

DEPARTMENT OF AGRICULTURAL CHEMISTRY



FACULTY OF AGRICULTURE UNIVERSITY OF JAFFNA

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1. Subject review process

Subject review process involves evaluating the quality of education within a specific subject or discipline, focussing on the student learning experience and on student achievement. The subject review process designed by the UGC evaluates the quality of both undergraduate and taught postgraduate programmes. It is however understood that the final responsibility for quality and standards lies within the institution itself, since it alone has the powers to control and to change existing practices.

Subject review process at the Department of Agricultural Chemistry was conducted adhering to the guidelines provided in the quality assurance handbook for Sri Lankan universities, published by the CVCD and University Grants Commission in July 2002. The self evaluation report submitted by the Department of Agricultural Chemistry comprises of six topics: 1) Aims, learning outcomes and programme details; 2) Students, staff and facilities; 3) Curriculum design, content and review; 4) Teaching, learning and assessment methods; 5) Use of feedback and 6) Conclusions. The quality of education was reviewed according to the aims and learning outcomes given in the self-valuation report. The following eight aspects of education were reviewed at the subject level:

- 1. Curriculum design, content and review.
- 2. Teaching learning and assessment methods.
- 3. Quality of students including student progress and achievements.
- 4. Extent and use of student feedback, qualitative and quantitative.
- 5. Postgraduate studies.
- 6. Peer observations.
- 7. Skills development.
- 8. Academic guidance and counselling.

The review team visited the department from $28^{th} - 30^{th}$ March 2005. The agenda of the three- day visit is annexed. The evaluation of eight aspects was based on:

- Meetings held with the Dean, Head of department, academic staff, nonacademic staff and undergraduate students representing all four years
- Observation of department facilities (office space, staff rooms, department library) and other facilities of the faculty and university (lecture rooms, laboratories, computer unit etc.).
- Observing teaching and practical classes.
- Reviewing documents available at the department, such as examination papers, marking schemes, answer scripts, practical handouts, student practical record books, term papers, final year research dissertations, minutes of Departmental meetings, feedback given by students.

Each of the eight aspects was judged as good / satisfactory / unsatisfactory, noting the strengths, good practices and weaknesses in each. Considering the judgement of the

eight aspects, an overall judgement was given as confidence / limited confidence / no confidence.

2. Brief History of the University and the Department

Jaffna campus was the 6th campus of the University of Sri Lanka and was established in 1974 with the Faculties of Humanities and Social Sciences and upgraded to university status in 1979. The vision of University of Jaffna is to be leading centre of excellence in teaching, learning, research and scholarship. Mission of the university is that of producing intellectual, professionally competent and capable graduates to meet the emerging needs of the national and international community with special emphasis on the social, economic and cultural needs of the Northern Sri Lanka.

At present the university has 8 faculties and 7 academic units. Faculty of Medicine was established in 1978, while Faculty of Agricultural Sciences in 1990, Graduate studies in 1999, and Management studies and Commerce in 1999. The Faculty of Agriculture of the University of Jaffna was initially located at Kilinochchi. Then the faculty had acquired buildings from various sources to provide residential facilities for students and staff and also to accommodate lecture halls and departments. In addition, temporary buildings were constructed. The faculty had 40 acres of paddy as well as units for livestock production. A branch library too was established with necessary books, journals and periodicals. The laboratories were equipped with necessary equipment.

In August 1997, the Council of University of Jaffna decided to shift the faculty temporarily to Jaffna. Now the faculty is functioning with few buildings, some of which are owned by the university while some others are private houses taken over by the university.

The Faculty of Agriculture consists of 6 departments; Departments of Agronomy, Animal Science, Agricultural Biology, Agricultural Chemistry, Agricultural Engineering and Agricultural Economics and Extension. At present the faculty has 42 academic staff (21 permanent and 21 temporary), 22 supporting staff and 177 students.

The mission of the Faculty of Agriculture, University of Jaffna is to educate students to reach a high standard of knowledge and impart skills and experience necessary to contribute towards regional, national and global needs of food and agriculture. The objective of the study programme is to produce well-informed agricultural graduates having the capacity to solve problems, ability to work in teams, innovative, creative and with entrepreneurial skills in agricultural enterprises.

The faculty offers a B.Sc. (Agriculture) programme for the students who gain direct entry to the faculty on the basis of their performance at the GCE (Advanced Level) examination. The students may specialize in either Agronomy, Animal Science, Agricultural Biology, Agricultural Chemistry, Agricultural Engineering or Agricultural Economics, after 6 semesters of general study, followed by two more semesters of specialized study and research project. The annual intake of the Faculty is 65.

The Department of Agricultural Chemistry, which is the department presently under review offers courses in two disciplines, namely, soil science and food science and technology. The department offers courses for all the students of the faculty during the first three years and specialized courses during the first semester of the final year for the students specializing in either Soil Science or Food Science and Technology. In addition, students specializing in other Departments can take the courses offered by the department as optional course in the first semester of the final year. About 5 students in each year specialize in Agricultural chemistry.

The department offers a total of six courses during the first three years, accounting for 19 credits out of a total of 130 credits offered by the entire Faculty. Of these six courses, three are on soil science accounting to 10 credits and 3 are on food science and technology accounting for 9 credits. During the first semester of the 4th year, the department offers six specialized courses, three each for Soil Science and Food Science and Technology accounting for 6 credits for each discipline. Students conduct a research project during the entire second semester of the 4th year. Research projects are conducted at various institutes, other departments of the university at present, and accounts for 10 credits.

The department has 3 permanent staff members (an Associate Professor, Senior Lecturer and a Lecturer), 1 visiting professor and 4 temporary staff members, of which 1 permanent member is pursuing for doctoral studies in a foreign university. The only Associate Professor of the Department is the present Vice Chancellor of the university. Due to the lack of permanent senior staff, a permanent staff member from another department is acting as the Head of the Department. It has 2 non-academic staff members; one technician and a labourer.

The Department has limited facilities to conduct the academic programme. It uses faculty lecture halls ill-equipped with audio visual aids for lectures and the laboratory of the Medical Faculty to conduct laboratory practical classes. However all the necessary equipment are available to conduct the practical classes effectively. The department has only three computers for the use of staff members. The students use the faculty computer unit, which has about 13 computers. The department maintains a small library consisting of a small collection of books, journals, and bulletins donated by various scientists and student dissertations. The faculty library contains about 40 journals.

3. Aims and Learning Outcomes

3.1 Aims

Agricultural Chemistry encompasses the disciplines of Food Science and Soil Science. Gaining a good understanding of these two fields in the agricultural sciences with relevance to Sri Lankan conditions and requirements is the aim of the courses provided by the department. Thus, the department aims to provide students with:

- 3.1.1 Courses in food science and soil science leading to bachelor degree in these fields to effectively contribute to the development of the country.
- 3.1.2. Practical skills through well-designed laboratory and field practicals to acquire an in-depth knowledge and understanding of the subjects taught in class
- 3.1.3. Experimental learning in farmers' fields in the application of scientific knowledge under actual field conditions and recognizes the constraints that are encountered and the methods to overcome such problems.
- 3.1.4. A well organized research training for students of the final year to develop research skills in their chosen field of specialization and acquire confidence in carrying out research independently.
- 3.1.5. Encouragement and enthusiasm through discussions with academic staff to maintain high academic standards and continuous learning even after university education.
- 3.1.6. Scientific skills and personality development by writing term papers and oral presentation in seminars.

3.2 Learning Outcomes

On successful completion of the four-year course students are expected to have:

- 3.2.1. A sound understanding and knowledge in the fields of soil science and food science from basics to recent development in these fields.
- 3.2.2. Acquired essential laboratory and technical skills needed for research and to solve problems related to soil science and food science.
- 3.2.3. Developed critical ability and objective approach to data handling, interpretation and presentation of research results.
- 3.2.4. Acquired both practical and theoretical knowledge to identify field problems, interpret diagnostic test data and provide measures to solve the problems and facilitate the participatory development with farmers.
- 3.2.5. Increased their capacity for self-directed learning through constant updating of their knowledge in their chosen field through the use of journals, extensive reading and electronic information media.

To help achieve the outcomes in 3.2.1 to 3.2.5, the programmes offer learning experiences that is intended to enable students to:

- 3.2.6. Relate theoretical knowledge acquired in the classroom to actual situations that prevail in the country by providing real examples
- 3.2.7. Gain experience of actual farm and market conditions and understand the problems and constraints experienced by the farming and food production systems.

4. Overall Judgement

Based on the observations made during the study visit by the review team, the eight aspects were judged as follows:

Aspect reviewed	Judgement given
Curriculum design, content and review	Satisfactory
Teaching learning and assessment methods	Satisfactory
Quality of students including student progress and achievements	Good
Extent and use of student feedback, qualitative and quantitative	Satisfactory
Postgraduate studies	Satisfactory
Peer observations	Satisfactory
Skills development	Good
Academic guidance and counselling	Satisfactory

Overall Judgment - *Suspended*

4.1. Curriculum design, content and review

The students have been following a semester- based curriculum since 1990. The students follow a general programme during the first 3 years, followed by a specialized programme during the fourth year. The general programme during the first three-year consist of 130 credits, of which the department offers 19 credits. These include courses on Basic Chemistry and Principles of Soil Science (3 credits), Soil Properties (3 credits), Soil Fertility and Plant Nutrition (4 credits), Bio Chemistry (3 credits), Food Science and Nutrition (3 credits) and Food Technology (3 credits). The observation of documents and the discussions held with students indicated high student workload during the first three years.

The department offers two specialization disciplines, Soil Science and Food Science. During the first semester of the specialized programme, the students offer 16 credits, of which 8 are common courses compulsory for all students. The department offers a package of 6 credits for each specialization area and the students take the other two credits from optional courses from another department with the advice of the academic staff. The advanced courses in the area of soil science are Advanced Soil Chemistry (2 credits), Advanced Soil Fertility (2 credits) and Advanced Soil Physics (2 credits). Advances Food Chemistry (2 credits), Advanced Food Microbiology (2 credits) and Advanced Food preservation and Processing (2 credits) are the advanced courses offered in the discipline of Food Science. During the second semester of the final year, the students carry out a research project, which accounts for 10 credits.

The contents of the courses in the general programme, basically covers the important topics in Soil Science and Food Science required for an agricultural graduate. All the courses contain a practical component, which strengthens their practical knowledge and skills. The courses offered during the advanced programme, which is confined to one semester and a total of 6 credits are inadequate for a specialization programme. The review team is of the opinion that more courses in relation to Soil Science / Food Science should be included in the specialization programme, with a practical component. It is suggested to shift the common courses offered during the first semester of the final year to the general programme. Compared to the courses offered during the general programme, the advanced courses contain new material and are usually identified with a new course title. As such, there is no need to use the term "advanced" at the beginning.

The curriculum has been amended 4 times over the years. All the amendments done in the past involved the introduction of some new courses. The last amendment was done in 2004, which was aimed at introducing course units in English, Information Technology, Basic Communication and Rural Sociology. Further, the meeting with the academic staff members indicated that the department is in the process of revising the present curriculum. The Visiting Professor of the department, has made a significant contribution in identifying the course contents related to soil science courses, by considering similar courses conducted in local and foreign universities. The discussions held with students, representing all four batches indicated however that there is no mechanism to get their feed back on curriculum revision. The review team strongly suggest having a formal mechanism of curriculum revision, considering the feedback from all stakeholders.

In relation to the curriculum design, content and review, the judgement of the team is satisfactory.

4.2. Teaching, learning and assessment methods.

The review team was able to observe lectures being conducted by the department staff members. The most common method of imparting knowledge is through lectures. It was noted that the lectures are conducted at a level suitable for the respective student group. The team however, observed that the teaching environment was not very interactive. Further, the meeting with the students revealed that the use of more interactive teaching methods such as tutorials, discussions, etc. is very rare. However, as an innovative approach of learning, each student is required to make a presentation and submit a term paper for each course unit. This facilitates self-learning and builds up the confidence of students to a certain extent. The chalkboard is the most common teaching aid used at present. Handouts are given when necessary and some lecturers use the overhead projectors. The lack of facilities and the frequent power failures restrict the use of more sophisticated teaching aids such as multi media.

The learning environment is not very conducive, mainly due to inadequate facilities in the lecture halls as well as in the laboratories. Lack of internet facilities at the department, limited library facilities and frequent disruptions to academic programme due to trade union actions hinder the learning process further. The meetings with the staff and students indicated that these facilities would improve once the department shifts to a permanent location.

Assessment process involves a combination of summative and formative methods for both practical and theory. In general, 70% marks are given for theory and 30% for the practical component. For theory, the end semester examination, which consists of essay type questions, carries a weightage of 70%, while a 30% is allocated for continuous assessments, which includes an announced quiz (10%), a mid semester examination (15%) and a term paper (5%). Theory paper is moderated by internal or external experts, and the second marking of paper is also being done. The observation of past examination papers revealed that the course contents are adequately covered and the repetition of questions is minimum.

The total marks for practical are given based on an end semester examination, spot test and practical record books. The end semester examination consists of a laboratory practical test conducted individually by each student and a practical question paper, which tests their ability to interpret the experimental results.

In relation to the teaching, learning and assessment methods the judgement of the team is satisfactory.

4.3. Quality of students including student progress and achievements

As revealed during the discussions held with the final year students, the department has been able to attract good students who have scored high marks during the first three years into the specialization programme. It was also noted that the number of students specializing at the department is increasing over the years. Further, the discussions held with the dean, the academic staff members and final year students indicated the high level of employability of graduates.

However, it was noted that there is no mechanism to monitor the progress of students during the academic programme. The review team is of the opinion that the students' progress be monitored either at the department or at the faculty level.

In relation to the quality of students, student progress and achievements the judgement of the team is good.

4.4. Extent and use of student feedback, qualitative and quantitative

At present, formal and informal methods are used to obtain students' feedback. The review of documents available at the department indicated the use of structured questionnaires to obtain student feedback on teaching of some staff members. This indicates the keenness of the staff members to identify their weaknesses and to improve their quality of teaching.

It is however noted that the results of the student feedback is neither analysed nor interpreted formally. It was also felt that the department should encourage other staff members too to obtain feedback through questionnaires. The review team feels that a formal mechanism of using student feed back should be implemented.

In relation to the extent and use of student feedback the judgement of the team is satisfactory.

4.5. Postgraduate studies

The university has a Faculty of graduate Studies, but the contribution by the department is limited. At present one postgraduate student is being supervised by the Professor of the department.

In our opinion it is difficult to strengthen the postgraduate programme considering the availability of the permanent staff at present.

In relation to the postgraduate studies the judgement of the team is satisfactory.

4.6. Peer observations

The discussions with the staff and the observation of practical classes indicated peer observations to some extent. The teaching conducted by temporary assistant lecturers and demonstrators is usually observed by senior staff members and informal feedback is given. The teaching of practical classes is usually done with the involvement of more than one teacher.

The review team however suggests to explore the possibility of implementing a formal or an informal mechanism for peer observation. Senior academic members within or outside the department could be invited for the process.

In relation to peer observations the judgement of the review team is satisfactory.

4.7. Skills development

The students follow the entire programme in English, which improves their communication skills in English. In addition, the course in Business English has been introduced recently to further improve their language skills. It was also noted that the faculty / department has made a significant effort in developing soft skills, such as critical thinking, leadership qualities, IT skills, communication skills, inter-personal skills etc. which are vital for employability. For example, several course units such as fundamentals of information technology, basic communication, rural sociology, experimental design, experiential learning, computer applications in bio-statistics and agribusiness management are offered as compulsory units with a view of improving a range of skills in students. The range of methods used in theory and practical assessments further support the skill development. The review team recognizes the innovativeness of the staff in developing a course unit on experiential learning, which also makes a significant contribution to develop the above-mentioned skills.

In addition, the department provides opportunities for students to develop transferable skills required by an agricultural graduate, by having a well-structured laboratory practical component during the first three years. The students are assessed individually at the end semester examination, which motivates the students in gaining the required practical skills. However, the discussions held with students and observation of practical classes revealed that the inadequacy of laboratory facilities deprives all students getting hands-on experience in conducting the practicals. The review team appreciates the effort taken by the staff to overcome this problem to some extent by taking a batch of students in two groups for practical classes.

The review team would like to express its deep concern of not having a practical component in any of the advanced courses offered by the department during the final year. It is suggested to have a well-structured practical component during the advanced programme. Further, the list of the practicals given for the course units of the first three years shows that some of them would fit in better for an advanced programme.

The review team noted the inadequacy of computers and other IT related facilities, which is an obstacle in successfully conducting these courses. Hence it is strongly recommended to improve IT facilities including the internet facilities at the faculty /department.

In spite of the weaknesses mentioned, the review team feels that the skills development is good.

4.8. Academic guidance and counselling.

Academic guidance and counselling are being done at university and at faculty levels. In general, each faculty has one student counsellor appointed by the Vice Chancellor. The present Head of the Department is the student counsellor for the faculty, which is an added advantage to the department.

A well-planned orientation programme of two weeks duration is usually being conducted by the faculty. As indicated by the discussions held with staff and students, several guest lectures are being conducted to guide the students during this programme. There is hardly any evidence of students seeking the guidance of the academic staff after the orientation programme.

It is suggested to have a better advisory programme for the entire four-year period. In addition, the faculty can consider assigning academic advisors / mentors for each student at the first semester itself.

In relation to academic guidance and counselling the judgement of the team is satisfactory.

5. Conclusions and Recommendations

Based on the observations / findings made by the review team in relation to the self evaluation report and the site visit, the reviewers are able to give an overall judgement of **"limited confidence**" for the academic programme of the Department of Agricultural Chemistry of the University of Jaffna. It is noted that major constraint for further improvement of the programme is the uncertainty regarding the future location of the faculty.

Therefore it is recommended that the relevant authorities make necessary arrangements to establish the faculty on a permanent location with the required infra structure and other facilities.