

A innovative Ecosystem has been created in the Zoology department and students are trained in various fields

## Ornamental Fish culture

Ornamental fishes are also known as living jewels. The increasing demand for aquarium fishes gradually paved the avenue towards global trade of ornamental fishes. World trade of ornamental fish is estimated to be about Rs. 2000 crores, but, India's share is only Rs. 15 crores, which is very insignificant. Most of the fish species of North-Eastern region of India possess high values for their attractive coloration pattern, graceful behavior, peculiar body morphology and endemism. The major shares of the country's ornamental fish export are captive collection from N-E states comprising about 85% of the total aquarium fish trade of India. Aquarium fish has become a popular hobby and aquarium fish selling is a popular trade in Tripura. The trade is mostly confined to import of exotic ornamental fishes from other states of the country particularly from Kolkata which are then sold out on the basis of temporary management. The indigenous ornamental fishes which are available in the rivers of the state are being neglected due to lack of awareness. Most of these fishes are caught before their first maturity and sold in the market as food fishes. These indigenous ornamental fishes can easily be collected from the wild resources and can be cultured and reared for keeping in the aquarium. There are more than 30,000 fish species reported around the world; of this about 800 belong to ornamental fishes. Most of the ornamental fishes survive in freshwater. They come under eight closely related families namely, Anabantidae, Callichthyidae, Characidae, Cichlidae, Cobitidae, Cyprinodontidae, Cyprinidae and Poeciliidae.

Aquarium fishes are mainly categorized into two groups namely, egg layers (oviparous) and live bearers (ovoviviparous). Majority of aquarium species are egg layers and normally external fertilization occurs. Based on this, it is again categorized into the following types. The Commercially Important indigenous species are: Reticulated Loach, Zebra Fish, Glassfish and Honey Gourami and Gold Fish. Black Shark.

## Benefits

- Ornamental fish hobby gives pleasure to young and old people.
- Relaxation to the mind.
- Keep blood pressure at normal level and therefore heart related diseases could be prevented.
- Increases life span.
- Children could acquire new knowledge and skills, by counting the number of fishes in an aquarium they get mathematical knowledge and by observing the behaviour, colour and fin shape of fishes they get scientific knowledge.
- Children could develop sense of attachment with nature.
- Ornamental fish keeping is easy over other pets as they don't make noise and also tank cleaning once in a while is enough (Dog barks, sheds fur and daily cleaning of shed is a must).
- Ornamental fishes like Arowana are believed to bring good luck, wealth and prosperity.
- Ornamental fish keeping can make hobbyists to start their own farms in due course of time thus creates self-employment opportunities.

## Opportunities

- The ornamental fish trade is a growing business with Chennai, Kolkata, Mumbai, Bangalore and Kochi turning out to be the major hubs. The demand for ornamental fishes in domestic market is high and mass production of the ornamental fishes has augmented supply of ornamental fishes in market. In India, despite many initiatives taken by the government, the ornamental fisheries remain highly unorganized, resulting into marginalization of the producer.
- Due to demand, Creation of SHGS and cooperatives can be initiated in which the presence of women is predominant.
- Ancillary industry A wide variety of pumps, air stones, filters, heaters, thermostats, assorted electrical gadgets, nets, tubes, buckets, are a prerequisite even for setting a home aquarium. Besides decoration pieces, molluscan shells, sand and gravel and a wide variety of beautiful artificial or natural aquatic plants like Cryptocome, Echinodorus, Elodea, Hydrophyla, Ludwigia, Cabomba, Myriophyllum, Vallisneria, etc. are options for trading.
- In most of the shopping malls in major and metro cities, now a day's one can see fish pedicure spa. It is nothing but cleaning the dead skin by small fish called doctor fish, Garrarufa (doctor fish), it is a fish originates in the river basins of the Northern and Central Middle East, mainly in Turkey, Syria, Iraq and Iran. A similar fish Garradactylais of Indian origin and can be studied for the spa. A considerable change is observed in the life style of Indians. Such type of pedicure is already in demand. A customer pays Rs. 100-200 per hour. An awareness and skill development to start such spa will certainly help and provide employment.
- Preparing medicines and chemicals for maintaining the fish health. As the ornamental fishes are being kept in captive conditions in small aquarium, chances to encounter diseases is very high. There is demand of chemicals and medicines for the prophylactic treatment and disease control of the ornamental fish.



**Edible Fish farming**



## **Edible Fish culture**

The Indian freshwater fish farming was based on a multi-species system. Natural fish food organisms were generated by adding organic and inorganic manure to water and the multi-species utilize this food based on the trophic system in the pond. For a long time, India traditionally used only the pond-based fish farming systems and has not strongly considered other options for culture system diversification that could greatly increase fish production. Recently, a few provinces in India have taken up cage farming of freshwater fish.

A combination of Indian major carps – including catla (*Labeo catla*), rohu (*Labeo rohita*) and mrigala (*Cirrhinus mrigala*) – were used as the main target species for culture, as well as a few Chinese carp species like silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*) and occasionally common carp (*Cyprinus carpio*). The very high level of technology developed for induced breeding of carps and the abundance of agri-byproducts used as supplemental feed led to the rapid development of freshwater aquaculture in the country.

## **Methods of Fish Farming**

Fish farming involves the following methods:

### **Extensive Fish Farming**

In this type of farming, economic and labour inputs are low. The natural food production plays a major role in this type of farming. Fertilizers may be added to increase the fertility and hence, the production of fish.

### **Semi-intensive Fish Farming**

This method implies moderate levels of economic and labour inputs. The production can be increased by supplementary feeding or addition of fertilizers. Thus, the production of fish is higher.

### **Intensive Fish Farming**

In this method, the fish are stocked with as many fish as possible. The fish are fed with supplementary feed.

## **Benefits**

- The farmed fish provides high quality protein for human consumption.
- Fish farming can be integrated into the existing farm to create additional income and improve its water management.
- The farmers can select the fish species with desired characteristics to raise.
- Fish in a pond are not accessible to everyone. Thus, they are secured and are harvested at will.
- Fish in a pond are nearby.

## **Markets**

Most freshwater fish are transported to markets in fresh or iced condition. Some, if close to markets, is transported live to help fetch higher prices. There are some large markets – such as in the province of West Bengal – where carps are in demand daily. The endemic population in the province culturally likes eating fish, and farmers and traders make efforts to transport fish to such attractive destinations.

In India, it's usually the fish traders who pick up fish at harvest and trade it off for a higher price to different markets. Fish is not generally available throughout the day in markets, it's sold either in the mornings or evenings for a limited period, and this limits the reach of fish to customers.

- **Start Farming A Catfish**

Catfish farming is a fish-related business that an aspiring entrepreneur can effectively start. Catfish is consumed by a large number of people, and catfish farming is one of the most straightforward fish farming operations. You can start a catfish farm in your own home or in man-made ponds.

- **Shrimp Farming Business**

An aspiring entrepreneur can start with a shrimp farming business in any part of the world. Shrimp farming is one of the most profitable businesses and it has evolved from a small scale to a global industry in most countries, where it is carried out. Countries such as the United States, Japan, China Thailand, and even South American countries have been farming shrimps on a large scale for a very long time.

- **Opening of a Fish Shop**

Selling fresh fish is another thriving & profitable fishing-related business that anyone can start with. In this, you don't need to be a fish farmer to successfully run a fish shop. You are good to go if you have access to fishermen. In a food hub or a farm market, you can open a fresh fish business. Just make sure you know how to secure a steady supply of fresh fish, and you'll be OK in this industry.

- **Start a Pond Construction Business**  
If person has construction skills, one of the fishing-related business ideas you should consider is building fish ponds for fish farmers or people interested in beginning a fish farm. This company is profitable since fish ponds of various sizes can be built in any place. Make sure you receive referrals from your clientele if you want to perform well in this industry.
- **Start a Prawn Farming Business**  
One of your possibilities if you want to create a fishing-related business is to open a prawn farm. It's crucial to note that prawns can thrive in waterlogged places provided you don't mind investing in artificial ponds. If you can site this firm in a water-logged area, you will likely have fewer difficulties with your prawn farming venture.
- **Raising & Harvesting Other Aquaculture (Ex: Alligators, Seaweed, Frogs & Turtles)**  
If you want to start a fishing-related business, you should think about raising and harvesting seaweeds, alligators, frogs, and turtles, among other things. Seaweeds, alligators, frogs, and turtles do have a vast global market if you know how to channel your marketing energy to the correct target market.
- **Construction of Aquariums Business**  
The building of aquariums is another fishing-related company that an entrepreneur with a construction background might pursue. Aquariums exist in a variety of sizes and designs, and their construction necessitates the expertise of a qualified professional. So, if you want to start a fishing-related business, one of your possibilities is to work in aquarium construction.
- **Sale of Fish Nutrients & Medications**  
The people, who run the fish farms usually, need nutrients & medications for their fish. The fact that fishes can become sick & die sometimes can make the fish medications & nutrients a necessity. So, If you are looking towards starting a fishing-related business, then of your options is to open up a shop where the fish medications & nutrients will be retailed.

## Vermicompost

Vermicompost is a biological source of nutrient and can be prepared with the use of biodegradable wastes available at the village farm level through the joint action of microbes and earth worms. Vermicompost is the major component of organic farming as it may fulfill all the requirements with respect to production and protection of crop plants. The vermicompost may also be used as a tool for income generation, organic farming, environment protection, maintaining the soil health and sustaining the agricultural production.

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Vermiculture means “worm-farming”. Earthworms feed on the organic waste materials and give out excreta in the form of “vermicasts” that are rich in nitrates and minerals such as phosphorus, magnesium, calcium and potassium. These are used as fertilizers and enhance soil quality.

### Vermicomposting comprises two methods:

- **Bed Method:** This is an easy method in which beds of organic matter are prepared.
- **Pit Method:** In this method, the organic matter is collected in cemented pits. However, this method is not prominent as it involves problems of poor aeration and waterlogging.

## Principle

This process is mainly required to add nutrients to the soil. Compost is a natural fertilizer that allows an easy flow of water to the growing plants. The earthworms are mainly used in this process as they eat the organic matter and produce castings through their digestive systems.

The nutrients profile of vermicompost is:

- 1.6 per cent of Nitrogen.
- 0.7 per cent of Phosphorus.
- 0.8 per cent of Potassium.
- 0.5 per cent of Calcium.

- 0.2 per cent of Magnesium.
- 175 ppm of Iron.
- 96.5 ppm of Manganese.
- 24.5 ppm of Zinc.

## Materials Required

- Water.
- Cow dung.
- Thatch Roof.
- Soil or Sand.
- Gunny bags.
- Earthworms.
- Weed biomass
- A large bin (plastic or cemented tank).
- Dry straw and leaves collected from paddy fields.
- Biodegradable wastes collected from fields and kitchen.

## Procedure

- To prepare compost, either a plastic or a concrete tank can be used. The size of the tank depends upon the availability of raw materials.
- Collect the biomass and place it under the sun for about 8-12 days. Now chop it to the required size using the cutter.
- Prepare cow dung slurry and sprinkle it on the heap for quick decomposition.
- Add a layer (2 – 3 inch) of soil or sand at the bottom of the tank.
- Now prepare fine bedding by adding partially decomposed cow dung, dried leaves and other biodegradable wastes collected from fields and kitchen. Distribute them evenly on the sand layer.
- Continue adding both the chopped bio-waste and partially decomposed cow dung layer-wise into the tank up to a depth of 0.5-1.0 ft.
- After adding all the bio-wastes, release the earthworm species over the mixture and cover the compost mixture with dry straw or gunny bags.
- Sprinkle water on a regular basis to maintain the moisture content of the compost.
- Cover the tank with a thatch roof to prevent the entry of ants, lizards, mouse, snakes, etc. and protect the compost from rainwater and direct sunshine.
- Have a frequent check to avoid the compost from overheating. Maintain proper moisture and temperature.

## Advantages of Vermicomposting

The major benefits of vermicomposting are:

- Develops roots of the plants.
- Improves the physical structure of the soil.
- Vermicomposting increases the fertility and water-resistance of the soil.
- Helps in germination, plant growth, and crop yield.
- Nurtures soil with plant growth hormones such as auxins, gibberellic acid, etc.

## Employment opportunities

Businesses that generate food waste include restaurants, grocery stores, hotels, food processors, nursing homes, wholesale food outlets and farmers markets, shopping malls, resorts, and offices with dining facilities.

### Target consumers:

The target consumers for your Vermicompost making business are as follows:









## Vermicompost



- **Agricultural industry:** it is of a great use to these industries who need fertilisers that improve soil aeration, improves water holding capacity to give their plants and crops a suitable environment to grow
- **Plant laboratories :** Those labs who deal in producing new breeds of fruits and cultivate organic vegetables etc. might require this Vermicompost fertiliser to enhance germination, plant growth and crop yields
- **On site institutions:** For managing the food scraps from on-site institutions like in hospitals, universities and shopping malls etc.
- **Gardeners and botanists:** The Vermicompost produces is used by many households and professional botanists to in the processes of gardening as a replacement for chemical based fertilisers, it being rich and nutrients.
- **Metal industries :** The Vermicompost fertilise which is rich in lead, zinc, cadmium, copper and manganese is also likely used to keep the metals cleans for further production
- **Sewage and drainage industries:** It is also used by the sewage and drainage industries for their treatment used to remove organic matter, pathogens and oxygen demand from the waste water.

## Vegetable Garden

Vegetable gardening requires attention to all production operations, including insect, disease, and control and efficient marketing. The kind of vegetable grown is determined by consumer demands, which can be defined in terms of vegetable variety, size, tenderness, flavour, and type of pack. Though, effective management involves the adoption of methods resulting in a steady flow of the desired amount of produce over the whole of the natural growing season of the vegetable crop. Many vegetable plants can be grown throughout the year in some climates, while yield per acre for a given kind of vegetable varies based on the growing season and region where the crop is produced.

### Factors influencing Vegetable garden:-

- **Climate change**  
Climate involves the temperature level, moisture, daylight, and wind conditions of a specific region. Climatic factors strongly affect all stages and processes of vegetable plant growth
- **Temperature**  
Temperature requirements are mainly based on the minimum, optimum, and maximum temperatures during both day and night throughout plant growth.
- **Moisture**  
The amount and annual distribution of rainfall in a region, particularly during certain periods of development, affects local crops.
- **Daylight**  
Light is the source of energy for vegetable plants. The response of plants to light is mainly dependent upon light intensity, quality, and daily duration.
- **Site**  
The choice of a site involves such factors as soil and climatic regions.
- **Soil preparation and management**  
Soil preparation and management for vegetable growing involves many of the usual operations required for other crops. Good drainage is important for early vegetables because of wet soil retards development.
- **Propagation**  
Propagation of vegetable plants, involving the formation and development of new individuals in the establishment of new plantings, is accomplished by the use of either seeds or the vegetative parts of plants.
- **Planting**  
Vegetable crops are planted in the field where they are to grow to maturity. A few kinds are commonly started in an established in the or the open, and transplanted as seedlings.

## Cultivation

Vegetable cultivation refers to stirring the soil between rows of vegetable plants.

## Irrigation

Vegetable farming requires in arid and semi-arid regions, and irrigation is frequently used as insurance against drought in more humid regions

## Disease and insect control

The vegetable production of satisfactory crops requires rigorous disease- and insect-control measures. Crop yield can be lowered by disease or insect attack, and when plants are attacked at an early stage of growth the entire crop may be lost. Reduction in the quality of crops may also be caused by diseases and insects.





## Harvesting

The development stage of vegetables when harvested affects the quality of the product reaching the consumer.

## Benefits

- **Improve your health.** Consuming more fresh fruits and vegetables is one of the most important things you can do to stay healthy. When you pick vegetables right from your garden, the vitamin content will be at its highest. Also, you are reducing the risk of eating vegetables that contain harmful chemicals—you know exactly what you're eating. In addition, getting kids involved in the gardening process will make it more likely for them to try the vegetables.
- **Save money on groceries.** One of the benefits of enjoying garden vegetables is a reduced monthly food bill. You can grow organic vegetables for a fraction of the cost in the stores.
- **Get outdoor exercise.** Gardening is a physical activity and pulling weeds, planting, and digging can burn up to 400 calories per hour. Gardening is also a good mental exercise and helps keep your mind sharp.
- **Gardening is a natural stress reliever.** Being outside in the fresh air and sunshine can improve mood and make you feel rejuvenated and overall happy. Growing your own produce also gives you a great sense of accomplishment.

## Opportunities

- **Community Nutrition Gardens (CNGs):** CNGs are established on the principle of sustainability on a free community land. CNGs are planned to promote year-round availability of fruits and vegetables and provide income generation opportunity for women in rural Madhya Pradesh, India. The approach of CNGs in participatory in nature and women SHGs are at the center of the activity. They participate in the planning and implementation process and are also the income recipient.
- Startup like MyDreamGarden, offers many career opportunities for passionate and enthusiastic people. Working in My Dream Garden is more than a job, it's a respectable profession with many advancement opportunities. Look beyond the myths surrounding these careers to learn the truth about professions that offer variety, flexibility, competitive pay, opportunities to grow, and overall job satisfaction. Recently, Government of Karnataka has set up programs encouraging people to grow an Organic vegetable garden in vacant terraces and community gardens.

## Duck

Ducks are extremely important birds to their ecosystems. They are often found in wetlands and as they go about their daily routines, they'll often move around to different wetland locations. This connects the different wetlands and helps keep them healthier.

### Impact of ducks in ecosystem

Generating revenue for states  
Providing recreation areas  
Purifying water sources  
Diminishing the severity of flooding

## Opportunities

### Duck Farming

Among various species of poultry, ducks are sturdy and prolific in nature. Indigenous ducks of our country constitute more than 90% of the total duck population and the second largest species contributing towards egg production in India. Duck rearing is still in the hands of poor rural farmers, who depend mainly on ducks for their livelihood and employment. The extensive coastal line with many inland water ways are the potential sources for their existence.

### Advantages of Duck Farming

There are numerous advantages of starting duck farming business. In many countries, ducks rank next to chicken for meat and egg production.



Duck Farming



Guinea Fowl Farming





- Ducks need less expensive, simple and non-elaborate housing facilities. As a result housing costs are very less for setting up commercial duck farming business.
- Ducks are very hardy bird and they need less care or management. They can adopt themselves with almost all types of environmental conditions.
- They lay eggs either at night or in the morning.
- Ducks have comparatively shorter brooding period and ducklings grow faster. Ducklings grow so fast that, you can dispense artificial heat within their 5 to 7 days. Although they will require a little longer heating period during cold months.
- Ducks are highly resistant to the common avian diseases.
- A duck's regular food includes cassava, copra, corn, rice, fruits and any other low cost and easily available foods. They also have the natural tendency of foraging on aquatic weeds, algae, green legumes, fungi, earthworms, maggots, snails, various types of insects etc. which directly reduce feeding cost.
- Ducks have less mortality rate and usually they live longer than chickens. In case of egg production, ducks lay eggs for a long time period.
- Duck products such as eggs and meat have a great demand in the local and international market. So commercial duck farming business can be a great source of earning. There are already many successful farmers who are making a high profit from their duck farming business.
- Duck farming business can also be a stable employment source. Young unemployed educated people can join this business and make their own employment source.

### **Plan**

Ducks are farmed in overcrowded indoor sheds with little or no access to open water for swimming, bathing, preening, dabbling, and head-bobbing. Usually, thousands of ducks are confined together without natural light.

### **Incubation: —**

Incubation period in duck is 28 days higher than chicken. To start duck farm, disease free duckling should be purchased from reliable source or Govt. agency.

Brooding (0-4 Weeks)- The brooding period (0-4 weeks) is very critical for duckling and highest mortality may observed, if proper care not taken. 1 sq. meter area for 100 ducklings or 100 sq. cms. per ducklings is sufficient for brooding. A temperature of 29 to 32 C (85 to 90 F) is maintained during the first week. It is reduced by about 30 C per week till it reaches 24 C (75 F) at the end of fourth week. If temperature is higher than the recommended level, air circulation should be increased. In case of winter, a 60 watt bulb at 1-1.5 meter height from the ground level is enough to maintain the required temperature. Feed may be sprinkled or provided in the trays for encouraging the new born ducklings to pick up feed. From day two onwards ad libitum feed is provided in trough type of feeders. As the duckling grows bigger suitable feeders are used. Water in the drinkers should be offer frequently, 5 to 7.5 cm (2 to 3") deep just sufficient to drink and not dip themselves. Try to keep duckling dry.

### **Housing:**

As stated above duck do not require any elaborate housing, depending on rearing system intensive, semi intensive or range system, a house can be made with locally available resources like bombu, toku patta etc. Under intensive system, allow a floor space of 3 sq.ft.per bird. Under semi intensive system, a floor space of 2- 2.5 sq.ft area per bird is allowed as night shelter. Under semi intensive system duckling should allowed to access the field at the age of 4 weeks.

**Feeding: (5-16 Weeks):** Supplementary feeding is essential for better results. Bird allowed to field should also be supplemented with concentrate feed at least half dose of recommended feed. The concentrate feed may be purchased or formulate with local feed ingredients. The feed should contain 16% protein for layer bird and 20% protein for broiler finisher bird. starter ration (0-8weeks) & grower ration should contain 22-24% & 20% protein respectively Feed ingredients for 10 kg feeds.

(Adult bird maize-4 kg, Rice Polish-3kg, Mustard Cake- 1kg, Min mix- 350g, Salt- 250g, Vita. mix250, Antibiotics-75g, Coccidiostate-75g. All ingredients should be free from aflatoxin. Feed bird morning and late afternoon.

**Disease management:** Some of the common ailments among ducklings are coryza and the respiratory distress due to exposure to chill weather during heavy mist, besides duck plaque which causes high morbidity and mortality. During summer season, swelling of joints, gasping for breath, etc. The farmers use a decoction made of Poduthalai leaves (Lippia

nodiflora), roots of paragrass, Omum and Vasambu (Sweet flag; *Acorus calamus* L). These materials are ground well, mixed in water and boiled. Vasambu, the underground stem of the aromatic marsh herb is a medicine described earlier in Ayurveda as having beneficial effect on the body as a stimulant tonic and antispasmodic. This keeps the living being always alert and active, makes resistance to diseases and gives more stamina.

## **Guinea fowl**

Guinea fowl have an almost prehistoric appearance when they are compared to chickens and other types of fowl. Their plumage is spattered with black and white feathers on their bodies. And depending on the breed of the guinea, the face and neck feathers that they have are generally shiny and entirely black. They have red eyes that look rather fierce as well. The helmeted guinea fowl looks the most prehistoric of all because it has a horn on top of a patch of red skin that looks just like a helmet sitting on its head. There is also a guinea that looks very similar to a vulture too. The unique attributes of this type of fowl make them an interesting addition to a farm, but their looks aren't why most people keep them. Read on for several benefits of having a flock of guineas.

### **Varieties of Guinea fowl:-**

There are three main varieties of guinea fowl raised at CPDO(ER): pearl, white, and lavender. The pearl variety is the most popular and typically the one that people recognize most readily. Feathers from the pearl variety are often used for ornamental purposes.

Guinea fowl in the garden:- A large garden could be home to a few guinea fowl, although they are likely to stray further afield. They range much further than chickens – we have a large garden plus an adjoining field, but that didn't stop my guineas from crossing the main road (in a single line) and marauding around the neighborhood.

### **Understanding guinea fowl**

It's a mistake to treat guinea fowl like chickens, although they share many characteristics. While chickens are much more inclined to domesticity, and can become very tame, guinea fowl tend to be wilder and more flighty. If regularly handled from day-olds they may be reasonably friendly towards their owner, but as a rule they hate being picked up or even touched.

### **Preparations before Starting a Flock:**

Before starting a poultry flock, you must check local zoning regulations to make sure that raising poultry is permitted. This is particularly important when raising guinea fowl because guineas will range and cross the boundaries of a small lot. Although guineas are typically quiet, they can be very noisy if disturbed. Guineas are more active than chickens and not as easily tamed—they seem to retain some of their wild behavior.

#### **Housing:**

Guinea fowl house is required to protect them from high winds, rain, cold, sun, and predators. The desired floor space of 2-3 sq ft /bird is essential. The floor of the pen should be covered with paddy husk, wood shavings or chopped hay or straw. The litter should be kept dry, it can stay in place till it becomes deep litter after several months.

#### **Bird selection and purchase:-**

Raising guinea fowl to control ticks and insects, you are better off purchasing adult guineas because they are easier to care for than young guineas and do well on their own. It takes guineas a while to get settled into a new home. It is best to keep them confined for a week or two to let them become accustomed to their new home. If you let them out right away, they could run away. The guineas should be confined in a pen where they can see the area where they will be living. After the initial couple of weeks, let one guinea out.

#### **Nutrition:-**

Under free range, adult guineas forage for themselves and are able to meet most of their nutrition requirements on their own. They consume a variety of insects and arachnids (mosquitoes, ticks, beetles, and so on), weed seeds, slugs, worms, and caterpillars. Guineas need to consume some greens in order to maintain good digestion, and so they eat grass, dandelions, weeds, and other vegetation. Because the birds are consuming vegetation, it is important to make sure grit is available for the birds, and the birds also benefit from having oyster shell available. Guineas do enjoy a little scratch feed on the ground. They like wheat, sorghum, or millet grain and will ignore whole corn kernels. Guineas need a higher protein feed than chickens, but do quite well on regular poultry diets. Keets need a 24% – 26% protein ration as the starter feed.

### **Socio-economic attributes of guinea fowl production:-**

Guinea fowl, apart from contributing to household income, play an important role in the sociocultural lives of the people. The guinea fowls are mainly raised by subsistence farmers mainly from the rural areas of the country under rural backyard system of poultry production.

Keeping guinea fowl with chickens:- Guinea fowl can be bullies with other poultry and won't easily tolerate newcomers. They seem to particularly pick on cockerels too. They can be relentless in their pursuit of a victim, and may keep him or her away from the food. It is experienced, and has heard similar stories from other people, but a friend who keeps both chickens and guineas on her farm has had no problems. Some people keep guinea fowl and chickens in the same house, but unless they have been very well integrated, it's probably better to give the guineas their own quarters.

## **Benefits of Keeping Guinea Fowl**

- **Pest Control**

Guineas originate from Africa where they spend their days with rhinos who don't mind their presence at all. They pick ticks and other bugs off the rhinos' thick skin that they can't reach themselves. And in return, the rhinos offer them protection from predators that could eat them.

On a farm, they continue this behaviour by eating bugs off of the ground. Some people have said that they have seen them do the same thing to farm animals too. These fowl also catch and eat small snakes and other vermin, such as rats and mice. Another positive benefit of them scavenging for pests as a food source is that they get about 90 percent of their meals this way, so it costs less to feed them than other fowl that depend on grains for food.

- **Source of Food**

Since guineas are not as protective of their eggs as chickens are, collecting them in the morning as a food source is fairly easy. The eggs are smaller than a chicken's egg and they also have a richer flavor. The guineas themselves are a food source too. Most people find that their meat is a little drier and leaner, so it tastes best when it is paired with foods that offer moisture to it. Guinea meat is lower in fat and calories, which makes it a heart-healthy choice of protein.

- **Easy to Multiply**

Guineas produce about the same amount of eggs that a chicken does, and their gestation period is only one week longer. This means you can multiply them almost as fast as chickens if you want to. In as little as one month, a brood of tiny guineas will hatch. However, guinea mothers often forget about the eggs that they lay.

- **Friends to Other Animals**

For the most part, guinea fowl get along well with other animals if they are raised with them. This includes other types of fowl. However, if a rooster from a flock of chickens should happen to harass them during a season of mating, they will not fail to attack. So it is important to keep roosters away from guineas during this time.

## **Protection**

It is difficult to sneak past a guinea without it alerting the other members of its flock with its loud call. They have been known to gang up on predators that are attempting to attack one of them, so this helps to protect other animals on the property from being injured by a fox or weasel.

## **Fertilizer**

When guinea fowl are allowed to roam about and eat insects at their leisure, they produce rich droppings as they go that fertilize areas of soil. Their droppings from barns or hen houses that they are kept in can also be collected for gardens for this purpose. Or they can be thrown directly into a compost pile.

## **Weed Control**

Unlike chickens who are constantly getting into gardens and causing trouble, guinea fowl generally leave most planted areas alone. However, they do peck at weeds that they find since they like a little vegetation in their diet.

## **Kadaknath Chicken**

Kadaknath is a unique chicken breed that's black in colour. It's not just the meat that's black, but most of its organs as well as bones are black.

The blackness is not just limited to it, the eggs of this chicken are black as well. This chicken is found in the tribal-dominated Jhabua district and had also got GI tag last year after a legal battle with Chhattisgarh. This variety of chicken is



# Kadaknath Chicken



## Incubator



believed to have medicinal properties in it with 25-27 per cent protein and low-cholesterol (0.73-1.03 %) content. As compared to the other chicken varieties, this one is highly nutritious.

### **Advantages**

- The demand for the byproducts of the Kadaknath chicken breed is very high.
- Meat taste, texture, and flavor are very good.
- The breed demand is high with a very high profit margin as the pricing of its byproducts are sold at high rates in the market.
- The breed meat and eggs contain many essential vitamins, minerals, protein, amino acids.
- Contains vitamins C, E, B1, B2, B6, and B12.
- High levels of 18 essential amino acids along with niacin, calcium, phosphorous, iron nicotinic acid, and others are required by the human body.
- The blood levels and hemoglobin levels in the human body can be increased due to the medicinal properties contained in Kadaknath meat.
- It has great importance in helping to treat and cure various medical problems such as a headache, post-delivery problems, nervous disorders, and asthma through Siddha and Homeopathy.
- Kadaknath breed chickens are hardy to many of the poultry diseases.
- In order to boost its commercial farming, many state governments are helping farmers by providing various schemes and subsidies to boost Kadaknath farming.
- Feed consumption is moderate compared to other poultry birds.
- Birds can easily grow and survive in low-cost food habitats.
- Chicks are highly disease resistant compared to other poultry.
- Kadaknath eggs and meat are a nutritious diet.
- Kadaknath chicks grow fast and the grown-up is tasty and nutritious food.
- It has the highest rate of protein content (more than 25%) compared with other chicken breeds.

### **Why Kadaknath Chicken Farming Business**

Kadaknath farming generates income and profit within a very short span of time and is solely based on eggs and meat. For getting started one needs to have a bit of training and a small piece of land to start the business. A proper business plan has to be prepared and should include functions like housing, feeding, caring, labour resource, investment and marketing.

### **Feeding of the birds**

Prior to 2 months, birds can be fed prestarter broiler feed along with maize crumbs. Post 2 months, they can be given a 20% protein diet. Based on the weight and age, you can start with broiler feed and then with regular feed. This breed needs minimum care and can feed on seeds, grass, leafy vegetables etc.

### **House Management:**

Kadaknath breed grows best in a room temperature of 20 to 26 degree Celsius and a humidity of 50 to 70 percent. Either Litter system or cages can be used for rearing kadaknath chickens. Sheds as well as surrounding areas must be clean and free of animals like cats, snakes, dogs and also from flies as well as mosquitoes.

### **Egg Incubation:**

Sixth month onwards, Kadaknath hens start laying eggs and lay in 2 to 3 clutches. Each clutches produces 25 to 40 eggs and adds up to 100-120 eggs per annum. Make sure maximum hatching happens by putting the eggs into artificial incubation. Eggs should not be allowed to lay on the floor and enough next boxes should be arranged.

### **Diseases and Care:**

Newborns are to be kept in clean and dry brooder with a temperature setting of 35-37.5 degree Celsius. These birds can survive under extreme conditions and can resist several diseases. Try not to overcrowd the shed to prevent coccidiosis.

### **Marketing:**

For profitability, proper marketing must be done. Advertising through leaflets, banners regarding its health benefits and educating locals from any area will play a major role in increasing your sales. Online and social media will also help grow the business. Other modes include newspaper, posters, flyers etc.

Firms Innovations & achievement in states like Madhya Pradesh, Chhattisgarh.

- Self-made solar system poultry hatchery machine.
- Supply chicks to Tribal farmers through NABARD.
- Use Hydroponics fodder to reduce cost of feed.
- Practices organic poultry farming.
- Export of kadaknath for meat and rearing purpose to China, Bangladesh and Nepal.

## Turkey Farming

Turkey, either of two species of birds classified as members of either the family Phasianidae or Meleagrididae (order Galliformes). The best known is the common turkey (*Meleagris gallopavo*), a native game bird of North America that has been widely domesticated .

Breeds of turkeys in India

- **Broad breasted bronze**

The basic plumage color is black and not bronze. The females have black breast feathers with white tips, which help in sex determination as early as 12 weeks of age.

- **Broad breasted white**  
This is a cross between Broad breasted bronze and White Holland with white feathers. White plumage turkeys seems to be suitable Indian-Agro climatic conditions as they have better heat tolerance and also good and clean in appearance after dressing.
- **Beltsville small white**  
It closely resembles the Broad breasted white in color and shape but smaller in size. Egg production, fertility and hatchability tend to be higher and broodiness tends to be lower than heavy varieties.
- **Nandanam Turkey-1**  
Nandanam Turkey – 1 variety is a cross between the black desi variety and exotic Beltsville small white variety. It is suited for Tamil Nadu climatic conditions.

## General Turkey Management

**Incubation:** The incubation period is 28 days in turkey. There are two methods of incubation.

- **Natural incubation with broody hens:**  
Naturally turkeys are good brooders and the broody hen can hatch 10-15 numbers of eggs. Only clean eggs with good eggshell and shape should be placed for brooding to get 60-80% hatchability and healthy young ones.
- **Artificial Incubation:**  
In artificial incubation, eggs are hatched with the help of incubators Egg should be turned at hourly intervals daily. Eggs should be collected frequently to prevent soiling and breakage and also to get better hatchability.

## Brooding

In turkey 0-4 weeks period is called as brooding period. However, in winter brooding period is extended upto 5-6 weeks. As a thumb rule the turkey young ones need double hover space as compared to chicken. Brooding day old young ones can be done using infra red bulbs or gas brooder and traditional brooding systems.

Points to be noted during brooding:



- The floor space requirement for 0-4 weeks is 1.5 sq.ft. per bird.
- The brooder house should be made ready atleast two days before the arrival of young ones
- The litter material should be spread in a circular manner with a diameter of 2 mtrs.
- To prevent the young ones from wandering away from source of heat, a fence of atleast 1 feet height must be provided
- Starting temperature is 950F followed by weekly reduction of 50F per week upto 4 weeks of age
- Shallow waterers should be used.

The average mortality rate is 6-10% during the first four weeks of life. Young ones by nature are reluctant to eat and drink in the first few days of life, primarily because of bad eyesight and nervousness. Hence, they have to be force fed.

## **Force Feeding**

Starve out problem is one of the major factors for early mortality in young ones. So special care should be taken for supplying feed and water to turkey poults. In force feeding, milk should be fed at the rate of 100ml per liter of water and one boiled egg have to be given at the rate of one per 10 young ones up to fifteen days. This will compensate the protein and energy requirements of the young ones.

## **Turkey rearing systems**

Turkeys can be reared under free range or intensive system.

- Free range system of rearing:

### **Advantages:**

- It reduces the feed cost by fifty percent.
- Low investment.
- Cost benefit ratio is high.

In the free range system, in one acre of fenced land we can rear 200-250 adult turkeys. Shelter should be provided during night at the rate of 3-4 sq.ft. per bird. They should be protected from predators during scavenging. Planting of trees is desirable for providing shade and cooler environment. The range should be rotated which will help to reduce incidence of parasite infestation.

## **Free range feeding**

Since turkeys are very good scavengers, it can consume earthworms, small insects, snails, kitchen waste and termites, which are rich in protein and that will reduce the feed cost by fifty percent. Apart from this leguminous fodder like Lucerne, Desmanthus, Stylo etc., can be fed. To avoid leg weakness and lameness in free ranging birds, calcium should be supplemented at the rate of 250gm per week per bird in the form of oyster shell. Ten percent of feed can be substituted with vegetable waste to reduce the cost of feed.

## **Health cover**

Turkeys in the free range system are highly susceptible for internal (round worms) and external parasites (fowl mite). Hence once in a month deworming and dipping is essential to improve the growth of the birds.

## **Intensive system of rearing**

### **Advantages**

- Improved production efficiency.
- Better management and disease control.
- Housing
- Housing protects turkeys form sun, rain, wind, predators and provides comfort.

In hotter parts of the country the long axis of the house should run from East to West.

The distance between two houses should be at least 20 meters and the young stock house should be at least 50 to 100 meters away from the adult house.

The width of the open house should not exceed 9 meters.

Care to be taken while rearing Turkeys

The temperament of turkeys is usually nervous; hence they get panicky at all stages. Hence entry of visitors in to the turkey's house should be restricted.

- **Debeaking**

Young ones should be debeaked to control feather picking and cannibalism. Debeaking can be done at day old or 3-5 weeks of age. Remove the beak at about one half the distance from nostril to the tip of the beak.

- **Desnooding**

Removal of the snood or dewbill (the fleshy protuberance near the base of the beak) is to prevent the head injuries from picking and fighting. At the day old the snood can be removed by finger pressure. At 3 weeks of age it can be cut off close to the head with sharp scissors.

- **Detoeing or toe clipping**

Clipping is done at day old by removing the tip of the toe just to the inside of the outer most toe pad including the entire toenail.

- Feeding management of turkeys
- The methods of feeding are mash feeding and pellet feeding.
- The energy, protein, vitamin and mineral requirements for turkeys are high when compared to chicken.
- Since the energy and protein requirements for the both sexes vary they must be reared separately for better results.
- Feed should be given in feeders and not on the ground.
- Whenever change is made from one diet to another it should be carried out gradually.
- Turkeys require a constant and clean water supply at all times.
- Provide more number of waterers during summer.
- Feed turkeys during the cooler parts of the day during summer.
- Provide shell grit at the rate of 30-40 gm per day per bird to avoid the leg weakness.

## **Benefits**

### **Turkey meat and egg**

- The turkey will start lay from the 30th week of age and its production period is 24 weeks from the point of lay.
- Under proper feeding and artificial lightening management turkey hens lay as much as 60-100 eggs annually.
- Nearly 70 percent of the eggs will be laid in the afternoon.
- The turkey eggs are tinted and weigh about 85 gms.
- Egg is noticeably pointed at one end with strong shell.
- The protein, lipid carbohydrate and mineral content of turkey egg are 13.1%, 11.8%, 1.7% and 0.8% respectively. The cholesterol is 15.67-23.97 mg/gm of yolk.

### **Turkey meat**

People prefer turkey meat because of its leanest nature. The protein, fat, energy value of turkey meat are 24%, 6.6%, 162 Calories per 100 gm of meat. Mineral like potassium, calcium, magnesium, iron, selenium, zinc and sodium are present. It is also rich in essential amino acids and vitamins like niacin, vitamin B6 and B12. It is rich in unsaturated fatty acids and essential fatty acids and low in cholesterol.

## **Marketing**

- In commercial turkey farming, the birds become suitable for marketing within 12 to 20 weeks. Marketing turkey products is very easy. Because these products have very good demand and value in the market
- Commercial turkey farming is a very profitable business. And you can take this opportunity for making profits.
- Raising turkeys is relatively easy. It's just like raising other poultry birds such as chickens, ducks etc.
- It's not a new business, and many people are already doing this business. So, you don't have to worry much about this business.
- If you have backyard or vacant land, then you can start this business easily for utilising your space.
- Commercial production is very profitable, and it has high return of investment ratio.
- You will get your invested money back within a short period of time.
- Caring the turkey birds is relatively easy, so you will probably be able to raise these birds even if you are a beginner.
- Turkeys are just like other domestic poultry birds. And you don't need to have any license for raising turkeys.
- Turkey products, especially meat is very popular throughout the world. So, you don't have to worry much about marketing your products.
- Commercial turkey farming is a good and profitable business. So, it can be a good business for the educated but unemployed young people.
- start a small scale production and utilize your family labor and can apply for bank loan if you want to start in large scale.

## **Pigeon Farming**

Pigeon farming is very interesting, profitable enterprises and pigeons are very popular domestic bird. Pigeons are considered as the symbol of peace. Here in India due to religious sentiments, this farming has not taken its shape, In our Neighbor country like Pakistan, Bangladesh, China the squab raising has become a means of livelihood for the poor rural people. It fetch good money without involving any expenditure. In our country also now the people has started realizing its importance and is becoming more popular day by day, Among tribal people this farming is very popular. Almost all types of people who have facilities, love to raise some pigeon in their home. Pigeon farming require less labour and low investment.

### **Life cycle**

Generally pigeons are raised in pair. One pair of male and female pigeon stay together for their whole life. They can survive for about 12 to 15 years. Male and female both collect straw together and build a small nest for them to live. Female pigeon start laying eggs at the age of 5-6 months of age. They lay two eggs every time and their breeding capability stays for about 5 years. Both male and female pigeons hatch the eggs. Usually it takes about 17 to 18 days to hatch the eggs. The stomach of baby pigeon contains crop milk, which they eat for 4 days. Female pigeon feed their baby for ten days by their lips. After that, they start taking supplementary food by their own. At their age of 26 days, they become adult.

### **Pigeon Breeds**

There are about three hundred pigeon breeds available around the world. Pigeon breeds are of two types which are described below

#### **Meat Productive Breeds:**

White king, texona, silver king, gola, lokha, etc. are meat productive pigeons.

#### **Entertaining:**

# Pigeon Farming



Moyurponkhi, shirazi, lohore, fantail, jacobin, frillback, modena, trumpeter, trubit, mukhi, giribaz, templar, lotal etc. are most popular entertaining pigeons. Generally, the main purpose of pigeon farming is their meat. The meat of baby pigeon is soft and tasty than the adult one. Weight of some fleshy squab productive pigeon breeds are described below.

Breeds Name	Adult	Squab
<b>White King</b>	755	500
<b>Carneau</b>	700	450
<b>Homer</b>	730	400
<b>French Mondain</b>	750	550
<b>Swiss Mondain</b>	800	600

### Housing

- Housing is very important factor for pigeon farming. Keep in mind the following factors before making house for your pigeons.
- Built their house in a higher place. This will keep the pigeons free from dog, cat, mouse and some other harmful predators.
- Ensure huge flow of air and light inside the house.
- Prevent the entrance of rain water directly inside the house.
- The house can be build by thin wood or tin, bamboo or with packing boxes.
- Every pigeon require about 30 cm long, 30 cm high and 30 cm wide space.
- Every room of the pigeon house have to have the facilities of staying two pigeon.
- The house will be adjoining to each other and polyhedral.
- Keep a door on every room measuring 10×10 cm.
- Always try to keep the house clean and dry.
- Clean the house once or twice per month.
- Keep the food and water pot near the house.
- Keep some straw near the house, so that the pigeons can make bed for them.
- Keep water and sand near the house, as they clean their body by water and dust.

### Feeding

Pigeons generally eat wheat, maize, paddy, rice, enamel, legume, triticum aestivus mustard, gram etc. Keep foods in front of their house and they will take the food by themselves. You have to serve them balanced feed for proper growing, good health and for proper production. You can also serve them balanced feed, prepared for the chickens. Pigeon feed should contain 15-16 % protein. Every pigeon consume 35-50 grams of grainy feed daily. For fast growing of baby pigeon and for nutrition of adult, feed them oyster shell, lime stone, bone powder, salt, greet mixture, mineral mixture etc. with their regular feed. Along with this, feed them some green vegetables daily

### Benefits of Pigeon Farming

Pigeon farming has some great benefits. The main and notable advantages of this business profitable are described below.

- Pigeons are domestic bird and it's very easy to handle them.
- From their six month of age they start laying eggs and produce two baby pigeon per month on an average.
- Pigeon can be raised easily in the home yard and roof of the house.
- It takes about 18 days to hatch their eggs.
- Baby pigeon (squab) become suitable for consumption within their 3 to 4 weeks of age.
- You can build a pigeon house in a small place with little investment.
- Pigeon feeding costs is very low. In most cases they collect food by themselves.
- Pigeon meat is very tasty, nutritious and has a great demand and value in the market.
- Pigeon farming is also very pleasing and entertaining. You can spent some good times through watching the activities of pigeons.
- You can get maximum profit form them, by investing small capital and labor.
- Diseases are comparatively less in pigeons.
- Closet of pigeon is a good manure for crop cultivation.



- Different types of toys can be made by the feather of pigeons.
- Pigeons help to keep the environment safe by eating different types of insects.
- The squab has a great demand in the market as a good patient's diet.
- Pigeons start laying eggs at their 5 to 6 months of age.
- Pigeon farming can be a great income source for the people of some poor country, such as Bangladesh, India, Nigeria, Pakistan etc.
- All domestic pigeons have one common ancestor, which is the Rock Dove Pigeon.
- Pigeons are known to survive for almost 10-15 years in their natural habitats. The longest recorded life-span of a pigeon was around 33 years!
- Pigeons and doves are known to produce crop milk, which they use to feed their young ones. It contains a highly nutritious amount of protein and fat and is produced by both male and female.



## THE EDP Programme Present Status and Future Plans

Among the Persons who underwent training Tamil Selvan of Zoology department UG 2016 to 2019 (Reg. No. 1622F0092 ) and PG completed.PG 2019-2021 PG register no (1932F0019) who have started their own Ventures has expanded their Venture TO a great extent and are inspiring others.



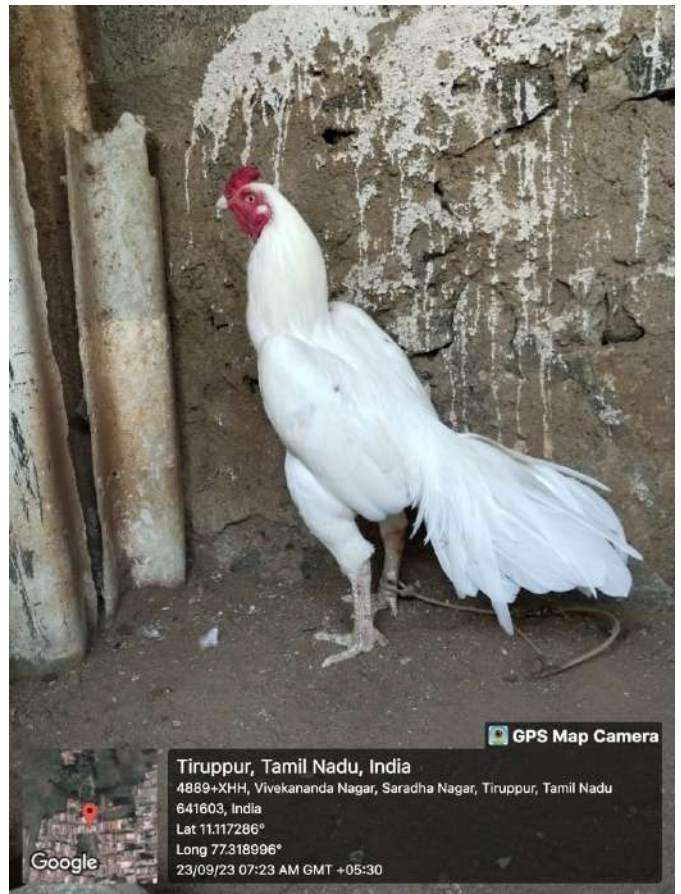
Tamil Selvan



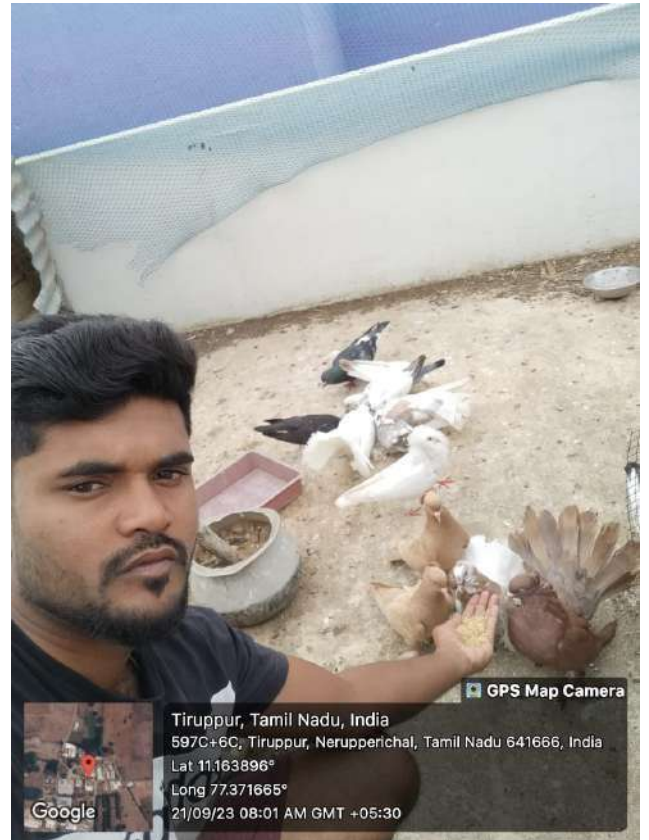
Mahendram















## Future Plans

To train more persons and make them interested

Since the campus is gifted with a variety of trees. There is no dearth of biodegradable Organic Waste. Already a Pilot vermin-compost yard is running in the college and the vermin compost is given to staff members as well as to kitchen Gardens free of cost.

In future there is plan to put a minimum value to the products so that the expenses can be overcome. Since the Directorate of Collegiate permission required for the same and we are waiting for a positive outcome







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