30 to 7.00 PM. Eggs can be collected twice daily to avoid damage in the pen. Normally, a hen lays about 15 eggs during first year cycle, In subsequent years, the egg production increases till it can reach about 30-40 eggs. On an average, a hen lays 25 eggs per year. Egg weighs about 475-650 g with an average egg weight of 560 g in a year. Egg appears greenish and looks like tough marble. The intensity of colour varies from light, medium to dark green. The surface varies from rough to smooth. Majority of eggs (42%) are medium green with rough surface. Feed the breeder ration with sufficient calcium (2.7%) for ensuring proper calcification of egg with strength. Feeding excess calcium to the breeding bird before laying will upset the egg production and also impairs the male fertility. Provide extra calcium in the form of grit or calcite powder, by placing in a separate trough. Collect eggs frequently from the pen. If eggs are soiled, clean with sand paper and mop up with cotton. Store the eggs in a cooler room providing 60^0F. Never store eggs for more than 10 days to ensure better hatchability. Eggs stored at room temperature can be set every 3 to 4 days for good hatchability.

Incubation and Hatching:-Set the fertile eggs after adjusting to room temperature. Place in a horizontal or in slant arranged row-wise in a tray. Keep the egg incubator ready by cleaning and disinfecting them thoroughly. Switch on the machine for setting the correct incubating temperature i.e dry bulb temperature of about 96-97^{0}F and wet bulb temperature of about 78-80^{0}F (about 30-40% RH). Place carefully the egg tray in a setter, once the incubator is ready with set temperature and relative humidity and place identification slip for date of set and pedigree, if required. Fumigate the incubator with 20g potassium permanganate + 40 ml formaline for every 100 cft of incubator space. Turn the eggs every one hour till the 48th day of incubation. From 49th day onwards, stop turning the eggs and watch for pipping. By 52nd day, the incubation period ends. The chicks need drying. Hold the chicks for at least 24 to 72 hours in the hatcher compartment, for reducing the down and to become healthy chicks. Normally hatchability will be 70% or more. There are many reasons for low hatchability. Proper breeder nutrition ensures healthy chicks.

Health management of emu birds:-Ratite birds are generally sturdy and live long (80% livability). Mortality and health problems in emus are mainly in chicks and juveniles. These include starvation, malnutrition, intestinal obstruction, leg abnormalities, coli infections and clostridial infections. The main causes were improper brooding or nutrition, stress, improper handling and genetic disorders. Other diseases reported were rhinitis, candidiasis, salmonella, aspergillosis, coccidiosis, lice and ascarid infestations. Ivermectin can be given to prevent external and internal worms at 1 month interval beginning at 1 month age. In emu, enteritis and viral eastern equine encephalomyelitis (EEE) were reported. In India, so far few outbreaks of Ranikhet disease were recorded based on gross lesions but were not confirmed. However, the birds vaccinated for R.D at the age of 1 (lasota), 4 (lasota booster) weeks; 8, 15 and 40 weeks by mukteswar strain gave better immunity.

NUTRIENT REQUIREMENTS

Table 1. Nutrient requirements suggested for Emu at different age groups

Parameter	**Starter (**10-14 week age or up to 10 kg body weight)	**Grower** (15-34 wk age or 10-25kg body weight)
Crude Protein%	20	18
Lysine %	1.0	0.8
Methionine%	0.45	0.4
Tryptophan %	0.17	0.15
Threonine %	0.50	0.48
Calcium % mini	1.5	1.5
Total phosphorus %	0.80	0.7
Sodium chloride %	0.40	0.3
Crude fiber (max) %	9	10
Vitamin A(IU/kg)	15000	8800
Vitamin D 3 (ICU/kg)	4500	3300
Vitamin E (IU/kg)	100	44
Vitamin B 12 (µ g/kg)	45	22
Choline (mg/kg)	2200	2200
Copper (mg/kg)	30	33
Zinc (mg/kg)	110	110
Manganese (mg/kg)	150	154
Iodine (mg/kg)	1.1	1.1

Table 2. EMU FEED (kg/100kg)

Ingredients	Starter	Grower	Finisher	Breeder	Maintenance
Maize	50	45	60	50	40
Soybean meal	30	25	20	25	25
DORB	10	16.25	16.15	15.50	16.30
Sunflower	6.15	10	0	0	15
Dicalcium phosphate	1.5	1.5	1.5	1.5	1.5
Calcite powder	1.5	1.5	1.5	1.5	1.5
Shell grit	0	0	0	6	0
Salt	0.3	0.3	0.3	0.3	0.3
Trace minerals	0.1	0.1	0.1	0.1	0.1
Vitamins	0.1	0.1	0.1	0.1	0.1
Cociodiostat	0.05	0.05	0.05	0	0
Methionine	0.25	0.15	0.25	0.25	0.15
Choline chloride	0.05	0.05	0.05	0.05	0.05

PREDATION:-There are few native natural predators of adult emus still extant. Early in its species history it may have faced numerous terrestrial predators now extinct, including the giant lizard *Megalania*, the thylacine, and possibly other carnivorous marsupials, which may explain their seemingly well-developed ability to defend themselves from terrestrial predators.

Dingo:- This is a modified dog breed in Australia. The main predator of emus today is the dingo, which was originally introduced by Aboriginals thousands of years ago from a stock of semi-domesticated wolves. Dingoes try to kill the emu by attacking the head. The emu typically tries to repel the dingo by jumping into the air and kicking or stamping the dingo on its way down. The emu jumps as the dingo barely has the capacity to jump high enough to threaten its neck, so a correctly timed leap to coincide with the dingo's lunge can keep its head and neck out of danger. Despite the potential prey-predator relationship, the presence of predaceous dingoes does not appear to heavily influence emu numbers, with other natural conditions just as likely to cause mortality.

Wedge-tailed eagles:- Wedge-tailed eagles are the only avian predator capable of attacking fully-grown emus, though are perhaps most likely to take small or young specimens. The eagles attack emus by swooping downwards rapidly and at high speed and aiming for the head and neck. In this case, the emu's jumping technique as employed against the dingo is not useful. The birds try to target the emu in the open ground so that it cannot hide behind obstacles. Under such circumstances, the emu runs in a chaotic manner and changes directions frequently to try to evade its attacker.

While full-grown adults are rarely preyed upon, dingos, raptors, monitor lizards, introduced red foxes, feral and domestic dogs, and feral pigs occasionally feed on emu eggs or kill small chicks. Adult males fiercely defend their chicks from predators, especially dingos and foxes.

TECNICAL PARAMETRES OF EMU BIRDS:-The birds reach their full size by the end of 1st year. They grow up to 5.5 to 6 feet with a weight of 40 to 70 kg. Laying period in India starts after 18 to 24 months and Eggs are laid during September to February. Eggs are dark bluish green in colour with a weight of 450 to 700 gm. A bird can lay 20-60 eggs in a season. Incubation period is 50- 52 days and newly hatched bird will be of 6-7"in height. The lift span of the bird is 30-35 years. The productive economic life of the bird is 20-25 years.

EMU PRODUCTS:-Meat from emu and ostrich are of high quality in terms of low fat, low cholesterol, gamey flavour. Valued cuts are from thigh and larger muscle of drum or lower leg. Emu skin is fine and strong. Leg skin is of distinctive pattern hence highly valued.

Figure 1.

Emu fat is rendered to produce oil, which has dietary, therapeutic (anti inflammatory) and cosmetic value.

USES OF EMU PRODUCTS:-Though farming at the centre has not been converted into fully fledged commercial activity, the centre produces leather goods using the skin of the bird. While the processing is done by the Central Leather Research Institute (CLRI), stitching is done outside. The institute sells the meat for INR 200 per kilogram, and the unfertilised eggs for cooking purposes at ₹150 each. Empty eggshells are used for decorative purposes and feathers are used for making dolls and brushes for cleaning computer peripherals, the report mentioned.
Mainly the future lies in the meat and oil business of emus. The oil cures paralysis, arthritis and any kind of pain. It helps in removing white patches on skin and the meat is 98 percent cholesterol free. The meat is very healthy for the heart.

ECONOMIC IMPORTANCE:-It is reported that the price of Rs.18, 000/- a pair of 3 months old birds and the price of Rs. 40, 000/- a pair of 15 months old birds having live body weight each 40 to 50 kg. and the birds are used for table purpose.

Meat:-Meat of Emu bird is reddish in colour, soft and with less of cholesterol 98% fat free.
Emu meat is lower in fat than Chicken. Turkey, Pork & Beef. It is the "Super Food of the New Millennium". The price commands higher than that of meat from other birds/animal and is reported at Rs. 300-450 per Kg. The American Heart Association has included Emu meant in its listing of heart healthy meats.

Feathers: Feathers are soft non allergic / anti static, beautiful double quelled and are used in hats, dresses, computer and car cleaning brushes and household decorative items. About 400 to 600 gms of feathers would be available from a bird and each bird would fetch about Rs. 200/- at present.

Skin: The skin is very thin, soft and strong. Price of good quality skin is reported Rs.700/- to Rs.1000/- per sq ft. and 8-12 sq ft. of skin is available from a well matured bird. The skin is used in the preparations of shoes, bags, belts, purses, jerkins and seat covers for expensive cars. At present raw skin of a matured bird would fetch about Rs. 1000 1200.

Egg Shells and nails: The egg shells are used for painting and as decorative items due to deep blue colour. Nails are strong and decor able used in artificial ornaments and craft goods.

Oil: About 4-6 a litter of oil is available from a bird which is devoid of any colour taste and odor. At present market prices, the price of one litter refined Emu oil is Rs. 3000/- to Rs. 4000/- The oil is penetrating and is having moisturizing, analgesic, anti allergic and antiseptic properties. The oil is used in analgesic ointments, beauty creams and lotions, soaps, hair oils, shampoos, perfumes and massage oils. The raw fat/crude oil of Emu fetches Rs.1000 per Kg.

Clinical experience with Emu oil has shown that its two major benefits are its anti- inflammatory properties and its ability to penetrate the skin. It also appears to provide some solar protection. The penetrating effect appears to be related to its non-phosphorous composition. "Our skin is phosphor-lipid deficient. In other words, there is no phosphorous in our skin. If you put anything on your skin that has phosphorous in it, your skin is 'programmed' to keep it from penetrating. Anytime you put anything on your skin that is phospholipids deficient, or has no phosphorous, it penetrates right through ". Emu oil has been documented to exhibit the following properties and/or has been used for the following purposes:

- Anti – Inflammatory Activity
- Moisturizing
- Cholesterol Reducer
- Bacteriostatic
- Penetration Enhancer
- Significant epidermal proliferative activity
- Non – comedogenic

- Significant wound healing agent
- Appears to promote faster healing of burns with less pain and scarring
- Anti – Arthritic Activity
- Excellent Emulsifier

Eyes: The bird is able to see up to a distance of 10 meters and its eyes are being used to replace damages corneas in human beings.

Utility: Fifteen months old Emu broiler weighing 40 kg. slaughtered for oil, meat and skin etc.

MONETARY GAIN:-Emu farm economic survey indicated that cost involved in purchase of breeding stock were expensive (68%). The rest of the investments are on farm (13%) and hatchery (19%). Feeding cost per breeding pair per annum was estimated to be Rs. 3600. Cost of production of hatching egg and day-old chick was Rs.793 and 1232 respectively. Annual feed intake per pair was recorded as 524 kg, costing Rs.3578. The cost of salable chick at day-old age was Rs.2500-3000. Better returns from emu are possible with good hatchability (more than 80%), lower feeding cost and minimized chick mortality (less than 10%).

ECONOMIC VALUE:-In the areas in which it was endemic, the emu was an important source of meat to Aboriginal Australians. They used the fat as bush medicine and rubbed it into their skin. It served as a valuable lubricant, was used to oil wooden tools and utensils such as the coolamon, and was mixed with ochre to make the traditional paint for ceremonial body adornment. Their eggs were also foraged for food. The birds were a food and fuel source for early European settlers, and are now farmed, in Australia and elsewhere, for their meat, oil and leather. Commercial emu farming started in Western Australia around 1970. The commercial industry in the country is based on stock bred in captivity, and all states except Tasmania have licensing requirements to protect wild emus. Outside Australia, emus are farmed on a large scale in North America, with about 1 million birds in the US, Peru, and China, and to a lesser extent in some other countries. Emus breed well in captivity, and are kept in large open pens to avoid the leg and digestive problems that arise from inactivity. They are typically fed on grain supplemented by grazing, and are slaughtered at 15 to 18 months.

LOCATION A FACTOR OF BUSINESS:-We recommend that you take the following factors into account when making your decision:

- **Visibility and foot traffic -** Emu farms may benefit from being located in areas with high visibility and foot traffic, as it can attract potential customers and promote the business.
- **Parking space, road and public transport accessibility -** Emus require regular transportation to markets and processing facilities, so a location with ample parking space and easy access to roads and public transport can be beneficial for an emu farm.
- **Proximity to target customers -** Emu farms may want to be located near potential customers, such as restaurants or other agricultural businesses that may be interested in purchasing emu products.
- **Competitor presence -** It may be advantageous for an emu farm to be located in an area with low competition in order to establish a unique market presence.
- **Efficient logistics -** Emu farms require efficient transportation and processing facilities, so a location with good logistics can help streamline operations and reduce costs.
- **Storage space -** Emu farms need adequate storage space for feed, equipment, and processed products. A location with sufficient storage space can help with the smooth functioning of the farm.
- **Availability of skilled labor -** Emu farming requires specialized skills, so a location with a skilled labor force can help with hiring and training employees.
- **Easy access to main roads -** Emu farms may need to transport large animals and equipment, so easy access to main roads can be beneficial for transportation purposes.
- **Climate and soil quality -** Emus require specific climate and soil conditions for optimal growth and health, so a location with suitable climate and soil quality can be important for an emu farm.
- **Adequate infrastructure -** Emu farms need access to electricity, water, and other necessary infrastructure for operations. A location with adequate infrastructure can help with the smooth functioning of the farm.
- **Premises layout -** The layout of the premises can affect the efficiency of operations and the well-being of the emus. A well-designed layout can help with the smooth functioning of the farm.
- **Space to grow -** As emus grow to be quite large, a location with ample space for growth and expansion can be beneficial for an emu farm.
- **Demographic of local population -** The demographic of the local population can play a role in the demand for emu products. A location with a population that is interested in alternative or exotic meats can be advantageous for an emu farm.

BUSINESS MODEL OF AN EMU FARM:-Before thinking about starting an emu farm, you'll need to have a solid understanding of its business model (how it generates profits) and how the business operates on a daily basis.Doing so will help you decide whether or not this is the right business idea for you, given your skillset, personal savings, and lifestyle choices.Looking at the business model in detail will also enable you to form an initial view of the potential for growth and profitability, and to check that it matches your level of ambition.

The easiest ways to acquire insights into how an emu farm works are to:

- Speak with emu farm owners
- Undertake work experience with a successful emu farm
- Participate in a training course

OBJECTIVES OF MARKET RESEARCH FOR EMU FARMING:-The goal here is straightforward: evaluate the demand for your business and determine if there's an opportunity to be seized. One of the key points of your market analysis will be to ensure that the market is not saturated by competing offers. The market research to open your emu farm will also help you to define a concept and market positioning likely to appeal to your target clientele. Finally, your analysis

will provide you with the data you need to assess the revenue potential of your future business.

Evaluating key trends in the sector:-Market research for an emu farm usually begins with an analysis of the sector in order to develop a solid understanding of its key players, and recent trends.

Assessing the demand:- After the sector analysis comes demand analysis. Demand for an emu farm refers to customers likely to consume the products and services offered by your company or its competitors. Looking at the demand will enable you to gain insights into the desires and needs expressed by your future customers and their observed purchasing habits. Analyzing demand helps pinpoint customer segments your emu farm could target and determines the products or services that will meet their expectations.

Assessing the supply:- Once you have a clear vision of who your potential customers are and what they want, the next step is to look at your competitors. The aim of your competitive analysis will be to identify who is likely to overshadow you, and to find a way to differentiate yourself .

Regulations:-Market research is also an opportunity to look at the regulations and conditions required to do business. At this stage, your analysis of the regulations should be carried out at a high level, to familiarize yourself with any rules and procedures, and above all to ensure that you meet the necessary conditions for carrying out the activity before going any further.

Take stock of the lessons learned from your market analysis:-Market research should give you a definitive idea of your business idea's chances of commercial success.

FRAUD HIT FARMING:-Many of these promoters have targeted farmers to invest in the emu business with superficial promises. According to a *Firstpost* report, farmers have been promised higher returns for growing emu than is realistic. Schemes floated by promoters have suggested investors would grow their money many times over from a one-time investment, by selling the eggs, each valued between ₹1,500 and ₹1,600 ($22 to $23). Farmers were told that emu meat costs ₹550 ($8) in the Indian market because of its low fat and protein-rich content. Companies also claimed that a total one-time investment of ₹300,000 would fetch a similar amount of income for every year "for 30 years as emu will lay eggs for more than 30 years," the *Business Standard* newspaper reported. Farmers who were lured by the assurances used by companies like "get rich quick" or "triple your money in five years" were bound to suffer. Talking to a 39-year-old farmer, S Selvam, who invested ₹600,000 in the business, as a case, the report said that none of the promises materialised and Selvam fell victim to the scam and lost his money. In some cases, in which the companies promised to provide feeding materials to the farmers till the birds start laying eggs, the supply was stopped after six months. "It was then difficult for us to arrange the feedings for 10 pairs of birds as it needed ₹15,000 every month. We managed for two months and then asked the promoter to supply feedings or take the birds. They took the birds but didn't pay anything against the one-year-old birds. When we tried to contact them after hearing about the scam, they were either unreachable or underground," says Subas Gauda, 70, whose son had sold land and invested money in the business. "As it seemed in the end, it was not a farming programme but [a scheme] to take farmers' money in the name of it," says Gopinath Dora.

PROBLEMS OF EMU FARMING

- In the absence of consistent support, the burden of feeding fully grown emu forced many farmers to abandon their birds.
- Many farmers have been told that the oil extracted from emu fat was in high demand and was supposed to sell at ₹3,000 per litre. Responding to this, a Pune-based farmer, Pravin Gorde, told *Indian Express* that "the business started plummeting and in 2013, I was left with around 60 birds which cost a bomb in terms of maintenance but yielded no returns. I simply decided to give up the business and slaughtered the birds to extract their oil. Our agents had told us the oil would fetch good money in the market, but even today, the bottles line my shelf with no takers."

PROMOTING OF EMU MARKETING

- Emu is the second largest bird in the world, with a height of 5-6 meters and a full-grown weight of 40-60 kg. It is known to be the most beneficial poultry since no part of it is wasted.
- Among the poultry birds, Emu has the highest resistance to diseases.
- An adult female Emu starts laying eggs normally from November to February and lays upto 30 to 40 eggs at the average rate of three eggs in a week. An Emu egg which can be fertilised can fetch upto Rs. 2,500 in the market.
- The meat of Emu right now is so expensive that it is sold in the market at the rate of Rs. 1,000 per kg and the delicacies made are served in five star hostels.
- The state of Manipur has taken the initiative to introduce sustainable practices in this direction with the introduction of 'Emu Rearing'. Emu rearing had been successfully carried out by KVK Sylvan at Henbung, Senapati and Foundation for Environment and Economic Development Services (FEEDS) in Manipur. They now look forward to popularizing Emu farming in the entire Northeast region. Although considered to be a rare and expensive bird in India, Emu farming is popular in states like Tamil Nadu, Maharastra, Andhra Pradesh and Karnataka. Talking about the newly launched practice, Dr. R.K. Imotomba Singh, Programme Co-Ordinator of KVK Sylvan and FFEDS, Manipur informed that Emu have to be fed thrice a day with crushed wheat and maize or with poultry feeds available in the market and properly washed leafy vegetables. By the time they are 18 to 24 months old, Emus become sexually mature adults. And one unique character of Emu quite different from other domestic birds is that although the female lays the eggs, it is the male which is responsible for hatching them. After a female Emu lays 7 to 9 eggs, the male Emu takes over the task of hatching the eggs.
- So far KVK Sylvan and FEEDS, Manipur have provided training to around 20 poultry farmers from different parts of Manipur with an eye on promotion of Emu farming widely in the State. Dr. R.K Imotomba said that plans are afoot for organising more such training programmes and popularisation of Emu farming not just in Manipur but also in other parts of the North East region. This will help not

only in improving the economic condition of the people but also the protection of the native biodiversity of the region.

- Bird species (especially in the event that it goes wild) does not have any interfering impact on the existing wildlife and biodiversity.
- The government has also listed the emu farming in poultry sector and has started providing loans for it. With such an initiative in place, it is to be seen in the coming days as to how many will 'hunt' for loans to secure economic gains for themselves and biodiversity conservation in the region.
- For example, your emu farm might consider partnering with local restaurants and gourmet food stores to showcase the unique and healthy qualities of emu meat. You could offer them a discounted price for bulk orders or provide educational materials to help them promote the benefits of emu meat to their customers.
- Additionally, hosting farm tours and tastings for chefs and food industry professionals can help build relationships and increase interest in your products.
- You could also attend food and trade shows to network and showcase your emu products to potential buyers.

CONCLUSION

Emu farming offers great scope & potential because of its supplementary income additional employment & simplicity in operation. Efficient Emu development can be achieved by promotion of small units in villages through a gamut of functions like dissemination of information & technology, making various inputs & organizing training Sessions for farmers on this subject. Although this is new venture for our farmer's but has great potential in the coming years. So take this opportunity and success in life by adopting this subsidiary occupations in agriculuture. Agriculture is the base of our country's development. In industrial sector, our country is day by day progressing as well as in service sector, our country is progressing at a faster rate. For industrial sector and service sector–need educated, skilled individuals and labourers mainly whereas in agriculture sector skilled and unskilled both individuals and labourers have the opportunity to get a job. As a seventh lagrest country in the world, our country having vast agricultural land. Hence, in our country, agriculture is such a field where individual can perform several activities, apply invention, innovation spontaneously in the field to judge and choose the best one for future progress.

According to 2023 population estimation, our country has largest population (142.86 crores) in the world surpassing China first time. More population means more demand of agricultural products for survival. To exploit this opportunities country's unemployed youths, progressive farmers, and agriculture loving individuals can jump on agricultural enterprises or can take it as a main professtion or subsidiary profession. Agriculture is the ocean of professions i.e. (1) crop cultivation (2) orchard (3) Dairy (4) Poultry (5) Apiculture (6) Pisciculture (7) Pearl culture (8) piggery (9) Goatary (10) Rabitry (11) Duckery (12) koel farming (13) Rice mill (14) Nursery etc. In this way emu farming is also an innovative and profit making farming. But before starting this farming, an individual must know about this farming in detail through (1) literature (2) speak with emu farm owners (3) undertake work experience with a successful emu farm (4) participate in a training programmes etc. Emu farming obviously will be a profit making agricultural enterprise, if the following things are taken under consideration mainly on –(a) a strong export marketing mechanism (2) changing food habit of countrymen through mass media (3) sound training on emu farming to interested individuals (4) general awareness development of common people/farmers on emu bird and its efficient farming procedures through extension agencies especially agricultural extension agencies.

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