

Role of Nalanda college of agriculture in promoting agricultural education in Tamil Nadu

Abstract

The Study focuses on major areas in which agricultural education is imparted by incorporating major and minor courses which are related to agriculture and allied subjects which are helping in the promotion of career orientation. Another aspect of the study is Promoting greenery to the environment by the students of agriculture and earns hands on training in the areas like bee keeping, mushroom cultivation, Ornamental Nursery, Entrepreneurial Development, Commercial Seed Production, Dry land farming, sericulture, vermicompost production, azolla production which are giving way to the students in practicing of agribusiness and its initiatives in their region of residence. In this respect, this article addresses how an educational institution could train the students in making use of the available dry lands for effective crop production front by employing the agricultural labour force in making the dry lands into a big greenery. This might be an example to the dry land farmers to cope with and elevate their lifestyle in an appreciable way and it will also promote the farming initiatives with courage and confidence wherever the land and irrigation facility are available. Certain students are also taking the lands on lease to promote agriculture in a big way. This paper is a paradigm for the persons who are taking initiatives in agriculture to make farming as their career path.

Keywords: Agricultural Education, Curriculum, Placement Efforts, Greenery Promotion

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Introduction

Agriculture is the backbone of India and Tamil Nadu state in which around 60 per cent of the population is still toiling in the agricultural environment to mitigate their food and other social needs through agriculture and allied activities like horticulture, forestry and fisheries, agricultural engineering, dairying, poultry development, goat and sheep rearing and pig farming. Tamil Nadu is the leader in all these allied sectorial activities and the farm-related activities. However, over a period of time, the dependence on agriculture is going down due to the development of agriculture and allied services sectors and hence the pressure on agriculture is reduced.

Government has taken several steps for increasing investment in the agriculture sector such as enhanced institutional credit to farmers; promotion of scientific warehousing infrastructure for increasing the shelf life of agricultural produce; setting up an Agri-tech Infrastructure Fund for making farming competitive and profitable; developing commercial organic farming etc. The government is implementing various schemes for supply of farm inputs, like seeds, fertilizers, agricultural machinery and equipment, irrigation facilities, institutional credit, etc., at subsidized rates to the farmers in the country. The government has recently taken several steps for increasing investment and growth in the agriculture sector which include the creation of the Long Term Irrigation Fund (LTIF), Micro Irrigation Fund for water use efficiency, promotion of commercial organic farming, etc. Due to the implementation of schemes, the development in agriculture is visible.

Trees release oxygen when they use energy from sunlight to make glucose from carbon dioxide and water. Like all plants, trees also use oxygen when they split glucose back down to release energy to power their metabolisms. Averaged over a 24-hour period, they produce more oxygen than they use up; otherwise, there would be no net gain in growth.

It takes six molecules of CO₂ to produce one molecule of glucose by photosynthesis, and six molecules of oxygen are released as a by-product. A glucose molecule contains six carbon atoms, so that's a net gain of one molecule of oxygen for every atom of carbon added to the tree. A mature sycamore tree might be around 12m tall and weigh two tonnes, including the roots and leaves. If it grows by five per cent each year, it will produce around 100kg of wood, of which 38kg will be carbon. Allowing for the relative molecular weights of oxygen and carbon, this equates to 100kg of oxygen per tree per year (Science Focus.com).

According to the European Union's Joint Research Centre, total global CO₂ emissions increased from 34.1 GT in 2010 to 37.9 GT an all-time high in 2019. The COVID-19 pandemic and its related restrictions on travel and transportation triggered a decrease to 35.962 GT in 2020, but emissions are expected to resume increasing once 2021 totals become available. China is the largest emitter of CO₂ in the world, with 11680 Mt (11.680 7 Gigatons-GT) of carbon dioxide emissions in 2020. This is just over 32% of the world's total 2020 emissions. The United States released the second-highest amount of carbon emissions at 4.535 GT, or roughly 12.6% of the total global emissions. India released the third-highest amount of carbon emissions at 2.411 GT. This accounts for 7 per cent of global GHG emissions. Agriculture and livestock account for 18 per cent of gross national emissions.

A majority of agricultural GHG emissions occur at the primary production stage and are generated through the production and use of agricultural inputs (mainly water, fertilisers, and pesticides) farm machinery, soil disturbance, residue management and irrigation.

The average plant will produce 900ml of oxygen/day or 27 litres of oxygen a month, if we say the average growing plant has 15 leaves and each leaf gives an average of 5ml oxygen/hour for 12 hours a day.

The share of agriculture in the gross domestic product (GDP) has reached almost 20 per cent for the first time in the last 17years, making it the sole bright spot in GDP performance during 2020-21 (Economic Survey 2021). The resilience of the farming community in the face of adversities made agriculture the only sector to have clocked a positive growth of 3.40 per cent at constant prices in 2020-21, when other sectors were facing sliding.¹ The sectorial contribution is on the rise might be mainly due to the implementation of the above schemes in the country through the State Governments. The growth in GVA (gross value added) of agriculture and allied sectors has been fluctuating over time. However, during 2020-21, while the GVA for the entire economy contracted by 7.20percent, growth in GVA for agriculture maintained a positive growth of 3.40 per cent, according to the economic survey, 2021 and 3.9 percent in 2021-22. Growth in allied sectors including livestock, dairying and fisheries has been the major driver of overall growth in the sector. The continuous supply of agricultural commodities, especially staple food items like rice, wheat, pulses and vegetables, also enabled food security.

In 2019-20, total food grain production (296.65million tonnes) in the country was higher by 11.44million tonnes than 2018-19. It was also higher

by 26.87million tonnes than the previous five years' (2014-15 to 2018-19) average production of 269.78 million tonnes. The production also boosted the allocation of food grains under the National Food Security Act (NFSA) that increased by 56 per cent in 2020-21, compared to 2019-20 crop diversification can be used as a tool to promote sustainable agriculture, reduction in import dependence and higher income through commercial crops for the farmers. For that, shifting some area from staple cereals to high value products can lead to sizable reforms for the farmers.¹ This activity will help in water use efficiency and sustainability of soil health. Such a proven sector has to be further activated with farm friendly programs and schemes that are capable of enhancing the farmer's level of living besides augmenting the area under crops with appropriate laws and regulations. The construction industry is a big threat to decreasing farm area under different crops due to the acquirement of lands for the construction industry. The construction industry can concentrate the upland areas that are unsuitable for agriculture and allied activities leaving the fertile land for agriculture and its operations so as to enhance food production with proven technologies. In this respect, this article addresses how an institution is making use of the dry lands for an effective crop production front by employing the agricultural labour force in converting the dry lands into big greenery. This might be an example to the dry land farmers to cope with and elevate their lifestyle in an appreciable way.

Methodology

To have an insight into the article, the collection of data and its methodological execution is of utmost important. The data related to the curriculum and its component to highlight its merits, the 2017 syllabi of Agricultural education is referred and the need based data on courses and

their credit requirements were collected. To learn the discipline wise courses, the courses and their credits were segregated based on the subject code and are classified and furnished under the head of department/discipline. In this only the percentage analysis was employed to highlight the strength of the disciplines by which the courses and their credit loads and are discussed suitably elsewhere. To judge the career orientation and placement of passed out candidates from this institution, the data available with the placement cell was analyzed and the results are discussed suitably to highlight the advantages associated with the institution.

Results and Discussion

Any developmental initiative in any form should have some strong foundation. Being the Agriculture College positioned in the dry tract, it teaches the agriculture subject to the rural communities through its four year agriculture education leading to the award of B.Sc. (Hons) in Agriculture which is a four year professional degree program which is affiliated to Tamil Nadu Agricultural University, Coimbatore and Diploma in Agriculture, a two-year diploma program which is affiliated to Bharathidasan University, Tiruchirappalli and its likely to be affiliated with Annamalai University from 2022-2023. These programs were offered after the selection of candidates who passed out their Plus Two program in the schools and based on their merits. The private Agriculture colleges are admitting the students for pursuing B.Sc. (Hons) in Agriculture program is based on the 65:35 per cent share which is acceptable to the Government of Tamil Nadu for counselling quota and the management quota respectively. Accordingly, the admitted strength is furnished in the Table 1.

Table 1 Student's Strength in the Nalanda Agriculture College, Trichy

Year of Commencement	Sanctioned Strength of the Students	Admitted Strength	No. of Students Discontinued	Percentage of Attrition
2016	60	54	03	05.55
2017	60	56	04	07.14
2018	75	60	03	05.00
2019	75	67	02	02.99
2020	75	73	00	00.00
2021	86	86	00	00.00
Average	72	66	02	03.03

Table 1 outlined that the sanctioned strength of the students with Nalanda College of Agriculture is found to be 72 per annum and the admitted strength is stalled at 66 due to the left out students. The left out students per annum is arrived at around 3 per cent which is very meagre. It might be due to opportunities in the medical and paramedical institutions, and students aspiring for them. During the year, the sanctioned strength rose to 86 because of the progress made by the institution in all aspects of infrastructure development to

cater the needs of agricultural education. Tamil Nadu Agricultural University is assessing the strength of the affiliated institution and approves the intake of students at a higher level. The admitted students are studying around 180 credits of agricultural and allied subjects in which Crop Management took the greatest share followed by Crop Improvement, Crop Protection and Social Sciences had an equal share because of the core nature. These details are delineated in Table 2.

Table 2 Curriculum Components in Agricultural Education System

Sl. No	Component of Agricultural Curriculum	No. of Subjects	No. of Credit Hours	Percentage to Total
01	Crop Improvement	07	18	10.00
02	Crop Management	23	50	27.78
03	Crop Protection	09	21	11.67
04	Horticulture	06	12	6.67
05	Agricultural Engineering	03	08	4.44
06	Social Sciences	09	21	11.67
07	Basics and Languages including Tamil	04	07	3.89
08	Experiential Learning	02	20	11.11
09	Optional Courses	01	02	1.11
10	Internship (RAWE) Courses	01	20	11.11
11	Project Work	01	01	0.56
12	Yoga / National Service Scheme / Physical Education	03	Compulsory	
Total		70	180	100.00

The curriculum components have not only the crop management courses but also the core areas of sister disciplines, it teaches the students to have experiential learning components to develop their hands-on- experience in the following areas.

- a. Bee Keeping
- b. Mushroom Cultivation
- c. Sericulture and Cocoon Production
- d. Biofertilizers Production
- e. Vermi-compost Production
- f. Azolla Production
- g. Ornamental Nursery
- h. Entrepreneurship Development
- i. Commercial Seed Production
- j. Hybrid Seed Production in Vegetable Crops

Besides the above experiential learning courses, the students are specifically trained in Farm Related Activities by placing the students in every village for about 75 days with the contact farmers in the village. They have to observe the day to day happenings in the farm and record their activities with regard to sowing, weeding, manuring, crop protection and other management related activities like crop harvest, cleaning, grading and marketing their farm produce. After the completion of Rural Agricultural Work Experience (RAWE), the students have to complete a project report by choosing a title in crop production and other sister areas for which One teacher will be identified to guide the project work. The project work completed will be evaluated by a team of experts at the time of presentation of the project findings.

Study Tour is another aspect which is to be completed by the students which comprise of visiting different central and state institutions in Agriculture and allied fields and their activities across the country and they have to prepare a report and the report will also be evaluated by the team of experts and the course teachers. This study tour is not having any credits but it is compulsory. If anyone is absent in not attending the tour he has to repeat the tour along with the junior batches while performing their tour program.

Besides the above, yoga for human excellence is another area wherein the student has to complete the courses which are also compulsory non credit course. To keep the health of the students fit, besides yoga, Physical education become the principal course which are non credit and are continued for four semesters and to impart the social participation and involvement, the Course on National Service Scheme (NSS) is also included as one of the components and it is also a non-credit course which comprises of the following activities.

- a. Demonstration of Farm Friendly Technologies at Farmers' Field
- b. Conduct of Veterinary Health Camp in the Selected Village
- c. Conduct of Health Camp by inviting a Physician from the Government Hospital
- d. Vermi-compost Unit Establishment and Preparation methods
- e. Azolla Production
- f. Infusing Entrepreneurship Development Skills to the Rural Youths in the Village
- g. Establishing Ornamental Nurseries
- h. Bee Keeping Techniques to the rural youths and
- i. Imparting Mushroom Production Technologies during the special camp organized by the students in the village. For that purpose, the students both boys and girls should have a stay in the selected village and to identify the targeted youths and the farmers of the village and the training will be imparted.

Above all, greenery development is one of the focuses to the students and to the institution as part of education and to establishing the green assets by the

institution are of much importance and hence these details are assessed and the results are delineated in Table 3.

Table 3 Greenery Establishment on the Part of the Students of Agriculture

Sl. No	Nature and Type of Green Cover	Area in Acres	Percentage to Total
01	Kitchen Garden	00.50	19.54
02	Crop Cafeteria	00.60	23.43
03	Crop Production- Sorghum	01.26	49.22
04	Crop Production - Onion	00.20	07.81
	Total	02.56	100.00

Table 3 outlined that the sorghum crop stands first in terms of its area due to the prevalence of crop production course to the students belonged to third years followed by crop cafeteria which is sharing around 23.43 per cent of greenery due to the prevalence of different crops in a single location so that the students can identify the crops and learn the technologies by practicing it in the select crops. Onion is yet another crop sown by the students under crop production course which has shared only around 8 per cent to the total area under crops. The students have established the kitchen garden for the day to day requirements of the mess in which they are dining sharing around 19.54 per cent of the total in which the crops like Bhendi, Greens, Turnip, Moringa, beetroot, Cluster beans and lab-lab were planted and their output was used in the kitchen. In an institution like Nalanda College of Agriculture, the management has also established some green cover to meet the requirements as enshrined in the Guidelines for establishing Agricultural Colleges in Tamil Nadu by Tamil Nadu Agricultural University Coimbatore. Accordingly, the following greenery requirements were analysed and the results are presented in Table 4.

Table 4 Greenery Establishment on the Part of the Institution Teaching Agriculture

Sl. No	Nature and Type of Green Cover	Available Area (acres)	Usage Area in Acres	Percentage to Total
01	Botanical Garden	05	03.50	11.39
02	Medicinal Garden	01	01.20	03.90
03	Protected Cultivation – Poly House	0.11	00.11	00.36
04	Protected Cultivation – Shade Net	0.03	00.03	00.10
05	Nursery under Protected Environment	0.02	00.20	00.65
06	Wet Land Crops	10	03.80	12.36
07	Orchard	20	05.40	17.57
08	Vegetable Garden	10	08.10	26.35
09	Woodlot	05	03.30	10.74
10	Vegetable and Ornamental Nursery	0.05	00.50	01.63
11	Dry Land Crops (Cotton and Sorghum)	30	04.60	14.96
	Total		30.74	100.00

Table 4 outlined that this institution has established around 31 acres under greenery which is comprised of Botanical Garden, Medicinal Garden, Protected cultivation, Nursery, Wet land crops, Orchard, Vegetable Garden, Woodlots, Vegetable Nursery and Dry land crops like Dry land Paddy, Cotton and Sorghum. Among these 31 acres of different crops, the Vegetable Garden alone accounted for 26.35 per cent in which the crops like Chilli, Brinjal, Onion and Gourds were planted followed by Orchard crops which included Guava, Ber, Sapota, Sweet Tamarind, Mango and Citrus which are accounted

for 17.57 per cent to the total area under greenery established by the institution. Wet land crops like Paddy accounted for 12.36 per cent of the total followed by the Botanical Garden area and its varieties of plants which have shared only 11.39 per cent of the total area under greenery established by the institution.

Besides the above requirements, forest plantation as woodlots is also equally important so as to accommodate the concepts of Agroforestry and Farm Forestry which are much more important components in the curriculum of agricultural education which has shared around 11 per cent to the total green cover. To meet the greenery requirements, according to the forest policy, one third of green cover is essential and when one could compare the requirements and the existing green cover, the green cover is available to the tune of around 38 per cent to the total requirements as enunciated in the guidelines of Tamil Nadu Agricultural University, Coimbatore. Already we have discussed that the courses under crop management discipline predominate among others and hence the details of courses and their credit requirements under the head crop management are delineated in Table 5.

Table 5 Details of Courses under the Discipline of Crop Management

Sl. No	Components of Crop Management	Credit Hours	Percentage to Total
01	Fundamentals of Agronomy and Agricultural Heritage	1 + 1	4.00
02	Fundamentals of Soil Science	2 + 1	6.00
03	Introduction to Forestry	1 + 1	4.00
04	Fundamentals of Crop Physiology	2 + 1	6.00
05	Fundamentals of Microbiology	2 + 1	6.00
06	Introductory Agro Meteorology and Climate Change	1 + 1	4.00
07	Crop Production Technology – I (Kharif)	1 + 1	4.00
08	Environmental Studies and Disaster Management	2 + 1	6.00
09	Soil Resource Inventory	1 + 1	4.00
10	Crop Production Technology – II (Rabi)	1 + 1	4.00
11	Farming Systems and Sustainable Agriculture	1 + 1	4.00
12	Problematic Soils and Their Management	2 + 0	4.00
13	Environmental Pollution and their Management	1 + 1	4.00
14	Practical Crop Production – II (Rabi)	0 + 2	4.00
15	Principles of Organic Farming	1 + 1	4.00
16	Rainfed Agriculture & Watershed Management	1 + 1	4.00
17	Livestock and Poultry Management	2 + 1	6.00
18	Practical Crop Production - I (Kharif crops)	0 + 2	4.00
19	Geo- informatics for Precision Farming	1 + 0	2.00
20	Agricultural Microbiology	1 + 1	4.00
21	Manures , fertilizers and soil fertility management	2 + 1	6.00
22	Fundamentals of plant biochemistry	2 + 1	6.00
Total		28 + 22 = 50	100.00

Table 5 outlined the details of courses which are subject matter oriented towards the curriculum. Soil Science, Crop Physiology, Microbiology, Environmental Studies and Disaster Management, Livestock and Poultry Management, Manures, Fertilizers and soil fertility Management and Fundamentals of Biochemistry are the courses gained two theory classes each and one practical session of 2.30hours each. Practical crop production is yet another course that has two practical credits in which the students have to process the land, sow the seeds, check the germinability, conducting weeding, manuring and fertilizer application, watering and other agronomic practices like insect pest identification and practicing the control measures which are of equally important to produce quality output. Besides the courses under crop management, the animal husbandry component and its establishment for learning agriculture are yet another important component as enshrined in the guidelines, the animal husbandry, poultry, sheep and goat units were also established which are presented in Table 6.

Table 6 Details of Animal Husbandry Component Established to aid Agricultural Education

Sl. No	Name of the Unit	Number of Animals	Percentage to Total
01	Milch Animals	09	7.38
02	Sheep	12	9.84
03	Goat	24	19.67
04	Poultry (Country) Birds	72	59.02
05	Piggery	05	4.10
Total		122	100

Among the animal husbandry components, this institution is having almost all the activities viz., Milch Animals, Sheep and Goat rearing, poultry birds and piggery units which respectively accounted for 7.38 per cent, 29.51 per cent, 59 per cent and 4.10 per cent. Students will be learning both theory and practical in rearing the animals and birds and gain the hands-on-experience from those units.

Besides the above, the students will be also facing the attachment in each and every village which are nearer to the institution to learn the art of crop production in the farm households by staying for three months duration. In addition, they have exposure to the agribusiness enterprise in which how the entrepreneur is managing the enterprise in all the areas of management from inventory to sales which is also adding skills to the learning students of the agricultural curriculum.

Placement and Career Orientation of Students

The passed out Graduates of Agriculture from this institution are placed both in Public and Private sector institutions due to their individual merits and few are aspiring for higher level positions. For that their intensive preparation through some training academies and a few others are Pursuing Post Graduate studies. These details are analyzed and the results are presented in Table 7.

Table 7 Placement Cell and Its Career Developments in Nalanda College of Agriculture

Sl. No	Placement Institutions	Number of Students Placed during		Total Number of Students	Percentage to Total
		2016-17	2017-18		
01	Government of India Institutions	04	01	05	05.62
02	State Government Institutions	03	00	03	03.37
03	Private Institutions Like Sathyam Biotech	09	02	11	12.36

Table Continued..

Sl. No	Placement Institutions	Number of Students Placed during 2016-17	2017-18	Total Number of Students	Percentage to Total
05	Preparation for Competitive Examinations	23	32	55	61.80
06	Practising Agriculture	04	05	09	10.11
Total		49	40	89	100.00

Table 7 delineates that around 5.62 per cent of the candidates who have passed out during 2016 and 2017 have joined in Government of India institutions like Post Offices and NLC Limited. The State Government Institutions like Agriculture have employed our graduates to the tune of 3.37 per cent to the total passed out candidates. Private Institutions like Sathyam Bio-Tech have employed our graduates to the tune of 12.36 per cent to the total passed out candidates. Around 6.74 per cent of the passed out candidates have opted for higher studies in the specializations like Agronomy, Agricultural Microbiology and Agro-Meteorology. Around 61.80 per cent of the passed out candidates are in various training academies for pursuing higher administrative positions. Only 10 per cent of the passed out candidates are practicing agriculture on their own farms located in different parts of Tamil Nadu.

Placement Efforts with Nalanda College of Agriculture

Placing the students in an appropriate position after the completion of their graduation will not only improve the face value of the institution but also the socio economic well being of the student in the society. In this respect, the details of placement efforts taken up by the institution are analyzed and the details are presented in Table 8.

Table 8 Details of Placement Efforts Made by Nalanda College of Agriculture

Sl. No	Details of Efforts Taken up	No. of Times	Percentage to Total
01	Linkages Made with Training Academy for UPSC Examinations	02	08.71
02	Tamil Nadu Public Service Commission Recruitment Related Services	03	13.04
03	Motivational Speech by inviting Experts.	07	30.43
04	Identifying and Documenting Potential Private Recruiters and Appraising the same to the students	03	13.04
05	Preparation and Communication of Brochure highlighting the talents of the Students to the Recruiting Companies	01	04.35
06	Employment Service Providing to the Students	07	30.43
Total		23	100.00

Table 8 outlined that the motivational speech to the students by inviting the experts in the related field will win the confidence of the students to opt for competitive examinations and the personal interview. In this respect, 7 motivational lectures were arranged during the year 2020-21 and the same is accounted for 30.43 per cent to the total efforts made. Another effort is Providing employment details both in Government and Private Sector institutions periodically also enhanced their participation to prepare and apply for the opt positions either in the Government or Private.

Identification of potential private recruiters in and around central Tamil Nadu is also made and the same is communicated to the students and the Tamil Nadu Public Service Commission (TNPSC) vacancy notification for farm graduates and other general positions were also communicated and both shared 13 per cent respectively to the total effort made. Another effort in this direction is providing linkage facilities with Indian Administrative Service Coaching Centres so as to learn the methodology of learning and make themselves fit to appear before the competitive examinations.²

Summary

This article highlights the major areas in which agricultural education is imparted by incorporating major and minor courses which are related to agriculture and student's career perspective. Because of the incorporation of multidisciplinary courses, the students were able to outperform in competitive examinations like UPSC, IBPS, TNPSC, SSC, RRB and get succeeded in the UPSC exams. Besides imparting agricultural education, the students are also learning the aspects of career oriented courses which are experiential learning and the art of Establishing greenery during their studentship is also highlighted and the role of Nalanda College of Agriculture, Trichy, Central Tamil Nadu is delineated not only in imparting education but also in placement efforts to place the students in an appropriate forum. Students have more opportunities in various aspects of farm based companies and in the Government agencies.

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None.

Conflict of interest

The author declares that there has no conflict of interest to publish this manuscript.

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