



“Self study report (SSR) of College of Agriculture, Vellayani Thiruvananthapuram - 695 522”

B.Sc. (Hons.) Agriculture



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**SELF STUDY REPORT FOR ACCREDITATION
COLLEGE OF AGRICULTURE, VELLAYANI**

2019 - 2023

DEGREE PROGRAMME: B.Sc. (Hons.) Agriculture

**FACULTY OF AGRICULTURE
KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI
THIRUVANANTHAPURAM- 695522
KERALA, INDIA**

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6.4.1. Brief History of the Degree Programme

The inception of the College of Agriculture, Vellayani, dates back to August 1955 when it was established as the Agricultural College and Research Institute, functioning as an integral part of the existing research wing of Travancore University and the Department of Agriculture. The primary objective was to deliver scientific agricultural education, producing skilled graduates to effectively implement agriculture-centric rural development programs in the State. The college's location in Vellayani, within Kalliyur Panchayath, Nemom Block, approximately 12 km southeast of Thiruvananthapuram, utilized the palace building of the erstwhile Travancore royal family as its infrastructure, with the surrounding area developed into the Instructional Farm for practical student training, spanning 251.73 hectares and bordered by the Kerala's second largest lake viz., Vellayani freshwater lake on three sides.



AERIAL VIEW

The administrative structure was headed by the Principal, doubling as the ex-officio Additional Director of Agriculture (Research), overseeing teaching and research activities, as well as planning the Department of Agriculture's research programs. The Principal was also the Dean of the Faculty of Agriculture in the affiliated Travancore University (later re-designated as Kerala University). Assisting the Principal were the Vice-principal and Division Heads, while academic staff comprised Professors, Junior Professors, and Lecturers. Distinct research schemes were underway, led by Research Officers and Research Assistants. Initially,



the college had seven divisions, expanding over time to eleven, covering various agricultural disciplines.

Initially functioning independently under the government's purview, the college later fell under the administrative control of the Kerala Department of Agriculture, with academic affiliation to the University of Kerala until 1972 when it was assimilated by the Kerala Agricultural University. The institution introduced the undergraduate program B.Sc. (Ag.)

in 1955, followed by postgraduate programs M.Sc. (Agri.) and Ph.D. in 1961 and 1965, respectively. The Kerala Agricultural University Act of 1971 designated the college as a constituent part of the Kerala Agricultural University from February 1, 1972, renaming it as the College of Agriculture. This integration marked a harmonization of teaching, research, and extension activities. A novel trimester system aligned with State Agricultural Universities' education patterns was introduced, emphasizing internal evaluation, a robust advisory system, flexibility in course content, and improved student-teacher relationships. Practical aspects gained prominence in the curriculum, with practical training programs like work experience and farm training instituted for the B.Sc. (Ag.) course. The new undergraduate instruction system began in 1972, extending the B.Sc. (Ag.) program duration from three to four years following semester system. Currently, the College of Agriculture, Vellayani, holds a prominent position as the primary provider of agro-technology in the state. In addition to this crucial role, the institution actively engages in various functions, such as spearheading innovative research initiatives, fostering agricultural development through cutting-edge technologies, and playing a pivotal role in shaping and influencing agricultural policies at both regional and national levels. Moreover, its graduates- B.Sc, M.Sc. and Ph.D. equipped with a comprehensive education that integrates theoretical knowledge with practical skills, not only contribute significantly to the local agricultural landscape but also enjoy widespread acclaim on the global stage, showcasing the institution's commitment to producing industry leaders and experts.

6.4.1.1 Objectives

The primary mandate of the college is to provide leadership in teaching, research and extension activities related to agriculture and allied sciences. The institute has been making efforts to keep pace with new frontiers of science and contemporary developments which are socially,



RICE WORK EXPERIENCE

economically and technically relevant to the farming community of the state. Based on the mission and mandates, the following objectives have been defined

- Impart quality education in the fields of agriculture, horticulture, veterinary and animal sciences, agricultural engineering, community science and other allied sciences in order to make it responsive to the growing demands of the society in general, and the aspirations of the farming community, in particular.
- Provide leadership in both basic and applied research for evolving need based and eco-friendly technologies for sustainable agriculture.
- Augment the production of major crops of Kerala by employing innovative techniques and exploiting the fragile areas for cultivation.
- Develop and transfer suitable end use technologies to solve farmer's problems and to enhance the agricultural productivity in a sustainable manner.
- Serve as a leading centre for the collection and maintenance of agricultural database.
- Impart training for grass root workers and officers of the State Departments of Agriculture, Central Institutes, NGOs Private organizations and farmers to update their knowledge base.

Table 1. Year of establishment of the different departments in college

Sl.No	Department	Year of establishment/ start	Remarks (renaming/ bifurcation etc) if any
		B.Sc.	
1.	Agronomy	1955	-
2.	Agricultural Chemistry	1955	Later renamed as Soil Science and Agricultural Chemistry
3.	Botany & Mycology	1955	

4.	Agricultural Engineering	1955	-
5.	Agricultural Botany	1955	Merged with Dept. of Plant Breeding and renamed as Dept. of Plant Breeding and Genetics in 1995
6.	Entomology	1955	-
7.	Animal Husbandry	1955	-
8.	Physical Education	1958	-
9.	Plant Pathology	1961	Renamed from Botany and Mycology
10.	Agricultural Extension Education	1962	-
11.	Agricultural Economics	1966	-
12.	Agricultural Statistics	1966	-
13.	Horticulture	1968	Later segmented to different departments
14.	Genetics and Plant Breeding	1979	Merged with Dept. of Agrl. Botany in 1995 and renamed as Dept. of Plant Breeding and Genetics
15.	Home Science	1983	College for Rural Home Science for UG was started in 1988 but was soon discontinued. Renamed as Dept. of Community Science
16.	Plant Physiology	1993	Separated from Dept. of Agrl. Botany and functions as an independent department since 1993
17.	Plant Biotechnology	1995	Became a full-fledged statutory department in 2003 Renamed as Department of Molecular Biology & Biotechnology in 2023
18.	Olericulture	1996	Horticulture Segmented
19.	Agricultural Meteorology	1998	Bifurcated from Dept. of Agronomy and established as separate department in 1998
20.	Processing Technology	1998	Horticulture segmented
21.	Plantation Crops & Spices	1998	Horticulture segmented
22.	Pomology & Floriculture	1999	Horticulture segmented
23.	Agricultural Microbiology	2005	-
24.	Nematology	2016	Separated from Agrl. Entomology as independent department in 2016
25.	Vegetable Science	2018	Renamed from olericulture
26.	Seed Science & Technology	2018	-
27.	Fruit science	2019	Formed by the bifurcation of Department of Pomology and Floriculture.
28.	Floriculture and Landscaping	2019	Formed by the bifurcation of Department of Pomology and Floriculture.
29.	Organic Agriculture	2022	-

30.	Agricultural Extension Education	2023	Renamed from Agricultural Extension
31.	Post Harvest Management	2023	Renamed from Processing Technology
32.	Plantation, Spices, Medicinal & Aromatic Crops	2023	Renamed from Plantation Crops & Spices
33.	Soil Science and Agricultural Chemistry	2023	Renamed from Soil Science
34.	Entomology	2023	Renamed from Agricultural Entomology
35.	Microbiology		Renamed from Agricultural Microbiology

6.4.1.2 Accomplishments

The Department of Agronomy has been adjudged as the “Best Department” of College of Agriculture, Vellayani by the students consecutively for the past nine years. Faculty of the department have also won awards as best teacher of the College.

The Department of Agricultural Extension Education has established collaborations with the premier national and international research institutes like the CIMMYT, Hyderabad and IIM, Kozhikode for internships as part of the

Experiential Learning programme (ELP). The Department has organized two international Seminars, two international workshops and a national seminar on various topics of contemporary research and academic importance. The Department conducted 207 training programmes for the various stakeholders in agriculture and 15 exhibitions both on and off the campus. during the period. A language lab, a heritage museum and tribal museum have been established during the period in the Department, with the funding from various externally aided projects. The faculty has secured the Young Scientist Award in various international and national conferences and holds various prestigious positions outside the institution such as the DAAD (German academic exchange service) ambassadorship of South-Asia, external membership of the Centre for International Development and Environmental research, JLU, Germany, the nodal officers of the Agricultural Knowledge Centres (AKCs) and editors of various UGC- CARE listed journals.



CIMMYT Intern Students

In the Department of Entomology, undergraduate students have achieved significant accomplishments through hands-on experiences, including successfully conducted and scaled up the production of microbial agents, showcasing proficiency in cultivation techniques and quality control. Accomplished the formulation of biopesticides and pheromone traps, illustrating expertise in the development of eco-friendly pest management solutions. Attained practical skills in beekeeping, highlighting a comprehensive understanding of apiculture and its significance in agricultural ecosystems. These accomplishments underscore the students' dedication to experiential learning and their ability to apply theoretical knowledge to real-world scenarios in the field of entomology.

In the Department of Genetics and Plant Breeding, for every UG courses, students are provided with printed practical manuals. UG students are trained in various aspects related to the breeding techniques of different crops and hands-on practical experience in selfing and crossing techniques in various crops. Students are instructed in solving practical and numerical problems in genetics and plant breeding. They are made aware of the importance and significance of Intellectual Property Rights. RARS training module in RAWE is also coordinated through department. JRF mock exams are conducted to secure high positions in competitive examinations.

The Department of Soil Science has an ICAR-Experiential Learning unit which trains the students in quality organic input production and rapid composting technologies. Faculty of the department acted as mentor of the winning team in the Young Innovators Programme at District and state levels. The department has established a model organic farm as well as an organic museum to disseminate the organic farming technologies among students.

As part of “Azadi Ka Amrit Mahotsav”- an initiative of the Govt of India to celebrate and commemorate 75 years of Independence- the Department of Molecular Biology and Biotechnology has organised an essay writing competition for the UG students of CoA Vellayani on 23rd April 2022 on the topic: Science and Technology: India- 75 years. Twenty-Eight students participated and the winner Ms. Anila Alex, 2018 admission B.Sc. (Ag.) student was awarded with certificate of Merit and Cash Prize on 15th August 2022 during the celebration of 75th Independence Day at CoA, Vellayani.

Abdullah Thaseem M of 2019 UG admission procured First Prize for National Level Photography contest - GLIMPSE, organized by the Agribusiness club of MANAGE and First Prize for Photography in Tropentag 2023, Germany in 2023.

6.4.2 Faculty strength

The total number of faculty involved in teaching for the B.Sc. (Hons.)Ag. Programme is 113. The details are given below.

Table 2. College of Agriculture, Vellayani (as on 1st March every year)

	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024
	IP**	IP**	IP**	IP**	IP**
Professors	26	21	19	24	20
Associate Professors	7	9	10	2	2
Assistant Professors	46	55	58	61	67
Total	79	85	87	87	89
RARS(SZ), COA Vellayani	21	21	21	21	15
Professors	3	1	2	1	1
Associate Professors	1	0	1	1	2
Assistant Professors	11	14	12	13	13
Total	15	15	15	15	16
Instructional Farm, CoAV					
Professors	1	1	1	1	1
Associate Professors	0	0	0	0	0
Assistant Professors	2	2	2	2	2
Total	3	3	3	3	3
PRRAL,CoAV					
Professors	1	1	1	1	1
Associate Professors	0	0	0	1	1
Assistant Professors	1	1	1	0	0
Total	2	2	2	2	2
TSS, CoAV					
Professors	1	0	0	0	0
Associate Professors	0	0	0	0	1

Assistant Professors	1	2	2	2	1
Total	2	2	21	2	2
Grand Total	101	107	109	109	112
Requirement as per ICAR norms Sanctioned – 123 @ 29(23+6) per 120 students 87(69+18)	58	58	58	58	58

6.4.3. Technical and Supporting staff

The technical and supporting staff in departments are allotted from Dean's office based on the requirements and requests placed by the Heads of Departments.

The details of staff assigned to the departments are as follows.

Table 3. Technical/ supporting staff

Sl. No.	Post	Sanctioned	In position
I. Agronomy			
1.	Computer Assistant	1	1
2.	Lab attendant	2	2
3.	Class IV	1	0
II. Agricultural Engineering			
1.	Technical Supervisor	1	0
2.	Lineman	0	0
3.	Electrician	0	0
4.	Office Attendant	1	0
III. Agricultural Economics			
1.	Class IV	1	0
IV. Agricultural Extension Education			
1.	Artist	2	0
2.	Photographer	1	0
3.	A.V Operator	1	0
4.	Office Attendant	1	1
5.	Office Superintendent	1	1 (Computer Asst.)
V. Agricultural Statistics			
1.	Technical Assistant	1	1 (on Daily wages)
2.	Office Assistant	1	1 (on Employment Exchange)
3.	Junior Programmer	1	1 (on Employment Exchange)
VI. Animal Husbandry			
1.	Farm staff- farm assistant and farm supervisor	3	1(permanent) 1 (daily wages)
2.	Office attendant	1	1
3.	Lab Assistant	1	1

VII. Community Science			
1.	Computer Assistant	1	1
2.	Lab attendant	1	1
3.	Class IV	1	1
VIII. Agricultural Meteorology			
1.	Farm Officer	0	1(from employment exchange)
2.	Class IV	0	1 (Shared with RC)
IX. Agricultural Microbiology			
1.	Lab Assistant	1	1
X. Entomology			
1.	Lab attendant	3	3
2.	Class IV	1	1
XI. Genetics and Plant Breeding			
1.	Computer Assistant	1	0
2.	Lab attendant	2	1
3.	Class IV	1	1
XII. Molecular Biology & Biotechnology			
1.	Lab attendant	2	2
2.	Computer Assistant	1	1 (Shared with the Department of Community Science)
3.	Office Attendant	1	1 (On contract)
XIII. Physical Education			
1.	Office assistant	1	1
2.	Marker	1	1(daily wages)
XIV. Plant Pathology			
1.	Lab attendant	1	1
2.	Class IV	1	1
XV. Plant Physiology			
1.	Lab assistant	1	1
2.	Office Attendant	1	0
XVI. Plantation, Spices, Medicinal & Aromatic Crops			
1.	Lab attendant	1	1
2.	Office attendant	1	1 * Office attendant of Department of Pathology and is given additional charge
XVII. Fruit science			
1.	Farm Manager	1	1(In charge of college garden and orchard and other activities in the Department of Fruit Science. In charge of two other Departments)

2.	Lab Assistant	1	0
3.	Office Attendant	1	1 (Assists in the official matters, handling and delivering official communications. In charge of two other Departments)
XVIII. Post Harvest Management			
1.	Lab Assistant	1	1
2.	Office Attendant	1	1*sharing with Dept of Vegetable Science
XIX. Soil Science and Agricultural Chemistry			
1.	Lab attendant	4	3
2.	Class IV	2	1
3.	Computer assistant	1	1
4.	Technical assistant	2	0
XX. Vegetable Science			
1.	Lab Assistant	2	1
2.	Office attendant	1	1
XXI. Seed Science			
1.	Lab attendant	1	0
2.	Class IV	1	1
XXII. Floriculture and Landscaping			
1.	Farm Manager	1	Farm Manager – upto 10.08.2021 Farm Supervisor- 11.02.2021 to 31.05.2023 Farm Manager (Temporary) 05.10.2023 to till date Supervision of garden activities of College Garden Demonstration units, practical facilities maintained by the Department and research plot of students
2.	Lab Attendant	1	0
3.	Class IV	1	1 (common with Dept. of Fruit Science, Dept. of Genetics and Plant Breeding)

4.	Computer Assistant	1	1(Common with Technical Cell, CoA, Vellayani)
XXIII. Nematology			
1.	Lab attendant	1	0
2.	Class IV	1	1
XXIV. Organic Agriculture			
1.	Class IV	0	1(Shared with Dept of Animal Husbandry)

The technical staff assist the course teachers in the conduct of practical sessions, preparation of samples, chemical solutions etc for practicals, maintenance of laboratory instruments and glassware, conduct of practical examinations and maintenance of safety in the labs. The supporting staff involve in the routine department office works, maintenance of library, computer works etc.

6.4.4. Classrooms and Laboratories

i) **Classrooms:** The new UG Academic Block for the B.Sc. (Hons.) Ag students was completed in 2016. A total of seven classrooms are available for UG classes in the campus. In addition, individual departments have classrooms for UG



CLASSROOM

practical classes. Two smart classrooms are available for the theory classroom sessions. The number and area of the rooms available are presented in Table 4.

ii) **Laboratories:** All the departments have well equipped laboratories for conducting practical classes as per the requirements of the course curriculum. The laboratories are equipped with modern equipment/machinery/instrument facilities (Table 4). In addition to the laboratories attached to the major departments, the facilities for laboratory works established under the different projects sanctioned to the college are also utilised for the practical sessions



SOIL SCIENCE LAB (UG)

(Central Instrumentation Laboratory, Leaf Tissue Laboratory, Pesticide Residue Laboratory with NABL accreditation (ISO: 1720252005), Plant Virus Indexing laboratory, Processing lab registered under FSS Act and with FSSAI license, Mushroom laboratory, Bio-control Lab, Centre for Microbial Technology etc.)

Table 4. Classrooms, labs and other attached facilities in the departments to conduct practical hands on training (Area in m²)

Classroom No.	Location	Area in m ²
1	Old Academic Block	78
2	Old Academic Block	78
3	Old Academic Block	78
4	New Academic Block	156
5	New Academic Block	156
6	New Academic Block	156
7	New Academic Block	156

Sl.No.	Department	Facilities
1	Agronomy	
	UG Lab	3 Nos (279.20m ²) ,1 Field class room (3.5 m ²)
	Other facilities	Field lab Crop museum-1 (3200 sq m); Millet museum-1 (800 m ²); Tuber museum-1 (1000 sq m); Certified Organic Farm-1 (4000 sq m); Wetland-1 (4000 sq m); Garden land- 3 (600 sq m); Net house- 1 (20 sq m); Medicinal plant unit-1 (6 sq m); Leaf tissue analysis lab-1 (100 sq m); Miniature models of soil and water conservation structures-8; IFS mini model-1
2	Soil Science and Agricultural Chemistry	
	UG Lab	2 No.s (95+97 m ²) ; 2 (120+105 m ²)
	Other facilities	Instrumentation room-minor-36 m ² ; Instrumentation room- major-40 m ² ; Computer room -90 m ² ; Organic Farm-12000 m ² ; Soil Museum- 180 m ² ; Soil Testing Lab-150 m ² ; Soil; Processing Yard-75.5 m ² ; Referral lab for quality control of organic manures-280 m ² GIS Lab-60 m ² ; Mobile Soil Testing Lab-1No.
3	Entomology	
	UG Lab	2 (70+42 m ²)
	Other facilities	Biocontrol Lab-210.41 m ² ; Insectory Lab-250.0 m ² ; Storage room-140.90 m ² ; PRRAL -350.0 m ²
4	Plant Pathology	
	UG Lab	1No (90 m ²)
	Other facilities	Protein Lab-48.5 m ² ; Instrument Lab-42 m ² ; Hot Lab-18 m ² Mushroom Lab-60 m ² ; Mushroom house-73 m ² Mushroom shed-24 m ² ; Biocontrol Lab-75 m ²

		Inoculation room 15 m ² ; Greenhouse-30 m ² ; Glass house-110 m ²
5	Agricultural Extension Education	
	UG Lab	Class room- 1 (310 sq m) ; Language lab-1 (40 sq m); Dept computer lab- 1 (30 sq m); Media lab- (100 sq m)
	Other facilities	Examination Hall -1 (165 sq m); AV Seminar hall-1 (130 sq m); Web conferencing cum lecture hall- 1 (77 sq m); Department library (150 sq m); Museum Hall cum UG lecture hall- 1 (167 sq m); Round Table Conference Hall- 1 (50 sq m); TSS Hall (77 sq m); Cellar Hall cum practical class room-1 (165 sq m); Generator room- 10 sq m)
6	Genetics & Plant Breeding	
	UG Lab	1 (113.85 m ²)
	Other facilities	Botany garden -1104.4 m ² ; Crossing shed -40.32 m ² ; Net house -537.2 m ²
7.	Plant Physiology	
	UG Lab	1 no.(70 m ²)
	Other facilities	Rain-out shelter -50 m ² ; Open top chamber -20 m ² ; Net house-50 m ²
8	Molecular Biology & Biotechnology	
	UG Lab	1+4 (40 m ² +37.17 m ²)
	Other facilities	Tissue culture Lab-48.8 m ² ; Animal cell culture lab-72.6 m ² Tissue culture hardening Chamber
9	Microbiology	
	UG Lab	1 no.(55.5 m ²)
	Other facilities	Research lab -83 m ² ; Instrumentation facility-27.6 m ² Biofertilizer Production unit -52 m ² ;Molecular biology lab -18 m ² ; Cyanobacterial lab -7.65 m ² ; Greenhouse -117 m ² ; Polyhouses-49 m ² ; Waste management pilot plant and composting unit- 55.5 m ²
10	Vegetable Science	
	UG Lab	1 (60 m ²) ;1 (15 m ²)
	Other facilities	Seed Lab- 480 m ² ; Seed Processing building -71.55 m ² Seed Processing yard-83.52 m ² ; Seed production field -1000 m ² ; poly house -440 m ² ; net house -400 m ² ; mist chamber-40 m ² ; rain shelter-230 m ²
11	Postharvest Management	
	UG Lab	1 (30 m ²) ; 1 (61.52 m ²)
	Other facilities	Processing unit with “Registration Certificate” under FSSAct 2006 (Reg. No. 21317138000133). Techno Incubation Centre-30 m ²
12	Plantation, Spices, Medicinal & Aromatic Crops	
	UG Lab	1 (55 m ²) ; 2 (22.68 +10.86) m ²

	Other facilities	Field for practicals-2000 m ² ; Hi tech Polyhouse -100 m ² Rainshelter -46 m ² ; Rain shelter with mist chamber-25 m ² Smart farming field -320 m ² ; Plant Tissue culture laboratory-25 m ² (shared with the Dept of Plant Physiology) Preparation room-50 m ² ; Inoculation cum incubation room -16 m ² ; Store room
13	Floriculture & Landscaping	
	UG Lab	1(44.55 m ²)
	Other facilities	Hydroponics demo unit-28.44 m ² ; Educational Museum -33.92 m ² ; Computer lab and Departmental Library-14.21 m ² College garden-1 ha ; Polyhouse-400 m ² Fernery-6 m ² ; Shade house -252 m ² Open precision farming research plots -2000 m ² Farm machinery and tools workshop 10 m ² Rosarium Ornamental Nursery-1200 m ²
14	Fruit Science	
	UG Lab	-
	Other facilities	Greenhouse -75 m ² : Potting shed -70 m ²
15	Agricultural Economics	
	UG Lab	1 (18.9 m ²)
	Other facilities	Department library; Thesis library
16	Agricultural Statistics	
	UG Lab	1(89.28 m ²) ; 1 (60.95 m ²)
17	Agricultural Meteorology	
	UG Lab	1 (40 m ²)
	Other facilities	Agromet observatory-1980 Automatic weather station
18	Agricultural Engineering	
	UG Lab	1 (100 m²)
	Other facilities	Workshop-110 m ² ; Implement yard- 55 m ² ; Open implement yard- 18 m ² ; Processing lab- 45 m ²
19	Community Science	
	UG Lab	1 (80 m²)
	Other facilities	Food Laboratory-122.67 m ² ; Bio Chemistry Laboratory-137.64 m ² ; Incubation Centre Lab-95.59 m ²
20	Seed Science & Technology	
	UG Lab	1 (40 m ²)
	Other facilities	Molecular biology lab -40 m ²
21	Nematology	
	UG Lab	1(120 m ²); 1(90 m ²)

	Other facilities	Instrumentation room-90 m ² ; Net House-110 m ² ; Glass House-155 m ²
22	Animal Husbandry	
	UG Lab	3 (177 m²)
	Other facilities	Cattle shed and Goat shed -418 m ² ; Poultry shed- 245 m ²
23	Physical Education	
	Facilities	Indoor Stadium(multipurpose)- 1500 m ² ; Open Playground-27600 m ² ; Football court-120 m x 70m ; Basketball court-28m x 15m ; Volleyball court- 18m x 9 m ; Badminton courts-6no.s ; Table Tennis ; Cricket ground; Athletics – facilities for track and field events



LAB FACILITIES

6.4.4.1. Farm and other facilities

a. Instructional Farm

The Instructional Farm attached to the College of Agriculture, Vellayani covers an area of 251.73 ha, in which garden land area is 78.23 ha and wetlands, 173.5 ha. The Instructional Farm together with the faculty and other staff support in the field level practicals, demonstration and experiments related to the course curriculum of the college including PG and Ph.D research projects. In addition, it facilitates the conduct of the experiential learning courses of final year B.Sc. (Hons.) Ag. programme and externally aided research projects, by providing the necessary infrastructure, labour and other technological inputs. Instructional

Farm, Vellayani is maintaining demonstration units for container growing of fruit plants, exotic fruit plants, Integrated Farming System, Model mango nursery, Small nursery for minor horticultural crops, Small nursery for bamboo, Hitech nursery for pro tray seedlings of vegetables, micro-rhizome production unit for ginger, Rapid multiplication unit for pepper, Floriculture unit, Aquaponics unit, Medicinal plants unit, mushroom spawn production, Value addition center, Seed processing unit, Modernized vermicomposting unit, Modernized sales counter cum information center and solar units to run the office building. The details of the facilities in the Instructional Farm are presented in Table 5.

Table 5. Infrastructural facilities in Instructional Farm

Sl.No	Facility	Area in sq. ft.
1	Office building	450
2	Sales counter	110
3	Store & temporary shed at Sales counter	54
4	Fertilizer store	128
5	Farm machinery & implements store	306
6	Mushroom house	86
7	Coconut store	342
8	Coconut seed store	79
9	HD potting shed	140
10	Seed processing yard	110
11	Seed Store (vegetables)	100
12	Pump houses	30 each
13	Value addition Centre	800
14	Mushroom Lab	500
15	Input store	60
16	Labourers' recreation hall	143
17	Farm machinery/ equipment	

<p>Farm tractors ; Power tillers ; Mini tillers; Inter-cultivator; Brush cutters ; Chain saw ; Thresher; Winnower; Walk-in-cooler for the storage of vegetable seeds (10ft x 10 ft.); Sprayers – knapsack, power, rocker, backpack Knives, spades, hoes, sickles Garden equipments & tools Green houses with micro irrigation Hardening chamber for tissue culture plants Poly houses / Shade houses Mist chambers Rain shelter Naturally ventilated poly house</p> <ul style="list-style-type: none"> • The farm ponds in the college campus are suited for fish rearing • The two ponds in Block C, each of 40m x 20m are stocked with fish (rohu, mrigal and catla) in rotation. • Ambal or water lilly in 20m x 20m pond adds to the aesthetic value of the campus. • In addition, eight ponds each of 10m x 5m and 1-2 m depth are available for fish rearing. • An IFS unit with animal, poultry and fish component is located at the B Block of the farm. 	<p>288m² 90 m² 560 m² 108 m² 1000 m² 320 m²</p>
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INSTRUCTIONAL FARM FACILITIES

Instructional Farm, Vellayani is providing Instructional facilities to UG and PG students of College of Agriculture, Vellayani. Work experience courses viz. Agro 3107 Practical crop production -I (Rice and tuber crops) and Agro 3208 Practical crop production -II (Pulses and oilseeds) are being conducted in the farm area. As a part of Fundamentals of Horticulture course, UG students get hands on training on plant propagation techniques like budding, grafting and layering. As a part of Experiential learning programme on Nursery management, students make planting materials of ornamentals, vegetables and fruit crops and sell it through the sales counter. Germplasm of ornamental plants, medicinal plants, vegetables, fruit plants, field crops and plantation crops are maintained in the farm area for instructional purpose of the students. Research work of PG and Ph.D students are also conducted in the farm area.

b. Model Organic Farming units

There are two certified organic farms in the campus; one under Department of Soil Science and Agricultural Chemistry (area 1.2ha) and one under the Department of Agronomy (area 1.0 ha).The organic farms are maintained for demonstration and research purposes. Demonstration –cum-production units of vermicomposting, coir pith composting, NADEP composting, biochar, azolla, etc are maintained in the organic farm. Trainings are given to various stakeholders like students, farmers, state agriculture department staff, LSG staff, NGOs, unemployed youth, housewives etc. on various aspects of organic farming. Emphasis is given to developing organic waste management technologies and organic input production.

c. Integrated Farming System model

The IFS model plot is located in a one-acre land in the B-Block of Instructional Farm Vellayani. The Model IFS unit consists of Giggin's Farm villa with provision to accommodate goat, rabbit and poultry along with vegetables by utilizing minimal space. This model will demonstrate how to increase the production per unit area by integrating inter-dependent components within a given area. At present, chilli variety Athulya is cultivated on the Giggin's villa structure and fodder grass and banana are cultivated in the IFS plot. There are 15 goats at present and one day old layer chicks are reared regularly in the shed adjacent to the Giggin's villa. The chicks are reared until one month old and are sold through the sales counter of IF Vellayani. Fresh water fish like Rohu and Catla are reared in the channels within the IFS unit. The fish is sold when they are 6 month old. Fish fingerlings are also sold as per order from farmers.

d. Livestock farm and Poultry unit

The livestock farm consists of dairy and goat unit with an area of 4500 ft². The dairy unit houses cross bred cattle of Holstein Friesian and Jersey breeds and also has a Vechur bull.

The farm provides opportunities to the students to learn the animal husbandry practices and to perform practicals pertaining to their syllabus. The poultry unit houses both layers and broilers and has an area of 2640 ft². Apart from the curricular activities the poultry unit helps the students develop their entrepreneurial abilities by encouraging them and providing them with the facilities to raise birds and to generate income from their sales through the Earn While You Learn programme.

e. Engineering Workshop

The workshop under the Department of Agricultural Engineering with an area of 110m² has facilities for demonstration, maintenance and repair of farm machinery. This facility provides the students with the opportunity to acquire skills in various aspects of engineering and workshop technology related to agriculture. The workshop also provides support for research programmes on PG and PhD students and scientists.



ENGINEERING WORKSHOP

6.4.4.2 Museums



SOIL MUSEUM

i. Soil Museum: The soil museum was established during 1991 under the University Soil Reference and Databases project as part of a collaborative project with International Soil Reference and Information Centre (ISRIC), Wageningen, The Netherlands. The objective of the museum was to serve as a centre for documentation and reference about the soils of Kerala,

to collect soil monoliths from the major agro-ecological zones of Kerala and to have an exposition of them in the soil museum and to provide information on soil for the use of students, farmers, scientists and planners. Twelve reference soils profiles from major land resource areas representing different agro-ecological zones of the state have been collected. Pedological and soil mineralogical exhibits are displayed in Soil Museum (Pedomarium).

ii. Organic museum: It was established on 2019 and has on display posters of various organic manures, green manure crops, production technology of liquid organic manures, biofertilizers etc. It is used for demonstration purpose for students, farmers and visitors to the college.

iii. Crop museums: A crop museum of 80 cents (3200 m²) area is maintained by the Department of Agronomy with a cafeteria of crops covering 98 number of live crop species in micro plots, pots and open planted condition under cereals, millets, pulses, vegetables, fruits, tuber crops, fodder, fibre, narcotics, medicinal plants, green manure and plantation crops. The crop museum has an aquaponic unit, vertical farming structures, composting unit, planting material production facility and medicinal plant unit as additional facilities. A tuber crop museum in 25 cents (1000 m²) area with different species and varieties of tuber crops is also maintained by the Department. A millet museum with different species and varieties collected from all over the country is being maintained in 20 cents (800 m²) area.



CROP MUSEUM

iv. Agricultural Technology Museum: The Agricultural Technology Museum at the Department of Agricultural Extension Education intends to transfer sustainable agricultural technologies for increasing farm productivity to the visitors of the campus, who are mostly farmers, students, research scholars, faculty etc. With the upcoming heritage museum, the department intends to generate awareness among the public on the subject of agricultural history, their legacy, etc. In a 167-metre square facility, display boards depicting recent agricultural technologies of various disciplines of agriculture, acrylic display boards with backlighting, still models, and dioramas for showcasing various sustainable agricultural technologies, traditional artifacts of tribal communities etc are arranged for display and technology transfer

v. Farm machinery museum: The museum attached to the Department of Agricultural Engineering has on display Mould board plough, Disc plough, Disc harrow, cage wheels, seed cum fertilizer drill, thresher, cultivator, seed dressing drum and various intercultural operation tools.

vi. Nematology museum: Nematode infected wet preservation of specimens and permanent mounts are being displayed in the Laboratory for the students to learn about the nematodes and diseases they cause.

6.4.4.3 Major equipments in departments

Table 6. Equipments in the departments and research units in CoA, Vellayani

Department	Equipment
Agromony	<p>Small implements: Digging hoe (wooden handle)– 208 Nos; Chopping hoe (steel)- 150; Khurpi-3 ; Chaff cutter- 1 ; Brush cutter- 3; Rotary weeder-1; Cono weeder -1 ; Weeder cum cultivator- 1 ; Hand hoes- 3; Garden hoes- 14 Garden rake -3; Cultivator-6; Pick axe- 16; Wheel barrow- 1; Hedge shear- 1; Hacksaw blade-1; Herbarium press; Wooden display box with front sliding glass- 6; Medicinal and aromatic plant unit with more than 30 sp.; Portable fertilizer and organic manure sample display unit; Display unit of herbicides and agro chemical samples</p> <p>Wetland paddy seeder- 1;SRI marker-1; Country plough-1; MB plough-2; Wetland puddler-2; Shovel- 1; Cultivator-6; Rotary weeder-1; Cono weeder- 1; Wheel hoe weeder-2; Weeder cum cultivator- 1; Bund former- 1; Sickle – 50; Thresher-1; Felling knife-2; Rubber cutter- 1</p> <p>Weighing balance:Platform balance-1; Counter poise balance-1; Kitchen balance- 3; Digital balance -1; Digital hanging scale-1; Top pan balance-5; Spring balance-1; Micro weighing balance-1; Electronic weighing balance- 4</p> <p>Sprayers: Knap sack sprayer (brass hynamic) -1; Knap sack sprayer (3 L)- 1 No. ; Sprayer (2 L)- 1; Knap sack sprayer (6 L)- 1 No.; Sieve-7; CO₂ meter- 2; Aquaponic unit-1; Azolla unit-2; Vermicompost unit-1; Vertical garden unit-12 Nos; Sprinkler Unit-1; Micro sprinkler and accessories- 1; Wick irrigation unit-1; Mini models of soil and water conservation structures- 8; Weirs- 5; Core samplers-86; Tube auger -3; Steel moisture can-53 Nos; Soil moisture meter-2; Keen-Raczkowski moisture box-4 Nos; Double ring infiltrometer- 1; Tensiometer-1; Hygrometer-1; Well thermometer-1</p> <p>Lab instruments: Hot plate- 4; KelPlus Automatic N Estimation system- 3; Hand Refractometers- 1; All glass distillation unit (single-1.5 L/hr)-1 Kelplus macro block digestion system-1; Muffle furnace-1 pH meter-1; Digital conductivity meter-1; Electronic weighing balance- 4; Centrifuge- 1; Shaker- 1; Water bath-2; Hot air oven- 5; Soil moisture meter- 2; Reverse osmosis system with filter and storage tank- 2 Nos. Distillation still (Stainless steel) -2; Kjeldahl Distillation Unit (Borosil)-2 ; Mono quartz distillation unit- 1</p>
Entomology	<p>BOD Incubator -1, Autoclave – 1; pH meter – 1, Electronic balance- 1 Potters tower – 1, Digital Camera – 4; Hot Air Oven – 1, Dissection microscope- 3; Stereo Zoom trinocular microscope -1; Stereo binocular microscope- 6; Gel electrophoresis unit -1, LCD projector – 4 Insect boxes – 350, Insect collecting nets – 20; Insect collection big boxes – 10 Bee keeping equipments – 1 set; Sericulture equipments – 1 set Sprayers - 1 of each type; Computer with printer – 1 set Imaging compound microscope 2; Stereo microscope 2, Centrifuge – 1, Refrigerator –3, Electronic weighing balance – 1 ; LCD projector – 1, pH meter – 1, ; Magnetic stirrer – 1, Laminar flow cabinet – 1 ; BOD Incubator shaker – 1, Autoclave – 2, ; Hot air oven – 2, Moisture balance – 1; UV cabinet -2, Double Distillation unit- 1 ; Microwave oven -1; Digital colony counter- 1;</p>

	<p>Tablet friability apparatus- 1; Tablet disintegration apparatus-1; Tablet press apparatus- 1; Capsule filling apparatus -1; pellet making apparatus -1; Temperature control device (Ac)- 2; Humidifier- 1, Air cooler -1; Compound microscope- 2, Stereo microscope- 3 ; Refrigerated Centrifuge – 2, Refrigerator – 3; Electronic weighing balance – 5; LCD projector – 1, pH meter – 1, ; Magnetic stirrer – 1, Laminar flow cabinet – 1 ; BOD Incubator – 1, Vertical Autoclave – 1 ; Hot air oven – 1, Single Distillation unit – 1; Microwave oven- 1, Colorimeter – 1 ; Mini centrifuge- 1, Vortex mixer- 1 ; Abbe Refractometer – 1, LC- MS/MS- 1 ; HPLC- 1, FTIR- 1 ,Fume hood- 1 Sonicator- 2, Incubating shaker- 1 ; Positive pressure processor- 1 Muffle furnace- 1, Deep freezer- 1 ; Nitrogen Evaporator- 1, Water bath- 1, Microtome- 1, Humidifier- 1, ; Honey Processing Plant- 1 LC-High Resolution Mass Spectrometer -1 ; LC-MS/MS- 2, GC-MS -1,GC-MS/MS -1,; GC-3, Turbovap -1,Rotary Evaporator -3; Muffle Furnace-3, Centrifuge -3; Centrifuge refrigerated table top model -2 Centrifuge refrigerated Floor model -1; Homogenizer -3, Electronic Balance - 6; Semi micro analytical balance; Platform shaker-1,Oven-2 Natural convection oven-1; Nitrogen evaporator-1, Elga Water Purifier-1; Funnel Shaker-1, Separatory funnel Shaker-2</p>
Genetics & Plant Breeding	<p>Stereo microscopes – 1; Dissection microscopes –49; Compound microscope - 8; Binocular microscope – 1; Monocular microscope -1; Vertical Deep Freezer – 1; Gel documentation system – 1 nos; Revolutionary table top cooling centrifuge – 1; Refrigerator – 5; Electronic weighing balance – 2; LCD projector – 2; pH meter – 1; Laminar flow cabinet – 2; Hot air oven – 2; UV spectrophotometer – Double Distillation unit – 1; Thermal cycler – 2 Nos; Revolutionary Image Analyzer – 1; Camera lucida – 2; Ocular micrometer-9; Stage micrometer- 1; Moisture testing machine- 1 Micropipette -5; Dissection instruments –9; Electrophoresis tank -1; Spinners -2; Tissue lyser -1</p>
Plant Pathology	<p>Microscope (10); Hot air oven (1); Laminar air flow (2); Microwave oven (1); Induction cook top (2); Pressure cooker (2); Refrigerator (2); Laminar air flow (1); Stereo microscope with image analyzer (1); Binocular microscope with image analyzer (1); pH meter (1); Weighing balance (1); Refrigerator (2); Induction cook top (1) ; Pressure cooker (1); -20 deep freezer (1); Laminar air flow (1); Rack for tissue culture in separate room with AC (1) ; Precision Weighing balance (1); Refrigerator (2); Weighing balance (mg) (1); Microscope (1); Computer system (1); pH meter (1) ; PCR machine (2); Refrigerated Centrifuge (1); Air conditioner (1); Microtome (1); Mini spinner (2); Vortex(1); Geldoc (1); Electrophoresis unit (1); Water bath (1); Refrigerator (1); Laminar air flow(2); Zeiss Fluorescent Microscope(1); Orbital shaker(1); Hot air oven(1); Induction cooker(2); Microwave oven(1); Pressure cooker(2); Compound microscope(2); Autoclave (horizontal) (1); Autoclave (1); Refrigerator (1); Oven (cookies baking) (1); Laminar air flow chamber (1); Microwave oven (1); Induction cooker (1); Rack for tissue culture in separate room with AC (1) ; ELISA washer (1); ELISA reader (1) ; UV trans illuminator (1) ; PCR machine (1) ; Hot air oven (1); Rocker (1) ; Refrigerated centrifuge (1); Magnetic stirrer (2) ; Table top microfuge (1); Hot water bath (1); Precision Weighing balance (1); Weighing balance (1); Horizontal gel unit (1); Vertical gel unit (1); Gel doc (1); Vertical Water distillation unit (2); -80 high efficiency freezer (1); -20 freezer (1); BOD incubator (1); Incubator Shaker (1); Oven for ELISA incubation (1); Monocular Microscope (2); Zeiss Binocular microscope with image analyser (1); Zeiss Stereomicroscope (1); Spectrophotometer (1);</p>

	Ice flaking machine (1); Heat block (1); Microwave oven (1); Refrigerator (3); Computer (1) ; Printer (1)' Desiccator(1); Laminar Airflow Chamber (LAF(2)') Autoclave(2)' Pressure cooker(2), Induction cooker
Soil Science and Agricultural Chemistry	Yoder's apparatus – 2; Single Distillation unit – 3; Double distillation unit-2; Hot air oven – 4 ; Laboratory centrifuge – 1; Mechanical shaker – 4, Pressure plate apparatus – 1, Hot plate – 3, Weighing balance – 7, Deep freezer – 1, Kjelpplus digestion unit – 2, Kjelpplus distillation unit – 2, BOD incubator – 2; pH meter – 4, ; EC meter – 4; Soil thermometer-1; UV-VIS double beam spectrophotometer – 2; Mechanical stirrer – 3, Muffle furnace – 3; Spectrophotometer – 1; Water bath – 2, Automatic N analyzer – 1, ICP OES-1, AAS-1; AAS with graphite furnace – 1, CHNS analyzer – 1, Refrigerator -4; Microwave digester – 1, Refrigerated centrifuge -1, Research microscope -1, Microcontrolled pH meter-1, Flame photometer – 2; Autoclave-1; Laminar air flow chamber-1; Tractor-1; Coir pith briquetting machine-1; Shrink wrapping and sealing machine-1; Electric shredder-1; Electric sieving machine-1; Slurry pump-1; Soil core sampler-1
Agricultural Extension Education	LCD Projector -5; LED TV -3; Television – 1 Visualiser – 2; Overhead Projector – 1; Public address system – 16 speakers 16 microphones; Camera - 1 ; Public address system – 1; Handy cam - 1
Fruit science	Hot air oven (1); Lux Meter (1) Pocket refractometer; Electronic weighing balance (1) microscopes (3); Centrifuge-1 (These are utilized by students for their routine PG practical and thesis works); Digital vernier calipers (1); Water bath (1); Distillation unit (1); Weighing balance (1); pH Tester; Hot air oven (1) ; Microscopes(5); Vernier calipers
Plantation, Spices, Medicinal and Aromatic Crops	Freeze Dryer (1); Double Distillation Unit (1); pH meter (1) ; Conductivity meter (1) ; Digital weighing balance (2); Soxhlet apparatus (3) ; Clevenger apparatus (3); Dissecting microscope (10) ;' TLC kit (1); Cryocan (1); Refrigerator with defreezing facility upto -23 C (1); Binocular microscope (1); Refractometer (1); Vernier Caliper (1) ; Stereo microscope (1); Muffle furnace (1) ; Microwave oven (1); Hot Air Oven (2); Coconut scraper (1); Magnetic stirrer (1); Water bath (1); Micropipette (6); Mixer grinder (1); Heating mantle (8); Battery operated sprayer (1); Knap Sack Sprayer (1) ; LCD projector (2); Water purifier (1); Drip irrigation system (1); Canon Printer (2); Butterfly stove (1); Pressure cooker 20 l (1); Prestige hand mixer (1); Wheel barrow (1); Telescopic pruner (1); Iron shear (1); Sealing machine (1); Multifunction lazer printer (1); Induction cooker (1); Laptop HP (1); Top loading balance 3 kg (1); Budding knife (3); Rose Can (3); Soil thermometer (1); Dry and Wet bulb thermometer (1)
Postharvest management	Laminar air flow (1); Magnetic induction sealer (1); Magnetic stirrer with hot plate (1); Modified Atmospheric Packaging System (1); Microcentrifuge (1); Microwave oven (1); Mixer (2); Moisture analyzer (1); Muffle furnace (2); OTG oven (1); Ozoniser (1); pH meter (1); Precision balance (1); Pulp processor (1); Refrigerator (4); RO water unit (1); Sealing machine (5); Shrink wrapping machine (1); Single distillation unit (1); Soxhlet apparatus (3); Spectrophotometer (1); Spray drier (1); Texture Analyzer (1); Thermohygrometer (1); Thermometer (2) ; TLC (1) ; Vacuum packing machine (1); Vernier caliper (2); Vertex mixer (1); Water activity meter (1); Water bath (2)
Vegetable science	Refrigerator – 3; Soxhlet apparatus- 1; Micro centrifuge- 1 ; Electronic weighing balance – 3 ; LCD projector – 2 ; Hot air oven – 1 ; Purity work

	board- 1; Desiccator- 1; Spectrophotometer- 1; Microscope- 1; Seed vending machine- 1; Distillation unit- 1; Hot plate- 1; Stirrer-1 ; Digital humidity meter- 1; Moisture meter- 1; Mixer grinder- 1; Thermometer- 1; Digital pH meter- 1; Moisture meter- 1; Photostat machine- 1; Computer desktops- 4; Laptop- ; Scanner- 1; Garden tools ; Garden secateur- 3; Garden shears- 2; Hand cultivator- 2; Pick-axe- 1 ; Crow bar- 1; Pruning saw- 1; Garden rake- 1; Showel- 1; Spade- 3; Rose can- 2; Sickle- 1; Garden sword- 1; Garden fork- 1; Trowel- 1; Wheel barrow-1; Budding knife- 30
Agricultural Statistics	Air Conditioned Computer LAB with No. of Computers -27 No. of Printers-3 No. of Internet Connection-3 K-phone (10 mb/s), Asianet (300 mb/s), BSNL(300 mb/s)
Community science	Glass and Quartz single water distillation unit (4 Ltrs/hr) with water circulation recycling unit 03 Digital pH Meters with combined electrodes and Thermo probes 01 Hot Water Bath 01; Horizontal shaker 01; Digital Flame Photometer assembly 02; Refrigerator 01; OTG Oven01 Mixers 01; Foil sealer & Hot gun 02; Band sealer 01 Tube sealer 01; Cling film wrapper 01; Paste cream filler 01 Fruit pulper 01; Deep freezer 01; Hot air oven 01 Atta kneader 01; Automatic namkeen machine 01 Water still 01; Protein analyser 01; Electric drier 01 Spectrophotometer 01; Electronic balance01; Microwave oven 01
Microbiology	Autoclave – 4; Laminar Air flow chamber – 4; Hot air oven – 2; Incubator – 3; Fermentors – 4; Deep Freezer – 2 ; Refrigerated Centrifuge – 2; UV Spectrophotometer – 2; Incubator shaker – 2 ; Water Bath – 3; Shaking water bath – 1; Shaker – 2; Electronic weighing balance – 3; Student Microscope Monocular – 19; Stereo Zoom Microscope – 1; Trinocular light Microscope with camera – 2; Phase contrast/Dark field Microscope – 2; Lyophilizer – 1; Rotary Evaporator – 1 no. Gel electrophoresis unit – 2; LCD projectors – 2; Smart board – 1; pH meter – 2; Magnetic stirrer – 2; Vortex mixer – 2; Distillation units – 3; Microwave oven – 2; BOD incubator – 1 no.
Molecular biology and biotechnology	Autoclave horizontal, Laminar airflow chamber; Benchtop Refrigerated Centrifuge, Incubator shaker, Hot air oven, Microwave Oven ; pH meter, Electronic Balance, Vortex machine; Water bath, Minispin centrifuge, Vacuum Concentrator, Magnetic stirrer, Trans illuminator, Gel documentation system , Double distillation unit, Electrophoresis unit, Micropipettes, -800C Deep freezer, -200C Deep freezer, PCR machine, Refrigerator; Real-Time PCR -1; Soxhlet Apparatus-1; Glass bead sterilizer-1; Monocular microscope -1; Inverted microscope-1; Stereo microscope- 1; Culture racks-10; Gene gun-1; Biosafety cabinet class II- 1; CO ₂ incubator-1; Filter sterilization unit- 1
Nematology	Stereomicroscope with image analyser (4); Trinocular Research microscope (2); Accelerated solvent extraction unit (1) ; BOD incubator (2), ; Double distillation unit (2); Refrigerated centrifuge (2) ; Vacuum flash evaporator (1) Nitrogen evaporator (1); Laminar flow chamber (2) Electronic precision balance (2); Hot air oven (2); Micro wave oven (2); Refrigerator (2); Waterbath (2); Hotplate with magnetic stirrer (2); LCD projector(1)
Plant Physiology	Vortex Mixer – 1; Stereo microscope – 1 ; Digital microscope – 1 ;

	Gel documentation system – 1; Trinocular Research Microscope-1 ; Deep freezer – 1; Centrifuge – 2 ; Refrigerator – 2; PCR machine- 1 nos ;PCR machine (gradient)- 1; Microwave oven- 1; ELISA plate reader-1; CO ₂ Gas Analyzer with Data Logger-1; Electronic weighing balance – 2 ; Mini Vacuum Cleaner – 1; pH meter – 2 ; UV/VIS Spectrophotometer – 1; Scanning Visible Spectrophotometer– 1; Laminar flow cabinet – 1; Incubator – 3; Hot air oven – 1; Distillation unit with Quartz Condenser: Borosil – 1
Seed science & Technology	Microscopes (2 nos); Boerner divider ; Digital moisture meter (2 nos) ; Refrigerator; Electrical conductivity meter ; Purity work board ; Hot air oven ; Seed germinator unit; Double distillation unit ; Electronic weighing balance (2 nos); Thermal cycler; Refrigerated Centrifuge; Gel Documentation System; Gel Electrophoresis Units (4 numbers); Microwave oven ; Stereo microscope
Animal Husbandry	Milking machine -1; Artificial insemination gun-1; Grooming instruments -1 each; Probang-1; Hot air oven-1; Laminar air flow cabinet-1; Incubator-1; Burdizzo castrator-1; Gerber Centrifuge-1; Electric dehorner-1; Ear tagging forceps-1; Ear tattooing forceps-1; Branding iron rod-4, ; Vaginal speculum-3; Bull holder-1; Anti-kicking device-2
Agricultural Engineering	Smooth Plane ; Saw Rip 26" (680/6); Socket Spanner Set (750/15) ; Lathe Bench; Bench Grinder (750/3); Double End Spanner Set; Depth Gauge Micrometer; Screw Pitch Gauge; Wooden Mallets; Micrometer M & W 0 to 1"; Circular Saw Machine; 18" Tong; Soldering Iron; Curved Tin Snip; Straight Tin Snip; Caliper Firm Joint Outside 4" Size ; Flat File Battered 6"; Flat Smooth 8" file; Square File 8"; Half Round File 6"; Half Round File 12"; Round File 6"; Round Files 12"; Hack Saw Frame 12"; Speed Indicator; Black Smith Vice 3½"; Unserviceable; Seed Drill; Rocket Arc Welding Transformer 5 p; Earth Marker Rammer Accessories; Slide Rule; Otto Frame Accessories ; Otto Frame (Universal); Quick Attachable Wooden Seat; Linkage with 2 Quick Hitches; Otto Disc Plough - 18"; Otto Cultivator - 4'; Otto Levelling Blade - 4'; Otto Cart Attachment; Wetland Puddler - 2 Disc ; Wetland Puddler - 3 Disc; Cow Dung Gas Plant; 3" Pipe Cutter; Band Saw Machine; 6" File Smooth Half Round; Sheet Gauge; Pulley Block 1 Tonne; Socket Wrench 1-11/2" etc; Nose Pleir 6"; Feeler Gauge (15 blades); 1" Wood Working Chisel; Four Fold Scale; Carpenter Vice Jaw Opening 6"; Hot Chisel ½"; Hammer; Power Hack Saw Machine with 6" without Motor; Ring Spanner; Leg Vice 8"; Villies P/K Engine Driven Pump Set; Surface Gauge; Dial Thickness Gauge (Plate Gauge) Pipe Bending Machine 3/8", ½", " , 1", 1 1/4", 1 1/2", 2.21/2" ; Mechanics Vice; Combination Set; Wood paining machine ; Pipe Die Set ¼" to 1"; Pipe Die Set 1" to 2" ; Spring Balance Circular Dial Type 10 kg; Spring Balance Circular Dial Type 100 kg; 1" Cup Electric Drill; Orbital Sander; Portable Electric Saw; Electric Disc Grinder Set; Number Punch; Pipe Vice 3" ; Sledge Hammer; Blacksmith Tongs; Ball Peen Hammer - ½ lb; Bal; Peen Hammer - 1 lb; Knife Double Blade; Hansa Steel Files (Square) - 6"; Hansa Steel Files (Square) - 8"; Lead Cutting Knife; File Rasp Cabinet - 8"; Hammer - ½ lb; Pincer - 6"; Pin Punch - 4"; Screw Driver - 150 mm; Adjustable Block Plane (680/3); Chisels (750/id) ; 1½ lb Hammer; Sledge Hammer 14 lb; Power Tiller Operated Terrace Cum Leveler; Power Tiller Operated Auger Digger; Power Tiller Operated Basin Lister; Power Tiller Operated Boom Sprayer with Pump ; KAMCO Power Reaper; Palm Climber; 1 lb Hammer; 12" Round Tong ; Loaded Cultivaor; Seed Drill Mounted on 9 Tyne Spring; Honda Brush Cutter; Drip Irrigation System; KAMCO Power Tiller; KAMCO Garden Tiller; Mini Lawn

	<p>Mover; Hedge Trimmer; Tree Pruner ; Adjustable Pole Pruner - 6.5 m; Hook Pole Set; Fruit Plucker ; Adjustable Professional Telescope Arm; Blade; KISS – Lopper; Adjustable Long Reach Pruner; KISS-Tree Pruner; Automatic Irrigation System; Oleomac Lawn Mover; Kisan Craft Pole Tree Pruner; Survey Equipment-4 Items; Sprinkler Heads and Garden Tools; Hydrometer ; Flow measuring device; Solar power plant; Tractor with rotavator ; Electrostatic sprayer; Seed Dressing Drum; Disc Harrow; Disc Plough; Cultivator; Tractor Cage Wheel; Power Tiller Cage Wheel; Mould Board Plough; Plane Hoe; Fork Hoe; Star Weeder; Peg Weeder Holder Weeder; Japanese Weeder; Draw Weeder; Push Pull Weeder Weeder Hoe; Microwave oven; Fluidized bed dryer; Refrigerator Table top General Vacuum Oven Centrifuge with Hand Refractometer and Infra Red Moisture Balance; INDOSAW Paddy Dehusker; Rice Sizing Device; Lab Model Rice Polisher; Coefficient of Friction Apparatus; Angle of Friction Apparatus; Penetration Force Apparatus Angle of Repose Apparatus; INDOSAW Digital Moisture Meter; Welding Hand Shield; Electronic balance; Paddy thresher(motorized) Model of Petrol engine (2 stroke and 4 stroke); Model of diesel engine Model of carpentry joints; Model of bevel gear; Kisan 1 litre Sprayer Kisan 8 litre Plastic Sprayer; Kisan 9 litre Brass Sprayer; ASPEE Power Sprayer; Oleomac Duster Sprayer; Coconut Climber Sitting Type; Coconut Climber Ordinary Type; Coconut Climber Kera Sureksha; Aluminium Ladder; Hand Drilling Machine; Coconut Dehusker Falcon FHS 888 Shear; Falcon FHS 999 Shear; Rose Cutter Falcon Major; Rose Cutter Falcon Regular; Honda Garden Tiller; Pressure Water Jet; Chain saw; Power operated post hole digger; Micro irrigation system; Spade; Pickaxe; Model of biogas plant (Fixed dome and floating); Hair hygrometer</p>
<p>Physical education</p>	<p>Air pump-1; Ball carrying net-2; Tennis ball-18; Batting pad-3; Shuttle bat-10; shuttle cock- 36; Football-15; Volleyball-11; Basketball(7)-12; Basketball (6)-4; Throw ball- 2;m Table tennis ball- 30; Shuttle bat (silver)-4; volleyball net-1; Throw ball net-1; Cricket stump-3; measuring tape (110m)-1; corner flag-4; whistle-4; Goal keeper gloves-1; Twisger-1; Table tennis table-1; Wicket keeper pad-1;mWicket keeper gloves-1; Cricket ball-12; Table tennis bat-1; TT ball-5 set; Weighing machine-1; Cricket bat-1; Batting glove-1; Helmet-1; Thigh pad-2</p>



COLLAGE OF EQUIPMENTS IN LABS

6.4.4.4 Theory and practical batches

The theory batch includes three units of 50-60 students/ batch and practical's are conducted as 6 units of 25-30 students.

6.4.5. Conduct of Practical and Hands-on-Training

Each batch of UG students is divided into 6 practical batches and the practical sessions of 2 hours are conducted in individual departments in the labs/ field. The students are provided with practical manuals and the completed practical records are submitted at the time of final practical examination. The facilities under the Instructional Farm in the campus are utilized for conduct of field practical exercises. The experiential learning module is an excellent opportunity for the student to acquire hands-on practice of various skills.

Department of Agronomy- Department provides a robust and diverse practical training curriculum for undergraduate students. Divided into six practical batches, students undergo two-hour practical sessions in labs/fields during even semesters (2nd, 4th, 6th, and 8th). The Instructional Farm facilitates hands-on



field exercises. The curriculum covers crop identification, seed analysis, herbicide application, and various agronomic practices. Fundamental courses entail hands-on experiences in tillage, soil moisture estimation, and irrigation techniques. Work experience courses involve extensive field training in crop production, including hands-on activities in rice cultivation, post-harvest operations, and marketing. Through a well-structured set of courses, including work experience, ELCP, associated courses, RAWE modules, and ELCP, students acquire hands-on skills in crop identification, weed preservation, germination testing, field practices, and the use of agricultural implements. The department emphasizes practical training in soil moisture estimation, irrigation techniques, and crop production, including extensive field experience in raising various crops. Work experience courses involve students in farm operations, from seed procurement to post-harvest and marketing. Additionally, the RAWE module on watershed management and analysis, as well as ELCP, focuses on GIS software, data analysis, seed production, and organic farming, ensuring students are well-equipped with a comprehensive skill set for success in agronomy.

Department of Entomology- Students receive comprehensive practical training with a focus on the detailed identification and familiarity with significant insect orders and families. The

curriculum places a strong emphasis on equipping students with the skills necessary for the identification of crop pests and the formulation of effective management strategies. Practical sessions extend to hands-on training in mass culturing of microbial biocontrol agents and apiculture. Students undergo superior training in understanding and utilizing beneficial insects, including pollinators, parasitoids, predators, and silkworms. Additionally, the program ensures students are adept at identifying and managing non-insect pests, further enhancing their practical expertise in the field of entomology.

Department of Plant Pathology- ensures a hands-on learning approach with a practical batch strength of 28 students per batch. All courses integrate field-oriented practical sessions, spread over four to five days a week for B.Sc. (Hons.) Ag. students, divided into six batches each year. An ELPT course on Mushroom cultivation and value addition, along with the detection and management of plant pathogens, is offered as part of the undergraduate program. The practical training's nature varies based on coursework and discipline, leveraging the expertise of faculty, farm staff, and instructional farm facilities. Practical manuals, continually revised with syllabus changes, are distributed to students during course registration, and smart classrooms are employed for procedural illustration and technology demonstrations. Students submit records based on practical class sessions, evaluated by course teachers, with practical examination marks encompassing both record submissions and class performance. This structured approach ensures a comprehensive and dynamic practical learning experience in Plant Pathology.

Department of Genetics & Plant Breeding- Undergraduate students engage in a diverse range of practical activities related to plant breeding. The overarching goals and guiding principles of genetics and plant breeding are briefly outlined, emphasizing the concept of selecting parent plants with desirable traits for genetic improvement. Students are taught the significance of genetic diversity research in breeding initiatives. Practical sessions cover taxonomy and dissection of floral parts for both self-pollinated and cross-pollinated crops. The importance of designing and laying out breeding plots in the field is demonstrated, with discussions on replication and randomization in experimental design. Breeding techniques are explored, including controlled pollination methods, bagging, and emasculation to prevent unwanted pollination. Strategies to avoid cross-contamination between different pollinated crops are explained, along with considerations of physical barriers, distance, and timing of flowering. Students are introduced to various methods for evaluating quantitative and qualitative traits using tools like rulers, weighing balances, and scoring systems for trait assessment. Training includes the significance of accurate record-keeping and the application of different statistical methods for data analysis and interpretation. The department's practical

sessions provide students with invaluable hands-on experience in the field of genetics and plant breeding.

Department of Agricultural Extension Education- focuses on providing hands-on training to undergraduate students, preparing them as effective extension personnel for the future. The curriculum encompasses practical elements such as program planning, encouraging students to organize events for the farming community, and developing feasible business plans. Additionally, students gain practical experience in conducting method demonstrations and creating various audio-visual aids, including charts, models, presentations, flashcards, and posters. Exposure is provided in writing for farm families through articles in magazines, leaflets, pamphlets, booklets, and bulletins. Familiarity with Participatory Rural Appraisal tools, including mapping, transect walks, matrix ranking, and seasonality calendars, enables students to prepare development plans for Panchayats. The



PARTICIPATORY RURAL APPRAISAL

department organizes study tours and exposure visits to rural development institutions, Panchayat Raj offices, Krishi Bhavan, veterinary offices, Kudumbasree units, SHG groups, Krishi Vigyan Kendra (KVKs), NGOs, research institutes, and more. Practical exercises involve visits to Panchayaths for Participatory Rural Development and different villages for Program Planning activities. The program also explores the potential of mass media in agricultural information dissemination through visits to Farm Information Bureau, All India Radio Station, Chithranjali Studio, Dooradarshan Kendra, and other media outlets. Regular visits were organized for students to Progressive Farmers' fields that enabled exposure to field realities and innovative farming methods, while

Students were also given opportunity to participate in different Agricultural Exhibitions, Seminars, Workshops etc organised as part of Vaiga, to accompany expert team for mega field visits as part of Krishi darshan programme, organised by Department of Agricultural Development and Farmers' Welfare. Participation in agricultural exhibitions, seminars, workshops, and field visits further enriched students' practical knowledge. In the evaluation process, students participate in practical class sessions, submit records documenting their hands-on experiences, and have their work assessed by the course teacher. The practical examination marks are a composite of the scores obtained for the submitted records and the

overall performance demonstrated during class sessions. This comprehensive evaluation method ensures a thorough assessment of students' practical skills, understanding, and application of the subject matter in Agricultural Extension Education.

Department of Agricultural Meteorology- In the first semester, the department provides a foundational course in Agrometeorology, acquainting students with the working principles of instruments used in meteorological studies. Students receive hands-on training in recording weather observations, and the inferences drawn from these observations are applied at the field level. The practical sessions are organized into six batches, ensuring each student has the opportunity to handle the instruments.

Department of Nematology- The practical aspects of Nematology include a range of activities such as the extraction of nematodes from soil and plant tissues, staining, fixing, counting, making permanent mounts of nematode specimens, estimation of nematode population, and disease diagnosis of nematode-infected crop plants. Hands-on training is provided to all undergraduate students, covering various aspects of nematology, including the development of management options for nematode diseases. Trained faculty from other State Agricultural Universities and scientific organizations contribute by delivering specific hands-on training on crucial practical classes.

Department of Plant Physiology- Practical classes in Plant Physiology follow internationally accepted and standardized procedures for estimating parameters related to various physiological processes and functions influencing the growth and development of plants/crops. Students gain practical insights into fundamental concepts such as plant water relations, mineral nutrition, soil-plant-environment interactions, and hormonal regulation of plant growth and development. The classes also involve the handling of various equipment, including centrifuges, spectrophotometers, and advanced systems like Portable Photosynthetic systems, enabling students not only to acquire knowledge but also to apply this information at the field level.

Department of Seed Science & Technology- The department offers facilities for practical sessions for postgraduate students in Seed Science & Technology. With a net house facility and field resources, students receive hands-on training in various seed quality analyses, including germination percentage, moisture content, electrical conductivity, and physical purity analysis. Training also covers the use of equipment such as moisture meters and genetic purity analysis using DNA fingerprinting in the molecular biology lab. The planning of a new lab in an upcoming project aims to provide additional facilities for students in this field.

Department of Post-harvest Management- B.Sc. (Hons.) Ag. students undergo practical sessions in six batches throughout the week. Students submit records based on the practical classes, which are evaluated by the course teacher. Practical examination marks encompass both record performance and in-class work. Students gain exposure to advanced processing and packaging equipment in the commercial processing unit and Incubation Centre, enhancing their understanding of advanced processing techniques.

Department of Plantation, Spices, Medicinal & Aromatic Crops- Students receive hands-on training in various horticultural techniques applicable to Plantation, Spices, Medicinal, and Aromatic Crops. The department provides facilities for diverse practical experiments, covering aspects such as familiarization and identification of important crops, floral biology, morphological studies, varietal studies, spacings and planting systems, and nursery management. Students are also trained in propagation methods and extraction techniques of spices, medicinal, and aromatic plants.



HANDS ON PRACTICAL EXPERIENCE

Department of Soil Science and

Agricultural Chemistry - Thorough hands-on practical experience is provided to students in soil, plant, water, fertilizer, and manure sample analysis. Pedological and soil mineralogical studies take place in the Soil Museum (Pedonarium). Students work with GIS software in the GIS Lab, utilizing the 26

desktop computers available. Exposure visits to locations like Thumba Equatorial Rocket Launching Station and Vikram Sarabhai Space Centre enhance students' understanding. They learn soil test-based fertilizer recommendation techniques, organic farming, and solid waste management practices through practical training. Production technology for various organic manures is acquired through hands-on practice, and students explore different ecosystems during the Environmental Studies course, visiting locations such as Vellayani Lake and Munnar.

6.4.6. Supervision of students in PG/Ph.D programmes

All the faculty members are involved in supervising M.Sc. and Ph.D programmes besides UG teaching.

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Agricultural Extension Education The students reported that the practical sessions and exposure visits conducted as part of the practical sessions helped them in understanding the

field realities and problems. The eight modules on various aspects of Extension, conducted as part of the RAWE programme provided the students with a multidimensional view of the Agricultural scenario in the state. They opined that this prepared them for future employment in the field.

The parents were appreciative of the field exposure and attachment trainings given to students and opined that this served to prepare them for jobs in the sector. This also provided them information on the possible job opportunities in the sector.

The industrial attachment as part of the student ready programme also helped the department in garnering positive feedback from the industries. They opined that they could obtain information and advisory on the emerging techniques in agriculture and in few cases, also explored the possibility of employing the students with the right kind of aptitude for their agri-business.

The farmers also were appreciative of the students for their support and advisory services provided during their attachment trainings and the various modules of the RAWE programme such as the Progressive farmer attachment training, Village stay programme, Krishi Bhavan training etc.

Agricultural Meteorology: The feedback from students were collected using Google forms at the end of the course gaining meritorious responses from the students. They acknowledge the teacher -student interactions, topic presentations, organised mode of lectures. Most of students wish to pursue this subject for their higher studies.

TSS: Over the past few years, Training Service Scheme, Vellayani,(TSS, Vellayani) has been at the forefront of organizing diverse and impactful training programs catering to a wide range of beneficiaries, including farmers, students, extension functionaries, entrepreneurs, labourers, and university staff. The programs on Cake & Wine Making, Budding, Grafting, Layering & Terrarium Making, Fruit & Vegetable Processing, and Gardening, Landscaping & Micro Irrigation Techniques received positive responses but consistently emphasized the requirement for more practical classes and extended duration. The Agripreneurship Orientation Program on Cake & Wine Making saw trainees expressing readiness to sell their products, again highlighting the need for a platform and participants expressed intentions to commercialize their ventures, showcasing the practical relevance of these initiatives. Participants appreciate the content and delivery of the programs but express a desire for deeper knowledge through extended durations, and more hands-on experiences. This

feedback not only underscores the success of the training initiatives but also provides valuable insights for the future planning and execution of training programs at Kerala Agricultural University.

6.4.8. Student intake and attrition in the programme for last five years

The details are as follows

Table 7. Student intake and attrition 2019 to 2023 admission

B.Sc. (Hons.) Ag	2019	2020	2021	2022	2023
Student intake	160	173	177	175	176
Attrition	3	5	8	9	0
Attrition %	1.88	2.89	4.52	5.14	0

6.4.9. ICT Application in Curricula Delivery

There are 4 Smart classrooms with interactive board and 6 with LCD, WiFi and AV in the college.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and PhD Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12 Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college, and degree awarding university.

Appendix. I.a.

UG Syllabus B.Sc. Hons. (Ag.) : 2016 Syllabus

1. Agronomy

Course no.	Title of the course	Credit
Agro 1101	Fundamentals of Agronomy	2 + 1
Agro 1102	Agricultural Heritage (Remedial) (Agronomy & Agrl. Extension Education)	1 + 0
Agro 1203	Irrigation and water management	1 + 1
Agro 2104	Crop Production Technology – I (Cereals, millets, tuber and fodder crops)	1 + 1
Agro 2205	Crop Production Technology –II (Pulses, oilseeds, sugar and fiber)	1 + 1
Agro 3106	Farming system and sustainable agriculture	1 + 0
Agro 3107	Practical Crop Production –I (Rice and Tuber crops)	0 + 2
Agro 3208	Practical Crop Production –II (Pulses and oilseeds)	0 + 1
Agro 3209	Rainfed Agriculture and Watershed Management	1 + 1
Total		8 + 8 = 16

2. Agricultural Meteorology

Course no.	Title of the course	Credit
Agmt 1101	Introductory Agro - meteorology & Climate Change	1 + 1
Total		1+ 1=2

3. Soil Science and Agricultural Chemistry

Course no.	Title of the course	Credit
Ssac 1101	Fundamentals of Plant Biochemistry	1 + 1
Ssac 1102	Fundamentals of Soil Science	2 + 1
Ssac 1203	Manures, Fertilizers and Soil fertility management	2 + 1
Ssac 2104	Environmental Studies & Disaster Management (SS & AC & Agrl. Meteorology)	1 + 1
Ssac 2205	Principles of Organic Farming (SS & AC & Agronomy)	1 + 1
Ssac 2206	Problem soils and their management	2 + 0
Ssac 3107	Geoinformatics, Nanotechnology and Precision Farming (SS & AC and Agronomy)	1 + 1
Total		10+ 6 = 16

4. Microbiology

Course no.	Title of the course	Credit
Micr 2101	Agricultural Microbiology	2 + 1
Total		2 + 1 = 3

5. Genetics and Plant Breeding

Course No.	Title of the course	Credit
Pbgn 1101	Fundamentals of Genetics	2 +1
Pbgn 1202	Fundamentals of plant Breeding	2 +1
Pbgn 2103	Crop improvement I	1 +1
Pbgn 2204	Crop improvement II	1 +1
Pbgn 3205	Intellectual Property Rights	1 +0
Total		7+ 4 = 11

6. Seed science Technology

Course No.	Title of the course	Credit
Sdtec 3201	Principles of Seed Technology	2 + 1
Total		2 +1 = 3

7. Horticulture

Course No.	Title of the course	Credit
Hort 1101	Fundamentals of Horticulture	1+ 1
Hort 2102	Production Technology for Plantation crops	2 +1
Hort 2203	Production Technology for Spices, Medicinal and aromatic plants	2 +1
Hort 2204	Production Technology for Vegetable crops	2 +1
Hort 3105	Production Technology for Fruit crops	2 +1
Hort 3106	Post – Harvest Management and value addition of horticultural crops	2 +1
Hort 3207	Landscaping and ornamental horticulture	1+ 1
Total		12+7=19

8. Entomology

Course No.	Title of the course	Credit
Ento 1201	Fundamentals of Entomology	2+ 1
Ento 2102	Insect Ecology and Integrated Pest Management	2 +1
Ento 2203	Pests of crops and their management I	1 +1
Ento 3104	Pests of crops and their management II	1 +1
Ento 3205	Management of beneficial insects and non insect pests	1 +1
Total		7+ 5 = 12

9. Nematology

Course No.	Title of the course	Credit
Nema 3201	Plant parasitic nematodes and their management	1 + 1
Total		1 +1 = 2

10. Plant Pathology

Course No.	Title of the course	Credit
Path 1101	Fundamentals of Plant Pathology	2 + 1

Path 2102	Principles of integrated plant disease management	1 + 1
Path 2203	Diseases of crops and their management I	2 + 1
Path 3104	Diseases of crops and their management II	2 + 1
Total		7 + 4 = 11

11. Plant Physiology

Course No.	Title of the course	Credit
Crps 1201	Fundamentals of Crop Physiology	2 + 1 = 3
Total		2 + 1 = 3

12. Agricultural Statistics

Course No.	Title of the course	Credit
Stat 2101	Agri - Informatics	1 + 1
Stat 3202	Statistical methods and applications	2 + 1
Total		3 + 2 = 5

13. Agricultural Engineering

Course No.	Title of the course	Credit
Engg 1201	Soil and Water Conservation Engineering	1 + 1
Engg 2102	Farm Machinery and Power	1 + 1
Engg 3103	Protected Cultivation and Secondary Agriculture	1 + 1
Engg 3204	Renewable Energy and Green Technology	1 + 1
Total		4 + 4 = 8

14. Agricultural Economics

Course No.	Title of the course	Credit
Econ 1201	Fundamentals of Agricultural Economics	2 + 0
Econ 2102	Agricultural Finance and Co-operation	1 + 1
Econ 3103	Farm Management, Production and Resource Economics	2 + 1
Econ 3204	Agricultural Marketing, Trade & Prices	2 + 1
Total		7 + 3 = 10

15. Animal Husbandry

Course No.	Title of the course	Credit
Anhs 1201	Livestock and Poultry Management	1 + 1
Total		1 + 1 = 2

16. Agricultural Extension Education

Course No.	Title of the course	Credit
Extn 1101	Rural Sociology & Educational Psychology	2+0
Extn 1203	Fundamentals of Extension Education and Rural Development	2+1
Extn 2204	Communication Skills and Personality Development	1+1

Extn 3105	Entrepreneurship Development and Agricultural Extension Management	1+1
Total		6+3=9

17. Home science

Course No.	Title of the course	Credit
Hmsc 3201	Principles of Food Science & Nutrition	2+0=2
Total		2

18. Molecular Biology & Biotechnology

Course No.	Title of the course	Credit
Biot 2201	Fundamentals of Plant Biotechnology	2+1
Total		2 + 1 = 3

17. Non- Gradual Courses

Course No.	Title of the course	Credit
Extn 1102	Human Values & Ethics	1+0
Engl 1101	Comprehension & Communication Skills in English	0+1
Nsnc 1101	NSS/NCC	0+1
Peyp 1201	Physical Education & Yoga Practices	0+1
Etur 3201	Educational Tour I (All India)	0+1
Etur 4102	Educational Tour II (All Kerala along with RAWE)	0+1
Total		1+5=6
RAWE + ELP (Student READY)		20 + 20 = 40
Grand Total		144+20+20=184

VII Semester		
Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE & AIA) (STUDENT READY)		
Activities	No. of weeks	Credit Hours
General orientation & On campus training by different faculties	1	14
Village attachment	8	
Unit attachment in Univ./ College. KVK/ Research Station Attachment	5	
Plant clinic	2	02
Agro-Industrial Attachment	3	03
Project Report Preparation, Presentation and Evaluation	1	01
Total weeks for RAWE & AIA	0+20	0+20
Etur 4102 – Educational Tour II (All Kerala) (Non Gradual)	0+1	0+1
Total	0+21	0+21

VIII semester. Experiential Learning			
Sl. No.	Catalogue No.	Courses	Credit hrs
Crop production			
1.	Elcp 4201	Seed production technology	0+10
2.	Elcp 4202	Soil, plant, water and seed testing services	0+10
3.	Elcp 4203	Hybrid seed production technologies	0+10
4.	Elcp 4204	Agriculture waste management	0+10
5.	Elcp 4205	Organic production technology	0+10
6.	Elcp 4206	Quality assurance of manures, fertilizers and agrochemicals	0+10
7.	Elcp 4207	Commercial production of seeds of pulses and forage legumes	0+10
8.	Elcp 4208	Seed and seedling production of vegetables	0+10
Crop protection			
1.	Elpt 4201	Bioagents and biofertilizer production	0+10
2.	Elpt 4202	Mushroom cultivation	0+10
3.	Elpt 4203	Beekeeping	0+10
4.	Elpt 4204	Detection and management of plant pathogens	0+10
Horticulture			
1.	Elht 4201	Floriculture and landscaping	0+10
2.	Elht 4203	Commercial vegetable production	0+10
3.	Elht 4204	Nursery management	0+10
Post harvest technology and value addition			
1.	Elht 4202	Food processing and food safety standards	0+10
Social Science			
1.	Elab 4201	Agri-business management	0+10
2.	Elss 4201	Agro-Advisory Services	0+10
3.	Elss 4202	Agricultural information support services	0+10
Molecular Biology & Biotechnology			
1.	Elbt 4201	Tissue culture technologies	0+10
2.	Elbt 4202	Molecular diagnostics	0+10
Total			20 (0+20)
Grand total			158+1+5



“Self study report (SSR) of College of Agriculture, Vellayani”

2019 - 2023

M.Sc & Ph.D



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**COLLEGE OF AGRICULTURE
VELLAYANI
SELF STUDY REPORT FOR ACCREDITATION
2019 - 2023**

Degree Programme : M. Sc. (Agri.)

**FACULTY OF AGRICULTURE
KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI
THIRUVANANTHAPURAM- 695522
KERALA, INDIA**

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Degree Programme: M.Sc. (Agri.) Agronomy

PG Laboratory facilities



Equipments



Ultra probe sonicator



Spectrophotometer



Laminar air flow chamber



Flame photo meter



Muffle furnace



Hot air oven



N distillation unit



BOD Incubator



Lux meter



Soil moisture meter

6.4.1. Brief History of the Degree Programme:

The Department of Agronomy had its inception in 1955 along with the formation of the then Agricultural College and Research Institute. The Master's Degree in Agronomy [MSc (Agri.) Agronomy] is being offered by the Department since 1961. The Department of Agronomy is upholding a history of excellence in teaching and conducting research on farmer centric agronomic issues with concomitant efforts to bridge the gap between the farmers and scientists through extension activities. The faculty of this major Department is engrossed in guiding the research of Master's Degree students in diverse fields such as crop husbandry of major crops such as rice, pulses and millets, weed management, water management, watershed management, cropping system's research, organic production etc. The Master's Degree programme was conducted based on the ICAR syllabus-2009 till 2021 admission and thereafter the revised PG syllabus is being followed.

Objective

- ♥ To impart quality education to post graduate students in the discipline of Agronomy to strengthen their career as Agronomists in various sectors by securing high positions in competitive examinations and eligibility tests
- ♥ To equip the post graduate students to formulate the research projects and conduct independent research in the field of Agronomy
- ♥ To strengthen the capability of the post graduate students in technology development, development of products and services related to agronomic management.
- ♥ To transform the post graduate students as technology managers enabling them to serve the farmers with plant tissue and soil diagnostic services, weather based advisory services and recent advanced techniques such as IoT and GIS

Accomplishments of M.Sc.(Agri.) Agronomy Programme at a glance		
Batches of students passed out so far	:	58
Number of students passed out so far	:	279
Number of students passed out during the assessment period	:	66
Number of students secured placement as faculty in the University	:	0
Number of students secured job in Govt./Private sector during the tenure	:	6
Number of students pursuing Ph. D with SRF	:	1
Number of students currently in roll and pursuing the PG programme	:	49
Number of PG students secured ICAR/UGC NET during assessment period	:	28
Number of PG students secured the best paper/poster/E-article title during assessment period	:	7
Number of Faculty secured National titles of best paper/Oral Presentation	:	3
Number of Faculty selected as Editor/Associate Editor of National Publications	:	1

Number of Faculty functioned as Nodal Officers of Agriculture Knowledge Centres of Department of Agriculture during assessment period	:	4
Total number of trainings organized by the Department during assessment period	:	40
Number of capacity building and training provided to PG students	:	4
Number of capacity building and trainings attended by the PG students	:	4
Number of PG students who attended capacity building and trainings	:	113
Number of times the Department has won the “Best Department” title so far	:	9
Number of best teacher awards won by faculty of the Department	:	1
Number of software developed by the department	:	1
Number of patents obtained	:	3

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of Agronomy. A brief account of the major accomplishments made out of M.Sc.(Agri.) Agronomy research programmes under various thrust areas are presented below.

Weed Management

- The Wheel Hoe Weeder fabricated during PG research obtained certificate of registration of design (Design No. 346280-001 dtd. 14.07.2021) and approved for technology transfer
- Studied and standardized the weed management of summer groundnut, sesame, *Setaria barbata* in upland rice, bajra Napier hybrid, bush type vegetable cowpea, okra
- Explored the possibility of bio utilization of water hyacinth and allelopathy-based bio-synthesized nano particles

Nutrient Management

- The Seed cum Fertilizer drill fabricated from PG research obtained Certificate of Registration of design (Design No. 359570-001 dt. 28.02.2022)
- Standardized the Integrated Nutrient Management (INM) for baby corn, sorghum, finger millet, upland rice, black gram
- Developed pelleted organo- mineral fertilizer and studied its effect on baby corn
- Established the role of nano -N supplemented with potassium in achieving N economy in rice, Zn fertilization in rice, and beneficial influence of PPFM in aerobic rice.
- Field validated the efficacy of liquid consortium biofertilizer in cassava

Water Management

- Established the drought stress mitigating effect of *Piriformospora indica* in rice

- Studied the effect of micro irrigation and mulching for yield optimization of bhindi under protected structure, tomato under rain shelter condition
- Identified wicking bed irrigation as a suitable method of irrigation in tomato

Agro techniques

- Standardized the agro techniques of spinach beet, *Rakthasali* rice, *Desmodium gangeticum*, fodder oat for the hilly tract.
- Standardized the hydroponics fodder production technology, seed invigouration for yield enhancement in grain cowpea, agro techniques for yield maximization in bush type vegetable cowpea

Cropping Systems Research

- Studied the feasibility of intercropping finger millet with pulses, baby corn with vegetables, red gram based systems for lowlands, finger millet and cowpea as intercrops in coconut garden

Department of Agronomy at a glance (2019-23)	
ICAR Schemes.	: 0
National Projects	: 0
External Aided Projects	: 0
State Plan Projects	: 19
Industry linked projects and consultancy	: 0
Publications	: With NAAS rating above 5 - 65 With NAAS rating below 5 - 33 Without NAAS rating -25 Book/Book chapters by faculty: 4 Proceedings/abstracts by Faculty:19 Popular articles/leaflets/booklets by Faculty:24 Proceedings/abstracts by MSc students :25 Book/Book chapters by MSc students: 4 Popular articles/leaflets/booklets by MSc students: 21
Revenue generation	: Rs. 14,82,057 (2019-23)

6.4.2. Faculty Strength :

i) Present status

Sl. No	Designation	Sancti oned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	2	3	-1	
2	Associate Professor	3	0	3	
3	Assistant Professor	8	8*	0	
	Total	13	11	2	

*One faculty redeployed to Department of Organic Agriculture, and one faculty on study leave

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	*Courses handled	Students guidance	Remarks
1	Dr Jacob D, Asst. Professor (Agronomy)	4	2	
2	Dr Jacob John, Professor (Agronomy)	1	6	
3	Dr Bindhu J S, Asst. Professor (Agronomy)	3	8	
4	Dr Renjan B, Asst. Professor (Agronomy)	1	3	
3	Dr Poornima Yadav P. I, Asst. Professor (Agronomy)	-	1	
4	Dr Sajitha Rani T, Professor (Agronomy)	1	3	
5	Dr Sheeja K Raj, Asst. Professor (Agronomy)	9	9	
6	Dr Sheeba Rebecca Isaac, Professor (Agronomy)	7	7	
7	Dr Usha C Thomas, Professor (Agronomy)	4	7	
8	Dr Sharu S R, Asst. Professor (Agronomy)	5	5	
9	Dr K Prathapan, Professor (Agronomy)	-	2	

* Including the courses taken as an earlier staff of Department of Agronomy during the reporting period

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	1
2	Lab attendant	2	2
3	Office attendant	1	0

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department together with the field lab facilities at crop Museum, millet museum, tuber museum, certified organic farm and open field area for field research are sufficient to provide a hands-on experience in every aspect of Agronomy at post graduate level.

Class rooms	Laboratories	Farm land	Equipment
PG – 49.58 m ²	PG lab – 113.16 m ²	Open area –	Hot plate- 4 Nos.
Library - 17.98 m ²	Field lab –	100 cents (4000 sq.m)	KelPlus Automatic N Estimation system- 3 Nos.
	Field class room – 31.5 m ²	Certified Organic Farm- 100 cent (4000 sq.m)	Hand Refractometers-1 No.
	Crop museum- 80 cents (3200 m ²)		All glass distillation unit (single-1.5 L/hr)-1 No.
	Millet museum-20 cents (800 m ²)		Kelplus macro block digestion system-1 No.
	Tuber museum – 25 cents (1000 m ²)		Muffle furnace-1 No.
	Net house- 20 m ² area		pH meter-1 No.
	Total field lab 5051.50- m²		Digital conductivity meter-1 No. Electronic weighing balance- 4 Nos. Centrifuge- 1 No.
	Additional Lab Facility		Shaker- 1 No.
	Leaf Tissue Analysis Lab		Water bath-2 Nos.
			Hot air oven- 5 Nos.
			Soil moisture meter- 2 Nos.
			Reverse osmosis system with filter and storage tank- 2 Nos.
			Distillation still (Stainless steel) -2 Nos.
			Kjeldahl Distillation Unit (Borosil)-2 Nos.
			Mono quartz distillation unit- 1 No. Digital platform balance- 1 No.

6.4.5. Conduct of Practical and Hands-on-Training

- Post graduate students are given thorough hands- on practical experience on leaf tissue analysis, soil and organic manure analysis and herbicide residue analysis. The leaf tissue analysis lab functioning under the Department also supports hands-on-trainings.
- Hands -on training on weed identification, and field application of herbicides are provided
- A medicinal garden unit serves the instructional purpose of identification and demonstration to the students.
- A net house of 20 sq. m is functioning for supporting the conduct of practical and research.
- Practical training is imparted on evaluation of growth parameters such as CGR, RGR, LAI etc.
- The students are also given training to use the new types of weeding implements under different field situations
- The PG students are given hands own training on assessment of crop water requirement, measurement of irrigation water and CROPWAT model.
- Hands on training on operation of micro irrigation systems are also given
- A crop museum is maintained by the Department of Agronomy with a cafeteria of crops. The museum covers an aquaponic unit, vertical farming structure, composting unit, planting material production facility etc. which supports in imparting hands-on-training to the post graduate students in these specific aspects.
- A millet museum is being established by the Department and it also supports the post graduate students in identifying varietal characteristics of millet crops
- A tuber museum having 25 cents area with a collection of genotypes of major and minor tuber crops supports the identification of varietal features of tuber crops by the PG students.
- Department is having a certified Organic Farm of 1 acre which is utilized for the field studies on organic production of crops
- Hands-on training on software for statistical methods of analysis is also imparted

6.4.6. Supervision of students in M.Sc. (Agri.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of student
M.Sc. (Agri.) Agronomy	18/year	18 (9 from the Department + 9 from outside the Department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

- An Advisory Committee is constituted for each M.Sc student. The committee regularly meets and discuss the progress of research work and feedback from the students are collected and recorded in the minutes.
- Separate feedback forms are also collected from the M.Sc students and submitted to the academic cell for further actions.
- Scientists of the Department have functioned as Nodal Officers of Agriculture Knowledge Centre of State Department of Agriculture and feed backs which are collected from farmers during monthly meetings are minuted and kept in the block.

- Feedback collected from the farmers and extension personnel during Zonal Research and Extension Workshops conducted annually are documented, prioritized and actions are taken,
- Feed backs are collected from the visitors of the Crop Museum maintained by the Department and are valued for improving the existing facilities.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	18	17	18	18	15
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	1	0	0	0	0
Percentage	5.55	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. Besides this, the Department has a You Tube Channel for the online dissemination of seminars and trainings organized by the Department which serves the instructional purpose too. The channel has hosted more than 19 videos with 1.26 k subscribers. Teaching videos are also prepared by the faculty for uploading to the You Tube Channel. Faculty of the department are also involved in the production of KAU lecture series (videos).

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M.Sc. (Agri.) Soil Science

DEPARTMENT OF SOIL SCIENCE



PG-PhD and UG Labs



Suchitha plant



GIS Laboratory



Soil Museum



Referral Lab for Quality control organic manures



Model Organic Farm



Organic Museum



High end equipments

CHNS Analyzer

ICP-OES

Centrifuge

UV-Vis Spectrometer

Kjeldplus



Waste management facilities

AAS with Graphite furnace

Vermicompost

Biochar unit

Coirpith compost

Mobile Soil testing laboratory

Facilities

6.4.1. Brief History of the Degree Programme

The Department of Soil Science and Agricultural Chemistry was established in 1955, at the time of inception of the College of Agriculture, Vellayani, to undertake soil related research and teaching. The first Soil Testing laboratory of the state was established at the Department in 1958. The post graduate programmes *viz.*, M. Sc. (Agri.) and Ph.D. were started in 1961 and 1963 respectively. A Model Organic Farm was established under the Department in 2007 and diploma course on 'Organic Agriculture' was started in 2013.

Objectives

- Teaching at UG, PG, and Ph.D. levels on various aspects of Soil Science and also for Diploma in Organic Agriculture, Integrated Biotechnology and B.Tech. Biotech courses.
- Research on fundamental and applied aspects of soils, *viz.* Soil Health Management, Soil Fertility and Plant Nutrition (customized formulations/nano fertilizers/fortified organic fertilizers/biochar), Soil Chemistry, Soil Biology, Soil Physics, Agricultural Chemicals, Pedology, Natural Resources Management, Land Use Planning (GIS based), Soil Reclamation and Solid Waste Management.
- Analytical services on soil, water, organic manures and fertilizers to various stakeholders.
- Training and advisory services to various stakeholders and farmers.
- Support block level Agricultural Knowledge Centres (AKC)s.
- Develop and disseminate the technologies for the benefit of farming community
- Impart quality education to students to secure high positions in competitive examinations and eligibility tests.
- Train the post graduate students to formulate the research programme and conduct independent research in the field of Soil Science and Agricultural Chemistry.

Services/ products offered

- Provide crop specific recommendations based on analysis of soil, plant, fertilizer, and manures.
- KAU Suchitha organic fertilizer is sold through KAU outlets and licensed input agencies of the state.
- Production and sale of vermicompost, coir pith compost, liquid organic manures
- A new micronutrient mix developed made available to the public through the Sales Counter, IF, Vellayani.
- Developed multi nutrient tablets and nutrient capsules for vegetables.
- Fabricated a portable electrically operated sub soil sampler.
- Organic manure quality can be tested for farmers in referral laboratory.

Accomplishments of M.Sc. Programme at a glance		
Batches of students passed out so far		62
Number of students passed out so far		252
Number of students passed out during the assessment period		37
Number of students secured placement as faculty in the University		0
Number of students secured job in Govt./Private sector during the tenure		14
Number of students pursuing Ph. D with SRF		-
Number of students currently in roll and pursuing the PG programme		18
Student: Teacher ratio		1.38*

*Including the faculty from outside the College acting as Major advisor to PG students.

Salient research findings

During the period of assessment, the department conducted research in the diverse fields such as soil fertility, plant nutrition, organic farming, solid waste management, pesticide residue analysis in soil, effect of climate change on soil *etc.*

Major achievements

- Developed and patented a rapid thermochemical waste processing technology and standardized use of 'Suchitha' organic fertilizer.
- Soil test-based fertility management for sustenance of soil health
- Characterized the secondary and micronutrient status of AEUs of Southern Kerala
- Assessed the impact of flood (2018) on soil fertility of different AEUs of Kerala
- Standardized vermitechnology and recommendations for organic crop production
- Established Lead Centre for Organic Farming
- Fabricated indigenous biochar kilns for pyrolysis of various substrates
- Sewage sludge compost for ornamentals
- Standardized enzyme technology for management of aquatic weeds
- Micronutrient mix for vegetables and banana
- Multinutrient tablets and capsules for vegetables

PG Research findings:

- Assessment of soil quality in the post-flood scenario of AEU 12 revealed that flooding caused an increase acidity and decrease OC, Mg and S compared to pre flood data of Kerala State Planning Board.

- Foliar application of 0.5% micronutrient solution ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ 0.1%, $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ 0.25%, borax 0.1%, $\text{MnSO}_4 \cdot \text{H}_2\text{O}$ 0.025%, and $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ 0.025 %) along with KAU PoP significantly increases grain yield and B:C ratio of upland rice.
- Fortified organic matrix pellets at 500g/plant in two splits is the best for soil physicochemical and biological properties and yield and in chilli of Onattukara.
- Sulphate of potash was the best potassium mineral source which release potassium faster when compared to remaining minerals in organic farming.
- Improvement in the rhizosphere dynamics by adding the Thermochemical Digested Organic Fertilizer (TOF) enhances the soil biology and crop productivity.
- Use of non-conventional organic amendments, compost tea, and the incorporation of effective microorganism concentrate and enhancing tomato yields in the Onattukara sandy plain.
- Organic multinutrient pellet using NPOP accepted nutrient sources developed for rice in acid sulphate soils of Kuttanad.
- Composting of sewage sludge with bulking agents such as coirpith, sawdust and heavy metal adsorbent zeolite reduced the bioaccumulation of heavy metals in marigold.
- The organic farming significantly contributed to soil carbon storage as different pools distributed in different sized aggregates due to increased organic carbon.
- Application of organic nano NPK 50 kg/ ha as basal dose along with 5 kg FYM significantly improved the growth, yield and quality of sesame grown in sandy tracts of Onattukara.
- Soil fertility maps of the acid saline Kaipad area were created using ArcGIS. Soil is strongly to extremely acidic with high EC, deficiencies of N, K, Ca, Mg, B and Fe and Al toxicity.
- Soil application of Silicon Solubilizing Bacteria along with Si sources such as calcium silicate and paddy husk Ash improved yield and yield attributes of rice
- The mobility of cyantraniliprole was found to be slightly higher in normal soil compared to the 0.5% FYM amended soil and also indicates its moderate behaviour.
- Prepared nano zeolite, chitosan, and carbon-based slow release fertilizer formulations, assessing the nutrient release and standardized dose and time of application for chilli.
- Bokashi compost prepared from the 1:1 mixture of *L. flava* and banana pseudostem enriched with calcium apatite, epsom salt and sylvinit recorded the highest values for the available nutrient status during incubation period.
- Application of 2% or 5% nonherbal kunapajala as foliar spray along with 50% N as FYM allows for a 50% reduction in FYM as a nutrient source.

- Adsorption, desorption, persistence and leaching of flupyradifurone in sandy loam soils revealed that the addition of 0.5% farmyard manure to soil increased sorption capacity.
- Fertilizer tablets reduce fertilizer rate by 25 % recommended dose of fertilizer.

Department of Soil Science and Agricultural Chemistry at a glance (2019-23)		
ICAR Schemes.	:	1
National Projects	:	2
External Aided Projects	:	3
State Plan Projects	:	11
Industry linked projects and consultancy	:	2
Publications	:	NAAS Rating > 15: 1 NAAS Rating > 10: 2 NAAS Rating > 7: 7 NAAS Rating > 5: 31 NAAS Rating < 5: 31
Revenue generation	:	Rs. 22,36,322/-
Total soil health card issued	:	740
<u>Diagnostic services and number of samples analysed:</u>		
Soil samples: 3064, Plant samples: 793, Manure samples: 97, Water samples: 38		
Number of awards	:	12
Capacity Building and Training conducted	:	21
Participation of faculty in Workshops/ Seminars/ Symposia/ Training/ Consultancy visits/Special assignments	:	40
No. of students with fellowships (PG)	:	25
No. of students with fellowship (PhD)	:	22

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI
1	Professor	1	1	0	ICAR
2	Associate Professor	3	0	3	ICAR
3	Assistant Professor	9	6*	3	ICAR
	Total	13	7	6	

*1- Assistant Professor attached to the Regional Agricultural Research Station (RARS, SZ, Vellayani) and her services are made use of in the academic and research activities of the Department.

ii) Teachers outside the department involved in the department activities (P.G.)

Sl. No	Name and Designation	Courses handled	Student guidance	Remarks
1	Dr. Aparna B. Professor, Department of Soil Science and Agricultural Chemistry, College of Agriculture, Ambalavayal	13	4	Worked as faculty in the department till 1.10.2021
2	Dr. Thomas George, Professor and Head, Pesticide Residue Research and Analytical Laboratory (AINP on Pesticide Residues),	3	6	...
3	Dr. Gladis R, Associate Professor, ARS, Thiruvalla	12	4	Worked as faculty in the department till August 2021
4	Dr. Biju Joseph, Associate Professor, RRS, Mancompu	11	2	...
5	Dr. Meera A. V., Assistant Professor, Integrated Farming System Research Station, Karamana	2	1	...
6	Dr. Mini V., Assistant Professor, ORARS, Kayamkulam	3	3	...
7	Dr. Sailaja Kumari M.S, Associate Professor, RARS, Kumarakom	-	1	...

* During the period from 2019 to 23

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	4	3
2	Office attendant	2	1
3	Computer assistant	1	1
4	Technical assistant	2	0

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities together with that of the of ICAR schemes functioning in the department are sufficient to provide a hands-on experience in every aspect of soil science and agricultural chemistry.

Class rooms	Laboratories	Farm land	Equipment
PG – 130 m ² Ph.D.- 20 m ²	UG Lab (I): 120 m ² , UG Lab (II): 104.56 m ² , Soil processing yard 75.5 m ² , PG Lab: 125 m ² , Ph.D. Lab: 56.27 m ² , Soil Testing Lab: 150 m ² , Instrumentation room- 60 m ² , Incubation room: 50 m ² , Referral laboratory for quality control of organic manures – 280 m ² , GIS Lab – 60 m ² , Soil biology lab: 50 m ² , Mobile Soil Testing Laboratory (MSTL)-1 No.	Field cum demonstration lab; Model organic farm with model organic kitchen garden, coirpith compost unit, vermicompost unit, NADEP compost unit, Azolla production unit, Biochar unit, polyhouse for protected organic cultivation, enriched manure production unit etc. – 3 acres	Yoder's apparatus – 2, Single Distillation unit – 3 Double distillation unit-2 Hot air oven – 4, Laboratory centrifuge – 1, Mechanical shaker – 4, Pressure plate apparatus – 1, Hot plate – 3, Weighing balance – 7, Deep freezer – 1, Kjelplus digestion unit – 2, Kjelplus distillation unit – 2, BOD incubator – 2, pH meter – 4, EC meter – 4, UV-VIS double beam spectrophotometer – 2, Mechanical stirrer – 3, Muffle furnace – 3, Spectrophotometer – 1, Water bath – 2, Automatic N analyzer – 1, ICP OES-1, AAS-1 AAS with graphite furnace – 1, CHNS analyzer – 1, Refrigerator -4, Microwave digester – 1, Refrigerated centrifuge -1, Research microscope -1, Microcontrolled pH meter-1, Flame photometer – 2

			Autoclave-1 Laminar air flow chamber-1
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6.4.5. Conduct of Practical and Hands-on-Training

- **Analytical techniques and instrumental methods:** Students are given thorough hands-on practical experience on soil, plant, water, fertilizer and manure sample analysis.
- **Soil genesis, survey and classification:** Students are trained in delineation of soil map units upto soil series level (USDA Soil Taxonomy).
- **Mineralogy and micropedology:** Micropedological and soil mineralogical studies are conducted in Soil Museum (Pedonarium).
- **Management of problem soils:** Teach tools and techniques of identification, delineation and management of problem soils.
- **Geospatial technology:** Students are allowed to learn and work with GIS software and can use 30 desktop computers available in the GIS Lab
- **Exposure visit:** Exposure visit conducted to Thumba Equatorial Rocket Launching Station, Vikram Sarabhai Space Centre (VSSC) and State Soil Museum, Parottukonam.
- **Soil microbiology and enzymology:** Students are trained for various composting techniques, microbial analysis, enzyme kinetics etc.
- **Soil fertility management:** Students are equipped with soil test-based fertilizer recommendation techniques.
- **Solid waste management and composting:** Equip the students on rapid composting technologies including thermochemical digestion techniques.
- **Plant Nutrition:** Students are well-trained in identification of function and deficiency symptoms of plant nutrients and its management.

6.4.6. Supervision of students in P.G. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Soil Science	12/year	13 6 (from Dept.), 7 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The department maintain good relationship with farming community and equip them with evolved technologies, conduct trainings, trials, demonstrations, etc. Faculty is nominated as nodal officers of block level agriculture knowledge centers of Dept. of Agriculture for overall development of state agriculture sector by providing technical advice and immediate solutions.

Scientists resolve the problems faced by farmers through direct interactions, field visits, advisory services, agroclinics, over phone or through social media etc. Maintain collaboration with industry and takes up paid up trials for various institutions, act as mentors of various agri start-ups.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake for M.Sc.					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	12	11	8	12	9
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	1	0	0	0	-
Percentage	8.33%	0	0	0	-

6.4.9. ICT Application in Curricula Delivery: (please mention numbers/title wherever applicable)

Adopts online platforms such as KAU Moodle and Google Classroom for the delivery of the course curriculum, teaching videos, fully equipped GIS Lab with 30 desktops.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M.Sc. (Agri.) Entomology

DEPARTMENT OF ENTOMOLGY



Facilities

6.4.1. Brief History of the Degree Programme:

The Master's programme was started in the year 1962 to ensure a balanced understanding of basic and applied Entomology. The department is beholding a long history of responsiveness towards excellence in teaching and mentoring students and serving farming community. The department undertakes basic research in Entomology and focus on development of research that ensure ecofriendly and cost-effective arthropod pest management measures. Faculties are guiding research scholars in various fields such as biological control, host plant resistance, botanical pesticides, pest resistance to pesticides and pesticide residues in agricultural commodities and apiculture. Noteworthy contributions include the identification and documentation of new crop pests and beneficial entomopathogens, the development of taxonomic keys for new insect species, and the study of the bioecology of insects, mites, and nematodes infesting crops. Through various coordinated projects and initiatives, the Department of Entomology continues to play a vital role in advancing entomological knowledge and sustainable agricultural practices in the region. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards. The nomenclature of the department was changed from Department of Agricultural Entomology to Department of Entomology in 2023.

Objective

- ♥ Mentoring the post graduate students to formulate and conduct research programmes in basic and applied fields of Entomology
- ♥ Conducting research in the field of biological control, botanical pesticides and other biorational methods of pest management to develop cost effective and environmentally safe integrated pest management programmes for major crops of Kerala
- ♥ Develop protocols for the management of bees and pollinators
- ♥ Develop and disseminate the technologies for the benefit of farming community
- ♥ Provide diagnostic services to pest problems faced by the farming community
- ♥ Provide research on pesticide residues and develop protocol for Pesticide residue analysis in confirmation with international standards

Accomplishments of M.Sc. (Agri.) Entomology Programme at a glance		
Number of students passed out so far	:	262
Number of students passed out during the assessment period	:	50
Number of students secured placement as faculty in the University	:	15
Number of students secured job in Govt./Private sector during the tenure	:	15
Number of students pursuing Ph. D with SRF	:	3
Number of students currently in roll and pursuing the PG programme	:	21

Salient research findings

- Validated and proved the efficacy of KAU isolate of entomopathogenic fungus *Lecanicillium saksenae*
- Developed smart formulations of such as chitin enriched *Lecanicillium* and capsules of *Beauveria*
- Standardized the number of bee hives required for yield enhancement in culinary melon as four Indian honey bee hives with six frames for one hectare
- Reported the arthropod diversity in *Moringa oleifera*, which include 41 insect pests, one non insect pest, 27 species of spiders, 19 insect predators and 4 parasitoids

- Eighteen ant species were identified in vegetable ecosystems, exhibiting diverse roles as phytophagy, mutualistic associations, predation, plant foraging and as pollinators
- Reported fumigant and repellent toxicity of the tea tree *Melaleuca bracteata* EO against *Callosobruchus chinensis*
- Fourteen phytophagous ant species were reported from vegetable crops
- The species of fruit fly infesting banana cultivars was identified as *Bactrocera dorsalis*
- Research on quantifying Indian honey bee venom found that the highest quantity (52.00 mg per hive) can be collected between 2 - 3 pm
- Sixteen pests infesting jasmine were recorded
- Identity and morphology of *Lema* species infesting orchids in India were documented
- Developed protocols for pesticide residue analysis in confirmation with international standards and laboratory secured accreditation under ISO 17025:2017

Department of Entomology at a glance (2019-23)	
ICAR Schemes.	: AICRP on Honey bees and Pollinators AINP on Pesticide residues AICRP on Biological Control of Crop Pests
National Projects	: 7 (NBB: 2, NBB-ICAR: 1, RKVY: 2, DAC: 1, Ministry of HRD: 1)
External Aided Projects	: 61
State Plan Projects	: 4
Industry linked projects and consultancy	: Karshaka Santhvanam Young Innovative Programme -1
Publications	: With NAAS above 5 - 32 With NAAS below 5 - 19 Leaflets - 13 Popular article- 13
Revenue generation	: Rs. 41.24 lakhs (2019-23)

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sancti oned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	2		ICAR
2	Associate Professor	2	1		ICAR
3	Assistant Professor	5	5		ICAR
	Total	8	8		

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. M. H. Faizal, Professor (RC)	1		
2	Dr. Amritha V. S, Professor (Entomology) PI, AICRP on Honey bees and pollinators	2	3	
3	Dr. Ambily Paul, Associate Professor, AINP Pesticide Residue	2	2	
4	Dr. Thania Sara Varghese, Assistant Professor, CoA, Padanakkad		2	
5	Dr. Malini Nilamudeen, Assistant Professor, RARS Pattambi		1	
6	Dr. Narayana R, Assistant Professor, Nematology		1	
7.	Dr. Nisha M. S. Assistant Professor, Nematology		1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	3	3
2	Class IV	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department together with the laboratory facilities of the ICAR schemes (AICRP on Biological Control of Crop Pests (AICRP on BCCP) AINP on Pesticide residue and AICRP on Honey bees and Pollinators) functioning in the department are sufficient to provide a hands-on experience in all aspects of Entomology

Class rooms	Laboratories	Farm land	Equipment
UG classroom I – 70 m ² UG classroom II – 42 m ² PG classroom – 30 m ² PhD classroom – 40 m ²	PG lab – 77 m ² PhD lab – 45 m ² Insect rearing lab I – 25 m ² Insect rearing lab – 30 m ²	1.25 acre (need basis)	BOD Incubator -1, Autoclave – 1 pH meter – 1, Electronic balance- 1 Potters tower – 1, Digital Camera – 4 Hot Air Oven – 1, Dissection microscope- 3 Stereo Zoom trinocular microscope -1 Stereo binocular microscope- 6 Gel electrophoresis unit -1, LCD projector – 4 Insect boxes – 350, Insect collecting nets – 20 Insect collection big boxes – 10 Bee keeping equipments – 1 set Sericulture equipments – 1 set Sprayers - 1 of each type Computer with printer – 1 set
	Biocontrol lab – 115 m ²		Imaging compound microscope 2 Stereo microscope 2, Centrifuge – 1, Refrigerator –3, Electronic weighing balance – 1 LCD projector – 1, pH meter – 1,

			<p>Magnetic stirrer – 1, Laminar flow cabinet – 1 BOD Incubator shaker – 1, Autoclave – 2, Hot air oven – 2, Moisture balance – 1, UV cabinet -2, Double Distillation unit- 1 Microwave oven -1, Digital colony counter- 1 Tablet friability apparatus- 1 Tablet disintegration apparatus-1 Tablet press apparatus- 1, Capsule filling apparatus -1 Pellet making apparatus -1 Temperature control device (Ac)- 2 Humidifier- 1, Air cooler -1</p>
	Quality Control Lab for Honey – 185 m ²		<p>Compound microscope- 2, Stereo microscope- 3 Refrigerated Centrifuge – 2, Refrigerator – 3 Electronic weighing balance – 5 LCD projector – 1, pH meter – 1, Magnetic stirrer – 1, Laminar flow cabinet – 1 BOD Incubator – 1, Vertical Autoclave – 1 Hot air oven – 1, Single Distillation unit – 1 Microwave oven- 1, Colorimeter – 1 Mini centrifuge- 1, Vortex mixer- 1 Abbe Refractometer – 1, LC- MS/MS- 1 HPLC- 1, FTIR- 1, Fume hood- 1 Sonicator- 2, Incubating shaker- 1 Positive pressure processor- 1 Muffle furnace- 1, Deep freezer- 1 Nitrogen Evaporator- 1, Water bath- 1, Microtome- 1, Humidifier- 1, Honey Processing Plant- 1</p>
	Pesticide Residue Research and analytical laboratory – 400 m ²		<p>LC-High Resolution Mass Spectrometer -1 LC-MS/MS-2, GC-MS -1, GC-MS/MS -1, GC-3, Turbovap -1, Rotary Evaporator -3 Muffle Furnace-3, Centrifuge -3 Centrifuge refrigerated table top model -2 Centrifuge refrigerated Floor model -1 Homogenizer -3, Electronic Balance -6 Semi micro analytical balance Platform shaker-1, Oven-2 Natural convection oven-1 Nitrogen evaporator-1, Elga Water Purifier-1 Funnel Shaker-1, Separatory funnel Shaker-2</p>

6.4.5. Conduct of Practical and Hands-on-Training

- Detailed practical exposure is being given to PG students for insect identification using taxonomic keys.
- Post graduate students are inculcated with knowledge in advances in toxicological studies and pesticide residue analysis methods and training on safe use of pesticides

- The students are being trained in different aspects of microbial pest control such as identification, bioassay, mass production, and formulation of entomopathogenic fungi, bacteria and virus.
- Students are well-trained in identification of crop pests
- Students are being exposed to different pest management strategies
- The well-established center of honey bee and other pollinators research gives students a superlative training in beneficial insects.
- Hands on practical training on mass culturing of host insects and mass production of arthropod natural enemies.

6.4.6. Supervision of students M.Sc. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Entomology	10/year	15 8 (from Dept.), 7 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department of Entomology maintains an effective feedback mechanism with students, receiving excellent ratings for faculty mentoring and guidance. Students appreciate innovative explanations, group discussions, and collaborative learning opportunities but suggest more industrial exposure and improved research facilities. Despite this, they express overall satisfaction with the quality of courses. The research work in biological control has received praise from the Director of ICAR NBAIR and the monitoring and evaluation team, leading to recommendations for commercializing novel formulations and potent fungal bioagents. The R&D project on establishing a National Level Quality Control Laboratory for Honey from 2019-22 was rated excellent by the ADG (PP&B), and the pesticide residue analytical service by the Pesticide Residue Research and Analytical Laboratory received an excellent rating from the network Coordinator, AINP on pesticide residues, ICAR, and ADG (PPT &B), ICAR.

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	14	14	10	10	9
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes e-teaching platform of the University, KAU Moodle for online teaching and effective delivery of the curriculum. MOOC course on Apiculture with class of nine sessions in the form of video classes, PDF notes and Video recorded practical sessions of apiculture was provided.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Plant Pathology

DEPARTMENT OF PLANT PATHOLOGY



Facilities

6.4.1. Brief History of the Degree Programme

The Department of Plant Pathology in the college was established in 1961. B.Sc. (Ag.) programme was started in the collage since 1955, the year in which the university was formed. Subsequently M.Sc. (Agri.) in Plant Pathology was started in 1962 with the commitment of imparting knowledge to students and developing innovative and practical solutions for the benefit of stakeholders, ICAR 2009 syllabus was followed till 2021 and from 2022 admission onwards revised ICAR syllabus is being followed. The department functions with the following objectives:

Objectives:

1. Detection, identification, characterization, molecular and nano technological studies of plant pathogens and microbial biotechnology for crop nutrition, crop protection.
2. Development of novel strategies, beneficial microbes, their improved strains and biomolecules for eco-friendly management of crop diseases, crop nutrition, crop growth enhancement and biological control of weeds.
3. Development of efficient microbial formulations and delivery systems for enhanced crop production and protection.
4. Post-harvest and seed borne diseases, myco-toxins and their management.
5. Mushroom production technology and its application in biodegradation, nutraceuticals and pharmaceuticals.
7. Molecular basis of beneficial microbial associations and host pathogen interaction.
8. Exploitation of microbes for bioremediation, biological waste management and waste water recycling.

Accomplishments of M.Sc. (Agri.) Plant Pathology Programme at a glance		
Batches of students passed out so far	:	60
Number of students passed out so far	:	200
Number of students passed out during the assessment period	:	45
Number of students secured placement as faculty in the University during the tenure	:	8
Number of students secured job in Govt./Private sector during the tenure	:	27
Number of students pursuing Ph. D with SRF/ INSPIRE/OTHERS	:	7
Number of students currently in roll and pursuing the PG programme	:	22

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of Plant Pathology such as microbial taxonomy, biological control, IDM, host pathogen resistance, post-harvest disease management, nanotechnology and mushroom cultivation. An array of technologies was researched through M.Sc. programmes and the findings open up the possibility of using diverse solutions to the challenges in the field of crop protection. A brief account of the accomplishments made out of M.Sc. research programme is presented below.

- Studies revealed *Lasiodiplodia theobromae* as the major pathogen associated with post-harvest crown rot of banana in Kerala and can be effectively managed by treatment with cinnamon oil (0.8 %).
- Two mushroom hybrids from the cross between *Pleurotus djamor* and *Pleurotus ostreatus* and *Pleurotus djamor* and *Pleurotus florida* were developed.

- Novel management of with *Piriformospora indica* and antiviral principles of *Phyllanthus niruri* and *Boerhavia diffusa* was developed and found effective under *in vitro* condition.
- Seed bio-priming and spraying with *Bacillus amyloliquefaciens* VLY24 at fruit set was to be effective for the management of fruit rot chilli.
- Sustainable management of *chilli leaf curl virus* was undertaken by the application of nutrients as per the package of practices recommendation along with boron as borax 10 kg per ha⁻¹.
- Cross infectivity of *Rhizoctonia solani* infecting rice, cowpea and amaranthus was studied.
- Prevalence of *Piper yellow mottle virus* and *Cucumber mosaic virus* in black pepper either alone or as mixed infection in cultivated areas of Idukki and Wayanad was confirmed by using serological and molecular techniques
- Exploration of *P. indica* on prophylactic basis for the *Bhendi yellow vein mosaic virus* on bhindi, *Piper yellow mottle virus* on black pepper, *Blackeye cowpea mosaic virus* on vegetable cowpea revealed its effectiveness in imparting tolerance to treated host plants against the respective virus.
- Ecofriendly strategy for the production of good quality cardamom against fusarial infection with 2% of *Pseudomonas fluorescens* (1L/10kg soil) per 10 kg soil at the time of planting along with 2% *P. fluorescens* spray at 0.5 L per plant at monthly interval thrice was effective.
- Association of *Candidatus* Phytoplasma asteris with bud proliferation in cowpea was identified and characterized under 16 Sr group 1, sub group B and sesamum phyllody associated with *Candidatus* Phytoplasma aurantifolia group prevalent in Onattukara region was elucidated
- Strain DMRP- 30 of *Pleurotus ostreatus* can be successfully cultivated in Kerala using locally available substrates for spawn production and cultivation.
- Association of *Fusarium* spp., *Lasiodiplodia* spp., *Colletotrichum* spp., and *Rhizoctonia* spp. with root rot of cassava in Southern Kerala was studied. The sett treatment can effectively manage the disease and soil application of biocontrol agent *Trichoderma* sp. (KAU isolate) (10⁸cfu/ml) or the fungicide trifloxystrobin 25%+ tebuconazole 50% 75 WG (1 gL⁻¹) at one and two months after planting.

Department of Plant Pathology at a glance (2019-23)		
ICAR Schemes.	:	AICRP on Mushrooms
National Projects	:	1
External Aided Projects	:	4
State Plan Projects	:	11
Designated Inspections Authority for Plant Quarantine GOI	:	1
Publications	:	With NAAS above 5 - 21 With NAAS below 5 – 29

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	1	NIL	ICAR
2	Associate Professor	2	0	2	ICAR
3	Assistant Professor	5	7	--	ICAR
	Total	8	8	Nil	

ii) Teachers outside the department involved in the department activities				
Sl. No	Name and Designation	Courses handled	Students' guidance	Remarks
1	Dr. Heera G., Assistant Professor (Plant Pathology) PI AICRP on Mushrooms	4	5	--
2	Dr. Safer M.M., Assistant Professor (Plant Pathology) Instructional Farm, College of Agriculture, Vellayani	1	--	...
3	Dr. Joy M., Professor (Plant Pathology) and Head, Coconut Research Station, Balaramapuram	1	7	...
4	Dr. Sajeena A., Assistant Professor (Plant Pathology), IFSRS, Karamana, KAU	2	7	...
5	Dr. Surendran M., Professor (Plant Pathology) and Head, RRS, Moncompu, KAU	...	3	...
6	Dr. Sible George Varghese, Professor and Head (Plant Pathology), College of Agriculture, Vellanikkara	--	3	--
7	Dr. Dhanya M. K Associate Professor (Plant Pathology), RARS, Kumarakom	--	4	--
8	Dr. Ayisha R., Assistant Professor (Plant Pathology), College of Agriculture, Vellanikkara	4	3	-
9	Dr. Sreeja S. J., Assistant Professor (Plant Pathology), RRS, Vytilla	3	3	-

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	1	1
2	Office attendant	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department together with that of ICAR schemes functioning in the department are sufficient to provide a hands-on experience in every aspect of Plant Pathology viz., Mycology, Plant Bacteriology, Plant Virology, Mushroom cultivation technology, Disease management studies both *in vitro* and field.

Class room	Lab area and equipment		Farm land
	Laboratories	Equipment	
	UG lab 90 m ²	Microscope (10)	Open area
PG class room 45 m ²	PG lab 1 71.3 m ²	Hot air oven (1); Laminar air flow (2) Microwave oven (1); Induction cook top (2); Pressure cooker (2); Refrigerator (2)	Insect free net house -230m ²
Seminar hall 45 m ²	PG lab 2 / Mycoherbicide 42.6 m ²	Laminar air flow (1); Stereo microscope with image analyzer (1); Binocular microscope with image analyzer (1); pH meter (1); Weighing balance (1); Refrigerator (2); Induction cook top (1) Pressure cooker (1); -20 deep freezer (1)	Mushroom house 73 m ²
Mushroom training hall 40 m ²	Protein lab 48.5 m ²	Laminar air flow (1); Rack for tissue culture in separate room with AC (1) Precision Weighing balance (1) Refrigerator (2)	Mushroom shed 24 m ²
	Instrumentation room 42 m ²	Weighing balance (mg) (1); Microscope (1); Computer system (1); pH meter (1) PCR machine (2); Refrigerated Centrifuge (1); Air conditioner (1); Microtome (1); Mini spinner (2); Vortex (1); Geldoc (1); Electrophoresis unit (1); Water bath (1)	Dark room 23.46 m ²
	PhD lab 1 40.23 m ²	Refrigerator (1)	Composting unit 44.28 m ²
	Ph D lab2 110.4m ²	Laminar air flow (2); Zeiss Fluorescent Microscope (1); Orbital shaker (1); Hot air oven (1); Induction cooker (2); Microwave oven (1); Pressure cooker (2); Compound microscope (2)	Greenhouse 30 m ²
	Hot lab 18 m ²	Autoclave (horizontal) (1)	Glass house 110 m ²
	AICRP (mushroom lab) 60 m ²	Autoclave (1); Refrigerator (1); Oven (cookies baking) (1); Laminar air flow chamber (1); Microwave oven (1) Induction cooker (1)	
	ARCPDD 435 .78 m ² (with Seminar Hall with AC (4 no) and AV aids	Rack for tissue culture in separate room with AC (1); ELISA washer (1); ELISA reader (1); UV trans illuminator (1); PCR machine (1); Hot air oven (1); Rocker (1) Refrigerated centrifuge (1); Magnetic stirrer (2); Table top microfuge (1); Hot water bath (1); Precision Weighing balance (1); Weighing balance (1); Horizontal gel unit (1); Vertical gel unit (1); Gel doc (1)	

		Vertical Water distillation unit (2); -80 high efficiency freezer (1); -20 freezer (1) BOD incubator (1); Incubator Shaker (1) Oven for ELISA incubation (1); Monocular Microscope (2); Zeiss Binocular microscope with image analyser (1); Zeiss Stereomicroscope (1); Spectrophotometer (1) Ice flaking machine (1); Heat block (1) Microwave oven (1); Refrigerator (3) Computer (1); Printer (1)' Desiccator (1) Laminar Airflow Chamber LAF (2)' Autoclave (2)' Pressure cooker (2) Induction cooker	
	Incubation room -4 m ²		Others- 534.74 m²
Total Class room area-130 m²	Total Area- 962.8 m²		Grand total: 1627.54m²

6.4.5. Conduct of Practical and Hands-on-Training

- All courses include field oriented practical sessions.
- Wet preservation of diseased specimen, herbarium sheets are maintained for practical classes.
- Students are trained to prepare permanent slides to study host pathogen interaction. Moreover, these are maintained for teaching the students.
- Students are trained in identification of diseases of crops through frequent field exposure, collection, culturing and identification.
- Hands on practical classes are given on handling the equipment and performing the experiments in mycology, bacteriology, virology, host pathogen interaction, plant disease management, mushroom identification, culturing, cultivation and familiarization of molecular techniques.
- For every practical course, a practical manual has been printed (revised from time to time with changes in syllabus) and is distributed to the students at the time of registration for the course in each semester. The available smart class room facilities are also used to illustrate the procedures or demonstrate the technologies.
- The students submit their records based on the practical classes taken and get them evaluated by the course teacher.

6.4.6. Supervision of students in M.Sc. (Agri.) Plant Pathology Programme

Degree programme	Intake capacity of students	Qualified faculty for supervision of students
Student intake	12/ year	17 (8 from department, 9 from outside)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The curriculum of the courses is designed well to equip the students according to the need of the industry. Department of Plant Pathology is always providing services regarding diagnosis and management trainings and consultancy to the farmers and are helping in the overall development of state agricultural sector. Scientific support to stakeholders on mushroom identification, cultivation, and processing and spawn production are facilitated through trainings and field visits. Feedbacks based on a proforma were collected from the students, parents and farming community periodically to improve the teaching and to assess the competency / performance of the faculty and students. Changes were made in the respective aspects in teaching and consultancy for the farmers and stakeholders by considering the suggestions pointed out for improvement. Moreover, meetings were conducted with students by chairman of advisory committee and also open discussions with the she students and faculty of the department to discuss about the progress of the work and for sharing the problems faced by them. Based on these solutions to the problems raised were found out.

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	12	11	11	12	10
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	1	0	0
Percentage	0	0	9	0	0

6.4.9. ICT Application in Curricula Delivery: (please mention numbers/title wherever applicable)

The department is provided with facilities for high speed internet connection with Wi-Fi. Power point presentations, videos and smart board facilities which are being utilized in the teaching learning process. Online access to e- resources available in College library including CERA (Consortium for e-Resources in Agriculture), KrishiKosh (for thesis reference full text), eBooks of CABI, Atral and Asap, DELNET (Developing Library Network), e - journals etc. are utilised by the students. MyLoft registration has been maintained by faculty and PG students for the effective utilization of digital library facilities. All the PG courses, course teachers and students are registered in Academic Management System (AMS). Seminars are being conducted by the students using ICT tools. Classes were handled during COVID lockdown period in hybrid mode. Examinations were conducted online. Assignment submissions were done using KAU Moodle platform. Seminars were conducted in Google meet platform. Students use GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software for statistical analysis of data. Bioinformatic tools are also familiarized to students as a part of their course programmes.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



**Degree Programme : M. Sc. (Agri.) Agricultural Extension
Education**

DEPARTMENT OF AGRICULTURAL EXTENSION EDUCATION



SEMINAR HALL



DUAL PURPOSE -
EXTENSION PRACTICAL HALL CUM DINING AREA



LANGUAGE LAB



TSS



VIDEO CONFERENCE HALL



EXAMINATION HALL



MUSEUM CUM CLASS ROOM

Facilities

6.4.1. Brief History of the Degree Programme:

The M.Sc. (Agri.) Agricultural Extension Education programme is offered by the Department of Agricultural Extension from 1976 onwards with an annual intake of 4 students. The Department was established in 1962. It beholds a long history of responsiveness towards excellence in teaching and mentoring students, developing highly innovative and responsive research and outreach program that addresses stakeholder needs and facilitate public policy and management. The faculty is committed to guiding research scholars in diverse fields such as crop and technology-based impact assessment of university technologies, Sustainable agricultural development, ecosystem studies based on Agro-Ecological Units, climate-smart agriculture for sustainability and food security, subaltern and women studies with reference to agrarian relations and agricultural development, organizational studies, ICT and communication strategies for agricultural development etc. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards. The nomenclature of the department was changed from Department of Agricultural Extension to Department of Agricultural Extension Education in 2023.

Objectives

- To equip postgraduate students with quality education, enabling success in competitive examinations, eligibility tests and career development while fostering confidence for entrepreneurial pursuits in agricultural and allied sectors.
- Equip the postgraduate students to formulate the research programme and conduct independent research in the field of Agricultural Extension Education
- Train and equip farmers and other stakeholders in adopting new technologies in agriculture through the Training Service Scheme and Agricultural Knowledge Centres spearheaded by the faculty of the department involving postgraduate students.
- Disseminate the technologies developed by the university for the benefit of farming community

Accomplishments of M.Sc. (Agri.) Agricultural Extension Education Programme at a glance		
Batches of students passed out so far	:	47
Number of students passed out so far	:	180
Number of students passed out during the assessment period	:	40
Number of students secured placement as faculty in the University during the tenure		5 + 2*
Number of students secured job in Govt./Private sector during the tenure	:	21**
Number of students pursuing Ph. D with SRF	:	2
Number of students pursuing Ph.D with other fellowships	:	11
Number of students currently in roll and pursuing the PG programme	:	21

* Secured placement in private universities in the faculty of agriculture

** 5 in Govt sector, 7 in Banks and 9 in various private and temporary positions

Salient research findings

During the period of assessment, the Department carried out 40 M.Sc research projects in the diverse areas of extension education focusing on climate change, entrepreneurship, tribal studies, urban agriculture, covid-related studies. A brief account of the research findings made out of M.Sc. programme is presented below.

1. Agro-ecosystem and climate studies

- In climate change vulnerability assessment of Kuttanad rice farmers and flood vulnerability assessment of rural women of Kuttanad and Pokkali, indices were developed, documented adaptation strategies and proposed policy interventions.
- Risk perception among farmers were assessed in the study ‘Variability in risk perception among vegetable farmers-Gender disaggregated analysis’ in which differences were observed in farmers’ perception on effect of climate change due to their social construction of gender roles and relations.

2. Adoption and impact assessment studies

- In the study titled ‘Technology adoption behaviour of cassava growers in Kollam district’ found that eighty four per cent of the farmers had medium level of knowledge about KAU POP cassava production technology and 66.25 per cent of the farmers had medium level of adoption of cassava production technology (KAU POP).
- Knowledge, extent of adoption and attitude of vegetable farmers on safe handling procedures of pesticides were assessed in the study titled ‘Pesticide handling behaviour of vegetable farmers - a multidimensional analysis’ and found that majority of the respondents (48.3%) had medium level of adoption of safe handling of pesticides followed by 26.7 per cent who had high level of adoption and only 25 per cent had low level of adoption of safe handling practices.
- Investigated the augmentation of livelihoods for coconut farmers through a resilient extension approach, contributing valuable insights to sustainable agricultural practices. 87 percent of coconut farmers possess medium to high level of knowledge in coconut farming implying coconut farmers possess adequate knowledge on KAU practice
- Yield Gap and technology adoption of rice in north Kerala: A multi- dimensional analysis- the yield gap index derived from the study ranged from 10 to 30 per cent. The results of the PCA revealed that five components namely climatic factors, biological factors, socio-economic factors, institutional/policy related factors and factors related to technology transfer were critically influencing the yield gap of rice.
- Technology assessment of rubber based Inter cropping system (RBIS) in south Kerala- identified that technology and scientific practices adoption were low for the intercrops in rubber gardens

3. Special group studies

- Livelihood Security of Farm Women (Kerala and Manipur): A comparative study found a medium level of livelihood security among farm women, leading to strategies for increased production and income.
- Online Agricultural Technology Transfer during COVID-19: Traditional classroom learning was favored for effective technology transfer, prompting the development of a blended learning package to overcome challenges like poor internet connectivity.

- Emotional Intelligence and Job Performance (Kerala Agricultural University Scientists): No significant gender difference was found in emotional intelligence, but a significant difference in job performance was observed between male and female scientists.
- Impact of COVID-19 pandemic on Tapioca Growers (Kerala and Andhra Pradesh): Kerala faced challenges in pre-farm gate operations, while Andhra Pradesh had experienced impacts in socio-psychological and post-farm gate operations.
- Impact of Online Education during COVID-19 (Kerala Agricultural University): Perspectives on online education were measured, focusing on perceived ease of use and usefulness. It is reported that self-efficacy and attitude had positive correlation whereas subjective norm and techno stress had negative correlation with students' perception of online education during COVID-19.
- Perceived Usefulness and Content Analysis (Postgraduate Theses, College of Agriculture, Vellayani): Theses from 2014-2018 showed highly ordered and with useful content parameters.
- Research Trends and Academic Productivity (PhD Dissertations, Kerala Agricultural University): Analysis revealed low visibility of published works, offering insights into scholarly trends.
- Social discrimination of tribal agricultural labourers (Wayanad): A critical gender analysis uncovered higher social discrimination among tribal labourers, with Kattunaikans experiencing the most, and women facing more than men.

4. Entrepreneurship development

- E-marketing of cardamom in Kerala: developed an index to measure e-marketing effectiveness for cardamom and the major constraints were delayed payments to farmers post e-auction and re-pooling with low-quality cardamom, leading to reduced auction prices.
- Supply chain management in Mango: developed a scale to measure the performance effectiveness of mango supply chains and the major constraints were inadequate storage and logistics facilities in Kerala and Tamil Nadu. Effective value addition and input supply were observed in Tamil Nadu.
- Transforming innovations into enterprises through agri-business incubators: conducted a process analysis, revealing a significant difference in entrepreneurial effectiveness between incubate and non-incubate entrepreneurs in Tamil Nadu, with no significant difference in Kerala.
- Performance of Agri-Clinics and Agri-Business Centers (ACABC) Scheme: conducted a multidimensional analysis, indicating that ACABCs in Kerala performed lower than those in Andhra Pradesh.
- Agri-preneurship prospect in South Kerala: explored the adoption of selected apiculture practices by Kerala Agricultural University (KAU). Socio-economic attributes were positively and significantly related to adoption, including total landholding, market intelligence, training attended, experience in beekeeping, and employment generation.
- Entrepreneurial Behaviour of Farmer Producer Organization (FPO) members for Livelihood Security- Majority of the FPO members had medium entrepreneurial behavior and livelihood security. The major constraints faced by FPO members were marketing challenge, lack of professional business skill, competition from branded products, seasonality of products, and frequent change of CEO.

These studies provided valuable insights into various agricultural domains, offering practical solutions and highlighting areas for improvement.

Department of Agricultural Extension Education at a glance (2019-23)		
ICAR Schemes.	:	ICAR Scheduled Tribe Sub Plan (20-21), (21-22), (22-23) – 3 Nos. ICAR Scheduled Caste Sub Plan (21-22)- 1 Nos
National Projects	:	0
External Aided Projects	:	10
International Projects	:	2
State Plan Projects	:	10
Industry linked projects and consultancy	:	0
Publications	:	With NAAS above 5 - 16 With NAAS below 5 – 34
Revenue generation	:	Rs. 2.749 lakhs (2019-23)
Total project outlay	:	8.40 lakhs MSc projects
Total no of trainings	:	207(organized by the Dept.) + 44(Faculty as RP)

*Refer Dept. SSR for details of faculty projects

The department received external funding from ICAR, Indian Council of Social Science Research, SC & ST Department, National Bank for Agriculture and Rural Development, Medicinal and Aromatic Board, State Planning Board, Kerala State Higher Education Council, Kerala State Council for Science Technology and Environment, German Academic Exchange Service, Kerala State Biodiversity Board and Kerala State Biotechnology Commission for research projects and various outreach activities.

International workshops /conferences organized

1. Organised an **International Interactive Workshop** on “Introduction to Qualitative Research Methods” in collaboration with Kerala Agricultural University and Institute for Development Research and Policy (IEE), University of Bochum, Germany (10-13 August 2021).
2. International Biotechnology Conclave entitled ‘Biozion– The Biotech Capstone-Science-Society-Interface’ (<https://biozion.in/>) at College of Agriculture, Vellayani from 7 to 11 August 2023, in collaboration with Sree Chitra Tirunal Institute for Medical Sciences and Technology, KCSTE and German Academic Exchange Service.

6.4.2 Faculty Strength - Present status

Sl. No	Faculty	Sanctioned	Faculty in place	Vacant Position	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	1	0	ICAR
2	Associate Professor	2	0	2*	ICAR
3	Assistant Professor	4	6	-	ICAR
4	Faculty on contract	-	0	-	
	Total	7	7	0	

*The overall strength is balanced with Assistant Professors

1- Assistant Professor attached to the (Regional Agricultural Research Station) RARS – services made use of in the academic and research activities of the Department.

1 - Assistant Professor attached to the KAU Training Service Scheme (TSS) - services made use of in the academic activities of the Department.

1 - Associate Professor attached to the KAU Training Service Scheme (TSS) - services made use of in the academic and research activities of the Department.

ii) Teachers from outside the Department

ii) Teachers outside the department involved in the department activities

Name and Designation	Courses handled	Students guidance	Remarks
1. Dr. Jayalekshmi. G, Associate Professor (Agricultural Extension Education)	-	7	Head, KVK Kottayam
2. Dr. Bindu Podikunju, Associate Professor (Agricultural Extension Education)	-	4	-
3. Dr. Aparna Radhakrishnan, Assistant Professor (Agricultural Extension Education)	-	1	-
4. Ms. Shamna. N, Assistant Professor (Agricultural Extension Education)	-	1	-

6.4.3 Technical and Supporting Staff

Sl. No	Technical/ supporting staff	Sanctioned	In position
1	Artist	2	0
2	Photographer	1	0
3	A.V Operator	1	0
4	Office Attendant	1	1
5	Office Superintendent	1	1 (Computer Asst.)

6.4.4 Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department together with that of Training Service Scheme functioning in the department are sufficient to provide a hands-on experience in every aspect of extension education, training on agro technology, and instructional technology along with theory sessions.

Class rooms	Laboratories	Farm land	Equipment
PG Lecture Hall– 50 m ² Pg/Ph.D. room – 35 m ² (second floor) Examination Hall – 165 m ² Seminar Hall 130 m ² Video conference hall (smart classroom (PG) 77 m ² Museum Hall 167 m ² . Department library -50 m ² (Ground floor) Round Table Conference Hall 77 m ² TSS Hall 70 m ² Cellar Hall 135 m ² Generator room Total -956 m²	Media lab 56 m ² Computer lab 50 m ² Language lab – 125 m ² (College computer lab+ Dept computer lab) with VLAN connectivity Total – 231 m²	NIL	LCD Projector -5 LED TV -3 Television - 1 Visualiser - 2 Overhead Projector - 1 Public address system – 16 speakers 16 microphones Camera - 1 Public address system – 1 Handy cam - 1

6.4.5. Conduct of Practical and Hands-on-Training

- Practical Skills Development: Postgraduate students gained hands-on experience in statistical computer packages and data collection instruments.
- Technological Orientation: Practical orientation was provided on Expert system-operational mechanisms, mobile-based agro advisory services, and ICT tools for online data collection.
- Institution Visits: Students visited institutions like IIITM-K, SAMETI, Kisan Call Centre, and FIB to study ICT tool usage and agricultural activities.
- Adoption Studies: Conducted content analysis of adoption studies, identifying adopter categories and information sources at different stages of technology adoption.
- Media Production and ICT: Students received hands-on practical experience in media production and ICT, creating content for social media platforms.
- Gender Analysis: Conducted gender analysis exercises in a village, interacting with successful women entrepreneurs and Self-Help Groups (SHGs). Visited agencies supporting women's empowerment, followed by report presentations on findings.
- Creative Thinking and Planning: Students gained hands-on experience in bottom-up planning and techniques for assessing creative thinking.
- Psychological Concepts Application: Lab exercises included applying Maslow's hierarchy, classical and operant conditioning, assessing learning styles, and building self-esteem.

- Emotional Intelligence Assessment: Practical sessions involved assessing emotional intelligence, information processing, attitudes, and self-concept using psychometric tools.
- Simulation Games: Exposure to various simulation games helped students understand decision-making under different situations.
- Research Tools and Techniques: Practical sessions included developing skills in using projective and semi-projective techniques, and Participatory Rural Appraisal (PRA) tools in extension research.

6.4.6. Supervision of students in M.Sc. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Agricultural Extension Education	12/year	10

6.4.7 Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department of Agricultural Extension Education has garnered positive feedback from key stakeholders:

- Students: The department's dynamic approach to providing advanced technologies and services, including exposure through diverse channels like farmers' interfaces, demonstrations, workshops, seminars, and training programs, is well-received by students.
- Parents: Parental satisfaction stems from the department's dedication to offering relevant and advanced technologies. The faculty's positive impact on creating a comprehensive learning environment is acknowledged, with feedback collected through oral sessions and response sheets during Parent-Teacher Association (PTA) meetings.
- Industries: Industry stakeholders appreciate the department's focus on disseminating practical knowledge to students, aligning well with industry needs. Commendation is given for efforts in establishing linkages and conducting comprehensive training programs. The faculty's mentorship of agri start-ups and guidance of PG/Ph.D. research scholars receive accolades for fostering entrepreneurship and research excellence within the department.
- Farmers and Government: Farmers, as well as the Department of Agriculture Development and Farmers Welfare, Government of Kerala, value the department's direct interactions, agro-advisory services, and agro-clinics. The faculty's role as nodal officers of Block Level Agriculture Knowledge Centres is recognized for contributing to the overall development of the state's agriculture sector.

6.4.8. Student intake and attrition in the M.Sc. programme for last five years:**i) Student intake**

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	12	7	4	6	8

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle, online platforms, youtube, social media platforms, whatsapp groups, Television channels for the delivery of the curriculum. Teaching videos are also prepared by the faculty and blended learning approach combines traditional classroom teaching with online components.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Genetics and Plant Breeding



The undergraduate & PG laboratory with hands-on activity as students engaged in a practical session within the department, enhancing their experiential learning



The department is equipped with facilities including a Molecular Biology Lab, Tissue Culture Lab, and Computer Lab, all designed to support and enhance both educational initiatives and research programs.



The department provides comprehensive facilities for conducting breeding work, cultivating ornamental plants, and executing field experiments, ensuring a conducive environment for research and practical application.

6.4.1. Brief History of the Degree Programme:

The Department of Agricultural Botany was established in 1955. In 2023, the Department's name was changed to Genetics and Plant Breeding. Initially, in the department, M.Sc. (Agri.) and Ph.D. courses were started in 1961. Student intake at the start was 6 and currently, each academic year accommodates 10 M.Sc. (Agri.) students. A team including Professors, Associate Professors, and Assistant Professors offers various courses. 2019 to 2021 admission ICAR 2009 syllabus was followed and for 2022 admission onwards the revised syllabus is being followed. Accordingly at the postgraduate level 7 courses are being offered in the department. The department has well-equipped laboratory facilities, including plant tissue culture, for research.

Objective

Breeding for high yield, quality and resistance to specific pests and diseases in rice, vegetables, oil seeds, pulses, fodder crops, tuber crops and ornamental crops.

Hybridization and development of F₁ hybrids in vegetables and ornamental crops.

Induction of male sterility in vegetables. Development of core set in millets

Induction of mutation and polyploidy in ornamental crops. Micropropagation in banana.

Germplasm collection, performance evaluation, biochemical profiling and database preparation using bioinformatic tools in landraces of rice in Kerala and development of its breeding lines.

No. of M.Sc. (Agri.) courses offered by the department - 7 (2022-2023)

Accomplishments of M.Sc. (Agri.) Genetics and Plant Breeding Programme at a glance		
Batches of students passed out so far	:	61
Number of students passed out so far	:	244
Number of students passed out during the assessment period	:	36
Number of students secured placement as faculty in the University	:	5
Number of students secured job in Govt./Private sector during the tenure	:	11
Number of students pursuing Ph. D with SRF	:	1
Number of students currently in roll and pursuing the PG programme	:	27
Number of students with ICAR-NTS scholarship	:	6

Salient research findings

During the period of assessment, the Department conducted post-graduate research in various fields, including field crops, vegetables, pulses, fodder crops and ornamental crops. These included genetic diversity assessment, morpho-molecular characterization of land races and wild relatives of crops, induction of mutants and polyploids, development, screening, and identification of breeding lines resistant to biotic and abiotic stress, marker-assisted screening of germplasm or breeding lines, etc. With the help of MSc programs, several findings have been made that could help crop varieties become more resilient to the effects of changing climate conditions. An outline of the achievements of the M.Sc. (Agri.) research programs can be found below.

- In rice BC₂F₂ lines, ICDE 13-3/46/4/7 and ICDE 13-3/46/4/48 were identified with two bacterial blight resistance genes (*xa13* and *Xa21*) in homozygous condition through

marker assisted selection and were red kernelled with maximum resemblance to Prathyasa.

- In rice *Sub1* pyramided F₅ lines showed a better survival rate after 2 weeks of submergence and two SSR markers were used to identify the *Sub1* QTL.
- Twenty saline-tolerant rice genotypes were characterized in Kerala, and it was found that other QTLs and alternative pathways, in addition to the saltol gene, are responsible for the salinity tolerance of the reproductive stage.
- In rice grown on Kerala's acid sulphate soils, the breeding signatures RM3317, RM256, RM1240, and RM3483 were found.
- Vaishakh, Karanavara, Karuthadukkan, Kattamodan, Parambuvattan, and Onamoottan were found to be superior genotypes of rice with yields that were better under water stress; these genotypes were comparable to the universal drought-tolerant check Apo.
- *Sesamum indicum* genotypes were screened for phyllody tolerance and *Thilathara* and *Kayamkulam 1* were identified with high selection index values and phyllody tolerance.
- Wild relatives like *Sesamum mulayanam*, *S. malbaricum*, *S. radiatum* were characterized morphologically and biochemically and revealed that highest oil content was for *S. indicum* var. *Thilak*.
- The core set of *Eleusine coracana* was developed with 25 accessions selected from 110 accessions using PowerCore software.
- Grain cowpeas with early maturing genotypes GC 1712, PCP 0306, GM 16, and CPD 313 have been identified and can be used as parental lines to boost grain yield.
- Grain cowpea variety Sreya was found to be superior in seed yield and protein content under partial shade.
- The best genotypes of black gram with respect to yield and seed quality for Kerala conditions were found to be VBN 5, Sumanjana, and AKU 15.
- Higher yields were observed with the green gram genotype BGS 9 in open environments and K7 in partially shaded conditions.
- High yield and moisture stress tolerance were found in horse gram genotypes IC22785, IC221105, IC22759, and IC139464.
- Horse gram genotype T12 was found to be superior under open and partially shaded condition.
- Fodder horse gram genotype T26 was identified as superior in green fodder yield, dry fodder yield and multicut purpose.
- Fodder bajra genotypes 2021K-135, IIMRA V26 and IIMR 8VS8 were identified as superior genotypes with high yield and quality suited to AEU 8 (Southern laterite).
- EMS-induced mutants for dual purposes from fodder cowpea var. Aiswarya was developed using 0.43% EMS.
- Tomato F₁ hybrid Akshaya x Palakkad local was found to be superior under water stress conditions.
- Genetic variability studies in Chinese potato identified Kenichira local with superior yield and nematode resistance.
- Genetic fidelity studies in Robusta plants suggest that 9 subculturing can be done for direct organogenesis.
- Half MS media is found to be best for asymbiotic seed germination in *Rhynchosyilis retusa* and half MS with 0.5 mg/l BAP for callus formation and shooting from protocorm.

- Knudson C media was found to be best for seed germination of the endangered wild orchid *Vanda tessellata*.
- Colchicine 0.15% for 24hrs and 0.1% for 48 hrs in vitro treatments induced maximum tetraploids in *Dendrobium crumenatum*.
- *Phalaenopsis* hybrids Juihbao Venus X Young Home Golden, Juihbao Venus X Lianher Orange, Young Home Golden X Juihbao Venus and Young Home Golden X Lianher Orange showed germination *in vitro*.
- Palynological studies in *Anthurium andreanum* revealed Liver Red, Tropical Red and Lima White as best pollen producing parents and (Lady Jane X Orange Glory) X Liver Red was the most compatible cross.
- *Gladiolus grandiflorus* colour mutants were obtained in EMS 0.5% and DES 0.5% treatments.

Department of Genetics and Plant Breeding at a glance (2019-23)	
ICAR Schemes	: 5
National Projects	: -
External Aided Projects	: -
State Plan Projects	: 18
Industry linked projects and consultancy	: -
PG projects	52
Publications (Annexure 2)	: 32 (with NAAS above 5) 8 (with NAAS below 5) 9 (without NAAS rate)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	2	1	1	ICAR
2	Associate Professor	7	0	7	ICAR
3	Assistant Professor	6	4(1)	-	ICAR
	Total	15	7	8	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students' guidance	Remarks
1	Dr. Bindu M. R., Professor and Head, (Genetics and Plant Breeding), FSRs, Sadanandapuram	-	7 Major advisor	
2	Dr. Veena Vigneshwaran, Assistant Professor (Genetics and Plant Breeding), RRS, Vytilla	-	7 Major advisor	...
3	Ms. Jyothilekshmi, Assistant Professor (Genetics and Plant Breeding), ORARS, Kayamkulam	-	2 (advisory committee member)	...

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	0

2	Lab attendant	2	1
3	Class IV	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The department's lab and classroom spaces offer practical experiences in a range of areas related to genetics and plant breeding, including molecular breeding, floral morphology, tissue culture, cell biology, cytogenetics and bioinformatics, in addition to theoretical instruction.

Class rooms	Laboratories	Farm land	Equipments
PG- 51.33 m ² Ph.D -18.01 m ²	UG lab – 113.85 m ² PG lab – 51.33 m ² Tissue culture lab – 62.27 m ² Computer lab - 11.55 m ²	Open area – 1104.4 + 1604.32 m ² Net house – (4 nos) – 134.2 m ² Rain shelter -1 Crossing shed- 1 Rodent & Bird proof cage Shade house - 1 Total (Rain shelter, crossing shed, rodent & bird proof shed & shade house) - 1247 m ²	Stereo microscopes – 1 no Dissection microscopes –49 nos Compound microscope - 8 nos. Binocular microscope – 1nos Monocular microscope -1 Vertical Deep Freezer - 1 Gel documentation system – 1 nos Revolutionary table top cooling centrifuge – 1 nos Refrigerator – 5 nos Electronic weighing balance – 2nos LCD projector – 2 nos pH meter – 1 nos Laminar flow cabinet – 2 nos Hot air oven – 2 nos UV spectrophotometer – Double Distillation unit - 1no Thermal cycler – 2 Nos Revolutionary Image Analyzer – 1 No Ocular micrometer-9 Stage micrometer- 1 Moisture testing machine- 1 Micropipette -5 Dissection instruments –9 Electrophoresis tank -1 Spinners -2 Tissue lyser -1 Desktop computer – 6 Note book computer - 1 Laptop – 1 Printer – 4 Camera – 2 Speaker – 1

			Pressure sprayer – 1 2 in 1 manual and battery sprayer – 1 Hand sprayer – 2
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6.4.5. Conduct of Practical and Hands-on-Training

- Postgraduate students receive extensive practical experience in a variety of breeding techniques across a range of crops.
- In the field and in the classroom, there is thorough training in the methods for selfing and crossing a range of vegetable crops, pulses, and field crops.
- A practical education in advanced plant breeding systems, including hybrid breeding, quality improvement breeding, biotic and abiotic stress breeding, ideotype breeding, and other biometrical aspects of quantitative genetics, is provided to students.
- Students are prepared for the conservation of plant genetic resources, including data collection, analysis, characterization, and register upkeep.
- Practical classes that involve handling equipment and carrying out experiments in molecular research are offered.
- With software tools like GRAPES, R-Stat, IndoStat, and others, students are well-versed in the analysis and interpretation of experimental data.
- Instruction in the use of hands-on, practical techniques for preparing various media and biotechnological breeding strategies such as gene pyramiding, PCR, Gel electrophoresis techniques, DNA extraction, and marker assisted selection.
- The value and significance of intellectual property rights are explained to students.

6.4.6. Supervision of students in M.Sc. (Agri.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M. Sc. (Agri.) Genetics and Plant Breeding	10 / year	7 (from Dept.), 2 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department of Genetics and Plant Breeding offers services such as consultations, trainings, and the release of improved variety seeds. The Department's scientists are available at all times to help farmers with their issues through direct communication, field visits, consultations, online training, phone calls, social media etc. Technical advice on IPR-related topics, such as patents, plant variety protection, and geographical indications, is given by the faculties. Additionally, faculty members hold positions as members of the university's intellectual property cell, nodal officers in the Kerala State Higher Education Council, and members of the Higher Education Department's Additional Skill Acquisition Program's technical committee for the agriculture cluster. The feedback from farmers who bought The Truthfully Labelled Seeds of the various vegetable varieties released by the department is positive and they are completely satisfied.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	10	10	10	10	10
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty delivers the curriculum through the use of ICT tools like KAU Moodle. Online learning was carried out during the COVID-19 pandemic using tools like Zoom, OBS Studio for video editing, and Google Meet. Farmers can also receive online training through these platforms. Online multiple-choice question quizzes are administered using Google Forms. Classes are also conducted using Microsoft PowerPoint.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Plant Physiology

DEPARTMENT OF PLANT PHYSIOLOGY

DEPARTMENT LABORATORIES



Undergraduate Research Lab



Media Preparation Room



Stress physiology laboratory



Post-Graduate Research Lab



Tissue Culture Laboratory



Tissue Culture Laboratory



Gel documentation system

Stress physiology laboratory



OPEN TOP CHAMBER SYSTEM (OTC) at College of Agriculture, Vellayani



Open Top Chambers



Sensors



Real time data recording system



Refrigerated centrifuge

Facilities

6.4.1. Brief History of the Degree Programme:

The Department of Plant Physiology came into existence on 17.03.1993 with Dr. S. Sheshadrenath as Professor & Head. Post Graduate programme was started in the year 1997. The Department is now offering courses at B. Sc. (Hons) Agriculture, M. Sc. (Ag) Plant Physiology, Ph. D. in Plant Physiology, B.Tech.Biotechnology and B. Sc. - M. Sc. (Integrated) Biotechnology levels. The faculties are committed in guiding research scholars in diverse fields such as response of plants towards climate change, abiotic stress tolerance and mitigation strategies for different abiotic stresses. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objective

- ♥ Academic, research and extension activities
- ♥ Serves as a centre for academic excellence in the area of Plant Physiology for graduate and post graduate students
- ♥ To conduct basic and strategic research to understand the underlying processes that determines the plant productivity
- ♥ To undertake fundamental research related to current problems in agriculture
- ♥ To provide consultancy and diagnostic services in the nutritional and physiological disorders of crops

Accomplishments of M.Sc. (Agri.) Plant Physiology Programme at a glance		
Batches of students passed out so far	:	25
Number of students passed out so far	:	39
Number of students passed out during the assessment period	:	19
Number of students secured placement as faculty in the University		2
Number of students secured job in Govt./Private sector during the tenure	:	8
Number of students pursuing Ph.D.		7
Number of students pursuing Ph.D. with SRF		1
Number of students pursuing Ph.D. with Future Food Systems CRC scholarship, University of New England, Australia		1
Number of students qualified NET (ICAR/UGC/CSIR)		4
Number of students currently in roll and pursuing the PG programme	:	5

Salient research findings

A brief account of the accomplishments made out of M.Sc. (Agri.) research programme are presented below.

- In thermosensitive genic male sterile rice, application of plant growth regulators, MH, ethrel and salicylic acid at specific concentrations during thermosensitive stage were found effective in increasing the pollen sterility.

- Seed colonization with *Piriformosporaindica* can mitigate salinity stress and water stress in rice by altering the physiological and biochemical traits.
- Vellayani Vijay and KashiVisvesh were identified to possess tolerance to high temperature.
- Drought mitigating compounds such as 1%KCl foliar spray followed by CaCl₂ foliar spray increased setting percentage and yield in cardamom.
- Root feeding with Hoagland solution-2X and Salicylic acid 200 ppm were found to be effective in managing Button shedding in coconut
- Treatments with Biochar + VAM, Biochar + Azospirillum and *P. indica* are effective in increasing morphophysiological parameters in bell pepper variety California Wonder. *P. indica* proved to reduce the vegetative period and induce earliness of flowering in bell pepper plants.
- Application of Fe+Zn+Mn+B@0.1% each +cycocel (500 ppm) at 30 days improve both quantitative and qualitative attributes in sweet potato.
- Incorporation of Azolla and PGPR along with POP (KAU) recommendations were found to enhance IAA and GA contents in rice. These biofertilizers were also effective in improving the root characteristics in terms of metaxylem number and diameter
- Increasing CO₂ concentration negatively influenced Zinc contents in leaf and shoot tissues of rice variety Uma and Njavara-golden yellow. Foliar application of ZnSO₄ solution at panicle initiation and grain filling stages significantly increased Zn content in these tissues.
- Improved Fe uptake and translocation in rice variety Uma, was found when treated with PGPR under ambient and elevated CO₂ conditions. The response of Fe homeostasis in PGPR treated plants strongly suggesting the possibility of utilizing them for designing iron management strategies to achieve higher yield and quality in rice.
- A stress combination treatment with 50% shade + 50% field capacity in cluster bean enhanced the root: shoot ratio and lowered the transpiration rate the most.
- CO₂ enrichment was found to have a deleterious influence on flowering and fruiting in tomato due to reduced pollen viability and floral deformities. Foliar spray with 50ppm B+50ppm Zn at 40, 55 and 75 DAS and addition of 25% extra Nitrogen than the recommended doze in equal splits improved yield and quality.
- Yield improvement in tomato with the application of 50% extra N and 25% extra P and K indicate the changing nutrient requirement of tomato under the current scenario of increasing atmospheric CO₂. Application of Azolla extract (20%) at 15 days interval after transplanting improved performance of tomato under elevated CO₂ condition.

Department of Plant Physiology at a glance (2019-23)	
External Aided Projects	: 2
State Plan Projects	: 9
Publications	: With NAAS above 5 - 52 With NAAS below 5 – 9
Other publications	: Proceedings/abstracts: 15 Popular articles: 2 Book/Book chapters: 3
Awards Honours	: 3 (Best teacher award 2021-1, Best paper/poster award-2)
HRD programmes of faculty (trainings/Seminar/Symposium/Workshop)	: Conference/symposium -16 Trainings-6 Workshop-7 Seminar/Webinar-63

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	2	-	ICAR
2	Associate Professor	1	0	1	ICAR
3	Assistant Professor	2	2	0	ICAR
	Total	4	4	0	

*Dr. Soumya P.R. joined on 03.07.2023 F.N. Dr. Viji M.M. transferred on 11.09.2023 A.N.

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students' guidance	Remarks

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab assistant	1	1
2	Office Attendant	1	0

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department are sufficient to provide a hands-on experience in Plant physiology. These include

Class rooms	Laboratories	Farm land	Equipment
PG – 100 sq. m.	UG lab – 70 sq. m. PG lab – 50 sq. m Tissue culture lab1 – 30 sq. m Tissue culture lab2 – 50 sq. m Preparation room-25 sq.m (shared with department of plantation, spices, medicinal and aromatic plants)	Rain-out shelter – 50sq.m Open Top Chamber (2nos) Poly house– 200 sq.m	Vortex Mixer – 1 no Stereo microscope – 1 no Digital microscope – 1 no Gel documentation system – 1 no Trinocular Research Microscope-1 no Deep freezer – 1 no Centrifuge – 2nos Refrigerator – 2nos PCR machine- 1nos PCR machine (gradient)- 1 nos Microwave oven- 1 no ELISA plate reader-1 no Portable photosynthetic system-1 no Electronic weighing balance – 2nos Mini Vacuum Cleaner – 1 no pH meter – 2 no UV/VIS Spectrophotometer – 1 no Scanning Visible Spectrophotometer– 1 no Laminar flow cabinet – 1 no Incubator – 3 no

			Hot air oven – 1 no Distillation unit with Quartz Condenser: Borosil – 1 no
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6.4.5. Conduct of Practical and Hands-on-Training

- Hands on training is given to PG students on assessment of physiological markers associated with abiotic stress tolerance, impact of application of nutrients/plant growth regulators on growth and development of crops.
- Students are helped to develop expertise in handling equipment's like portable photosynthetic system, PCR machines, spectrophotometer, stereo microscope, digital microscope, gel documentation system etc.
- Hands on training is given to PG students on DNA and RNA isolation, Isozyme analysis for various stress responsive proteins, identification of molecular markers for specific traits.
- CO₂enrichment simulation studies using Open Top Chamber facility and trench system available in the department.
- PG classes are being conducted on tissue culture of medicinal and ornamental plants.

6.4.6. Supervision of students in M.Sc. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Plant Physiology	6/year	4

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

A feedback mechanism is active and is being utilized by the students, parents, farmers, and the department officials. All means of feedbacks (direct, over phone, by post, email etc) are entertained and are well attended.

6.4.8. Student intake and attrition in the M.Sc. (Agri.) programme for last five years:						
i) Student intake						
Year	2019-20	2020-21	2021-22	2022-23	2023-24	
Number	6	2	1	0	2	
ii) Student attrition in the last five years						
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24	
Number	0	0	0	0	0	
Percentage	0	0	0	0	0	

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. The wi-fi connectivity, computer facilities, LCD projectors and classrooms are utilized by the teachers and students.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Molecular Biology & Biotechnology

DEPARTMENT OF MOLECULAR BIOLOGY & BIOTECHNOLOGY



Facilities

6.4.1. Brief History of the Degree Programme:

The M.Sc. (Agri.) Molecular Biology and Biotechnology programme is offered by the Department of Molecular Biology and Biotechnology since its inception in 2003. The Department has a long history of responsiveness towards excellence in teaching and mentoring students, serving the farming community, as well as developing innovative technologies in agriculture. Currently, the student intake is 6 and the ICAR syllabus is being followed for the programme.

Objectives

- To provide good quality education and hands on experience in plant molecular biology and biotechnology
- To empower the students to take up higher studies in biotechnology and equip them to take up positions as scientists/teachers
- Equip the postgraduate students to adopt programmes for the benefit of farmers
- To empower them as entrepreneurs.

Accomplishments of M.Sc. (Agri.) Molecular Biology and Biotechnology Programme at a glance	
Batches of students passed out so far	14
Number of students passed out so far	45
Number of students passed out during the assessment period	17
Number of students secured placement as faculty in the University	4
Number of students secured job in Govt./Private sector during the tenure	5
Number of students who opted for Ph.D. so far	19
Number of students pursuing Ph.D. with SRF (During the assessment period)	1
Number of students currently in roll and pursuing the PG programme	2
Awards received	2

Salient research findings

A brief account of the accomplishments made out of M.Sc. research programme is listed below.

- Algicidal effects of green synthesized nanoparticles using *Tinospora cordifolia* was studied on *Chlamydomonas reinhardtii*.
- Embryogenesis was induced in anthers of *Capsicum annum* var. Arka Meghana.
- Stable housekeeping genes were identified for gene expression studies in different varieties of black pepper (*Piper nigrum* L.).
- Transformation of *Agrobacterium* assisted by silver nanoparticles was developed.
- Expression profiling of auxin-responsive genes during inflorescence development in black pepper (*Piper nigrum* L.) was analysed using Real time PCR (RT-QPCR).
- Virus-responsive miRNAs in banana (*Musa AAB*) were computationally predicted

- *In vitro* synthesis of phenyl propanoid glycosides in *Artanema sesamoids* was enhanced using elicitors
- Silver nanoparticles were studied for biolistic transformation in *Nicotiana tabacum*

Department of Molecular Biology and Biotechnology at a glance (2019-24)	
External Aided Projects	: 1
State Plan Projects	: 6
Industry linked projects and consultancy	: Consultancy to BMFC and State Horticulture mission
Trainings conducted	2
Publications	: With NAAS above 5 – 24 With NAAS below 5 – 20
Revenue generation	: Internship Fee Sale of Tissue Culture Plants Rs.1.63lakhs (2019-23)

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies
1	Professor	2	2	Nil	1
2	Associate Professor	Nil	-	Nil	1
3	Assistant Professor	7	5+2*	-	3
	Total	9	9		5

* Two Assistant Professors are working on contract

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	2	2
2	Computer Assistant	1	1 (Shared with the Department of Community Science)
3	Office Attendant	1	1 (On contract)

6.4.4. Classrooms and Laboratories: PG Programme

Class rooms	Laboratories	Equipment
No of PG class room –1 Area 38.34 m ² seating capacity of 25	PG lab – 1 Size: 72.53 m ²	Autoclave horizontal, Laminar airflow chamber Benchtop Refrigerated Centrifuge, Incubator

		shaker, Hot air oven, Microwave Oven pH meter, Electronic Balance, Vortex machine Water bath, Minispin centrifuge, Vacuum Concentrator, Magnetic stirrer, Trans illuminator, Gel documentation system, Double distillation unit, Electrophoresis unit, Micropipettes, -80°C Deep freezer, -20°C Deep freezer, PCR machine, Refrigerator
	The facilities in the department shared for the PG programme 1. Tissue culture Lab: 48.8 m ² 2. Animal cell culture lab: 72.6 m ² 3. Tissue culture hardening chamber 4. Containment facility for transgenic research	Real-Time PCR -1 No Soxhlet Apparatus-1 No Glass bead sterilizer-1No Monocular microscope -1No Inverted microscope-1No Stereo microscope- 1No Culture racks-10 No Gene gun-1No Biosafety cabinet class II- 1No CO2 incubator-1No Filter sterilization unit- 1No
Waste disposal Facility	Waste disposal facilities affiliated with IMAGE (Indian Medical Association Goes Eco friendly), Indian Medical Association	

6.4.5. Conduct of Practical and Hands-on-Training

- Postgraduate students are given hands-on practical experience in molecular biology, genetic transformation and plant tissue culture techniques.
- A soft copy of practical manual is provided to the students at the beginning of practical courses and students have to submit the observations and the results of each experiment in the practical record.
- The techniques include
Molecular biology techniques - DNA, RNA and Protein isolation, Electrophoresis, PCR, Quantification of nucleic acids and proteins, Real time PCR, Blotting techniques, genetic transformation techniques

Analytical techniques- Chromatography, spectrophotometry, ELISA

Plant tissue culture techniques – Initiation of cultures, establishment and multiplication of cultures, Hardening of plants

Bioinformatics and computer application: Different bioinformatic tools for nucleic acid analysis, gene identification and annotation, multiple sequent alignment, prediction of

secondary structures, primer synthesis, protein structure and prediction tools, molecular visualization tools, phylogenetic analysis

Genetic Transformation: gene cloning and transformation, selection of transformants etc.

- **Institutional Visits** : The course teachers organise visits to research institutes such as Biotechnology and Model Floriculture Centre (BMFC), Rajiv Gandhi Centre for Biotechnology (RGCB), ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), CSIR - National Institute for Interdisciplinary Science and Technology (NIIST) etc. The Department also organises invited talks, seminars of experts and resource persons from various industries and research institutes.

6.4.6. Supervision of students in M.Sc. (Agri.) Programmes:		
Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Molecular Biology and Biotechnology	6/year	7

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Feedback is collected from the students periodically to improve the teaching and to assess the competency/performance of the faculty and students. Regular meetings are conducted with students and proper actions initiated to address their issues, if any. As per their feedback, session on update of technologies was initiated in journal club; and a hands-on training in Bioinformatics was organized for the students. Interaction with international faculty was organized to provide opportunities for higher studies. The faculty of the department provide consultancy services in plant tissue culture for various firms/ Govt Agencies/NGOs. Two department faculty are nominated as nodal officers of block level agriculture knowledge centres of Dept. of Agriculture. The faculty also act as mentors of various agri start-ups and young innovators programmes.

6.4.8. Student intake and attrition in the M.Sc. (Agri.) programme for the last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	2	1	1	0
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	-	1* (Appointed as Bank Officer)	-	-	-
Percentage	0	50	0	0	0

6.4.9. ICT Application in Curricula Delivery:

Moodle platform is used for all the course-related activities.
Full-speed internet connectivity available.
Classrooms equipped with projectors and laptops
Laptop facilities are available in the department for data analysis and other academic purposes.
Classes are conducted in online and hybrid mode.
Students given training in bioinformatics databases and tools for retrieving sequences, primer design and sequence.
Students given training to access e-resources for literature in CeRA, MyLOFT, Pubmed.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M. Sc. (Agri.) Microbiology

DEPARTMENT OF AGRICULTURAL MICROBIOLOGY



Facilities

6.4.1. Brief History of the Degree Programme:

The Department of Agricultural Microbiology at College of Agriculture, Vellayani was established in 2007 as per the decision of the 101st meeting of the Academic council. Three faculty members working in the Department of Plant pathology were deployed to form the Department of Agricultural Microbiology. The Department was established with the objective of offering PG programme in Agricultural Microbiology and to conduct research on microbial inoculants for developing native isolates of biofertilizers, biocontrol agents and organisms for waste management. The Under Graduate courses handled include Agricultural Microbiology and Experiential Learning in Microbial inoculant production-Biocontrol and Biofertilizer organisms, with the aim of introducing the students to the fascinating world of microorganisms especially agriculturally important ones. The post graduate programme started in the Department with the intake of two students during the academic year 2012-13. The ICAR syllabus is being followed for UG and PG courses. In the 56th meeting of Board of Studies in 2015, approval was given for starting Ph.D. programme in the Dept. of Agrl. Microbiology at CoA, Vellayani. Ph.D. programme started with intake of two scholars in 2019-20. The faculty are committed in guiding research scholars in diverse fields such as bioinoculant technology, metagenomic studies, biofertilizers and biological control agents, beneficial microorganisms, food microbiology, plant microbe interaction coming up with innovative technologies in crop production and protection. The nomenclature of the department was changed from Department of Agricultural Microbiology to Department of Microbiology in 2023.

Objective

- ♥ Impart teaching at UG and PG levels in various aspects of Agricultural Microbiology.
- ♥ Conduct research on microbial inoculants for developing native isolates of biofertilizers for crop nutrition, biocontrol agents for disease management and organisms for waste management.
- ♥ Offer training and advisory services to farmers and public through different extension modes.
- ♥ Microbial quality analysis of microbial inoculants and soil samples.

Accomplishments of M.Sc. (Agri.) Microbiology Programme at a glance		
Batches of students passed out so far	:	11
Number of students passed out so far	:	22
Number of students passed out during the assessment period	:	14
Number of students secured placement as faculty in the University		Nil
Number of students secured job in Govt./Private sector during the tenure	:	2
Number of students pursuing Ph. D with SRF	:	1
Number of students currently in roll and pursuing the PG programme	:	3

Salient research findings

During the period of assessment, the Department carried out research in the field of agricultural microbiology including plant-microbe interaction studies, development of microbial inoculant and novel formulations, soil metagenomic analysis. Many technologies, leads and the findings obtained through M.Sc. programmes opened up the possibility of developing new technologies in the field of crop production and protection. A brief account of the accomplishments made out of M.Sc. research programme are presented below.

- Pink Pigmented Facultative Methylophilic (PPFM) isolates were screened for water stress tolerance and yield in paddy and two isolates PPFM 37 and PPFM 38 were found to be promising.
- Silicate solubilizing bacteria were isolated from rice cultivated areas and its potential for plant growth promotion and disease suppression was evaluated
- An encapsulated formulation of PGPR Mix I was developed and tested for growth and yield in bush cowpea (*Vigna unguiculata* sub sp. *unguiculata* (L.) Verdcourt).
- Endophytic endospore forming *Bacillus* were tested for plant growth promotion and disease suppression in black pepper
- Isolation and characterization of beneficial rhizosphere microorganisms from ragi grown in Attappady hill tract of Kerala showed promising results.
- Exopolysaccharide producing bacteria were isolated and characterized from soil-based nesting structures of insect.

Department of Microbiology at a glance (2019-23)		
ICAR Schemes.	:	1 AINP on Soil Biodiversity - Biofertilizers (AINP on SBB)
National Projects	:	0
External Aided Projects	:	2
State Plan Projects	:	5
Industry linked projects and consultancy	:	3 (ESAF ToT, Attingal Municipality, State Biocontrol lab)
Publications	:	32
Revenue generation	:	Rs. 49.00 lakhs (2019-23)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	0	1 (in the vacan	0	ICAR

			cy of Assist ant profes sor)		
2	Associate Professor	1	0	1	ICAR
3	Assistant Professor (Non-plan)	3	1	1	ICAR
4	Assistant Professor (AINP)	1	1	0	ICAR
5	Assistant Professor Microbiology (Originally posted at the Dept of Mol. Biol. and Biotechnology)	1	1	0	ICAR
	Total	6	4	2	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students' guidance	Remarks
1	Dr. Chitra N., Assistant Professor, AINP on SBB, RARS(SZ), Vellayani	4	1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The department is supported with fully functional laboratories as per the requirements of the course curriculum. Separate class rooms and laboratory facility are available for UG and PG courses. The PG laboratory is well equipped and is sufficient to give hands-on training in different microbial techniques as per the course curriculum to under graduate and post graduate students. In addition to this an instrumentation facility and a research lab is also available for teaching and research purpose. The Centre for Microbial Technology functioning in the Department also facilitate in trainings students in microbial inoculant technology. The department also has a full-fledged production unit with four fermenters which is used to impart

hands-on training to UG and PG students on microbial inoculant production. The class room and lab facilities of the department are sufficient to provide a hands-on experience in every aspect of microbiology *viz.*, techniques in microbiology, microbial physiology, genetics, food microbiology, microbial biotechnology, soil microbiology and biofertilizer technology.

Class rooms	Laboratories	Farm land	Equipment
PG – 40.5 m ² Ph.D.- 20 m ²	UG lab – 55.5 m ² PG lab – 36 m ² Research lab – 83 m ² Instrumentation facility – 27.6 m ² Biofertilizer Production unit – 52 m ² Molecular biology lab – 18 m ² Cyanobacterial lab – 7.65 m ² Staff rooms- 3 nos- 26.55 m ² Total – 778.917 m²	Open area – 135 m ² Greenhouse – 117 m ² Polyhouses– 49 m ² Waste management pilot plant and composting unit – 55.5 m ²	Autoclave – 4 nos Laminar Air flow chamber – 4 nos Hot air oven – 2 nos Incubator – 3 nos Fermentors – 4 nos Deep Freezer – 2 nos Refrigerated Centrifuge – 2 nos UV Spectrophotometer – 2 nos Incubator shaker – 2 nos Water Bath – 3 nos Shaking water bath – 1 no Shaker – 2 nos Electronic weighing balance – 3 nos Student Microscope Monocular – 19 nos Stereo Zoom Microscope – 1 no. Trinocular light Microscope with camera – 2 nos Phase contrast/Dark field Microscope – 2 nos Lyophilizer – 1 no. Rotary Evaporator – 1 no. Gel electrophoresis unit – 2 nos LCD projectors – 2 nos Smart board – 1 no. pH meter – 2 nos Magnetic stirrer – 2 nos Vortex mixer – 2 nos Distillation units – 3 nos Microwave oven – 2 nos BOD incubator – 1 no.

6.4.5. Conduct of Practical and Hands-on-Training

- Post graduate students are given thorough hands- on experience on basic microbiology techniques including isolation, enumeration, biochemical and molecular characterization, and identification of microorganisms.
- Students are trained well in soil microbiology and isolation and characterization of biofertilizer microorganisms.

- Students are given practical training on mass production and quality control of biofertilizers and biocontrol agents.
- Hands on practical training is given for operating equipment including fermenters.
- The students are exposed to techniques in microbial genetics, physiology etc

6.4.6. Supervision of students in M.Sc. (Agri.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Microbiology	4/year	4

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Department of Microbiology is functioning as Center of Excellence in Microbial Technology and was instrumental for the development and popularization of microbial inoculant technology in the state. The Department is acting as a nodal agency for supply of mother culture of biofertilizers and biocontrol agents to production units thorough out the State. We are playing a major role in popularizing microbial inoculant technology among the farming community by conducting trainings, trials, demonstrations and equipping farmers with evolved technologies. The department faculty is nominated as nodal officers of Block Level Agriculture Knowledge Center of Dept. of Agriculture for overall development of state agriculture sector by providing technical advice and immediate solutions. We are extending our service to remote villages like Attappady, dominated by tribal population, by conducting demonstrations, hands-on training and trials on production and use of biofertilizers the farmers. We have stakeholder in industries to whom our technology has been transferred. The technology for waste management developed by the Department has been adopted and successfully implemented by different local self-governing institutions in the South zone of Kerala. The Department scientists are always ready to resolve the problems faced by farmers through direct interactions, multidisciplinary field visits, advisory services, agro-clinics, over phone or through social media etc. The teaching curriculum followed is equipping the students to meet the demands of the industry especially in the field of plant protection.

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	5	1	1	2	1
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24

Number	0	0	0	0	-
Percentage	0	0	0	0	-

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle, Google meet, Google classroom for the delivery of the curriculum. Teaching videos on different topics are also available. A collection of microbiology books is available at the Department accessible to the students.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M. Sc. (Hort.) Vegetable Science

DEPARTMENT OF VEGETABLE SCIENCE

Naturally ventilated polyhouse



Heating mantle



Hotplate



Microscope



Centrifuge



Mist chamber



Rain shelter



Hot air oven



Stirrer



PG lab



Water bath



Classrooms

UG class room



Parity work board



Distillation unit



Digital moisture meter



Desiccator



PG classroom



Facilities

6.4.1. Brief History of the Degree Programme:

Department of Horticulture was established in College of Agriculture, Vellayani in 1955 and PG courses were offered since 1976. Department of Olericulture attained the status of individuality in the year 1996 and Master's programme was started in the department in 1996. The department was renamed as Department of Vegetable Science in 2018. The department is beholding a long history of responsiveness towards excellence in teaching and mentoring students, serving farming community through sale of seeds and planting materials of KAU released high yielding vegetable varieties, as well as to develop new strategies in vegetable crop production, management and improvement and release of high yielding and disease resistant vegetable crop varieties. The faculty are committed in guiding research scholars in the latest aspects of vegetable crop production like protected cultivation, organic crop production, hydroponics *etc.*, breeding vegetables for crop improvement and pest and disease management, development of climate resilient cultivation practices for vegetable crops and vegetable grafting. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objective

- Impart quality education to post graduate students to secure high positions in competitive examinations and eligibility tests
- Equip the post graduate students to formulate research programmes and conduct independent research on vegetable crops
- Develop and release high yielding and stress tolerant varieties of vegetable crops for the benefit of farming community
- Educate on production technology and crop improvement of warm season, cool season and under- utilized vegetable crops, protected cultivation and biotechnology of vegetable crops
- Production and sale of seeds and planting materials of KAU released high yielding varieties of vegetable crops
- Provide diagnostic services to field problems faced by the vegetable farmers throughout Kerala

Accomplishments of M.Sc. (Hort.) Vegetable Science Programme at a glance		
Batches of students passed out so far	:	27
Number of students passed out so far	:	49
Number of students passed out during the assessment period	:	16
Number of students secured placement as faculty in the University	:	8
Number of students secured job in Govt./Private sector during the tenure	:	15
Number of students pursuing Ph. D with SRF	:	3
Number of students currently in roll and pursuing the PG programme	:	8

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of vegetable science such as vegetable cultivation practices, crop improvement, vegetable seed production, vegetable grafting and biotic and abiotic stress resistance in vegetable crops.

- Released the following high yielding varieties of vegetable crops:
Amaranthus (*Amaranthus tricolor*)- KAU Vaika
Yard long bean (*Vigna unguiculata* ssp. *sesquipedalis*) – KAU Deepika
Winged bean (*Psophocarpus tetragonalobus*)- KAU Nithya
Cluster bean (*Cyamopsis tetragaloba*)- KAU Suruchi

An array of technologies was researched through M.Sc. programmes and the findings open up the possibility of using diverse solutions to the challenges in the field of vegetable crop production. A brief account of the accomplishments from M.Sc. research programmes are presented below.

- Identified varieties in netted musk melon suitable for cultivation in Kerala
- Standardized micropropagation technique in ivy gourd
- Standardized grafting technique in bittergourd and watermelon and evaluated tomato grafts for yield, quality and bacterial wilt resistance
- Evaluated bush dolichos bean, bottle gourd, beetroot and tropical radish for growth, yield and quality
- Evaluated biostimulants for growbag culture of organic amaranthus and studied the seed yield in amaranthus using plant growth regulators
- Identified varieties in watermelon suitable for cultivation in Kerala and standardized agrotechniques for vertically trained watermelon
- Nutrient profiling of yard long bean was studied

Department of Vegetable Science at a glance (2019-23)		
ICAR Schemes	:	Nil
National Projects	:	Nil
External Aided Projects	:	Nil
State Plan Projects	:	12
Industry linked projects and consultancy	:	Nil
Publications	:	With NAAS above 5 - 20 With NAAS below 5 - 13
Revenue generation	:	Rs. 25.16 lakhs (2019-23)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	0	0	0	ICAR
2	Associate Professor	0	0	0	ICAR
3	Assistant Professor	4	4	NIL	ICAR
	Total	4	4	Nil	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Student guidance	Remarks
	2019			
1	Dr. Nisha S.K., Assistant Professor, KVK, Sadanandapuram, Kollam	-	2019- 1 2020- 1	-
2	Dr. Lekshmi S.L., Assistant Professor, ORARS, Kayankulam	-	2019- 1	...

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	2	1
2	Office attendant	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The class rooms, lab facilities and seed production plot of the department together with the Revolving fund on seed production and Annual state plan projects functioning in the department are sufficient to provide a hands-on experience in every aspect of vegetable science *viz.*, vegetable cultivation practices, vegetable seed production, vegetable grafting, vegetable breeding, biotic and abiotic stress management in vegetables *etc.* along with theory sessions.

Class rooms	Laboratories	Farm land	Equipments
PG – 42 m ² . Ph.D.- 24 m ² .	UG lab – 15 m ² . PG lab – 18 m ² Total - 33 m²	Seed Lab- 480 m ² Seed Processing building – 71.55 m ² Seed Processing yard – 83.52 m ² Seed production field – 10000 m ² - poly house - 440 m ² - net house – 400 m ² - mist chamber – 40 m ² - rainshelter- 230 m ²	Refrigerator – 3 nos. Soxhlet apparatus- 1 Micro centrifuge- 1 Electronic weighing balance – 3 LCD projector – 2 Hot air oven – 1 Purity work board- 1 Dessicator- 1 Spectrophotometer- 1 Microscope- 1 Seed vending machine- 1 Distillation unit- 1 Hot plate- 1 Stirrer-1 Digital humidity meter- 1 Moisture meter- 1 Mixer grinder- 1 Thermometer- 1 Digital pH meter- 1 Moisture meter- 1 Photostat machine- 1 Computer desktops- 4 Laptop- Scanner- 1 Garden tools Garden secateur- 3 Garden shears- 2 Hand cultivator- 2 Pick-axe- 1 Crow bar- 1 Pruning saw- 1 Garden rake- 1 Showel- 1 Spade- 3 Rose can- 2 Sickle- 1 Garden sword- 1 Garden fork- 1 Trowel- 1 Wheel barrow-1 Budding knife- 30

6.4.5. Conduct of Practical and Hands-on-Training

- Hands-on training on the cultural operations to be followed in the field for the cultivation of cool season vegetables and warm season vegetables from sowing upto harvesting

- Training on selfing and crossing techniques and hybrid seed production in vegetable crops
- Familiarization with protected cultivation of vegetable crops inside poly house, rain shelter, mist chamber, shade house *etc.*
- Students are trained in preparation and use of plant growth regulators and herbicides
- Practical training on experiments on breaking and induction of dormancy using chemicals
- Students are given exposure to seed processing and extraction of warm season vegetables
- Seed testing for genetic purity, germination, physical purity, seed viability *etc.*, were carried out
- Identification and maintenance of vegetable species and varieties, planting and maintenance of under exploited vegetables and organic vegetable production were carried out

6.4.6. Supervision of students in M.Sc. (Hort.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Hort.) Vegetable Science	4/ year	4 4 (from Dept.)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The students who have passed out from the department are well equipped on different aspects of vegetable cultivation, which enables them to appear for National level competitive examinations and secure good jobs, at the state and National level. Department of Vegetable Science is maintaining good relationship with farming community and equip them with evolved technologies and services through supply of quality seeds and planting materials of KAU released high yielding vegetable varieties, trainings, demonstrations, *etc.* One faculty is nominated as the nodal officer of block level agriculture knowledge centres (AKCs) of Dept. of Agriculture for overall development of state agriculture sector by providing technical advice and immediate solutions. The department has collaboration with progressive farmers under different AKCs who undertake participatory seed production of the vegetable varieties being released from the department. One Faculty is a member of the Multidisciplinary diagnostic team of College of Agriculture, Vellayani, All faculties are always ready to resolve the problems faced by farmers through direct interactions, multidisciplinary field visits, advisory services, agroclinics, over phone or through social media *etc.*

6.4.8. Student intake and attrition in the M.Sc. (Hort.) programme for last five years:

i) Student intake

Year	2019- '20	2020- '21	2021- '22	2022- '23	2023- '24

Number	4	4	4	4	4
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. Teaching notes are also prepared by the faculty.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M.Sc. (Hort.) Postharvest Management

DEPARTMENT OF POSTHARVEST MANAGEMENT



Facilities

6.4.1. Brief History of the Degree Programme:

The Department was established as a division of Processing Technology under the Department of Horticulture from March 1992 and four separate departments including Dept. of Processing Technology was established in 01.09.1998. The Department was renamed as Dept. of Post Harvest Technology from 14.06.2017 and as Department of Postharvest Management from 23.11.2022. The M. Sc. (Hort.) programme with specialization in Processing Technology was started in 1998 itself, later the degree programmes were named as Hort. (Post Harvest Technology) and now as Hort. (Postharvest Management). The Department is beholding responsiveness towards excellence in teaching and mentoring students, serving farming community, as well as developing innovative and practical solutions for postharvest management, processing and value addition of horticultural crops. The faculty are committed in guiding research scholars in diverse fields such as post-harvest technology, processing and value addition of horticultural commodities, benefiting the public at large. Focal areas of research include postharvest management, pre- harvest factors affecting post-harvest quality, application of nanotechnology, post-harvest management, packaging and storage of fresh and processed commodities, bioactive compounds and development of functional foods, byproduct utilization, development of novel and convenient food products and quality control studies. ICAR 2009 syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objectives

- ❖ Undertaking research, teaching & extension on post-harvest management including processing, value addition, quality control and marketing of horticulture crops of Kerala.
- ❖ Developing strategies for reducing post-harvest losses in commercial horticultural crops of Kerala.

Accomplishments of M.Sc. (Hort.) Postharvest Management at a glance		
Batches of students passed out so far	:	18
Number of students passed out so far	:	38
Number of students passed out during the assessment period	:	16
Number of students secured placement as faculty in the University so far	:	1
Number of students secured placement as faculty in the Central Govt Institutions so far	:	1
Number of students secured job in Govt./Private sector during the tenure	:	6
Number of students qualified NET	:	6
Number of students pursuing Ph. D with SRF	:	4

Number of students currently in roll and pursuing P.G programme	:	10
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Salient research findings

A brief account of the accomplishments made out of M.Sc. research programme during the assessment period are presented below.

- Protocol for hydromaceration of purple- fleshed dragon fruit peels for betalain pigment extraction was standardized. Dragon fruit and peel could be effectively utilized for beta carotene rich blended and functional RTS beverages thus proving the possibility of efficient waste utilization.
- Potential of purple dragon fruit peel as a natural food colour source was proved by incorporating the betalain pigment into white or purple fleshed dragon fruit squash.
- Process parameters for anthocyanin extraction from pomegranate peel by maceration were standardized.
- Fermentation of jackfruit seeds for eight days could produce aromatic jackfruit seed flour with acceptable biochemical, physical, functional and sensory qualities and quality cookies could be formulated with 10% aromatic jackfruit seed flour.
- Pre-treatment with 50% aloe gel, followed by pre-packaging in ventilated polypropylene and refrigerated storage in CFB boxes could extend the shelf life of rambutan fruits up to 16 days with minimum spintern browning and nutritional loss.
- Processing methods for the production of varikka jackfruit seed flour with functional properties were analysed. Pressure cooking, pan roasting followed by manual removal of spermoderm and pan roasting of seeds were identified as the best processing methods for production of jackfruit seeds with different functional properties.
- Pineapple fruits (var. Mauritius) harvested with crown and two cm stalk at stage I maturity when subjected to hot water treatment followed by low temperature storage (24°C) could extend the shelf life of fruits meant for distant markets up to 21.25 days and 18.25 days for stage 2 maturity stage for the local market.
- Technology for wine preparation from three different under-exploited fruits of Kerala viz., papaya, carambola and rose apple was refined.
- Sanitization by ozonation and hot water treatment followed by dipping in 2 mM salicylic acid for 5 minutes could delay ripening of papaya cv. Red Lady with an extended shelf life of 14.56 days under room temperature storage.
- Surface sanitization of jackfruit using 100 ppm sodium hypochlorite, followed by pretreatment of de-seeded bulbs with calcium chloride and refrigerated storage in laminated PP/LDPE pouches could give a shelf life of 7 days for minimally processed ripe bulbs of cv. Muttom varikka.

Department of Postharvest Management at a glance (2019-23)

External Aided Projects (RKVY)	:	1
State Plan Projects	:	10
State Agricultural Department project	:	1

Observational Trial	:	1
Short term projects to students from Outside Universities	:	30
Industry linked consultancies	:	16
Transferred Technologies	:	1
Technologies approved for ToT	:	8
Awards	:	Best paper presentation award – 2 Best poster presentation award - 1 Second Best poster presentation award – 1
Faculty international fellowship/training	:	Asian Productivity Organisation fellowship for multicountry observational study mission on Good Agricultural Practices and Advanced Postharvest Handling practices at Tokyo, Japan
Student exposure/hands-on training on recent advances	:	i) Recent advances in food drying technologies ii) Hands-on training on High end scientific equipment for appraisal of food properties iii) Recent advances in banana improvement, production, protection, PHT, extension, and business arena for nutritional security
Publications	:	Research Papers - 19 With NAAS above 5 - 13 With NAAS below 5 - 6 Seminar proceedings/abstracts – 18 Book chapters – 19 Book – 2 Popular Articles – 31
Extension activities	:	Radio programmes – 4 Dooradarshan programme-1 Trainings organised - 32 Faculty as resource person in training programme – 99 Incubation facility in Techno Incubation centre-8
Training/ seminars/ workshop attended by faculty	:	41
Other activities	:	Commercial Production and sale of value-added products

		Quality analysis of fresh and processed commodities. Maintaining 4 WhatsApp groups for technical advice and consultation in the field of post-harvest technology and value addition. 9 KW Solar power plant for generation of electricity
Revenue generation	:	Rs. 9,12,776/- (2019-23)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant
1	Professor	1	1	0
2	Associate Professor	0	0	0
3	Assistant Professor	2	2	0
	Total	3	3	0

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	1	1
2	Office Attendant	1	1- 2019-2022 April 1*(*sharing with Dept of Vegetable Science from May, 2022 onwards)

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities functioning in the Department are sufficient to provide a hands-on experience in every aspect of postharvest management, processing and value addition of horticultural crops.

The following additional space and facilities available in the Department are utilized for teaching and research activities of P.G. students of the Department.

1. Techno Incubation Centre with a production unit, quality control lab and preliminary processing area to help the prospective entrepreneurs and SHG groups ensuring sustainable income and effective dissemination of value addition technologies operating on a revolving fund mode.
2. Centre for formulation of convenient foods which serves as a model minimal processing unit fulfilling the requirement of FSSAI standards.
3. Processing laboratory with FSSAI registration No.21317138000133 for commercial production and marketing of value-added fruits and vegetable products.

The biochemical, nutritional and sensory quality parameters (colour and texture) of fresh and processed commodities, plant samples etc are analysed for the P.G. research projects of other Departments of College of Agriculture, Vellayani also utilizing the laboratory facilities of our department.

Class room	Laboratory	Equipments	
P.G. Class room- 50 m ²	P.G. Lab- 87.32 m ²	Analytical balance (1) Air fryer (1) Autoclave (2) Blancher cum drier (1) Blender (2) Cabinet tray dryer (2) Centrifuge (2) Clevenger apparatus (4) Cold room (1) Colourimeter (1) Continuous sealer (1) Cup sealer (1) Deep freezer (3) Digital refractometer (2) Double distillation unit (1) Electronic balance (4) Foil sealer (1)	Laminar air flow (1) Magnetic induction sealer (1) Magnetic stirrer with hot plate (1) Modified Atmospheric Packaging System (1) Microcentrifuge (1) Microwave oven (1) Mixer (2) Moisture analyzer (1) Muffle furnace (2) OTG oven (1) Ozoniser (1) pH meter (1) Precision balance (1) Pulp processor (1) Refrigerator (4) RO water unit (1) Sealing machine (5) Shrink wrapping machine (1) Single distillation unit (1) Soxhlet apparatus (3) Spectrophotometer (1) Spray drier (1) Texture Analyzer (1) Thermohygrometer (1) Thermometer (2) TLC (1) Vacuum packing machine (1) Vernier caliper (2) Vertex mixer (1) Water activity meter (1) Water bath (2)
Additional facilities for P.G. students		Foot operated packing machine (1) Freeze drier (1)	
1. Techno Centre 2. Centre for formulation of convenient foods 3. Commercial processing laboratory	Incubation	Fruit and vegetable cutter (1) Fruit and vegetable washer (1) Fruit mill (1) Fruit pulper (1) Gas analyser (1) Grinder (1) Hand pH meter (1) Hand Refractometer (8) Hand wrapper (1) Head space O ₂ - CO ₂ analyzer (1) Hot air oven (2) Hot plate (1) Juice filling machine (1) L –Sealer (1)	
TOTAL - 311.46 m²			

The above equipments are also utilized for the quality testing of plants, fresh and processed food products of P.G Research projects of other Departments of College of Agriculture, Vellayani and Padannakkad under Kerala Agricultural University

6.4.5. Conduct of Practical and Hands-on-Training

- Preparation of value added products from horticultural crops on a commercial scale.
- Practical training on different aspects of advanced processing techniques and advanced packaging technologies including vacuum, MAP and Individual Shrink Wrapping.
- Exposure in quality analysis of fresh and processed products including sensory studies.
- Post harvest physiology trials are being conducted in practical classes for understanding shelf life and storage stability.
- Students are well equipped with the recent and advanced value addition technologies and post-harvest management practices adopted in fruits, vegetables, spices, plantation crops, medicinal and aromatic crops.
- Exposure visits to technology incubation centres, processing industries, well equipped and established processing units, packaging and exporting units and research centres are arranged
- Students are attending National and Regional seminars and training programmes organised by different Central Institutes to familiarize with the recent developments in processing technology.

6.4.6. Supervision of students in M.Sc. (Hort.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Hort.) Postharvest Management	4/year	3

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

- Local specific problems highlighted by the farmers and extension personnel in the field of postharvest Technology (State Horticulture Mission, Vegetable and Fruit Promotion Council of Kerala, ATMA, HortiCorp) in the annual zonal research and extension advisory council meeting are prioritized for further research as PG projects.
- Feedback was taken from each student after each semester to assess the quality of Teaching

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	4	3	4	4	4

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	1	0	0	-
Percentage	0	33.3	0	0	-

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of curriculum
High speed wifi internet connection.

Facilities available in the College library including online access to e-sources viz., CeRA, Krishikosh, eBooks of CABI, e - journals etc. are utilised by the students.

Usage of GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software developed by KAU for statistical analysis of data.

PG courses, course teachers and students are registered in Academic Management System (AMS).

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



**Degree Programme : M.Sc. (Hort.) Plantation, Spices, Medicinal
& Aromatic Crops**

DEPARTMENT OF PLANTATION, SPICES, MEDICINAL & AROMATIC CROPS



Clevenger Apparatus



Freeze Drier



Laminar Air Flow



Water Bath



Stereomicroscope



Distillation Unit



Hot Air Oven



Rainshelter



Hi Tech Spice Nursery



Vertical Column Pepper

Facilities

6.4.1. Brief History of the Degree Programme:

The Department of Plantation Crops and Spices came into existence after the division of the Department of Horticulture in 1998 as per Order No. Acad Ag (1) 9347/98 dated 26/08/1998 of the Dean, College of Agriculture, Vellayani. M.Sc. Horticulture and Ph.D. Horticulture degree has been offered to students from this department who carried out research in various aspects of Plantation, Spices, Medicinal and Aromatic Crops. Since then, the department has been dealing with teaching, research and extension activities related to plantation, spices, medicinal and aromatic plants. The Department imparts knowledge on crop production, crop improvement, value addition and conservation aspects of plantation, spice, medicinal and aromatic crops grown in India. The department also takes up programmes on biotechnological interventions for improvement of plantation, spices, medicinal and aromatic crops.

In accordance with ICAR accreditation systems and BSMA recommendations, the nomenclature of the discipline has been revised to Plantation, Spices, Medicinal & Aromatic Crops as per order No. Acad/B2/2022/101/12636 dated 23/11/2022 of Director of Education. Henceforth the Department is known as Department of Plantation, Spices, Medicinal & Aromatic Crops.

Objective

To impart basic knowledge and undertake research in the following aspects of Plantation, Spices, Medicinal and Aromatic Crops.

- Production technology of plantation, spices, medicinal and aromatic crops grown in India
- Principles and practices of breeding of plantation, spices, medicinal and aromatic crops
- Principles, concepts and production of organic farming in spice and plantation crops and to facilitate the understanding of the importance, conservation and cultivation of medicinal and aromatic crops.
- Biotechnological interventions for improvement of plantation, spices, medicinal and aromatic crops and to teach advances in environmental management of horticultural crops.
- Systematics of PSMA crops
- Growth, development and physiology of PSMA crops
- Underexploited medicinal and aromatic crops

Accomplishments of M.Sc. (Hort.) Plantation, Spices, Medicinal & Aromatic Crops Programme at a glance			
Batches of students passed out so far	:	19	
Number of students passed out so far	:	49	
Number of students passed out during the assessment period	:	18	
	So far	:	10

Number of students secured placement as faculty in the University	During the assessment period		0
Number of students secured job in Govt./Private sector during the tenure		:	15
Number of students pursuing Ph. D with SRF		:	3
Number of students currently in roll and pursuing the PG programme		:	15

Salient research findings (during the assessment)

- Genetic variability in ginger for yield and resistance to rhizome rot
- Chitosan and salicylic acid mediated metabolite elicitation and growth responses in Kasthuri turmeric and Thipali respectively
- Quality assessment of coconut oil and detection of adulteration
- Evaluation of elite clove accessions and nutmeg genotypes; standardisation of pollination techniques, propagation and mechanical harvesting in clove
- Germination and plant growth responses in *Ocimum* sp., Aswagandha and Kiriya to seed pre treatments
- Microbial elicitation for enhanced growth, yield and secondary metabolite production in *Withania somifera* and *Ocimum basilicum*
- Characterisation and quality analysis of black pepper genotypes in Kerala
- Bioprospecting of Wayanad flora for hepatoprotective and antidiabetic potential
- Diversity analysis of Chittamruthu accessions from Northern districts of Kerala
- Growth responses in *Curcuma longa* to application of Chitin and Chitosan
- Development of Coconut inflorescence based dietary supplement

Department of Plantation, Spices, Medicinal & Aromatic Crops at a glance (2019-23)		
ICAR Schemes.	:	Nil
National Projects	:	Nil
External Aided Projects	:	1
State Plan Projects	:	6
Industry linked projects and consultancy	:	
Publications	:	With NAAS above 5 - 16 With NAAS below 5 - 5 Without NAAS – 7 Proceedings/Abstract – 26 Book/Book chapters- 13 Popular articles- 26

	Leaflets-5
Revenue generation	:

6.4.2. Faculty Strength: Present status

Sl. No	Designation	1/1/2019 to 10/09/2023			11/09/2023 to till date			Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
		Sanctioned	In place	Vacant	Sanctioned	In place	Vacant	
1	Professor	1	0	0	1	0	0	ICAR
2	Associate Professor	1	1	0	1	1	0	ICAR
3	Assistant Professor	2	3*	0	2	2*	1**	ICAR
	Total	4	4	0	4	3	1	

* One of the faculty Dr. Sreekala G.S. is also associating with the duties at RARS (SZ), Vellayani

**Dr. Sonia N. S- Faculty of our Department was transferred to College of Agriculture, Padanakkad on 11.09.2023

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. Sonia N S, Assistant Professor (from 11.09.2023)		4	
2	Dr. Nimisha Mathews, Assistant Professor, Cardamom Research Station, Pampadumpara		1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab assistant	1	1
2	Farm Assistant	1	0
3	Office attendant	1	1 *

*Office attendant of Department of Pathology and is given additional charge

Cleaning staff is provided to the department by the college on periodic basis for cleaning the department and premises

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department are sufficient to provide a hands on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic Crops along with theory sessions.

Class rooms	Laboratories	Farm land	Equipment
UG practical class room and laboratory (55 m ²)	PG laboratory I (22.68 m ²)	Field for practicals – 2000 m ²	Freeze Dryer (1) Double Distillation Unit (1) pH meter (1) Conductivity meter (1) Digital weighing balance (2) Soxhlet apparatus (3) Clevenger apparatus (3) Dissecting microscope (10) TLC kit (1) Cryocan (1) Refrigerator with defreezing facility upto -23° C (1)
Class room for PG (14 m ²)	PG laboratory II (10.86 m ²)	Hi tech Polyhouse (1 no) –100 m ²	Binocular microscope (1) Refractometer (1) Vernier Caliper (1) Stereo microscope (1) Muffle furnace (1) Microwave oven (1) Hot Air Oven (2) Coconut scraper (1) Magnetic stirrer (1) Water bath (1) Micropipette (6) Mixer grinder (1) Heating mantle (8) Battery operated sprayer (1) Knap Sack Sprayer (1) LCD projector (2) Water purifier (1) Drip irrigation system (1)
Class room for Ph.D (50 m ²) (shared with the Department of Post Harvest Technology)	PhD laboratory (32.85 m ²)	Medicinal garden-75 m ²	
	Store room – 16 m ²	Rainshelter – 46 m ²	
	Plant Tissue culture laboratory (shared with the Dept of	Rain shelter with mist chamber – 25 m ²	

	Plant Physiology) Preparation room- 25 m ² Inoculation cum incubation room – 50 m ²		Canon Printer (2) Butterfly stove (1) Pressure cooker 20 l (1) Prestige hand mixer (1) Wheel barrow (1) Telescopic pruner (1) Iron shear (1) Sealing machine (1) Multifunction laser printer (1) Induction cooker (1) Laptop HP (1) Top loading balance 3 kg (1) Budding knife (3) Rose Can (3) Soil thermometer (1) Dry and Wet bulb thermometer (1)
Staff room (22 m ²) HOD (14 m ²)			

The Department is maintaining a library for reference of the students and faculties, comprising of 82 reference books, 70 thesis, magazines, credit seminar report, proceedings and abstracts, research reports etc.

6.4.5. Conduct of Practical and Hands-on-Training

- Students get hands-on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic Crops. They are given opportunity to present their research ideas and new knowledge as part of seminars. The students get familiarized with the various recent techniques and advances in the research field. Science discussions are held in the department to invoke inquisitiveness for research in students. Students are provided with facilities for carrying out different practical experiments. The students are well-trained in:
 - Varietal evaluation studies in Plantation, Spices, Medicinal and Aromatic Crops
 - Floral biology of important Plantation, Spices, Medicinal and Aromatic Crops
 - Spacings and planting systems
 - Raising seedlings in nurseries, portrays and polybags
 - Production technology of important Plantation, Spices, Medicinal and Aromatic Crops
 - Use of growth regulators
 - Crop regulation practices including different methods of training and pruning
 - Fertigation and foliar nutrition studies
 - Nursery management
 - Propagation methods like budding, grafting, layering, cuttings and seed propagation
 - As part of the course on propagation, students use the facilities available in the tissue culture lab shared by Department of Plantation, Spices, Medicinal & Aromatic Crops with the Department of Plant Physiology. They also use the facilities available in the Instructional Farm of the college. The students are utilizing these facilities for obtaining hands on training and research.

- Department is maintaining dry plant specimens, herbarium, essential oils and other value added products for acquaintance of the students with the samples.

6.4.6. Supervision of students in M.Sc. (Hort.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Hort.) Plantation, Spices, Medicinal & Aromatic Crops	6/year	4 Till 10.09.2023, 3 (from Department), 1(from outside Department)
		4 *From 11.09.2023, 2 (from Department), 2 (from outside Department)

* One faculty Dr. Sonia N.S. has been transferred

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Feedbacks were collected from the students and parents periodically to improve the teaching and to assess the competency / performance of the faculty and students based on a proforma. The suggestions pointed out for improvement were considered and changes were made in the respective aspects in teaching to improve the quality of teaching. Moreover, meetings were conducted with students by chairman of advisory committee to discuss about the progress of the work and students shared the problems faced by them. These were discussed in advisory committee meetings and solutions to these problems were found out. Periodic department level meeting comprising of the staff and students are conducted in order to analyse the requirements and solutions to the problems raised by the students and the staff. Feedback is taken from the farming community during the training programmes, department visit as well as over the phone regarding the advice and recommendations given to them in sorting out their field problems. Advices are also being given through various farmer whatsapp groups.

6.4.8. Student intake and attrition in the M.Sc. (Hort.) programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	4	5	6	6
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	1	0	0
Percentage	0	0	20	0	0

6.4.9. ICT Application in Curricula Delivery:

The classes are being handled with the application of ICT. High speed internet connection with Wifi is available in the Department. The facilities available in College library including online access to e resources like CERA (Consortium for e-Resources in Agriculture), KrishiKosh, eBooks of CABI, e – journals, digital library facilities, My Loft are being utilised by students and faculties. PG courses, course teachers and students are registered in Academic Management System (AMS). Seminars are being conducted by the students using ICT tools. Classes were handled during COVID lockdown period in hybrid mode using moodle platform. Examinations were conducted online. Seminars were conducted in Google meet platform. Many e-resources like power point presentation slides and practical manuals are being prepared and distributed to students. Students use GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software developed by KAU for statistical analysis of data.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M. Sc. (Hort.) Floriculture and Landscaping



UG Classrooms

Lab and Exhibition unit

Demonstration units of Hydroponic system for ornamental foliage



Polyhouse for cut flowers



Shade house for cut foliage



Fernery



6.4.1. Brief History of the Degree Programme:

The ‘M. Sc. (Hort.) Floriculture and Landscaping’ programme is offered by the Department of Floriculture and Landscaping. The Department is formed by the bifurcation of Department of Pomology and Floriculture in 2019 as per the ICAR guidelines. The decision to bifurcate the Department of Pomology and Floriculture into two *viz.*, Department of Fruit Science and Department of Floriculture and Landscape Architecture, as per ICAR guidelines was implemented following the 134th Meeting of the Academic Council of Kerala Agricultural University, held on 31.12.2019. Accordingly, from 2020 admission onwards students joined in discipline ‘Floriculture and Landscape Architecture’; later the department name was revised to ‘Floriculture and Landscaping’ in accordance with the ICAR accreditation systems and BSMA recommendations (No. Acad/B2/2022/101/12636 of Director of Education, dated, Vellanikkara, 23.11.2022)

The faculties of the newly evolved department are committed in guiding research scholars in diverse fields of commercial and ornamental floriculture such as crop production technology, crop improvement, exploiting native and traditional ornamentals, precision farming, landscaping, hydroponics, and value addition. The department followed ICAR 2009 Syllabus till 2021 admission, and the ‘ICAR- Restructured and Revised Syllabi of Post-graduate Programmes Vol. 1- Horticultural Sciences – Floriculture and Landscaping’, is being followed from 2022 admission onwards. The faculties are also instrumental in imparting training to farmers, students, entrepreneurs, and women on commercial cultivation of flowers and foliage, and value addition technologies in ornamentals.

Objective

- ♥ Impart quality education to post graduate students to secure top positions in competitive examinations and eligibility tests and empower them for managing new job requirements in landscaping and commercial production of ornamentals
- ♥ Update knowledge on various subsectors of floriculture such as production of loose flowers, cut flowers, cut foliage, specialty flowers, cut greens and fillers, pot plants, and bedding plants; seed production in flower crops; crop regulation in ornamental crops; landscaping and interiorscaping; vertical gardening; dry flower production technology and products; lawns; arboriculture; essential oils, nutraceutical pigments; dyes; value addition; current trends in production of floricultural crops; developments in protected cultivation of floricultural crops etc.
- ♥ Equip the post graduate students to formulate the research programme and conduct independent research in various aspects of floriculture and landscaping
- ♥ Develop and disseminate the technologies for the benefit of farming community, and entrepreneurs.

Batches of students passed out so far (M.Sc. (Hort.) Floriculture and Landscaping, 2020)	1
Number of students passed out so far (M.Sc. (Hort.) Floriculture and Landscaping, 2020)	4

Number of students passed out during the assessment period	4
Number of students passed out and pursuing PhD programme	1
Number of students secured job in Govt./Private sector during the tenure	3
Number of students currently in roll and pursuing the PG programme	10

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of floriculture such as crop production and propagation, crop improvement, and value addition. A brief account of the accomplishments from research programs are presented below.

- Commercial cut foliages, *Dracaena reflexa* 'Variegata' and *D. fragrans* 'Massengeana', performed better under shade level of 75 % in terms of vegetative parameters, while 50 % shade level resulted in better vase life. Shade net colors of red resulted in better vegetative parameters and maximum vase life in *D. reflexa* 'Variegata' and black shade net color gave maximum vase life in *D. fragrans* 'Massengeana'
- In the study on 'Morphological and molecular characterization of genotypes of orchid *Cattleya*', the highest scoring genotypes in terms of morphological and floral characters were identified, which can be selected for further breeding programs in this high value orchid.
- Nutrient management studies in commercial cut flower Gerbera (*Gerbera jamesonii* 'Natasha', showed that soil application of thermochemical organic fertilizer custom blended with Urea, Rajphos and MOP @ 1.2 g N: 0.8 g P₂O₅: 2 g K₂O per plant showed significant improvement in floral parameters
- Studies on 'Irrigation scheduling of potted gerbera (*Gerbera jamesonii* Bolus) under rain shelter" revealed that drip irrigation at 60 % water deficit level recorded lowest mean number of days for bud initiation, highest flower yield, highest values of all flower characters and more sucker yield.
- Studies on "Shade requirement for cut foliage plants (*Dracaena* spp.)" showed that shade level of 75 % gave highest values for biomass accumulation and growth parameters and shade level of 50 % reported maximum vase life. Among the different shade net colors used, red colored net reported highest biomass accumulation and growth parameters; whereas maximum vase life was noted under black (*Dracaena fragrans*), red and control (*D. reflexa*) and green (*D.sanderiana*).
- As part of the State Plan Project 'Entrepreneurship development through value addition in floriculture (2021-22, 2022-23)', infrastructure for value addition in floriculture was created and an 'Educational Museum' for value added products was set up. Two 5-day skill training was given to 43 participants interested in value addition in floriculture. Following the training, participants have taken up activities like indoor gardening, miniature garden and open terrariums, and marketing the products.
- A rose garden was established within the College Garden premises utilizing state plan funds. The rosarium has collection of about 30 varieties and serve as a germplasm collection

of rose genotypes. Moreover, the department maintains a collection of different ornamentals such as flowering and foliage shrubs, climbers, herbaceous perennials and annual flowers.

Department of Floriculture and Landscaping at a glance (2019-23)		
State Plan Projects	:	3
Publications-Research paper	:	With NAAS above 5 - 10 With NAAS below 5 - 2
Publications-Popular Articles	:	7
Publications-Training Notes	:	1
Publications-Abstract	:	8
Seminar presentation	:	5 (poster)
Award for best poster presentation	:	1
Extension activities: Trainings organized	:	3
Extension activities: Training classes handled by Faculty	:	57
Extension activities: Radiotalks and learning videos	:	7 (1 video)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1		1	ICAR
2	Associate Professor	1		1	ICAR
3	Assistant Professor	2	3	0	ICAR
	Total	4	3		

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. Sheena. A Assistant Professor (Horticulture) Instructional Farm College of Agriculture, Vellayani, Thiruvananthapuram – 695 522	1	3	Assistant Professor (Hort.) Instructional Farm

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Farm Manager	1	Farm Manager – upto 10.08.2021 Farm Supervisor- 11.02.2021 to 31.05.2023 Farm Manager (Temporary) 05.10.2023 to till date. Supervision of garden activities of College Garden, Demonstration units, practical facilities maintained by the Department and research plot of students
2	Lab Attendant	1	0
3	Class IV	1	1 (Common with Dept. of Fruit Science, Dept. of Genetics and Plant Breeding)
4	Computer Assistant	1	Common with Technical Cell, CoA, Vellayani

6.4.4. Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department are sufficient to provide a hands-on experience in different aspects of floriculture along with theory sessions.

Class rooms	Laboratories	Farm land	Equipment
UG - 44.55 m ²	-PG lab – 34.2 m ²	College garden – 1 hectare	Stereo zoom microscope – 1 no: Dissection microscopes – 5 no:s Refrigerator – 1 no, Hot air oven – 1 no: Electronic weighing balance – 1 no: LCD projector – 3 no:s Hotplate Magnetic stirrer – 1 no:s Electronic weighing balance -1 no: Microwave oven -1 no: Soxhlet apparatus – 2 no:s Water Double distillation unit – 1 no. Flame photo meter– 1 no: Clevenger Apparatus -1 no: Electric Bunsen Burner -1 no: Refractometer – 2 no:s., Lux meter – 1 no: Soil hydrometer -1 no:., Tensiometer -1 no: Water proof PC tester/pH/ conductivity /temperature tester – 1 no: Precision balance-1 no:., Weighing balance -1 no: Laboratory Centrifuge-1 no: Garden Equipments Vertical Garden Set -2 no:s Refillable CO ₂ tanks (aquascaping) -4 no:s
PG – 29.4 m ²	-Ph.D lab - 34.2 m ²	Polyhouse - 400 m ²	
Ph.D. - 29.4 m ²		Fernery- 6 m ²	
Staff room- 110.5 m ²	-Hydroponics demo unit - 28.44 m ²	Shade house - 252 m ²)	
	-Educational Museum - 33.92 m ²	Open precision farming research plots – 2000 m ²	
	-Computer lab and	Farm machinery and tools	

Departmental Library-14.21 m ²	workshop – 10 m ²	Hydroponic systems-3 no:s Electric lawn mower- 2 no:s Garden secateurs- 3 no:s Hedge shears- 2 no:s, Spade- 8 no:s Rose can- 2 no:s , Felling knife-2 no:s Small knife-5 no:s , Sprayer-3 no:s Power sprayer-1 no., Hoe -6 no:s Pick-axe- 2 no:s , Crow bar- 1 no: Pruning saw- 1 no:, Garden rake- 2 no:s Trowel- 3 no:s , Sickle- 3 no:s Wheel barrow-2 no:s, Brush cutter-2 no:s
Store rooms – 2 no:s – 28m ²	Rosarium - 1200 m ²	
	Collection of ornamentals – 5000 m ²	

6.4.5. Conduct of Practical and Hands-on-Training

- Practicals are conducted for floral biology and hands on training were given for selfing and crossing procedures for important ornamental crops.
- Familiarization with varieties of important cut and loose flowers, propagation, crop production aspects are being covered. Hands-on training on the cultural operations to be followed such as pruning, pinching, deshooting, disbudding, desuckering etc. were practiced.
- Practical aspects of establishing lawn and its management including special practices such as mowing, raking, top dressing, weed management were covered
- Familiarisation and identification of plants for dry flower making and methods in dry flower making were covered. Hands-on training practices in preparation of different type of flower arrangements including dry flower baskets, bouquets, button-holes, potpourri, wall hangings, greeting cards, floral wreaths, resin-based products, garlands with fresh flowers were being provided. Extraction of essential oil and pigments were also handled.
- Practices were given in preparatory operations, growing media preparations, microclimate management, drip and fertigation techniques, determination of harvest indices and harvesting methods, postharvest handling, and packing methods

6.4.6. Supervision of students in M.Sc. (Hort.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Hort.) Floriculture and Landscaping	4/year	4 3 (from Dept.), 1 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Department of Floriculture and Landscaping maintains cordial relationship with farming community and equip them with evolved technologies and services through trainings, trials, demonstrations, etc. The teaching curriculum followed is equipping the students to meet the demands of the industry especially in the field of landscaping and novel technologies. The faculties also act as mentors for career counselling and placement programs. The faculties are

actively involved in imparting technical sessions for vocational higher secondary students and also in framing their curricula in line with National Skill Qualification Frameworks. The faculties are also involved in extension activities through training sessions to farmers and entrepreneurs; and also delivered radiotalks on popular topics. The 5-days training programs on 'Entrepreneurship development through value addition in Floriculture' conducted by the department has helped entrepreneurs to expand their business in areas of interiorscaping.

6.4.8. Student intake and attrition in the M.Sc. (Hort.) programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number		4	3	3	4
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. The faculty of the department is involved in the development of e-content for value addition in floriculture. Teaching videos are also prepared by the faculty.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Agricultural Economics

6.4.1. Brief History of the Degree Programme:

- The department of Agricultural Economics, headed by a professor was started in the year 1966. M.Sc. (Agri.) programme in Agricultural Economics was initiated in the year 1992 and Ph.D. in Agricultural Economics was initiated in 2010. The thrust areas of the department include agricultural marketing, financial management, Farm management, Natural resource economics and climate change. The faculties are members of various policy making committees of Government of Kerala under Kerala state Planning board and Prices Board. The department of Agricultural Economics is in close liaison with the Department Agriculture Development and Framers Welfare in the implementation of Farm planning

Objectives

- Research on farm management and production economics, agricultural marketing, agri business management, agricultural finance, natural resource and environmental economics
- To equip the students for various examinations like ICAR-JRF, ICAR-SRF, NET, ARS etc.
- To make the students equipped to prepare detailed project reports including financial and economic analysis and developing farm plans through different RAWE modules like farm planning and budgeting and attachment training in Bank.
- To acquaint the students with various software packages and help them to analyse the practical problems with the help of different softwares.
- Prepare the students for various agricultural jobs concerned with the management of farm business and farm resources.

Accomplishments of M.Sc. (Agri.) Agricultural Economics Programme at a glance		
Batches of students passed out so far	:	13
Number of students passed out so far	:	31
Number of students passed out during the assessment period	:	16
Number of students secured placement as faculty in the University	:	1
Number of students secured job in Govt./Private sector during the tenure	:	14
Number of students currently in roll and pursuing the PG programme	:	19

Salient research findings

A brief account of the accomplishments made out of M.Sc. (Agri.) research programme are presented below.

- A study on mitigating production vulnerability of banana through weather-based crop insurance found out that the net returns at Cost C for insured farmers was Rs. 3,56,261 per ha and for uninsured farmers was Rs. 3,24,197 per ha.
- A study on Economic analysis of agricultural input subsidies for coconut cultivation in Kozhikkode district revealed that there is better utilization of available resources by the

large farmers. It was also recommended that if more amount of subsidy were given to environmentally sustainable components such as organic manures and bio-fertilizer, it could enhance the use of these components by the farmers.

- A study on the effect of salinity on paddy production in Alappuzha district of Kerala found out that the average rice yield obtained from paddy cultivation in the salt water unaffected and affected area was 6.01 and 3.8 tonnes per hectare respectively.
- A study on the economic impact of an extreme weather event on the production of cardamom in Idukki district of Kerala revealed that 42.09 per cent of expected yield was lost due to extreme weather event to farmers and only 518.49 kg per ha of cardamom was the harvested yield.
- An economic analysis of Non-Timber Forest Products (NTFPs) in Kerala revealed that out of the total 140 NTFPs collected in Kerala, 69.28 per cent were used for medicinal purposes. The study also found out that on an average, 39.24 lakh kilograms of NTFPs yielded a revenue of Rs. 3.33 crores each year.
- Analysed the production and marketing of turmeric in Kerala and Andhra Pradesh found out that the total cost of cultivation of turmeric was Rs. 2,01,224 per ha in Kerala and Rs. 1,24,410 per ha in Andhra Pradesh. The net returns were found out to be Rs. 68,775 per ha and Rs. 43,589 per ha in Kerala and Andhra Pradesh, respectively.
- Analysed the impact of Vegetable Development Programme (VDP) on farmer's income in Malappuram district of Kerala and found out that the cost of cultivation were Rs. 72,858/ha for the beneficiaries and Rs. 77,634/ha for the non-beneficiaries of pumpkin cultivation, Rs. 78,847/ha for the beneficiaries and Rs. 76,086/ha for the non-beneficiaries of bottle gourd cultivation and Rs. 74,371/ha for the beneficiaries and Rs. 77,840/ha for the non-beneficiaries of cucumber cultivation.
- The result of the study entitled the Capture production and economic performance of inland fisheries in Kerala revealed that the average returns obtained from three fish species namely Pangassius, Tilapia and Anabus was 19,763.52 kg.
- A study on economic value of irrigation water: A case study of Neyyar Irrigation Project, Thiruvananthapuram found out the mean willingness to Pay by the beneficiary farmers to be Rs. 721.80 per year which was only 0.3 per cent of their average annual farm income.
- A study on impact of climate change and adaptation strategies in banana production in Thiruvananthapuram district revealed that growing mixed short duration cropping was the major adaptation practice followed by crop insurance which was practiced by 71 per cent and 65 per cent of the total respondents, respectively.
- A study on the valuation of externalities due to agrochemicals in vegetable cultivation in Palakkad district estimated that the willingness to pay for pesticide-free vegetables to be Rs. 9.02 per kg.

Department of Agricultural Economics at a glance (2019-23)		
National Projects	:	1 (as Co-PI)
State Plan Projects	:	5 (as Co-PI)
Publications	:	With NAAS above 5 - 3
		With NAAS below 5 - 8

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	0	0	0	ICAR
2	Associate Professor	1	0	1	ICAR
3	Assistant Professor	4	4	NIL	ICAR
	Total	5	4	NIL	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Class IV	1	0

6.4.4. Classrooms: PG Programme

Class room	Staff rooms
No. of classroom – 1	No of Staff rooms – 4
Area – 5.73 m length and 3.30m width	Area – 4.51 m length 3.63 width (3 rooms), 6.30m length and 3.32m width (1 room)
Facilities in classroom –Projector, 2 computers, 1 printer	Facilities in Staffrooms –1 Computer, 3 Printers, Department library, Thesis library

6.4.5. Conduct of Practical and Hands-on-Training

- Conducts visits to banking institutions and agribusiness units.
- Imparts hands on training to students to use various statistical packages related to economics.
- Imparts training to prepare detailed project reports including financial and economic analysis
- To equip the students to prepare farm plans and farm budgets.

6.4.6. Supervision of students in M.Sc. (Agri.) Programmes:

Degree Programme	Intake capacity of students (Present)	Qualified faculty for supervision of students
M.Sc. (Agri.) Agricultural Economics	9/year	4

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Feedbacks were collected from the students, parents and farming community periodically to improve the teaching and to assess the competency/ performance of the faculty and students.

6.4.8. Student intake and attrition in the M.Sc. (Agri.) programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	3	5	6	9
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	1	0
Percentage	0	0	0	16.7	0

6.4.9. ICT Application in Curricula Delivery:

The PG classroom is equipped with overhead projector and computers which are used for the delivery of classes.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: M. Sc. (Community Science) Food & Nutrition

6.4.1. Brief History of the Degree Programme:

A humble beginning - The Department started at the College of Agriculture, Vellayani campus in 1983. The course M.Sc. (Community Science) Food and Nutrition has been offered from this department from 1984. Community Science is an interdisciplinary field of study having scientific understanding of the community concerned in order to improve the quality of life of individuals, family and people at large. The department has made significant development through the major mandate of State Agricultural Universities i.e, teaching, research and extension. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objectives

- The Master of Science course in Food and Nutrition focuses on the interface between human nutrition and food science, an area of increasing importance to consumers, government and the food industry.
- This course equips the students for skill development, academic understanding, entrepreneurship, community role and employment in various fields of food industry, hospitals, NGOs, etc.

Accomplishments of M.Sc. (Community Science) Food and Nutrition Programme at a glance		
Batches of students passed out so far	:	34
Number of students passed out so far	:	150
Number of students passed out during the assessment period	:	10
Number of students secured placement as faculty in the University		7
Number of students secured job in Govt./Private sector during the tenure	:	2
Number of students pursuing Ph. D with SRF	:	2
Number of students currently in roll and pursuing the PG programme	:	10

Salient research findings

- ✓ Developed value added products from the low cost and locally available agricultural food crops like Jack fruit, Rice, Avocado, Papaya.
- ✓ Ascertained anti-carcinogenic and anti-oxidant potential of ready to cook Jackfruit products and Jackfruit based curry mixes has been approved as deliverable technology of KAU in 2021.
- ✓ Developed Nutrition education tools and methods for pre-school children, school going children, adolescents and women.
- ✓ Developed therapeutic diets for children with Autism Spectrum Disorder and Attention Deficit Hyper Active Disorder.
- ✓ Standardised protocol of horticultural therapy and Garden based Nutrition education interventions modules for children with special needs.

Department of Community Science (Food and Nutrition) at a glance (2019-23)		
International Projects		1 (UNWFP)
National Projects		1 (RKVY)
External Aided Projects	:	5 (KSCSTE, KSSM)
State Plan Projects	:	3

Industry linked projects and consultancy	:	2
Publications	:	With NAAS above 5 – 12 With NAAS below 5 - 9
Revenue generation	:	Rs. 3,99,239/-

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	2	2	-	ICAR
2	Associate Professor	2		2	ICAR
3	Assistant Professor	2	2	NIL	ICAR
	Total	6	4	2	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr Safia Siraj, Asst Professor, KVK , Ambalavayal		1	Advisory committee member

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	1
2	Lab attendant	1	1
3	Class IV	1	1

6.4.4. Classrooms and Laboratories: PG Programme

Class rooms

Sl.No.	Class room No.	Area	Seating capacity	Other facilities (LED projector, Computer etc.)
1.	P.G. Class room 01	5.4 x 7.9 m	20	LCD projector, Computer and smart board facility

Laboratories

Sl.No.	Name of the laboratory	Area	Seating capacity (No.)
1.	Food Laboratory	8.7 x 14.1 m	30 (with multimedia facility)
2.	Bio Chemistry Laboratory	9.3 x 14.8 m	30
3	Incubation Centre Lab	7.9 x 12.1m	20

Major equipment available at the Department of Community Science for PG Research

Sl.No.	Name of the Equipment	Quantity	Cost (In lakhs)
1	Glass and Quartz single water distillation unit (4 Ltrs/hr) with water circulation recycling unit	03	0.05225
2	Digital pH Meters with combined electrodes and Thermo probes	01	0.13944
3	Hot Water Bath	01	0.12163
4	Horizontal shaker	01	0.245
5	Digital Flame Photometer assembly	02	1.17
6	Refrigerator	01	0.255
7	OTG Oven	01	0.145
8	Mixers	01	0.07
9	Foil sealer & Hot gun	02	0.09492
10	Band sealer	01	0.19775
11	Tube sealer	01	0.33335
12	Cling film wrapper	01	0.10085
13	Paste cream filler	01	0.2373
14	Fruit pulper	01	0.6825
15	Deep freezer	01	0.245
16	Hot air oven	01	0.861
17	Atta kneader	01	0.4599
18	Automatic namkeen machine	01	0.2259
19	Water still	01	0.145
20	Protein analyser	01	1.22
21	Electric drier	01	0.32512
22	Spectrophotometer	01	0.31888
23	Electronic balance	01	0.12201
25	Microwave oven	01	0.085

6.4.5. Conduct of Practical and Hands-on-Training

- Microscopic structure of different starch granules, Evaluation of food by subjective and objective methods, Changes in colour, texture and flavour of foods due to processing, Product preparation using leavening agents, Physicochemical evaluation of grains like length, breadth, L/B ratio, bulk density, cooking properties, 1000 grains weight, functional properties of grains - gelatinization, water absorption capacity, oil retention capacity and water retention capacity, Sugar cookery, Smoking temperature of fats and oils, Factors effecting absorption of fats, Deep fat fried food preparation Changes in cookery- meat, fish, poultry, Coagulation of egg, poached egg, omelette, custard, cake, Emulsion - mayonnaise preparation, Soaking, germination and fermentation of pulses.
- Effect of blanching on enzymatic activity and volume occupation, refrigeration and freezing on quality of fruits and vegetables, Dehydration of fruits and vegetables, Canning of fruits and vegetables, Preparation of fruit candy, squash, nectar, malt beverages and quality evaluation with respect to FPO, Clarification of juice using various methods

(chemical, enzyme and fining agents) Malting of green gram, moth bean- enzymatic activity determination.

- An interactive, hands-on experience to obtain skills: Assessment for muscle wasting and fat loss, Assessment for micronutrient deficiencies/toxicities, Assessment for fluid accumulation/edema, Assessment for functional status/hand grip strength, For Pediatrics – Assessment for mid-upper arm circumference, In-depth discussions on Coding for Malnutrition, Case Study to review Malnutrition components. Demonstrate basic skills to perform a nutrition focused physical exam, empowering the students to accurately identify and provide a nutrition diagnosis of malnutrition. Discussions on malnutrition characteristics and documentation, Development and sensory evaluation of various low-cost recipes to combat dual burden of malnutrition.
- Techniques of assessment of nutritional status, Use of Screening Tools Visit to the ongoing public health nutrition programme and report writing.
- Study of existing diet and nutrition practices, Planning and conducting survey Analysing data and writing report, Development, implementation and evaluation of community nutrition and health programmes
- Therapeutic modifications of diet in terms of nutrients, consistency and composition, Planning and preparation of diet for diabetes, cardiovascular diseases, kidney disorders, obesity, cancer patients, burns patients -first, second and third-degree burns, gastrointestinal disorders, critical care patients, Visits to hospital to see preparation of tube feeding diets, Presentation of case studies.
- Nutrient analysis of different foods, identification of anti-nutritional factors, present in food and Techniques of food samples collection; Analysis; Use and general maintenance of basic analytical instruments including use of digital burettes, pipettes etc.
- Students undergo internship in reputed hospitals and clinics as part of the nutrition counselling course.

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Department has keen interest in receiving and understanding student's feedback on teaching to strengthen the learning process. The feedback of the stakeholders on Syllabus, Teaching and Learning process have been collected for analysis and prepared a report for the appropriate deed. The feedback was collected through Google forms comprise of closed and open-ended questions depicting vital aspects of curriculum. The analysis explores the stakeholders feedback on various aspects of the curriculum. The feedback questions intended to reveal the following curriculum indicators. a) Load of the content of each course b) Quality and inclusion of new concepts c) Relevance and need of the course in each programme d) Accomplishment of Course outcome e) Suggestions for addition and deletion f) Employability and Skill Component g) Research h) Books and reference materials in Library j) Incorporation of Innovative teaching and learning methodology k) Internal Evaluation system. Information were collected from the outgoing students (after thesis submission) to know their future plans and to get their feedbacks for further improvements. Feedback was collected from students, women and other participants who attend trainings and accordingly initiatives were taken to better the deliverance of the courses and trainings.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	3	4	4	7
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty members have adopted multimedia approach for better teaching. The ICT tools used for teaching and learning are Learning management system (MOODLE), Google meet, Video conferencing Platforms and Virtual Labs. To prepare video content for teaching screen castify is used by the teachers. To prepare audio content podcast is used. Google Apps (Docs, Sheets, Slides and Forms) is used to create and collaborate on online documents. Google drive is used to store and share files in the cloud. Canva is used for making posters and other education materials. You tube is used for video sharing and preparing video assignments by the students. e- resources like e-Gyankosh, University of the People, UG/PG UGC-MOOCs and National Digital Library of India (NDLI) are widely used by the students and teachers. They are used by teachers to encourage participation and engage learning in their classrooms

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

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Signature of Dean of the College with Date & Seal



Degree Programme : M. Sc. (Agri.) Agricultural Statistics

6.4.1 Brief history of the degree programme:

The inception of the Agricultural Statistics division dates back to the year 1968. A pivotal milestone was reached in 2014 with the launch of the Postgraduate program, M.Sc. (Agri.) Agricultural Statistics, within the department. Initially admitting two students, the program has since expanded, presently offering four seats.

In its formative years, the curriculum adhered to the ICAR 2009 Syllabus until the admission year 2021. Subsequently, a noteworthy transition occurred in 2022, marking the adoption of a revised syllabus to align with contemporary academic standards. This evolution reflects the department's commitment to staying abreast of advancements in agricultural statistics education. We also developed software tools like Grapes and grapesAgri1 to assist research students with data analysis. Creating user-friendly tools can significantly enhance the efficiency and effectiveness of data analysis, especially for those who may not have extensive experience in the field. Having over 30,000 users per month and receiving 42 citations in the last two years is a clear indication of the impact and utility of Grapes software. It's a significant achievement to have such a wide user base and recognition within the research community all over the nation.

OBJECTIVES

- Provide top-tier education to both undergraduate and postgraduate students, equipping them with the knowledge and skills necessary to excel in competitive examinations and eligibility tests, thereby positioning them for success in their future endeavours.
- Spearhead the planning of experiments for cutting-edge research initiatives, ensuring a methodical and strategic approach to scientific inquiry.
- Foster a culture of research, encouraging students and faculty alike to engage in impactful and innovative research projects that contribute to the broader academic community and address real-world challenges.
- Conduct in-depth analysis of diverse datasets, employing advanced statistical methodologies to extract meaningful insights and contribute to the advancement of knowledge in the field.
- Develop software tools for enhancing the quality of data analysis for the scientific community
- Conduct training programmes to expertise the research scholars and faculty in usage of software tools for data analysis

STUDENTS STATISTICS		
Number of students secured job in Govt./Private sector during the tenure	:	5
Number of students pursuing Ph.D with SRF	:	5
Number of students pursuing PG with JRF	:	2
Number of students currently in roll and pursuing the PG programme	:	6
Number of students who has scholarships	:	10

Accomplishments of M.Sc. (Agri.) Agricultural Statistics Programme at a glance		
Batches of students passed out so far	:	7
Number of students passed out so far	:	22
Number of students passed out during the assessment period	:	14
Websites and softwares developed	:	7

6.4.2 SALIENT RESEARCH FINDINGS

During the period of assessment, the Department carried out several activities such as data analysis, developing of softwares. A brief account of the accomplishments made out of M.Sc. (Agri.) research programme are presented below.

- GRAPES: General R shiny Based Analysis Platform Empowered by Statistics – Web Application
- An Artificial Intelligent (AI) chatbot for scientific knowledge delivery in black pepper cultivation
- grapesAgri1: collection of shiny apps for data analysis in agriculture
- Foliar symptom based disease diagnosis in black pepper using Convolutional Neural Network (CNN)
- An intelligent ripening classification of Nendran banana using convolution neural network
- Web application for data visualization tools in Agricultural research – GRAPES DRAW
- Augmented randomized complete block design for Multi locational trials
- Software for statistical methods in social science research
- Application of response surface methodology for optimal yield of transplanted rice (*Oryza sativa L.*)

Department of Agricultural Statistics at a glance (2019-23)	
External Projects	: 1
Publications	: With NAAS above 5 – 11 With NAAS below 5 – 6
Revenue generation	: Rs. 1,22,500 (2019-2023)
Websites and Softwares developed	: <ul style="list-style-type: none"> ● GRAPES – online statistical platform for data analysis with 30,000 users ● grapesAgri1 – An open source R package with 40,000 downloads ● KAU Me-LON – Module for e-Learning and Online notes with above 29 K users ● HANDS – Hassle free Attendance Notifying and Deployment System for taking attendance ● GRAPES PBGN – An AI – based software redefining data analysis in plant breeding and genetics ● GRAPES Draw - Online platform for data visualisation ● College Management System for College of Agriculture, Vellayani

6.4.2 Faculty Strength: Present status

Sl. No.	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/UGC/VCI/other regulatory bodies
1	Professor	1	0	1	ICAR
2	Associate Professor	1	1	0	ICAR
3	Assistant Professor	3	2	0	ICAR
4	Faculty on contract	-	1	0	
Total		5	4	1	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. Manju Mary Paul, Assistant Professor, College of Agriculture, Padanakkad	1	2	

6.4.3 Technical and Supporting staff

Sl. No.	Post	Sanctioned	In position
1	Technical Assistant	1	1 (on Daily wages)
2	Office Assistant	1	1 (on Employment Exchange)
3	Junior Programmer	1	1 (on Employment Exchange)

6.4.4 Classrooms and Laboratories: PG Programme

The department boasts well-equipped classrooms and state-of-the-art laboratory facilities that, in conjunction with the resources allocated through the ICAR schemes operating within the department, collectively ensure an enriching hands-on experience for students in every facet of Agricultural Statistics. Our infrastructure is designed to foster practical learning, allowing students to engage comprehensively with the subject matter and gain valuable insights through real-world applications. This commitment to providing robust facilities ensures that our students are well-prepared and equipped with the practical skills necessary for success in the field of Agricultural Statistics.

Class Rooms		Laboratories		Remarks
No.	Area m ²	No.	Area m ²	

UG lecture hall – 1	89.28	Computing facility – 1	60.95	Air Conditioned Computer LAB with No. of Computers - 27 No. of Printers-3 No. of Internet Connection-3 K-phone (10 mb/s), Asianet (300 mb/s), BSNL (300 mb/s)
PG classroom and demonstration hall – 1	43.71	Statistical Analysis Facility - 1	43.71	

6.4.5 Conduct of Practical and Hands-on-Training

- Designing the Statistical methodologies for the various research programmes
- Statistical analysis of MSc and PhD projects of the various departments
- Use of statistical software for analysis of experimental data
- Hands On Training on Multivariate Data Analysis tools
- Hands on Training in Statistical methods

6.4.6 Supervision of students in M.Sc. (Agri.) Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
M.Sc. (Agri.) Agricultural Statistics	3	2

6.4.7 Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Regular feedback from diverse stakeholders, including students, parents, and members of the farming community, is systematically gathered to enhance the quality of teaching and evaluate the competence and performance of both faculty and students. This ongoing feedback loop serves as a valuable mechanism for continuous improvement, ensuring that our educational practices align with the expectations and needs of those directly impacted by our programs. A portal is added in www.agristatkau.com the official website of Department of Agricultural Statistics where, the Alumni and other stakeholders can communicate, provide feedback and post job openings news etc

6.4.8 Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24

Number	4	3	3	2	4
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9 ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. The faculty of the department developed GRAPES and grapesAgri1 for data analysis, GRAPES for plant breeding and varietal trails (GRAPES PBGN), KAU Me-LON for e-Learning and online notes; GRAPES Draw for graphical representation of data, HANDS for online attendance taking.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12 Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.10, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



**COLLEGE OF AGRICULTURE
VELLAYANI
SELF STUDY REPORT FOR ACCREDITATION
2019 - 2024**

Degree Programme : Ph.D.

**FACULTY OF AGRICULTURE
KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI
THIRUVANANTHAPURAM- 695522
KERALA, INDIA**



Degree Programme : Ph.D. AGRONOMY

6.4.1. Brief History of the Degree Programme:

The Department of Agronomy had its inception in 1955 along with the formation of the then Agricultural College and Research Institute. The Doctorate Degree (Ph.D) programme in Agronomy is being offered by the Department since 1965. The Department explicitly upholds a legacy of excellence in teaching and research on farmer centric agronomic issues and has been instrumental in molding enthusiastic young scientists with potential to excel in teaching, research and extension activities with national and international perspectives. The faculty of Department of Agronomy is engrossed in mentoring Doctoral Degree students in diverse areas of Agronomic research such as crop husbandry, weed management, water management, watershed management, cropping system's research, organic production, agro-ecological based production technology etc. The Ph.D programme was conducted based on the ICAR syllabus-2009 till 2021 admission and thereafter the revised syllabus is being followed.

Objective

- To impart quality education and research aptitude to doctoral degree students in the discipline of Agronomy to strengthen their career as Scientists, Faculty and top-level administrators in National and International Research Institutions, State Agricultural Universities, Foreign Universities, State and Central Government Departments by securing high positions in competitive examinations and eligibility tests
- To equip the Doctoral Degree students to formulate the research projects and conduct independent research in the field of Agronomy
- To elevate the doctoral degree students as research guides of post graduate students and mentors of graduate students.
- To strengthen the capability of the Doctoral Degree students in technology development, development of advanced products and services related to agronomic management and thus serving the farming community in a better way.

Accomplishments of Ph.D Programme in Agronomy at a glance		
Batches of students passed out so far	:	52
Number of students passed out so far	:	59
Number of students passed out during the assessment period	:	16
Number of students secured placement as faculty in the University	:	3
Number of students secured job in Govt./Private sector during the tenure	:	13
Number of students pursuing Ph. D with SRF	:	0
Number of students pursuing Ph.D with other National Fellowships	:	4
Number of students currently in roll and pursuing the PhD programme	:	34
Number of Ph.D students pursuing dual degree programme with Western Sidney University, Australia	:	3
Number of Ph.D students secured ICAR/UGC NET during assessment period	:	10

Number of Ph.D students secured the national titles of best paper/poster/E-article/Essay writing during assessment period	:	14
Number of Ph.D students recognized in YIP/other National Programmes	:	8
Number of Faculty secured National titles of best paper/Oral Presentation	:	3
Number of Faculty selected as Editor/Associate Editor of National Publications	:	1
Number of Faculty functioned as Nodal Officers of Agriculture Knowledge Centres of Department of Agriculture during assessment period	:	4
Total number of trainings organized by the Department during assessment period	:	40
Number of capacity building and training provided to Ph.D students	:	4
Number of capacity building and trainings attended by the Ph.D students	:	6
Number of Ph.D students who attended capacity building and trainings	:	63
Number of Ph.D students nominated as “NEP SAARATHI-student ambassador” by UGC	:	1
Number of times the Department has won the “Best Department” title so far	:	9
Number of best teacher awards won by faculty of the Department	:	1
Number of software developed by the department	:	1
Number of patents obtained	:	3

Salient research findings

During the period of assessment, the Department has carried out fundamental as well as applied research in the diverse fields of Agronomy.

A brief account of the major accomplishments made out of Ph.D research programmes under various thrust areas during the assessment period are presented below.

Weed Management

- The crop protective herbicide applicator developed during the Ph.D work has been forwarded for innovation patent (date of filing of application-25.03.2021, date of publication in Journal-30.09.2022 Patent office Journal No. 39/2022 dtd.30.09.2022)
- Weedicide recommendation based on Ph.D work i.e. Penonsulam + Cyhalofop butyl 135 g/ha for broad spectrum weed management in direct seeded rice, has been approved in the State level POP workshop for recommendation in the State.

Nutrient Management

- Customized micro nutrient mixture Zn-B was developed for rice cultivation in AEU 8 (southern laterites)
- Standardized the INM practices for miniset elephant foot yam cultivation and organic nutrition of taro

Water Management

- Standardized the irrigation scheduling and water stress mitigation strategies in upland rice
- Established the use of magnetized irrigation for improving productivity of brinjal

Agro techniques

- Standardized the agro techniques in bhindi for precision farming and short duration red gram.
- Studied the resource management for source-sink modulation for Chinese Potato
- Investigated the vetiver based organic mediculture technologies for watersheds

Cropping Systems Research

- Investigated the shade tolerance and productivity enhancement of black gram varieties under intercropped condition in coconut garden.
- Studied the land configuration and intercropping feasibility for bridging the yield gap in aerobic rice.

Department of Agronomy at a glance (2019-23)	
ICAR Schemes.	: 0
National Projects	: 0
External Aided Projects	: 0
State Plan Projects	: 19
Industry linked projects and consultancy	: 0
Publications	: With NAAS rating above 5 - 65 With NAAS rating below 5 - 33 Without NAAS rating -25 Book/Book chapters by faculty : 4 Proceedings/abstracts by Faculty:18 Popular articles/leaflets/booklets by Faculty:24 Proceedings/abstracts by Ph.D students :26

	Book/Book chapters by Ph.D students: 6
	Popular articles/leaflets/booklets by Ph.D students: 20
Revenue generation	: Rs. 14,82,057 (2019-23)

6.4.2. Faculty Strength :

i) Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies
1	Professor	2	3	-1	
2	Associate Professor	3	0	3	
3	Assistant Professor	8	8*	0	
	Total	13	11	2	

*One faculty redeployed to Department of Organic Agriculture, and one faculty on study leave

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	*Courses handled	Students guidance	Remarks
1	Dr Jacob D, Asst. Professor (Agronomy)	0	1	
2	Dr Jacob John, Professor (Agronomy)	0	1	
3	Dr Bindhu J S, Asst. Professor (Agronomy)	7	2	
4	Dr Renjan B, Asst. Professor (Agronomy)	0	1	
3	Dr Poornima Yadav P.I, Asst. Professor (Agronomy)	0	1	
4	Dr Sajitha Rani T, Professor (Agronomy)	6	5	
5	Dr Sheeja K Raj, Asst. Professor (Agronomy)	9	3	
6	Dr Sheeba Rebecca Isaac, Professor (Agronomy)	7	5	
7	Dr Usha C Thomas, Professor (Agronomy)	4	4	
8	Dr Sharu S R, Asst. Professor (Agronomy)	2	2	

* Including the courses taken as an earlier staff of Department of agronomy during the reporting period

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	1
2	Lab attendant	2	2
3	Class IV	1	0

6.4.4. Classrooms and Laboratories: Ph.D Programme

The class room and lab facilities of the department together with the field lab facilities at crop museum, millet museum, tuber museum, certified organic farm and open field area for field research are sufficient to provide a hands-on experience in every aspect of Agronomy at doctorate degree level.

Class rooms	Laboratories	Farm land	Equipment
Ph.D – 20.74 sq. m area	Ph.D lab – 27 m ²	Open area – 100 cents (4000 m ²)	Kelplus Macro Block Digestion System- 1 No.
Library - 17.98 sq.m area	Field lab – Field class room – 31.5 m ²	Certified Organic Farm- 100 cents (4000 m ²)	Flame Photometer- 2 Nos
	Crop museum- 80 cents (3200 m ²)		BOD Incubator- 2 Nos
	Millet museum-20 cents (800 m ²)		Centrifuge- 1 No.
	Tuber museum – 25 cents (1000 m ²)		pH meter- 1 No.
	Net house- 20 m ²		Digital Conductivity Meter-1 No.
	Total field lab -5051.50 sq. m		Electronic weighing balance -3 Nos.
	Additional Lab Facility		Laminar air flow meter-1 No.
	Leaf Tissue Analysis Lab		Spectrophotometer- 1 No.
			Portable Lux Meter-1 No.
			Magnetic Stirrer- 1 No.
			Soil Thermometers- 2 Nos
			Ultra probe sonicator- 1 No.

6.4.5. Conduct of Practical and Hands-on-Training

- The Ph.D students are given thorough hands-on practical experience on leaf tissue analysis, soil and organic manure analysis, herbicide residue analysis and soil enzyme

studies. The leaf tissue analysis lab functioning under the Department also supports hands-on-trainings.

- A net house of 20 sq. m is functioning for supporting the conduct of practical and research especially for growth studies.
- The students are given hands-on-training on assessment of crop water requirement, measurement of irrigation water and CROPWAT model, and operation of micro irrigation systems.
- A crop museum is maintained by the Department of Agronomy with a cafeteria of crops. The museum covers an aquaponic unit, vertical farming structure, composting unit, planting material production facility etc. which support in imparting hands-on- training to the doctoral degree students on related aspects.
- A millet museum is being established by Department and it supports the Ph.D students in identifying varietal characteristics of millet crops.
- A tuber museum having 25 cents area with a collection of genotypes of major and minor tuber crops supports the identification of varietal features of tuber crops by the Ph.D students who are doing research on tuber crop production.
- A certified organic farm of 1 acre is maintained by the Department which helps the Ph.D scholars specializing in organic nutrition to undertake field studies.
- Hands-on training on software for statistical methods of analysis, accessing research data base, journal finder, open access publishing tools and plagiarism software is also imparted. A computer lab functioning in the Department is helpful in this regard.

6.4.6. Supervision of students in Ph.D. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D Agronomy	8/year	18 (9 from the Department + 9 from outside the Department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

- An Advisory Committee is constituted for each Ph.D student. The committee regularly meets and discuss the progress of research work and feedback from the students are collected and recorded in the minutes.
- Separate feedback forms are also collected from the Ph.D students and submitted to the academic cell for further actions.
- Scientists of the Department have performed as Nodal Officers of Agriculture Knowledge Centre of State Department of Agriculture and feed backs which are collected from farmers during monthly meetings are minuted and kept in the block.
- Feedback from the farmers and extension personnel during Zonal Research and Extension Workshops conducted annually and are documented, prioritized and actions are taken.
- Feed backs are collected regularly from the visitors of the Crop Museum maintained by the Department and are valued for improving the existing facilities.

6.4.8. Student intake and attrition in the programme for last five years:**i) Student intake**

Year	2019-'20	2020-'21	2021-'22	2022-'23	2023-'24
Number	9	8	8	8	6

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	2	0	0	-
Percentage	0	25.00	0	0	-

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. The Ph.D students use online tools such as research data base, journal finder, open access publishing tools and plagiarism software during the preparation of research articles. The Department owns a You Tube Channel for the online dissemination of seminars and trainings organized by the Department which serves the instructional purpose too. The channel has hosted more than 19 videos with 1.26 k subscribers. Teaching videos are also prepared by the faculty for uploading to the You Tube Channel. Faculty are also involved in the production of the KAU lecture series (videos).

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

Trainings and Seminars



Book release



Release of CD



Training given on 'Recent advances in weed management'



Training on mechanisation to agricultural officers



Book release



Invited talk on "IFS for 4Es"



Degree Programme: Ph.D. Soil Science

6.4.1. Brief History of the Degree Programme

The Department of Soil Science and Agricultural Chemistry was established in 1955, at the time of inception of the College of Agriculture, Vellayani, to undertake soil related research and teaching. The first Soil Testing laboratory of the state was established at the Department in 1958. The post graduate programmes *viz.*, M. Sc (Agri.) and Ph.D. were started in 1961 and 1963 respectively. A Model Organic Farm was established under the Department in 2007 and diploma course on ‘Organic Agriculture’ was started in 2013.

Objectives

- Teaching at UG, PG, and Ph.D. levels on various aspects of Soil Science and also for Diploma in Organic Agriculture, Integrated Biotechnology and B.Tech. Biotech courses.
- Research on fundamental and applied aspects of soils, *viz.* Soil Health Management, Soil Fertility and Plant Nutrition (customized formulations/nanofertilizers/fortified organic fertilizers/biochar), Soil Chemistry, Soil Biology, Soil Physics, Agricultural Chemicals, Pedology, Natural Resources Management, Land Use Planning (GIS based), Soil Reclamation and Solid Waste Management.
- Analytical services on soil, plant, water, organic manures and fertilizers to various stakeholders.
- Training and advisory services to various stakeholders and farmers.
- Support block level Agricultural Knowledge Centres (AKC)s.
- Develop and disseminate the technologies for the benefit of farming community
- Impart quality education to Ph.D. students to secure high positions in competitive examinations and eligibility tests.
- Train the Ph.D. students to formulate the research programme and conduct independent research in the field of Soil Science and Agricultural Chemistry.
- Provide internship facilities to PG students from other universities.

Services/ products offered

- Provide crop specific recommendations based on analysis of soil, plant, fertilizer, and manures.
- KAU Suchitha organic fertilizer is sold through KAU outlets and licensed input agencies of the state.
- Production and sale of vermicompost, coir pith compost, liquid manures *viz.* Panchagavya, Dashagavya, Egg Amino Acid and Fish Amino Acid.
- A new micronutrient mix developed in the department is also made available to the public through the Sales Counter, IF, Vellayani.
- Developed multi nutrient tablets and nutrient capsules for vegetables.
- Fabricated a portable electrically operated sub soil sampler.
- Organic manure quality can be tested for farmers in referral laboratory.

Accomplishments of Ph.D. Soil Science Programme at a glance	
Number of students passed out so far	53
Number of students passed out during the assessment period	11
Number of students secured placement as faculty in the University	03
Number of students secured job in Govt./Private sector during the tenure	07
Number of students pursuing Ph. D with SRF	03

Number of students currently in roll and pursuing the PhD programme	22
Student: Teacher ratio	1.83*

*Including the faculty from outside the College acting as Major advisor to PG students.

Salient research findings

During the period of assessment, conducted research in the diverse fields such as soil fertility, plant nutrition, organic farming, solid waste management, pesticide residue analysis in soil, effect of climate change on soil *etc.*

Major achievements

- Developed and patent has been received for rapid thermochemical waste processing technology and standardized use of ‘Suchitha’ organic fertilizer.
- Soil test-based fertility management for sustenance of soil health
- Characterized the secondary and micronutrient status of AEU of Southern Kerala
- Assessed the impact of flood (2018) on soil fertility of different AEU of Kerala
- Standardized vermitechnology and recommendations for organic crop production
- Established Lead Centre for Organic Farming
- Fabricated indigenous biochar kilns for pyrolysis of various substrates
- Sewage sludge compost for ornamentals
- Standardized enzyme technology for management of aquatic weeds
- Micronutrient mix for vegetables and banana
- Multinutrient tablets and capsules for vegetables
- Standardized doses of nano organic fertilizers for vegetables *viz.* Okra

Major Ph.D. Research findings

- Paddy husk or coconut frond biochar @ 30 t ha⁻¹ with NPK as per POP in laterite soil, and @ 20 t ha⁻¹ with NPK as per POP in sandy soil increases yield of ginger.
- Soil quality evaluation of flood-affected soils of different AEU revealed that acidity increased, P content was high and Fe and Mn were in sufficient quantities whereas nutrients like N, K, Mg, S, Cu and B depleted.
- Soil C pools were highly linked to root biomass and NP pools to shoot biomass. The root biomass and root lignin were the main drivers of C stabilization.
- Soil test-based POP + AMF recorded the highest yield in cropping sequence while organic nutrition (TOF-F) + AMF contributed more to soil properties.
- Coconut frond biochar and paddy husk biochar produced by the method of slow pyrolysis had ideal physical and chemical properties and acts as good soil amendments.
- Rice husk biochar at 5 t ha⁻¹ along with urea, rajphos and muriate of potash can be adopted for alleviating Fe and Al toxicity in detrital soils.
- The persistence of fluopyram was more under air-dry conditions with greater half-life values than field capacity moisture conditions in both laterite and red loam soil.
- The dissipation rate of fluopyram in soil, tomato fruit and leaf in red loam soil was faster than in laterite soil when applied at flowering and fruiting stage of crop.

Department of Soil Science and Agricultural Chemistry at a glance (2019-23)		
ICAR Schemes.	:	1
National Projects	:	2
External Aided Projects	:	3
State Plan Projects	:	11

Industry linked projects and consultancy	:	2
Publications	:	NAAS Rating > 15: 1 NAAS Rating > 10: 2 NAAS Rating > 7: 7 NAAS Rating > 5: 31 NAAS Rating < 5: 31
Revenue generation	:	Rs. 22,36,322/-
Total soil health card issued	:	740
<u>Diagnostic services and number of samples analysed:</u> Soil samples: 3064, Plant samples: 793, Manure samples: 97, Water samples: 38		
Number of awards		12
Capacity Building and Training conducted		21
Participation of faculty in Workshops/ Seminars/ Symposia/ Training/ Consultancy visits/Special assignments etc		40
No. of students with fellowships (PG)		25
No. of students with fellowship (PhD)		22

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	1	0	ICAR
2	Associate Professor	3	0	3	ICAR
3	Assistant Professor	9	6*	3	ICAR
	Total	13	7	6	

*1- Assistant Professor attached to the Regional Agricultural Research Station (RARS, SZ, Vellayani) and her services are made use of in the academic and research activities of the Department.

ii) Teachers outside the department involved in the department activities (Ph.D.)

Sl. No	Name and Designation	Course handled	Students guidance	Remarks
1	Dr. Aparna B. Professor, Department of Soil Science and Agricultural Chemistry, College of Agriculture, Ambalavayal	13	4	Worked as faculty in the department till 1.10.2021
2	Dr. Thomas George, Professor and Head, Pesticide Residue Research and Analytical Laboratory (AINP on Pesticide Residues),	3	6	...
3	Dr. Gladis R, Associate Professor, ARS, Thiruvalla	12	4	Worked as faculty in the department till August 2021

4	Dr. Biju Joseph, Associate Professor, RRS, Mancompu	11	2	...
5	Dr. Meera A. V., Assistant Professor, IFSRS, Karamana	2	1	...
6	Dr. Mini V., Assistant Professor, ORARS, Kayamkulam	3	3	...
7	Dr. Sailaja Kumari M.S, Associate Professor, RARS, Kumarakom	-	1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	4	3
2	Office attendant	2	1
3	Computer assistant	1	1
4	Technical assistant	2	0

6.4.4. Classrooms and Laboratories: Ph.D. Programme

The class room and lab facilities together with the of ICAR schemes functioning in the department are sufficient to provide a hands-on experience in every aspect of soil science and agricultural chemistry.

Class rooms	Laboratories	Farm land	Equipment
PG – 130 m ² . Ph.D.- 20 m ²	UG Lab (I): 120 m ² , UG Lab (II): 104.56 m ² , Soil processing yard 75.5 m ² , PG Lab: 125 m ² , Ph.D. Lab: 56.27 m ² , Soil Testing Lab: 150 m ² , Instrumentation room- 60 m ² , Incubation room: 50 m ² , Referral laboratory for quality control of organic manures – 280 m ² , GIS Lab – 60 m ² , Soil biology lab: 50 m ² , Mobile Soil Testing Laboratory (MSTL)-1 No.	Field cum demonstration lab; Model organic farm with model organic kitchen garden, coirpith compost unit, vermicompost unit, NADEP compost unit, Azolla production unit, Biochar unit, polyhouse for protected organic cultivation, enriched manure production unit etc. – 3 acres	Yoder's apparatus – 2, Single Distillation unit – 3 Double distillation unit-2 Hot air oven – 4, Laboratory centrifuge – 1, Mechanical shaker – 4, Pressure plate apparatus – 1, Hot plate – 3, Weighing balance – 7, Deep freezer – 1, Kjelplus digestion unit – 2, Kjelplus distillation unit – 2, BOD incubator – 2, pH meter – 4, EC meter – 4, UV-VIS double beam spectrophotometer – 2, Mechanical stirrer – 3, Muffle furnace – 3, Spectrophotometer – 1, Water bath – 2, Automatic N analyzer – 1, ICP OES-1, AAS-1 AAS with graphite furnace – 1, CHNS analyzer – 1, Refrigerator -4,

			Microwave digester – 1, Refrigerated centrifuge -1, Research microscope -1, Microcontrolled pH meter-1, Flame photometer – 2 Autoclave-1 Laminar air flow chamber-1 Tractor-1 Coir pith briquetting machine-1 Shrink wrapping and sealing machine-1 Electric shredder-1 Electric sieving machine-1 Slurry pump-1 Soil core sampler-1
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6.4.5. Conduct of Practical and Hands-on-Training

- **Analytical techniques and instrumental methods:** Students are given thorough hands-on practical experience on soil, plant, water, fertilizer and manure sample analysis.
- **Soil genesis, survey and classification:** Students are trained well in identification of soil classification using USDA Soil Taxonomy.
- **Mineralogy and micropedology:** Micropedological and soil mineralogical studies are conducted in Soil Museum (Pedonarium).
- **Management of problem soils:** Teaching tools and techniques of identification, delineation and management of problem soils.
- **Geospatial technology:** Students are allowed to learn and work with GIS software and can use 30 desktop computers available in the GIS Lab
- **Exposure visit:** Exposure visit were conducted to Thumba Equatorial Rocket Launching Station (TERLS) and Vikram Sarabhai Space Centre (VSSC). Visits were also made to State Soil Museum, Parottukonam.
- **Soil microbiology and enzymology:** Students are trained for various composting techniques, microbial analysis, enzyme kinetics etc.
- **Soil fertility management:** Students are equipped with soil test based fertilizer recommendation techniques.
- **Solid waste management and composting:** Equip the students on rapid composting technologies including thermochemical digestion techniques.
- **Plant Nutrition:** Students are trained in identification of deficiency symptoms of plant nutrients and its management.

6.4.6. Supervision of students in Ph.D. Programmes:

Degree Programme	Intake capacity	Qualified faculty for supervision of students
Ph.D.	7/year	11 5 (from Dept.), 6 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The department maintains good relationship with farming community and equip them with evolved technologies and services through trainings, trials, demonstrations, etc. The department faculty is nominated as nodal officers of block level agriculture knowledge centers of Dept. of Agriculture for overall development of state agriculture sector by providing

technical advice and immediate solutions. Regular meetings of the Ph.D students' advisory committee are conducted wherein the students share their feedback and difficulties if any, faced by the students are solved. Scientists are always ready to resolve the problems faced by farmers through direct interactions, multidisciplinary field visits, advisory services, agroclinics, over phone or through social media etc. The department has collaboration with industry and takes up paid up trials for various institutions. The teaching curriculum followed is equipping the students to meet the demands of farmers. The faculty also act as mentors of various agri start-ups.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake for Ph.D.					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	5	7	6	-
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	1	0	1	-
Percentage	0	20%	0	16%	-

6.4.9. ICT Application in Curricula Delivery:
 For effective teaching, the faculty adopts online platforms such as KAU Moodle and Google Classroom for the delivery of the course curriculum. Teaching videos are also prepared by the faculty. Teaching is also conducted through fully equipped GIS Lab with 30 desktop computers.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF SOIL SCIENCE



National Seminar



International Seminar - Dr. Rattan Lal
Lead talk



Release of National Seminar proceedings



Release of book



Release of book



World Environmental Day talk



Fertilizer Orientation Course



Poster & oral presentation



Workshop on NABL accreditation



Abroad research collaborations and visits



World Soil Day 23



World Soil Day 23 Exhibition



World Soil Day 23 Exhibition



World Soil Day 22



World Soil Day 22 drawing competition



Exhibition on organic agriculture



World Soil Day 21



Constant winners of intra college
competitions



Training on Soil testing to
Agricultural Officers

Training, Seminars, Workshops, Etc.



Degree Programme: Ph.D. Entomology

6.4.1. Brief History of the Degree Programme:

The Department of Entomology at Kerala Agricultural University, established in 1966, offers a comprehensive doctoral program aimed at fostering advanced research in various entomological fields. These include insect taxonomy, biological control, apiculture, toxicology, molecular entomology, biorational management, host plant resistance, and integrated pest management. The program provides scholars with a solid foundation in the latest developments in entomology, combining theoretical knowledge with practical exposure through laboratory and field studies. Scholars are well-equipped to develop research proposals, conduct studies, and communicate effectively within both scientific and agricultural communities. The department followed the ICAR 2009 Syllabus until the 2021 admission, transitioning to a revised syllabus from the 2022 admission onwards.

Objective

- Enable scholars to conduct advanced research in Entomology, focusing on molecular entomology, indigenous microbes, and integrated pest management methods.
- Developing protocols for bee and pollinator management
- Develop expertise in identification of insects, exploring their biodiversity
- Introduce principles of insecticide resistance and explore management strategies
- Provide pesticide residue analytical services adhering to national and international standards.
- Identify biomolecules with insecticidal properties and develop botanical/biopesticide formulations.
- Collect insects of economic importance, creating a diverse habitat repository.

Accomplishments of Ph.D. Entomology Programme at a glance		
Number of students passed out so far	:	55
Number of students passed out during the assessment period	:	12
Number of students secured placement as faculty in the University	:	15
Number of students secured job in Govt./Private sector during the tenure	:	15
Number of students pursuing Ph. D with SRF	:	3
Number of students currently in roll and pursuing the Ph. D programme	:	27

Salient research findings

A brief account of the accomplishments made out of Ph.D programme are presented below.

- Documented 40 predatory coccinellid species in Kerala and their hymenopteran parasitoids.
- Evolved carbendazim and hexaconazole tolerant strains and UV tolerant strains of the entomopathogenic fungus *L. saksenae*
- EC formulations of cashew nut shell liquid (CNSL) was developed from crude CNSL.
- Generated taxonomic and ecological data on Lamiinae fauna, developed a checklist for Eumolpinae, an illustrated key for Galerucini, and a checklist of galerucine leaf beetles in South India.
- Morphological and molecular analysis revealed the existence of two species of cavity nesting bees in Kerala *i.e.* the Plain group, *Apis indica* and Hill group, *Apis cerana*.
- Standardized technologies for seasonal bee management, quality honey production, and hive-based value-added products in the National Level Quality Control lab. It also serves as a Referral Laboratory for honey quality.

- ES formulation of Bb 6063 and SINPV as well as SINPV bait was developed for management of *Spodoptera litura*
- Standardized various international methods for Residue analysis for the benefit of the students and Secured ISO: 17025:2017 accreditation for the Pesticide Residue and Research laboratory

Department of Entomology at a glance (2019-23)	
ICAR Schemes.	: AICRP on Honey bees and Pollinators AINP on Pesticide residues AICRP on Biological Control of Crop Pests
National Projects	: 7 (NBB: 2, NBB-ICAR: 1, RKVY: 2, DAC: 1, Ministry of HRD: 1)
External Aided Projects	: 61
State Plan Projects	: 4
Industry linked projects and consultancy	: Karshaka Santhvanam Young Innovative Programme -1
Publications	: With NAAS above 5 - 32 With NAAS below 5 - 19 Leaflets - 13 Popular article- 13
Revenue generation	: Rs. 41.24 lakhs (2019-23)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	2		ICAR
2	Associate Professor	2	1		ICAR
3	Assistant Professor	5	5		ICAR
	Total	8	8		

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. M. H. Faizal, Professor (RC)	2	2	
2	Dr. Amritha V. S, Professor (Entomology) PI, AICRP on Honey bees and pollinators	1	2	
3	Dr. Ambily Paul, Associate Professor, AINP Pesticide Residue	2	2	
4	Dr. Thania Sara Varghese, Assistant Professor, CoA, Padanakkad		2	
5	Dr. Malini Nilamudeen, Assistant Professor, RARS Pattambi		1	
6	Dr. Narayana R, Assistant Professor, Nematology		1	
7.	Dr. Nisha M. S. Assistant Professor, Nematology		1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	3	3
2	Class IV	1	1

6.4.4. Classrooms and Laboratories: Ph.D Programme

The class room and lab facilities of the department together with the laboratory facilities of the ICAR schemes (AICRP on Biological Control of Crop Pests (AICRP on BCCP) AINP on Pesticide residue and AICRP on Honey bees and Pollinators) functioning in the department are sufficient to provide a hands-on experience in all aspects of Entomology.

Class rooms	Laboratories	Farm land	Equipment
UG classroom I – 70 m ² UG classroom II – 42 m ² PG classroom – 30 m ² PhD classroom – 40 m ²	PG lab – 77 m ² PhD lab – 45 m ² Insect rearing lab I – 25 m ² Insect rearing lab – 30 m ²	1.25 acre	BOD Incubator -1, Autoclave – 1 pH meter – 1, Electronic balance- 1 Potters tower – 1, Digital Camera – 4 Hot Air Oven – 1, Dissection microscope- 3 Stereo Zoom trinocular microscope -1 Stereo binocular microscope- 6 Gel electrophoresis unit -1, LCD projector – 4 Insect boxes – 350, Insect collecting nets – 20 Insect collection big boxes – 10 Bee keeping equipments – 1 set Sericulture equipments – 1 set Sprayers - 1 of each type Computer with printer – 1 set
	Biocontrol lab – 115 m ²		Imaging compound microscope 2 Stereo microscope 2, Centrifuge – 1, Refrigerator –3, Electronic weighing balance – 1 LCD projector – 1, pH meter – 1, Magnetic stirrer – 1, Laminar flow cabinet – 1 BOD Incubator shaker – 1, Autoclave – 2, Hot air oven – 2, Moisture balance – 1, UV cabinet -2, Double Distillation unit- 1 Microwave oven -1, Digital colony counter- 1

		<p>Tablet friability apparatus- 1</p> <p>Tablet disintegration apparatus-1</p> <p>Tablet press apparatus- 1,</p> <p>Capsule filling apparatus -1</p> <p>Pellet making apparatus -1</p> <p>Temperature control device (Ac)- 2</p> <p>Humidifier- 1, Air cooler -1</p>
	<p>Quality Control Lab for Honey – 185 m²</p>	<p>Compound microscope- 2, Stereo microscope- 3</p> <p>Refrigerated Centrifuge – 2, Refrigerator – 3</p> <p>Electronic weighing balance – 5</p> <p>LCD projector – 1, pH meter – 1,</p> <p>Magnetic stirrer – 1, Laminar flow cabinet – 1</p> <p>BOD Incubator – 1, Vertical Autoclave – 1</p> <p>Hot air oven – 1, Single Distillation unit – 1</p> <p>Microwave oven- 1, Colorimeter – 1</p> <p>Mini centrifuge- 1, Vortex mixer- 1</p> <p>Abbe Refractometer – 1, LC- MS/MS- 1</p> <p>HPLC- 1, FTIR- 1, Fume hood- 1</p> <p>Sonicator- 2, Incubating shaker- 1</p> <p>Positive pressure processor- 1</p> <p>Muffle furnace- 1, Deep freezer- 1</p> <p>Nitrogen Evaporator- 1, Water bath- 1, Microtome- 1, Humidifier- 1,</p> <p>Honey Processing Plant- 1</p>
	<p>Pesticide Residue Research and analytical laboratory – 400 m²</p>	<p>LC-High Resolution Mass Spectrometer -1</p> <p>LC-MS/MS-2, GC-MS -1, GC-MS/MS -1, GC-3, Turbovap -1, Rotary Evaporator -3</p> <p>Muffle Furnace-3, Centrifuge -3</p> <p>Centrifuge refrigerated table top model -2</p> <p>Centrifuge refrigerated Floor model -1</p> <p>Homogenizer -3, Electronic Balance -6</p> <p>Semi micro analytical balance</p>

			Platform shaker-1, Oven-2 Natural convection oven-1 Nitrogen evaporator-1, Elga Water Purifier-1 Funnel Shaker-1, Separatory funnel Shaker-2
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6.4.5. Conduct of Practical and Hands-on-Training

- Extensive hands-on experience in insect identification through the utilization of taxonomic keys
- The students are being trained in different aspects of microbial pest control such as identification, mass production and formulation of entomopathogenic fungi, bacteria and virus.
- The well-established center of honey bee and other pollinators research gives students a superlative training in beneficial insects.
- Students are well-trained in identification of pests of field crops, horticultural crops and plantation crops through frequent field exposure, collection and rearing.
- Students are given thorough hands- on practical experience on pesticide residue analysis in food commodities *viz.*, fruits, vegetables, cereals, pulses, spices, water, fish, meat, milk and practical training on safe use of pesticides

6.4.6. Supervision of students Ph.D Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Entomology	7/year	12 5 (from Dept.), 7 (from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department of Entomology maintains an effective feedback mechanism with students, receiving excellent ratings for faculty mentoring and guidance. Students appreciate innovative explanations, group discussions, and collaborative learning opportunities but suggest more industrial exposure and improved research facilities. Despite this, they express overall satisfaction with the quality of courses. The research work in biological control has received praise from the Director of ICAR NBAIR and the monitoring and evaluation team, leading to recommendations for commercializing novel formulations and potent fungal bioagents. The R&D project on establishing a National Level Quality Control Laboratory for Honey from 2019-22 was rated excellent by the ADG (PP&B), and the pesticide residue analytical service by the Pesticide Residue Research and Analytical Laboratory received an excellent rating from the network Coordinator, AINP on pesticide residues, ICAR, and ADG (PPT &B), ICAR.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	7	4	7	7
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	1	1	0	2	0
Percentage	16	14	0	28	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes e-teaching platform of the University, KAU Moodle for online teaching and effective delivery of the curriculum. MOOC course on Apiculture with class of nine sessions in the form of video classes, PDF notes and Video recorded practical sessions of apiculture was provided.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF ENTOMOLGY



Training, Seminars, Workshops, Etc.



Degree Programme : Ph.D. Plant Pathology

6.4.1. Brief History of the Degree Programme

The Department of Plant Pathology in the college was established in 1961. B.Sc. (Ag.) programme was started in the college since 1955, the year in which the university was formed. Subsequently Ph.D. in Plant Pathology was started in 1965 with the commitment of imparting knowledge to students and developing innovative and practical solutions for the benefit of stakeholders, ICAR 2009 syllabus was followed till 2021 and from 2022 admission onwards revised ICAR syllabus is being followed. The department functions with the following objectives:

Objectives:

1. Detection, identification, characterization, molecular and nano technological studies of plant pathogens and beneficial microorganisms for crop nutrition, crop protection and microbial biotechnology.
2. Development of novel strategies, beneficial microbes, their improved strains and biomolecules for eco-friendly management of crop diseases, crop nutrition, crop growth enhancement and biological control of weeds.
3. Development of efficient microbial formulations and delivery systems for enhanced crop production and protection.
4. Post-harvest and seed borne diseases, myco-toxins and their management.
5. Mushroom production technology and its application in biodegradation, nutraceutical and pharmaceuticals.
7. Molecular basis of beneficial microbial associations and host pathogen interaction.
8. Exploitation of microbes for bioremediation, biological waste management and waste water recycling.

Accomplishments of Ph.D. in Plant Pathology Programme at a glance		
Batches of students passed out so far	:	50
Number of students passed out so far	:	34
Number of students passed out during the assessment period	:	1
Number of students secured placement as faculty in the University during the tenure		7
Number of students secured job in Govt./Private sector during the tenure	:	3
Number of students pursuing Ph.D. with SRF/ INSPIRE/OTHERS	:	7
Number of students currently in roll and pursuing the Ph.D. programme	:	19

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of Plant Pathology such as microbial taxonomy, biological control, IDM, host pathogen resistance, post-harvest disease management, nanotechnology,

endophytes in plant disease management and mushroom cultivation. An array of technologies was researched through Ph.D. programmes and the findings open up the possibility of using diverse solutions to the challenges in the field of crop protection. A brief account of the accomplishments made out of Ph.D. research programme is presented below.

Association of CymMV and ORSV in the imported and cultivated Dendrobium orchids in Kerala was recorded. The co-cultivation root endophyte *Piriformospora indica* with meristem cultured plants followed foliar application of antiviral compounds effectively controls CymMV in Dendrobium orchids. This management practice can be easily adopted by farmers and with ease and had a prolonged effect on Dendrobium orchids.

Department of Plant Pathology at a glance (2019-23)		
ICAR Schemes.	:	AICRP on Mushrooms
National Projects	:	1
External Aided Projects	:	4
State Plan Projects	:	11
Designated Inspections Authority for Plant Quarantine GOI	:	1
Publications	:	With NAAS above 5 - 29 With NAAS below 5 - 20

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	1	0	ICAR
2	Associate Professor	2	0	2	ICAR
3	Assistant Professor	5	7	0	ICAR
	Total	8	8	0	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students' guidance	Remarks
1	Dr. Heera G., Assistant Professor (Plant Pathology) PI AICRP on Mushrooms	4	2	--
2	Dr. Safer M.M., Assistant Professor (Plant Pathology) Instructional Farm, College of Agriculture, Vellayani	1	--	...
3	Dr. Joy M., Professor (Plant Pathology) and Head, Coconut Research Station, Balaramapuram	1	7	...
4	Dr. Sajeena A., Assistant Professor (Plant Pathology), IFSRS, Karamana, KAU	2	3	...
5	Dr. Dhanya M. K., Associate Professor (Plant Pathology), RARS, Kumarakom	--	1	--

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab attendant	1	1
2	Office attendant	1	1

6.4.4. Classrooms and Laboratories: Ph.D. Programme

The class room and lab facilities of the department together with that of ICAR schemes functioning in the department are sufficient to provide a hands-on experience in every aspect of Plant Pathology *viz.*, Mycology, Plant Bacteriology, Plant Virology, Mushroom cultivation technology, Disease management studies both *in vitro* and field.

Class room	Lab area and equipments		Farm land
	Laboratories	Equipment	
	UG lab 90 m ²	Microscope (10)	Open area from farm
PG class room 45 m ²	PG lab 1 71.3 m ²	Hot air oven (1) Laminar air flow (2) Microwave oven (1) Induction cook top (2) Pressure cooker (2) Refrigerator (2)	Insect free net house -230m ²
Seminar hall 45 m ²	PG lab 2 / Mycoherbicide	Laminar air flow (1)	Mushroom house 73 m ²

	42.6 m ²	<p>Stereo microscope with image analyzer (1)</p> <p>Binocular microscope with image analyzer (1)</p> <p>pH meter (1)</p> <p>Weighing balance (1)</p> <p>Refrigerator (2)</p> <p>Induction cook top (1)</p> <p>Pressure cooker (1)</p> <p>-20 deep freezer (1)</p>	
Mushroom training hall 40 m ²	Protein lab 48.5 m ²	<p>Laminar air flow (1)</p> <p>Rack for tissue culture in separate room with AC (1)</p> <p>Precision Weighing balance (1)</p> <p>Refrigerator (2)</p>	Mushroom shed 24 m ²
	Instrumentation room 42 m ²	<p>Weighing balance (milligrams) (1)</p> <p>Microscope (1),</p> <p>Computer system (1)</p> <p>pH meter (1)</p> <p>PCR machine (2)</p> <p>Refrigerated Centrifuge (1)</p> <p>Air conditioner (1)</p> <p>Microtome (1)</p> <p>Mini spinner (2)</p> <p>Vortex (1)</p> <p>Geldoc (1)</p> <p>Electrophoresis unit (1)</p> <p>Water bath (1)</p>	Dark room 23.46 m ²
	PhD lab 1 40.23 m ²	Refrigerator (1)	Composting unit 44.28 m ²

	Ph D lab2 110.4m ²	Laminar air flow (2) Zeiss Fluorescent Microscope (1) Orbital shaker (1) Hot air oven (1) Induction cooker (2) Microwave oven (1) Pressure cooker (2) Compound microscope (2)	Greenhouse 30 m ²
	Hot lab 18 m ²	Autoclave (horizontal) (1)	Glass house 110 m ²
	AICRP (mushroom lab) 60 m ²	Autoclave (1) Refrigerator (1) Oven (cookies baking) (1) Laminar air flow chamber (1) Microwave oven (1) Induction cooker (1)	
	ARCPDD 435 .78 m ² (with Seminar Hall with AC (4 no) and AV aids	Rack for tissue culture in separate room with AC (1) ELISA washer (1) ELISA reader (1) UV trans illuminator (1) PCR machine (1) Hot air oven (1) Rocker (1) Refrigerated centrifuge (1) Magnetic stirrer (2) Table top microfuge (1) Hot water bath (1) Precision Weighing balance (1) Weighing balance (1)	

		Horizontal gel unit (1) Vertical gel unit (1) Gel doc (1) Vertical Water distillation unit (2) -80 high efficiency freezer (1) -20 freezer (1) BOD incubator (1) Incubator Shaker (1) Oven for ELISA incubation (1) Monocular Microscope (2) Zeiss Binocular microscope with image analyzer (1) Zeiss Stereomicroscope (1) Spectrophotometer (1) Ice flaking machine (1) Heat block (1) Microwave oven (1) Refrigerator (3) Computer (1) Printer (1) Desiccator (1) LAF (2) Autoclave (2) Pressure cooker (2) Induction cooker	
Total Class room area-130 m²	Incubation room 4 m ² Total Area-962.8 m²		Others- 534.74 m2 Grand total: 1627.54m2

6.4.5. Conduct of Practical and Hands-on-Training

- All courses include field oriented practical sessions.
- Students are well-trained in identification of diseases of crops through frequent field exposure, collection, culturing and identification.
- Hands on practical classes are given on handling the equipment and performing the experiments in mycology, phytopathogenic bacteria, Advanced virology, host pathogen interaction, plant disease management, mushroom identification, culturing, cultivation and familiarization of molecular techniques.
- For every practical course, a practical manual has been printed (revised from time to time with changes in syllabus) and is distributed to the students at the time of registration for the course in each semester. The students submit their records based on the practical classes taken and get them evaluated by the course teacher.

6.4.6. Supervision of students in Ph.D. Plant Pathology Programme

Degree programme	Intake capacity of students	Qualified faculty for supervision of students
Student intake	6/ year	8 (5 from department, 3 from outside)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The curriculum of the courses is designed well to equip the students according to the need of the industry. Department of Plant Pathology is always providing services regarding diagnosis and management trainings and consultancy to the farmers and are helping in the overall development of state agricultural sector. Scientific support to stakeholders on mushroom identification, cultivation, and processing and spawn production are facilitated through trainings and field visits. Feedbacks based on a proforma were collected from the students, parents and farming community periodically to improve the teaching and to assess the competency / performance of the faculty and students. Changes were made in the respective aspects in teaching and consultancy for the farmers and stakeholders by considering the suggestions pointed out for improvement. Moreover, meetings were conducted with students by chairman of advisory committee and also open discussions with the students and faculty of the department to discuss about the progress of the work and for sharing the problems faced by them. Based on these solutions to the problems raised were found out.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	6	4	3	1
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	2*	0	1*	1*	-
Percentage	33	0	25	33	-

*Students opted for studies with scholarship

6.4.9. ICT Application in Curricula Delivery:

The department is provided with facilities for high-speed internet connection with Wi-Fi. Power point presentations, videos and smart board facilities which are being utilized in the teaching learning process. Online access to e- resources available in College library including CERA (Consortium for e-Resources in Agriculture), KrishiKosh (for thesis reference full text), eBooks of CABI, Atral and Asap, DELNET (Developing Library Network), e - journals etc. are utilised by the students. MyLoft registration has been maintained by faculty and PG students for the effective utilization of digital library facilities. All the PG courses, course teachers and students are registered in Academic Management System (AMS). Seminars are being conducted by the students using ICT tools. Classes were handled during COVID lockdown period in hybrid mode. Examinations were conducted online. Assignment submissions were done using KAU Moodle platform. Seminars were conducted in Google meet platform. Students use GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software for statistical analysis of data. Bioinformatic tools are also familiarized to students as a part of their course programmes.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme : Ph.D. Agricultural Extension Education

6.4.1. Brief History of the Degree Programme:

The Ph.D. Agricultural Extension Education programme is offered by the Department of Agricultural Extension from 1976 onwards with an annual intake of 4 students. The Department was established in 1962. It beholds a long history of responsiveness towards excellence in teaching and mentoring students, developing highly innovative and responsive research and outreach program that addresses stakeholder needs and facilitate public policy and management. The faculty is committed to guiding research scholars in diverse fields such as crop and technology-based impact assessment of university technologies, Sustainable agricultural development, ecosystem studies based on Agro-Ecological Units, climate-smart agriculture for sustainability and food security, subaltern and women studies with reference to agrarian relations and agricultural development, organizational studies, ICT and communication strategies for agricultural development etc. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards. The nomenclature of the department was changed from Department of Agricultural Extension to Department of Agricultural Extension Education in 2023.

Objectives

- Impart quality education to postgraduate students to secure high positions in competitive examinations and eligibility tests
- Equip the postgraduate students to formulate the research programme and conduct independent research in the field of Agricultural Extension Education
- Train and equip farmers and other stakeholders in adopting new technologies in agriculture through the Training Service Scheme and Agricultural Knowledge Centres spearheaded by the faculty of the department involving postgraduate students.
- Disseminate the technologies developed by the university for the benefit of farming community and encourage to take up entrepreneurial ventures

Accomplishments of Ph.D Agricultural Extension Education Programme at a glance		
Batches of students passed out so far	:	34
Number of students passed out so far	:	39 + 5*
Number of students passed out during the assessment period	:	7 + 5*
Number of students secured placement as faculty in the University during the tenure	:	1**
Number of students secured job in Govt./Private sector during the tenure	:	6***
Number of students with UGC NET JRF	:	2
Number of students currently in roll and pursuing the Ph.D programme	:	16

* Five students have completed the viva and are in the process of submission and result notification.

** Secured placement in private university in the faculty of agriculture

*** All six in Govt sector

Salient research findings

During the period of assessment, the Department carried out applied research in the diverse areas of extension education focusing on climate change, entrepreneurship, tribal studies, urban agriculture and Covid-related studies. A brief account of the research findings made out of Ph.D programme is presented below.

1. Agro-ecosystem and climate studies

- **Social Dynamics of Urban Agriculture (UA): A Critical Analysis-** The study investigated the subjective well-being, health and social benefits of UA. Most of the farmers were aware about marketing channels, but marketable surplus was less.
- **Climate Resilience of Peri-urban Agriculture in Kerala: A Farming System-based Assessment -**The study revealed that Kaipad areas (AEU-7) had the highest absorptive and adaptive capacities, while Kuttanad (AEU-4) has the lowest values. AEU-23 had the highest transformative capacity, while AEU-13 had the lowest transformative capacity. In the case climate of resilience, AEU-7 had the highest climate resilience, while AEU-4 had the lowest climate resilience.

2. Subaltern studies

- **Tribal Labour Migration of Wayanad District: An Impact Analysis-** Developed the livelihood capital index of tribes people. Immense increase in physical capital was observed after migration that is a pull factor for the younger generation. A decrease in the social and natural capital was observed due to migration. The unemployment or loss of employment was the main push factor while superior opportunity for employment was the main pull factor for migration
- **Performance Effectiveness of Biodiversity Management at Grama Panchayats in Kerala-** The regions and districts, a considerable proportion of the respondents (68.9%) opined low-performance effectiveness of BMCs. Administrative and advisory function, documentation and conservation were the most important determinants influencing the performance effectiveness of BMCs across regions as well as district.
- **Sustainable Rice Production in Wayanad District: A Tribal Perspective-** developed a sustainability index for tribal rice farming and an attitude scale towards sustainability of rice farming. The study revealed that 73% of the respondents had social sustainability. 59% of the tribal farmers were economically sustainable and 79% of the tribal rice farmers had environment sustainability. Similarly, majority (81.11%) of tribal rice farmers had highly favourable attitude towards sustainability of rice farming.

3. Adoption and impact assessment studies

- **Participatory Technology Intervention in High-Range Home Gardens-** Significant crop diversity observed despite lower overall biodiversity. Banana-based gardens recorded 154 plant species (58 families), while pepper-based gardens had 146 species (54 families). Action research affirmed improved B:C ratio and high adoption of KAU technologies. Emphasized vertical integrations for enhanced profitability.
- **Risk Behavior of Vegetable Farmers in Special Agricultural Zone-** Pareto analysis identified 15 major risks in vegetable farming. Top six risks included wildlife damage,

surplus production, complicated banking, climatic variations, lack of schemes, and price fluctuation. Findings offer insights for targeted risk mitigation strategies.

- Participatory Action and Learning for Sustainable Agri-preneurial Models:- Developed sustainable models for tapioca, banana, vegetables, pineapple, and fish along with capital formation index through PAL. Eight key performance indicators identified, including profit, diversification, and customer satisfaction.
- Technology Assessment and Refinement in Coastal Home Gardens- Mean diversity index compared across different AEU, with AEU 4 exhibiting the highest diversity. Crop-wise diversity profile analyzed, with fruits having the highest diversity index. Lowest biodiversity recorded for tubers and ornamental plants. Coastal home garden biodiversity found lower compared to other agricultural systems. 51.43% of respondents had low adoption, categorized as innovators (0.95%), early adopters (16.19%), early majority (34.29%), late majority (32.38%), and laggards (16.19%).

4. Special group studies

- Geriatric Horticultural Therapy (GHT) among the inmates of Care Home: A Case Study based Action Research in Thiruvananthapuram District- A protocol of GHT activities was developed for enhancing the cognitive, psychological, physical and social well-being of inmates of care home. The results also state that GHT had a positive and substantial impact on the cognitive, psychological and social well-being of the inmates.

Department of Agricultural Extension Education at a glance (2019-23)		
ICAR Schemes.	:	ICAR Scheduled Tribe Sub Plan (20-21), (21-22), (22-23) – 3 Nos. ICAR Scheduled Caste Sub Plan (21-22)- 1 Nos
National Projects	:	0
External Aided Projects	:	10
International Projects	:	2
State Plan Projects	:	10
Industry linked projects and consultancy	:	0
Publications	:	With NAAS above 5 - 16 With NAAS below 5 – 34
Revenue generation	:	Rs. 2.749 lakhs (2019-23)
Total project outlay	:	11 lakhs (PhD projects)
Total no of trainings	:	207(organized by the Dept.) + 44 (Faculty as RP)

*Refer Dept. SSR for details of faculty projects

The department received external funding from ICAR, Indian Council of Social Science Research, SC & ST Department, National Bank for Agriculture and Rural Development, Medicinal and Aromatic Board, State Planning Board, Kerala State Higher Education Council, Kerala State Council for Science Technology and Environment, German Academic Exchange Service, Kerala State Biodiversity Board and Kerala State Biotechnology Commission for research projects and various outreach activities.

International workshops /conferences organized

1. Organised an **International Interactive Workshop** on “Introduction to Qualitative Research Methods” in collaboration with Kerala Agricultural University and Institute for Development Research and Policy (IEE), University of Bochum, Germany (10-13 August 2021).
2. International Biotechnology Conclave entitled ‘Biozion– The Biotech Capstone-Science-Society-Interface’ (<https://biozion.in/>) at College of Agriculture, Vellayani from 7 to 11 August 2023, in collaboration with Sree Chithra Thirunal Institute for Medical Sciences and Technology, KCSTE and German Academic Exchange Service.

6.4.2 Faculty Strength - Present status

Sl. No	Faculty	Sanctioned	Faculty in place	Vacant Position	Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies
1	Professor	1	1	0	ICAR
2	Associate Professor	2	0	2*	ICAR
3	Assistant Professor	4	6	0	ICAR
4	Faculty on contract	0	0	0	
	Total	7	7	0	

*The overall strength is balanced with Assistant Professors

1- Assistant Professor attached to the (Regional Agricultural Research Station) RARS – services made use of in the academic and research activities of the Department.

1 - Assistant Professor attached to the KAU Training Service Scheme (TSS) - services made use of in the academic activities of the Department.

1 - Associate Professor attached to the KAU Training Service Scheme (TSS) - services made use of in the academic and research activities of the Department.

ii) Teachers outside the department involved in the department activities

Name and Designation	Courses handled	Students guidance	Remarks
5. Dr. Jayalekshmi.G, Associate Professor (Agricultural Extension Education)	-	7	Head, KVK Kottayam
6. Dr. Bindu Podikunju, Associate Professor (Agricultural Extension Education)	-	4	-
7. Dr. Aparna Radhakrishnan, Assistant Professor (Agricultural Extension Education)	-	1	-
8. Ms. Shamna. N, Assistant Professor (Agricultural Extension Education)	-	1	-

6.4.3 Technical and Supporting Staff

Sl. No	Technical/ supporting staff	Sanctioned	In position
1	Artist	2	0
2	Photographer	1	0
3	A.V Operator	1	0
4	Office Attendant	1	1
5	Office Superintendent	1	1 (Computer Asst.)

6.4.4 Classrooms and Laboratories: PG Programme

The class room and lab facilities of the department together with that of Training Service Scheme functioning in the department are sufficient to provide a hands-on experience in every aspects of extension education, training on agro technology, and instructional technology along with theory sessions.

Class rooms	Laboratories	Farm land	Equipment
PG Lecture Hall– 50 m ²	Media lab	NIL	LCD Projector -5
Pg/Ph.D. room – 35 m ² (second floor)	56 m ²		LED TV -3
Examination Hall - 165 m ²	Computer lab 50 m ²		Television - 1
Seminar Hall 130 m ²	Language lab – 125 sq.m		Visualiser – 2
			Overhead Projector - 1

Video conference hall (smart classroom (PG) 77 m ²	(College computer lab+ Dept computer lab) with VLAN connectivity	Public address system – 16 speakers 16 microphones
Museum Hall 167 m ²		Camera - 1
Department library -50 m ² (Ground floor)	Total – 231 m²	Public address system – 1
Round Table Conference Hall 77 m ²		Handy cam - 1
TSS Hall 70 m ²		
Cellar Hall 135 m ²		
Generator room		
Total -956 m²		

6.4.5. Conduct of Practical and Hands-on-Training (Ph.D.)

- As part of the practical exercises, the students were trained in developing & standardizing various measurement techniques for quantifying different socio psychological variables: Scale construction - Summated Scale, Continuous rating Scale, Guttman Cumulative Scaling, Thurston Equal appearing Interval Scale, Likert scale Q-sort scaling etc. They were also familiarized with Index Development, Qualitative research techniques-Content Analysis, Grounded Theory, Phenomenology, Ethnography etc.
- Conducted workshop on qualitative data analysis using MAXQDA, provided hands on Training Open-source survey tool - KObo Collect
- Exercise on Techniques of participatory training need assessment, designing of training programmes. Techniques for Training evaluation, participatory training methods - Role Play, Brainstorming, Group discussion, Counselling etc. were done. Students were well equipped in conducting seminars, conferences, and poster presentations.
- Students visited different training institutions and studied the training technologies followed there.
- Students analysed ITK systems, integration of ITK and formal research system, cyber extension, privatization of extension, ATMA and SREP, Projects and Programmes on Food and Nutritional Security and bio-diversity etc.
- Students were given practical exercises on studying organizations, organizational climate in different organizations, organizational structure of development departments, departmentalization, span of control delegation of authority, decisions making patterns, individual and group behavior at work in an organization, Conflicts and their management in an organization, functional and non-functional organizations drawing factors for organizational effectiveness.
- The students gained hands-on experience in risk assessment/analysis tools, use of vulnerability and risk assessment tools and techniques, developing criteria, indicators, and indices for assessment of risk, vulnerability and resilience.

- Case studies were conducted on risk / distress assessment in agriculture -Indian and global, success stories of climate change adaptation and community-based initiatives, climate smart agriculture etc.
- Students conducted impact assessment studies on crop insurance programs, disaster management programs etc.
- In addition, various training programs on capacity building, entrepreneurship and skill development, career guidance, start-ups, business meet etc. were undertaken with active participation of PhD students.

6.4.6. Supervision of students in Ph.D. Programmes

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Agricultural Extension Education	5	10

6.4.7 Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department of Agricultural Extension Education has garnered feedback from the following key stakeholders:

- **Students:** The students suggested that the exposure visits to the institutions and industries in connection with the various courses were very effective since they provided opportunities for networking and gaining understanding of the field realities. The students were appreciative of the national and international seminars/symposiums/workshops organized by the department at regular intervals and opined that the opportunity they get to function as organizers and participants simultaneously, has helped them a long way in their curriculum.
- **Parents:** The responses obtained by the parents of the students indicated that they were satisfied with the academic activities of the department such as the timely completion of the course work and research works, exposure visits of the students to the relevant industries and institutions, encouragement in participation in seminars/workshops in their areas of research, ensuring timely publication of their research works etc.
- **Industries:** The industries/institutions appreciate the regular visits of the research scholars to their institute and find it useful to identify competent/resourceful students for placement in their institutes in short term/long term assignments. The areas of researches of the students, which are in line with the mandates/thrust areas of the institutes, provides opportunities for collaboration. The industries also opined that such visits by the researcher scholars opened up opportunities for up-scaling and commercialization of the relevant research findings.
- **Farmers:** The farmers opined that the visits by the students to their fields as part of the research activities help them in finding solutions to their farming related problems, by the advisory services provided by the researchers. They also get the opportunity to know about the latest technologies in relation to their enterprises in addition to suggestion of alternate farm plans by the students, to increase income of the farmers.

6.4.8. Student intake and attrition in the Ph.D. programme for last five years:

i) Student intake

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	6	2	3	5	3

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle, online platforms, YouTube, social media platforms, Whatsapp groups, Television channels for the delivery of the curriculum. Teaching videos are also prepared by the faculty.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF AGRICULTURAL EXTENSION EDUCATION



PRA



GUEST LECTURE & DEMO ON ROBOTICS



INTERNATIONAL COLLABORATIONS



LINKING GRASSROOTS

Training, Seminars, Workshops, Etc.



Degree Programme: Ph.D. Genetics and Plant Breeding

6.4.1. Brief History of the Degree Programme:

The Department of Agricultural Botany was established in 1955. In 2023, the Department's name was changed to Genetics and Plant Breeding. Initially, in the department, Ph.D. courses were started in 1961. Student intake at the start was 2 and currently, each academic year accommodates 5 Ph.D. students. A team including Professors, Associate Professors, and Assistant Professors offers various courses. 2019 to 2021 admission ICAR 2009 syllabus was followed and for 2022 admission onwards the revised syllabus is being followed. Accordingly at the postgraduate level 9 courses are being offered in the department. The department has well-equipped laboratory facilities, including plant tissue culture, for research.

Objectives

- Breeding for high yield, quality and resistance to specific pests and diseases in rice, vegetables, pulses, oil seeds, fodder crops, tuber crops, and ornamental crops.
- Hybridization and development of F1 hybrids in ornamental crops.
- Germplasm collection, performance evaluation, biochemical profiling and database preparation using bioinformatic tools in landraces of rice in Kerala and development of its breeding lines.
- Marker assisted breeding and gene pyramiding in rice for resistance to pests and diseases
- Development of herbicide-tolerant breeding lines in rice.

No. of Ph.D. courses offered by the department- 9 (2022-2023)

Accomplishments of Ph.D. Genetics and Plant Breeding Program at a glance	
Batches of students completed so far	59
Number of students completed so far	71
Number of students completed during the assessment period	14
Number of students secured placement as faculty in the University so far	25 (in KAU) 3 (Teaching assistants)
Number of students secured placement in Govt./Private sector during the tenure	26
Number of students currently in roll	18
Number of students pursuing Ph. D with JRF	1
Number of students pursuing Ph. D with other fellowship	4

Number of students admitted during the reporting period					
2019-20	2020-21	2021-22	2022-23	2023-24	Total
5	5	5	4	4	23

Salient research findings

Plant breeding and other basic and applied genetics research were conducted during this time. Various techniques including molecular breeding, gene pyramiding, tissue culture etc. in field crops, vegetables, pulses, floral crops etc. were included in the studies. Through the various research projects they completed, the students were able to investigate the subject's

multifaceted potential. Some of the salient findings of the students' research projects are enlisted below:

- Marker assisted breeding program was used to identify high yielding and phenotypically superior lines of tomato that had Ty2 genes resistant to TOLCV.
- In the rice variety Sreyas, the Saltol gene was introduced using the donor parent FL478.
- R genes for BPH resistance in rice breeding lines were created by pyramiding them against the Jyothi variety's background.
- In the background of the rice variety Manu Ratna, short-duration, drought-tolerant, and highly productive Backcross Inbred Lines (BILs) are being developed, stacked with drought yield QTLs.
- Breeding lines in the background of rice varieties Prathyasa and Aiswarya were developed by pyramiding two R genes against BLB using donor parent ISM
- The genes responsible for the efficiency of potassium and nitrogen in cassava have been identified.
- In white seeded sesame, 6 superior segregants with respect to seed yield and oil content were identified.
- Two hybrids were identified as superior with respect to their fodder yield in horse gram
- Ten commercially viable hybrid genotypes of Dendrobium orchids with exceptional floral features and diversity attributes have been identified.
- By crossing varieties Jyothi and Kanchana with CMS lines CRMS 31A and UPR195-17A, respectively, the first CMS line in the Kerala rice variety's background could be developed.
- In yard-long beans, three superior hybrids were distinguished based on their ability to withstand drought and produce well in situations where water is scarce.
- Four hybrids with high dry matter yield, low fiber content, high protein content, and high green fodder yield were found in the fodder cowpea population.

Department of Genetics and Plant Breeding at a glance (2019-23)

ICAR schemes	5
National projects	-
External aided projects	-
State plan projects	18
Ph. D projects	28
Industry linked projects and consultancy	-
Publications	32 (with NAAS above 5) 8 (with NAAS below 5) 9 (without NAAS rate)
Popular article- 20 Proceedings- abstract -34 Leaflet-24	Booklet-2 Book -1 Book chapter -12

6.4.2. Faculty Strength: Present status

Sl. No.	Designation	Sanctioned	In place	Vacant	Recommended by the ICAR/UGC/VCI/ other regulatory bodies
1.	Professor	2	1	1	ICAR
2.	Associate Professor	7	-	7	ICAR
3.	Assistant Professor	6	4(1)		ICAR
Total		15	7	8	

Teachers outside the department involved in the department activities

Sl.No.	Name and designation	Students' guidance
1.	Dr. Bindu M.R., Professor and Head, IFSRS, Sadanandapuram	4
2.	Dr. Veena Vigneswaran, Assistant Professor, RRS, Vyttila	2

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	0
2	Lab attendant	2	1
3	Class IV	1	1

6.4.4. Classrooms and laboratories: Ph.D. program

The department has a classroom exclusively for PhD. Students, equipped with LCD projector to facilitate presentations of seminars. The molecular biology lab associated with the department is sufficient to provide hands on experience as well as conduct their research works related to their projects.

Class rooms	Laboratories	Farm land	Equipments
PG- 51.33 m ² Ph.D -18.01 m ²	UG lab - 113.85 m ² PG lab - 51.33 m ²	Open area - 1104.4 + 1604.32 m ² Net house (4 nos) - 134.2 m ²	Stereo microscopes - 1 no Dissection microscopes -49 nos Compound microscope - 8 nos. Binocular microscope - 1nos Monocular microscope -1 Vertical Deep Freezer - 1 Gel documentation system - 1no

	<p>Tissue culture lab -62.27 m²</p> <p>Computer lab - 11.55 m²</p>	<p>Rain shelter + Crossing shed (1) + Rodent & Bird proof cage + Shade house - 1247 m²</p>	<p>Revolutionary table top cooling centrifuge – 1 no</p> <p>Refrigerator – 5 no</p> <p>Electronic weighing balance – 2nos</p> <p>LCD projector – 2 nos</p> <p>pH meter – 1 no</p> <p>Laminar flow cabinet – 2 nos</p> <p>Hot air oven – 2 nos</p> <p>UV spectrophotometer – 1</p> <p>Double Distillation unit - 1no</p> <p>Thermal cyclor – 2 Nos</p> <p>Revolutionary Image Analyzer – 1 No</p> <p>Camera lucida – 2</p> <p>Ocular micrometer-9</p> <p>Stage micrometer- 1</p> <p>Moisture testing machine- 1</p> <p>Micropipette -5</p> <p>Dissection instruments –9</p> <p>Electrophoresis tank -1</p> <p>Spinners -2</p> <p>Tissue lyser -1</p> <p>Desktop computer – 6</p> <p>Notebook – 1</p> <p>Laptop – 1</p> <p>Printer – 4</p> <p>Camera – 2</p> <p>Speaker – 1</p> <p>Handsprayer – 1</p>
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6.4.5. Conduct of Practical and Hands-on-Training

- Students are provided with hands on training on various biotechnology tools
- Students get familiarized with the various recent techniques and advances in the research field.

Institutional Visits

Students were given tours of research facilities by course teachers, including the University of Kerala's Central Laboratory for Instrumentation and Facilitation.

Training programmes

The Department offers training sessions and seminars on a variety of relevant subjects.

6.4.6. Supervision of students in Ph.D. Program

Degree program	Intake capacity	Qualified faculty for supervision of students
Ph.D. Genetics and Plant Breeding	5/year	6 (4 from department + 2 from outside department)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The faculty conducts various seminars and trainings for the farmers on cultivation practices of various crops including field crops, vegetable crops, floriculture etc. Workshops on relevant aspects of intellectual property rights such as geographical indication, patents etc. were also organized by the faculty members. The students are also equipped with the farming aspects and the trials being carried over in the field.

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	5	5	5	4	4
ii) Student attrition in the last five years					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	-

6.4.9. ICT Application in curricula delivery:

Moodle platform is used by the faculty for the conduct of several sessions. Online learning was carried out during the COVID-19 pandemic using tools like Zoom, OBS Studio for video editing, and Google Meet.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the section 6.4.1. to 6.4.9. are furnished as per the records available in the college and degree awarding university.

Signature of Dean of the College with Date & Seal



A one-day awareness workshop on GI and patents for farmers and extension officials of Thiruvananthapuram district was conducted by the Department of Plant Breeding and Genetics on 17-01-2023. Four leaflets on relevant topics related to IPR were released by the Associate Director of Research (SZ).



A comprehensive one-day workshop on the statistical package R was meticulously organized at the Department of Genetics and Plant Breeding on September 25, 2023, catering to faculty members, postgraduate, and doctoral



On September 30, 2023, faculty members and Ph.D. students from the department undertook a visit to CLIF, Karyavattam, fostering academic engagement and collaborative exploration



The 40th ZREAC workshop, hosted by the RARS (SZ) at the College of Agriculture, Vellayani, took place on January 29, 2024. During the event, booklets meticulously prepared by the Department of Genetics and Plant Breeding were officially unveiled by the Associate Director of Research (SZ).



Degree Programme : Ph. D. Plant Physiology

6.4.1. Brief History of the Degree Programme:

The Department of Plant Physiology came into existence on 17.03.1993 with Dr. S. Sheshadrenath as Professor & Head. The Doctoral programme was started in the Department of Plant Physiology in 2009. The faculties are committed in guiding research scholars in diverse fields such as response of plants towards climate change, abiotic stress tolerance and mitigation strategies for different abiotic stresses. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objective

- ♥ To conduct basic and strategic research to understand the underlying processes that determines the plant productivity
- ♥ To undertake fundamental research related to current problems in agriculture
- ♥ To provide consultancy and diagnostic services in the nutritional and physiological disorders of crops

Accomplishments of Ph.D. Plant Physiology Programme at a glance		
Batches of students passed out so far	:	14
Number of students passed out so far	:	10
Number of students passed out during the assessment period	:	7
Number of students secured placement as faculty in the University		2
Number of students secured job in Govt./Private sector during the tenure	:	5
Number of students pursuing Ph. D. with CSIR/UGC fellowship	:	3
Number of students qualified NET (ICAR/UGC/CSIR)		6
Number of students currently in roll and pursuing the Ph. D. programme	:	11

Salient research findings

A brief account of the accomplishments made out of Ph. D. research programme are presented below.

- A BC2F4 generation of TGMS rice mutant line for *tms5* gene has been developed through marker assisted back crossing with the recurrent red rice parent, Jyothi.
- Pollen selection followed by selective fertilization is developed as a technology for generating stress tolerant crops.
- CO₂ enrichment improves stress tolerance through enhanced photosynthetic efficiency and activation of defense mechanism which can be exploited for developing production technologies of economically valuable secondary metabolite.
- CO₂ enrichment can improve the performance of ginger in terms of growth, yield and quality. Ginger plants have better tolerance against *P. aphanidermatum* under CO₂enrichment.
- Application of Azolla and AMF improves Zn uptake, translocation and remobilization in rice variety Uma resulting in enhanced Zinc concentration in the bran, endosperm and grain.

- Incorporation of Azolla + AMF and also application of PGPR Mix I helps to improve soil Carbon sequestration.
- A core collection of rice germplasm adapted to Southwestern Indian peninsular was genotyped using SSR markers and characterized by contrasting water regimes to associate genomic regions for physiological, root traits and yield related traits.
- Bulk segregant analysis (BSA) was carried out between F₂ (Uma X NERCA-L-44) tolerant and susceptible bulks using 100 SSR markers. Among the polymorphic markers, RM337 was newly reported marker for heat tolerance. Expression analysis of two genes corresponding to RM337 revealed that *LOPI*(LOC_Os08g01330) was linked to high temperature tolerance in rice.
- Foliar spray of (Panicle initiation and flowering stage) Brassinosteroid (4ppm) can be used as a mitigating strategy against high temperature stress in rice and tomato.
- Black glumed Njavara rice performed better than yellow glumed Njavara under UV-B radiation stress condition.
- Improvement of performance of cowpea under elevated CO₂ with additional nitrogen input.
- Amaranthus, which is a C₄ plant, also responded to CO₂ enrichment. But the extent of increase in growth and dry matter production was less compared to cowpea.

Department of Plant Physiology at a glance (2019-23)		
External Aided Projects	:	2
State Plan Projects	:	9
Publications	:	With NAAS above 5 - 52 With NAAS below 5 – 9
Other publications	:	Proceedings/abstracts: 15 Popular articles: 2 Book/Book chapters: 3
Awards & Honours	:	7 (Best Ph.D. Thesis Award-2020, Eminent Scientist Award 2020, Dr. Harbhajan Singh Memorial Award 2020, Best teacher award 2021, Dr. N. E. Borlaug Award 2023, Best poster/paper Award)
HRD programmes of faculty (trainings/Seminar/Symposium/Workshop)	:	Conference/symposium -16 Trainings-6 Workshop-7 Seminar/Webinar-63

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	1	2	-	ICAR
2	Associate Professor	1	0	1	ICAR
3	Assistant Professor	2	2	0	ICAR
	Total	4	4	0	

*Dr. Soumya P.R. joined on 03.07.2023 F.N. Dr. Viji M.M. transferred on 11.09.2023 A.N.

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. Krishnakumar G. Assistant professor (Plant Physiology), College of Agriculture, Vellanikkara	1 (Associated)	-	1

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab assistant	1	1
2	Office Attendant	1	0

6.4.4. Classrooms and Laboratories: Ph.D.Programme

The class room and lab facilities of the department are sufficient to provide a hands-on experience in Plant physiology. These include

Class rooms	Laboratories	Farm land	Equipment
PG – 100 sq. m. Ph.D – 40 sq. m. Students room-75 sq. m.	UG lab – 70 sq. m. Ph.D. lab – 50 sq. m Tissue culture lab1 – 30 sq. m Tissue culture lab2 – 50 sq. m Preparation room-25 sq.m (shared with department of plantation, spices, medicinal and aromatic plants)	Rain-out shelter – 50sq.m Open top chamber (2nos) Poly house– 200 sq.m	Vortex Mixer – 1 no Stereo microscope – 1 no Digital microscope – 1 no Gel documentation system – 1 no Trinocular Research Microscope-1 no Deep freezer – 1 no Centrifuge – 2 nos Refrigerator – 2 nos PCR machine- 1 nos PCR machine (gradient)- 1 nos Microwave oven- 1 no ELISA plate reader-1 no CO ₂ Gas Analyzer with Data Logger-1 no

			Electronic weighing balance – 2 nos Mini Vacuum Cleaner – 1 no pH meter – 2 no UV/VIS Spectrophotometer – 1 no Scanning Visible Spectrophotometer– 1 no Laminar flow cabinet – 1 no Incubator – 3 no Hot air oven – 1 no Distillation unit with Quartz Condenser: Borosil – 1 no
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6.4.5. Conduct of Practical and Hands-on-Training

- Practical's oriented towards providing basic knowledge on plant physiological processes and plant responses to environment and other constraints are being carried out.
- Undertake programs for improving crop growth, productivity and abiotic stress tolerance by exploiting well characterized physiological traits.
- Hands on training is given to Ph.D. students on assessment of physiological markers associated with abiotic stress tolerance, impact of application of nutrients/plant growth regulators on growth and development of crops.
- Students are helped to develop expertise in handling of various equipment's like portable photosynthetic system, PCR machines, spectrophotometer, stereo microscope, digital microscope, gel documentation system etc.
- Hands on training is given to Ph.D. students on DNA and RNA isolation, Isozyme analysis for various stress responsive proteins, identification of molecular markers for specific traits.
- CO₂ enrichment simulation studies using Open Top Chamber facility and trench system available in the department.

6.4.6. Supervision of students in Ph.D.Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D.Plant Physiology	4/year	4

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

A feedback mechanism is active and is being utilized by the students, parents, farmers, and the line department officials. All means of feedbacks (direct, over phone, by post, email etc) are entertained and are well attended.

6.4.8. Student intake and attrition in the programme for last five years:						
i) Student intake						
Year	2019-20	2020-21	2021-22	2022-23	2023-24	
Number	4	2	2	3	1	
ii) Student attrition in the last five years						
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24	
Number	0	1	0	0	0	
Percentage	0	50	0	0	0	

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. The wi-fi connectivity, computer facilities, LCD projectors and classrooms are utilized by the teachers and students.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal



Degree Programme: Ph.D. Microbiology

6.4.1. Brief History of the Degree Programme:

The Department of Agricultural Microbiology at College of Agriculture, Vellayani was established in 2007 as per the decision of the 101st meeting of the Academic council. Three faculty members working in the Department of Plant pathology were deployed to form the Department of Agricultural Microbiology. The Department was established with the objective of offering PG programme in Agricultural Microbiology and to conduct research on microbial inoculants for developing native isolates of biofertilizers, biocontrol agents and organisms for waste management. The Under Graduate courses handled include Agricultural Microbiology and Experiential Learning in Microbial inoculant production-Biocontrol and Biofertilizer organisms, with the aim of introducing the students to the fascinating world of microorganisms especially agriculturally important ones. The post graduate programme started in the Department with the intake of two students during the academic year 2012-13. The ICAR syllabus is being followed for UG and PG courses. In the 56th meeting of Board of Studies in 2015, approval was given for starting Ph.D. programme in the Dept. of Agrl. Microbiology at CoA, Vellayani. Ph.D. programme started with intake of two scholars in 2019-20. The faculty are committed in guiding research scholars in diverse fields such as bioinoculant technology, metagenomic studies, biofertilizers and biological control agents, beneficial microorganisms, food microbiology, plant microbe interaction coming up with innovative technologies in crop production and protection. The nomenclature of the department was changed from Department of Agricultural Microbiology to Department of Microbiology in 2023.

Objective

- ♥ Impart teaching at Ph.D. level in various aspects of Agricultural Microbiology.
- ♥ Conduct research on microbial inoculants for developing native isolates of biofertilizers for crop nutrition, biocontrol agents for disease management and organisms for waste management.
- ♥ Offer training and advisory services to farmers and public through different extension modes.
- ♥ Microbial quality analysis of microbial inoculants and soil samples.

Accomplishments of Ph.D. Microbiology Programme at a glance		
Batches of students passed out so far	:	1
Number of students passed out so far	:	1
Number of students passed out during the assessment period	:	1
Number of students secured placement as faculty in the University		Nil
Number of students secured job in Govt./Private sector during the tenure	:	Nil
Number of students pursuing Ph. D with SRF/INSPIRE/other fellowships	:	2
Number of students currently in roll and pursuing the PhD programme	:	5

Salient research findings

During the period of assessment, the Department carried out research in agricultural microbiology including plant-microbe interaction studies, development of microbial inoculant and novel formulations, soil metagenomic analysis. Many technologies, leads and the findings obtained through M.Sc. and Ph.D. programmes opened up the possibility of developing new

technologies in the field of crop production and protection. A brief account of the accomplishments made out of Ph.D. research programme are presented below.

- Endospore forming endophytic bacterial consortium for biotic and abiotic stress mitigation in cowpea and tomato.
- Plant growth promotion and stress mitigation mediated by the root endophytic fungus *Piriformospora indica* in cassava (*Manihot esculenta* Crantz).
- Endophyte mediated plant growth promotion and biotic stress mitigation in ginger (*Zingiber officinale* Rosc).

Department of Microbiology at a glance (2019-23)		
ICAR Schemes.	:	1 AINP on Soil Biodiversity - Biofertilizers (AINP on SBB)
National Projects		0
External Aided Projects	:	2
State Plan Projects	:	5
Industry linked projects and consultancy	:	3 (ESAF ToT, Attingal Municipality, State Biocontrol lab)
Publications	:	32
Revenue generation	:	Rs. 49.00 lakhs (2019-23)

6.4.2. Faculty Strength: Present status					
Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	0	1 (against the vacancy of Assistant Professor)	0	ICAR
2	Associate Professor	1	0	1	ICAR
3	Assistant Professor (Non-plan)	3	1	1	ICAR
4	Assistant Professor (AINP)	1	1	0	ICAR
5	Assistant Professor Microbiology (Originally posted at the Dept of Mol. Biol. and Biotechnology)	1	1	0	ICAR
	Total	6	4	2	

ii) Teachers outside the department involved in the department activities

Sl. No.	Name and Designation	Courses handled	Students' guidance	Remarks
1	Dr. Chitra N., Assistant Professor, AINP on SBB, RARS(SZ), Vellayani	4	1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	1	1

6.4.4. Classrooms and Laboratories: Ph.D. Programme

The department is supported with fully functional laboratories as per the requirements of the course curriculum. Separate class room and laboratory facility is available for UG and PG courses. The PG laboratory is well equipped and is sufficient to give hands-on training in different microbial techniques as per the course curriculum to under graduate and post graduate students. In addition to this an instrumentation facility and a research lab is also available for teaching and research purpose. The Centre for Microbial Technology functioning in the Department also facilitate in trainings students in microbial inoculant technology. The department also has a full-fledged production unit with four fermenters which is used to impart hands-on training to UG and PG students on microbial inoculant production. The class room and lab facilities of the department are sufficient to provide a hands-on experience in every aspect of microbiology *viz.*, techniques in microbiology, microbial physiology, genetics, food microbiology, microbial biotechnology, soil microbiology and biofertilizer technology.

Class rooms	Laboratories	Farm land	Equipment
PG – 40.5 sq. m. Ph.D.- 20 sq.m.	UG lab – 55.5 sq.m PG lab – 36 sq. m Research lab – 83 sq.m. Instrumentation facility – 27.6 sq.m. Biofertilizer Production unit – 52 sq.m. Molecular biology lab – 18 sq.m. Cyanobacterial lab – 7.65sq.m. Staff rooms- 3 nos- 26.55 sq.m. Total – 778.917 sq. m	Open area – 135 sq.m Green house – 117 sq.m. Polyhouses– 49 sq.m. Waste management pilot plant and composting unit – 55.5 sq.m	Autoclave – 4 nos Laminar Air flow chamber – 4 nos Hot air oven – 2 nos Incubator – 3 nos Fermentors – 4 nos Deep Freezer – 2 nos Refrigerated Centrifuge – 2 nos UV Spectrophotometer – 2 nos Incubator shaker – 2 nos Water Bath – 3 nos Shaking water bath – 1 no Shaker – 2 nos Electronic weighing balance – 3 nos Student Microscope Monocular – 19 nos Stereo Zoom Microscope – 1 no. Trinocular light Microscope with camera – 2 nos

			Phase contrast/Dark field Microscope – 2 nos Lyophilizer – 1 no. Rotary Evaporator – 1 no. Gel electrophoresis unit – 2 nos LCD projectors – 2 nos Smart board – 1 no. pH meter – 2 nos Magnetic stirrer – 2 nos Vortex mixer – 2 nos Distillation units – 3 nos Microwave oven – 2 nos BOD incubator – 1 no.
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6.4.5. Conduct of Practical and Hands-on-Training

- PhD students are given thorough hands- on experience on basic microbiology techniques including isolation, enumeration, biochemical and molecular characterization, and identification of microorganisms.
- Students are trained well in soil microbiology and isolation and characterization of biofertilizer microorganisms.
- Students are given practical training on mass production and quality control of biofertilizers and biocontrol agents.
- Hands on practical training is given for operating equipments including fermenters.
- The students are exposed to techniques in microbial genetics, physiology etc

6.4.6. Supervision of students in PhD. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Microbiology	2/year	4

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Department of Microbiology is functioning as Center of Excellence in Microbial Technology and was instrumental for the development and popularization of microbial inoculant technology in the state. The Department is acting as a nodal agency for supply of mother culture of biofertilizers and biocontrol agents to production units thorough out the State. We are playing a major role in popularizing microbial inoculant technology among the farming community by conducting trainings, trials, demonstrations and equipping farmers with evolved technologies. The department faculty is nominated as nodal officers of Block Level Agriculture Knowledge Center of Dept. of Agriculture for overall development of state agriculture sector by providing technical advice and immediate solutions. We are extending our service to remote villages like Attappady, dominated by tribal population, by conducting demonstrations, hands-on training and trials on production and use of biofertilizers the farmers. We have stakeholder in industries to whom our technology has been transferred. The technology for waste management developed by the Department has been adopted and successfully implemented by different local self-governing institutions in the South zone of Kerala. The Department

scientists are always ready to resolve the problems faced by farmers through direct interactions, multidisciplinary field visits, advisory services, agro-clinics, over phone or through social media etc. The teaching curriculum followed is equipping the students to meet the demands of the industry especially in the field of plant protection.

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	2	2	1	2
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	1	0	0	0	-
Percentage	50 %	0	0	0	-

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle, Google meet, Google classroom for the delivery of the curriculum. Teaching videos on different topics are also available. A collection of microbiology books is available at the Department accessible to the students.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF AGRICULTURAL MICROBIOLOGY



Training, Seminars, Workshops, Etc.



Degree Programme: Ph. D. Vegetable Science

6.4.1. Brief History of the Degree Programme:

Department of Horticulture was established in College of Agriculture, Vellayani in 1955 and PG courses were offered since 1976. Department of Olericulture attained the status of individuality in the year 1996 and Doctoral programme was started in the department in 1996. The department was renamed as Department of Vegetable Science in 2018. The department is beholding a long history of responsiveness towards excellence in teaching and mentoring students, serving farming community through sale of seeds and planting materials of KAU released high yielding vegetable varieties, as well as to develop new strategies in vegetable crop production, management and improvement and release of high yielding and disease resistant vegetable crop varieties. The faculty are committed in guiding research scholars in the latest aspects of vegetable crop production like protected cultivation, organic crop production, hydroponics *etc.*, breeding vegetables for crop improvement and pest and disease management, development of climate resilient cultivation practices for vegetable crops and vegetable grafting. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objective

- Impart quality education to post graduate students to secure high positions in competitive examinations and eligibility tests
- Equip the post graduate students to formulate research programmes and conduct independent research on vegetable crops
- Develop and release high yielding and stress tolerant varieties of vegetable crops for the benefit of farming community
- Educate on production technology and crop improvement of warm season, cool season and under- utilized vegetable crops, protected cultivation and biotechnology of vegetable crops
- Production and sale of seeds and planting materials of KAU released high yielding varieties of vegetable crops
- Provide diagnostic services to field problems faced by the vegetable farmers throughout Kerala

Accomplishments of Ph.D. Vegetable Science programme at a glance		
Batches of students passed out so far	:	7
Number of students passed out so far	:	9
Number of students passed out during the assessment period	:	4
Number of students secured placement as faculty in the University	:	4
Number of students secured job in Govt./Private sector during the tenure	:	6
Number of students pursuing Ph. D with SRF	:	1
Number of students currently in roll and pursuing the Ph. D programme	:	10

Salient research findings

During the period of assessment, the Department carried out fundamental as well as applied research in the diverse fields of vegetable science such as vegetable cultivation

practices, vegetable breeding, vegetable seed production, vegetable grafting and biotic and abiotic stress in vegetables.

- Released the following varieties of vegetable crops:
 Amaranthus (*Amaranthus tricolor*)- KAU Vaika
 Yard long bean (*Vigna unguiculata* ssp. *sesquipedalis*) – KAU Deepika
 Winged bean (*Psophocarpus tetragonalobus*)- KAU Nithya
 Cluster bean (*Cyamopsis tetragaloba*)- KAU Suruchi

An array of technologies was researched through PhD. programmes and the findings open up the possibility of using diverse solutions to the challenges in the field of vegetable crop production. A brief account of the accomplishments made out of Ph.D. research programme are presented below.

- Developed chilli hybrids with high yield and leaf curl virus resistance, tomato hybrids with high yield and bacterial wilt resistance and a yard long bean cross with high yield and anthracnose resistance
- Genetic analysis of shade tolerance in chilli was conducted
- Standardized agrotechniques for precision farming in water melon
- Standardized grafting techniques in cucumber for yield and stress tolerance
- Water stress in tomato and the influence of the fungus *Piriformospora indica* was studied

Department of Vegetable Science at a glance (2019-23)		
ICAR Schemes	:	Nil
National Projects	:	Nil
External Aided Projects	:	Nil
State Plan Projects	:	12
Industry linked projects and consultancy	:	Nil
Publications	:	With NAAS above 5 - 20 With NAAS below 5 - 13
Revenue generation	:	Rs. 25.16 lakhs (2019-23)

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Student guidance	Remarks
	Nil			

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	2	1
2	Office attendant	1	1

6.4.4. Classrooms and Laboratories: PG Programme

The class rooms, lab facilities and seed production plot of the department together with the Revolving fund on seed production and Annual state plan projects functioning in the department are sufficient to provide a hands-on experience in every aspect of vegetable science

viz., vegetable cultivation practices, vegetable seed production, vegetable grafting, vegetable breeding, biotic and abiotic stress management in vegetables *etc.* along with theory sessions.

Class rooms	Laboratories	Farm land	Equipments
PG – 42 m ² . Ph.D.- 24 m ² .	UG lab – 15 m ² . PG lab – 18 m ² Total - 33 m²	Seed Lab- 480 m ² Seed Processing building – 71.55 m ² Seed Processing yard – 83.52 m ² Seed production field – 10000 m ² - poly house - 440 m ² - net house – 400 m ² - mist chamber – 40 m ² - rainshelter- 230 m ²	Refrigerator – 3 nos. Soxhlet apparatus- 1 Micro centrifuge- 1 Electronic weighing balance – 3 LCD projector – 2 Hot air oven – 1 Purity work board- 1 Dessicator- 1 Spectrophotometer- 1 Microscope- 1 Seed vending machine- 1 Distillation unit- 1 Hot plate- 1 Stirrer-1 Digital humidity meter- 1 Moisture meter- 1 Mixer grinder- 1 Thermometer- 1 Digital pH meter- 1 Moisture meter- 1 Photostat machine- 1 Computer desktops- 4 Laptop- Scanner- 1 Garden tools Garden secateur- 3 Garden shears- 2 Hand cultivator- 2 Pick-axe- 1 Crow bar- 1 Pruning saw- 1 Garden rake- 1 Shovel- 1 Spade- 3 Rose can- 2 Sickle- 1 Garden sword- 1 Garden fork- 1 Trowel- 1 Wheel barrow-1 Budding knife- 30

6.4.5. Conduct of Practical and Hands-on-Training

- Hands-on training on the cultural operations to be followed in the field for the cultivation of cool season vegetables and warm season vegetables from sowing upto harvesting
- Training on selfing and crossing techniques and hybrid seed production in vegetable crops
- Familiarization with protected cultivation of vegetable crops inside poly house, rain shelter, mist chamber, shade house *etc.*
- Students are trained in preparation and use of plant growth regulators and herbicides
- Practical training on experiments on breaking and induction of dormancy using chemicals
- Students are given exposure to seed processing and extraction of warm season vegetables
- Seed testing for genetic purity, germination, physical purity, seed viability *etc.*, were carried out
- Identification and maintenance of vegetable species and varieties, planting and maintenance of under exploited vegetables and organic vegetable production were carried out

6.4.6. Supervision of students in Ph.D. programme:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Vegetable Science	2 /year	2 2 (from Dept.)

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The students who have passed out from the department are well equipped on different aspects of vegetable cultivation, which enables them to appear for National level competitive examinations and secure good jobs, at the state and National level. Department of Vegetable Science is maintaining good relationship with farming community and equip them with evolved technologies and services through supply of quality seeds and planting materials of KAU released high yielding vegetable varieties, trainings, demonstrations, *etc.* One faculty is nominated as the nodal officer of block level agriculture knowledge centres (AKCs) of Dept. of Agriculture for overall development of state agriculture sector by providing technical advice and immediate solutions. The department has collaboration with progressive farmers under different AKCs who undertake participatory seed production of the vegetable varieties being released from the department. One Faculty is a member of the Multidisciplinary diagnostic team of College of Agriculture, Vellayani, all faculties are always ready to resolve the problems faced by farmers through direct interactions, multidisciplinary field visits, advisory services, agroclinics, over phone or through social media *etc.*

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake					
Year	2019-'20	2020-'21	2021-'22	2022-'23	2023-'24

Number	2	0	1	3	3
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of the curriculum. Teaching notes are also prepared by the faculty.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF VEGETABLE SCIENCE

Farmers' trainings conducted on 21-01-2023 & 4-02-2023



Training, Seminars, Workshops, Etc.



Degree Programme : Ph.D. Postharvest Management

6.4.1. Brief History of the Degree Programme:

The Department was established as a division of Processing Technology under the Department of Horticulture from March 1992 and four separate departments including Dept. of Processing Technology was established in 01.09.1998. The Department was renamed as Dept. of Post Harvest Technology from 14.06.2017 and as Department of Postharvest Management from 23.11.2022. The M. Sc. (Hort.) programme with specialization in Processing Technology was started in 1998 itself, later the degree programmes were named as Hort. (Post Harvest Technology) and now as Hort. (Postharvest Management). The Department is beholding responsiveness towards excellence in teaching and mentoring students, serving farming community, as well as developing innovative and practical solutions for postharvest management, processing and value addition of horticultural crops. The faculty are committed in guiding research scholars in diverse fields such as post harvest technology, processing and value addition of horticultural commodities, benefiting the public at large. Focal areas of research include postharvest management, pre- harvest factors affecting post harvest quality, application of nanotechnology, post harvest management, packaging and storage of fresh and processed commodities, bioactive compounds and development of functional foods, byproduct utilization, development of novel and convenient food products and quality control studies. ICAR 2009 syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objectives

- ❖ Undertaking research, teaching & extension on post harvest management including processing, value addition, quality control and marketing of horticulture crops of Kerala.
- ❖ Developing strategies for reducing post harvest losses in commercial horticultural crops of Kerala.

Accomplishments of Ph.D. Postharvest Management at a glance		
Batches of students passed out so far	:	4
Number of students passed out so far	:	5
Number of students passed out during the assessment period	:	2
Number of students secured placement as faculty in the University so far	:	1
Number of in-service students so far	:	3
Number of students secured job in Govt./Private sector during the tenure	:	2
Number of students pursuing Ph. D with SRF	:	4
Number of students currently in roll and pursuing Ph.D programme	:	7

Salient research findings

A brief account of the accomplishments made out of Ph.D research programme during the assessment period are presented below.

- Extraction procedure for maximum retention of phytochemicals, antioxidant activity, anti-hyperglycemic and anti-cancerous properties from inedible parts of both varikka and koozha jackfruit types was standardized.
- Process parameters for spray and freeze encapsulation of phytochemical extracts of jackfruit waste was standardized for maximum retention of phytochemical and antioxidant properties.

- Fortified mango RTS beverage with 13-16% enhanced antioxidant activity was formulated using spray and freeze dried encapsulates of photochemical extracts @ 50 mg 100 ml without affecting the sensory parameters.
- Bioactive profiling of major *Garcinia* spp. of Kerala viz. *G. gummi-gutta* (malabar tamarind), *G. mangostana* (mangosteen), *G. xanthochymus* (yellow mangosteen) was carried out.
- Protocol for anthocyanin colour extraction from mangosteen pericarp using acidified ethanol was standardized and was utilized as natural colourant in *Garcinia* fruit beverages.
- Value added products viz., osmodehydrated rind, culinary paste, sweet and sour pickles were developed from *G. gummi-gutta* rind with good acceptability and storage stability.

Department of Postharvest Management at a glance (2019-23)	
External Aided Projects (RKVY)	: 1
State Plan Projects	: 10
State Agricultural Department project	: 1
Observational Trial	: 1
Short term projects to students from Outside Universities	: 30
Industry linked consultancies	: 16
Transferred Technologies	: 1
Technologies approved for ToT	: 8
Awards	: Best paper presentation award – 2 Best poster presentation award - 1 Second Best poster presentation award – 1
Faculty international fellowship/training	: Asian Productivity Organisation fellowship for multicountry observational study mission on Good Agricultural Practices and Advanced Postharvest Handling practices at Tokyo, Japan
Student exposure/hands-on training on recent advances	: i) Recent advances in food drying technologies ii) Hands-on training on High end scientific equipment for appraisal of food properties

	iii) Recent advances in banana improvement, production, protection, PHT, extension, and business arena for nutritional security
Publications	: Research Papers - 19 With NAAS above 5 - 13 With NAAS below 5 - 6 Seminar proceedings/abstracts – 18 Book chapters – 19 Book – 2 Popular Articles – 31
Extension activities	: Radio programmes – 4 Dooradarshan programme-1 Trainings organised - 32 Faculty as resource person in training programme – 99 Incubation facility in Techno Incubation centre-8
Training/ seminars/ workshop attended by faculty	: 41
Other activities	: Commercial Production and sale of value added products Quality analysis of fresh and processed commodities. Maintaining 4 WhatsApp groups for technical advice and consultation in the field of postharvest technology and value addition. 9 KW Solar power plant for generation of electricity
Revenue generation	: Rs. 9,12,776/- (2019-23)

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant
1	Professor	1	1	0
2	Associate Professor	0	0	0
3	Assistant Professor	2	2	0
	Total	3	3	0

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab Assistant	1	1
2	Office Attendant	1	2- 2019-2022 April 1*(<i>*sharing with Dept of Vegetable Science from May, 2022 onwards</i>)

6.4.4. Classrooms and Laboratories: Ph.D. Programme

The class room and lab facilities functioning in the Department are sufficient to provide a hands-on experience in every aspect of postharvest management, processing and value addition of horticultural crops.

The additional space and facilities available in the Department are utilized for teaching and research activities of Ph.D. students of the Department.

1. Techno Incubation Centre to help the prospective entrepreneurs and SHG groups ensuring sustainable income and effective dissemination of value addition technologies operating on a revolving fund mode.
2. Centre for formulation of convenient foods which serves as a model minimal processing unit fulfilling the requirement of FSSAI standards.
3. Processing laboratory with FSSAI registration No.21317138000133 for commercial production and marketing of value-added fruits and vegetable products.

The biochemical, nutritional and sensory quality parameters (colour and texture) of fresh and processed commodities, plant samples etc are analysed for the Ph.D. research projects of other Departments of College of Agriculture, Vellayani utilizing the laboratory facilities of our department.

Class room	Laboratory	Equipments	
50 m ²	67.50 m ²	Analytical balance (1) Air fryer (1) Autoclave (2) Blancher cum drier (1) Blender (2) Cabinet tray dryer (2) Centrifuge (2) Clevenger apparatus (4) Cold room (1) Colourimeter (1) Continuous sealer (1) Cup sealer (1) Deep freezer (3) Digital refractometer (2) Double distillation unit (1) Electronic balance (4) Foil sealer (1)	Laminar air flow (1) Magnetic induction sealer (1) Magnetic stirrer with hot plate (1) Modified Atmospheric Packaging System (1) Microcentrifuge (1) Microwave oven (1) Mixer (2) Moisture analyzer (1) Muffle furnace (2) OTG oven (1) Ozoniser (1) pH meter (1) Platform balance-1 Precision balance (1) Pulp processor (1) Refrigerator (4)
Additional facilities for P.G. students			

4. Techno Incubation Centre	Foot operated packing machine (1)	RO water unit (1)
5. Centre for formulation of convenient foods	Freeze drier (1)	Sealing machine (5)
6. Commercial processing laboratory	Fruit and vegetable cutter (1)	Shrink wrapping machine (1)
	Fruit and vegetable washer (1)	Single distillation unit (1)
	Fruit mill (1)	Soxhlet apparatus (3)
	Fruit pulper (1)	Spectrophotometer (1)
TOTAL - 311.46 m²	Gas analyser (1)	Spray drier (1)
	Grinder (1)	Texture Analyzer (1)
	Hand pH meter (1)	Thermohygrometer (1)
	Hand Refractometer (8)	Thermometer (2)
	Hand wrapper (1)	TLC (1)
	Head space O ₂ - CO ₂ analyzer (1)	Vacuum packing machine (1)
	Hot air oven (2)	Vernier caliper (2)
	Hot plate (1)	Vertex mixer (1)
	Juice filling machine (1)	Water activity meter (1)
	L –Sealer (1)	Water bath (2)

The above equipment are also utilized for the quality testing of plants, fresh and processed food products of Ph.D. Research projects of other Departments of College of Agriculture, Vellayani and Padannakkad under Kerala Agricultural University.

6.4.5. Conduct of Practical and Hands-on-Training

- PhD scholars are trained to formulate and conduct practical experiments by themselves in well planned manner.
- The students are trained to formulate, plan and conduct mini- projects, interpret and discuss the results in detail.
- They are well equipped with the recent and advanced value addition technologies and post-harvest management practices adopted in fruits, vegetables, spices, plantation crops, medicinal and aromatic crops.
- The studies on safety and quality control systems are included in practical sessions.
- Exposure visits to advanced quality control laboratories, technology incubation centres, established processing units, packaging and exporting units and research centres.
- National and Regional workshops and training programmes organised by different Central Institutes are attended by the students to familiarize with the recent developments in processing technology.

6.4.6. Supervision of students in Ph.D. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Postharvest Management	2/year	2

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

- Local specific problems highlighted by the farmers and extension personnel in the field of postharvest Technology (State Horticulture Mission, Vegetable and Fruit Promotion Council of Kerala, ATMA, HortiCorp) in the annual zonal research and extension advisory council meeting are prioritized for further research as PG projects.
- Feedback was taken from each student after each semester to assess the quality of Teaching

6.4.8. Student intake and attrition in the programme for last five years:					
i) Student intake					
Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	2	1	2	-	1
ii) Student attrition in the last five years					
Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	1	0	-	-
Percentage	0	100	0	-	-

6.4.9. ICT Application in Curricula Delivery:

The faculty utilizes the ICT tools such as KAU Moodle for the delivery of curriculum High speed wifi internet connection in the Department. Facilities available in the College library including online access to e-sources viz., CeRA, Krishikosh, eBooks of CABI, e - journals etc. are utilised by the students. Usage of GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software developed by KAU for statistical analysis of data. Ph.D courses, course teachers and students are registered in Academic Management System (AMS).

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF POSTHARVEST MANAGEMENT



Training, Seminars, Workshops, Etc.



**Degree Programme : Ph. D. Plantation, Spices, Medicinal &
Aromatic Crops**

6.4.1. Brief History of the Degree Programme:

The Department of Plantation Crops and Spices came into existence after the division of the Department of Horticulture in 1998 as per Order No. Acad Ag(1) 9347/98 dated 26/08/1998 of the Dean, College of Agriculture, Vellayani. M.Sc. Horticulture and Ph. D. Horticulture degree has been offered to students from this department who carried out research in various aspects of Plantation, Spices, Medicinal and Aromatic Crops. Since then, the department has been dealing with teaching, research and extension activities related to plantation, spices, medicinal and aromatic crops. The Department imparts knowledge on crop production, crop improvement, value addition and conservation aspects of plantation, spice, medicinal and aromatic crops grown in India. The department also takes up programmes on biotechnological interventions for improvement of plantation, spices, medicinal and aromatic crops.

In accordance with ICAR accreditation systems and BSMA recommendations, the nomenclature of the discipline has been revised to Plantation, Spices, Medicinal & Aromatic Crops as per order No. Acad/B2/2022/101/12636 dated 23/11/2022 of Director of Education. Henceforth the Department is known as Department of Plantation, Spices, Medicinal & Aromatic Crops.

Objective

To impart basic knowledge and importance of the following aspects of Plantation, Spices, Medicinal and Aromatic Crops.

- To impart basic and applied knowledge and take up research on various aspects of advanced production technology of plantation, spices, medicinal and aromatic crops grown in India
- To update knowledge and take up research on the recent trends in the field of breeding of plantation, spices, medicinal and aromatic crops
- To elucidate the advances in biotechnological interventions for improvement of plantation, spices, medicinal and aromatic crops and to take up research in specified area of biotechnological applications
- Advances in environmental management of horticultural crops
- To equip the students with latest laboratory techniques required for assessing the qualities of PSMA crops
- To impart knowledge on influence of abiotic stress factors on growth, yield and quality of PSMA crops along with advanced approaches in the management of these stresses.
- To impart knowledge on principles, concepts, techniques and certification procedures for organic farming in plantation and spices
- To have a deeper understanding of marketing and trade of raw materials and value-added products of PSMA crops both at the domestic and international level
- To take up research in varied aspects of Plantation, Spices, Medicinal and Aromatic Crops

Accomplishments of Ph.D. Plantation, Spices, Medicinal & Aromatic Crops Programme at a glance

Batches of students passed out so far	:	9
Number of students passed out so far	:	11
Number of students passed out during the assessment period		1

Number of students secured placement as faculty in the University	So far	:	8
	During the assessment period	:	1
Number of students secured job in Govt./Private sector during the tenure		:	5
Number of students pursuing Ph. D with SRF		:	2
Number of students currently in roll and pursuing the Ph D programme		:	11

Salient research findings (during the assessment period)

- Developed protocol for gel stabilisation and nutraceuticals in *Aloe vera* – The nutraceutical with liquidised and stabilised aloe gel juice mixed with equal proportion of honey and clove oil has been developed as a palatable drink with higher calories and shelf life of 2 months.

Department of Plantation, Spices, Medicinal & Aromatic Crops at a glance (2019-24)	
ICAR Schemes.	: Nil
National Projects	: Nil
External Aided Projects	: 1
State Plan Projects	: 6
Industry linked projects and consultancy	:
Publications	: With NAAS above 5 - 16 With NAAS below 5 - 5 Without NAAS – 7 Proceedings/Abstract – 26 Book/Book chapters- 13 Popular articles- 26 Leaflets-5

6.4.2. Faculty Strength: Present status

Sl. No	Designation	1/1/2019 to 10/09/2023			11/09/2023 to till date			Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies
		Sanctioned	In place	Vacant	Sanctioned	In place	Vacant	
1	Professor	1	0	0	1	0	0	ICAR
2	Associate Professor	1	1	0	1	1	0	ICAR
3	Assistant Professor	2	3*	0	2	2*	1**	ICAR
	Total	4	4	0	4	3	1	

*One of the faculty Dr. Sreekala G.S. is also associating with the duties at RARS (SZ), Vellayani

**Dr. Sonia N. S- Faculty of our Department was transferred to College of Agriculture, Padanakkad on 11.09.2023

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr. Sonia N S, Assistant Professor (from 11.09.2023)		1	

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Lab assistant	1	1
2	Farm assistant	1	0
3	Office attendant	1	1 *

*Office attendant of Department of Plant Pathology and is given additional charge Cleaning staff is provided to the department by the college on periodic basis for cleaning the department and premises

6.4.4. Classrooms and Laboratories: Ph.D Programme

The class room and lab facilities of the department are sufficient to provide a hands-on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic Crops along with theory sessions.

Class rooms	Laboratories	Farm land	Equipment
UG practical class room and laboratory (55 m ²)	PG laboratory I (22.68 m ²)	Field for practicals – 2000 m ²	Freeze Dryer (1) Double Distillation Unit (1) pH meter (1) Conductivity meter (1) Digital weighing balance (2)
Class room for PG (14 m ²)	PG laboratory II (10.86 m ²)	Hi tech Polyhouse (1 no) – 100 m ²	Soxhlet apparatus (3) Clevenger apparatus (3) Dissecting microscope (10)
Class room for Ph.D (50 m ²)	PhD laboratory (32.85 m ²)	Medicinal garden- 75 m ²	TLC kit (1) Cryocan (1) Refrigerator with defreezing facility upto -23° C (1)
(shared with the Department of Post Harvest Management)	Store room – 16 m ²	Rainshelter – 46 m ²	Binocular microscope (1) Refractometer (1) Vernier Caliper (1) Stereo microscope (1)
	Plant Tissue culture laboratory (shared with the Dept of Plant Physiology)	Rain shelter with mist chamber – 25 m ²	Muffle furnace (1) Microwave oven (1) Hot Air Oven (2) Coconut scraper (1) Magnetic stirrer (1) Water bath (1) Micropipette (6)

	Preparation room- 25 m ² Inoculation cum incubation room – 50 m ²		Mixer grinder (1) Heating mantle (8) Battery operated sprayer (1) Knap Sack Sprayer (1) LCD projector (2) Water purifier (1) Drip irrigation system (1) Canon Printer (2) Butterfly stove (1) Pressure cooker 20 l (1) Prestige hand mixer (1) Wheel barrow (1) Telescopic pruner (1) Iron shear (1) Sealing machine (1) Multifunction laser printer (1) Induction cooker (1) Laptop HP (1) Top loading balance 3 kg (1) Budding knife (3) Rose Can (3) Soil thermometer (1) Dry and Wet bulb thermometer (1)
Staff room (22 m ²) HOD (14 m ²)			

The Department is maintaining a library for reference of the students and faculties, comprising of 82 reference books, 70 thesis, magazines, credit seminar report, proceedings and abstracts, research reports etc.

6.4.5. Conduct of Practical and Hands-on-Training

- Students get hands-on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic Crops. They are given opportunity to present their research ideas and new knowledge as part of seminars. The students get familiarized with the various recent techniques and advances in the research field. Science discussions are held in the department to invoke inquisitiveness for research in students. Students are provided with facilities for carrying out different practical experiments.
 - Nursery techniques, propagation methods and standardizing micro propagation techniques
 - Foliar nutrition, fertigation, training, pruning and shade regulation
 - Soil test crop response studies
 - Pollination biology, study of selfing and crossing techniques and hybrid seed production
 - Mutagenesis, induction of polyploidy and germplasm characterization
 - Clonal selection in plantation and spices, medicinal and aromatic plants and Clonal fidelity testing
 - Establishment of axenic explants, callus initiation and multiplication

- *In vitro* conservation and cryopreservation, *in vivo* production of secondary metabolites, isolation and amplification of DNA.
- Department is maintaining dry plant specimens, herbarium, essential oils and other value-added products for acquaintance with the samples for the students

6.4.6. Supervision of students in Ph.D. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Plantation, Spices, Medicinal & Aromatic Crops	2/year	<p style="text-align: center;">3</p> <p style="text-align: center;">Till 10.09.2023- 3 (from Department)</p> <p style="text-align: center;">3</p> <p style="text-align: center;">From 11.09.2023- 2 (from Department), 1* (from outside Department) Total -3</p>

* One faculty Dr. Sonia N.S. has been transferred

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

Feedbacks were collected from the students and parents periodically to improve the teaching and to assess the competency / performance of the faculty and students based on a proforma. The suggestions pointed out for improvement were considered and changes were made in the respective aspects in teaching to improve the quality of teaching. Moreover meetings were conducted with students by chairman of advisory committee to discuss about the progress of the work and students shared the problems faced by them. These were discussed in advisory committee meetings and solutions to these problems were found out. Periodic department level meeting comprising of the staff and students are conducted in order to analyse the requirements and solutions to the problems raised by the students and the staff. Feedback is taken from the farming community during the training programmes, department visits as well as over the phone regarding the advice and recommendations given to them in sorting out their field problems. Advices are also being given through various farmer whatsapp groups.

6.4.8. Student intake and attrition in the programme for last five years:

i) Student intake

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	2	2	1	2+1 (in service)	2

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The classes are being handled with the application of ICT. High speed internet connection with Wifi is available in the Department. The facilities available in College library including online access to e resources like CERA (Consortium for e-Resources in Agriculture), KrishiKosh, eBooks of CABI, e – journals, digital library facilities, My Loft are being utilised by students and faculties. PG courses, course teachers and students are registered in Academic Management System (AMS).

Seminars are being conducted by the students using ICT tools. Classes were handled during COVID lockdown period in hybrid mode using moodle platform. Examinations were conducted online. Seminars were conducted in Google meet platform. Many e-resources like power point presentation slides and practical manuals are being prepared and distributed to students. Students use GRAPES (General R-shiny based Analysis Platform Empowered by Statistics) software developed by KAU for statistical analysis of data.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

DEPARTMENT OF PLANTATION, SPICES, MEDICINAL & AROMATIC CROPS



School Students visit to department



Training to Coconut Farmers



Visit to Pepper Field



Training to Tribal farmers

Training, Seminars, Workshops, Etc.



Degree Programme: Ph.D. Food & Nutrition

6.4.1. Brief History of the Degree Programme:

A humble beginning - The Department started at the College of Agriculture, Vellayani campus in 1983. Community Science is an interdisciplinary field of study having a scientific understanding of the community concerned with the aim of improving the quality of life of individuals, family and people at large. PhD in Community Science (Food and Nutrition) is a 3-year doctorate degree program, offered from this department since 1988. The minimum eligibility for which is a Master's degree in Home Science (Food and Nutrition) from a recognized college or university or its equivalent exam. Ph.D. in Food and Nutrition is the study of science and in this program, the primary focus is food, nourishment, nutrition, diet and their production, management, safeguarding, preservation, etc. The department has made significant developments through the major mandates of State Agricultural Universities i.e., teaching, research and extension. ICAR 2009 Syllabus was followed till 2021 admission, and the revised syllabus is being followed from 2022 admission onwards.

Objective

- The Doctor of Philosophy in Foods and Nutrition is designed for individuals who want to advance in the field of Foods and Nutrition.
- This program prepares students to work in academic, governmental, nonprofit, and private sectors.
- The program's curriculum focuses on research and leadership positions in the field of food and nutrition.
- The program helps to provide candidates with a wide range of both innovative practices and fundamental principles in the subject areas.

Accomplishments of Ph.D. Food & Nutrition Programme at a glance		
Batches of students passed out so far	:	23
Number of students passed out so far	:	15
Number of students passed out during the assessment period	:	5
Number of students secured placement as faculty in the University		11
Number of students secured job in Govt./Private sector during the tenure	:	1
Number of students pursuing Ph. D with SRF	:	4
Number of students currently in roll and pursuing the PhD programme	:	11

Salient research findings

- Standardised novel functional foods based on jackfruit-Health mix for diabetes, fermented products from jackfruit bi products, TVP, In depth profiling of bioactive components in 6 jackfruit cultivars conducted
- Developed therapeutic diets and Garden based Nutrition education interventions modules for children with Autism Spectrum Disorder and Attention Deficit Hyper Active Disorder.
- Role of diet and its impact on the occurrence of Ischemic stroke was established through premorbid nutritional status research and developed Nutrition Software applications for Ischemic stroke patients.

Department of Community Science (Food and Nutrition) at a glance (2019-23)

International Projects	1 (UNWFP)
National Projects	1 (RKVY)
External Aided Projects	: 5 (KSCSTE, KSSM)
State Plan Projects	: 3
Industry linked projects and consultancy	: 2
Publications	: With NAAS above 5 – 12 : With NAAS below 5 - 9
Revenue generation	: Rs. 3,99,239/-

6.4.2. Faculty Strength: Present status

Sl. No	Designation	Sanctioned	In place	Vacant	Faculty recommended by the ICAR/ UGC/VCI/ other regulatory bodies
1	Professor	2	2	-	ICAR
2	Associate Professor	2		2	ICAR
3	Assistant Professor	2	2	NIL	ICAR
	Total	6	4	2	

ii) Teachers outside the department involved in the department activities

Sl. No	Name and Designation	Courses handled	Students guidance	Remarks
1	Dr Safia Siraj, Asst Professor, KVK , Ambalavayal		1	Advisory committee member

6.4.3 Technical and supporting staff

Sl. No.	Post	Sanctioned	In position
1	Computer Assistant	1	1
2	Lab attendant	1	1
3	Class IV	1	1

6.4.4. Classrooms and Laboratories: PG Programme

Class rooms

Sl.No.	Class room No.	Area	Seating capacity	Other facilities (LED projector, Computer etc.)
1.	PhD. Class room 01	6..5 x 8.2 m	20	LCD projector, Computer and smart board facility

Laboratories

Sl.No.	Name of the laboratory	Area	Seating capacity (No.)
1.	Food Laboratory	8.7 x 14.1 m	30 (with multimedia facility)
2.	Bio Chemistry Laboratory	9.3 x 14.8 m	30

3	Incubation Centre Lab	7.9 x 12.1 m	20
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Major equipment available at the Department of Community Science for PhD Research

Sl.No.	Name of the Equipment	Quantity	Cost (In lakhs)
1.	Glass and Quartz single water distillation unit (4 Ltrs/hr) with water circulation recycling unit	03	0.05225
2.	Digital pH Meters with combined electrodes and Thermo probes	01	0.13944
3.	Hot Water Bath	01	0.12163
4.	Horizontal shaker	01	0.245
5.	Digital Flame Photometer assembly	02	1.17
6.	Refrigerator	01	0.255
7.	OTG Oven	01	0.145
8.	Mixers	01	0.07
9.	Foil sealer & Hot gun	02	0.09492
10.	Band sealer	01	0.19775
11.	Tube sealer	01	0.33335
12.	Cling film wrapper	01	0.10085
13.	Paste cream filler	01	0.2373
14.	Fruit pulper	01	0.6825
15.	Deep freezer	01	0.245
16.	Hot air oven	01	0.861
17.	Atta kneader	01	0.4599
18.	Automatic namkeen machine	01	0.2259
19.	Water still	01	0.145
20.	Protein analyzer	01	1.22
21.	Electric drier	01	0.32512
22.	Spectrophotometer	01	0.31888
23.	Electronic balance	01	0.12201
24.	Microwave oven	01	0.085

6.4.5. Conduct of Practical and Hands-on-Training

- Assignments, Class seminars, presentations and group discussions are conducted to
 - To attain experience on advanced analytical protocols of Carbohydrates, proteins and fats estimation
 - Understand the global nutritional problems across the world through updating the Global Nutrition Report of each country.
 - Learn the scientific foundation of risk management associated with malnutrition

and relate the key learning to the job of a professional.

- Understand the global nutritional problems across the world through updating the Global Nutrition Report of each country.
- Survey on dietary patterns, assessing critical interventions and implementing.
- Utilize methods and tools to assess the nutritional scenario and plan out suitable interventions
- Mock role plays to apply the knowledge in planning and implementation of agriculture and nutrition related policies
- Mock references to act as expert in developmental programmes of GOs and NGOs
- Case studies on anaemia, osteomalacia, iodine deficiency disorders and other nutrition related disorders

6.4.6. Supervision of students in Ph.D. Programmes:

Degree Programme	Intake capacity of students	Qualified faculty for supervision of students
Ph.D. Food & Nutrition	4/year	4

For allotment of the research topic and major advisors, the students are encouraged to search literature and come out with the appropriate research areas. The allotment will be made by the HOD. Advisory Committee of PhD student shall consist of at least four members including Major advisor among whom, two members shall be from outside the major field of specialization. The members from the major field shall be chosen to form a closely knit team in the area of specialization giving a coordinated approach to help the student to complete the research work.

6.4.7. Feedback of stakeholders (Students, parents, industries, employers, farmers etc.)

The Department has keen interest in receiving and understanding student's feedback on teaching to strengthen the learning process. The feedback of the stakeholders on Syllabus, Teaching and Learning process have been collected for analysis and prepared a report for the appropriate deed. The feedback was collected through Google forms, which comprised of closed and open-ended questions depicting vital aspects of curriculum. The feedback questions intent to reveal the following curriculum indicators. a) Load of the content for each course b) Quality and inclusion of new concepts c) Relevance and need of the course in each programme d) Accomplishment of Course outcome e) Suggestions for addition and deletion f) Employability and Skill Component g) Research) Books and reference materials in Library j) Incorporation of Innovative teaching and learning methodology k) Internal Evaluation system. Information were collected from the outgoing students (after thesis submission) to know their future plans and to get their feedbacks for further improvements. Based on their feedback actions were taken to improve on the strategies of deliverance of the course.

Feedback was collected from students, women and other participants who attended trainings and accordingly initiatives were taken to better the deliverance of the courses. PhD Scholars deliver nutrition counselling and training to mothers and Anganwadi workers. Feedback from them are obtained and accordingly scholars are trained to improve their counselling deliverance and trainings.

Alumni of the department are well placed in numerous academic and research institutions not only in India but also in several institutions in the U.S, Middle east and other countries, in several industries and voluntary organizations both national and international.

6.4.8. Student intake and attrition in the programme for last five years:**i) Student intake**

Year	2019-20	2020-21	2021-22	2022-23	2023-24
Number	3	4	4	7	3

ii) Student attrition in the last five years

Attrition	2019-20	2020-21	2021-22	2022-23	2023-24
Number	0	0	0	0	0
Percentage	0	0	0	0	0

6.4.9. ICT Application in Curricula Delivery:

The faculty members have adopted multimedia approach for better teaching. The ICT tools used for teaching and learning are Learning management system (MOODLE), Google meet, Video conferencing Platforms and Virtual Labs. To prepare video content for teaching screencastify is used by the teachers. To prepare audio content podcast is used. Google Apps (Docs, Sheets, Slides and Forms) is used to create and collaborate on online documents. Google drive is used to store and share files in the cloud. You tube is used for video sharing and preparing video assignments by the students. e- resources like e-Gyankosh, University of the People,UG/PG UGC-MOOCs and National Digital Library of India (NDLI) are widely used by the students and teachers . They are used by teachers to encourage participation and engage learning in their classrooms. Few research scholars also has developed nutrition app with the help of professionals to deliver nutrition counselling sessions.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and Ph.D. Degree Programmes, separately, and to be presented College-wise.

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6.4.12. Certificate

I, the Dean hereby certify that the information contained in the Section 6.4.1 to 6.4.9, are furnished as per the records available in the college, and degree awarding university.

Signature of Dean of the College with Date & Seal

For annexures M.Sc. and Ph.D.





“Self study report (SSR) of College of Agriculture, Vellayani”

2019 - 2023



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**KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF AGRICULTURE, VELLAYANI**

**SELF STUDY REPORT OF COLLEGE OF AGRICULTURE, VELLAYANI
(2019-2023)**



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PREFACE



Esteemed Members of the Accreditation Body,

It is my distinct honour as the Dean of the Faculty to present the Self Study Report, an in-depth exploration of the College of Agriculture, Vellayani.

The College of Agriculture, Vellayani, nestled in the enchanting surroundings of the second-largest freshwater lake in Kerala, holds a unique position as an institution with a rich agricultural legacy. The sprawling campus, bordered by the scenic Vellayani Lake, provides an idyllic backdrop for academic pursuits and is home to the historic Royal Landloch Palace. Renowned for its commitment to excellence, the college is a hub of innovation and knowledge dissemination in the agricultural domain. With a rich heritage dating back to its establishment, the institution has consistently produced leaders and experts in the field, contributing significantly to the agricultural landscape of the region. Boasting state-of-the-art facilities, experienced faculty, and a vibrant academic community, the College of Agriculture, Vellayani continues to be a nurturing ground for aspiring agri-professionals, fostering a holistic approach to education, research, and community outreach.

This document encapsulates the collective spirit, dedication, and transformative journey that defines our institution's commitment to academic excellence, research innovation, and holistic development.

In the following pages, the peer team will delve into a comprehensive analysis of our academic programmes, research initiatives, infrastructural advancements, and the dynamic ecosystem that fosters a culture of continuous learning. The report encapsulates the

collaborative efforts of our faculty, staff, and students who are the driving force behind the remarkable achievements and growth witnessed at our esteemed college.

The detailed self-assessment within these pages reflects our steadfast dedication to quality education, quality research, and impactful community engagement. It outlines our strategic vision, mission, and the robust framework we have established to ensure holistic development of our students.

As we submit this report, we open our doors to scrutiny, recognizing the importance of external perspectives in shaping our future trajectory. We invite your insightful feedback and constructive critique, which we consider invaluable in our pursuit of excellence.

This document serves as a testament to our unwavering commitment to educational innovation, research excellence, and the broader societal impact that our institution aspires to achieve. We eagerly anticipate the forthcoming dialogue with the accreditation body, confident in the shared goal of advancing education and contributing to the greater academic landscape.

Thank you for your time, consideration, and shared commitment as a direction for our pursuit to educational excellence.

Sincerely,
Dr. Roy Stephen

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SELF STUDY REPORT FOR ACCREDITATION
COLLEGE OF AGRICULTURE, VELLAYANI

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SELF STUDY REPORT OF COLLEGE OF AGRICULTURE, VELLAYANI (2019-2023)

INTRODUCTION

The inception of the College of Agriculture, Vellayani, dates back to August 1955 when it was established as the Agricultural College and Research Institute, functioning as an integral part



Lalindloch Palace / Admin Building

of the existing research wing of Travancore University and the Department of Agriculture. The primary objective was to deliver scientific agricultural education, producing skilled graduates to effectively implement agriculture-centric rural development programs in the State. The college's location in Vellayani, within Kalliyur Panchayath, Nemom Block, approximately 12 km southeast of Thiruvananthapuram, utilized the palace building of the erstwhile Travancore royal family as its infrastructure, with the surrounding area developed into the Instructional Farm for practical student training, spanning 251.73 hectares and bordered by the Kerala's second largest lake viz., Vellayani freshwater lake on three sides.

The administrative structure was headed by 'The Principal', who served as the ex-officio Additional Director of Agriculture (Research), overseeing teaching and research activities, as well as planning the Department of Agriculture's research programmes. The principal was also the Dean of the Faculty, Faculty of Agriculture in the affiliated Travancore University (later re-designated as Kerala University). Assisting the Principal were the Vice-principal and Division Heads, while academic staff comprised Professors, Junior Professors, and Lecturers. Distinct research schemes were underway, led by Research Officers and Research Assistants. At the time of inception, the college had seven divisions, which expanded over time to eleven departments, covering various agricultural disciplines.

Functioning independently under the government's purview in the initial phase, the college later fell under the administrative control of the Kerala Department of Agriculture, with academic affiliation to the University of Kerala until 1972 when it was integrated with Kerala Agricultural University. The institution introduced the undergraduate program B.Sc.(Ag.) in 1955, followed by postgraduate programs M.Sc.(Agri.) and Ph.D. in 1961 and 1965, respectively. The Kerala Agricultural University Act of 1971 designated the College of Agriculture, Vellayani as a constituent college of the Kerala Agricultural University from

February 1, 1972. This integration harmonised teaching, research, and extension activities. A novel trimester system aligned with State Agricultural Universities' education patterns was introduced, emphasizing internal evaluation, a robust advisory system, flexibility in course content, and improved student-teacher relationships. Practical aspects gained prominence in the curriculum, with practical training programs like work experience and farm training instituted for the B.Sc. (Ag.) course. The new undergraduate instruction system began in 1972, extending the B.Sc. (Ag.) program duration from three to four years following semester system. Currently, the College of Agriculture, Vellayani, holds a prominent position as the primary provider of agro-technology in the state. In addition to this crucial role, the institution actively engages in various functions, such as spearheading innovative research initiatives, fostering agricultural development through cutting-edge technologies, and playing a pivotal role in shaping and influencing agricultural policies at both regional and national levels. Moreover, its graduates- B.Sc, M.Sc. and Ph.D. equipped with a comprehensive education that integrates theoretical knowledge with practical skills, not only contribute significantly to the local agricultural landscape but also enjoy widespread acclaim on the global stage, showcasing the institution's commitment to producing industry leaders and experts.

VISION

To cater sustainable development of agricultural community by integrating quality Education, Extension and Research

MISSION

- To provide quality education in agriculture and allied discipline
- To undertake basic applied and adaptive research to address current & future challenges of farming community
- To develop innovative extension strategies for transfer of technology and document traditional knowledge
- To develop technology to support sustainable growth of agricultural entrepreneurship and agri-business

Objectives

The primary mandate of the college is to provide leadership in teaching, research and extension activities related to agriculture and allied sciences. The institute has been making efforts to advance frontiers of agricultural science and contemporary developments in education, research and extension, which are socially and economically relevant to the

farming community of the state. Based on the vision and mission, the institution work with the following mandates:

- Impart quality education in the fields of agriculture, horticulture, animal sciences, agricultural engineering, community science and other allied sciences to make it responsive to the growing demands of the society in general, and the aspirations of the farming community, in particular.
- Design and undertake basic and applied research for augmenting production and productivity in agriculture across different agro ecological units evolving useful crop improvement, production, protection and valorization technologies for sustainable farming ensuring food and livelihood security.
- Serve as a leading centre for the collection and maintenance of plant genetic resources and various database in agriculture.
- Evolving suitable extension tools and techniques to disseminate the developed technologies to solve farmer's problems along with capacity development initiatives for different stakeholders.

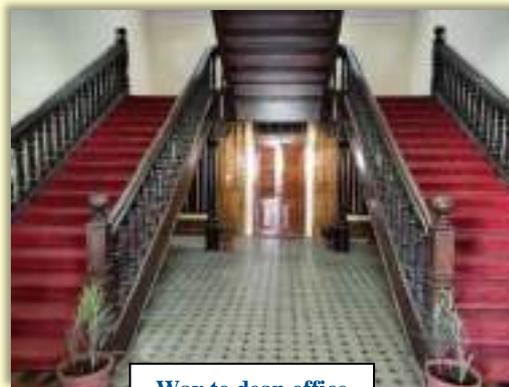
6.5.1. College Administration

The college is headed by Faculty Dean with an organized structure in place to facilitate the educational, research and extension mandates of the college.

6.5.1.1. College Dean's Office Establishment:

The Dean of Faculty of Agriculture is the Head of Agriculture in Kerala Agricultural University.

The post of Dean, Faculty of Agriculture is sanctioned by KAU Statute SRO No.70/72.



Dean	Mode of selection	Date of Selection	Tenure
Dr.Anil Kumar A.	Nominated	01-12-2016	5 years
Dr. Roy Stephen	Nominated	21-07-2022	Continuing

Dean's Secretariat:

The details of the Dean's Secretariat are presented in Table 1a, 1b and 1c.

Table 1a. Staff details of the Dean's Office (Current Position)

Sl No.	Name of the post	Number of post as per ICAR guidelines	Number in Place
1.	P.A. / P.S. to Dean	1	1 (PS to Dean)
2.	Asstt. Administrative Officer	1	1 (Administrative officer)
3.	Asstt. Academic Officer	1	3(SO-UG, PG, PhD)
4.	Assistant Accounts Officer	1	2(SO-Cash, SO-Accounts)
5.	Assistants (one for each AAO)	3	15
6.	Steno/Computer Operators	1	6
7.	Driver	1	3
8.	Farm Manager (Asst. Prof.)	1	1 (Prof& Head-IF)
9.	Store Keeper	1	1(Office Superintendent)
	Total	11	33

The Engineering sub division (Civil) of KAU monitors the civil work and maintenance of building. The electrical work and maintenance is undertaken by Engineering sub division (Electrical) of KAU functioning in the College of Agriculture, Vellayani campus. Utility services like plumbing is provided by 4 pump operators, 2 plumbers while two wireman (electrician) attend electrical works. Sixteen security personnel including the security supervisor work under the supervision of campus officer who is a faculty member. All security personnel are ex-servicemen and 24 hour security service is rendered in the campus, hostel and farm area. These personnel undergo training in fire safety protocols and are equipped to handle emergencies, including attending to injured students or hospital cases during odd hours. Sixteen cleaning staffs supervised by the Department of Physical Education are engaged for cleaning of college, departments and hostels.

Table 1b. Additional manpower available at Dean's secretariat

Sl. No.	Academic Cell	No
1.	Professor (Academic)	3(UG-1, PG-1, BTech-1)
2.	Computer Assistant	3
3.	Office Attendant	2
	Total	8
	Research Co-ordination	
1.	Professor (RC)	1
2.	Office Superintendent	1
3.	Office Attendant	1
	Total	3
	Administrative staff	
1.	Section Officers	4
2.	Office Superintendent	2
3.	Clerical Assistants	5

4.	Office Attendants	4
	Total	15

Table 1c. Additional manpower for civil and electrical works at CoA, Vellayangi

Sl. No.	Name of the Post (Office of Engineering sub division - Civil)	Staff in position
1.	Assistant Executive Engineer	1
2.	Assistant Engineer	1 (temporary)
3.	Assistant	1
4.	Computer Assistant	1
5.	Office Attendant	1
6.	Pump Operator	4 (2 temporary)
Office of Engineering sub division –Electrical		
7.	Assistant Engineer	1
8.	Overseer	1 (temporary)
9.	Electrician	2
10.	Assistant	1
11.	Computer Assistant	1
12.	Office Attendant	1
	Total	16

Infrastructural facilities:

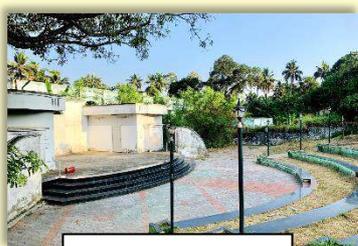
The college boasts abundant infrastructure facilities, continually enhanced each year to ensure top-notch quality. Noteworthy features include a cutting-edge indoor stadium cum auditorium and an expansive outdoor stadium with a 400m track and a turf cricket pitch, hosting events at the state, national, and international levels. A heritage mandapam provides a picturesque setting for open-air arts and cultural festivities. The 2-acre Kochu Kovalam, nestled by a freshwater lake, serves as a hub for various student-driven extracurricular



Outdoor stadium



Kochu kovalam



Amphi theatre



Mandapam

activities. The Cultural Centre, an open-air amphitheater, offers an additional venue for organizing diverse cultural events. In 2022, the campus embraced sustainable practices, operating four solar plants with a 10kW capacity. Collaborations with ANERT aim to further expand the solar infrastructure, aligning with our commitment to achieving

power sustainability. The details of the infrastructural facilities in the Dean's Secretariat are given in Table 2a and additional infrastructure facilities are presented as Table 2b.

2a. Infrastructure facilities

Sl. No.	Details	Minimum Requirement (No.of Rooms)	Available	Minimum Requirement (Dimensions-ft)	Available (in sq.ft)
1.	Dean Office	1	1	20×24	980
2.	P.A. Room	1	1	10×12	200
3.	Committee Room with video conferencing facility	1	1 (Council Hall)	20×30	692
4.	Administrative Officer including staff	1	1(A O)	20×12	716
5.	Assistant Accounts Officer including staff	1		20×12	714
6.	Assistant Academic Officer including staff	1	1 (Academic Office)	20×12	622
7.	Exam Hall (300capacity)	1	1(New Block)	20×12	360 seating capacity
8.	Evaluation Room	1	2	20×36	410+340
9.	Faculty Room (Ladies)	2	80 (Adequate faculty rooms in each department)	10×12	12000
10.	Faculty Room (Gents)			20×12	
11.	Placement Cell	1	1	20×12	214
12.	Smart Lecture Halls	5	4 (with interactive board) 6 (with LCD, WiFi & AV)	40×30 (60capacity)	14000
13.	Exam Hall cum Auditorium	1	2 (exam halls) 1-Indoor auditorium cum stadium 2-Mini auditorium 1-Open auditorium	100×50	6000 sq.ft 25000 sq. ft 6000 sq.ft 8000 sq.ft
14.	Library/Book Bank	1	1	30×72	11409 sq.ft.
15.	Common Utility Room	1	4	20×36	642
16.	Central Laboratory	1	2	50×36	116 x111 +100 x 120
17.	Hostels including	1 (boys)	2 (1-UG,1-	150	11200 sq.

	Mess, Gym/Indoor, Reading room, Warden Room, Store etc.		PG)		ft. 13907 sq. ft.
		1 (girls)	2 (1-UG,1-PG)	150	25839 sq. ft. 17862 sq. ft.
18.	Canteen	1	1	20×12 (kitchen area with store) 20×36- dining area	4250 sq. ft.
19.	Wash room (with toilet & urinary facilities)	10	38	20×12 (keeping ladies requirements)	1636 sq. ft.
20.	Parking space		Open parking space available as per requirement	As per requirement	Sufficient space available in common area and each department
21.	Farm stores, threshing yards including implements and tractor sheds		Store & temporary shed at Sales counter-1	One core complex	54 sq. ft.
			Fertilizer store-1		128 sq. ft.
			Coconut store-1		342 sq. ft.
			Coconut seed store -1		79 sq. ft.
			Seed Store (vegetables)-1		100 sq. ft.
			Input store-1		60 sq. ft.
			HD potting shed -1		140 sq. ft.
			Seed processing yard-1		110 sq. ft.
			Farm machinery & implements store including tractor shed-1		306 sq. ft.
			Solar panels 260 watts		3 nos
			Solar plant 9	1 no	

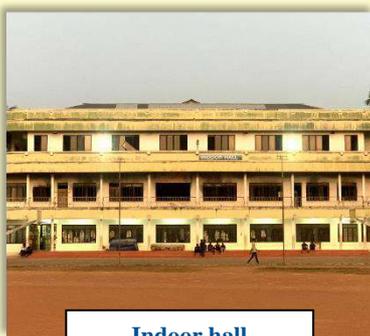
			KW		
			Tractor shed-1		
22.	Vehicles				
	i.Car	1	1		
	ii.Jeep /Car staff	2	2		
	iii. Bus	1	3		
	iv.Pickup van	1	1		
	v.Motor Bikes	2	1		
	vi.Minibus (30 capacity)	1	1		
	vii.Tractors	2	5		
23.	*Drinking water and irrigation facilities			Adequate	
24.	Vehicles shed	1	7 Parking sheds	10×80	

*Drinking water source-2 wells, connection from Water Authority, dispensing units located at various places including hostels and departments. Irrigation wells and tanks, drip and sprinkler facilities available

Pictures depicting some important Infrastructure facilities



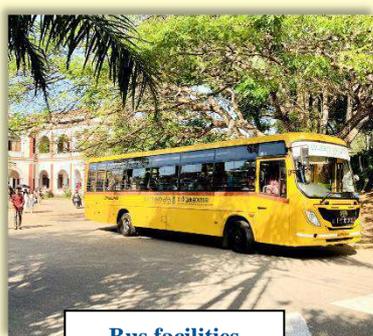
Cooperative store



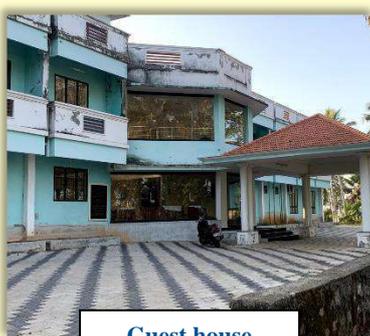
Indoor hall



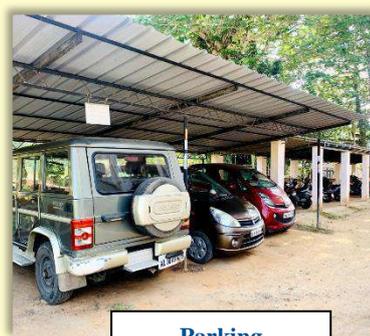
Cafeteria



Bus facilities



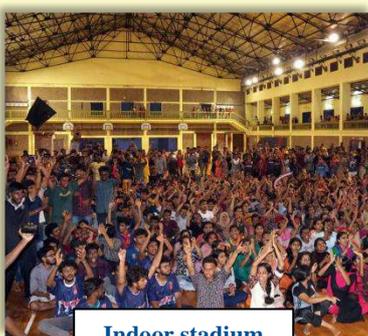
Guest house



Parking



Council hall



Indoor stadium



Lecture hall

Table 2b. Additional infrastructural facilities available at the Dean's Secretariat

Sl. No.	Facilities	Numbers
1.	Computer	29
2.	Printer	22
3.	Internet Connection	3- (BSNL optical fibre/Asianet BB/LAN)
4.	Telephone connection	2
5.	Laptop	6
6.	Cash counting machine	1
7.	Photocopier	3
8.	Weighing machine	1

6.5.1.2. Monitoring Mechanism for Quality Education (on-line):

Internal Quality Assurance Cell has been constituted in the College of Agriculture, Vellayani to develop a mechanism to promote conscious, consistent and catalytic action plans to improve the academic and administrative performance of the institution. It aimed in promoting institutional quality enhancement and sustenance through the internalization of quality culture and institutionalization of the best practices.

Academic Monitoring Mechanisms:

In order to uphold academic excellence, the institution employs a multi-faceted monitoring approach. 10 students each is assigned to a dedicated faculty advisor to provide guidance on academic matters, with regular advisory



Screenshot of AMS portal

meetings convened to assess individual performance. A systematic feedback system is in place, allowing students to contribute their insights at the end of each semester. A dedicated academic cell operates in the College catering to the various academics requirements along with monitoring of BSc, MSc and PhD programmes. The academic process is undertaken through the Academic Management System (AMS). Furthermore, the institution actively involves parents in the academic process through phased Parent-Teacher Association (PTA) meetings, providing a platform for constructive feedback on teaching methods, evaluation processes, examinations and students residential requirements.

Research and Development Monitoring Mechanisms:

The institution's commitment to research is underscored by a structured monitoring framework. A Research Coordinator and Project Coordination (PC) group, selected by the Director of Research, oversee the faculty's research initiatives. Each Postgraduate Student engaging in research are supported by a Faculty Advisory



Student interaction with dean to collect feedbacks

Committee, with rigorous evaluation processes at the department and PC group levels. Doctoral research projects undergo a thorough review, progressing through the Faculty Research Council and the University's Academic Council for approval. Regular convening of the Research Advisory Committee ensures continuous evaluation of students' research progress in each semester, promoting a culture of scholarly rigor. Annual review of the PG research is undertaken by the honourable Vice Chancellor.

Extension Activities Monitoring Mechanisms

The institution actively engages in extension activities with a focus on practical impact. Scientists conduct field visits based on identified needs, and a dedicated diagnostic support team, Karshaka Santhwanam, addresses the challenges faced by farmers in southern districts. Students contribute to these efforts by conducting research on technology adoption. The Director of Extension plays a key role in organizing training programs that enhance interaction between the institution, the farming community, and extension workers. Additionally, annual ZREAC workshops serve as a vital platform, facilitating the convergence of Research, Extension, and the Farmer interface. Agriculture Knowledge Centre operates in Development Block in South Kerala headed by faculty from the College to guide and coordinate agricultural developmental activities. A Training Service Scheme in the college monitors and evaluate dedicated training programmes to different stakeholders. This feedback loop refines existing practices and guides the exploration of new alternatives in both research and extension activities.

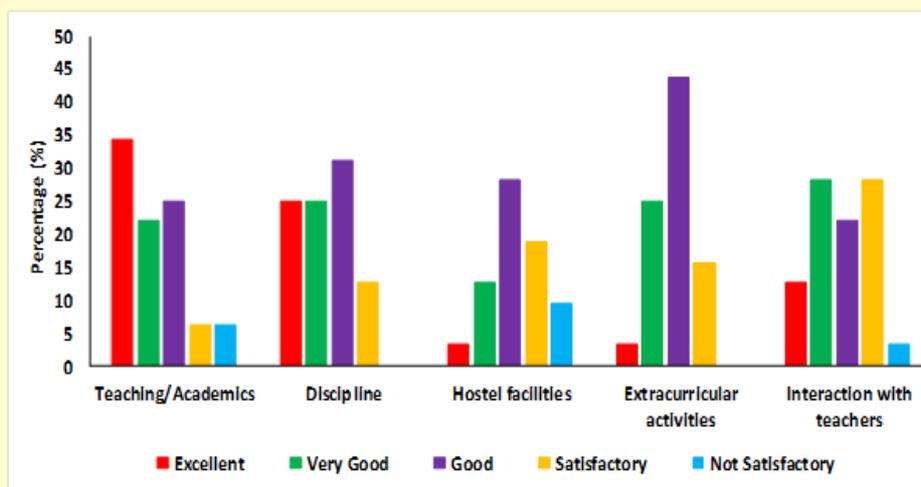
The Department of Agricultural Extension Education engage students to conduct need assessments of farmers through PRA exercises using rigorous participatory tools and organizes student outreach activities as part of regular course requirements of different departments of the College. These mechanisms collectively ensure a comprehensive approach to monitoring and enhancing academic, research, and extension activities within the institution.

Parents Teachers Association

The Parent - Teacher Association of the College of Agriculture, Vellayani is quite an active forum catering to several developmental initiatives of the college. Development of infrastructure facilities for the well being of the students like maintenance and painting of class rooms, student hostels, purchase of furniture including cots, tables, electronic equipments and audio-visual aids for class room lectures are undertaken by the PTA. Renovation, modernisation and beautification of the hitherto dilapidated college cafeteria with proper waste management systems adhering to green protocol was taken up. Installation of water purifiers and coolers in all floors of the academic blocks and the undergraduate and post graduate men and ladies hostels were done for ensuring clean and safe drinking water. A dedicated internet connection was provided for the PG/PhD men's hostel. PTA encourages the students to develop their talents both in new gen digital/entrepreneurial/young innovators program/ start up initiatives. Promotion of extracurricular activities and inborn talents of students and equipping them to become successful in the intercollegiate arts and sports activities has always been a priority area of the PTA. Facilitating the organisation of orientation programs and welcoming the newcomers and their parents coming from various states at the commencement of each academic year and organisation of a formal send-off function for the passing out graduates, post graduates and doctoral students have been a key activity of the PTA. Facilitating exposure programs, interactive sessions with eminent academicians and researchers also form part of the PTA activities. Efforts are also made to rope in other external funding sources for improvement of infrastructural facilities. Two high mast lights were set up in the college campus utilising the MP Fund. Solar powered lights were installed by the State Bank of India under their CSR scheme.

The day-to-day activities of the PTA is coordinated by the Executive Committee. An Executive Committee is elected from the General Body meeting of the parents and teachers with due representation from parents of each batch of students. The President of the PTA is an elected parent representative and the Secretary nominated from the faculty members, the Dean of Faculty being the patron. The Executive Committee holds frequent regular meetings and the general body meeting is conducted annually. Student related problems are discussed and critically analysed and advisory suggestions are formulated in such meetings. Feedback forms are distributed and the response of parents to various activities of the PTA are also collected. The PTA of the College of Agriculture, Vellayani functions effectively in a facilitatory, supportive and advisory/ consultative role.

Graph depicting the percentage rating for various attributes as expressed by feedback of parents of students



6.5.1.3. CC/Board of Studies

The course programme, syllabus, and modifications for each course as per ICAR guidelines are finalized at the Department level of the University wherein the Heads of Departments of the three colleges discuss and prepare proposals which are later submitted for approval in the Board of Studies of the University.

Board of Studies (Faculty of Agriculture) of the University
Chairman:
Dean (Faculty of Agriculture)
Members:
Dean, College of Agriculture, Vellanikkara
Dean, College of Agriculture, Padannakkad
Dean, College of Agriculture, Wayanad
Dean, College of Co-operation, Banking & Management, Vellanikkara
Professor & Head, Dept. of Agronomy
Professor & Head, Dept. of Soil Science and Agricultural Chemistry
Professor & Head, Dept. of Genetics and Plant Breeding
Professor & Head, Dept. of Entomology
Professor & Head, Dept. of Plant Pathology
Professor & Head, Dept. of Plant Physiology
Professor & Head, Dept. of Molecular Biology & Biotechnology
Professor & Head, Dept. of Seed Science and Technology
Professor & Head, Dept. of Fruit Science
Professor & Head, Dept. of Postharvest Management
Professor & Head, Dept. of Plantation, Spices, Medicinal and Aromatic Crops
Professor & Head, Dept. of Vegetable Science
Professor & Head, Dept. of Floriculture & Landscaping
Professor & Head, Dept. of Agricultural Extension Education
Professor & Head, Dept. of Agricultural Economics
Professor & Head, Dept. of Microbiology
Professor & Head, Dept. of Agricultural Statistics
Professor & Head, Dept. of Agricultural Meteorology

Professor & Head, Dept. of Community Science
 Professor & Head, Department of Organic Agriculture
 Professor & Head, Department of Nematology
 Professor & Head, Dept. of Co-operative Management, CCB & M, Vellanikkara
 Professor & Head, Dept. of Rural Banking & Finance Management, CCB & M, Vellanikkara
 Professor & Head, Dept. of Development Economics, CCB & M, Vellanikkara
 Professor & Head, Dept. of Rural Marketing Management, CCB & M, Vellanikkara
 Special Officer, Institute of Agriculture Technology and RARS, Pattambi
 Director, MBA Agribusiness Management, CCB & M, Vellanikkara
 Course Director, BSc.- MSc. (Integrated) Biotechnology, CoA, Vellayani
 Director of Education, Kerala Agricultural University
 Controller of Examinations, Kerala Agricultural University
 Member (1) who is specialist in the subject (Outside KAU)
 Member (2) who is specialist in the subject (Outside KAU)
 Student Representative of Faculty of Agriculture in Academic Council

*Total number of meetings conducted (2019-2023): 6/ *Dates of meetings and major recommendations of Board of Studies are given in **Annexure 1**

6.5.1.4. Anti Ragging Cell

Anti-Ragging Measures:

In compliance with the directives of the Honorable Supreme Court of India and the Kerala Prohibition of Ragging Act 1997, the institution has established an Anti-Ragging Committee and an Anti-Ragging Squad. An annual undertaking is to be signed by each student by his/her own parents jointly stating that each of them have read relevant instructions/regulations to ensure compliance. This system is instrumental in ensuring a safe and inclusive environment for all students. The specific actions undertaken by both the Anti-Ragging Committee and the Anti-Ragging Squad, along with comprehensive details about committee members, are outlined in **Annexure II**.

Monitoring and Reporting:

The Anti-Ragging Cell operates under the guidance of the Professor (Academic) which organizes sensitization programmes and actively submits monthly reports detailing the ongoing efforts and outcomes in preventing and addressing ragging incidents. One such report is made available for reference in Annexure III. The regular submission of these reports ensures transparency and accountability in the institution's commitment to eradicating ragging. The Professor (Academic) serves as a key liaison in this process, overseeing the timely dissemination of information regarding anti-ragging initiatives.

Commitment to a Safe Campus Environment:

The establishment of the Anti-Ragging Committee and Anti-Ragging Squad, coupled with the routine reporting mechanism, underscores the institution's unwavering commitment to maintaining a secure and harassment-free campus. By adhering to the prescribed legal and regulatory framework, the institution actively promotes a culture that prioritizes the well-being and dignity of every student. The provided annexures serve as tangible evidence of the institution's proactive stance against ragging, contributing to the creation of a positive and nurturing academic community. Registers are maintained at Academic cell and hostels to ensure compliance. The details of registers are annexed.

Actions of the Anti-ragging committee and Anti-ragging squad and details regarding members of the Anti-ragging committee as per the following orders

- 1) No. Acad.Ag(1)/13894/2019 dated 25/09/2019
- 2) No. Acad./A1/13894/2019 dated 18/10/2021
- 3) No. Acad./A1/13894/2019 dated 02/02/2023

are given in Annexure II and the monthly reports of the anti- ragging cell are submitted by the Professor (Academic). A copy of one such report is presented as **Annexure III**.

6.5.1.5 Biological waste disposal facility:



IMAGE waste collection point

The institution has implemented a comprehensive approach to biological waste disposal, utilizing the IMAGE biomedical waste management system sanctioned by the Indian Medical Association. This system efficiently handles the disposal of laboratory waste, encompassing disposable plastic labware, gloves, syringes, gels, sharps, and broken glass. Notably, the campus does not generate radioactive waste as part of its research activities. A groundbreaking development by the Department of Soil Science and Agricultural Chemistry, known as 'Suchitha' rapid thermochemical conversion technology, has been patented (Patent No 321857). This innovation facilitates the conversion of degradable waste into valuable organic fertilizer, with a 500 kg/batch pilot plant established on campus. The plant processes food and kitchen waste from student hostels, contributing to sustainable waste management practices.

Composting Inoculum and Waste Utilization:



Compost bin

The Department of Agrl. Microbiology has developed composting inoculum, a microbial product for solid waste management, which is made available to various departments across the campus. Departments, the Ayyankali Sports School, and the Instructional Farm utilize this facility to process organic waste. Additional waste generated in the PG ladies' hostel is responsibly managed by nearby pig farms. The institution has also deployed customized equipment for processing degradable waste in schools and Doordarshan Kendra, Trivandrum, ranging from 15 kg to 100 kg/cycle, showcasing a commitment to sustainable waste management practices. Animal and poultry manures

(compost pits of the livestock and poultry farm) contributes 50-60 tonnes of manure per year.

Vermicomposting units

The college maintains 18 vermicomposting units monitored by various departments and instructional farm, wherein the biodegradable wastes are converted into valuable manures and sold to the farming community.



Vermicompost unit

Plastic and E-Waste Management:

A dedicated material collection facility (MCF) on campus ensures the proper segregation and storage of plastic and e-waste. Once a substantial quantity is amassed, Clean Kerala Company collects the waste, and the amount is transferred to the college for recycling based on government-approved rates. This initiative aligns with the Clean Kerala mission, emphasizing responsible waste management. Waste management in hostels is equally meticulous, with daily disposal of food waste to piggery units, segregation of vegetable and fruit waste for composting in the organic farming unit, sanitary waste incineration, and non-biodegradable waste disposal through government waste collection services. This comprehensive waste management strategy reflects the institution's commitment to environmental sustainability and responsible waste handling.

The details of the biological waste disposal facilities established in the campus are presented in Table 3.

Table 3. Biological waste disposal facilities established in the campus

Sl. No.	Facility for recycling	Number
1.	Biomedical waste management unit of IMAGE, IMA	1
2.	'Suchitha' rapid thermochemical conversion technology	1
3.	Microbial Composting units	5
4.	Biogas units (animal wastes, processing wastes and kitchen wastes) 12 L/day	5
5.	Vermi-compost units (agricultural wastes from farm, research plots etc.)- (FARM-11 tanks) +2 (SOIL) + 5 (Agronomy-4 Organic farm +1 crop museum) Model organic farm-10, Elcp-8No Soil Science Bokashi-1 No	18
6.	Ordinary compost unit (crop residues from farm)	2
7.	NADEP compost unit	1
8.	Biochar unit	2
9.	Coirpith compost unit	3
10.	Vermi wash unit	3

NB: Vegetable waste from UG ladies Hostel is composted in the Model Organic farm of Department of Soil Science and Agricultural Chemistry.

6.5.1.6. Institutional Ethics Committee for Experiment on Animals

College of Agriculture does not have many experiments involving animals. However, an ethics committee on experiment on animals is constituted and a register is maintained for this purpose.

Members of Ethics committee consists of the following structure:

Ethics Committee	
Chairman	Dr. Priya Srinivas Scientist-G Faculty Rajiv Gandhi Centre for Biotechnology Thiruvananthapuram
Member	Dr. Roy Stephen Dean of Faculty College of Agriculture, Vellayani
Member Secretary	Dr. Anith K N, Associate Director of Research RARS(SZ) Vellayani
As Medical Expert	Dr. Libu G K., Professor Community Medicine, Govt. Medical College Thiruvananthapuram
As Member	Dr. Sophia B Modi, Assistant Professor (Pharmacology) Govt. Medical College, Thiruvananthapuram
As Social Scientist	Dr Allan Thomas, Professor & Head Department of Agriculture Extension Education College of Agriculture
Lay Person from community	Smt.K.B.Valsala Kumari (IAS Rtd)
As Legal Expert	Adv.Suja Madhav District Court

	Vanchiyoor, Thiruvananthapuram
As Subject Expert	Dr Suma Divakar Professor Department of Community Science

Institutional Biosafety committee

The Institutional Biosafety committee functions in the College which monitors experiments involving GMO including the ones performed on animals and a committee consists of the following structure:

Institutional Biosafety committee	
Chairman	Dr. Roy Stephen, Dean of Faculty, College of Agriculture, Vellayani
Member Secretary	Dr. Swapna Alex, Professor, Department of Molecular Biology and Biotechnology, College of Agriculture, Vellayani
DBT Nominee	Dr. Swapna T. S., Professor, Department of Botany, University of Kerala, Kariavattom, Thiruvananthapuram
External expert	Dr. Makesh Kumar T., Principal Scientist, ICAR-CTCRI, Thiruvananthapuram
Medical practitioner	Dr. Noble Gracious, Associate Professor, Govt. Medical College
Members	Dr. Soni, K. B., Professor and Head Dr. Viji M.M., Professor Dr. Asha S., Assistant Professor Dr. Anuradha T., Assistant Professor

6.5.1.7. Committee for Prevention of Sexual Harassment of Women at Work Places

The college has established an Internal Complaint Committee (ICC) with representatives from the teaching faculty and administrative staff, led by Dr. N. Anitha, Professor of Entomology. The committee was reconstituted on two occasions (on 25-8-22 and 08-11-2022), incorporating a transfer and the addition of an Advocate. Four complaints were registered during the reporting period, all of which were promptly and effectively addressed, leaving no pending complaints. The ICC's composition reflects a comprehensive and inclusive approach to handling internal grievances, ensuring a safe and respectful environment within the college. Monthly reports are submitted to the Honourable Vice Chancellor.

Internal Quality Assurance Cell (IQAC)

The main objective of IQAC is to develop a mechanism to promote conscious, consistent, and catalytic action plans to improve the academic and administrative performance of the institution. It aims to promote institutional quality enhancement and sustenance through

the internalization of quality culture and institutionalization of the best practices. It shall strive to make College of Agriculture, Vellayani as a leading centre of excellence in education, research and extension in agriculture meeting international standards.

Activities undertaken by IQAC

- Monitors overall academic and administrative performance of the institute.
- Conducts and documents various programmes/ activities leading to quality improvement
- Maintains the institutional database
- Organises International/National/State/University level workshops, seminars, conferences through various departments for quality enhancement of education and teaching.
- Facilitates a learner centric environment in the college conducive for quality education and faculty development
- Ensures proper implementation of the academic calendar
- Promotes Green Initiative programmes in the College
- Ensures cleanliness in the campus through proper sorting and waste disposal mechanism.
- Analysis of overall feedback of students

The organization of IQAC is presented as below:

Internal Quality Assurance Cell	
Chairman	Dr. Roy Stephen, Dean of Faculty, College of Agriculture, Vellayani
	Smt Sreekala CD , Senior Administrative Officer
Members	Dr. Thomas George, Professor & Principal Investigator, AINP on Pesticide Residues, PRRAL& General Council Member Dr. Shalini Pillai P, Professor & Head, Dept of Agronomy & Staff Council Secretary Dr Allan Thomas, Professor & Head , Department of Agriculture Extension Education Dr. Rafeekhar M, Asst.Prof & Head, Dept of Floriculture & Land scaping & Officer i/c of Technical Cell Dr Beena R., Asst Prof (Dept. of Plant Physiology) & Head, Dept of Seed Science & Technology & Associate Patron, Students Union Dr.Naveen Leno, Asst.Prof, Dept of Soil science and Agrl. Chemistry Dr.Pratheesh P. Gopinath, Asst Prof & Head, Dept of Ag Statistics Dr.Safeer M.M Asst.Prof, Instructional Farm, Vellayani Dr.Gayathri.G., Asst Prof, Dept of Forage crops & Academic Officer Mrs. Divya S., Asst Prof, Dept of Plant Pathology Sri. Nasser A., Asst Librarian, College of Agriculture, Vellayani

Dr. Abdul Khader, President, Alumni Association Ms. Akshaya P S., President, Students' Union Nominee from Stake Holder: Sr S.S. Nagesh, Chief of Agriculture, Kerala State Planning Board Other External Expert: Sr. Anil Kumar. S, Principal Agriculture Officer, Thiruvananthapuram IQAC Co-ordinator: Dr. Swapna Alex , Professor, Dept of Molecular Biology & Biotechnology
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Harassment complaint committee: A committee to enquire about the harassments/complaints reported by the students was also constituted in the college with the following members:

Chairman	Professor (Research Co-ordination)
Member	Professor Academic (UG)
Member	Staff Secretary
Member	Adv. Shynimol

6.5.2. Faculty

6.5.2.1 Faculty strength

As of the academic year 2023-2024, the faculty strength at the College of Agriculture (CoA) Vellayani, including its Research and Regional Stations, reflects a dynamic scenario. The total faculty strength stands at 112, comprising Professors, Associate Professors, and Assistant Professors across various departments. The breakdown includes 20 Professors, 2 Associate Professors, and 67 Assistant Professors at the main campus, supplemented by faculty members at the Research and Regional Stations (RARS(SZ), Instructional Farm, PRRAL, and TSS). Despite fluctuations in faculty numbers over the years, the total is aligned with the sanctioned strength, indicating a relatively stable workforce.

Faculty positions (both in sanctioned and in-position) at the College are furnished in Table 2.1. All the faculties are recruited as per the existing UGC regulations.

Faculty position at the college level

	Sanctioned	In-position
Professor	13 + 1*	23
Associate Professor	31 + 7*	6
Assistant Professor	77 + 21*	83
Total	100 + 12*	112*

*Faculty in AICRP/AINP/NARP engaged in academic activities of the College

Table 2.1 Department-wise faculty profile

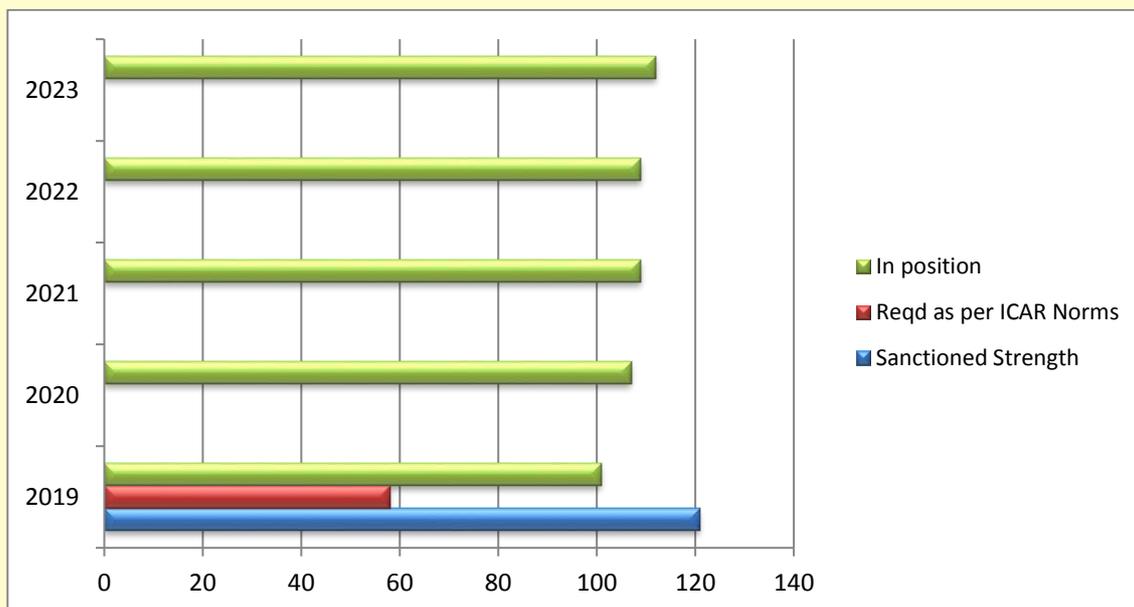
Department	Professor		Assoc. Prof.		Asst. Prof.		Total	
	Sanctioned	In position	Sanctioned	In position	Sanctioned	In position	Sanctioned	In position
Dean	1	0						
	Current status: Professor (Plant Physiology)							
Professor (RC)	1	0						
	Current status: Professor (Entomology)							
ADE (SZ)	1	0						
	Current status: Associate Professor (TSS)							
ADR (Veg. Mission)	1	0						
ADR (Soils)	1	0						
ADR (Plant Protection)	1	0						
Agronomy	2	1	4	2	7	7	13	10
	Current status: Professor-3: Assistant professor-6, Total -9							
Agricultural Economics	0	0	3	2	2	2	5	4
	Current status: Professor-1: Assistant professor-4, Total -5							
Agricultural Statistics	0	0	1	1	3	1	4	2
	Current status: Associate Professor-1: Assistant professor-2(1 Contract), Total -3							
Agricultural Extension Education	1	1	3	3	3	3	7	7
	Current status: Professor-1: Assistant professor-6, Total -7							
Entomology	0	0	3	3	5	4	8	7
	Current status: Professor-4: Assistant professor-3, Total -7							
Genetics and Plant Breeding	0	0	6	3	3	3	9	6
	Current status: Professor-1: Assistant professor-4, Total -5							
Seed Science and Technology	0	0	0	0	2	0	2	0
	Current status: Assistant professor-1, Total -1							
Horticulture	1	1	1	1	13	12	15	14
	Current status: Professor-1:Associate Professor-1, Assistant professor-12, Total -14							
Community Science	1	1	1	1	4	3	6	5
	Current status: Professor-2: Assistant professor-2, Total -4							
Soil Science and Agricultural Chemistry	1	0	3	1	7	6	11	7
	Current status: Professor-1: Assistant professor-5, Total -6							
Microbiology	0	0	3	2	1	0	4	2
	Current status: Professor-1: Assistant professor-2, Total -3							
Agricultural Meteorology	0	0	0	0	1	0	1	0
	Current status: Total -0							

Plant Pathology	0	0	1	1	7	7	8	8
	Current status: Professor-1: Assistant professor-6, Total -7							
Molecular Biology and Plant Biotechnology	0	0	0	0	11	9	11	9
	Current status: Professor-2: Assistant professor-6 (2 Contract), Total -8							
Plant Physiology	0	0	1	1	3	2	4	3
	Current status: Professor-1: Assistant professor-2, Total -3							
Agricultural Engineering	1	0	1	1	1	1	3	2
	Current status: Professor-1: Assistant professor-2 (1 Contract), Total -3							
Animal Management	0	0	0	0	1	1	1	1
	Current status: Assistant professor-1, Total -1							
Computer Science	0	0	0	0	1	0	1	0
Physical Education	0	0	0	0	1	0	1	0
	Current status: Assistant professor-1(Contract), Total -1							

Faculty working in AICRP/AINP/NARP and other stations

Department	Professor		Assoc. Prof.		Asst. Prof.		Total	
	Sanctioned	In position	Sanctioned	In position	Sanctioned	In position	Sanctioned	In position
NARP (SR)	1	0	3	1	9	6	13	7
	Current status: Professor-0:Associate Professor-1, Assistant professor-11, Total -12							
NARP (SR) Pesticide Residue	0	0	0	0	1	1	1	1
	Current status: Professor-1:Associate Professor-1, Total -2							
Agricultural Meteorology	0	0	0	0	1	1	1	1
	Current status: Assistant Professor-1, Total -1							
AICRP Forage	0	0	1	0	1	2	2	2
	Current status: Professor-1:Assistant Professor-1, Total -2							
AICRP Honey bee	0	1	0	0	2	1	2	2
	Current status: Professor-1, Total -1							
AICRP Mushroom	0	0	0	0	1	1	1	1
	Current status: Assistant Professor-1, Total-1							
AICRP Nematode	0	0	0	0	1	1	1	1
	Current status: Assistant Professor-1, Total-1							
AINP PR	0	0	1	1	0	0	1	1
AICRP PR	0	0	1	1	0	0	1	1
TSS, Vellayani	0	0	1	1	1	1	2	2
	Current status: Associate Professor-1:Assistant Professor-1, Total -2							
ECF	0	0	1	1	0	0	1	1

IF, Vellayani	0	0	0	0	3	3	3	3
Current status: Professor-1:Assistant Professor-2, Total -3								



Sanctioned faculty position of 121 includes staff of College, IF and RARS (SZ)

However, in comparison to the ICAR norms, a faculty ratio of 29 (23+6) per 120 students is recommended, totaling 58 for the given student population. The institution, with a faculty strength of 112, has more than ample resources to meet and exceed these guidelines, nearly doubling the required strength. This indicates a commendable commitment to maintaining a robust academic and research environment, ensuring a favorable faculty-to-student ratio that exceeds the established benchmarks set by ICAR.

6.5.2.2. Faculty Profile (department wise):

The faculty (department wise) in position as on 31.03.2024 is given below in Table 5.

The grand total of 112 faculty members demonstrates a well-rounded and qualified academic team, contributing to the overall academic and research excellence at CoA Vellayani.

Table 5. Faculty at CoA Vellayani

Sl. No.	Department	Assistant Professor	Associate Professor	Professor	Total	With PhD
1.	Agronomy	6	0	3	9	7
2.	Genetics and Plant Breeding	4	0	1	5	3
3.	Vegetable Science	3	0	0	3	2
4.	Fruit Science	3	0	0	3	2
5.	Postharvest Management	2	0	1	3	2
6.	Plantation, Spices Medicinal and Aromatic Crops	1	1	0	2	1
7.	Soil Science and Agricultural Chemistry	5	0	1	6	6

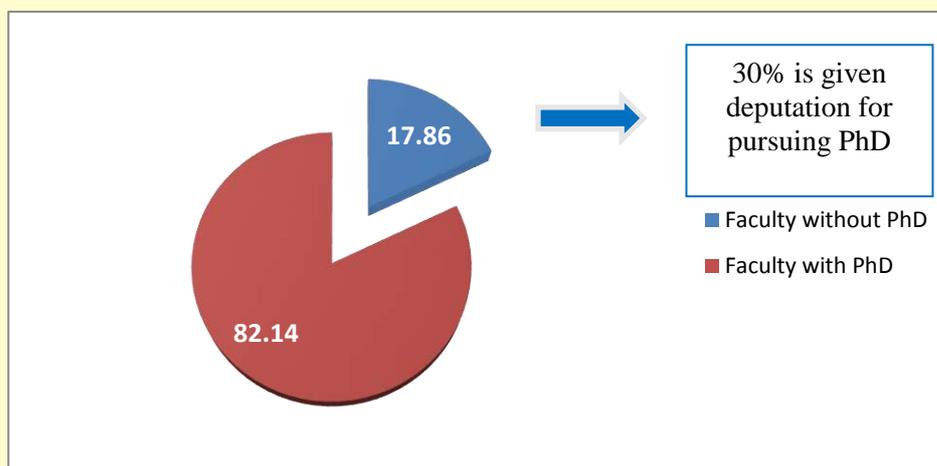
8.	Agricultural Economics	4	0	0	4	4
9.	Agricultural Extension Education	6	0	1	7	7
10.	Community Science	2	0	2	4	4
11.	Animal Husbandry	1	0	0	1	0
12.	Molecular Biology and Plant Biotechnology	6 (2C)	0	2	8	6
13.	Plant Pathology	6	0	1	7	5
14.	Plant Physiology	1	0	2	3	3
15.	Entomology	3	0	4	7	7
16.	Agricultural Engineering	2 (1C)	0	1	3	2
17.	Microbiology	2	0	1	3	3
18.	Agricultural Statistics	2 (1C)	1	0	3	2
19.	Nematology	1	0	0	1	1
20.	Physical Education	1 (C)	0	0	1	0
21.	Seed Science and Technology	1	0	0	1	0
22.	Floriculture and Landscaping	3	0	0	3	3
23.	Organic Agriculture	2	0	0	2	1
	Total	67	2	20	89	71
24.	Instructional Farm, CoA, Vellayani					
a.	Agronomy	0	0	1		1
b.	Fruit Science	1	0	0		1
c.	Plant Pathology	1	0	0		1
	Total	2	0	1	3	3
25.	Training Service Scheme, CoA, Vellayani Agricultural Extension Education	1	1	0	2	2
26.	RARS (SZ) ,CoA, Vellayani					
a.	Agronomy	0	1	0	1	1
b.	Genetics and Plant Breeding	1	0	0	1	1
c.	Vegetable Science	1	0	0	1	1
d.	Plantation, Spices, Medicinal and Aromatic Crops	1	0	0	1	1
e.	Soil Science and Agricultural Chemistry	1	0	0	1	1
f.	Plant Pathology	1	0	0	1	1
g.	Plant Physiology	1	0	0	1	1
h.	Entomology	2	1	1	4	4
i.	Microbiology	1	0	0	1	1
j.	Nematology	1	0	0	1	1
k.	Agricultural Meteorology	1	0	0	0	0
l.	Agricultural Extension Education	1	0	0	0	0
m.	Agricultural Statistics	1	0	0	1	1
	Total	13	2	1	16	14

27.	PRRAL, CoA, Vellayani					
a.	Entomology	0	1	0		1
b.	Soil Science and Agricultural Chemistry	0	0	1		1
	Total	0	1	1	2	2
	Grand Total	83	6	23	112	92

C-contract

6.5.2.3. Credentials of the Faculty:

Out of the 112 faculty members, a noteworthy 92 hold doctorates, highlighting a robust academic foundation. The details of the credentials in Table 5 presents a comprehensive overview of the faculty profile at CoA Vellayani across different departments as of March 31, 2024. The faculty distribution reveals a total of 83 Assistant Professors, 6 Associate Professors, and 23 Professors, summing up to 112 faculty members. Notably, 92 (82.14%) of them possess a Ph.D. qualification, reflecting a significant academic expertise within the faculty.



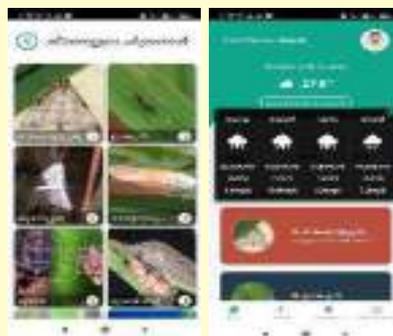
Among this distinguished group, five faculty members possess postdoctoral qualifications, including the esteemed Fulbright Nehru post-doc fellowships and BoysCast post doc fellowship. Three faculty members have successfully secured patents (wheel hoe weeder, seed cum fertilizer drill from Agronomy and Suchitha from Soil Science and Agricultural Chemistry). AICRP on Honey Bees & Pollinators Vellayani Centre attached to Entomology, received the Best Research Centre Award in 2023. Faculty members has been recognized as a Research Ambassador to the German Academic Exchange Service (DAAD); External Membership, ZEU, Justus Liebig University, Germany; Returning Expert, Centre for International Migration, New Delhi; holds Honorary Visiting Fellow position at Western Sydney University, Australia; The recipient of the John Walker Community Service International Award. Through faculty facilitation, students were selected for Fulbright fellowships, short research stay at JLU, Giessen, Germany, participated in student exchange programs at Cornell University, USA, and engaged in dual degree programs at WSU, Australia.

Faculty collaborates with University of Hohenheim, University of Siegen and University of Giessen Germany. Dr. Pratheesh Gopinath is honoured with Sub Lt. rank in NCC- Navel Unit of the college. Teachers mentoring has resulted in student internships at international research institutes such as CIMMYT and IRRI; internship at IIMK. The Statistics department developed a statistical package for data analytics called "GRAPES," the Soil Science and Agricultural Chemistry department created a mobile app called "G-Digi Probe and Ag. Meteorology department build an AI based crop pest forewarning android application named '*Ente Vayal*'. Additionally, more than two dozen faculty and students mentored by faculty members have received awards for the best paper and poster presentations in both national and international seminars and conferences.

G-Digi Probe



Ente Vayal



GRAPES



Two International symposia, Biozion-International Biotechnology Conclave 2023 and AICSA 2024 KAU-Corteva International Plant Science Symposium, were conducted by College of Agriculture, Vellayani.

BioZion - The Biotech Capstone: Science - Society Interface The Department of Molecular Biology and Biotechnology, in collaboration with the Department of Agricultural Extension Education, successfully organized the international Biotechnology conclave, BioZion, at the

College of Agriculture, Vellayani, affiliated with Kerala Agricultural University, Thrissur from August 7th - August 11th, 2023.

Collaboration: Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum Keynote Speakers: Renowned experts from around the globe, including: Prof. Dr. Dr. habil Thomas Braun



BioZion – International Biotechnology conclave

(Max Planck Institute for Heart and Lung Research, Germany) Prof. Soni Pullamsetti (Center for Infection and Genomics of the Lung, Germany) Dr. Shameer Khader (Sanofi, USA) Dr. Mohanan P. V. (Sree Chitra Tirunal Institute for Medical Sciences and Technology) Dr. Renu John (Dept. of Biomedical Engineering, IIT Hyderabad) Dr. Sagar Pandit (Indian Institute of Science Education and Research, Pune) Dr. K. K. Narayanan Namboodiri (Sree Chitra Tirunal Institute for Medical Sciences and Technology) Dr. Kiran R. Gore (IIT Kharagpur) Dr. Christoph Funk (Centre for International Development and Environmental Research, Germany) Dr. Susanne Jacobs (Centre for International Development and Environmental Research, Germany) Dr. Binod P (CSIR-National Institute for Interdisciplinary Science and Technology) Dr. Radhakrishnan E.K. (Mahatma Gandhi University)

The conclave delved into captivating subjects such as Animal Biotechnology, Clinical Biotechnology, Agricultural Biotechnology, Climate Change, Natural Resources, and Environmental Biotechnology. Exciting Competitions and Activities: Participants engaged in diverse competitions and activities, including Photography, Meme Creation, Deciphering, Research Slam, DNA Art, Reels, Research Paper Presentation, Research Poster Presentations, Debate, Ideathon, Workshops on Molecular Biology, Case Study Analysis, Science Communication, Biotech Startup Pitch Competition, Job Fair, and Panel Discussions. BioZion proved to be an enriching experience, fostering the intersection of science and society through an array of educational and engaging initiatives.

AICSA 2024 featured a competitive landscape, bringing together innovative ideas and research in plant science for climate-smart agriculture. The event was graced by Dr. Swathi Naik, the World Food Prize winner, who also gave the keynote address. Lead talks, panel discussion, industry meet, fund connect, exhibition, cultural fiestas and competitions in oral presentation, poster presentation, Quiz and ideathon were conducted. During the Ideathon, various teams presented pioneering solutions, with projects focusing on topics such as early disease detection and post-harvest quality management. Industrial experts from multi national companies led the industrial meet with promises for future collaborations for research and development in agriculture. Faculty of the college bagged seventeen awards in the event.



KAU – CORTEVA International Plant Science Symposium (AICSA 2024)

Projects handled by faculty as Major Advisors and Principal Investigators

A total of 436 PG and 190 PhD projects were undertaken by the faculty during the assessment period. 374 sponsored projects funded by 15 agencies with a total outlay of Rs. 34.74 crores were undertaken as EAPs by the faculty members. Projects handled by faculty as Major Advisors and Principal Investigators (2019-24) is presented in Table 6. The details of the EAPs are presented in **Annexure IV**.

Table 6. Projects handled by faculty as Major Advisors and Principal Investigators (2019-24)

Faculty	2019-20	2020-21	2021-22	2022-23	2023-24**
1. Major Advisor (student projects)					
i) *PG	224	146	127	128	73
ii) *Ph.D	105	77	90	102	75
2. Principal Investigator (EAPs)	144	103	104	101	35
Total Projects	473	326	321	331	183

*Newly allotted in each year alone are mentioned

**As on 31.12.2023

National and International honors & awards received by the faculty:

The number of National and International honors and awards received by the faculty are presented in Table 7. **The details of awards are depicted in Annexure V**

Table 7. National and international honours & awards received by the faculty

Sl. No.	Year	No. of Honours & Awards received	
		National	International
1.	2019	16	4
2.	2020	9	1
3.	2021	11	0
4.	2022	16	2
5.	2023	17	1
	Total	69	8

Trainings/ Workshops/ seminars/ conferences attended/conducted by the faculty:

The faculty during the assessment period has participated in 1472 Trainings/ Workshops/ seminars/ conferences at national, international and state level. The year wise details are presented in Table 8. The details of the trainings and workshops/seminars attended by faculty are presented in Annexure VI a,b

Table 8a. Trainings/ Workshops/ seminars/ conferences attended by the faculty

2019-20	2020-21	2021-22	2022-23	2023-24*
62	532	396	302	180

*As on 31.12.2023

Table 8b. Trainings/ Workshops/ seminars/ conferences conducted by the faculty

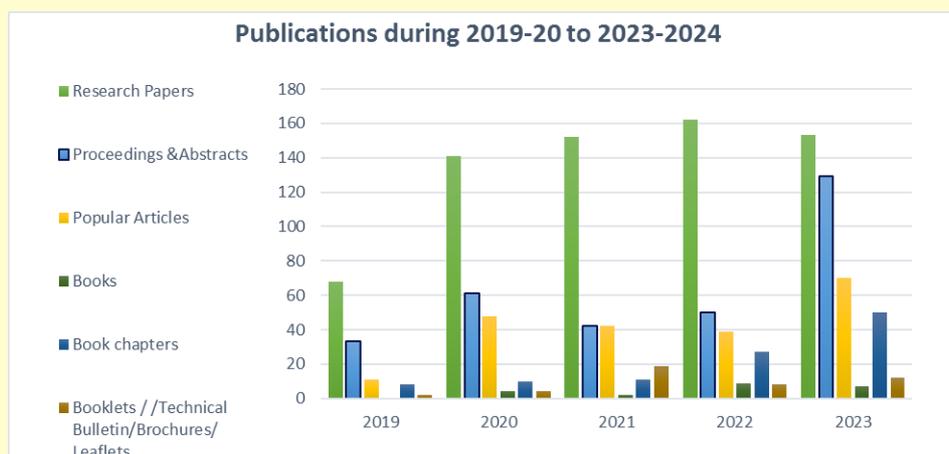
2019-20	2020-21	2021-22	2022-23	2023-24*
22	212	107	115	73

*As on 31.12.2023

Multiple webinars, programs, seminars have been conducted over and above.

Publications during 2019-20 to 2023-2024The publication statistics from various departments is presented as given in **Table 9.****Table 9. Publications during 2019-20 to 2023-2024**

S.No	Year	Research Papers	Proceedings & Abstracts	Popular Articles	Books	Book chapters	Booklets /Technical Bulletin/Brochures/ Leaflets
1.	2019	68	33	11	-	8	2
2.	2020	141	61	48	4	10	4
3.	2021	152	42	42	2	11	19
4.	2022	162	50	39	9	27	8
5.	2023	153	129	70	7	50	12
Grand Total 2019-2023		676	315	210	22	106	45



The details of publications from various departments of the college is given in Annexure VII A , VII B

6.5.2.4 Technical and supporting staff:

The details of the technical and supporting staff is presented in Table 10.

Table 10. Technical and Supporting staff of CoA Vellayani

Sl No.	Name of Department	2023-24				Total
		Assistant/Computer Assistant/Library Staff/Driver/Bus Attendant	Lab Assistant	Field Assistant (FO)	Office Attendant	
1.	Agronomy	Computer Assistant - 1	2	-		3
2.	Soil Science and Agrl. Chemistry	Computer Assistant -1	3	-	1	5
3.	Entomology	-	1	-	1	2
4.	Genetics & PlantBreeding	-	1	-	1	2
5.	Plant Physiology	-	1	-		1
6.	Microbiology	-	1	-		1
7.	Plant Pathology	-	1	-	1	2
8.	Agricultural Meteorology	-	-	1(C)		1
9.	Vegetable Science	-	1	1 (C)	1	3
10.	Postharvest Management	-	1	-		1
11.	Plantation, Spices, Medicinal and Aromatic Crops	-	1	-		1
12.	Fruit Science	-	-	-		
13.	Floriculture & Landscaping	-	-			
14.	Agrl. Extension Education	Computer Assistant - 1	-	-	1	2
15.	Molecular Biology and Biotechnology	-	2	-		2
16.	Community Science	Computer Assistant - 1	1	-	1	3
17.	Physical Education	-	-	-	1	1
18.	Animal Husbandry	Farm Assistant (C) -1	1	1	1	4
19.	Academic Cell	Computer Assistant - 2			2	4
20.	Vehicle Section	Driver – 5 (2 C) Bus Attendant -2	1			8
21.	College Library	Assistant Librarian -1 Reference Assistant -1 Professional Assistant - 2	1		1	6
22.	Research Coordination	Computer Assistant-1			1	2
23.	Technical Cell	Computer Assistant - 1				1
24.	Instructional Farm	5	-	-	8	13
25.	Organic Agriculture	-	-	3	-	3
	Total	25	19	6	21	71

Supporting staff though attached to individual departments as indicated above, they caters to the needs of various departments as per requirement. C- Contract; T- Daily Wage.

6.5.3. Learning resources:

The learning resources at our college are diverse and tailored to provide students with a comprehensive education in the field. Our well-equipped library houses an extensive collection of books, journals, and research publications, fostering a culture of continuous learning. The state-of-the-art laboratories provide hands-on experience, allowing students to apply theoretical knowledge to practical situations. Additionally, our college maintains strong ties with local farms, offering students real-world exposure through internships and experiential learning programs. The integration of modern technology, such as precision agriculture tools and data analytics, further enhances the learning experience. The commitment to staying abreast of the latest advancements in agriculture ensures that our students graduate with a cutting-edge education, well-prepared for the challenges and opportunities in the dynamic field of agriculture.

The library is well managed under the guidance of College Library Development Committee and the structure of CLDC is presented in **Annexure VIII**.

6.5.3.1 College Library (digital)

The library attached to the College of Agriculture, Vellayani was established in 1955 and meets the information needs for academics, research, and extension fraternity of the College. Details regarding the Infrastructure and Organization set up of library is given in **Table 11**.

Table 11. Infrastructure and Organisation of College Library

Area (in m ²)	1060 m ²
Seating Capacity	120
Disable friendly	Yes
Wi-Fi connectivity	Yes
Internet connectivity	Provide in the entire campus through LAN
Software used	Integrated Library Management Software KOHA. It is the first open-source integrated library system
Plagiarism checking software	TURNITIN Software
Remote Access Application Tool	MyLOFT
Library timings	9 am to 8 pm
Circulation section	a. Property counter Circulation counter Stack room Book Bank Scheme Collection - SC/ST

Reference section	Current Periodicals Reference Collection Bound Volume Collection Theses Collection
Server room	
Learning Resources	Numbers
Books	31648
Indian journals	10
Bound journals	5424
Theses	2645
Gifted books / Annual reports	2367
Book Bank Books	1900
CD ROM*	1300
e-Learning Resources	Numbers
CeRA (no. accessed)	Hits of Kerala Agricultural University- 1,29,220
CABI e-Books	Can access CABI (Centre for Agriculture and Biosciences International) e-books published from the year 2000 onwards
CAB Abstracts	Access to over 12,498,000 records from the year 1910 – 1972 CABI Full text access available
Krishikosh	Accessibility
DELNET	Kerala Agricultural University has been an Institutional Member of DELNET Access to more than 20 million bibliographic records of books, journals, articles, CDs etc
KAUTIR	Kerala Agricultural University Theses Information and Retrieval- an Institutional Repository of Kerala Agricultural University
Indiaagrstat	Accessibility
IDEAL (Indian Digital Ensemble of Agricultural Libraries)	Ready platform for Agricultural libraries of Indian National Agricultural Research & Education System (NARES) Procuring books and other library resources at low-cost KAU is a member of this IDEAL platform
Total number of trainings attended by the library staff	11

Details of Training Programmes & National seminars attended by the Library Staff is given in **Annexure IX**

6.5.3.1.1. Service provided by the Library

- Plagiarism Checking
- OPAC (Online Public Access Catalogue) Services
- Current Awareness Service (CAS)
- Selective Dissemination of Information Service (SDI)
- Book Loan Service
- Reference Service
- Broadband Internet connectivity and LAN
- WIFI connectivity
- Digitization and institutional repository*

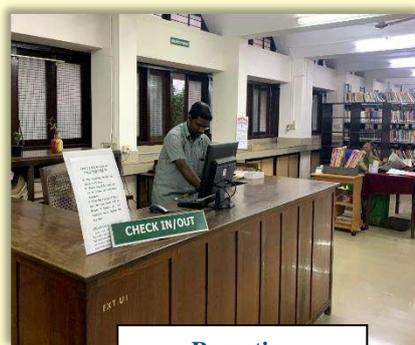
- Book Bank Scheme (General)
- Book Bank Scheme SC/ ST
- Digital resources are made available through MyLOFT to individual users.



Study area - 1



e-resources facility OPAC



Reception



New arrivals display



Reference section



Study area - 2

Library Staff Strength

The library is managed by professionally qualified personnel and supporting staff.

Details of staff strength are given in **Table 12**.

Table 12. Details of staff strength in library

Sanctioned Faculty	Faculty in place	Qualification
Assistant Librarian	1	LLB, MLISc, UGC-NET, Ph.D
Assistant Librarian	Vacant	
Reference Assistant	1	MSc, MLISc , M.Phil
Professional Assistant Gr II	1	BSc, B.Ed, MLISc , UGC-NET(JRF)
Professional Assistant Gr II	1	BSc, MLISc, UGC-NET
Supporting Staff		
Computer Assistant	Vacant	
Lab Assistant Grade 2	1	SSLC
Office Attendant	1	BA

6.5.3.2. Laboratories, Instructional Farm, Workshops, Dairy Plant, Veterinary Clinic, Hatchery, Ponds etc.

i) Laboratories

All the departments have dedicated fully equipped laboratories for UG and PG (MSc and PhD) students as per the requirements of the course curriculum. In addition the college also have state of the art laboratories like Central Instrumentation Laboratory, Referral lab for standardization of quality control of organic manures, Quality control lab for Honey, Leaf Tissue Laboratory, Molecular biology laboratory, Geo-Informatics laboratory, Pesticide Residue Laboratory with NABL accreditation (ISO: 1720252005), Plant Virus Indexing laboratory, commercial processing lab registered with FSSAI registration, Techno-incubation centre, Mushroom laboratory, Bio-control Lab, Centre of Excellence in Microbial Technology, etc. that facilitates teaching and research activities. The Class B Agro-meteorological Observatory and Automatic weather station attached to the Dept. of Ag. Meteorology provides daily weather data for various research activities and serves as an input for generating agro advisories to the farmers. Department wise detailed Labs and attached facilities to **conduct practical hands-on training are given in Annexure X and the major components are presented Table 13.**

Table 13. Labs and attached facilities in the Departments to conduct practical hands-on training

Sl. No.	Department	UG (Nos)	PG (Nos)	Additional Facilities
1.	Agronomy	3	3	Crop Cafeteria, Crop Museum, millet museum, tuber museum, Seed Museum, organic farm, wet land open field, Net House, Medicinal plant unit, Leaf tissue analytical lab, Computer lab and Herbarium press
2.	Soil Science and Agricultural Chemistry	2	2	Referral Laboratory, GIS lab, Model Organic farm, Soil Museum, Stationary Soil Testing Lab, Mobile Soil Testing Lab, Suchitha waste conversion system and Soil processing yard, Organic Museum, 2 Biochar production unit, 2 soil incubation rooms
3.	Entomology	2	3	Biocontrol Lab, Insectory Lab, storage room, pesticide residue analysis lab, quality testing lab for honey, Insect Museum, Insect repository, Honey bee lab, Apiary unit, Trichogramma rearing unit.
4.	Nematology	1	3	Soil Washing lab, glass house, net house.
5.	Genetics and Plant Breeding	1	2	Tissue culture lab, Molecular Lab, Computer lab, Crossing shed, Rain shelter, Net house
6.	Plant Physiology	1	2	Rain out shelter 50 m ² , tissue culture lab, polyhouse - 200 m ² , Open Top Chamber (OTC) System.

7.	Microbiology	1	2	Glass house, Instrumentation room, Bioinoculant production unit, Cyanobacteria lab, Rain out Shelter
8.	Plant Pathology	2	4	Protein lab., Molecular lab., Advanced Research Centre for Plant Diseases Diagnostics, Insect proof glass house, Mushroom house, Insect Proof nethouse-230msq, green house
9.	Agricultural Engineering	2	-	Engineering workshop, Secondary agriculture laboratory, Working model laboratory set up for micro irrigation system, Demonstration model of fertigation system and filter unit, Demonstration model of wind turbines, Regional technology transfer lab (RTTL) of Govt of Kerala is located in the campus
10.	Agri. Statistics	1	1	Computer lab, Data Analytics lab
11.	Agri. Meteorology	1	-	Agromet observatory, Automatic weather station
12.	Vegetable Science	2	2	Seed lab, Seed production field, Seed processing building, Seed processing yard, Polyhouse, Mist chamber, Net house, Rain shelter (2), Healing chamber
13.	Postharvest Management	1	2	Techno incubation centre, Centre for formulation of convenient food, Commercial Processing laboratory
14.	Plantation, Spices, Medicinal and Aromatic crops	1	3	Medicinal Plant Garden, rain shelter (46 m ²), rain shelter with misting facility (25m ²) Hi-tech-polyhouse (100 m.sq.), clove germplasm, plant tissue culture lab (75 m ²), field area 2000m ² , collection of dry plant specimens in storage bottles, herbarium, essential oils, value added products
15.	Fruit Science	1	2	Orchard of HDP of mango (2 acres), potting shed 70 sq m, glass house-75 sq m
16.	Floriculture & Landscaping	2	4	College Garden- 1ha, Polyhouse-400 msq, Net house-100 msq, Fernery-6msq, Shade house- 180 m sq, ornamental nursery, Value added products museum, rosarium-1200m sq
17.	Agri. Extension Education		1	Web conferencing cum training room, Language Lab, AV enabled Seminar hall, Heritage museum, AV enabled TSS Classroom
18.	Molecular Biology and Biotechnology	1	3	Plant tissue culture laboratory, Animal cell culture laboratory, tissue culture hardening chamber, transgenic containment facility, sterilization rooms (2)
19.	Community Science		3	Incubation centre, Nutrition Lab, Food Science lab, Horticultural therapy garden-70 cents, mini conference room, computer lab
20.	Physical Education			Indoor stadium, track and field, stadium, badminton, basket ball, volleyball, foot ball, cricket ground, gym etc.
21.	Ag. Economics	1	1	-
22.	Animal Husbandry	3	0	Livestock-Dairy, piggery, goatery units. Poultry. Egg incubation unit. Silage unit, Forage unit.

23.	Organic Agriculture	2	0	Analytical Lab
24.	Seed Science		2	Seed science lab and molecular lab



Collage of various lab facilities

ii) Instructional Farm

The Instructional Farm at the College of Agriculture, Vellayani, occupies a sprawling 78.23 hectares of garden and 173.50 hectares of kayal land, establishing itself as a vital hub for practical agricultural learning and managed by 181 labourer's. Cultivating a diverse range of major crops, including Coconut, Paddy, Banana, Tropical Fruits & Vegetables, Tubers & Yams, Spices & Aromatic Crops, Fodder, and Medicinal Plants, the farm not only enriches academic curricula but serves as a dynamic, living laboratory for students across various agricultural disciplines. The Instructional Farm at the College of Agriculture, Vellayani, extends beyond being a practical learning space and is also a comprehensive field lab. This integral facet caters to the research requirements of M.Sc and PhD scholars across all departments, providing a vibrant environment for advanced studies and exploration. Additionally, the farm serves as a crucial venue for UG field practical work experience, offering students hands-on exposure to real-world agricultural practices. Moreover, the

Instructional Farm plays a pivotal role in facilitating externally aided projects led by faculty members. The dynamic nature of the farm, with its diverse crops, specialized units, and advanced infrastructure, provides an ideal setting for faculty-led projects that contribute to advancements in agricultural



Instructional farm office

research and technology. Greenhouse and poly house structures play a crucial role in creating controlled environments for plant growth and research. These facilities are integral to advancing agricultural knowledge and experimentation.

Demonstration units, including those for container growing of fruit plants, integrated farming systems, model nurseries, and specialized units for floriculture, aquaponics, and medicinal plants, underscore the farm's commitment to holistic and diverse agricultural education. The farm actively contributes to revenue generation, evidenced by the centralized Sales cum Information Center. Over the years, the farm's revenue, inclusive of seeds and planting materials, has demonstrated a commendable trend, showcasing its economic significance. The presence of farm ponds for fish rearing, integrated aquaculture in the form of the Integrated Farming System (IFS) unit, and model organic farming units certified under RKVY project highlight the farm's dedication to sustainable and eco-friendly practices. In essence, the Instructional Farm stands as a multifaceted ecosystem, supporting the academic and research needs of scholars, students, and faculty alike. Its role extends beyond the boundaries of traditional learning, fostering a culture of continuous exploration and innovation within the College of Agriculture, Vellayani. Details of Infrastructural facilities in the Instructional Farm is presented in **Table 14**. Details of water management followed in Instructional Farm are given in **Annexure XI**

Tables 14. Infrastructural facilities in the Instructional Farm

Sl.No.	Facility	Numbers	Area in sq. ft.
1.	Office building	1	450
2.	Sales counter	1	110
3.	Store & temporary shed at Sales counter	1	54
4.	Fertilizer store	1	128
5.	Farm machinery & implements store	1	306
6.	Mushroom house	1	86
7.	Coconut store	1	342

8.	Coconut seed store	1	79
9.	HD potting shed	1	140
10.	Seed processing yard	1	110
11.	Seed Store (vegetables)	1	100
12.	Pump houses	4	30 each
13.	Value addition Centre	1	800
14.	Mushroom Lab	1	500
15.	Input store	1	60
16.	Labourers' recreation hall	1	143
17.	Washrooms	12	600
18.	Farm machinery/ equipment		
i.	Farm tractors		3
ii.	Power tillers		2
iii.	Mini tillers		1
iv.	Inter-cultivator		1
v.	Brush cutters		4
vi.	Chain saw		1
vii.	Thresher		1
viii.	Winnower		1
ix.	Walk-in-cooler for the storage of vegetable seeds (10ft x 10 ft.)		1
x.	Others Sprayers – knapsack, power, rocker, backpack Knives, spades, hoes, sickles, Garden equipments & tools		5- sprayers Garden knives and implements
Structures	Type of facility	Area(sq.m)	
Green house, glass house, poly house structures in Instructional Farm	Green houses with micro irrigation	288	
	Hardening chamber for tissue culture plants	90	
	Poly houses / Shade houses	560	
	Mist chambers	108	
	Rain shelter	1000	
	Naturally ventilated poly house	320	
	Shade house (renovated)	300	
Other Physical Facilities	Facility	Number	
1.	Demonstration units for container growing of fruit plants, exotic fruit plants	1 each	
2.	Integrated Farming System		
3.	Model mango nursery		
4.	Small nursery for minor horticultural crops		
5.	Small nursery for bamboo		
6.	Hitech nursery for pro tray seedlings of vegetables		
7.	Micro-rhizome production unit for ginger		
8.	Rapid multiplication unit for pepper		
9.	Floriculture unit		
10.	Aquaponics unit		

11.	Medicinal plants unit	
12.	Mushroom spawn production	
13.	Value addition center	
14.	Seed processing unit	
15.	Modernized vermicomposting unit	
16.	Modernized sales counter cum information center	

A Centralised Sales cum Information centre is located at the entrance of the college. It serves as the common outlet for the marketing of all farm produce and products from the College. Revenue generation and other details regarding Instructional farm is presented in **Table 15**.



Instructional farm facilities

Table 15. Revenue generation and other details regarding Instructional farm

Year	Farm revenue (including seeds and planting materials) (In lakhs)
2018-19	200.32
2019-20	169.77
2020-21	125.70
2021-22	155.88
2022-23	161.59
Sources of revenue generation in Instructional Farm	
Seeds and planting material production	
Coconut hybrid seedling production	
Organic inputs	

Value added products
Secondary micronutrient mixtures
Value added products of banana, coconut and cassava (Value addition Centre)
Ponds <ul style="list-style-type: none"> • The farm ponds in the college campus are suited for fish rearing • The two ponds in Block C, each of 40m x 20m are stocked with fish (rohu, mrigal and catla) in rotation. • Ambal or water lilly in 20m x 20m pond adds to the aesthetic value of the campus. • In addition, eight ponds each of 10m x 5m and 1-2 m depth are available for fish rearing. • An IFS unit with animal, poultry and fish component is located at the B Block of the farm.

iii) Model Organic Farming units

A model organic farming unit established under RKVY project by Department of Agronomy and Department of Soil Science and Agricultural Chemistry functioning in the campus. Two primarily certified model organic farms

Model Organic Farm Location	Area (in acre)
Dept of Soil Science and Agricultural Chemistry	3
Dept. of Agronomy	1

Integrated Farming System model

A teaching cum demonstration model of Integrated Farming System (IFS) unit is maintained in an area of 5000m².

The major components are crops (banana, vegetables), duck and fish.

It is unique in that there is a natural cleaning and aeration mechanism from the nearby spring (water channel).

Livestock farm and Poultry unit

Functioning under:	Department of Animal Husbandry
Purpose:	To impart training to B.Sc. (Hons.) Ag and Diploma students. To provide scientific advisory services to farmers with regard to animal rearing
Poultry	2640 sq ft
Livestock farms	4500 sq ft
Dairy farm	Mainly cross bred dairy breeds of: Holstein Friesian Jersey The smallest notified breed Vechur (Bull)

Goat and Sheep farm	Malabari
Poultry unit	BV-380 Thalassery Gramasree

Engineering Workshops

Area	110m ²
Facilities	Tools/ equipments for farm mechanization, repair and other engineering works Working model laboratory set up for micro irrigation system Facilities for the project works of PG, Ph.D students in the institution. Demonstration model of fertigation system and filter unit Demonstration model of wind turbines
	Tools and machinery
Tractor Workshop tools Lathe Drilling equipment Primary tillage equipment Secondary tillage equipment Seed drills Plant protection equipment Harvesting tools and equipment Post harvest equipment Sprinkler head and drip irrigation system with fertigation Models of different engines, carpentry joints, bevel gear, biogas plant	Carpentry tools Automated irrigation system Garden tools Surveying tools Weeders Power tiller Post hole digger Chain saw

6.5.3.3. Student READY / In-Plant Training / Internship / Experiential Learning Programmes:

Student READY (Rural Entrepreneurship Awareness Development Yojana) programme is an innovative initiative by Indian Council of Agricultural Research to reorient graduates of Agriculture for ensuring and assuring employability and promoting entrepreneurship for agriculture. The



Interaction with farmers

programme helped in building skills in project development and execution, decision-making, self confidence, individual and team coordination, problem solving, accounting, quality control, marketing and resolving conflicts, skill acquisition, self-employment avenues in

farming and related fields and provided opportunities to acquire hands-on-experience and entrepreneurial skills.

RAWEP

Rural Awareness Works Experience Programme enable the students to gain rural experience, give them confidence and enhance on farm problem solving abilities in real life situations, especially in contact with farmers, growers, etc. RAWEP is primarily aimed at equipping the future scientist to address new challenges by providing them maximum field exposure. RAWEP helps the students primarily to understand the rural situations, status of technologies adopted by farmers, prioritize the farmers' problems and to develop skills and attitude of working with farm families for overall development in rural area. During RAWEP students get experience to deal with problems related to teaching, research and extension in agriculture. It also helps them to feel the pulse of the villages and the farming community.

Programme Content

The RAWEP & AIA programme was implemented for one full semester of 20 weeks, during the seventh semester of the degree programme. The breakup of 20 weeks for the various components of RAWEP programme, including examination as follows:

Rural Awareness Work Experience and Agro-industrial Attachment (RAWEP & AIA) (STUDENT READY)		
Activities	No. of weeks	Credit hours
General orientation & On campus training by different faculties	1	0+1
Village Attachment		
a. Krishibhavan	1	} 9 weeks } 0+9
b. SHG	1	
c. Farm Planning	1	
d. Watershed management	1	
e. Progressive Farmer	1	
f. Soil Testing	2	
g. Village stay	2	
Unit Attachment in University/College, KVK/research Station		
Attachment		
a. KVK	1	} 3 weeks } 0+3
b. RARS	1	
c. NGO	1	

Plant clinic	2	0+2
Agro-Industrial Attachment / Media Attachment / Bank attachment	3	0+3
Project Report preparation, presentation, interim evaluation	2	0+2
Total weeks for RAWE & AIA	20	0 + 20

Mode of implementation

In the beginning of the RAWE, a detailed orientation on the programme had been arranged on the conduct of each module and the rules and procedures to be followed. The programme provided the students an overall idea of the agricultural development scenario, different agencies involved, agri-business enterprises, self employment avenues and similar kind of emerging challenges in the sector at large. Attachment training in banks equipped the students with knowledge on institutional agricultural credit system, lending procedure and utilization of different types of credit by different categories of beneficiaries.

The different entrepreneurship development programmes, project management and agri-industrial attachment helped in inculcating the entrepreneurial behaviour among the students for self employment, motivated and equipped them with the capacity for project formulation and consultancy. With this purpose, the students were attached to selected agri-business units to acquire firsthand knowledge on technology involved, management aspects and marketing and sale of end products. The agro-



industrial attachment module gave an idea about the working of an industry, proposing a project, assessing its feasibility and looking onto putting the steps into action, hands on experience on cultivation and processing of tea, different activities undertaken in agro based industrial units, the

records maintained, progress, organization, staffing etc. It helped the students to instill an urge to become an entrepreneur and doing some pioneering works in postharvest field and the opportunities can be utilized in the agro industrial sector. By undertaking the Village stay module, students got a clear vision about the rural community, their

socio-economic condition, the problems faced by them in agricultural and related fields etc. They had experienced and familiarized with various institutions under KAU and non- governmental institutions and their works for the upliftment of farming community, how to plan and organise appropriate extension programmes based on the local farming problems identified in the village.



Students gaining hands on experience during ELP

At the end of this programme each student has become an expertise in handling field problems and for preparing integrated agricultural development plan for the development of farming community.

Experiential Learning Programmes not only enhance students' practical skills but also provide opportunities for income generation, fostering a holistic and applied approach to learning within the agricultural domain.

- Around 16 to 20 students register for a particular ELP course every year
- A total of 16 ELP courses are offered in this college which include both skill development courses as well as income generating courses
- One unit of ICAR sanctioned experiential learning is functioning as 'Agricultural waste management' in which 75% of the profit is provided to students.
- During 2019-23 the students were provided with a nominal amount of funds from the College and the rest of the amount were met with students' own funds and utilized the facilities in the department for production process or activity envisaged. This combined funding facilitated the utilization of departmental facilities for production processes and other envisioned activities and its details are presented in **Table 16**.

Table 16. Details of ELPs from 2019 to 2023

Year	No. of ELPs offered	Total No. of students registered	Total Income Generated (Rs)	Total Profit realized (Rs)
2019	8	105	5,55,633	1,47,947
2020	11	102	2,90,421	79,907
2021	10	96	1,72,329	49,353
2022	16	155	5,24,463	2,46,074
2023	16	154	3,83,661	1,41,689

6.5.3.4. Curricula Delivery through IT (smart class rooms/interactive board etc.):

- Total number of AV enabled classrooms - 22
- Number of full fledged smart class rooms - 08

6.5.4. Student Development:

The College of Agriculture, Vellayani, is dedicated to comprehensive student development through a myriad of programs and activities across various academic levels. Our offerings encompass BSc, B.Tech, Diploma, MSc, PhD, and PG Diploma courses, ensuring a holistic educational experience. Academically, our institution fosters a supportive environment with the Academic Improvement Advisory System, facilitating a close-knit relationship between 10 students and their respective teachers in the undergraduate program. Additionally, postgraduates benefit from personalized guidance through a major advisor system. To bolster research aspirations, the college provide coaching for Junior Research Fellowship (JRF) and Senior Research Fellowship (SRF) through the Scholarship Facilitation Cell, emphasizing the importance of continuous learning and scholarly pursuits. Our commitment extends beyond classrooms, offering ample field exposure, internships, and industry attachments to bridge the gap between theoretical knowledge and practical application, ensuring students are well-prepared for real-world challenges. Career development takes center stage with the Placement and Guidance Cell, organizing career development programs and soft skill training sessions for personality development and leadership skills. Recognizing the significance of mental well-being, our Counseling Centre, staffed with experts, addresses stress-related issues. One-to-one counseling sessions and regular interactions with counselors create a supportive framework for students facing personal challenges. A vibrant Student's Union, with an array of diverse clubs such as the Biodiversity Club, Speakers Club, Planning Forum, and Social Service League, Arts club, magazine club, Sports club, Forestry club, Student E-cell, and Farmers club



Students visit to KVK

encourages co-curricular activities. This emphasis on literary, arts, sports, and community engagement ensures a well-rounded educational experience. Highlighting the importance of extracurricular activities, we organize annual college arts and sports weeks, providing platforms for students to

showcase their talents. Our students often represent the university at various levels, further enhancing their exposure and skills. College of Agriculture, Vellayani, E-cell bagged the Best Start-up E-cell award by competing with about 4000 similar E-cells from different institutions in the country. 26 members were qualified with free pass for the National E- summit organized by IIT , Mumbai.



E-Cell team - National Level winners

In conclusion, the College of Agriculture, Vellayani, stands as a testament to its commitment to nurturing well-rounded individuals by seamlessly integrating academic excellence, career development, mental well-being, and extracurricular pursuits into the fabric of our educational philosophy.

6.5.4.1 Student Intake and Attrition: The information about student intake and attrition, for college as a whole but separated in UG, PG and PhD for last five years (2019-2023) along with current year 2023 is given in **Table 17**.

Table 17. Student intake and attrition, for college as a whole but separated in UG, PG and PhD for last five years.

Year	2019-20	2020-21	2021-22	2022-23	2023-2024
UG					
B.Sc (Hons.) Ag					
Intake	160	173	176	175	175
Discontinued*	3	5	8	9	0
Attrition	0	0	0	0	0
B.Sc. – M.Sc. (Integrated) Biotechnology					
Intake	17	-	-	-	-
Discontinued*	0	-	-	-	-
Attrition	0	-	-	-	-
B.Tech Biotechnology					
Intake	-	39	40	39	40
Discontinued*	-	1	1	1	0
Attrition	-	0	0	0	0
PG					
Intake	133	104	97	110	73
Discontinued*	2	3	2	1	0
Attrition	0	0	0	0	0
PhD					

Intake	57	47	45	55	75
Discontinued	4	7	1	2	0
Attrition	0	0	0	0	0
Diploma in Organic Agriculture					
Intake			29	29	25 (admn. continuing)
Discontinued*			0	1	-
Attrition			0	0	0
PG Diploma in Landscaping and Ornamental gardening					
Intake	0	0	0	1	0
Discontinued*	0	0	0	0	0
Attrition	0	0	0	0	0
PG Diploma in Horticultural therapy					
Intake	0	5	0	0	0
Discontinued	0	0	0	0	0
Attrition	0	0	0	0	0

*Higher option

*Detail list of department wise student intake and attrition is given in **Annexure XII**.

6.5.4.2 Average Number of Students in Theory and Practical Classes:

The distribution of students across theory and practical classes in various degree programs is as follows. The Bachelor of Science (Hons.) in Agriculture program includes three theory batches, each consisting of 56 students, and six practical batches, with 23 students in each. The details are presented in **Table 18**.

Table 18. Number of students in theory and practical classes

Sl. No.	Name of the Degree Programme	Total Intake/ years	Batch of students in theory class	Batch of students in practical class
2019-23				
1	B.Sc. (Hons.) Ag		3 batches (56 students / batch)	6 batches (23 students/ batch)
2	PG		1 batch per discipline	1
3	Ph. D		1 batch per discipline	1

6.5.4.3 Admission Process:

The admission process is conducted in adherence to the prevailing rules and regulations. The qualifications required for different degree programs are determined by the Government and specified by the Academic Council periodically. Registration is carried out at the college in an offline mode. Upon payment of the approved fee, students are required to complete the Course Registration cum Grade Card, utilizing Academic Form No. 3, with the guidance of the Advisor or Head of Department, on the day of registration for each semester. The academic schedule, outlining the activities and timelines, is published at the commencement of each semester for every program. Additional details regarding the admission procedure can be found in **Table 19**. This structured approach ensures a systematic and transparent process for student admissions and registration.

Table 19. Details of admission procedure

Programme	B. Sc (Hons) Agri.
Admission procedure	Selection from NEET exam : 85% of seats, ICAR's AIEEA-UG- Rank List: 15% seats
Eligibility	50% marks in Biology separately and 50% marks in Physics, Chemistry and Biology put together.
Programme	M.Sc.(Agri.) Agronomy
	M.Sc.(Agri.) Agricultural Extension Education
	M.Sc.(Agri.) Entomology
	M.Sc.(Agri.) Genetics and Plant Breeding
	M.Sc.(Agri.) Plant Pathology
	M.Sc.(Agri.) Soil Science
	M.Sc.(Agri.) Agricultural Economics
	M.Sc.(Agri.) Agricultural Statistics
	M.Sc.(Agri.) Microbiology
	M.Sc.(Agri.) Molecular Biology & Biotechnology
	M.Sc.(Agri.) Plant Physiology
	M.Sc.(Agri.) Nematology
	M.Sc.(Agri.) Seed Science and Technology
	M.Sc.(Hort.) Floriculture and Landscaping
	M.Sc.(Hort.) Fruit Science
	M.Sc.(Hort.) Plantation, Spices, Medicinal and Aromatic Crops
M.Sc.(Hort.) Postharvest Management	
M.Sc.(Hort.) Vegetable Science	
M.Sc. (Community Science) Food & Nutrition	
Admission procedure	ICAR entrance examinations for M.Sc. (Agri.)
Eligibility	M.Sc.(Agri.) : Bachelor's degree in the respective subject/equivalent degree recognised by KAU with an OGPA of 6.50/10.00 for general candidates and 6.00/10.00 for SC/ST

	<p>M.Sc. Home Science (FS&N) : B.Sc. (Hons.) Ag. or equivalent four year degree in the relevant discipline offered by SAUs/ICAR institutes with an OGPA of 6.50/10.00 for general candidates and 6.00/10.00 for SC/ST OR Bachelor degree in Community Science/B.Sc. Home Science/ B.Sc. Nutrition and dietetics/ B.Sc. Clinical Nutrition/ B.Sc. Food and Nutrition/ B.Sc. Clinical nutrition and dietetics or equivalent with 55 % in traditional system for general candidates and 50 % for SC/ST</p> <p>M.Sc. (Agri. Statistics): B.Sc. (Hons.) in Agriculture/ Forestry/ Co-operation and Banking offered by SAUs/ICAR institutes with an OGPA of 6.50/10.00 for general candidates and 6.00/10.00 for SC/ST (OR) A bachelor degree holder in B.Sc. Mathematics/ Statistics with 55 % in traditional system for general candidates and 50 % for SC/ST.</p>
Programme	Ph.D. Agronomy
	Ph.D. Agricultural Extension Education
	Ph.D. Entomology
	Ph.D. Genetics and Plant Breeding
	Ph.D. Plant Pathology
	Ph.D. Soil Science
	Ph.D. Microbiology
	Ph.D. Molecular Biology & Biotechnology
	Ph.D. Plant Physiology
	Ph.D. Fruit Science
	Ph.D. Plantation, Spices, Medicinal and Aromatic Crops
	Ph.D. Postharvest Management
	Ph.D. Vegetable Science
	Ph.D. Food & Nutrition
Admission procedure	ICAR Entrance examination (AICE- JRF/ SRF (Ph.D))
Eligibility	M.Sc. in the concerned subject of 7.00/10.00 for general candidates and 6.50/10.00 for SC/ST Experience, Awards, Papers/publications were also considered in the interview.
Programme	B Tech Biotechnology
Admission procedure	Selection from NEET exam
Eligibility	Students having passed Plus Two/ Higher Secondary/ recognized equivalent, examination with Physics, Chemistry and Biology with a minimum of 50% marks except for SC/ST communities.
Programme	Diploma in Organic Agriculture
Admission procedure	KAU entrance
Eligibility	Plus two or Vocational Higher Secondary Education (VHSE)
Programme	PG Diploma in Horticulture therapy
Admission procedure	KAU entrance

Eligibility	Bachelor's degree in Agriculture, Horticulture, Community Science, Home Science, Nursing, Environmental Science, Education, Special education, Botany, Psychology, Occupational Therapy, Speech Therapy, Audiology & Speech Language Pathology, Social work, Occupational therapy, Physiotherapy
Programme	PG Diploma in Landscaping and ornamental gardening.
Admission procedure	KAU entrance
Eligibility	B.Sc (Agriculture/Horticulture/ Forestry/ Agricultural Engineering), B.Sc (Botany/ Zoology/ Environmental Science), Bachelor of Architecture.

6.5.4.4. Conduct of Practical and Hands on Training:

Our courses prioritize a holistic learning experience, placing practical and hands-on training at the core. B.Sc. (Hons.) Ag. students undergo organized field-oriented sessions, with six batches engaged six days a week, while B.Tech students are divided into two batches. The practical hands-on training, tailored to course



structures, draws on the expertise of faculty, farm staff, and instructional farm facilities. In cases of resource constraints, an interdisciplinary approach is seamlessly integrated. Regularly revised practical manuals guide students, utilizing smart classrooms for procedural illustration and technology demonstrations. Complementing these structured sessions are immersive field visits to farmers' fields, Krishi Bhavan institutions, and training centers like SAMETI, RATTC, IMG etc. These excursions transcend traditional classrooms, offering students direct exposure to real-world applications and fostering connections with industry professionals. Industrial visits, a crucial component, bridge academic concepts with industry practices, showcasing the tangible impact of their studies. This comprehensive approach, seamlessly blending theoretical understanding and practical proficiency, ensures our students not only grasp agricultural intricacies but also graduate with a nuanced understanding of the sector's challenges and innovations (a brief note of the practical hands on training in the different departments is attached as **Annexure XIII**).

6.5.4.5 Examination and Evaluation Process

The evaluation of the student's performance is based on internal and external valuation.

The evaluation of Master's degree and Doctorate degree programmes is based on the successful completion of the course credits with two internal examinations of 10,20 and 80 marks, practical examination of 100 marks, a qualifying exam, completion of research project in the major field of study and submission of a thesis thereon. Evaluation process of UG is described in Table 20 and evaluation scheme of PG and PhD is given in Table 20b.

Table 20a. System of evaluation in UG programme

Examination and Evaluation Process of UG programme							
	Internal (50 marks)			External (50 marks)			
	Method	Nos	Weightage		Method	Nos	Weightage
Theory (100 marks)	Internal exam	1	40 marks		Final theory examination (2 hrs)	1	50 marks
	Assignment	1	10 marks				
Practical (100 marks)	Examination		Practical record	Viva			
	60 marks		15 marks	10 marks	15 marks		

Table 20b. System of evaluation in PG programme

PG courses	Theory			Practical		Total
	First term exam	Midterm exam	Final exam	Practical exam	Assignment/Viva	
Theory and Practical	10	20	50	15	5	100
Theory only	10	30	50		10	100
Practical only				60	Viva-10 Assignment -30	100

Ph.D	Theory-Final exam	Practical exam	Case study/ Viva voce	Assignment/ Seminar/Presentation/ Review article	Total
Theory and Practical	50	20	10	20	100
Theory only	50		10	40	100
Practical only		60	10	30	100

6.5.4.6. NCC/NSS Units

NSS Units

The National Service Scheme (NSS) is actively operational within the college, overseen by two dedicated staff advisors. The NSS has been organized into two units within the college, and all undergraduate students are enrolled as volunteers. These enthusiastic volunteers play a pivotal role in identifying community issues collaboratively with local leaders. Their engagement extends to participating in a range of community development activities, environmental protection programs, and initiatives related to national integration and social harmony. The impact of their efforts and the scope of NSS activities over the past five years are detailed in **Table 21**, providing a comprehensive overview of the college's commitment to fostering social responsibility, community engagement, and environmental stewardship through the NSS platform. Detailed list is given in **Annexure XIV A**

Table 21. Number of activities organised under NSS during the last five years

Year	Number of activities
2019-20	16
2020-21	14
2021-22	21
2022-23	37
2023-24	34



NCC Unit Overview

The College of Agriculture, Vellayani, inaugurated its Senior Division Naval Wing NCC unit on November 26, 2021, with a robust membership of 50 dedicated cadets. This unit operates in affiliation with the 1(K) Navy Unit, NCC, Aaakulam, Thiruvananthapuram, ensuring a comprehensive training experience for its cadets over a tenure of three years. The initiation of this program occurred with the enrollment of the first batch of students on November 30, 2021, featuring participants from the BSc (Hons.) Agriculture and BTech (Biotechnology) programs. The array of activities offered encompasses a diverse range, including Naval Wing activities, participation in the Youth Exchange Programme, Adventure Training, Cycle Expedition, Trekking

& Sports, Foot Drill, Arms Drill & Weapons Training, Self Defence, and Map Reading. This dynamic curriculum aims to instill leadership, discipline, and a spirit of adventure among the cadets. Number of activities are presented in **Table 22**. Detailed list is given in Annexure XIV B



NCC activities

Table 22. Number of activities organised under NCC during the last five years

Year	Number of activities
2021-22	01
2022-23	10
2023-24	11

6.5.4.7. Language Laboratory:

The Language Laboratory, a pivotal component of the "ICT enabled Social Science Media Lab" project, has been established through collaborative efforts between the Centre for International Migration in the Department of Agricultural Extension Education and the Department of Agricultural Statistics. Seventeen computers within the laboratory are seamlessly connected through a Local Area Network (LAN), providing a technologically integrated space for language learning and development. The Language Laboratory is fortified by the Orell Talk English software, a robust tool designed to enhance language proficiency and communication skills. During their first year, undergraduate students undergo



Language lab

comprehensive training in the Language Laboratory. This training is facilitated by an English course teacher who has received specialized training in utilizing the Orell Talk English software. This synergistic approach ensures that students receive effective guidance and support, fostering a conducive environment for language acquisition and skill enhancement.

6.5.4.8 Cultural Centre

The Students Union plays a pivotal role in fostering a vibrant cultural atmosphere within the college, organizing annual Interclass and Inter University Arts festivals, as well as various cultural events during Farewell functions. These initiatives serve as platforms for students to showcase their artistic talents and celebrate diversity. A noteworthy addition to the cultural



Holi celebration

landscape is the Club of Lady Scientists, which orchestrates cultural programs on significant occasions such as International Women's Day, Onam, Christmas, and retirement functions. This club adds a distinct dimension to cultural expression by highlighting the achievements and contributions of women in science.

To nurture talent and promote holistic development, regular Talent Development programs, including Quiz competitions, are conducted. Cultural development opportunities with a focus on gender concerns are integrated into the college environment, ensuring a well-rounded educational experience. The Speakers Club contributes to intellectual growth by organizing essay writing competitions, encouraging students to articulate their thoughts and opinions effectively. The commitment to cultural education is further underscored through arts, sports, and literary clubs. This multifaceted approach ensures that extracurricular education is a focal point, providing students with a culturally rich learning and living environment conducive to their overall development.

6.5.4.9. Personality Development

The Placement and Career Guidance Cell at the college is dedicated to enhancing the employability of students through comprehensive personality development programs. These initiatives are designed to equip students with the skills and attributes that are highly sought after in the professional world. In addition to personality development programs, the cell actively coordinates campus recruitment drives with leading private firms such as Federal Bank, AMUL, IFFCO Kissan, Mondelez International, among others. This not only provides students with valuable exposure to potential employers but also serves as a bridge between academia and industry.

Recognizing the diverse career aspirations of students, the cell extends its support beyond conventional recruitment drives. It organizes coaching programs for students aspiring

to pursue Civil services, UPSC exams, Agricultural Officer exams conducted by the Kerala Public Service Commission, and JRF exams. This broadens the horizon of opportunities available to students and prepares them for various competitive examinations. The Department of Agricultural Extension Education complements these efforts by conducting a series of webinars. These webinars focus on elucidating opportunities for agricultural students in higher education abroad, job prospects both in India and abroad, and available scholarships in foreign countries. This strategic information-sharing contributes to informed decision-making among students.

Moreover, the webinars are instrumental in goal-setting and career development for students. By providing insights into different career paths and industry trends, students can make well-informed decisions about their professional trajectories. As a part of the final year UG program, students are exposed to social awareness initiatives, furthering their understanding of societal issues. Additionally, they undergo specialized personality development and leadership programs. These components of the curriculum are geared towards moulding well-rounded individuals who not only excel academically but also contribute meaningfully to society as socially aware and responsible citizens.

6.5.5 Physical facilities:

6.5.5.1. Hostels

The campus accommodates four hostels catering to the diverse needs of students. '**Greeshma**' is designated for UG lady students, '**Tharangam**' for undergraduate men students, and '**Samrudha**' exclusively for postgraduate students. The overall administration of all hostels is overseen by the Dean, who serves as the Warden. The day-to-day management of each hostel falls under the immediate control of two Assistant Wardens. These individuals play a crucial role in ensuring the well-being and discipline of the residents. Additionally, each hostel is supported by a Manager (for men's hostels) or a Matron (for women's hostels), who assists the Assistant Wardens in general administration.

For effective and participatory hostel governance, student committees are in place to manage various aspects of hostel life. These committees convene regular meetings under the chairmanship of the Assistant Warden, facilitating open communication channels and ensuring the smooth functioning of the hostels. This student involvement fosters a sense of responsibility and community among the residents. In matters concerning the mess, students take an active role in its management, contributing to a collaborative living environment. The Assistant Wardens oversee financial aspects, ensuring transparency and efficiency in the administration

of the hostel mess. This approach not only empowers students with a sense of ownership but also promotes a culture of shared responsibility within the hostel community. The details are presented in Table 23.

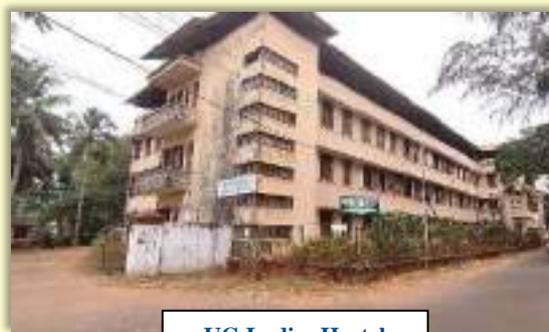
Table 23. Hostel facilities at CoA Vellayani

Hostel	No. of rooms	Inmates / room	Mess facility	Guest rooms	Drinking facility
UG men's hostel - 'Tharangam'	54	4	Separate kitchen-workers (5 nos) + 2 cleaning staff & dining hall (seating capacity - 44)	0	Water filters-3 Water dispenser-1
Ladies' hostel- 'Greeshma'	144	4	Separate kitchen-workers (11 nos) & dining hall (seating capacity-150)	0 (sick room-1)	Water filters -4 Water dispenser-1 Water cooler-1
PG hostel- 'Samrudha'					
PG ladies' hostel	97	2	Independent kitchen – 7 workers with a dining hall (seating capacity -60)	sick room-1	Water cooler cum filter-1 Aqua guards -5 Water filter-1
PG Men's hostel	18 apartments	4 per apartment			

UG Hostels:

Cleaning and Maintenance:

Cleaning staff, employed on a daily wage basis, diligently carry out regular cleaning of hostels and toilets. The cleaning schedule alternates between the two hostels, ensuring a consistent and hygienic living environment. The premises receive additional attention from laborers associated with the Instructional Farm, who undertake weeding and maintenance activities, contributing to the overall cleanliness of the surroundings.



UG Ladies Hostel

Lodging Facilities:

Each hostel room is well-equipped with essential furniture such as cots, tables, chairs, and cupboards. Common toilets are conveniently available in each wing, enhancing the convenience and comfort of the residents.

Recreational Facilities:

Both girls and boys hostels are equipped with recreational amenities, including television, reading materials, carom boards, table tennis, badminton, and Wi-Fi connectivity. For enhanced security, biometric punching facilities are installed in the UG hostels.

PG Hostel:**Cleaning and Maintenance:**

PG – Ph.D Mens Hostel

In the PG hostel, a dedicated cleaning staff ensures daily upkeep of corridors, mess hall, and other communal areas. The cleaning routine includes alternate-day cleaning of toilets, maintaining a high standard of hygiene.

Recreational Facilities:

The PG hostel provides entertainment amenities such as a 50" LCD TV and audio systems in the dining hall, offering residents a space for relaxation and leisure.

Library Facilities:

To support the career development of students, the PG hostel features reading rooms and mini professional libraries. These facilities aim to provide a conducive environment for academic pursuits.

Computer Facility:

A computer is available in the PG hostel, serving both accounting needs for the mess and supporting students with their academic work.

Recent Renovation and Modification:

The PG and PhD scholar hostels have undergone recent renovations, including the installation of vitrified tiles, painting, and other green initiatives. These efforts are geared towards improving the overall lodging facilities, ensuring a comfortable and aesthetically pleasing living environment for residents.

General facilities available in the college for residential students**Sports facilities**

A well-equipped Indoor stadium at international standards that was a venue for many events like the Commonwealth games and a vast outdoor stadium with turf pitch and 400 m track which again hosted district, state, national and international matches are present in the

College campus. Facilities for playing various games like cricket, volleyball, football, basket ball, badminton, table tennis etc are available for students and staff.

Medical facilities

Ensuring the well-being of students and staff is a paramount concern within our campus community. Our commitment to providing comprehensive health and safety facilities is reflected in the range of medical services and resources available on campus.

Medical laboratory service of Rajiv Gandhi Centre for Biotechnology (RGCB):

RGCB conducts medical checkups and lab tests for students and staff at minimal rates every Friday within the campus. This service ensures regular health monitoring and diagnostic support for the campus community.

Primary Health Centre (PHC):

A primary health center in close proximity to the campus is available for immediate medical attention. This facility serves as a resource for addressing urgent health concerns and providing basic medical care to students and staff.



Primary Health Centre

Emergency Response Vehicle:

An emergency response vehicle, attached to the Instructional Farm, is utilized for medical emergencies. This vehicle ensures swift transportation to medical facilities and plays a crucial role in handling urgent situations.



Private hospital

Private Hospital:

Within a 2-kilometer radius, there is a private hospital accessible for seeking immediate medical attention. This additional resource enhances the availability of medical services and options for the campus community.

First Aid and Safety Measures:

First Aid Kits and Fire Extinguishers are strategically provided in laboratories, emphasizing a proactive approach to safety. This ensures that immediate care can be administered in case of minor injuries or incidents, contributing to a safe and secure environment on campus. The comprehensive medical support system, combining regular checkups, diagnostic services, proximity to health centers, and an emergency response vehicle, reflects a holistic approach to the well-being of students and staff. These facilities are crucial

in addressing both routine health needs and unforeseen medical emergencies within the campus community.

Child Care Facilities on Campus:

A creche is operating in the campus to provide quality child care. In recognition of the diverse needs of our campus community, we proudly operate a fully equipped creche, offering high-quality child care services. The creche



Creche

serves as a dedicated space designed to cater to the well-being and development of young children, providing a secure and nurturing environment.

Educational Enrichment:

In addition to ensuring the safety and comfort of the children, the creche incorporates educational enrichment programs suitable for various age groups. These programs are designed to stimulate curiosity, creativity, and early learning through age-appropriate activities, fostering a foundation for lifelong learning.

Health and Nutrition:

The well-being of the children is a top priority, and the creche ensures access to nutritious meals and snacks, adhering to high standards of hygiene. Regular health checkups are conducted to monitor the physical health of the children, with immediate attention provided if needed.

Parental Involvement:

The creche encourages active parental involvement through regular communication channels, parent-teacher meetings, and special events. This collaborative approach ensures that parents are well-informed about their child's experiences and achievements, fostering a sense of community within the creche.

Safety Measures:

The creche is equipped with safety features and childproofing measures to create a secure environment. Trained staff members are adept at handling emergency situations, ensuring the safety and well-being of every child under their care. In essence, our campus creche is a testament to our commitment to supporting the holistic needs of our community

members. By providing a conducive environment for early childhood development and offering support to parents, we strive to create a campus where individuals can balance their academic and professional pursuits with the joys of parenthood.

Food and refreshment amenities within the Campus:

Cafeteria:

Our campus boasts a cafeteria managed by skilled staff from the Department of Community Science. This culinary hub produces and sells a diverse range of processed food products, aligning with seasonal variations. The offerings are crafted to meet the nutritional needs and preferences of the campus community.

Refreshment stall:

The Agricultural College Co-operative Society runs a store that caters to a spectrum of needs, including stationery, food items, and various day-to-day requirements of both students and staff. This one-stop-shop ensures convenience and accessibility for essential supplies.

Dairy and meat outlet:

The Department of Animal Husbandry contributes to campus sustenance by producing and selling essentials such as milk, eggs, meat, and more. This not only ensures a regular supply of quality products but also supports sustainable practices within the campus community.

Instructional Farm Sales Counter:

The Instructional Farm, Vellayani, operates a sales counter offering an array of fresh vegetables and processed agricultural products. From coconut oil and turmeric powder to tapioca powder, jackfruit powder, and fruit juice-based sip-ups, the counter provides a rich selection of locally sourced and processed items. These diverse food services on campus create a holistic ecosystem, where the offerings are not only convenient but also aligned with principles of sustainability and local sourcing. The integration of departments and cooperative societies ensures a collaborative approach to meeting the culinary needs of the college community.

International Guest house

The International Guest House, spanning 5500 sq. ft. within the campus, stands as a distinguished accommodation facility, offering 17 thoughtfully designed rooms, including a Suite room, AC and non-AC double rooms, and non-AC single rooms. With a dedicated caretaker and support staff



International Guest house

sourced from the Instructional Farm, the guest house ensures a seamless and comfortable experience for guests. Essential amenities, including a dining area and kitchen, contribute to a homely atmosphere, while additional features such as a reception area, lounge spaces, and conference facilities cater to diverse needs. The guest house's strategic location provides easy access to the vibrant campus surroundings, making it an ideal space for academic collaborations, conferences, and other guest-related activities.

Students Amenity Centre:

The Students Amenity Centre is a vital hub within the campus dedicated to providing essential services and support exclusively for female students. This facility serves as a central point for meeting various needs, fostering a comfortable and conducive environment for academic and personal development. Whether offering guidance on academic resources, providing counseling services, or facilitating social interactions, the Student Amenity Centre plays a pivotal role in enhancing the overall well-being of female students. It stands as a testament to our commitment to creating an inclusive and supportive campus environment that prioritizes the diverse needs of all students.

Transport facilities:

The campus ensures convenient daily transport facilities for students and staff, facilitating easy commuting. College bus trips are scheduled on all working days, with services operating twice in the morning and evening, providing a reliable and punctual means of transportation. Additionally, the Kerala State Road Transport Corporation (KSRTC) offers frequent bus services from the main campus to the city center, enhancing accessibility for the campus community. For added flexibility, various hired transportation options such as taxis and auto-rickshaws are readily available at the main entrance of the college, catering to individual preferences and ensuring a comprehensive transportation network to and from the campus.

Staff quarters:

The College of Agriculture is committed to fostering a conducive academic environment, extending its dedication to both teaching and non-teaching staff through the provision of residential facilities. The campus features eight professor quarters, alongside purpose-built two BHK and 3 BHK residences, catering specifically to the accommodation requirements of our esteemed faculty and non-teaching staff. This initiative aligns with our holistic approach to promoting a supportive and nurturing atmosphere, essential for the overall well-being of our staff, ultimately enhancing their contribution to the institution's mission and goals.

Waste management:

The campus takes a proactive approach to waste treatment, implementing sustainable solutions to manage kitchen waste effectively. Biogas plants have been strategically installed in each hostel, providing an eco-friendly method for the treatment of kitchen waste. These plants not only assist in waste reduction but also contribute to the generation of biogas, a renewable energy source.

In addition to biogas plants, compost pits have been established to further enhance the organic waste treatment process. These pits facilitate the decomposition of organic matter, creating nutrient-rich compost that can be utilized for campus landscaping and agricultural activities. Moreover, the campus has established a collaboration with Clean Kerala Company, ensuring a comprehensive approach to waste management. This partnership involves the systematic collection and disposal of waste, aligning with sustainable practices and contributing to the broader goal of environmental conservation.

The integration of biogas plants, compost pits, and external collaborations demonstrates the commitment of the campus to responsible waste management, promoting a greener and more sustainable living environment for the entire community.

Recreational cum Well-being facilities:

The campus offers a diverse range of facilities aimed at promoting well-being, fitness, and recreational activities. The Horticultural Therapy park, located adjacent to the Department of Community Science, features a treadmill, providing an outdoor exercise space where individuals can engage in physical activity surrounded by greenery. Complementing this, there is a dedicated walkway path designed for brisk walking, encouraging a healthy and active lifestyle among students and staff.

For those focusing on nutritional well-being, the Diet Counselling Centre on campus serves as a valuable resource. This center provides personalized diet plans based on individual nutritional requirements and Body Mass Index (BMI), fostering a holistic approach to health and wellness.

Adding to the cultural and recreational amenities, the campus has an amphitheatre named 'Neelambari'. This open-air venue is utilized for the conduct of various student programs, allowing participants to appreciate the scenic beauty of Kochukovalam while enjoying artistic and cultural events. The amphitheatre serves as a vibrant space for community gatherings and performances, enriching the overall campus experience. In essence, these additional facilities contribute to a well-rounded campus environment, promoting physical fitness, nutritional awareness, and cultural engagement among students and staff.

Facilities for differently abled:

The campus is committed to inclusivity and accessibility, providing various differently abled-friendly facilities to ensure that individuals with diverse needs can fully participate in academic and recreational activities. Four ramps have been strategically placed at different buildings, facilitating easy access for differently abled persons throughout the campus. Wheelchair-accessible corridors, labs and disabled-friendly toilets are available.



Ramps for disabled

Horticultural Therapy:

The Department of Community Science has taken a holistic approach by incorporating assistive technology, garden tools, and structures in their facilities, creating an inclusive learning environment for all students. The establishment of a Horticultural Therapy garden, supervised by the Department, aims to support children with special needs by providing a space for them to adapt, cope, and develop their personal abilities and potential.



Australian team visiting horticultural therapy

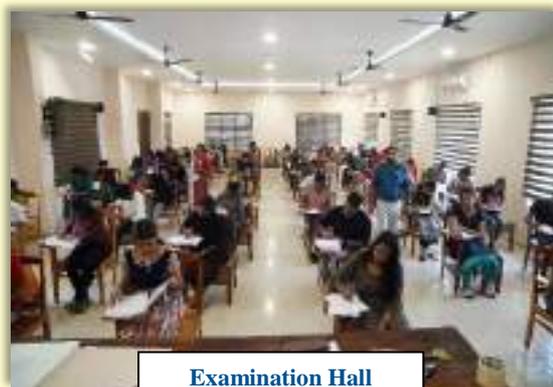
In addition, a Sensory Garden specifically designed for visually impaired individuals has been created within the campus. This garden serves as a sensory-rich environment, catering to the unique needs of visually impaired individuals and promoting a holistic sensory experience. Recognizing the diverse learning requirements of differently-abled students, the campus offers additional

learning support and remedial teaching programs. These initiatives are tailored to the individual needs of students with disabilities, ensuring that they have the necessary resources and assistance to thrive academically.

6.5.5.2. Examination hall:

The examination facilities at our institution are meticulously designed to ensure a conducive and organized environment for the assessment process. The campus boasts a state-of-the-art New Examination Hall covering an expansive 450 square meters, accommodating up to 500 individuals with armed chairs, CCTV surveillance, clocks, and efficient lighting and ventilation. Additionally, the New UG Block presents four distinct examination halls, each spanning 195 square meters, with tables, armed chairs, CCTV cameras, clocks, and essential

lighting and fans for 100 students in each hall. The Main Block Hall, with an area of 123 square meters, is equipped with a table, 110 armed chairs, CCTV cameras, and a clock, providing a focused space for examinations for up to 100 students. The New PG Block contributes a 120-square-meter examination hall accommodating 70 individuals, furnished



Examination Hall

with armed chairs, clocks, and essential lighting and ventilation. The emphasis on security, comfort, and efficiency in these facilities reflects our commitment to providing a conducive environment for the examination process, ensuring a fair and streamlined assessment experience for all students. Additionally, practical exams find a suitable home in well-equipped classrooms and labs affiliated with respective departments, completing the comprehensive examination infrastructure on our campus. The facilities for the conduct of examinations are presented in **Table 24**.

Table 24. Examination hall facilities

Examination hall	Area	Capacity	Facilities
New Examination Hall-1no.	450 m ²	500	500 armed chairs, CC TV camera, clock, lights and fans
New UG Block -4no.s	195m ² x 4	100 x 4	Four tables, 4x110 armed chairs, CC TV camera, clock, lights and fans.
Main Block Hall -2no.s	123 m ²	100	One table, 110 armed chairs CC TV camera, clock
New PG Block -3no.s	120 m ²	70	70 armed chairs, clock, lights and fan

*Practical exams are conducted in the classrooms and labs attached to the departments

6.5.5.3. Sports and recreational facilities

The college takes pride in offering exceptional indoor and outdoor stadium facilities, widely recognized as some of the best in the state. The well-equipped multi-purpose Indoor Stadium stands as a testament to this commitment, featuring courts for table tennis, badminton, basketball, volleyball, and a dedicated area for high jump training. Complementing this, the Outdoor Stadium boasts courts for basketball and ball badminton, cricket nets, and a versatile

cricket/football ground. Notably, the outdoor stadium also houses a 400-meter track and long jump pits, along with equipment for practicing javelin throw, shot put, and discus throw.

Athletics, sports, and games are integral components of the Physical Education courses, fostering both individual skill development and team spirit. The sports facilities are not only utilized for college-level competitions but also extend to university-level events. Furthermore, these facilities are available to students for recreational use, with the indoor stadium open during specified hours on all working days.



Remarkably, these sports amenities are not exclusive to the college community alone; they are also open to the public, including external organizations and institutions. Requests for hosting tournaments and athletic meets are accommodated, promoting a broader engagement with the local community. Additionally, the Physical Education Department provides rowing boats, adding a unique dimension to the range of sporting opportunities available on campus. In essence, the college's dedication to fostering a culture of physical fitness, competitive sports, and community engagement is exemplified through these outstanding stadium facilities. The details of the facilities available for sports and recreation are available in Table 25.

Table 25. Sports and recreational facilities

Facility	Dimensions	Number
Indoor Stadium (multipurpose- games, judo and gym)	1500 m ²	1
Open Playground	27600 m ²	
Football court	120 m x 70m	1
Basketball court	28m x 15m	2
Volleyball court	18m x 9 m	3
Badminton courts	13.40 m x 6.1m	6
Table Tennis		2 tables
Cricket ground	130 m x 60 m	1
Athletics – facilities for track and field events	400m	
Advanced rowing boat simulator	12ft x 5 ft	1
EC dinghy sail boat		1
Single seater kayak		1

Recreational Facilities

The college is dedicated to providing a vibrant array of recreational facilities, catering to the diverse interests and preferences of its student community. Hostels are equipped with reading rooms, TV rooms, and Wi-Fi facilities, creating conducive environments for relaxation and leisure. The Indoor Stadium serves as a hub for various sports, including table tennis, offering both competitive and recreational opportunities for students.

For enthusiasts of martial arts and fitness, the Indoor Stadium features specialized halls for Judo, Weight Training, and Gymnastics. These halls, each spanning an impressive 50m x 12m, are fully equipped with state-of-the-art facilities, and the Gym remains accessible from 6 am in the morning, providing ample time for fitness enthusiasts to engage in their routines.

To further enhance the recreational experience, a cafeteria located near the administrative block operates on all working days from 8:30 am to 8 pm. The cafeteria serves breakfast, tea, lunch, and snacks, providing a convenient spot for students to socialize and refuel between academic commitments. In essence, the college's commitment to recreation is evident through its comprehensive facilities, fostering a dynamic and engaging campus environment that supports both active and leisurely pursuits. These offerings not only contribute to the overall well-being of the students but also create a sense of community and camaraderie within the campus. The details are presented in **Table 26**.

Table 26. Recreational Facilities

RECREATION	
Reading rooms, TV rooms, wifi facilities in hostels	Hostels
Sports- table tennis	Available in Indoor stadium and hostel
Judo hall, Weight Training Hall and Gymnastic Hall	Indoor stadium. Halls are 50m x 12m each and the Gym is fully established with all equipments. Remains open from 6 am in the morning
Cafeteria	Near the administrative block. Is open on all working days from 8.30 am till 5 pm. Breakfast, tea, lunch, and snacks are available.

6.5.5.4 Auditorium:

The college takes pride in its diverse and well-equipped auditorium facilities that serve as vibrant venues for a myriad of events and functions. The open auditorium in the quadrangle of the old academic block, with a seating capacity of 300, hosts interclass arts competitions,

Students Union functions, fresher's day celebrations, Onam festivities, and various other important events. The Indoor Stadium, accommodating 1000 individuals, becomes the focal point for major college functions, including inaugurations, valedictory ceremonies, award distributions, and exhibitions.

The Neelambari Amphitheatre, with a seating capacity of 500, adds a unique charm to the campus, being utilized for film shows, farewell functions, students union activities, and other engaging events. The Mandapam, a heritage building from the erstwhile Maharaja's palace, stands as a dignified venue for official functions, oath-taking ceremonies, exhibitions, prize



Neelambari Amphitheatre

distributions, and various competitions, group discussions, and Onam celebrations. The serene "Kochukovalam" garden near the Vellayani lakeshore, adorned with a lotus pool and thatched huts, provides a beautiful space for relaxation and gatherings, becoming a cherished spot for students, staff, and alumni. The details of auditorium facilities and events conducted are presented in **Table 27**.

Table 27. Auditorium facilities and events conducted

Auditorium	Seating capacity	Use/ special events conducted
Open auditorium in quadrangle of old academic block	300	Interclass arts competitions, Students union functions, freshers' day, Onam celebration etc,
Indoor stadium	1000	Major functions of the college, inaugurations of various students' union activities, valedictory functions, award distribution ceremonies, exhibitions etc.
Neelambari Amphitheatre	500	Used for conduct of film shows, farewell functions, students union activities etc.

Additionally, the garden in front of the academic block serves as a picturesque venue for ceremonies like the Flag Hoisting on August 15th and January 26th. In essence, these auditorium facilities reflect the college's commitment to providing versatile spaces that cater to the diverse needs of the academic community, fostering a rich cultural and communal experience within the campus. The College has open stage facilities for the conduct of arts, stage programmes and important functions.

6.5.5.5. Exhibition Hall/Museum:

The details of exhibition facilities, museums and important programmes conducted are presented from table 28-30.

Table 28. Exhibition hall and events conducted

Sl. No.	Exhibition hall	Special Events
1.	Indoor and open stadium	Conduct of mega exhibitions BIOZION (International Conclave), CORTEVA 2023
2.	Mandapam and the quadrangle	Mini exhibitions and other social programmes
3.	Exhibition hall attached to the Model Organic Farm of the Dept of Soil Science	Exhibits different types of manures, bio-fertilizers and biocontrol agents
4.	Demonstration units	Biogas plant
		BIOCHAR preparation model
		Household composting model
5.	Space available in the corridors	Vermi-wash collection unit.
		Utilized by departments for displaying their research achievements and study materials

Museums:

Museums in the college provide a professionalized learning space for students. The different departments have established museums related to their areas of specialization.



Collage of Museums

Table 29. Museums in the college

Sl. No.	Museum	Department	Remarks
1.	SOIL Museum	Department of Soil Science & Agrl Chemistry	Soil Monoliths of different soil types of Kerala have been mounded and exhibits different rock types, soils etc., A training hall is also attached . A TV screen and audio system for visiting students and public.
2.	ORGANIC Museum	Department of Soil Science & Agrl Chemistry	The Organic Museum in the Model Organic Farm is an interactive space featuring organic demonstration units, providing hands-on insights into various aspects of sustainable farming. One of the key highlights includes exhibits on different composting methods, showcasing practical approaches to organic waste management. Visitors to the museum can explore and learn about composting techniques such as aerobic composting, vermicomposting, and other innovative methods that contribute to soil enrichment.
3.	CROP Museum (Crop cafeteria)	Department of Agronomy	Established in 1972, the Crop Museum within the Agronomy Department spans 80 cents, offering a comprehensive showcase of over 100 crops. This educational hub provides season-wise insights into various crops, including field, ornamental, herbal, garden crops, and perennials. More than just a museum, it serves as an invaluable resource for students and the public alike, offering a deeper understanding of cultivation practices. In essence, the Crop Museum stands as a cornerstone in promoting agricultural education, community involvement, and the principles of sustainable farming.
4.	MILLET museum		The Department of Agronomy has established a "Millet Museum" which is serving as an educational hub showcasing a wide variety of millets. The Millet Museum comprises a diverse germplasm collection, including 6 varieties of bajra (pearl millet), 13 varieties of sorghum (jowar), 32 varieties of ragi (finger millet), 3 varieties of kodo millet, 4 varieties of proso millet, 4 varieties of little millet, 2 varieties of barnyard millet, 6 varieties of foxtail millet, browntop millet, and Job's tear. This collection encompasses local varieties from Kerala and Tamil Nadu, as well as released varieties. The Museum is now open for general public to see and familiarize with the crops.
5.	FODDER museum		The Golden Jubilee Fodder Museum, under the AICRP (All India Coordinated Research Project) on Forage Crops and its Utilisation, marks a significant

			milestone in showcasing the diversity and impact of 50 distinct fodder varieties. Established to commemorate the project's golden jubilee, this museum serves as a focal point for research and education in the realm of forage crops. Within its exhibits, visitors can explore an extensive collection of fodder varieties, gaining insights into their characteristics, nutritional value, and utilization in livestock farming.
6.	EXOTIC FRUIT museum		Fruit plants including exotic fruit plants maintained by the instructional farm are also utilised by the department for practical sessions on identification of fruit crops. Exotic fruit crops including dragon fruit, abiu, mangosteen, sweet santol, jabuticaba, miracle fruit, kepel, rambutan, pulasan, longan, peanut butter fruit, matoa, cocoplum, acai berry, cat eye fruit, black berry jam fruit, bitter cola, coral berry, nam nam fruit and dunal fruit are being maintained here.
7.	Museum cum Information center	Department of Agricultural Extension Education	The Museum cum Information Center at the Department of Agricultural Extension Education serves as a focal point for showcasing and disseminating the extension activities of the college. Within this dynamic space, blow-ups featuring recent varieties of KAU (Kerala Agricultural University) and other research highlights provide visitors with a visual overview of the college's agricultural advancements. The center also incorporates models focused on homestead cultivation and related aspects, offering practical insights for visitors interested in agricultural practices. Beyond highlighting achievements, the Museum cum Information Center plays a vital role in education by displaying preserved specimens related to diseases affecting major crops. By combining visual representations, informative blow-ups, and tangible models, the center contributes to effective knowledge transfer, making it an integral part of the educational and outreach initiatives of the Department of Agricultural Extension Education.
8.	MUSHROOM Museum	Department of Plant Pathology	The Mushroom Museum at the Department of Plant Pathology serves as an informative showcase, displaying a diverse array of edible and non-edible mushrooms collected from various parts of the country. This museum highlights the wide variability in mushroom species, providing valuable insights into their different forms, characteristics, and uses. The collection not only serves as an educational resource for students studying mycology and plant pathology but also contributes to the broader understanding of mushroom biodiversity. By

			featuring both edible and non-edible varieties, the museum enhances awareness about the importance of proper identification and cultivation practices, fostering a comprehensive understanding of mushrooms within the agricultural and scientific communities.
9.	IMPLEMENTS Museum	Department of Agricultural Engineering	The Implement Museum within the Department of Agricultural Engineering serves as a dynamic display of the agricultural evolution, housing an array of farm machineries and implements that span both traditional and modern categories. This unique collection includes implements such as ploughs, harrows, and threshers that represent traditional farming practices, juxtaposed with modern counterparts like tractors, harvesters, and precision agriculture equipment.

Visitors at Museums

The museums are visited regularly by students from educational institutions, farmers, entrepreneurs and other enthusiasts. The visitors Higher officials in KAU, ICAR and LSG representatives also acquaint with the museums during their visits to the college.

Table.30. Events conducted in the Exhibition halls/ Auditorium

Sl. No	Events conducted	Period
Exhibition		
1.	ZREAC workshops and exhibitions	2019, 2020, 2021, 2022, 2023
2.	Dr. N.P Kumari Sushamma Memorial Award ceremony	2019, 2020, 2021, 2022
3.	World Environment Day	2019,2020,2021,2022, 2023
4.	World Soil Day	2019,2020,2021,2022,2023
5.	World Honey bee Day	2019,2020,2021,2022,2023
6.	International Yoga Day	2019,2020,2021,2022,2023

6.5.6. Research Facilities

The college is equipped with state-of-the-art research facilities to support academic pursuits and foster innovation. These facilities are designed to enhance the research capabilities of both faculty and students across various disciplines. Specialized laboratories, experimental fields, and cutting-edge equipment are available to facilitate in-depth exploration and analysis. The research infrastructure encompasses areas such as agricultural sciences, biotechnology, horticulture, and more. This robust framework enables scholars to conduct impactful research, contribute to scientific advancements, and address challenges in the field of agriculture. The

commitment to providing top-notch research facilities underscores the college's dedication to academic excellence and the pursuit of knowledge-driven solutions in the agricultural domain.

Under graduate

All 23 departments have dedicated lab facilities for catering to the requirement of UG academic requirements.

6.5.6.1. Postgraduate Laboratories and Equipment's:

Dedicated laboratories for BSc, MSc, PhD programmes are available in the college. A brief write up of the major facilities is described below under the title 'Post graduate Laboratories and Equipments'.

AGRONOMY

Department has a separate PG class room (49.58 sq. m area) and a PG lab (113.16 sq. m area) with instruments and equipment for conducting PG practical and for analytical work of PG research. A Library (17.98 sq.m area) with a collection of thesis and books also provides reference facility for PG students. A crop museum with crop cafeteria (3200 m²), millet museum (800 m²), tuber museum (1000 m²), certified organic farm (4000 m²), wet land (4000 m²), net house, vertical garden units, composting unit, planting material production facility, aquaponic unit, net house, medicinal garden units, drip and sprinkler systems maintained by the Department also facilitates the conduct of PG courses and PG research. The Leaf Tissue Lab under the Department provides additional support for PG research. Major equipment in PG lab include KelPlus Automatic N Estimation systems, Kelplus macro block digestion system, distillation stills and units, hot air ovens, shaker, muffle furnace etc. Dept. has a wi-fi connected computer lab for supporting the PG academic activities.



The Department is having a separate Ph.D class room of 20.74 sq. m area and library of 17.98 sq.m area with a collection of agronomy theses and publications for reference purpose. A separate Ph. D lab of 27 sq. m area is attached to the Department with equipment such as Kelplus Macro Block Digestion System, Flame photometer, BOD incubator, pH meter, digital conductivity meter, centrifuge etc. A crop museum with crop cafeteria (3200 m²), millet museum (800 m²), tuber museum (1000 m²), certified organic farm (4000 m²), wet land (4000 m²), net house, vertical garden units, composting unit, planting material production facility, aquaponic unit, net house, medicinal garden units, drip and sprinkler systems maintained by

the Department also facilitates the conduct of Ph.D course work and research work. The Leaf Tissue Lab under the Department provides additional support for the analytical works of Ph.D students. Dept. has a wi-fi connected computer lab for supporting literature search, data mining, checking plagiarism and other related academic activities of Ph.D students.

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

One Post Graduate Laboratory of 125 m² is fully equipped with all the analytical instruments like UV-Vis Spectrophotometer, Flame Photometer, Muffle Furnace, Yoder Apparatus, Hot Air Oven, Shaker etc. Practicals are conducted on analysis of soil, plant, water, and fertilizer samples with detailed discussions on principle, method and instrumentation techniques. Students are trained well in identification of soil classification using USDA Soil Taxonomy, Teaching tools and techniques of identification, delineation and management of problem soils. Students are trained for various composting techniques, microbial analysis, enzyme kinetics etc. Students avail this facility for practical classes as well as research works.

Two Ph.D. Laboratories fully equipped with advanced instruments viz. Atomic Absorption Spectrophotometer, Kjehl-Plus Digestion- cum- trio Distillation System, UV-Vis double beam Spectrophotometer, Flame Photometer, Centrifuge, BOD incubator, Muffle



Furnace, Yoder Apparatus, Hot Air Oven, Shaker etc. for soil, water, plant and manure analysis functions in an area of 56.27 m². Students avail all these facilities for research works. A laboratory for accustoming students to Geo Informatics System is functioning in the Department in an area of 50 m². There are

27 desktop computers in the GIS lab, installed with Arc- GIS software. Students are allowed to learn and work with GIS software available in the GIS Lab. A referral laboratory for standardization of quality control of organic manures established with an RKVY assistance of Rs. 2.92 crores is functioning under the department of Soil Science in an area of 310 m². Sophisticated analytical equipments like CHNS Analyzer, Atomic Absorption Spectrophotometer with Graphite Furnace, Inductively Coupled Plasma Optical Emission Spectroscopy, Kjehl-Plus Digestion – cum trio Distillation unit, Microwave Digestor, Laminar Air Flow, BOD incubator *etc.* are available in this laboratory.

ENTOMOLOGY

Well established pesticide residue laboratory is attached to the department with equipments *viz.* LC-High Resolution Mass Spectrometer, GC, LC-MS/MS, GC-MS, GC-MS/MS etc. PG and PhD students have easy access in the Biocontrol



Laboratory for utilizing the facilities of Stereo and Compound microscopes, Laminar Air Flow, Autoclaves, BOD incubator, Centrifuge, Moisture Analyser, Tablet, Pellet and Capsule making apparatuses, double distillation units etc. for their practical and research works. National Quality control laboratory for Honey attached to the department will also provide facilities to the students for their research work. There is a well-established repository of major orders of insects.

PLANT PATHOLOGY

Department of Plant Pathology has adequate and advanced facilities to cater the need of UG, PG and Ph.D. students. The department maintains instruments/equipments like microscopes, laminar air flow, autoclave (vertical and horizontal), double distillation units, refrigerated centrifuge, -80°C deep, -20°C freezer, BOD incubator, ice flaking machine, Gel documentation unit, spectrophotometer, ELISA washer and reader, image analyzer etc for performing basic and molecular studies. The Advanced research centre for plant disease diagnosis started in 2018 has laboratories with instruments for undertaking specialized research in plant virology, bacteriology, mycology, plant pathogen interaction, disease detection and diagnosis. We have a seminar hall to accommodate 100 s of stakeholders. The department also has insect free net houses and poly houses for performing *in vitro* experiments. The department maintains more than 100 s of herbarium and wet preserved specimens of plant diseases for teaching students. More than a hundred mushroom specimens adorns our mushroom museum. We have mushroom houses for cultivation and inoculation rooms for culturing and preparation of spawns. Two experiential learning programmes are offered for UG students which includes on mushroom cultivation, and detection and diagnosis of plant diseases.

AGRICULTURAL EXTENSION EDUCATION

A Language Lab has been established in the Department of Agricultural Extension Education in collaboration with the Department of Agricultural Statistics in the computer Lab attached to the Department. For enabling this facility, 17 computers are connected through Local Area Network. The Language Lab is supported by the Orell Talk English software. The

UG students get trained during their first year with the support of their English Course teacher who has received training in the software. The Department also is equipped with a Web conferencing studio and training hall, a media lab with audio recording facility, training facility, a full-fledged audio-visual lab and a computer room for access by the PG and PHD students.

GENETICS AND PLANT BREEDING

To impart more advanced and specialized training like cytogenetics, and biotechnological aspects mainly the use of tissue culture, population genetics to understand gene flow, genetic drift selection within populations, writing scientific papers, and encouraging students to submit articles in scientific journals.

PLANT PHYSIOLOGY

More emphasis will be given to modern concepts and active fields of contemporary research in the area of Plant Physiology. Students will be acquainted with the practical implications of plant water relations and mineral nutrition, abiotic stress factors, hormonal regulation of plant growth and development, etc. In the practical classes students are following internationally accepted, standardized procedures for various biochemical quantifications. They will be exposed to different options to regulate growth and development through molecular tools and by using chemicals and external factors like CO₂ enrichment. They will also be helped to apply the knowledge on plant development and morphogenesis using tissue culture. The students will be introduced to various soil-less cultivation practices like hydroponics. Students are exposed to various seed viability, seed vigour and storability tests. They also get hands-on experience in extending shelf life of vegetables and vase life of flowers using of various chemicals and Plant Growth Regulators. Preparation of standard solutions and proper handling of various equipments are also given emphasis.

The practical classes in Ph.D. courses help students to keep pace with the new advances in the field of plant physiology while continuing to provide students with the background information they need for a better understanding of the principles and experimental techniques. Students are exposed to, internationally accepted, standardized procedures for the estimation of parameters related to various physiological processes and functions. In addition to the basic concepts of plant water relations and mineral nutrition, soil-plant-environment interactions, hormonal regulation of plant growth and development, they also get exposure in the molecular approaches for improving physiological mechanisms and also various experimental techniques to characterize plant processes for crop improvement. They will also be trained to formulate independent project proposals setting priorities based on regional requirements and use efficiency of available resource. There will be visits to nearby institutions so as to help students

to develop contacts with experts in various fields and also to explore the possibilities of collaborations.

MOLECULAR BIOLOGY AND BIOTECHNOLOGY

The students get experience in molecular biology techniques such as DNA, RNA and protein isolation, electrophoresis, PCR, Quantification of nucleic acids and proteins, PCR, and genetic transformation techniques. They also get practical classes on analytical techniques like chromatography and spectrophotometry. The students are trained in Plant tissue culture techniques like initiation of



cultures, establishment and multiplication of cultures and hardening of plants. A soft copy of practical manual is provided to the students at the beginning of the practical

All the students get trained in Bioinformatics tools for nucleic acid analysis, multiple alignment, primer designing and phylogenetic analysis. The course teachers organise visits to research institutes such as Rajiv Gandhi Centre for Biotechnology (RGCB), ICAR-Central Tuber Crops Research Institute (ICAR- CTCRI), CSIR - National Institute For Interdisciplinary Science and Technology (NIIST) and also to Biotechnology and Model Floriculture Centre (BMFC). The Department also organises invited talks, and seminars of national and international experts and resource persons from various industries and research institutes.

The students are provided hands-on training in molecular biology techniques like DNA, RNA and protein isolation, electrophoresis, PCR, quantification of nucleic acids and proteins, Real time PCR, blotting and genetic transformation techniques. Weekly seminars are conducted by the journal club to familiarize the students with recent techniques and advances in the research field. Science discussions/journal club meetings are held every week in the department to invoke inquisitiveness for research in students. All the students are trained in plant tissue culture techniques – Initiation of cultures, establishment and multiplication of cultures, and hardening of plants. All the students are trained in bioinformatics tools for nucleic acid analysis, multiple sequent alignment, primer designing, phylogenetic analysis etc. Special advanced training is also provided in bioinformatics.

PhD students are taken to other research institutes such Rajiv Gandhi Centre for Biotechnology (RGCB), ICAR-Central Tuber Crops Research Institute (ICAR- CTCRI),

CSIR - National Institute For Interdisciplinary Science and Technology (NIIST) etc. and Biotechnology and Model Floriculture Centre (BMFC), The Department also organises invited talks of national and international experts and resource persons from various industries and research institutes.

MICROBIOLOGY

The Department of Microbiology is having separate laboratories for teaching undergraduate and post graduate students. In addition to this there is a research laboratory with all equipment needed for conducting microbiology research. The UG laboratory is equipped with microscopes, laminar air flow chamber, microwave oven, autoclaves, incubator etc. which are required to carry out basic microbiology experiments. The PG lab has precision weighing balances, laminar air flow chambers, densitometer, UV-VIS



spectrophotometer, stereo-zoom microscope, trinocular microscopes, deep freezers, cooling incubators, shaker incubators with illumination, electrophoresis units, cooling centrifuge, vacuum filter apparatus, lyophilizer etc. A glass house facility and rain shelter facility is available to conduct pot culture experiments. Small field experiments are conducted in the land area allotted to the department which is situated behind the glass house.

VEGETABLE SCIENCE

Practical sessions and Hands on training on cultivation practices from sowing to harvesting and seed processing of major tropical vegetable crops such as solanaceous, cucurbitaceous, leguminous, okra and amaranthus; familiarization with protected cultivation structures such as poly house, rainshelter, net house, healing chamber *etc.* are being given to UG students in the Vegetable seed production field and seed processing yard in the department.

The Seed production field in the department caters to the conduct of practical sessions on application of growth regulators, selfing and crossing techniques in vegetable crops, grafting in vegetables *etc.* for all the PG courses handled by the department. The PG research work of few of the PG students are also being undertaken in the field attached to the department. Equipments such as distillation unit, hot plate, microcentrifuge, seed purity work board, shaker

etc. in the department lab enables PG students to carry out analysis as part of their research work.

The Seed production field in the department caters to the conduct of practical sessions on application of growth regulators, selfing and crossing techniques in vegetable crops, grafting in vegetables *etc.* for all the PhD courses handled by the department. The Doctoral research work of few of the PhD students are also being undertaken in the field attached to the department. Equipments such as distillation unit, hot plate, microcentrifuge, seed purity work board, shaker *etc.* in the department lab enables PhD students to carry out analysis as part of their research work.

POSTHARVEST MANAGEMENT

Department has a separate PG class room (50 sm²) and a PG lab (87.32 sm²) with instruments for conducting PG practical and for analytical work of PG research. The additional space and facilities available in the Department viz., Techno Incubation Centre, Commercial processing laboratory, Quality control lab etc are utilized for teaching and research activities of P.G. students. Some of the major equipment in PG lab include L-sealer, shrink wrapping machine, Fruit and vegetable cutter, Fruit and vegetable washer, clevenger and soxhlet apparatus, Magnetic induction sealer, Gas analyser, Ozonizer, Moisture analyzer,



PG Lab – Post harvest management

Blancher cum drier, R.O water unit etc. Dept. has a wi-fi connected computer system for supporting the PG academic activities. A Library with a collection of thesis also provides reference facility for PG students. Study tours are organized to research stations viz., CTCRI, CSIR- NIIST etc for familiarizing with the advanced processing technologies.

The Department is having a separate Ph.D class room of 50 m² and a research lab of 67.50 m² area. Department has advanced processing equipments like, spray drier, texture analyser, Modified Atmospheric packaging System, food colourimeter, water activity meter etc. All the additional facilities including the cold room facility, created under the Techno Incubation Centre, Centre for formulation of convenient foods and Commercial processing laboratory with a total area of 311.46 m² are utilized by the research scholars for their course

work and research work. The Quality control laboratory Lab under the Department provides additional support for Ph.D research. Exposure visits are organized to advanced quality control laboratories, established processing units and research centres. National and Regional workshops and training programmes organised by different Central Institutes are attended by the students to familiarize with the recent developments in processing technology.

The biochemical, nutritional and sensory quality parameters (colour and texture) of fresh and processed commodities, plant samples etc are analysed for the P.G. and Ph.D. research projects of other Departments of College of Agriculture, Vellayani utilizing the laboratory facilities of our Department.

PLANTATION, SPICES, MEDICINAL AND AROMATIC CROPS

The department is having 2 PG laboratories with ample facilities and laboratory equipments. Students get hands-on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic Crops. They are given opportunity to present their research ideas and new knowledge as part of seminars. The students

get familiarized with the various recent techniques and advances in the research field.

Science discussions are held in the department to invoke inquisitiveness for research in students. Students are provided with all facilities for carrying out different practical experiments. The students are well-trained in various propagation techniques, floral biology,



varietal evaluation studies in Plantation, Spices, Medicinal and Aromatic Crops. PG students are given hands on training in raising crops in Polyhouses and in Hydroponic system and in fertigation and foliar nutrition practices. As part of the course on propagation, students use the facilities available in the tissue culture lab tissue shared by Department of Plantation, Spices, Medicinal and Aromatic Crops with the Department of Plant Physiology. They also use the facilities available in the Instructional Farm of the college. The students are utilizing these facilities for obtaining hands on training and research. The PG students interested to pursue Ph D research in Plantation, Spices, Medicinal and Aromatic Crops are given SRF coaching by the faculties and Ph D scholars of the department

The department is having one Ph D lab with separate facilities for oil and oleoresin extraction and drying of the samples. Students get hands-on training on various horticultural techniques and their applications in the field of Plantation, Spices, Medicinal and Aromatic

Crops. They are given opportunity to present their research ideas and new knowledge as part of seminars. The students get familiarized with the various recent techniques and advances in the research field. Science discussions are held in the department to invoke inquisitiveness for research in students. Students are provided with all facilities for carrying out different practical experiments in Nursery techniques, propagation methods and standardizing micropropagation techniques and in-vitro conservation techniques.

FLORICULTURE AND LANDSCAPING

The department has PG and PhD labs along with Hydroponics demo unit and Educational Museum for value added products. The labs have equipments such as hot air oven, electronic weighing balance, hotplate, magnetic stirrer, microwave oven, Soxlet apparatus, Water Double distillation unit, Stereo zoom microscope, Dissection microscopes, Flame photo meter, Clevenger Apparatus, Refractometer, Lux meter, Soil hydrometer, Tensiometer, Water proof PC tester/pH/ conductivity /temperature tester, Precision balance, Laboratory Centrifuge etc.

The department also owns and maintains the College Garden which houses the ornamental nursery, polyhouse, fernery, shade house, rosarium and a farm machinery tools workshop. The garden is having an excellent collection of ornamental trees, shrubs, annuals, herbaceous perennials, climbers, creepers, bulbous ornamentals, cut flowers and foliage, loose flowers, succulents, bromeliads, ferns, traditional ornamental plants etc, which serve as germplasm source for



Hydroponics setup

academic, research and extension purposes. Collection, evaluation and maintenance of ornamental plants are being carried out regularly to enrich the diversity of germplasm collection. Apart from this, the department also has open precision farming research plots near lake area.

FRUIT SCIENCE

The Department of Fruit Science has a PG Smart class room (of area 71 m²) with LCD projector and a PG lab (20 m² area). Here equipments essential for conducting various practical classes and PG thesis works like physico chemical analysis of fruits including water bath, distillation unit, weighing balance, pH tester, hot air oven etc. In addition the department shares an additional classroom of the Department of Floriculture and Landscaping which was a part of Department of Pomology and Floriculture. The PhD lab has equipments like pocket

refractometer, centrifuge, electronic weighing balance, microscopes, digital vernier calipers, lux meter, hot air oven etc. for conducting experiments. One refrigerator is shared with the Department of Floriculture and landscaping.

AGRICULTURAL ECONOMICS

The PG classroom is equipped with overhead projector and computers which are used for the delivery of classes.

SEED SCIENCE AND TECHNOLOGY

Department have two labs including molecular lab for conducting practical for P.G. students. Net house facility and field facility is there to give hands own training to the students. Students are given hands on training on all the seed quality analysis like germination percentage, moisture content, electrical conductivity, physical purity analysis etc. Students are trained to use moisture meter and other equipment of the lab. They are also trained for genetic purity analysis using DNA fingerprinting in the molecular biology lab.

NEMATOLOGY

The Department of Nematology has a well-equipped soil washing room with stereo and research microscopes with image analyzers to extract different types of nematodes from soil samples. To isolate and identify biomolecules that impart nematocidal property, the department has a well-equipped lab with ASE 150, hot air oven, rotary vacuum flash evaporator, Clevenger apparatus, and nitrogen evaporator. PG and PhD students are utilizing the equipment such as refrigerated centrifuge, electronic precision balance, water bath, laminar air flow, double distillation unit, and B.O.D incubator to isolate indigenous entomopathogenic nematodes (EPN's) and nematophagous microorganisms from soil samples as part of their research work. The department also has a net house and glass house to conduct *in vivo* testing of indigenous EPN's and antagonistic microorganisms. Wet collections of nematode infested plant samples and permanent mounts of different types of nematodes also available in the department for conducting practical classes for PG and PhD students.

COMMUNITY SCIENCE

The Department of Community Science has well equipped Nutrition lab to provide practical knowledge for students to learn how to plan normal and therapeutic diet. In the Foods lab students investigate the chemical, physical and biological properties of food ingredients. PG and PhD students also develop novel food products with both quantitative and subjective metrics to assess its quality. The incubation Centre contains processing equipment for food product development work, allowing students to understand and recreate industry conditions. It offers short and long term hands-on training (skill development training) to rural

youth, women self help groups, students, new and experienced entrepreneurs and other stakeholders for the startups to establish food industries.

AGRICULTURAL STATISTICS

The department boasts well-equipped classrooms and state-of-the-art laboratory facilities that, in conjunction with the resources allocated through the ICAR schemes operating within the department, collectively ensure an enriching hands-on experience for students in every facet of Agricultural Statistics. Our infrastructure is designed to foster practical learning, allowing students to engage comprehensively with the subject matter and gain valuable insights through real-world applications. This commitment to providing robust facilities ensures that our students are well-prepared and equipped with the practical skills necessary for success in the field of Agricultural Statistics.

Detailed list of instruments in the different laboratories of various departments are attached in the respective part of **PG SSR 6.4**

6.5.6.2 Research Contingency

To ensure the smooth progression of research endeavors, the college has established a dedicated Research Contingency framework. This contingency plan is designed to provide support and resources for unforeseen challenges or emergent research needs. It allows researchers to adapt swiftly to changing circumstances, allocate resources efficiently, and address any unexpected requirements that may arise during the course of their research projects. The Research Contingency reflects the institution's commitment to fostering a flexible and responsive research environment, enabling scholars to navigate uncertainties and maintain the momentum of their research pursuits. This strategic approach underscores the college's dedication to empowering researchers and promoting resilience in the face of evolving scientific landscapes.

Table 31 Details of Research Contingency
PG Programme

Sl. No.	Departments	No. of Students (Contingency)					Total number of students	Total contingency amount in Rs (Lakhs)
		2019-2020	2020-2021	2021-2022	2022-	2023-2024		
1.	Agronomy	18 (7.2 lakhs)	17 (6.8 lakhs)	18 (7.2 lakhs)	18 (7.2 lakhs)	15 (6.0 Lakhs)	71	28.4
2.	Soil Science	12 (4.8 Lakh)	11 (4.4 Lakh)	8 (3.2 Lakh)	11 (4.4 Lakhs)	9 (3.6 Lakh)	51	20.4

3.	Entomology	14 (5.6 lakhs)	14 (5.6 lakhs)	10 (4 lakhs)	10(4 lakhs)	7 (2.8 lakhs)	48	19.2
4.	Plant Pathology	12(4.8 lakhs)	11(4.3 lakhs)	10 (4 lakhs)	12(4.8 lakhs)	10 (4.0 lakhs)	45	17.9
5.	Agri. Extension Education	12 (4.8 lakhs)	7 (2.8 lakhs)	4 (1.6 Lakhs)	6 (2.0 Lakhs)	8 (3.2 Lakhs)	33	14.4
6.	Genetics and Plant Breeding	10 (4 lakhs)	10 (4 lakhs)	10 (4 lakhs)	10 (4 lakhs)	8 (3.2 lakhs)	40	16.0
7.	Plant Physiology	6 (2.4 lakhs)	2 (0.8 lakhs)	1(0.4 lakhs)	0	2 (0.8 Lakhs)	9	3.6
8.	Vegetable Science	4 (1.6 lakhs)	4 (1.6 lakhs)	4 (1.6 lakhs)	4 (1.6 lakhs)	4 (1.6 lakhs)	16	4.80
9.	Postharvest Management	4 (1.6 lakhs)	2(0.8 lakhs)	4 (1.6 lakhs)	4 (1.6 lakhs)	3 (1.2 Lakhs)	14	4.00
10.	Plantation, Spices, Medicinal and Aromatic Crops	6 (2.4 lakhs)	4 (1.6 lakhs)	4 (1.6 lakhs)	6 (2.4 lakhs)	6 (2.4 Lakhs)	20	8.00
11.	Fruit Science	6 (2.4 lakhs)	1(0.40 lakhs)	2(0.80 lakhs)	3(1.2 lakhs)	2 (0.8 Lakhs)	12	4.80
12.	Floriculture & Landscaping	0	4 (1.6 lakhs)	3 (1.2 lakhs)	3(1.2 lakhs)	4 (1.6 Lakhs)	10	2.80
13.	Seed Science	3(1.2 lakhs)	2 (0.8 lakhs)	1 (0.4 lakhs)	2 (0.8 lakhs)	2 (0.8 Lakhs)	8	3.2
14.	Microbiology	5 (2 lakhs)	1 (0.4 lakhs)	1 (0.4 lakhs)	2 (0.8 lakhs)	1(0.4 Lakhs)	9	3.60
15.	Molecular Biology & Biotechnology	6(2.4 lakhs)	1(0.4 lakhs)	1(0.4 lakh)	1 (0.4 lakh)	-	9	3.6
16.	Nematology	2 (0.8)	0	2(0.8)	2(0.8)	2(0.8 Lakhs)	6	2.4
17.	Ag. Economics	6 (2.4 lakhs)	3 (1.2 lakhs)	5 (2 lakhs)	5 (2 lakhs)	9 (3.6 Lakh)	19	7.6
18.	Ag. Statistics	4 (1.6 lakhs)	3 (1.2 lakhs)	3 (1.2 lakhs)	2 (0.8 lakhs)	4 (1.6 Lakhs)	12	4.80
19.	Community Science	4 (1.6 lacs)	2 (0.8 lacs)	0	3(1.2 lakhs)	3 (1.2 Lakhs)	9	2.4

Ph.D.programme

Sl No	Name of Department	Number of students (contingency amount)						
		2019-2020	2020-2021	2021-2022	2022-	2023-2024	Total number of students	Total contingency amount (Rs in Lakhs)
1	Agromony	9 (9 lakhs)	8 (8 lakhs)	8 (8 lakhs)	8 (8 lakhs)	6 (6 Lakhs)	33	33

2	Soil Science	6 (6 Lakh)	5 (5 Lakh)	7 (7 Lakh)	6 (6 Lakh)	-	24	24
3	Entomology	5 (5lakhs)	6 (6 lakhs)	4 (4lakhs)	7 (7lakhs)	4 (4lakhs)	22	22
4	Plant Pathology	4 (4 lakhs)	6(6 lakhs)	3 (3 lakhs)	4 (4 lakhs)	1(1lakh)	17	17
5	Ag. Extension Education	8 (8 lakh)	2 (2 Lakhs)	3 (3 lakhs)	5 (5 Lakhs)	3 (3 lakhs)	21	21
6	Genetics and Plant Breeding	5 (5 lakhs)	5 (5 lakhs)	5 (5 lakhs)	4 (4 lakhs)	3(3 lakhs)	19	19
7	Plant Physiology	4 (4 lakhs)	1 (1lakh)	2 (2 lakhs)	3 (3 lakhs)	1 (1lakh)	10	10
8	Vegetable Science	2 (2 lakh)	-	1 (1 lakh)	3 (3 lakhs)	2(2 lakhs)	6	06
9	Postharvest Management	2 (2 lakhs)	-	2 (2 lakh)	4 (1.6 lakhs)	-	10	5.6
10	Plantation, Spices, Medicinal and Aromatic Crops	2 (2 lakh)	2 (2 lakh)	1 (1 lakh)	3 (3 lakhs)	2(2 lakhs)	8	08
11	Fruit Science	2 (2 lakh)	1 (1 lakh)	-	-	1(1lakh)	3	03
12	Floriculture & Landscaping	-	1 (1 lakh)	2(2 lakhs)	2	1(1lakh)	5	03
13	Microbiology	1 (1 lakh)	2 (2 lakhs)	1 (1 lakhs)	2 (2 lakhs)	-	6	06
14	Community Science	2(2 lakhs)	1(1 lakh)	2(2 lakhs)	-	2 (2 lakhs)	5	05

6.5.7. Outcome/Output

6.5.7.1. Student Performance in National Examinations:

Table 32. Student performance in JRF/SRF/NET/ARS/and other national examinations for last five years.

Students performance	2019 to 2023	No. of students				
		2019-20	2020-21	2021-22	2022-23	2023-24
Exam qualified	241	42	39	78	29	53
Scholarship/ fellowship	52	12	12	11	9	8
Total	293	54	51	89	38	61

Students performance Exam qualified	No. of students				
	2019-20	2020-21	2021-22	2022-23	2023-24*
ICAR-NET	20	18	49	11	43
UGC-NET	10	14	14	11	9
CSIR-NET	1	-	-	-	-
ARS	-	-	-	2	-
SRF	11	7	15	5	1
Scholarship/ fellowship					
ICAR-JRF	4	3	4	4	-
UGC-JRF	-	-	-	-	3
Maulana Azad National Fellowship	1	1	1	1	-
NFOBC	-	1	1	-	-
NFSC	-	-	-	1	-
Indira Gandhi Single Girl Child Scholarship	1	1	1	-	-
Jawaharlal Nehru National Fellowship	-	1	-	-	-
International Agriculture and Rural Development Programme (2019-20), Cornell University, USA	1	-	-	-	-
Western Sydney University Dual degree programme	-	-	1	-	7
World vegetable Centre-2019-20 Master's Research Fellowship at Taiwan	1	-	-	-	-
NAHEP-CAAST fellowship	1	1	1	1	-
Inspire fellowship	3	4	2	2	1
International internship	-	-	-	9	12

(Detailed list is given as **Annexure XV**) * Data as on the beginning of 2023 Admission

6.5.7.2. Students Placement Profile:

The numbers of students who have qualified state/ national exams for employment are listed in Table.33

Table 33. Details of Placements

Year	State level exams	National Exams	Others (Pvt, interview based etc)	Total
2019-20	27	2	2	31
2020-21	23	9	3	35
2021-22	40	7	4	51
2022-23	52	22	5	79
2023-24	62	18	4	84

* Data as on the beginning of 2023 Academic Year

6.5.7.3. Awards/Recognitions/Certificates:

In 2019, the College of Agriculture, Vellayani, clinched the Best College Award in the University, while the Research Station at RARS (SZ) secured the Best Research Station Award in 2021. Simultaneously, the college celebrated accolades for the Best Teacher Award bestowed on Dr. Roy Stephen.

Consistently, the College of Agriculture, Vellayani, has earned recognition and accolades, demonstrating excellence in diverse domains. Concurrently, the Department of Vegetable Science

earned acclaim from the State Variety Release Committee for recommending the release of four high-yielding vegetable varieties viz., yard long bean variety 'KAU Deepika', winged bean variety 'KAU Nithya', amaranthus variety 'KAU Vaika' and cluster bean variety 'KAU Suruchi' and high-yielding fodder variety viz., Susthira.

In 2022, the Department of Agronomy achieved a significant milestone, securing a design patent for the Seed Cum Fertilizer Drill, showcasing innovative agricultural practices. The year 2023 brought further distinctions, including the Dr. N. E. Borlaug Award for the Department of Plant Physiology and the INSO Women Research Award for the Department of Community Science. Additionally, the college emerged victorious in the Young Innovation Programme 4.0 at both state and district levels, underscoring its dedication to fostering innovative ideas.

Beyond academic triumphs, the College of Agriculture, Vellayani, earned accolades for environmental responsibility, attaining an "A" grade in the green audit. Recognition extended to extension efforts, with the institution securing the Best Stall Award at the Krishidarshan exhibition in Thiruvananthapuram. Furthermore, the Department of Agricultural Extension Education received the Young Scientist Award at the 1st International Extension Education Congress in 2023.



Dr.K.N.Anith receiving award



The College of Agriculture, Vellayani was credited with some notable achievements for the year 2023 with Dr. K.N. Anith and Dr. R Beena securing KAU Foundation Day Awards with Second and Third prize respectively for best research publications. Dr. Sheeja K Raj and Dr.

Shalini Pillai secured the Foundation Day Award for securing patents. Individual contributions were equally notable, with scientist receiving the Woman Scientist Award for significant contributions in Biological Control of the Department of Entomology from the Dr. B. Vasantharaj David Foundation. In 2020, the Department of Molecular Biology and Biotechnology was honoured with the Harbhajan Singh Memorial Award for the best publication in Vegetable Science, emphasizing its research prowess.

These collective achievements affirm the College of Agriculture, Vellayani, as a beacon of excellence, where innovation, research, and unwavering dedication converge to create a vibrant and impactful academic environment. Number of awards received by the faculty is given in **Table 7** and details are given in **Annexure XVI** Number of Awards won by students in the last 5 years is given in **Table 34 and** details are given in **Annexure XVII**

Table 34. Awards won by students in the last 5 years

Sl. No.	Year	No. of Awards received		
		Academics	Cultural	Sports
1	2019	09	1	-
2	2020	19	5	-
3	2021	06	7	3
4	2022	19	38	12
5	2023	29	20	1
	Total	82	71	16

6.5.7.4. Employability:

Collaborative projects were initiated with various industries which offer internships, co-op programs, and training opportunities, enabling students to gain practical experience and apply academic knowledge in real-world settings. NIMS Medicity, Thiruvananthapuram, has initiated signing MoU with the College of Agriculture, Vellayani for resource sharing for the internship programs of students. The Kerala State Land Use Board has facilitated knowledge exchange for equipping students in advanced software and technologies for geographic information systems (GIS), identification, mapping, delineation etc.

Student exchange programmes were also initiated with University of Western Sydney which paved way for higher studies and better employment of students from College of Agriculture, Vellayani. Private industries like Tecpharma, Xcellogen, Servell bioengineers, Concord Scientific etc) had sponsored for International Biotechnology Conclave – *Biozion* which in turn benefited more than 500 students. Career placement programmes were conducted

by various biotechnology, agri and IT firms like AVT, Sterling Group of Companies, Aura Biotechnologies, Bio Genomics Asia, BAYER, Arvind Limited, UST Global, etc.

PURSUIT TO ACADEMIC, RESEARCH AND EXTENSION EXCELLENCE IN THE RECENT PAST.

Our college is pleased to present a compelling narrative of our steadfast commitment to academic and research excellence in the recent past, coupled with proactive measures to foster international and national collaborations and drive innovative academic programs. Hosting distinguished speakers in international seminars and



First student TO pursue dual degree programme in Western syndney university, Australia

workshops, along with organizing boundary-transcending initiatives across departments, has been instrumental in enriching our academic landscape and creating opportunities for collaboration. Noteworthy among our recent endeavors are the international Biotechnology conclave - BioZion, and the KAU - CORTEVA PLANT SCIENCE SYMPOSIUM, showcasing our dedication to pushing the boundaries of knowledge exchange. Collaborations with esteemed partners such as the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, have added significant value to our initiatives, bringing luminaries from institutions like the Max Planck Institute and Sanofi to our global forums. Student achievements, awards, and innovative competitions further highlight our commitment to excellence, positioning our institution as a dynamic hub for collaboration, innovation, and global impact.

Our college had the distinct honor of hosting an array of esteemed resource persons and distinguished guests who enriched our academic forums with their unparalleled expertise. From the International Rice Research Institute (IRRI), we were privileged to have Dr. Swati Nayak, a World Food Prize winner, as a resource person, offering invaluable insights. Additionally, our global collaborators included Prof. Dr. Dr. habil Thomas Braun, the Director of the Max Planck Institute for Heart and Lung Research in Germany, Prof. Soni Pullamsetti, a renowned Professor in the Center for Infection and Genomics of the Lung, Germany, and Dr. Christoph Funk, a Post Doc from the SDGnexus Network at the Centre for International Development and Environmental Research, Germany. Further enhancing our symposium were Dr. Shameer Khader, Executive Director at Sanofi, USA, and Dr. Susanne Jacobs, a Research Associate at the Centre for International Development and Environmental Research, Germany.

In addition to our global collaborators, we were honored to host distinguished experts from renowned national institutes, including Dr. Mohanan P. V., Scientist-G & Head of the Toxicology Division at the Sree Chitra Tirunal Institute for Medical Sciences and Technology. Further contributing to our symposium were Dr. Renu John, Professor and Head of the Department of Biomedical Engineering at IIT Hyderabad, Dr. Sagar Pandit, Assistant Professor at the Indian Institute of Science Education and Research, Pune, Dr. K. K. Narayanan Namboodiri, Professor in the Department of Cardiology at the Sree Chitra Tirunal Institute for Medical Sciences and Technology, and Dr. Kiran R. Gore, Assistant Professor and DAAD Research Ambassador in the Department of Chemistry at IIT Kharagpur. Their collective expertise and contributions significantly elevated the academic discourse, making our symposium an enriching and globally collaborative experience. As we look ahead, our unwavering commitment remains steadfast in creating a vibrant ecosystem that nurtures collaborations across all levels, with the belief that education extends beyond classroom walls, reaching a global arena where diverse perspectives converge to shape the leaders of tomorrow. The College of Agriculture, Vellayani has established an Innovation and Incubation facility for the graduate and post-graduate students. A full-fledged Start-up E-cell is functioning on the campus under the mentorship of the faculty and the Cell received the Best Start-up E-cell award among 4000 similar E-cells in the country. Also to broaden the academic sphere, the college has initiated various collaborations with International institutes like IRRI, CIMMYT, WSU Australia, Swedish University of Agricultural Sciences, and Central Highlands University (Tay Nguyen University), Dak Lak Province, Vietnam.

Digital Data Base Management of Flora in College of Agriculture, Vellayani

The College of Agriculture, Vellayani, has undertaken a comprehensive database management initiative for its flora, showcasing a remarkable commitment to ecological restoration and agro-biodiversity conservation. Through a KSBB-funded project, 160 species of tree flora have been meticulously identified, documented, and digitized. This floristic diversity has been ingeniously transformed into a digital garden accessible to students, farmers, and visitors. The project further engaged students and faculty in biodiversity walks and a photography competition,



Digital database management of flora

enriching the process of identification and documentation. The integration of QR codes, linking to specific URLs for each species, enhances accessibility, creating a dynamic and informative digital garden at the forefront of biodiversity documentation in the College of Agriculture, Vellayani.

Subaltern Development Initiatives

The Tribal Support Initiatives have significantly contributed to the empowerment of tribal communities. By focusing on employment generation, the initiatives have equipped tribal youth with specialized skills in mechanical, electrical, and other technical aspects related to agro machinery, opening doors for meaningful employment opportunities. Furthermore, the establishment of Integrated Farming Systems components, including plantations, spice and tuber crops, freshwater fish ponds, goatry units, and apiculture units, has not only diversified income sources but also bolstered the nutritional security of tribal families. Through comprehensive training programs, these initiatives ensure that tribal community members are well-prepared to manage and thrive in these ventures. Additionally, a proactive approach to nutritional security involves conducting diet clinics, awareness sessions, and the creation of nutrition gardens in tribal households and schools, further reinforcing the holistic impact of these initiatives on the well-being of the tribal population.



Community library for ST children

These initiatives exemplify the College of Agricultural, Vellayani's profound social inclination and unwavering commitment to fostering positive change. By actively engaging in programs aimed at employment generation and livelihood enhancement for tribal youth, as well as establishing Integrated Farming Systems with diverse components, the college showcases a dedication to empowering tribal communities. The emphasis on skill development, nutritional security, and awareness campaigns reflects a holistic approach to community well-being. In essence, these efforts underscore the College of Agricultural, Vellayani's pivotal role in championing social responsibility and contributing to the sustainable development of tribal societies.

The list of programmes conducted in the year 2023-2024 alone is presented below in Table 34.

Table 34. The list of programmes conducted in the year 2023-2024

Date	Speaker name	Topic
04/01/2023	Dr.Anjali Jayakumar Lecturer in Chemical Engineering, School of Engineering, Newcastle University, United Kingdom	Nature-Based Solutions Using Biochar for Climate Change Mitigation and Adaptation
06/01/2024	Dr. Venkatraman Srinivasan Assistant Professor, IIT Madras	Strategies to optimise C4 crop water use efficiency under climate change
07-11 th -08-2023	Experts and Guests from Germany, USA and national Institutes of repute- that included: Prof. Dr. Dr. habil Thomas Braun (Director, Max Planck Institute for Heart and Lung Research, Germany) Prof. Soni Pullamsetti (Professor, Center for Infection and Genomics of the Lung, Germany) Dr. Shameer Khader (Executive Director, Sanofi, USA) and leading academicians of national institutes.	international Biotechnology conclave - BioZion: The Biotech Capstone: Science - Society Interface!
11/09/2023	Dr. Mahesh Jaishi Co-ordinator, Research Development – Training and Extension Center (RD -TEC), Nepal, Kathmandu	Academic interaction
18/10/2023	Ms. Marie Fiers Member, French Association of Urban Agriculture	Workshop on ‘Greener Cities, Healthier Lives: Urban Agriculture Unleashed’
30/10/2023	Dr. Sanjay M. T. Professor and Scheme Head AICRP on IFS UAS, GKVK, Bangalore	Integrated Farming Systems for 4 E’s
20/11/2023	Dr. Bony De Kumar Director of Operations, Yale Genome Analysis Center, Yale University	Career beyond conventional tracking
12/12/2023	Dr.Braham Dhillon Plant Mycologist University of Florida, USA	Fungal Pathosystems of Palms: From Diagnostics to Management
4/1/2024	Mr. Tim Thomas CEO, Centre for Australia- India Relations	Indo-Australian Academic, Research and Industry collaboration
18-19 th / 01/2024	Dr. Swati Nayak CGIAR IRRI, Dr. Anne Elise Stratton, USA and Eminent Industrialist of the country.	KAU - CORTEVA PLANT SCIENCE SYMPOSIUM: AICSA- 2024 on 'Advanced Technologies and Innovative

		Practices for Climate Smart Agriculture: Bridging Academia, Industry, and Society'.
28/02/2024	Mr. Mubeen Rahiman, Chief technical officer & Analyst project management, Propellor technologies, Pvt. Ltd.	Fields of the future: Exploring the fusion of robotics & agriculture
07/03/2024	Dr. Jauhar Ali, Principal Scientist, IRRI, Philippines Prof. K.P. Sudheer, Principal Secretary, S & T Department, KSCSTE Dr. M.S. Sheshshayee, Professor Head, Department of Plant Physiology, UAS, Bangalore	International workshop on "Climate resilient rice for Kerala"

6.5.8 SSR of the college must have the SSR of all its degree programmes (following Section 6.4) then the report of the colleges shall be considered

6.5.9 Certificate

I, the Dean..... hereby certify that the information contained in section 6.4 and 6.5.1 to 6.5.7.4 are furnished as per the records available in the college and degree awarding university.

Signature of the Dean of the college with Date and Seal

TEAM**SELF STUDY REPORT FOR ACCREDITATION
COLLEGE OF AGRICULTURE,VELLAYANI**

- Patron : Dr. Roy Stephen, The Dean of Faculty (Agricuilture)
- Chairman : Dr: M. H Faizal, Professor, (Research Co-ordination)
- Co-chairman : Dr: Rani B, Professor and Head, Department of Soil Science
- Nodal Officer : Dr. Allan Thomas, Professor and Head, Department of Agricultural Extension Education
- Members : Dr. M. Rafeekher, Assistant Professor and Head, Department of Floriculture and Landscaping (Technical Cell Convenor)
- Dr. Sreekala G S, Assistant Professor, Department of Plantation, Spices, Medicinal and Aromatic Crops
- Dr. Gowri Priya, Assistant Professor, Department of Soil Science
- Dr. Durga A R, Assistant Professor, Department of Agricultural Economics
- Ms. Ninitha Nath C, Assistant Professor, Department of Genetics and Plant Breeding

TECHNICAL CELL MEMBERS

- Ms. Linitha Nair, Assistant Professor and Head, Department of Agricultural Meteorology
- Dr. Pratheesh P Gopinath, Assistant Professor and Head, Department of Ag. Statistics
- Dr. Athulya S Kumar, Assistant Professor, Department of Post Harvest management
- Dr. Chithra N, Assistant Professor, Department of Microbiology
- Dr. Gopika Somnath, Assistant Professor, Department of Agricultural Extension Education
- Dr. Priyakumari, I. Assistant Professor, Department of Floriculture and Landscaping
- Dr. Sindhura K. P. Assistant Professor, Department of Molecular Biology and Biotechnology
- Dr. Thasnimol F. Assistant Professor, Department of Agricultural Economic
- Dr. Atul Jayapal, Assistant Professor, Department of Agronomy
- Student team : Mr. Mohamed Aseemudheen M (Team Leader)
- Mr. Adarsh H.S
- Ms. Anaida A Sangma
- Ms. Aleena Elias
- Ms. Megha A.M
- Ms. Joe Shiney M.A
- Ms. Yaman Chadar



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