Constraints Perceived by Agricultural Scientists in Teaching Undergraduate Students in Tamil Nadu Agricultural University, India

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Authors' contributions

All authors contributed equally and significantly in writing this paper starting from preparatory works for the study, research design modeling, data collection, data entry, analysis and report writing. All authors have read and accepted the final manuscript.

Original Research Article

ABSTRACT

Teachers are the ultimate medium of knowledge delivery to students. They connect the students to harness the facilities available in the institution. The teaching staff of agricultural universities uniquely performs multidimensional functions than any other type of educational institutions. Similarly, their nature of work is also unique. Hence, the working environment of the teachers should be analysed periodically to create a conducive working condition. Thus, the study was conducted with the prime objective to document the constraints of the agricultural teaching scientists in teaching undergraduate agricultural students. Ex-post-facto research design was employed to document and diagnose the constraints faced by them. The scientists working in the main campus of Tamil Nadu Agricultural University, Coimbatore, India were considered as the sample for the study and the study was conducted during September 2017 to January 2018. A semi-structured questionnaire was prepared to document the constraints faced by the respondents. The study included 52 university teachers of age range from 34 to 59 comprising of 52 percent of male and 48

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percent of the female. The constraints were documented through an open-ended questionnaire to state their difficulty with undergraduate teaching. Wider student-teacher ratio, poor classroom infrastructure, poor maintenance of Audio-Visual aids, immoral activities of the students, the distracted mind of the students, external intrusion with guest lectures and heterogeneity of the students were identified to be the significant constraints faced by the UG teaching staff. This paper attempts to suggest remedies for the documented constraints.

1. INTRODUCTION

Agriculture is a potential employment generation sector in India. About 54.6% of the population depends on it for their revenue [1]. Agriculture being a primary sector dealing with raw material production, it supports the other sectors like manufacturing sector and service sector. Many stakeholders like starting from farmers, input dealers, traders, processing companies, government agencies, private firms, Non-Governmental Organizations (NGOs) etc., are striving for the sustainable development of agriculture. With the declining population contributing to farming and shrinking resources there is a serious threat to food and nutritional security to the nation [1]. Hence, a technically sound manpower is needed to be built to support the existing farming community and also to take up farming. Agricultural education is the route map to attain a quality manpower trained with the agricultural practices. In India, agricultural education has seen several stages of growth over thousand years. However, no formal education system was reported until the 19th century in agriculture. Later on, the need for formal agricultural research and education system was realized from the 20th century and several initiatives have commenced. Agricultural education and extension have been geared to harness the modern science and technology for higher productivity and production [2].

Agriculture is an applied science and hence development in the cognitive, psychomotor and affective domain is necessary to achieve quality and effectiveness of people, products and profits through agriculture. The success of education is highly influenced by several elements like the subject, students, teachers, physical environment and teaching. Thus, it is very much clear that the teachers are key facilitators of quality education, which is also recognized in the Sustainable Development Goals (SDG) [3]. The declining quality of education has implications on its impact on reducing poverty and fostering social and economic development [4,5]. In order for education to fulfill its potential in development, it is essential to improve the quality of education at all levels. Teachers play a key role in improving learning and achievements as they are the most crucial agents who can influence education quality in practice [6].

Agricultural human resource development is a continuous process being undertaken through partnership and efforts of the components of the Indian Council of Agricultural Research (ICAR) - Agricultural Universities (AUs) System. Quality of education in most of the agricultural universities is adversely affected due to a shortage of teaching faculty, lack of motivation and opportunity for development of faculty with time and space and the regional inbreeding [7].

[8] pointed out that only around 130 out of 600 universities and 2088 out of 30,000 colleges in India have received accreditation from the National Assessment and Accreditation Council, Bangalore. More universities are being established every year without showing any concern for high quality.

[9] expressed that the role of the faculty member is no longer limited to lectures but he/she afford the responsibility to spread the knowledge by simplifying it for students. He/she need to deal with educational technology to achieve the interaction of the learners with the best that technology has to offer. So it becomes so necessary to upgrade the level of the faculty member scientifically, educationally, and professionally.

Big agricultural and / or food enterprises usually employ several strategies to improve their human resources viz., training for the development of the professionals to ensure their technical mental and physical abilities, job assessment, job requirement etc. They even develop their own

evaluation framework to assess the performance of the individuals against prescribed indicators. They also pay greater attention towards motivational strategies to keep their employees on track. The need for the periodic review and feedback meetings were understood by the people of the business sector, and it could be implemented in the agricultural education system to overcome the constraints of the agricultural scientists involved in teaching, research and extension.

The quality of education depends ultimately on the issues related to the teachers and teaching. Research with respect to appraisal and feedback system for such important stakeholders in the agricultural education system is very much limited. The teachers of the agricultural education system are generally scientists, who play multiple roles and perform multiple tasks. Unlike other disciplines, the teachers of the agrarian education system are scientists, who are expected to perform research and extension but not mere teaching. Hence, emphasis should be given to gain their feedback for harvesting their effectiveness by providing convenient and favourable working environment. Thus the paper attempts to investigate possible constraints faced by the teaching staff of Tamil Nadu Agricultural University, India to provide a conducive and convenient environment for effective teaching-learning situation.

Hence, with this background, the present study has been conducted with the prime objective to analyse the perceived constraints if the active teaching scientists of TNAU and proposing suitable remedial strategies.

2. BACKGROUND STUDIES

Literature related to the bottlenecks of faulty with respect to teaching were enumerated below for clear understanding of the study. In under-resourced schools, such as those in Tanzania, considering the lack of textbooks and other learning materials, teachers play an even more important role in providing quality education. Legislation alone is not enough to bring about a change in perspectives, attitudes and practices. Quality education for all can only be realised if contextually relevant and creative ways are explored. Both the schools and the teachers who work in them need to be prepared to embrace the undoubted challenges, which come with the implementation of inclusive education in an emerging economy [10].

[11] mentioned that the teachers are passionate about teaching at the tertiary level, but, this is not to say that all tertiary educators look forward to all aspects of the "job." Given the parameters of end of semester time constraints and the many and varied expectations of an academic (i.e., teaching, research, administration, consultation, community service, and academic leadership), there are certain aspects of an academic's duties that can be considered to be less attractive than others.

[12] reported that the teachers also seem to be in conflict with wanting to stimulate critical thinking in their students and needing to complete the stipulated requirements of the course. This is a dilemma because the relevant governing and licensing bodies of these institutions may not be aware of the needs and the time constraints imposed on teachers. [13] noted that although content delivery is very important in higher education, it often does not encourage active learning of critical thinking among students. It is important to take into consideration the arguments of [14] that a teacher's perceptions were not shared by their students. Their students may actually be looking at the same situation from vastly different perspectives.

[15] found that teacher-pupil ratios are still too high, which makes teaching more difficult. Moreover, there is a lack of trained teachers and training opportunities for teachers and teachers struggle with unsatisfactory working conditions, which can lead to absenteeism, low motivation and low professionalism. [9] identified that the economic resources, including money, skills and technology, and social resources such as motivation, trust, confidence, and knowledge to access, assess, and apply the content of information were mandatory for teachers to teach effectively.

[16] recommended that more resources need to be allocated to improving teachers' working conditions and professional environment to eliminate the barriers to teaching according to their own values and the priorities in education policies. The problems confronting SAUs listed by [8] included, (i) traditional method of teaching material and aids with age-old lecture notes, (ii) lack of good textbooks combining theory and case studies in the Indian context, (iii) inability of most of the faculty to inspire and motivate students and promote interactive classes, and (iv) ineffective communication skills of faculty.

A perusal of above research studies indicates the following basic constraints of the scientists offering courses in the agricultural education system. In South India, Tamil Nadu Agricultural University is one of the prime institutions offering agricultural education to students. A systematic study if conducted to analyse the constraints of the teaching faculties would help in proposing appropriate remedial strategies so as to improve the quality educational standards in this university.

3. MATERIALS AND METHODS

3.1 Study Area

Tamil Nadu Agricultural University (TNAU) was the first established institution in south India especially for agricultural education at Saidapet, Chennai in 1868. Later it was shifted to Coimbatore in 1906. TNAU serves the farming community through its threefold activities viz., Teaching, Research and Extension. TNAU is a premier institute offering the variety of courses in agriculture at UG and PG level. It was also confined as the best agricultural university in India, Education Excellence Award mentioning as 'The University of the Year' during 2014-15 [17]. Considering the meritorious facts, TNAU was chosen as the study area. The teachers are the role models for the students. The teachers are the real mentors and arranging an appropriate teaching-learning situation in line with the students' requirements. The teachers are also actively engaged in designing appropriate curriculum in line with modern developments in science and technology. Moreover, in our agricultural education system, in every semester at least one or two courses will be offered by every major department and hence almost every staff members are having a constant touch with the students. Hence the teachers were considered as the respondents for the study.

3.2 Sampling of Respondents

There were totally 26 departments from where courses were offered to the undergraduate agricultural degree students. There are three categories of teaching scientists in TNAU viz., Assistant professors, Associate professors and Professors, offering courses to the students. The assistant professors and associate professors were categorized as junior scientists and professors as senior scientists. The associate professors were promoted very recently during the time of the study and hence they were included under the category of junior scientists. From each department, two respondents (Correspondingly, one from junior scientists and senior scientists categories) handling classes for undergraduate level agricultural students were identified and selected. Thus the total sample was 52 respondents.

The university administration has come out with the strong suggestion to involve senior teachers (professors) as course teachers for the UG degree program. Normally a newly appointed staff could elevate to a cadre of professor after an approximate period of 17 years of service. Most of the professors in our university are having more than 20 years of service till date. So, they could provide a vast amount of information pertinent to the educational needs, suggestions on improvement over the present education system, students' skill gap and the required human resource development interventions.

The junior scientists like assistant professors and associate professors are also actively involved as course teachers or course associates in offering the courses. Most of the assistant professors in our university are having experience ranging between 3 to 10 years. These assistant professors are the active teachers handling the undergraduate courses. They could provide comprehensive information about the present learning situation, skill gap analysis required for the human resource development interventions in a meaningful way.

3.3 Data Collection

The ex-post facto research design was employed for this study. The ex-post facto research was defined as a research in which the independent variable or variables have already occurred and in which the researcher starts with the observation of a dependent variable or variables [18]. He then studies the independent variables in retrospect for their possible relations to, and effects on, the dependent variable or variables. Survey research method was adopted for the study. Survey research is a research method involving the use of standardized questionnaires or interviews to collect data about people and their preferences, thoughts, and behaviour in a systematic manner.

A semi-structured questionnaire was developed for data collection purpose. Questionnaire consists of parts dealing with the profile of the agricultural teaching staff and an open-ended question to document their perceived constraints with respect to UG teaching. Self-administered questionnaire method was employed for collection of response from the scientists considering their work schedule and convenience. The constraints perceived by the university teachers with respect to handling courses for undergraduate degree program was documented through an open-ended questionnaire and percentage analysis was worked out to quantify the proportion of respondents experiencing each constraint.

4. RESULTS AND DISCUSSION

4.1 Profile of the Respondents

The profile of the respondents was studied based on their age, gender, educational qualification and years of experience. It could be observed that half of the respondents of the samples belonged to the old age category which is followed by middle-aged (44.20%). Only a meager proportion of six (5.80) percent of the sample respondents was found to be young aged. There exists almost an equal distribution of male and female scientists. Despite, precisely male respondents of the sample slightly lead ahead with about 51.90 percent, the female proportion was found to be 48.10 percent. Slightly greater than ten percent of the sample respondents (13.50 %) owned post-doctoral degree and a meager proportion of four (3.80) percent of the respondents were observed with masters' degree in other subjects like M. V. Sc. and M. A. (English).

Variations exist among the sample respondents in their distribution based on the years of working experience in TNAU. About forty percent of the respondents (38.50 %) were with less than 10 years of experience followed by 36.50 percent with 11 to 20 years of professional experience in TNAU. One-fourth of the sample respondents were found to possess an experience of more than 20 years in TNAU. The distribution of the respondents based on the profile is listed in Table 1.

4.2 Perceived Constraints of Respondents

The constraints perceived by the university teachers with respect to handling courses for undergraduate degree program was also documented through an open-ended questionnaire. [19] noted lack of advanced training, additional duties to teachers, lack of confidence, inadequate availability of equipment, procedural delay in purchasing A.V. aids, improper maintenance of available technologies to be the most important constraints faced by majority of the agricultural teachers in the study conducted at central campus of Mahatma Phule Krishi Vidyapeeth, Rahuri, India. The documented constraints were categorized into five groups as mentioned in Table 2.

Table 1. Distribution of the respondents based on profile (n=52)

S. No.	Category	Number	Percentage (%)
Age			
i.	Young	03	05.80
ii.	Middle	23	44.20
iii.	Old	26	50.00
	Total	**52**	**100**
Gender			
i.	Male	27	51.90
ii.	Female	25	48.10
	Total	**52**	**100**
Educational Qualification			
i.	Others	02	03.80
ii.	Ph. D.	43	82.70
iii.	Post Doctoral Fellow (PDF)	07	13.50
	Total	**52**	**100**
Working Experience			
i.	Less than 10 Years	20	38.50
ii.	11 to 20 Years	19	36.50
iii.	More than 20 Years	13	25.00
iv.	No Experience	0	00.00
	Total	**52**	**100**

4.2.1 Students related constraints

Table 2 reveals that eight (7.69) percent of the respondents faced constraints due to lack of self-discipline and the higher level of immoral activities of the students. A meager proportion of respondents felt that handling uninterested students, activities of students misguided by wrong role models and guidance of seniors, high level of distraction created during class hours, existence of communication gap within students,

between students and teachers, lack of book reading habits of students and increased malpractices in examinations, preparing and submitting assignments and record as their prime constraints.

4.2.2 Infrastructure related constraints

With regard to the infrastructure related constraints, a similar proportion of respondents (15.38%) pointed out poor classroom

Table 2. Constraints faced by the respondents in UG teaching (n=52)

S. No.	Constraints	Number	Percentage (%)
a.	**Problems with respect to Students**		
i.	Lack of self-discipline and higher level of immoral activities	04	7.69
ii.	Misconception due to wrong guidance from seniors and wrong role models	01	1.92
iii.	Lack of self interest in learning	03	5.77
iv.	Higher distraction during class hours	01	1.92
v.	Communication gap among students	01	1.92
vi.	Lack of reading habits	01	1.92
vii.	Increased rate of mal practices	01	1.92
b.	**Constraints pertinent to Infrastructure and Supporting Facilities**		
i.	Poor class room infrastructure	08	15.38
ii.	Poor maintenance of AV aids	08	15.38
iii.	Inadequate and non-functioning instruments in laboratories	03	5.77
iv.	Lack of modern AV facilities in labs and classrooms	01	1.92
v.	Inadequate/insufficient internet connectivity	02	3.85
vi.	Inadequate/improper functioning of computers in computer lab	02	3.85
vii.	Inadequate transport facilities for field visits	02	3.85
c.	**System Constraints**		
i.	Unbalanced student-teacher ratio	22	42.31
ii.	Unable to maintain balance between teaching role and administrative roles	04	7.69
iii.	Untimely intrusion of class hours with frequent guest lectures	03	5.77
iv.	Difficulty to meet the educational needs of heterogeneously abled students	03	5.77
v.	Replacement of traditional teaching methods with ICT based teaching	02	3.85
vi.	Manual attendance monitoring is time consuming	01	1.92
vii.	Organizing club activities in 8th semester	01	1.92
viii.	More courses allotted to a single staff	02	3.85
ix.	Inadequate teaching assistants or lab assistants to support teaching staff during practical sessions	02	3.85
d.	**Time related Constraints**		
i.	Time shortage to handle social science practical session	03	5.77
ii.	Too many courses for students per semester	01	1.92
iii.	No time to think ahead for future progress	01	1.92
iv.	Preparation of manuals, lecture handouts and power points consume more time/labourious	01	1.92
v.	Rushing vast portions in short period	01	1.92
e.	**Teacher Centered Constraints**		
i.	Weak student teacher relationship	03	5.77
ii.	Lack of stress relieving mechanism	01	1.92
iii.	Lack of motivating or encouraging mechanism for teachers	01	1.92
iv.	Less scope for teachers to get access to updated technologies	01	1.92
v.	Introduction of new examination pattern or system	01	1.92
vi.	Less choice of interest in work	01	1.92
vii.	Tedious evaluation system and grading	01	1.92
viii.	Lesser scope for personal growth and development	01	1.92

infrastructure and poor maintenance of Audio-Visual aids as their prominent constraints. A small percentage of six (5.77) percent of the respondents mentioned about the inadequate and non-functioning instruments in laboratories. A scrimpy percentage of the respondents reported the constraints like inadequate/insufficient internet connectivity in the campus, inadequate/improper functioning of computers in the computer lab and inadequate transport facilities for field visits, lack of modern AV facilities in labs and classrooms.

4.2.3 System-related constraints

Little more than forty percent of the respondents (42.31%) added that the main constraints faced by them were the wider student-teacher ratio. Roughly eight (7.69) percent of the respondents disclosed that they couldn't able to balance between teaching role and administrative roles. [20,21] have analyzed the higher agricultural education system in India and concluded that the number of faculties decreased significantly during 1990s and has further depleted in recent years. The number of vacancies is very high; some 43% of the approved positions are filled and no significant recruitment has taken place in recent years. A large number of agricultural teaching scientists are retiring in 2–3 years time and they are not very active. This has resulted in having heavy work load on the remaining faculty and consequently poor performance in teaching and no time for research or extension.

A small percentage of six (5.77) percent of the respondents commented that it was discomforting to have untimely and frequent guest lectures' intruding the class hours and they have also added that they couldn't able to meet the educational needs of heterogeneously abled students. A trifling proportion of four (3.85) percent of the respondents emphasized that they experienced constraints like replacement of traditional teaching methods with ICT based teaching, allocation of more number of courses to single staff and inadequacy of teaching assistants or lab assistants to support UG teaching during practical sessions. A paltry percentage of two (1.92) percent of the respondents conveyed that a series of the club, college and hostel functions being organized during the final semester as prime constraints hampering their UG teaching efforts.

4.2.4 Time related constraints

The major time related constraint depicted by the respondents was shortage of time to conduct or handle practical sessions for social science courses by six (5.77) percent of the respondents followed by a meager percentage of two (1.92) percent of the respondents delineating constraints like too much of courses pressurizing students and restraining them from concentrating in education and classes, lack of time for the staff themselves to think ahead for future progress, time consuming and laborious process of preparing separate literature for manuals, lecture handouts and power points and the situation to rush a vast portion of subject in short period. But the results were found contradictory with the results of [9] as his results focused on the resources available and negative personal traits of the agricultural teachers that were found to be the barriers in effective teaching.

4.2.5 Teacher centered constraints

Among the constraints that affects the self-development and performance of the teachers a trifling percentage of two (1.92) percent of the respondents uttered constraints like, lack of stress relieving mechanism, lack of motivating or encouraging mechanism for teachers, lesser scope to get access to updated technologies, exposure to new examination pattern, lack of choice of interest pertaining to work, tedious evaluation and grading system and lesser scope for personal growth and development. [8] mentioned that there are very limited opportunities for the agricultural faculty to attend international and national seminars and workshops. They also do not get opportunities to take sabbatical leave to improve and update their knowledge. It is important that the faculty is encouraged to participate in international and national seminars and workshops to keep them well informed about global development in their field. Just about of six (5.77) percent of the respondents presented the weak student-teacher relationship as a constraint in teaching UG courses.

4.3 Suggestions to Solve the Perceived Constraints of the Respondents

After a rigorous analysis of the Table 2, it could be clearly observed that unbalanced student-teacher ratio, poor classroom infrastructure, poor maintenance of Audio-Visual aids, immoral

activities of the students, distracted mind of the students, external intrusion with guest lectures and heterogeneity of the students were identified to be the significant constraints faced by the UG teaching staff. Several difficulties like lack of funds, other resource constraints and allocation of teachers towards other multifold activities of the university caused a wider gap in the student-teacher ratio and inadequacy of resources like classroom facilities, labs, transport, lesser adoption of motivation techniques etc. It is obvious to point out that there is a need to equip the departments with adequate funds in time to purchase various teaching aids. Teachers are trained in advanced educational technologies and they should be involved more in teaching than non-academic work. Proper care and maintenance should be carried out of A.V. aids already available in the departments [19].

The necessary mechanism should be adopted to narrow down the above-stated constraints. More teaching assistants could be employed to reduce and assist with the difficulties arising out of shortage of teachers. In turn, this would eliminate the constraints like pressure on staff with additional courses, evaluation process and role conflict between academic and administrative activities. A regular time could be allotted exclusively for guest lectures at a stipulated time interval like one per month so as to manage this issue. Ward counseling system should be strengthened to achieve a good student-teacher relationship. Classrooms could be redesigned in such a way to accommodate the AV modern technologies and to minimize the distraction level of students.

A lab assistant exclusive for practical sessions could be employed to assist the staff. A regular stress relieving session could be provided for the teachers. Frequent workshops or seminars or discussion or brainstorming sessions could be conducted within the department and inter-department to get the wider scope of access to updated technologies which paves way for greater personal growth and development.

Many scientists stated that they are distracted by frequent guest lecturers arranged by the university administration. Even though it is an appreciable fact that the university administration is taking up such noble efforts of arranging periodic guest lecturers involving eminent personalities in agriculture, the appropriate mechanism should be worked out to schedule these guest lectures. Moreover, here most of the guest lectures are arranged in the convenient time of the experts / eminent personalities and hence the administration can't allocate a fixed weekly time slot to accommodate such guest lectures. Hence the year coordinators should take formal initiatives to find out the missing classes and arrange to prepare/work out a compensating time schedule to manage this issue.

Further, most of the scientists felt that all the college, club and hostel level functions are organized in the eighth semester itself and the above days are also treated as working days. Hence, most of the scientists felt that this as a major issue to cover up the entire syllabus. Hence the above functions and related celebrations may be distributed in different semesters without affecting the students under RAWE and All India Study Tour. Teachers felt that the conduct of all club related activities in even semester as barrier for syllabus coverage, due to the shortage of time. It is also suggested to conduct the inaugural functions and its related activities pertinent to students club and other club societies to be evenly distributed in both odd and even semesters. The valedictory functions may be scheduled at the end of the even semester.

5. CONCLUSION

Education is the keystone for the successful development of oneself and the society. Hence a quality agricultural education should be ensured to develop a quality and skilled manpower to serve farming. The attempts in the quality appraisal of higher education were found to be very minimal. A regular monitoring setup could be developed at the national level with nodal agencies at state levels to monitor the educational quality of the institutions. Research on education systems could be increased by encouraging postgraduate research scholars to take up educational research for active evaluation setup. Roles and responsibilities of the agricultural scientists should be clearly framed by the institution. Suitable policies should be framed to avoid role conflict and accumulation of workload on few faculties. Recruitment process could be streamlined to be conducted with transparency at regular interval under the governance of ICAR and state department of agriculture.

As teachers are the prime medium for knowledge dissemination in any educational system, the needs and constraints of the teachers should be addressed to attain the quality education. The infrastructural facility needs to be properly monitored, maintained and updated. The faculty could be provided with more exposure towards students' psychology to handle, monitor and manage the student- centred problems. A heterogenous condition was observed among the sample respondents with respect to the profile. The paper revealed a diversified need of the teachers with respect to system, students, self, physical facilities and time. Hence necessary and adequate support could be provided based on regular monitoring and evaluation of existing systems.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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