AgroTech Nexus

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AGRICULTURAL ENGINEERING

NANDHA ENGINEERING COLLEGE
(Autonomous)
Affiliated to Anna University, Chennai & Accredited by NAAC A+ Grade
Perundurai - Erode Main Road, Erode - 638 052, Tamil Nadu.

Department Vision and Mission

VISION

- To foster academic excellence by imparting knowledge in Agricultural Engineering to meet the ever-growing needs of the society.

MISSION

- To provide quality education to produce agricultural engineers with social responsibility.
- To excel in the thrust areas of agricultural engineering to identify and solve the real-world problems.
- To create a learner-centric environment by upgrading knowledge and skills to cater the needs and challenges of the society.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The graduates of Agricultural Engineering will be

- **PEO1: Core Competency:** Successful professional with core competency and inter-disciplinary skills to satisfy the Industrial needs.
- **PEO2: Research, Innovation and Life-long Learning:** Capable of identifying technological requirements for the society and providing innovative solutions to real time problems.
- **PEO3: Ethics, Human values and Entrepreneurship**: Able to demonstrate ethical practices and managerial skills through continuous learning

PROGRAMME SPECIFIC OUTCOMES (PSO)

The students of Agricultural Engineering will be able to

- **PSO1:** Design, analyze and apply the knowledge gained on agricultural machinery, tools, implements and production technologies to increase crop production, improve land use, soil nutrient and conserve resources like water, fertilizer and energy.
- **PSO2:** Apply the comprehensive knowledge of engineering properties of agricultural products for upgrading the unit operation and developing innovative process, value-added products, and advanced engineering technologies to meet the challenges in agriculture.

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MAGAZINE

Urban agriculture

P. Dhevayani, 3rd Year, Agri, NEC

Urban agriculture refers to various practices of cultivating, processing, and distributing food in urban areas.The term also applies to the area activities of animal husbandry, aquaculture, beekeeping, and horticulture in an urban context. Urban agriculture is distinguished from peri-urban agriculture, which takes place in rural areas at the edge of suburbs. Urban agriculture can appear at varying levels of economic and social development. It can involve a movement of organic growers, "foodies" and "locavores," who seek to form social networks founded on a shared ethos of nature and community holism.These networks can develop by way of formal institutional support, becoming integrated into local town planning as a "transition town" movement for sustainable urban development. For others, food security, nutrition, and income generation are key motivations for the practice. In either case, the more direct access to fresh vegetable, fruit, and meat products that may be realised through urban agriculture can improve food security and food safety.

Fabrication of solar seed dryer

Mr. N. Mukilan, Assistant professor, Agri, NEC

A solar seed dryer is made from local, biodegradable, and low-cost materials. It consists of:A solar flat plate air heater with three layers of insulation. A drying chamber. A fan with a regulator that directs the required air flow through the system. A tray, Reflective walls and glass roof ,A preheating air absorber plate, Inner panels for removal of moisture. A chimney through which air stream passes across the dryer. The air is heated up in the solar collector and channeled through the drying chamber where it is utilized in drying. The heat required for drying is provided by radiation to the upper layers and subsequent conduction into the grain bed.The sun is used to dry crops in many places worldwide. Heating applications use solar radiation, converted into useable thermal energy by the process.

Groundnut harvesting machine

A. Prawin, 3rdYear, Agri, NEC

Groundnut harvesting machine is mainly used to harvest peanut from field. And Taizy two row peanut harvesting can be operated flexibly in the field with 20-35 hp tractor, picking fruit with high capacity,1300-200m2/h. Its breakage rate is less than 1%, and great picking rate (98%) saves labor time and energy.Groundnut harvesters are machines that harvest peanuts from the field. They use a V-shaped blade to uproot the groundnuts from the soil. The machine is tractor-mounted and has a telescopic propeller shaft. It can be operated with a 20-35 hp tractor.The machine separates the crop and soil through a vibration sieve. The soil drops down from the sieve, and the crop falls onto the road.Groundnut harvesters can have a breakage rate of less than 1% and a picking rate of 98%. This saves labor time and energy.When harvesting groundnuts, you should avoid high humidity because it can cause mold on the pods. Harvesting should coincide with the end of the rainy season and dry conditions.

Beekeeping

Mr. R. M. Subramanian, Assistant professor, Agri, NEC

Beekeeping, also known as apiculture, is the maintenance of bee colonies in man-made beehives. The most commonly kept species are honey bees in the genus Apis, but other honey producing bees such as Melipona stingless bees are also kept.Bees are kept for their honey and other products, or their services as pollinators of fruit and vegetable blossoms. Honey is highly nutritious and an important constituent of several medicines. The apiaries in which honeybees live and nurture their young ones are also a source of beeswax.Beekeeping requires less time, money, and infrastructure investments. Honey and beeswax can be produced from an area of little agricultural value. The Honey bee does not compete for resources with any other agricultural enterprise. Beekeeping has positive ecological consequences.

Milking Machine

P. Ravipravin, 2ndYear, Agri, NEC

Modern milking machines are capable of milking cows quickly and efficiently, without injuring the udder, if they are properly installed, maintained in excellent

operating conditions, and used properly. The milking machine performs two basic functions.It opens the streak canal through the use of a partial vacuum, allowing the milk to flow out of the teat cistern through a line to a receiving container.It massages the teat, which prevents congestion of blood and lymph in the teat.

Milking characteristics depend upon vacuum levels and pulsation rates among others. Studies on Egyptian buffaloes revealed that a vacuum of 51 kPa and a pulsation rate of 55 cycles/min led to much longer milking times than a vacuum of 60 kPa and a pulsation rate of 65 cycles/min (6.21 min. compared to 3.18 min.). The higher vacuum level, however, caused a significant increase in the somatic cell counts. Highest milk yield within an acceptable time were found when using 56 kPa and 65 cycles /min. In all trials a pulsation ratio of 50:50 was used. Studies in Pakistan indicated that the pulsation rate and ration should be 70 cycles/min and 65:35 respectively for Nili-Ravi buffaloes. In Italy, the majority of farms use the same machines for both buffaloes and cattle. It is a simple" cattle machine" with one vacuum level operating at approximately 40 cm Hg.

Fishery

S. Shalini, 4th Year, Agri, NEC

A fishery is an area where fish are caught for commercial or recreational purposes. It can be a defined body of water or a collection of fishing activity that have been agreed upon by countries and fishers. You often have different fisheries for each target species of fish or shellfish.A sustainable fishery has healthy and productive populations of fish where the integrity of the ecosystem is maintained. The fishing activity within the sustainable fishery is well managed and ensures their environmental impact is reduced including minimising bycatch and collecting data to determine their total allowable catch.An MSC certified sustainable fishery must be scored highly against three principles:Healthy populations of target fish, Ecosystem impact minimized, Good management in place.

Locavore

L. M. Haripriya, A. Sameena Beham, 2nd Year, Agri, NEC

A locavore is someone who eats food that is grown, raised, or produced locally, usually within 100 miles of home. The term is a combination of the word "local" and the suffix "vore" which refers to an animal's diet.The locavore movement encourages consumers to buy from farmers' markets or even to produce their own food. The argument is that fresh, local products are more nutritious and taste better.The term "locavore" was first used in 2005. The locavore movement is said to have begun on World Environment Day in 2005 in San Francisco. Four Californian women, Lia McKinney, Jessica Prentice, Dede Sampson and Sage Van Wing, were inspired by ecologist Gary Paul Nabham's book “Coming Home to Eat” to start an eating challenge.

Sericulture

Dr. S. Vanitha, Associate professor, Agri, NEC

Sericulture, or silk farming, is the cultivation of silkworms to produce silk. Although there are several commercial species of silkworms, the caterpillar of the domestic silkmoth is the most widely used and intensively studied silkworm. Sericulture is the process of producing raw silk by breeding, rearing, and domesticating silkworms. The most commonly used silkworm species is the domestic silkmoth, also called "Bombyx Mori". Other silkworms used for cultivating wild silk include Eri, Muga, and Tasar.

The production of silk generally involves two processes:Care of the silkworm from the egg stage through completion of the cocoon, The silk glands of the mature lava secrete a clear fluid that hardens when exposed to air, forming a fine silk fiber. The filament forming a cocoon can measure from 700 to 1100 meters in length.The full-grown lava then pupates inside the cocoon. In about ten days the pupae develops into a winged adult. The adult moth secretes a substance and dissolves one end of the cocoon, escaping out through the opening.

Sugarcane harvester

Mr. V. Chandramohan, Assistant professor, Agri, NEC

A sugarcane harvester is a large piece of agricultural machinery used to harvest and partially process sugarcane. The machine was developed in the 1920s and is similar in function and design to a combine harvester.The harvester moves along the rows of cane, removing the leafy tops and cutting the stalk into short pieces called "billets". The billets are loaded into bins that are towed alongside the harvester. When full, the bins are taken to the sugar mill by road or tramway.Some popular sugarcane harvesters include:Shaktiman Sugarcane Harvester, New Holland Sugarcane Harvester Austoft 4000, New Holland Sugarcane Harvester Austoft 8000, Mini sugarcane harvesters are usually self-propelled machines or connected with tractors. They can pick up fallen sugarcane, cut and pave the stalk, and adapt to different land forms.

Poultry farming

S. K. Abirami Meenakshi, 4th Year, Agri, NEC

Poultry farming is the practice of raising domesticated birds for their meat, eggs, and feathers. The most common birds raised for poultry are chickens, ducks, turkeys, and geese. Other birds, like guinea fowl and squabs, are not as frequently raised for food.Poultry farming is a major industry in many countries, producing large quantities of poultry meat and eggs for human consumption. More than 60 billion chickens are killed for consumption annually.Poultry farming can be done domestically or commercially. Chickens account for more than 90% of poultry farming.The poultry industry is about to be radically transformed by robots, the Internet of Things (IoT), and artificial intelligence.

Fish-pig farming material flow

S. Krishna Kumar, 4th Year, Agri, NEC

The raising of pigs can fruit-fully be combined with fish culture by constructing animal housing units on the pond embankment or over the pond in such a way that the wastes are directly drained into the pond. The system has obvious advantages:The pig dung acts as excellent pond fertilizer and raises the biological productivity of the pond

and consequently increases fish production.Some of the fishes feed directly on the pig excrete which contains 70 percent digestible food for the fish.No supplementary feed is required for the fish culture, which normally accounts for 60 percent of the total input cost in conventional fish culture.The pond dikes provide space for erection of animal housing units.Pond water is used for cleaning the pigsties and for bathing the pigs.The system cannot be adopted in all parts of India due to religious consideration but it has special significance in certain areas as it can improve the socioeconomic status of weaker rural communities, especially the tribals who traditionally raise pigs and can take up fish-pig farming easily.

Pig raising

C. Seenivasan, 3rdYear, Agri, NEC

The number of pigs required will depend upon the pond area. The excreta of three pigs are sufficient to fertilize a pond of 1 000 m^2. So three pigs may be raised on a pond of 0.1 ha. As pigs attain slaughter size within 5-6 months and fish raising of Indian exotic carp is done for 10-12 months, two lots of pigs can be raised along with one lot of fish.The pigsties are constructed on the pond embankments in such a way that the washings are drained to the pond through a delivery channel. A diversion channel is always provided to divert the excreta away from the ponds as these develop algal bloom or any other abnormality. Washings of pigsties are drained into the pond after sunrise to avoid oxygen depletion.The pigsties can be constructed from any available cheap materials but the floor must be cemented with a slope towards the pond. Each pig is provided with a floor space of 1-1.5 m^2.

Organic soils

Ms. P. Sandhiyadevi, Assistant professor, Agri, NEC

Organic soils can help your plants resist pests and disease, avoiding the need to use chemicals and pesticides. Because organic soil is composed of nutrient and mineral rich elements, your plants will grow stronger cell wells, giving them added layers of protection from pests and disease. This eliminates the need to buy chemical heavy pesticides that introduce synthetic elements to your plants. The nutrients in organic

soils also provide a natural protection making plants more resistant to diseases. All of this adds up to stronger pest and diseases resistant plants that save you from having to spend more to keep them healthy.Depending on your gardening needs and preferences organic soils come in a range of varieties and uses from organic potting soil to lawnand garden soil.

Biodiversity

S. Nishanthini, 2nd Year, Agri, NEC

Biodiversity encompasses the variety of all life on earth. India is one of the 12-mega diverse countries of the world. With only 2.5% of the land area, India already accounts for 7.8% of the global recorded species. India is also rich in traditional and indigenous knowledge, both coded and informal.India is a Party to the Convention on Biological Diversity (1992).Recognizing the sovereign rights of States to use their own biological resources, the Convention expects the parties to facilitate access to genetic resources by other Parties subject to national legislation and on mutually agreed upon terms (Article 3 and 15 of CBD). The Convention on Biological Diversity recognizes contributions of local and indigenous communities to the conservation and sustainable utilization of biological resources through traditional knowledge, practices and innovations and provides for equitable sharing of benefits with such people arising from the utilization of their knowledge, practices and innovations.

Biodiversity is a multi-disciplinary subject involving diverse activities and actions. The stakeholders in biological diversity include the Central Government, State Governments, institutions of local self-governmental organizations, industry, etc. One of the major challenges before India lies in adopting an instrument,which helps realise the objectives of equitable sharing of benefits enshrined in the Convention on Biological Diversity.

Tissue culture

E. T. Nouvshika, 2nd Year, Agri, NEC

Tissue culture is the growth of tissues or cells in an artificial medium separate from the parent organism. This technique is also called micropropagation. This is typically facilitated via use of a liquid, semi-solid, or solid growth medium, such as broth or agar. Tissue culture commonly refers to the culture of animal cells and tissues, with the more specific term plant tissue culture being used for plants. The term "tissue culture" was coined by American pathologist Montrose Thomas Burrows.[1] This is possible only in certain conditions. It also requires more attention. It can be done only in genetic labs with various chemicals.

Carbon Trading

K. R. Nithiya Devi, 4th Year, Agri, NEC

Carbon trading means an idea presented in response to the Kyoto Protocol that involves the trading of greenhouse gas (GHG) emission rights between nations. For example, if Country A exceeds its capacity of GHG and Country B has a surplus of capacity, a monetary agreement could be made that would see Country A pay Country B for the right to use its surplus capacity.The Kyoto Protocol presents nations with the challenge of reducing greenhouse gases and storing more carbon. A nation that finds it hard to meet its target of reducing GHG could pay another nation to reduce emissions by an appropriate quantity.The carbon trade came about in response to the Kyoto Protocol. Signed in Kyoto, Japan, by some 180 countries in December 1997, the Kyoto Protocol calls for 38 industrialized countries to reduce their greenhouse gas emissions between the Years 2008 to 2012 to levels that are 5.2% lower than those of 1990.Carbon is an element stored in fossil fuels such as coal and oil. When these fuels are burned, carbon dioxide is released and acts as what we term a "greenhouse gas".

The idea behind carbon trading is quite similar to the trading of securities or commodities in a marketplace. Carbon would be given an economic value, allowing people, companies or nations to trade it. If a nation bought carbon, it would be buying the rights to burn it, and a nation selling carbon would be giving up its rights to burn it. The value of the carbon would be based on the ability of the country owning the carbon to store it or to prevent it from being released into the atmosphere. (The better you are at storing it, the more you can charge for it.)

A market would be created to facilitate the buying and selling of the rights to emit greenhouse gases. The industrialized nations for which reducing emissions is a daunting task could buy the emission rights from another nation whose industries do not produce as much of these gases. The market for carbon is possible because the goal of the Kyoto Protocol is to reduce emissions as a collective.On the one hand, carbon trading seems like a win-win situation: greenhouse gas emissions may be reduced while some countries reap economic benefit. On the other hand, critics of the idea suspect that some countries will exploit the trading system and the consequences will be negative.

Ozone depletion

S. Sathya, 3rdYear, Agri, NEC

Ozone layer is a protective layer in our atmosphere (O3, three oxygen atoms). It's about 19 to 30 km in distance from the Earth surface. It plays an important role of blocking ultraviolet (UV) rays that come from the sun, which, if there was no ozone layer ever, cancer would dominate and even no life would be in this world! The concentration of the layer is usually under 10 parts ozone per million. The ozone layer is made up by the action of sunlight to oxygen, and the amount is stabled by the existence of nitrogen.

In today's trends there is a noticeable depletion of the ozone layer. It's popularly known since 1970 that a substance called CFC (chlorofluorocarbon) is threatening the layer. This substance is usually contained in refrigerators, coolants, and aerosol sprays. When we use much of those things (which contain CFC), we are continually depleting our Earth's ozone layer. However, most of the latest products today do not contain CFC anymore. Some other substances, like bromine halocarbons and nitrous oxides are also possible threats.

ACABC TRAINING

Dr. D. Prabha, Professor, Agri, NEC

The Ministry of Agriculture and farmers welfare, Government of India, in association with NABARD has launched a unique programme to take better methods of farming to each and every farmer across the country.This programme aims to tap the expertise available in the large pool of Agriculture Graduates. Irrespective of whether

you are a fresh graduate or not, or whether you are currently employed or not, you can set up your own AgriClinic or AgriBusiness Centre and offer professional extension services to innumerable farmers. Committed to this programme, the Government is now also providing start-up training to graduates in Agriculture, or any subject allied to Agriculture like Horticulture, Sericulture, Veterinary Sciences, Forestry, Dairy, Poultry Farming, and Fisheries, etc. Those completing the training can apply for special start-up loans for venture.

Fungiculture

Mr. K. Pradeep Kumar, Assistant professor, Agri, NEC

Fungiculture is the cultivation of fungi such as mushrooms. Cultivating fungi can yield foods (which include mostly mushrooms), medicine, construction materials and other products. A mushroom farm is involved in the business of growing fungi.The word is also commonly used to refer to the practice of cultivation of fungi by animals such as leafcutter ants, termites, ambrosia beetles, and marsh periwinkles.

Autumn leaves

M. Inthu, 2nd Year, Agri, NEC

Autumn leaves are the leaves of deciduous trees and shrubs that change color in the fall. The leaves are normally green, but in the fall they turn various shades of yellow, orange, red, purple, and brown. The leaves change color because they receive less sunlight in the fall, which causes the chlorophyll in the leaves to break down. The chlorophyll is what makes leaves green. When the chlorophyll breaks down, the leaves reveal the colorful pigments underneath.Fallen leaves are important to the environment because they provide food for birds, pollination for plants, and help keep soils healthy. Some groups, such as the Xerxes Society and the National Wildlife Federation, have started campaigns to encourage homeowners to leave the leaves.

Kitchen garden

M. Tharani, 2nd Year, Agri, NEC

The kitchen garden is miniature farming of vegetables and herbs. It can be a great source of nutritious and fresh veggies. Apart from garden beds, you can create one even in the patio, balcony, terrace, or even window boxes. Succession, intercropping, and vertical gardening are also finding great significance in kitchen garden ideas. The Importance of Kitchen Garden in a home are many! Let's have a look.

The biggest perk of having your own kitchen garden is that you have access to fresh harvest, whenever you need it. It eliminates the hassle of rushing to the vegetable markets. The kitchen garden ensures inexpensive and nutritious harvest Year-round. And, you cannot deny the fact that homegrown vegetables are far tastier and chemicals-free.

Vegetables are loaded with several vitamins, fibers, and minerals that provide essential nutrition to the body and prevent numerous diseases and malnutrition. Leafy vegetables prevent iron deficiency like anemia. Herbs and spices are known for playing a vital role in detoxifying toxins from the body. Furthermore, herbs are easiest to grow and require lesser space. You can pick lemongrass, coriander, dill, rosemary, mint, basil, and thyme for growing in kitchen gardens.

Power tiller

Y. Karthikeyan, 2nd Year, Agri, NEC

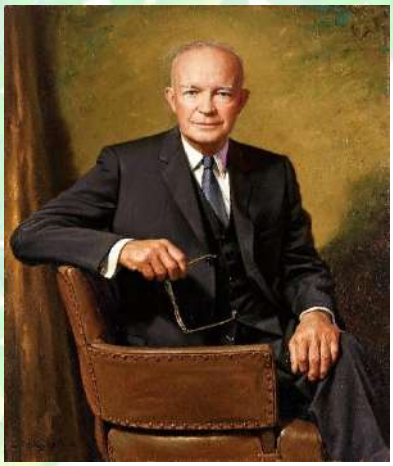
A power tiller is a two-wheeled agricultural implement that has rotary tillers. It is also known as a walking tractor. Power tillers are used for many farm activities, including:Preparing the soil, Sowing seeds, Planting seeds, Adding and spraying fertilizers, herbicides, and water. Power tillers are efficient and can help farmers complete their work quickly. They have a horsepower range of 2.0 to 40 HP.When choosing a power tiller, you can consider factors such as: Engine type, Power, Tine position, Build quality.

DuckRearing

M. Parthipan, 4th Year, Agri, NEC

The duck is one of the most significant poultry species, and in India it holds a significant position in terms of egg and meat production. Though ducks are reared throughout the world, the majority are concentrated on the Asian continent. In addition to being a valuable global livestock sector generating eggs, meat, and feathers, duck farming provides small, marginal, and even landless people with a source of income. India's duck rearing is characterised by being nomadic, extensive, seasonal, sometimes primitive, and still controlled by landless farmers, small-scale farmers, marginal farmers, and nomadic tribes. With growing demand, some organised duck farms are being established in different parts of the country. States which top in duck rearing in the country are West Bengal, the north eastern state of West Assam, Kerala, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Bihar, and Orissa etc.

The fact that fish-based gastronomic preparations go particularly well with duck eggs and meat is one of the reasons that West Bengal and Kerala are historically the two states that consume the most duck eggs and meat. Native ducks, characterised by their attractive plumage, are essential to the resource-poor duck farmers' ability to sustain their way of life. In spite of the fact that the majority of the ducks reared in the country are of native/nondescript type, they happen to be the second largest poultry species contributing to egg production in India. Ducks lay more eggs per Year in comparison to native chicks, and the size of eggs is also bigger. Duck meat is high in calories and often considered a delicacy. Duck husbandry is mostly traditional, but with time, the interest in this sector is increasing. Producing one more egg per capita per Year can generate 25,000 or more employment and 50 g more meat per capita per Year can provide employment to the same number of people in the poultry sector in India, so the scope for employment generation in this sector is immense with the least investment. To refine current practises in duck farming, location-specific technological interventions are needed.



FARMING LOKKS MIGHTY EASY WHEN YOUR PLOW IS A PENCIL, AND YOU'RE A THOUSAND MILES FREM THE CORN FIELD.

- D. EISENHOWER

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