SRI SHANMUGHA
EDUCATIONAL INSTITUTIONS

SRI SHANMUGHA
COLLEGE OF ENGINEERING AND TECHNOLOGY

GROSSMARTZZ

GLIMPSE OF 2021-2022

DEPARTMENT OF AGRICULTURE ENGINEERING

Thiru. K.Shanmugham
CHAIRMAN
SRI SHANMUGHA EDUCATIONAL INSTITUTIONS

Dear Members of the Sri Shanmugha Educational Institutions,

I am delighted to announce the release of the inaugural edition of GROSSMARTZZ, a magazine brought to you by the Department of Agriculture Engineering. This publication encapsulates the essence of our institution's commitment to academic excellence and innovation in the field of biomedical engineering. Within its pages, you will find insightful articles, highlights of student achievements, and a retrospective on the myriad events that shaped our academic journey throughout the year 2021 - 2022. As Chairman, I extend my heartfelt congratulations to the editorial team and contributors for their dedication in bringing this vision to fruition. May Inventus serve as a beacon of inspiration and knowledge for years to come.

Warm regards,

THIRU.SHANMUGHAM K, Chairman,
Sri Shanmugha Educational Institutions

Thiru. A.Thirumoorthy

EXECUTIVE DIRECTOR

SRI SHANMUGHA EDUCATIONAL INSTITUTIONS

Dear GROSSMARTZZ Readers, As Executive Director,

I am thrilled to announce the launch of the first edition of GROSSMARTZZ from the the Department of Agriculture Engineering at Sri Shanmugha Educational Institutions. This publication encapsulates the pinnacle of academic prowess and innovation within our institution, offering a glimpse into the ground breaking research, student achievements, and enriching events that defined the year 2021 - 2022. My sincere gratitude goes to the editorial team and contributors for their dedication in crafting this informative and inspiring magazine.

Warm regards,

Mr. THIRUMOORTHY ARUMUGAM, Executive Director,
Sri Shanmugha Educational Institutions.

Mrs. GOKILA THIRUMOORTHY ARUMUGAM
JOINT SECRETARY SRI SHANMUGHA EDUCATIONAL INSTITUTIONS

Dear GROSSMARTZZ Readers,

As Joint Secretary of Sri Shanmugha Educational Institutions,

I am pleased to announce the launch of the inaugural edition of GROSSMARTZZ, prestigious publication curated by the the Department of Agriculture Engineering. Within its pages lie stories of academic prowess, student achievements, and noteworthy events that shaped the fabric of our institution in the vibrant year of 2021 - 2022. This magazine stands as a testament to our unwavering commitment to fostering intellectual growth and scholarly exploration. Let us embrace this momentous occasion and look forward to the continued success of this esteemed publication.

Warm regards,
Ms. GOKILA THIRUMOORTHY ARUMUGAM, Joint Secretary,
Sri Shanmugha Educational Institutions.

Dr. S.MURUGANANDHAM

PRINCIPAL

SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY

Greetings,

I am pleased to introduce the inaugural edition of GROSSMARTZZ, a magazinecrafted by the the Department of Agriculture Engineering. This publicationencapsulates the remarkable achievements and milestones reached in therealm of **Agriculture** Engineering throughout the academic year 2021 - 2022.Within its pages, you will find insightful articles, student accomplishments,and a retrospective on the events that have shaped our academic journey. Mysincere appreciation goes to the editorial team and contributors for theirdedication and hard work in bringing this vision to life. GROSSMARTZZ servesas a testament to our institution's commitment to excellence and innovationin the field of the Department of Agriculture Engineering.

Warm regards,

Dr . S. MURUGANANDHAM,

Principal,

Sri Shanmugha College of Engineering and Technology.

Dr. L. Ranganathan

HEAD OF THE DEPARTMENT

DEPARTMENT OF AGRICULTURE ENGINEERING

Dear colleagues and students,

It is with great pleasure that I announce the release of the inaugural edition of GROSSMARTZZ, brought to you by the the Department of Agriculture Engineering. This magazine encapsulates the remarkable journey of our department throughout the academic year 2021 - 2022 , showcasing the outstanding achievements, ground breaking research, and enriching events that have defined our academic landscape. I extend my heartfelt thanks to the dedicated editorial team for their tireless efforts and unwavering commitment in curating this publication. Your hard work and dedication have truly brought GROSSMARTZZ to life, serving as a testament to our department's excellence and innovation in the field of the Department of Agriculture Engineering.

Warm regards,

Dr . L. Ranganathan,

Head of Department,

Department of Agriculture Engineering,

Sri Shanmugha College of Engineering and Technology.

ABOUT US

Considering the importance of conserving natural resources, proper land management and to provide quality education on agriculture to the rural masses, the department of Agriculture Engineering was established in the year 2016 with an intake of 60. Sri Shanmugha vows to promote agriculture by bridging the gap between agriculture and latest technology. Our primary motive for offering this course is to serve the farming community by inculcating the effective utilization of available resources with the motto: "Resources are limited but creativity is unlimited'. Sri Shanmugha provides state-of-the-art agricultural practices to the farmers and the society at large, 'for a better and a greener tomorrow'.

The Department has been maintaining high standards in informing superiority education in the challenging field of Agriculture. Highly experienced and dedicated faculty members with\ minimum M.E / M.Tech / M.Sc qualification impart quality training to students, with solid emphasis on understanding the fundamentals and intricacies of the subjects concerned and subsequently apply them to solve problems. The Department has successfully conducted Technical Symposiums and has arranged a number of seminars and several invited lectures by eminent persons both from academia and industry. The Department has well established lab facilities with well- equipped farm land suited to the syllabus prescribed by the University.

VISION AND MISSION OF THE DEPARTMENT

VISION

To produce Agricultural Engineers with enriched knowledge and moral values to achieve excellence in academic, industry and research-centric environments.

MISSION

- To provide a conducive learning atmosphere to improve the analytical, design and investigation knowledge through effective teaching-learning Processes.

- To create an amicable environment to solve societal problems through continuing education programmes and research.

- To develop students ethically responsible for the benefit of society through cultural, social and economic awareness.

PEOs AND PSOs OF THE DEPARTMENT

PEO1 - Practice Agricultural Engineering and Technology concepts across diverse Industrial, societal, and real-world contexts.

PEO2 – Pursue higher education for professional development.

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PEO3–Become Agripreneur with leadership qualities and continuously contributes to societal needs ethically.

PSO1 – Develop the student's expertise in the field of agricultural engineering by using diverse resources, farm mechanization, and processing.

PSO2 – Acquire knowledge on IoT, Drone Technology applications in Agriculture and Automation in Agriculture sectors..

STUDENT OFFICIALS

Mr S R Karthick
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MR B GUNAL
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Mr MASAN
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CHIEF EDITOR

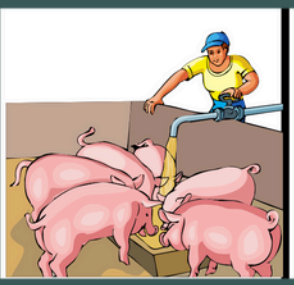
Mr K MOHAN
EDITOR

MRs K LAVANYA
EDITOR

HIGHLIGHTS OF THE DEPARTMENT (2021 - 2022)

HIGHLIGHTS OF THE DEPARTMENT (2021 - 2022)

ARTICLES - 1



AZOLLA CULTIVATION GUIDE (RICH PROTEINS FEED FOR CATTLE,POULTRY, FISH AND PIG)

Mr.,S R Karthick
4 rd year student / Agri

Azolla, a wonderful plant, is a branched free-floating aquatic fern, and it rapidly grows on the water's surface. Many farmers, due to limited resources, often struggle to produce sufficient feed for those animals. But Azolla is the right option in front of them. Azolla is an ideal sustainable feed for cattle, fish, pigs, and poultry. Apart from this, it's also used as a bio fertilizer on the farm. Hence many farmers attract to the Azolla cultivation. Azolla cultivation is popular in countries like China, Vietnam, the Philippines, etc. Azolla fixes nitrogen; it is an excellent source of nitrogen and has a high nutrient value. For Azolla, cultivation required less investment; hence it is a low-cost alternative for a good feed and good bio fertilizer. **Benefits of Azolla Feed for Livestock** Azolla contains very high proteins, amino acids, vitamins (vitamin A, vitamin B12, Beta Carotene), and minerals, so it is an excellent nutrient feed for livestock. Also, Azolla has low lignin content. So animals easily digest. It is observed that Feeding Azolla to poultry birds improves the weight of broiler chicken and increases the egg production of layers birds. In animals, it showed an overall increase of milk yield by 15–20% when 1.5–2 Kg of Azolla was combined with regular feed. This experiment was conducted in the Natural Resources Development Project at Vivekananda Kendra. You can feed Azolla to sheep, goats, pigs, rabbits, and fish. **Bio fertilizer** Azolla fixes atmospheric nitrogen and stores it in leaves. Therefore, it is used as green manure. It has been observed and appreciated by rice farmers that they cultivate Azolla in paddy farms and increase rice production by 20%. **Weed Control** Azolla plant can form a thick layer on water surfaces, so it uses for weed control in paddy farms. In paddy farms, Azolla forms a thick layer that covers all farm areas and works as organic mulching, which doesn't allow producing weeds. Also, it slows the water evaporation rate and maintains soil moisture for a long time.

Mosquito Control Azolla has another ability. Azolla restricts the mosquito breeding process, and thus. Azolla is also called a “mosquito fern.” **Azolla Cultivation Procedure** Create an artificial pond for growing Azolla. For creating the Azolla cultivation pond, select a partially shaded area because Azolla needs 30% sunlight; too much sunlight will destroy the plant.

The area under the tree is preferable. If you decide to grow an Azolla on a large scale, you can make small concrete tanks. Otherwise, you can make the pond any size you want. Now Azolla plastic beds are available in the market they are more convenient and easy to use dig out the soil for the pond and level the soil; after that, spread the plastic sheet around the ground to prevent water loss.

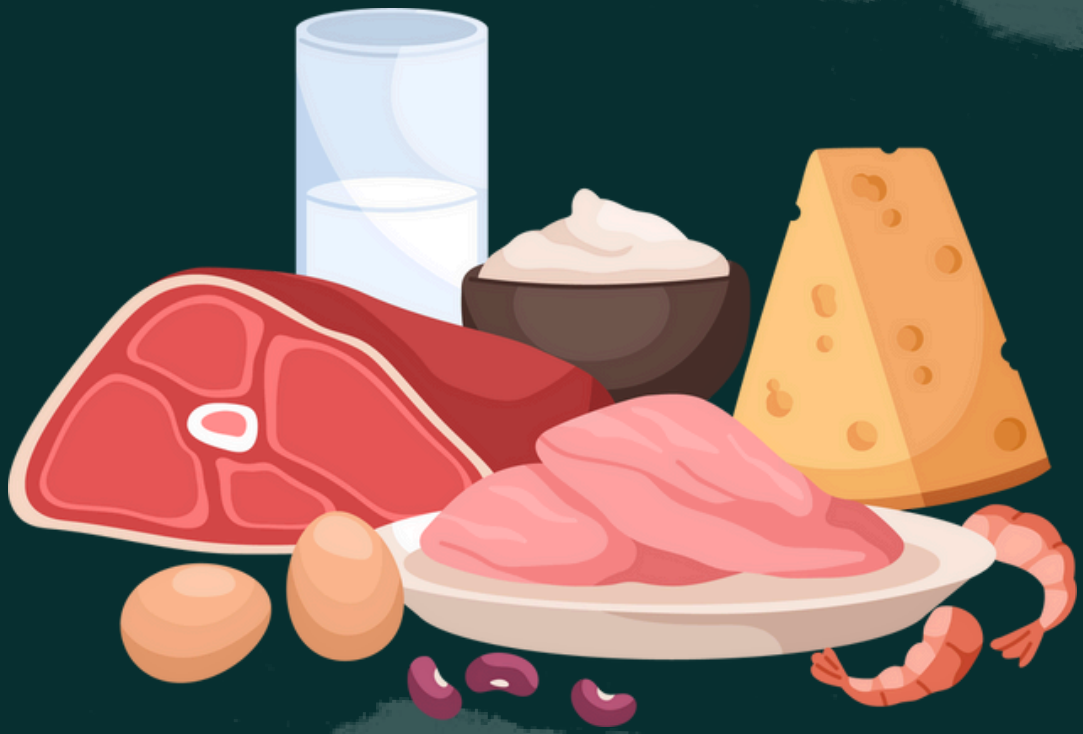
Make sure the pond is at least 20 CM Deep. Add some soil uniformly to the plastic sheet in the pond. For a 2M X 2M size pond, add 10-15 kg soil. Azolla needs Phosphorus to grow well you can use Super Phosphate along with cow dung slurry. Cow dung increases the available nutrients.

Use cow dung 4-5 days old. Next, fill the pond with water to a level of about 10 cm; this will allow the Azolla Plant’s short route to floating freely, then leave the pond for 2 to 3 days so the ingredients can settle. After 2-3 days, add Azolla culture in the pond by gently rubbing Azolla in your hands. It helps break Azolla into smaller pieces for faster multiplication.

Important Tips For Growing Azolla

- Azolla rapidly grows, so maintain Azolla biomass 300 gms – 350 gms /sq.meter hence harvest daily to avoid overcrowding.
- Add once in 5 days mixture of Super Phosphate and cow dung also add mixture containing magnesium, iron, copper, Sulfur etc., at weekly intervals, to enhance the mineral content of Azolla.
- Replace 25 to 30% old water with fresh water once in 10 days; it helps prevent nitrogen buildup in the pond.
- Replace complete water and soil at least once in six months, and then add Fresh Azolla seeds.
- Maintain the water level of at least 10 cm, so Azolla root doesn’t grow in the soil by keeping the roots floating, it becomes easy to harvest.
- Harvested Azolla wash thoroughly, so it removes dirt and smell of cow dung and then feeds them to animals.

Conclusion Azolla is an ideal feed for livestock. If you take good care of your Azolla pond, you can harvest good quality weed every day, and it definitely reduces your cost of feed and fertilizer.



STUDENT DRAWING

Thesigan
II Agri

ARTICLES - 2

CULTIVATION OF SAFFRON

Ms DHANUSHIYA
4 rd year student / Agri

SAFFRON: Saffron plays an important role in economy of Jammu and Kashmir state. It is grown in an area of about 4000 hectares with an estimated annual production of 60 q. The crop is grown in the temperate regions of the state comprising Kashmir Valley and adjoining mountainous regions of Jammu division. For obtaining optimum production of saffron, the following improved practices are recommended. **SOIL REQUIREMENT:** It requires well drained clay loam soils having a pH range of 7-7.5 free from pebbles. **LAND PREPARATION:** The land should be ploughed upto a depth of 25-30 cm and subsequently, suckers rhizomes, runners etc. of perennial weeds which are uprooted during the ploughing operations, should be collected and removed from the field. The field should be thoroughly leveled filling in all depressions to avoid stagnation of water. **TIME OF PLANTING:** August to September. **PLANTING STOCK**: Saffron is planted by dormant corms, select disease free and large sized corms, having at least 2.5 cm diameter. The husk dirt etc. adhering to the corms, should be removed, and the corms before planting. **SEED RATE:** About 80 q corms are required to establish a hectare stand under

METHOD OF PLANTING: The Berwar method of saffron cultivation comprises essentially of charging the soil with two underground layers of corms, one above the other, in a particular geometric way. The first or the ground layer is planted at a depth of 10-12 cm in straight furrows, opened 15 cm apart. Furrows may be opened, either with a plough or manually with hoe. Corms in the furrows are planted at a distance of 7.5 cm from each other. After planting the first or the ground layer, the second or the upper layer are planted 2.5 cm above and each in between the two rows of the ground layer. The upper layer, thus, rests a depth of 7.5 to 9.5 cm from the surface or the soil. This method of planting is also called the double storey system of saffron cultivation. **FERTILIZER APPLICATION**: Yield of saffron is increased when chemical fertilizers in a balanced from and in moderate doses are applied. The following doses of different fertilizers are recommended to increase the yield of saffron z 20 Nutrient (kg/ha) P 27.6 K 18 Urea 20 Fertilizer (kg/ha) DAP 60 MOP 33 Urea should be top dressed in the crop during the winter season (December-January). Diammonium Phosphate and Murate of potash should be applied in the month of September with the last intercultural operation. **INTERCULTURE:** Intercultural in saffron is very essential. It is done during the summer season when the corms are resting in the soil in dormant state. During this period, at least three intercultural may be done to remove weeds, mixing of dry leaves in soil and to create soil mulch for conservation of moisture. **PLANT PROTECTION:** Rats are No. 1 enemy of saffron corms. For eradication ofrats, their holes should be fumigated with Phosfume tablets. For control of corm rot, treat the corms before planting with 0.1% carbendazim solution. Dip for 30 minutes. **ROTATION:** Saffron under the said intensive programme should be cultivated in a Four year short rotation with some salt resistant crop like wheat, barley, oats mustard etc. YIELD: A hectare crop grown under the Berwar way produces during the four years, 6-8 kg saffron or 1.5-2 kg saffron per annum. Yield during the first year of planting is the lowest.

STUDENT DRAWING

M.V.Aathira
II-Agri

ARTICLES - 3

COMBINE HARVESTERS

Mrs Kumaresh
2 rd year student / Agri

There are millions of acres of land in the United States devoted to the growth of crops to be harvested in mass quantities. In 2010, 205.6 million acres of the country's three main crops (corn, soybeans, and wheat) were harvested . Since these three crops are produced in such large quantities, mass harvest is required through the use of combine harvesters. Combines are agricultural machines that cut, thresh (separate grain from a plant), and collect grain from cultivated crops. The machines are vehicles that are driven into the crop by an operator and simultaneously convert a field of growing plants into a substance which can be processed as food for livestock or humans. Figure 1 below shows a combine harvesting shelled corn (dry, hardened corn kernels typically used for animal feed). Typically, a combine weighs over 15 tons and is approximately 13 feet high, 12 feet wide, and 12 feet long while having the capacity to hold over 2,800 gallons of grain [3]. It is a complex machine with thousands of parts that perform different tasks. With the right parts implemented, a single combine is capable of harvesting corn, oats, soybeans, wheat, rye, barley, sunflowers, and more. For simplicity, our analysis in this report will focus on the harvest of corn. To most effectively explain how this piece of equipment converts a crop to stored grain, we will analyze the main subsystems in the order that they meet the product while ignoring components inherent in self-propelled vehicles such as the engine, suspension, etc. **Subsystem 1: Header** The header of a combine is the first component to meet the crop. Its purpose is to extract the useful section of a plant from the rest of the plant and transport it to the next subsystem. The header is an implement that can be attached and removed from the front of the combine. It is designed as an attachment because different headers work best for different crops. For example, when combining corn it is more efficient to simply pluck the ears from its stalk while when harvesting oats it is better to sever the plant near the ground and process it in its entirety. Also, headers come in many different widths, but they all accomplish the same task. The head you see in Figure 2 can process twelve rows of corn and is approximately 30 feet wide, which is rather large.

Usually headers this wide have two hinges located at the fourth (counting from the left) and ninth rows so the sides may fold upwards to reduce the width while it is not in operation. The pointed tips you see in Figure 2 are simply to guide stalks into the chain and paddles between each point, which can be seen in Figure 3 where the points have been removed. The two sprockets, or small gears, shown that turn the chains are rotating in opposite directions so the paddles on the inside of either chain are moving toward the combine. These serve to pull the stalks into the header and pinch the ear off from them. Once the paddles remove the ears and pull them to the back of the head, an auger (a helical shaft that rotates, allowing objects to move up its flutes) pulls them to the middle of the header where they will enter the next stage of processing. Figure 4 depicts more clearly the auger of a corn header and the opening through which the ears of corn flow to enter the next stage. **Subsystem 2: Threshing Section** After the ears fall through the opening of the corn head shown in Figure 4,they land on the feed channel shown in Figure 5. This section consists of chains linked with cross bars that serve to carry the ears up to the threshing cylinder and concave. The threshing cylinder is one with pointed fins while the concave is a ridged screen that conforms to the curvature of the cylinder. Figure 6 below depicts a

rotates view of the concave. The threshing cylinder (counterclockwise in our orientation) while the concave remains stationary which grinds the ears of corn as they pass through. This grinding action breaks kernels loose and shakes them away from the cob and husks. The cob and husks go through this process again through the beater and rotary separator to ensure that most kernels have been broken loose and separated. The threshing section sends the useful part of the crop, the kernels, on a separate path than the residual waste.

Subsystem 3:

Cleaning Section Following the threshing section, product can take several different paths as it undergoes “cleaning”. The a visual representation of this flow of product where item 16 denotes the grain tank. The product larger unusable waste such as the husks and large pieces of stalks gets pushed onto the straw walkers by the rear beater .In this graphic there are 5 separate straw walkers shown which serve to push the straw towards the back of the combine and eventually expel it onto the field. They do so by way of a rotating crankshaft like the one shown below in Figure 8 which allows one or more straw walkers to make contact with the straw and continuously drag it toward the back of the combine. These walkers are also vented so they may serve as a sieve to allow any loose grain and smaller pieces of straw to fall through to the upper sieve.

Subsystem 4: Storage Section Once the grain is cleaned, it is ready to be collected and stored in the grain tank. The auger previously mentioned that is located below the sieves transports the product to one side of the combine. At the end of that auger is another vertical one that raises the grain to the grain tank located on top of the combine. Once that occurs, the operator must discharge through one last auger usually into a wagon or trailer not attached to the combine. Item number 20 in Figure 10 is an auger that pushes the corn out of the grain tank and into the discharge auger.

This discharge auger must be very long to hover above and eject grain into a wagon, so it pivots at its base to be oriented parallel to the combine during operation but perpendicular to it when discharging. Figure 11 shows a combine unloading a tank of grain. **Summary of System:** Combine harvesters consist of thousands of parts working together to take in a growing crop from a field and transform it into clean grain to be used as food for livestock or humans. Different parts belong to different subsystems that play various roles in order to efficiently collect massive amounts of grain. To summarize, the four main subsystems and their purposes are listed below in order of which they meet the product: 1. Header

- Collects usable product along with its stalk from the field
- Transports the plant to the threshing subsystem

2. Threshing Section
   - Breaks grain free of plant
   - Transports product to the cleaning subsystem

3.Cleaning Section
   - Cleans grain by filtering out and ejecting chaff
   - Sends incompletely threshed product back to the threshing section
   - Transports clean grain to the storage section

4. Storage Section
   - Moves and collects clean grain in the grain tank
   - Unloads product when the tank is full


SAIS
Society of Agriculture Innovators in Shanmugha