AGRICULTURAL ENGINEERING

MAGAZINE 2021

EXCEL ENGINEERING COLLEGE (AUTONOMOUS)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NBA (AERO, CSE, ECE & MECH), NAAC with "A+" and
Recognised by UGC (2f &12B)
KOMARAPALAYAM

DEPARTMENT VISION MISSION

VISION

To be a global leader in Agricultural Engineering, pioneering innovative solutions, fostering creativity and inspiring lifelong learning, all while embracing social responsibility to enhance agricultural sustainability and nourish the world.

MISSION

1.Provide an exceptional teaching and learning experience that integrates Experimental learning with practical skills and knowledge in agriculture engineering.
2.Advance cutting-edge research and comprehensive training, stringing to be at the forefront of innovations and knowledge dissemination in our field.
3. Emphasis on skill development, value addition and hand-on field work, to make students academically proficient.
4.Foster technological advancements and create abundant career opportunities, to ensure graduates are well prepared for successful careers and become industry leaders.

PROGRAMME EDUCATIONAL OBJECTIVES

- Graduates will demonstrate comprehensive technical proficiency as agricultural engineers, applying knowledge and skills to design, implement, and manage innovative agricultural systems effectively
- Graduates will cultivate an entrepreneurial mindset, showcasing the ability to identify, evaluate, and implement sustainable agricultural solutions, contributing to the growth and viability of agricultural enterprises.
- Graduates will champion sustainable development in agriculture by integrating environmentally conscious practices, promoting resource efficiency, and engaging in initiatives that address the socio-economic needs of communities
- Graduates will embrace a culture of creative learning, continuously adapting to emerging technologies and contributing to the advancement of agricultural sciences. Furthermore, they will actively serve society by applying their expertise to address agricultural challenges and promote community well-being.

PROGRAMME SPECIFIC OUTCOMES

- PSO1: To develop the skills in the field of Agriculture Engineering to become well versed in farm Mechanization, Food and Dairy Processing, Soil and Water Conservation, Bio Energy and IoT in Agriculture.
- PSO2: To imbibe the skills on supervising, coordinating, guiding, leading and decision making in the minds of Agriculture Engineering students for completing crop production projects in time

MESSAGES

CHAIRMAN'S MESSAGE

Prof.Dr.A.K.NATESAN

Agricultural Engineering is one of the essential branches of Engineering which demands innovation. With the rapid advancement of technology, Agricultural Engineering is becoming more important to tackle challenges in the global food market. The future of Agricultural Engineering is to integrate technology with biology and the social aspects of agriculture to create sustainable environment. I congratulate the Department of Agricultural Engineering for their initiatives to introduce department newsletter and also I wish the students to shine in their career.

VICE CHAIRMAN'S MESSAGE

DR. N. MATHAN KARTHICK, M.B.B.S., M.H.SC. (DIABETOLOGY), AKS

Agricultural engineers' main role is to solve problems found in agricultural production. Goals may include designing safer equipment for food processing. Agricultural engineers must creatively apply the principles of engineering. Agricultural engineer solve problems concerning power supplies, machine efficiency, the use of structures and facilities, pollution and environmental issues, and the storage and processing of agricultural products. I congratulate the Department of Agricultural Engineering for their initiatives to introduce department newsletter.

DR. K. BOMMANNA RAJA, PH.D.

Agricultural Engineering is highly job oriented discipline especially in India where agriculture plays a major role in the economy of the country. I congratulate all the students and faculty members in publishing the department newsletter portraying the academic activities, student and faculty participation and achievements.

DR.G.VIJAYAKUMAR, M.E., PH.D.,

The Department of Agriculture Engineering started during the Academic Year 2018-19 with an intake of 60 students. We have well established laboratories, well qualified and multi-disciplinary faculty members from various specializations such as Soil and Water Conservation Engineering, Farm Machinery and Power, Bio Energy Resources and IoT in Agriculture, Agricultural Process Engineering, Food and Dairy Engineering, Water Resources Engineering. Since agriculture started from ancient period, nowadays modern methods are being used. Also it requires much contribution from engineers to improve the economic wellbeing of the farmers through efficient mechanization. We are proud to create the entrepreneurs in agriculture field. I congratulate all the students also members of GRAES association to launch the newsletter for the Academic year 2021-2022.

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MAGAZINE

Nutritional Value of Jackfruit Seed Flour

K.R. Krishun and S. Agilan , 3rd Year, Agri,EEC

In recent years food industries are facing challenge of developing new products for healthy and quality of life. To obtain healthy diet, there is a need to find new plant sources with higher nutritive profile. Consumers are also now giving more importance to healthy and nutritious quality food. There are many values added products in the market which are made from different sources such as milk, cereals, meat etc. Nowadays nutritional bar has become popular among people. It is very easy to manufacture and can be sold at low price depending upon the ingredients.1 Snack bars can be considered as convenient means of supplying nutrients in human diets.2 Gat and Ananthanarayan3 has successfully utilized jackfruit seed flour for preparation of value-added snacks.

Fertilizer Sprayer

S.Dharshini and P. Kiruba Darthi , 3rd Year, Agri,EEC

When it comes to the cultivation of rice, the application of fertilizer in an effective manner is essential to producing a decent yield, cutting down on production expenses, and minimizing nitrogen losses caused by denitrification and volatilization. These three goals can be accomplished by applying fertilizer in an efficient manner. One of the principal pathways through which nitrogen is lost in rice fields is a process known as volatilization. Although broadcasting is the most common method used to apply fertilizer to paddy fields, there is still a possibility that some of the fertilizer might be lost due to volatilization.

Solar Vegetable Dryer

Dinesh kumar S, Poovarasan V , 3rd Year, Agri,EEC

Drying is one of the methods used to preserve food products for longer periods. The heat from the sun coupled with the wind has been used to dry food for preservation for several thousand years. Solar thermal technology is a technology that is rapidly gaining acceptance as an energy saving measure in agriculture application. It is preferred to other alternative sources of energy such as wind and shale, because it is abundant, inexhaustible, and non-polluting. Solar air heaters are simple devices to heat air by utilizing solar energy and it employed in many applications requiring low to moderate temperature below 80°C, such as crop drying and space heating. Drying is the oldest preservation technique of agricultural products and it is an energy intensive process.

Drying of agricultural products using renewable energy such as solar energy is environmental friendly and has less environmental impact. Different types of solar dryers have been designed, developed and tested in the different regions of the tropics and subtropics.

The major two categories of the dryers are natural convection solar dryers and forced convection solar dryers. In the natural convection, solar dryers the airflow is establish by buoyancy, induced airflow while in forced convection solar dryers the airflow is provide by using fan operated by either electricity solar module or fossil fuel. Now the solar dryer designed and developed for and used in tropics and subtropics are discuss under two headings.

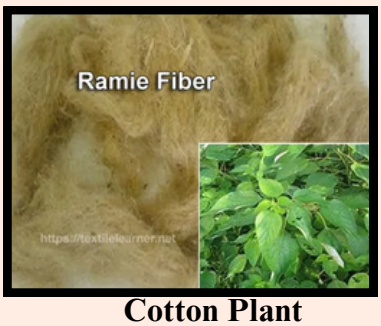
Sugarcane Fiber Byproducts

Kamalisri N, Nishnthini B , 3rd Year, Agri,EEC

NATRAL FIBERS

Cotton Plant

Hemp



Cotton Plant

Natural fibers are the upcoming promising fibers in the area of composites. Its presence from the Egyptian period of civilization and still popularly used especially in western countries. India has the ability to produce vast amount of natural fibers because of the favourable climate for its growth and its eco-system. There are several methods of extracting natural fibers from its source, but the mechanical way of extracting fibers is the most commonly used. Fibres can be classified as plant/vegetable fibers, animal fibers and mineral fibers. Plant-based fiber types include seed fibers like cotton, bast fibers, hemp, core fibers like jute, leaf fibers like abaca, fruit fibers like coconut, stalk fibers like wheat, cane, grass, and reed fibers like bamboo. Commonly used animal-based fibers for fashion include wool or hairs and silk fibers.

Pinapple Plant

Bamboo Crop

Abaca

Jute

IoT based Plant Watering System

Arthi V, Rajalakshmi P , 3rd Year, Agri,EEC

The internet of things helps people live and work smarter, as well as gain complete control over their lives. IoT provides businesses with a real-time look into how their systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations. A smart irrigation system based on water is added to the soil or land during irrigation to support plant development. Rainfall could not always be enough to supply the plants with the water they need to develop, depending on various factors such as area, season, and climate. Most irrigation systems perform database systems resulting in predicting soil moisture.

Farmers can use scientific techniques such as various irrigation systems and a balanced quantity of herbicides and fertilizers to increase crop output. Crop production is determined by the availability of water, land, rainfall, meteorological conditions, and other factors. More extensive databases for crop and meteorological factors are now accessible. However, the agricultural industry lags significantly behind other sectors utilizing farm data in decision-making.

Threshing Machine

Ajithkumar K, Dharanish B.T, 3rd Year, Agri,EEC

In India the smallholder and marginal farmers do manual threshing using sticks and rakes. Variations also exist in stripping pods from the plant. After harvest bunch type plants are stacked in heaps with the pod□end exposed. After the crop has remained in this state for a week or so the pegs become brittle and the pods are plucked from the plants with labor. This operation is comparatively difficult as the attachment of peg to pod is stronger in bunch type, but drying the plants for a few days facilitates this operation. Sometimes the stripping of the pods is also performed side by side with the harvest when the crop area is small and laborers are available. In this case, the pods are dried immediately after stripping. The usual practice is to separate pods by beating the pod-end of the plants against a rough stone or a thick iron rod. This process damages a small percentage of the pods.

Global warming and agriculture

Naveenkumar K , Rajeswari P , 2nd Year, Agri,EEC

Agriculture produces a substantial amount of greenhouse gas emissions, which contribute greatly to global warming and climate change. Agriculture is both a victim of and a contributor to climate change. On the one hand, agricultural activities contribute approximately 30 per cent of total greenhouse gas emissions, mainly due to the use of chemical fertilizers, pesticides and animal wastes. This rate is bound to further rise as a result of an increase in the demand for food by a growing global population, the stronger demand for dairy and meat products, and the intensification of agricultural practices. To reduce the emission of nitrous oxide, a greenhouse gas with a global warming potential 300 times larger than that of carbon dioxide, chemical fertilizers, pesticides and manure must be used conscientiously. Climate change can affect agriculture in a variety of ways. Beyond a certain range of temperatures, warming tends to reduce yields because crops speed through their development, producing less grain in the process. And higher temperatures also interfere with the ability of plants to get and use moisture. Evaporation from the soil accelerates when temperatures rise and plants increase transpiration—that is, lose more moisture from their leaves. The combined effect is called “evapotranspiration.” Because global warming is likely to increase rainfall, the net impact of higher temperatures on water availability is a race between higher evapotranspiration and higher precipitation. Typically, that race is won by higher evapotranspiration. But a key culprit in climate change—carbon emissions— can also help agriculture by enhancing photosynthesis in many important, so-called C3, crops (such as wheat, rice, and soybeans). The science, however, is far from certain on the benefits of carbon fertilization. But we do know that this phenomenon does not much help C4 crops (such as sugarcane and maize), which account for about one-fourth of all crops by value.

Water Management in Agriculture

Kishore Kumar K G , Mahalakshmi R , 2nd Year, Agri,EEC

To ensure food security and sustainable water management for agriculture, there is an urgent need to produce more crop per drop of water used in the agricultural sector and hence ensure that water use efficiency is increased without negative impacts on downstream water quantity and quality.

Improvements in the handling of water resources must be built on an integrated approach to soil-water-plant-nutrient management. This should include optimizing irrigation scheduling and more efficient irrigation systems, such as drip irrigation. Soil fertility needs to be improved to ensure that crop growth is not limited by nutrient or physical constraints and every drop of water can be fully utilized for growth. Efficient water uptake by crops can be achieved through demand-based irrigation scheduling that takes account of different crop's water needs, growth stages and the prevailing environmental conditions. Agricultural water use efficiency can be improved by minimizing soil evaporation losses relative to plant transpiration in the field. The ability to quantify soil evaporation and plant transpiration provides information on irrigation amount for specific crop types and growth stages, which play key roles in the conservation and management of water.

Urban Farming

Abhiranji C, Nishalini M , 4 th Year, Agri,EEC

Enhance the urban landscape (and human well-being), By cultivating lettuces, kale, arugula, and other crops, rooftop farms literally make cities greener. And studies have found that exposure to nature and vegetation provides an array of psychological benefits, from decreased anxiety to increased productivity.

It Make cities more eco-friendly. Bare roofs in cities absorb and then radiate heat a phenomenon known as the “heat island effect.” This increases energy usage and contributes to the poor air quality that often plagues big cities. But rooftop farms help cool buildings, ultimately reducing carbon emissions. And by growing food in the communities they serve, rooftop farmers lessen the environmental impact of food transportation, as well.

Also increase the availability of real, healthy food. When farmers grow inside or better yet, on top of the concrete jungles and food deserts that many of us inhabit, more people have access to fresh, wholesome, and affordable food. And because it travels fewer food miles, hyper-local produce is often healthier and tastier