PIR MEHR ALI SHAH

ARID AGRICULTURE UNIVERSITY

RAWALPINDI

DEPARTMENT OF HORTICULTURE

B.Sc. (Hons)

Self Assessment Report

2010-12

Program Self Assessment Team

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TABLES

Introduction

Keeping in view the importance of Horticulture in Agriculture sector the department started working with the establishment of the Barani Agricultural College in 1979. The department began two supporting courses for the students of B.Sc. (Hons) agriculture and the subject gained the status of major discipline for undergraduate students in 1986. Courses for M.Sc. (Hons) in horticulture commenced in 1997 when college was upgraded to University of Arid Agriculture in 1994; and Ph.D. Program was initiated in 1999. The Department gained striking response from here onward. The eminent Horticulturists produced by this department have been contributing the nation in different capacities. The department is obligated to high standard teaching and advance research in the area of Horticulture.

To develop necessary skills in understanding of problems in horticultural sector the program of Horticulture is established. Its curriculum highlights the coming forth issues of economically important plant production aspects in Pakistan. Moreover, crop management has been given substantial importance in the curriculum. Additionally, new and modern techniques have been introduced to conduct superior research.

Regarding the latest development in the Horticulture sector, the department improve its curriculum on regular basis and has incorporated the emerging tools of molecular/tissue culture approaches. The department is committed to provide a variety of study programs such as Post-harvest Technology and Physiology, Crop Improvement, Vegetable Breeding, Biotechnology, Hydroponics/Soil less Culture Technology, Protected Cultivation Technology, Floricultural Crop Improvement, Landscape Horticulture and Certified Nursery Plant Production to enhance student's professional training skill and career opportunities. It holds national and international conferences, seminars and training program to exchange knowledge and views. The faculty is actively involved in a number of research projects; some of which are internationally collaborated and funded.

SECTION 1

Components of Self Assessment Process

This report has been prepared on the basis of criteria as guided by the Self- assessment manual.

Criterion-1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Introduction

This program deals with production technology and crop improvement of horticultural crops (Fruits, Vegetables, House Plant and Flowers). Crop improvement has a great impact on economic and social values of agricultural society. More emphasis is given on qualitative and quantitative improvement of horticultural crops by using modern techniques of horticultural crop production. The introduction, evaluation, characterization, and development of horticultural crops are continuous processes of education and research both at graduate level; these involve the use of modern/advanced teaching methods to enhance the crop facilities and also to develop a sustainable and substantially profitable production system for the farmers.

Standard 1-1: The program must have documented measurable objectives that support faculty / college and institution mission statement.

Mission Statement of the Department of Horticulture

The goal of the Department of Horticulture is to bestow quality education and research- oriented training, extension of horticultural knowledge for self-sufficiency in quality food and development of sustainable system for profitable production which can be environment friendly to make the future of Pakistan Prosperous.

Programme Objectives of the Department

1. Development of Horticulture structure on advance and innovative lines for teaching and research activities for the graduate students.

2. To contribute basic and applied high quality knowledge and skills in the field of horticulture.
3. To lead students and conduct research on advanced scientific lines in the field of horticulture.
4. To strengthen the discipline with integration of knowledge and approach of related fields such as Breeding, Biotechnology, Hydroponics, Plant Physiology and Landscape Horticulture.
5. To counter new problems in horticulture.
6. Training of the teaching faculty and students on the basis of technological lines.

Main Elements of Strategic Plan to Achieve Mission and Objectives

1. Developing of a teaching structure based on the experience and vision assembled from latest knowledge, proceedings, symposia etc to uplift the capabilities of the students.
2. Formatting and constantly updating the curricula involving core subjects, elective subjects, specialized areas, internship programs and study tours.
3. Setting up of well-equipped specialized research laboratories to facilitate the students.

Expected Outcome

1. It will ameliorate the basic structure of the department standardizing at par with advanced developed countries of modern world.
2. The students' vision and in depth approach will be more extensive.
3. The students will get the quality education.
4. The incorporated knowledge of allied fields will help to develop the confidence of students, consequently crop productions will increase.
5. The smooth, dynamic and problem; free progress will continue in the area of horticulture.
6. The quality, confident and well equipped human resource development will be achieved in the field of horticulture.

Table-1: Programme objective assessment

Objective		How Measured	When Measured	Improvement Identified	Improvement made
1	Development of Horticulture structure on advance and innovative lines for teaching and research activities for the graduate students.	On the basis of recognition of Horticultural crops in the area and determining their impact	The process is in progress on required basis	Facilities provided for teaching are not sufficient	Some steps have been taken to improve the teaching method
2	To contribute basic and applied high quality knowledge and skills in the field of horticulture.	Back ground information and status of knowledge of students through entry tests and student feed back	At the time of admission or semester	Some courses are to added and the existing required to be revised in the curriculum	Curriculum changes have been made on required basis
3	To lead students and conduct research on advanced scientific lines in the field of horticulture.	Evaluating the students demands and taking their feedback for the betterment	Before start up projects	Students to participate in the class, assignments and report preparation	Improvement is still going on

4	To strengthen the discipline with integration of knowledge and approach of related fields such as Breeding, Biotechnology, Hydroponics, Plant Physiology and Landscape Horticulture.	Through entry tests, interviews research own interest	Subject / courses attachment before start	The relevant subjects are emphasize and recommended in the study programs	Enhancement of knowledge and vision
5	To counter new problems in Horticulture.	Through discussion, consultation and practical implementation with the farmers for better interaction	Regular activity	New courses to be included in curriculum, research on new problem	Recommendation of new curriculum is suggested
6	Training of the teaching faculty and students on the basis of technological lines.	Through training courses in and outside the country	Regular activity	Finding the problem-oriented and solution oriented research along with new teaching methodology	Improved better then before and continued

<u>Standard 1-2:</u> The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.

PROGRAM OUTCOMES

The program outcomes are tabulated in the following Table 2. Each program aligned in the table with each objective

Table-2: Program Vs Outcomes

Program Objectives	Program Outcomes					
	1	**2**	**3**	**4**	**5**	**6**
1	XX	XXX	X	XX	XXX	XXX
2	XX	XX	X	XXX	XX	X
3	XX	XX	XX	XX	XX	XXX
4	X	X	XX	XX	XX	XX
5	XX	XXX	XXX	XX	XXX	XXX
6	X	XX	X	X	XX	XXX

X:- Relevant
XX:- Relevant and Satisfactory
XXX:- Very Relevant and Very Satisfactory

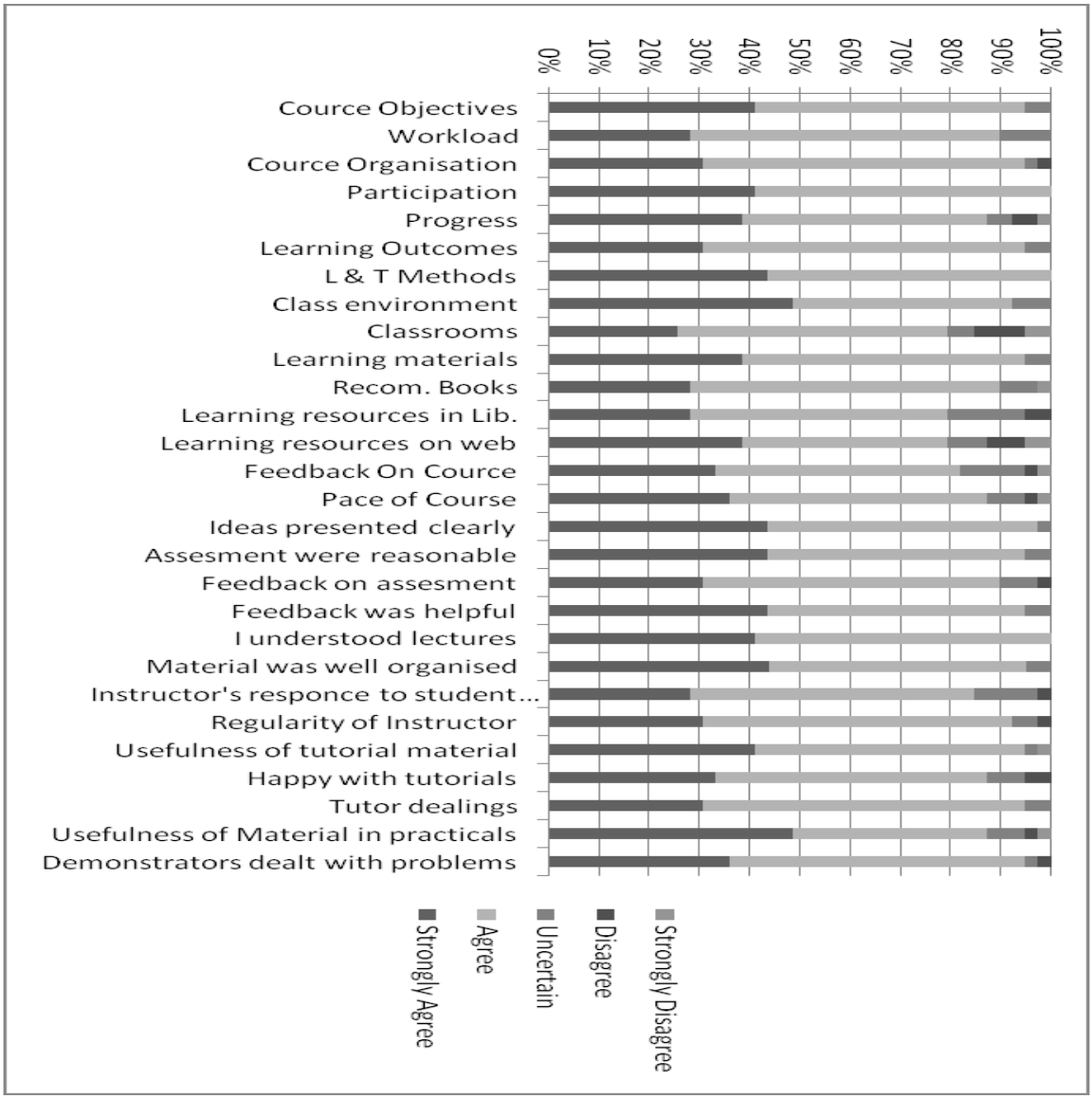
Meeting Standards 1-2: Program Outcome Measurement

A number of surveys based on the QAC questionnaires were initiated to assess the programme outcomes/graduates of the Department.

Proforma 1: Students Course Evaluation Questionnaire

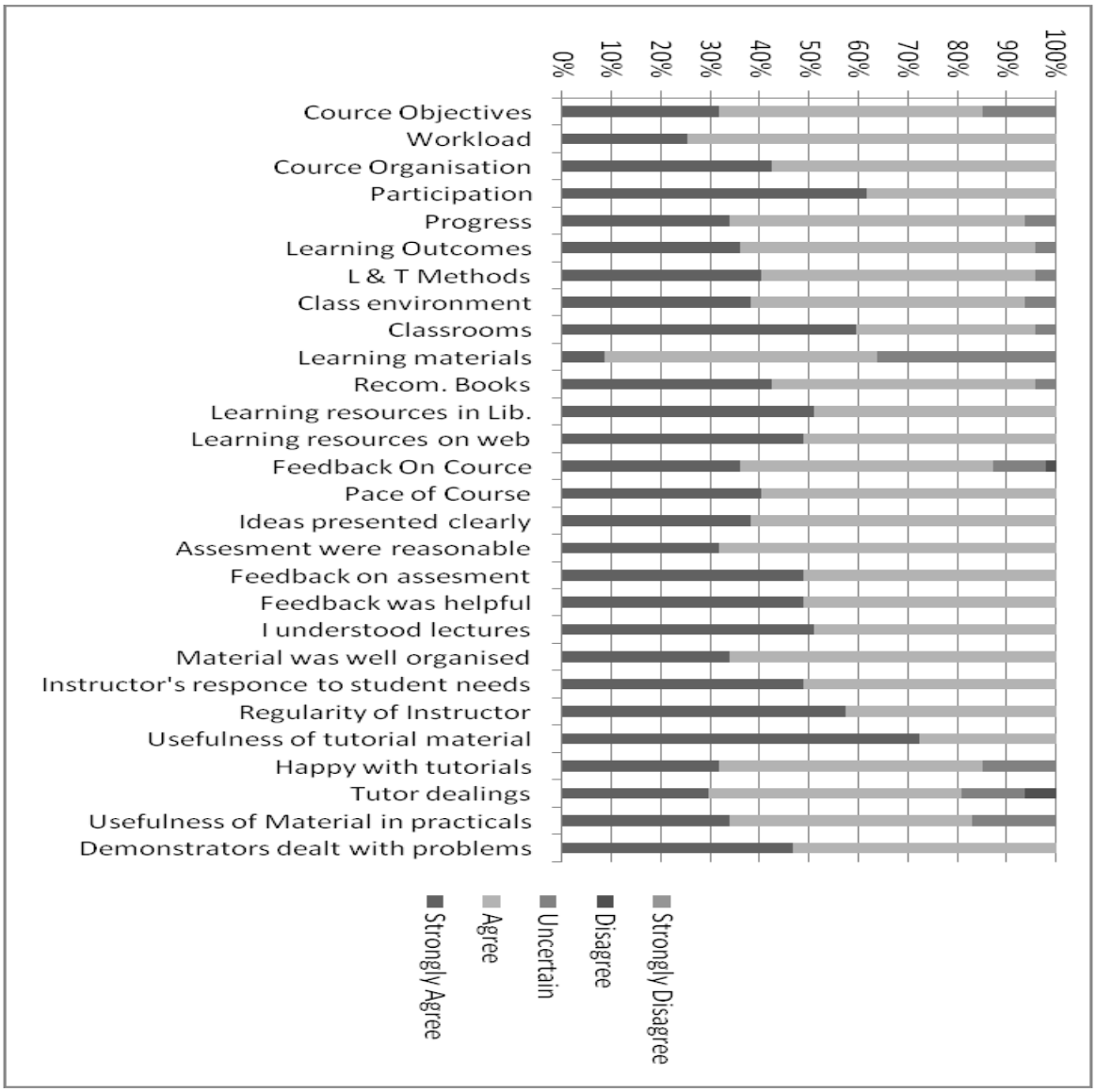
HORT-301 INTRODUCTION TO HORTICULTURE 3(2-2)

Cumulative graph regarding students' opinion for course evaluation questionnaire revealed that most of the students showed strong agreement to the question asked regarding the various aspects of course taught like, course objectives, class environment, ideas presented, course organization etc. A good number of students showed agreement; however few were uncertain or disagreed to the questions asked.



HORT-302 PRINCIPLES OF HORTICULTURAL PRACTICES 2(1-2)

As per cumulative graph pertaining to students course evaluation proforma, around 40% students showed strong agreement to the questions asked whereas most of them showed agreement. Small number of students were uncertain in answering the questions.

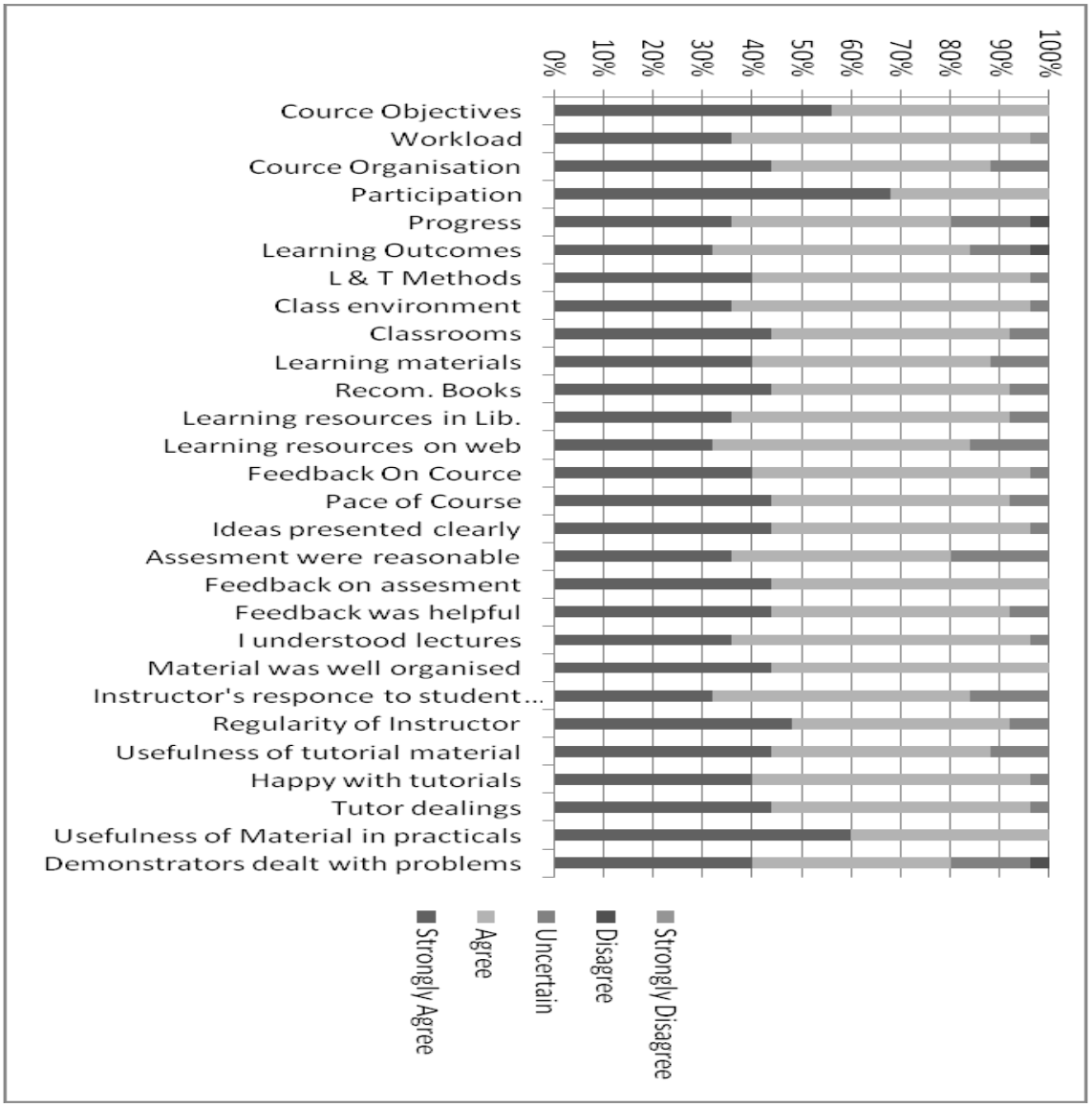


HORT-401 INTRODUCTION TO HORTICULTURE 3(2-2)

The aggregate analysis of Proforma 1, revealed that around 45% of the students strongly agreed to the various aspects of course evaluation questionnaire like course objectives, work load, feed back on assessment, usefulness of material in practical etc. Whereas, many of them showed general agreement. About 10% students were uncertain and are disagreed in answering their responses.

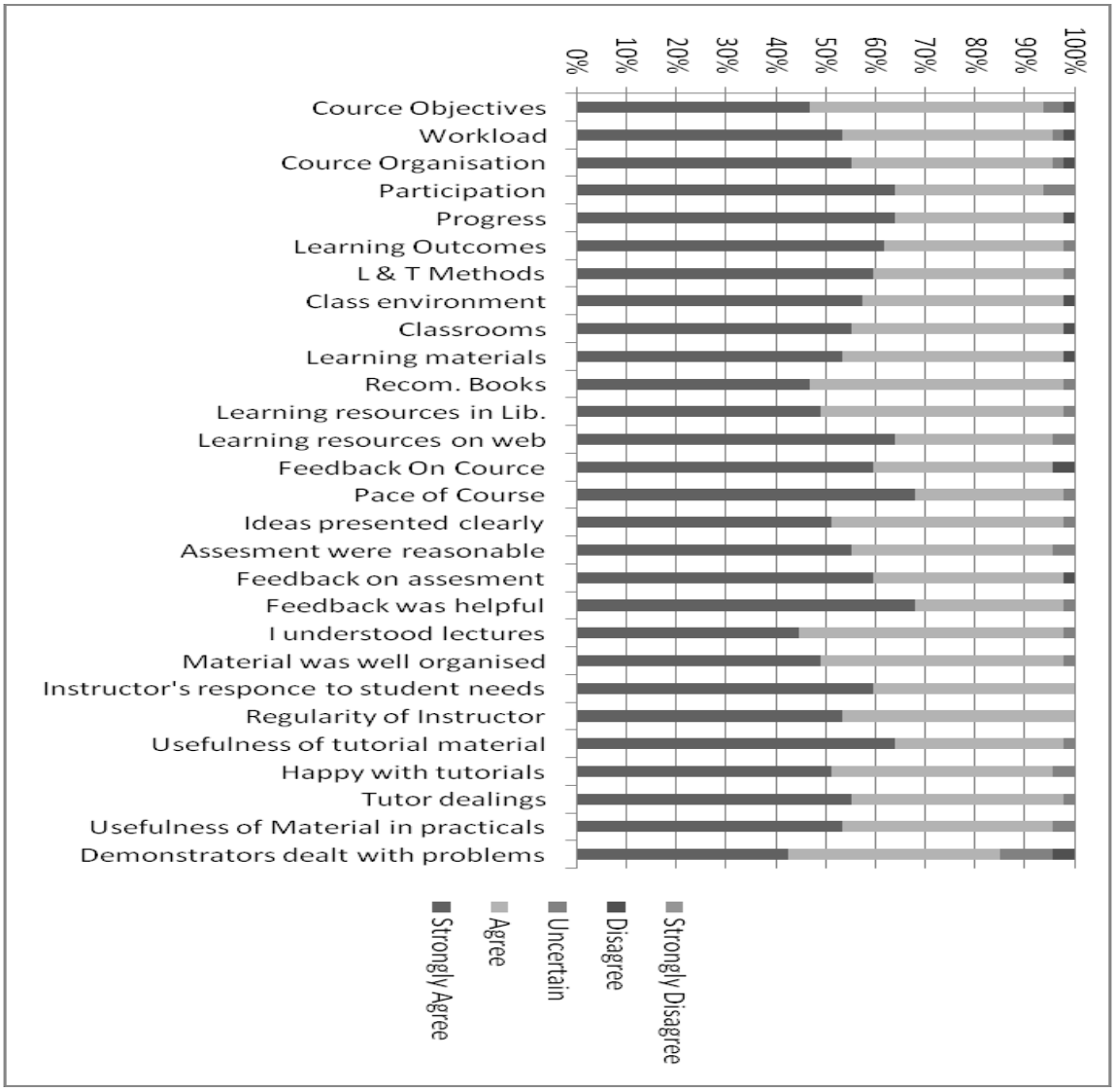
HORT-402 PROPAGATION OF HORTICULTURAL PLANTS 3(2-2)

A perusal of proforma 1, depicted that about 35% students strongly agreed to different aspects of course evaluation questionnaire. However, around 30% students were satisfied with the class environment, assessment, L&T method etc. Only a few students were uncertain and disagreed.



HORT-501 PRINCIPLES OF FRUIT PRODUCTION 3(2-2)

As regards cumulative student course evaluation graph, around 40% students expressed strong agreement on questions asked regarding course progress, learning outcomes, L&T methods, pace of course, feed back, usefulness of materials, and similar number of students showed agreement. However, about 10% students were uncertain in answering the questions and are disagreed with the contents.

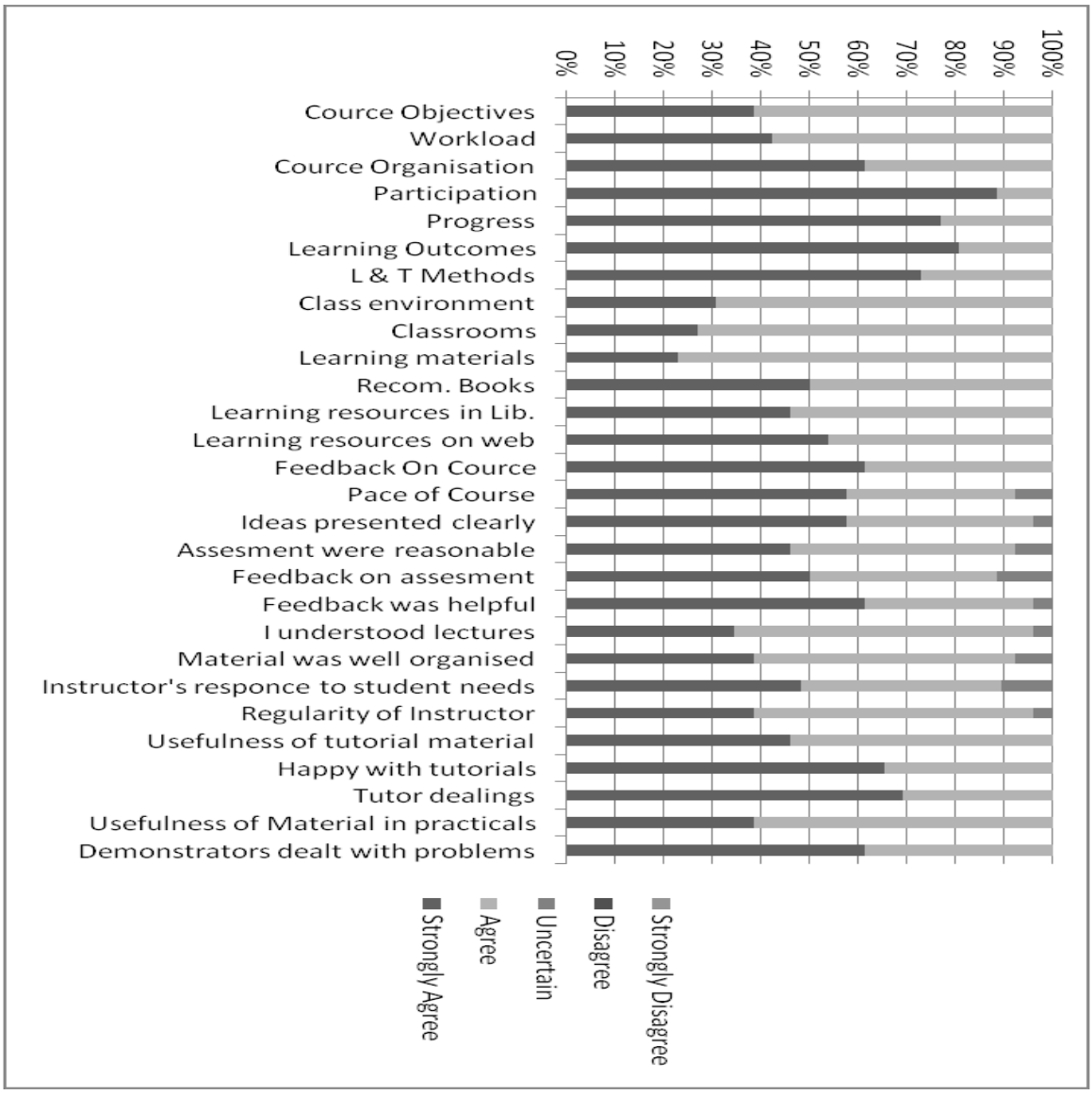


HORT-503 WINTER VGETABLES 3(2-2)

The aggregate analysis regarding Breeding Maize and Millets course, revealed that around 35% students strongly agreed to the various aspects of course evaluation questionnaire like course progress, participation, learning outcomes, L&T methods, pace of course, feed back on course and assessment, usefulness of materials, whereas, 25% students showed general agreement. However, a small proportion of students were uncertain in their response.

HORT-505 ORNAMENTAL HORTICULTURE 3(2-2)

The analysis of Proforma 1, showed that about 55% students strongly agreed to the various aspects of course evaluation questionnaire course organization, course progress, learning outcomes, L&T methods, pace of course, ideas presented, feed back, tutor dealing with the problems, whereas 25% students showed general agreement. About 15% students were uncertain in answering their response



HORT-506 HARVEST AND POST HARVEST TECHNOLOGY OF HORTICULTURAL CROPS 3(2-2)

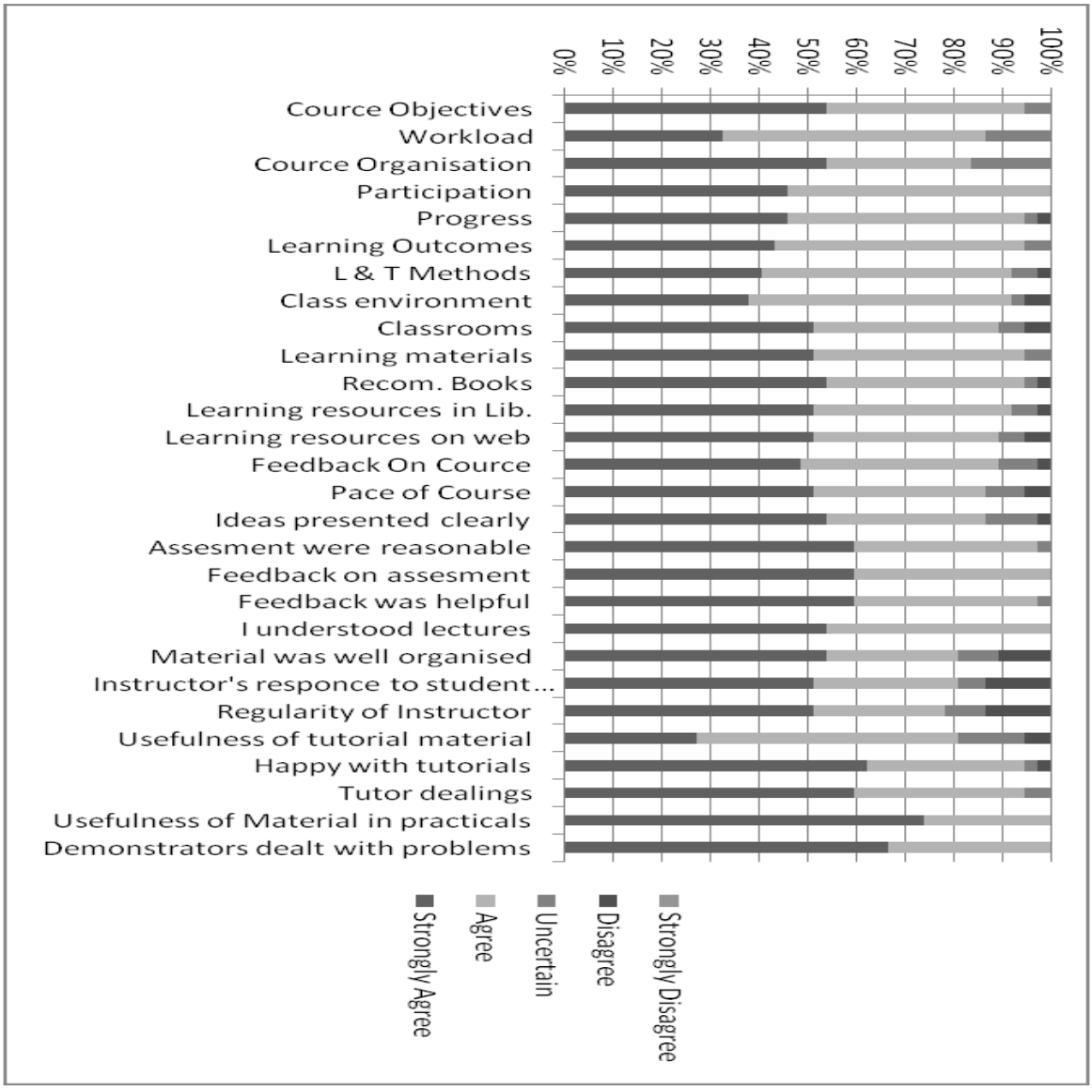
A perusal of student course evaluation proforma 1, expressed that about 50% students showed strong agreement on questions asked like course organization, learning outcomes, learning resources, L&T methods, feed back, assessment, and dealing of problems whereas 25% showed agreement. However, about 20% students were uncertain in answering the questions, and a few disagreed with the contents.

HORT-507 PRODUCTION OF TROPICAL AND SUB-TROPICAL FRUITS 3(2-2)

The graphical analysis of Proforma 1, expressed that about 60% students strongly agreed to the various aspects of course evaluation questionnaire like work load, course objectives, course progress, learning outcomes, L&T methods, pace of course, assessment and understanding, feedback, usefulness of materials etc. Around 20% students showed general agreement with various aspects of Performa. About 10% students were uncertain in answering the questions.

HORT-508 INDOOR HOUSE PLANT 3(2-2)

The cumulative analysis for Proforma 1, suggested that 40% students strongly agreed to difference aspects of course evaluation questionnaire like work load, course objectives and organization, course progress, learning materials, L&T methods, pace of course, assessment and timely feedback, usefulness of materials etc. Around 30% students were in general agreement. Only a small proportion of students were uncertain in and/or disagreed.



HORT. 601 COMMERCIAL FLOWR PRODUCTIONS 4(3-2)

The graphic analysis showed that about 45% students strongly agreed to the various aspects of course evaluation questionnaire like work load, course objectives, course progress, participation, learning outcomes, L&T methods, pace of course, assessment, feed back, usefulness of materials etc. About, 25% students showed general agreement and a small number of students were uncertain in answering the questions.

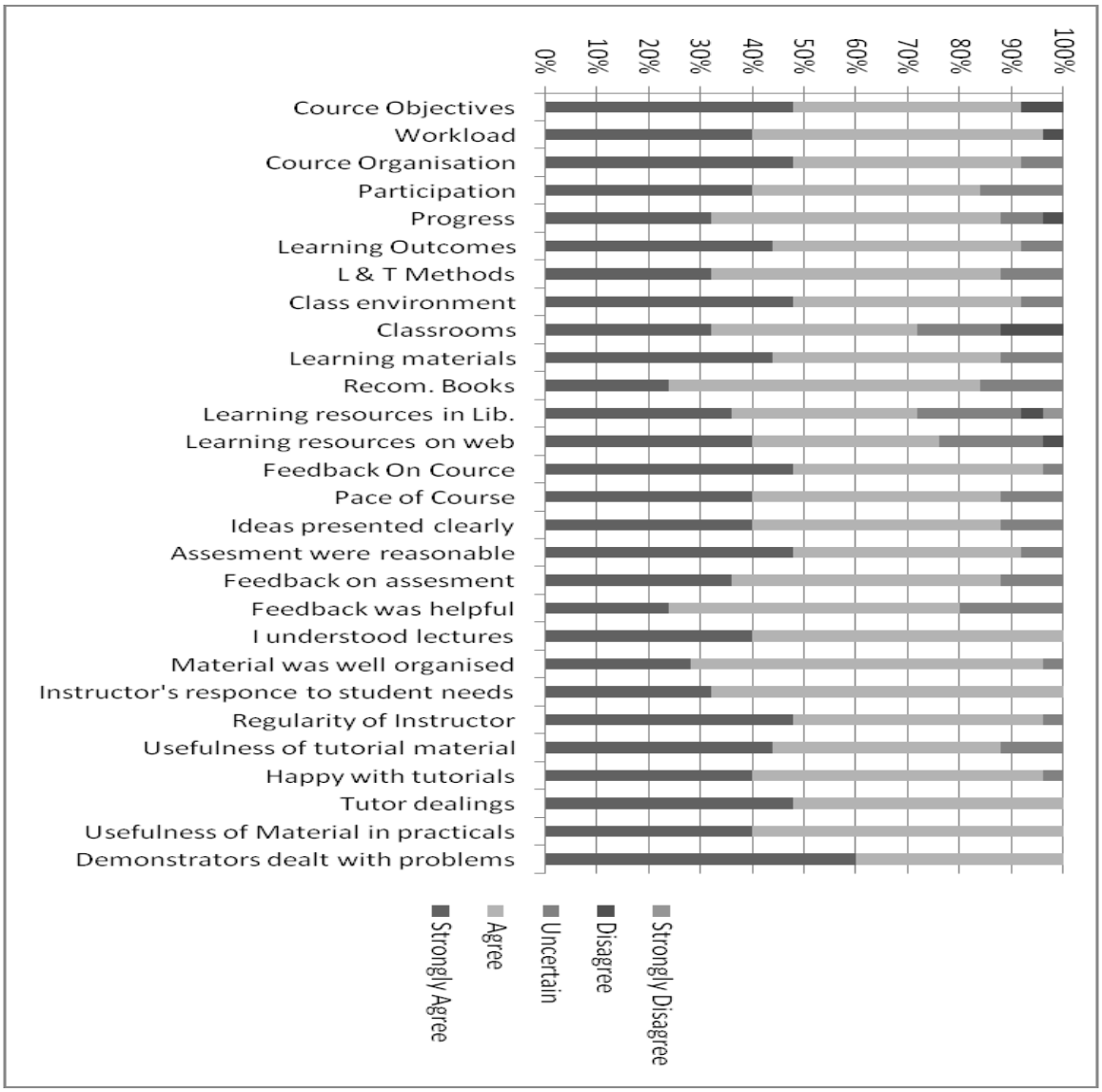
HORT- 603 Certified SEED PRODUCTION OF HORTICULTURAL CROPS 3(2-2)

The analysis for Proforma 1, revealed that 60% students strongly agreed to difference aspects of course evaluation questionnaire like, course objectives, pace of course, ideas presented, assessment and feed back, usefulness of materials and demonstration etc. About 20% students were in general agreement with various aspects of Proforma and a few students were uncertain.

HORT- 605 USES OF GROWTH REGULATORS IN HORTICULTURAL CROPS

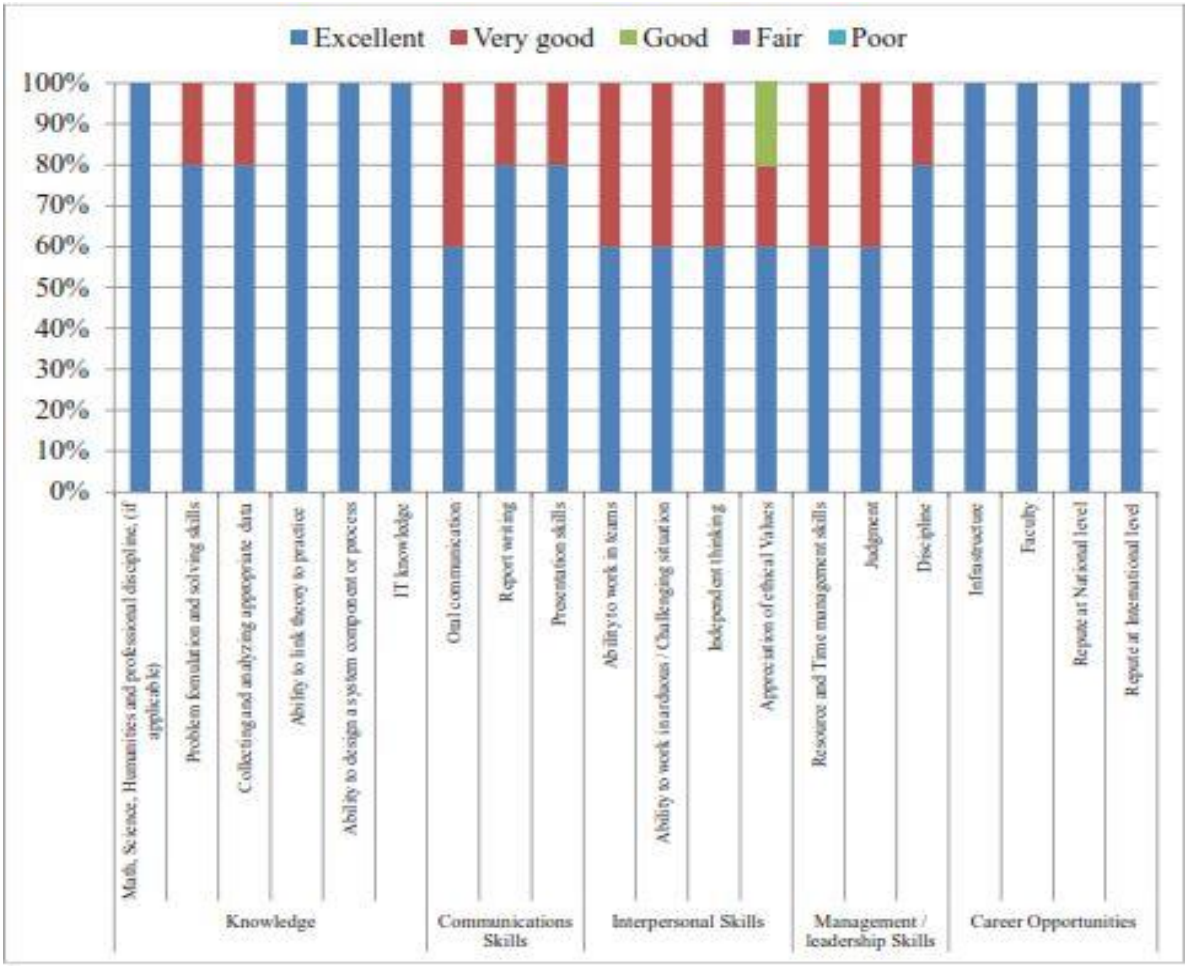
3(3-0)

The aggregate analysis for Proforma 1, showed that about 65% students strongly agreed to difference aspects of course evaluation questionnaire viz. course objectives, learning outcomes, class environment, pace of course, assessment and feed back, usefulness of materials, dealing of problems etc. About 25% students were in general agreement with various aspects of Proforma. A small number of students were uncertain and/or disagreed to the contents of Proforma.



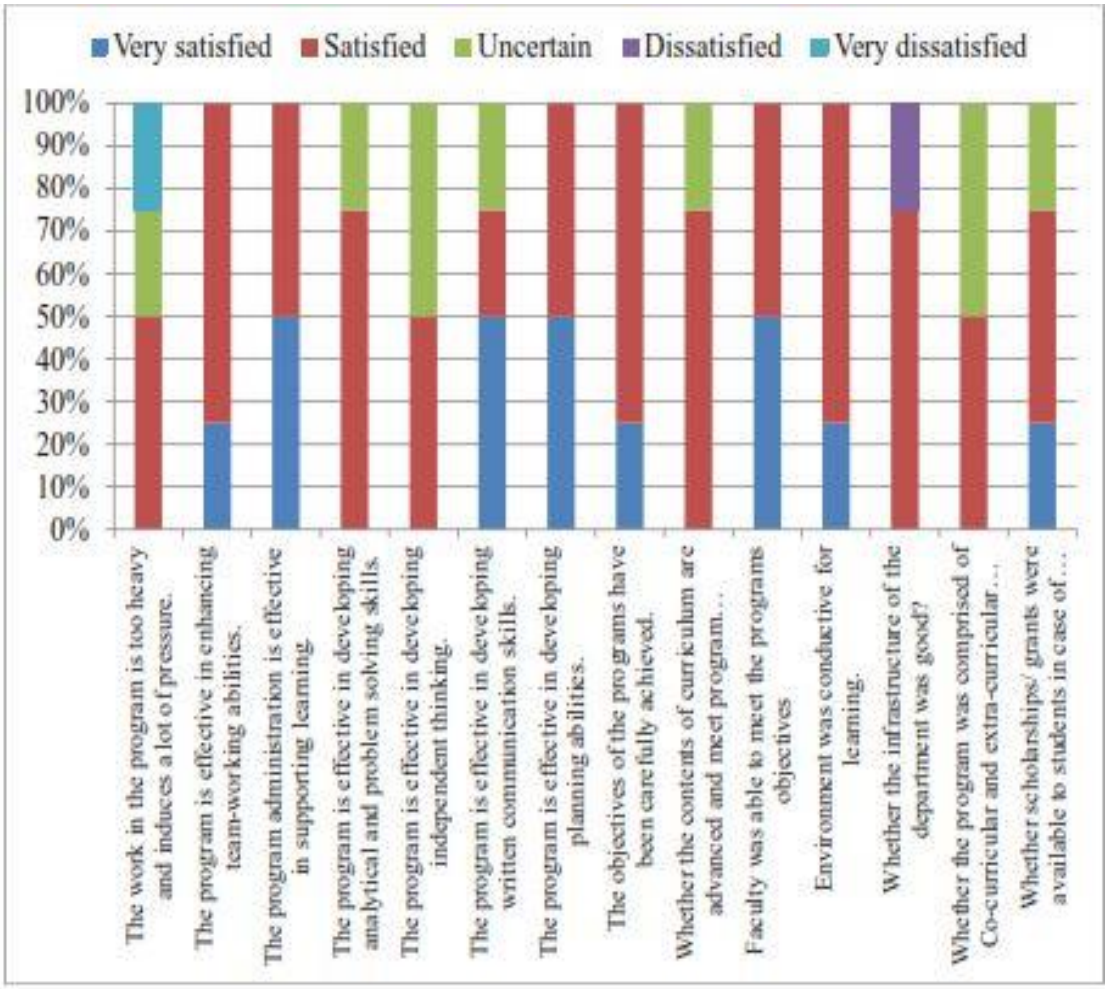
ALUMNI SURVEY RESULTS

Feedback of students graduated during 2010 to 2012 was acquired through Proforma-7. Majority of the Alumni have rated the knowledge imparted by the department and career opportunities as excellent. Communication skills, interpersonal skills and management/ leadership skills have also been rated high, a mix of excellent & very good. Results of the survey are presented below.



SURVEY OF GRADUATING STUDENTS

Survey of graduating students was conducted through Performa 3. Students showed their high satisfaction program effectiveness for enhancing team work, support for learning, meeting objectives of program and conducive environment for learning. Other aspects of the program have also been rated high. They were dissatisfied only with infrastructure of department. The results of the survey are given as below.



<u>Standard 1-3:</u> The results of program's assessment and the extent to which they are used to improve the program must be documented

Skills and capabilities reflected in performance as Horticulturist

Special importance has been given on the practical work in the profession of horticulture to build confidence and communication skills effectively in writing, oral and demonstration to use modern tools and techniques for their profession. Efforts also have been made to explicate and design the experiments/project and to work effectively in a team, to manage a crop problem and assimilate ability to recognize future needs.

Major future improvement plans

- An essential and distinguishing attribute of horticulture education through audio visual aids and modern tools along with provision of latest literature, journals, books, reviews and access to internet.

- Flourishing the facilities for horticulture crop improvement, hydroponics setup, germplasm units and develop extension material.

Strength and weaknesses of the department

Strength

The main strength of the department is the availability of highly qualified teachers including (9 Ph.Ds), with good experience of their respective subjects, having vast knowledge of horticultural production and management systems and associated problems. Faculty members have local as well as foreign degrees (USA, UK, Turkey, China etc) and are experts in their area of specialization. Four faculty members got postdoctoral research experience from Australia, Italy and UK and China. Many faculty members have national research projects and are highly conscious of the problems to be taken by the post-graduate students. A professor, 2 Associate Professor, 4 Assistant Professor & 5 Lecturers specialized in their subjects are currently engaged in their academic and research activities.

Weaknesses

Advanced teaching and research is being handicapped due to lack of important equipments as hydroponics system including a fully equipped and the set of automated greenhouses and cold storage facilities for post-graduate students. To introduce the most economical protected horticulture, there is a dire need to establish the chain of greenhouse based on the Chinese energy saving technology (in progress). For the research to solve the problems in the area of post- harvest there is need for controlled atmosphere storage and multi-temperature storage chambers. In case of biotechnology, there is need for vector construction, electorporation and gene transformation equipment. Additionally, to ensure the production of pathogen-free plant material, a complete system of ELISA and other diagnostic kits for detection and determination of plant pathogens. Areas for seed production of vegetables and ornamentals are not available. Lecture rooms, post-graduate laboratories and survey / offices for faculty members are also lacking. A landscape studio is indispensable to coup up the present needs of landscape horticulture. The is a need to have a computer with efficient internet access for every faculty member

<u>Standard 1-4:</u> The department must assess its overall performance periodically using quantifiable measures.

Present students' enrolment

In the past, the enrolment was significantly less compared with the present status. The new trend is that the applicants give high preference to opt the horticulture as a major subject in the agriculture faculty as illustrated in the following table:

Table-4: Quantitative assessment of the department (during 2010-12)

Sr. #	Particular	No.	Remarks
I	Undergraduates (B.Sc. Hons) produced	50	90% of them joined and 10%did not continue their education.
	Students: Faculty rates	5:1	
	Average grade point	2.5	Fulfils HEC criteria

The evaluation process pointed high efficiency of system and satisfactory impact of outcomes. Almost all the graduate and post graduates got jobs in various organizations (provincial department, universities, research organizations, banks and private firms).

Performance for research activities

The faculty staff of Horticulture department is awfully engaged in teaching and research activities, consequently the findings are being published in reputed national and international journals along with the presentation of the findings of problem-oriented and solution-oriented research outcomes at different national and international forums. The following table shows some laudable performance in the form of publication:

Table- 5: Performance for research activities

Faculty	Journal Publications (National & International)	Conference Publications (Proceedings/ Abstract)	Projects
Dr. Ishfaq Ahmad Hafiz	17	---	3

Dr. Khalid Mahmood	4	1	-
Dr. Imran Hassan	--	--	--
Ms. Najma Yousaf Zahid	--	-	-
Dr. Shahid J. Butt			
Dr. M. Azam Khan	--	--	--
Mr. Umer Habib	1	--	-
Ms. Qurat-ul-Ain Farooq	--	--	--
Ms. Mehwish Yaseen	5	--	1

The staff is well trained in horticultural crop production, post-harvest technology, biotechnology, protected cultivation, vegetable breeding, hydroponics/soilless crop production, floriculture, landscape horticulture, and many other specialized fields in horticulture.

Community services

- Holding of national and international conferences/workshops and training programme on horticulture for students, teachers and farming community
- Advisory services to the farmers, especially for Pothohar region.
- Knowledge dissemination for the promotion of greenhouse and tunnel technology in arid region.
- To guide the education institutes for improved landscaping.
- Guidance and supervision of students and interested people for the promotion of horticulture.
- Coordination and participation in different horticultural competitions (e.g. fruit, flower and vegetable shows).
- Supervision of students on internship in various organizations.

Departmental administrative services for faculty and students

- To achieve the task assigned by the competent authority.
- The department maintains a ratio of 4:1 for the academic (technical) and administrative non-technical staff which fulfils this standard set by the HEC.
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required. Generally two meetings of

academic council are held per month. Board of studies of the department meets quarterly.

- Sharing the role in publishing the university magazine.
- Quick office disposal; no complaint pertaining to delay has ever received from authorities.
- Proper records of individuals' students, their theses etc. are maintained.

Criterion 2: CURRICULUM DESIGN AND ORGANIZATION

Degree Title: B.Sc.(Hons) Agri, Major Horticulture

All the courses for degree program were built up by a committee constituted by the Higher Education Commission, Pakistan. The committee consists of experts and learned professors, subject-matter specialists from other universities and research organization from Pakistan. When and if needed, ccurriculum for the Department of Horticulture is revised/updated through different bodies. At department level, Board of Studies, which constituted of senior faculty members, is responsible for updating the curriculum. This body is authorised to formulate syllabus and course content. The chairman of the Department is the convener of this body. The courses are then sent to the Board of Faculty for approval. The Dean of the Faculty, who is also the Convener, conducts meeting. As per university rules courses after the approval from the Faculty Board, are placed before the University Academic Council for their approval.

Definition of credit hour

A student must complete a definite number of credit hours. One credit hour is one theory lecture or two hours laboratory (practical / week). One credit hour carries 20 marks. The semester is of 18 weeks.

Degree plan

Presently three degree programs are organized by the department.

B.Sc. (Hons) Agric. Majoring in Horticulture**:** The B.Sc. (Hons) degree program consists of 4 academic years/ 8 semesters.

Pre-requisites

Minimum academic requirements for B.Sc. Honours in Horticulture

A person retaining intermediate science certificate (Pre-Medical & Pre-Engineering) or an equivalent certificate from any recognized institute with at least second division or overall 45 % marks.

The candidates domiciled in the Barani Areas of Punjab are eligible for admission. The admission to the university is on merit which is determined on entry test and past academic performance. Merit is determined as per the following formula:

Matric	10%
Intermediate	50%
Entry test	40%

Degree Requirements:

As a whole a student has to study 140 credit hours. In the first four semesters, students study minor courses (Agriculture Sciences, Information Technology and Veterinary Sciences etc.). After the completion of four semesters, students choose a specialized field (major) of study. In the other four semesters courses of major specialized subject are taught including some other courses of other departments (Detail is given in Table-6). The final semester includes internship of 15 credit hours. Students are placed in research institutes to learn research techniques practically.

Degrees are awarded after completing the required number of credit hours (courses) followed by internship report and its presentation.

Minimum Grade Point Average for obtaining the degree in 2.50.To remain on the roll of the university a student shall be required to maintain the following minimum GPA/CGPA in each semester

Semester	**CGPA**
First	0.75
Second	1.00
Third	1.25
Fourth	1.50
Fifth	1.75
Sixth	2.00
Seven	2.25
Eight	2.50

Examination and Weightage:

a) Theory

In theory paper, student's evaluation is done by mid-term examination, assignments/quizzes/presentations and final examination. Both the mid-term and final examinations are compulsory. A student, who misses the mid-term examination, is not allowed a make-up examination and is awarded zero marks in that examination. In case a student does not appear in the final examination of a course, he shall be deemed to have failed in that course. In theory, weightage to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments plus others	10%
Final Examination	60%

b) Practical

For practical examination (if applicable) 100% weightage is given to practical final examination

Eligibility for examination:

A student is eligible to sit for the examination provided that he/she has attended not less than 75 % of the classes in theory and practical, separately.

The minimum pass marks for each course are 40% for undergraduate.

Table-6: Scheme of studies for B. Sc. (Hons.) Agriculture (first semester)

Course No.	Course Title	Credit Hours
AGR-301	Basic Agriculture	3(2-2)
AEC-301	Principles of Agricultural Economics	3(3-0)
ENG-301	Functional English	3(3-0)
HORT-301	Introduction to Horticulture	3(2-2)
IS-301/ ET-301	Islamic Studies/ Ethics	2(2-0)
MATH-301/ BIOL-301	Mathematics-I/ Biology-I	3(3-0) 3(2-2)
SS-301	Introduction to Soil Science	3(3-0)

Second semester

Course No.	Course Title	Credit Hours
AGR-302	Summer Crops	3(2-2)
ENG-302	Communication Skills	3(3-0)
FT-302	Introduction to Food Sciences Technology	2(2-0)
HORT-302	Principles of Horticultural Practices	2(1-2)
MATH-302/ BIOL-302	Mathematics-II/ Biology-II	3(3-0) 3(2-2)
FR-302	Introduction to Rangeland & Wildlife Management	3(2-2)
SS-302	Soil and Water Conservation	2(2-0)
SSH-302	Pakistan Studies	2(2-0)

Third semester

Course No.	Course Title	Credit Hours
AGR-401	Winter Crops	3(2-2)
AS-401	Animal Husbandry	3(2-2)
ENT-401	Introductory Entomology	2(1-2)
FT-401	Food Processing and Preservation	3(2-2)
IT-401	Introduction to Information Technology	3(1-4)
PBG-401	Introductory Genetics	2(1-2)
PP-401	Introduction to Plant Pathogens	2(1-2)
AE-401	Introduction to Agricultural Extension Education	2(1-2)

Fourth semester

Course No.	Course Title	Credit Hours
AGR-402	Field Crop Physiology	3(2-2)
ENT-402	Applied Entomology	3(2-2)
FR-402	Introduction to Forestry and Watershed Management	3(3-0
AS-402	Poultry Husbandry	2(1-2)
PBG-402	Introductory Plant Breeding	3(2-2)
PP-402	Introduction to Plant Pathology	3(2-2)
STAT-402	Introduction to Statistics	3(3-0)

Fifth semester

Course No.	Course Title	Credit Hours
General Courses		
AEN-501	Farm Mechanization	2(1-2)
AGRO-501	Arid Zone Agriculture	2(2-0)
Major Courses		
Hort- 501	Winter Vegetables	3(2-2)
Hort-503	Medicinal and aromatic Plants	3(2-2)
Hort-505	Production of Tropical & Sub-tropical Fruits	3(2-2)
Hort-507	Physiology of Horticultural Plants	3(2-2)

Sixth semester

Course No.	Course Title	Credit Hours
General Courses		
AEN-502	Conservation Engineering and Water Resources Development	2(1-2)
SS-508	Instrumentation and Laboratory Techniques	2(0-4)
Major Courses		
Hort-502	Summer Vegetables	3(2-2)
Hort-504	Temperate Fruits Productions	3(2-2)
Hort-506	Pre and post harvest Technology of Horticultural crops	3(2-2)
Hort-508	Landscape Plants	3(2-2)
Hort-510	Arid Zone Horticulture	2(1-2)

Seventh semester

Course No.	Course Title	Credit Hours
General Courses		
STAT-601	Experimental Designs	2(1-2)
SOC-601	Rural and Pastoral Sociology	
MGT-601	Introduction to Agri. Business Management	2(2-0)
Major Courses		
Hort-601	Commercial Flower Production	3(2-2)
Hort-603	Certified Seed and Nursery Production of Horticultural Crops	3(2-2)
Hort-605	Forcing of High Value Crops	3(2-2)
Hort-607	Breeding of Vegetable Crops	3(2-2)
Hort-609	Project Planning and Scientific Writing	2(1-2)
Hort-611	In Vitro Propagation of Horticultural Crops	2(1-2)

Eighth semester

Course No.	Course Title	Credit Hours
Hort-611	**Internship including Report writing and Presentation**	**15(0-30)**

<u>Standard 2-1:</u> The curriculum must be consistent and supports the program's documented objectives.

The assessment of curriculum given in the following table and the courses are cross tabulated according to the program outcomes.

Table-8: Courses *vs* programme outcomes

Course/ Groups of Course	Outcomes					
	1	**2**	**3**	**4**	**5**	**6**
Hort-604, Hort-605, Hort-607	XX	XX	XX	X	XX	XX
Hort-603	XXX	XX	X	X	XXX	XX
Hort-301, Hort-302 Hort-601	X	XX	XX	X	XX	XX
Hort-505, Hort-602	XXX	X	XX	X	XX	X
Hort-501, Hort-504	XX	X	XXX	X	XX	XX
Hort-604	XX	XX	XX	XX	XX	XX
Hort-503	XX	XX	XX	X	X	XX
Hort-507	XXX	X	XX	XX	XX	
Hort-508	XX	XX	X	X	XX	XX
Hort-506	XXX	XX	XX	X	XXX	XX

X: relevant

XX: relevant and satisfactory

XXX: very relevant and satisfactory

- The curriculum fits very well and satisfies the core requirements for the program, as specified the respective accreditation body.
- The curriculum satisfied the general arts and professional and other discipline required for the program according to demands and requirements set by HEC.

<u>Standard 2-2:</u> Theoretical background, problem analysis and solution design must be stressed within the problem core material.

The meeting standard of this clause is tabulated in the following:

Table-9: Standard 2-2 requirement (percentage of elements in courses)

Elements	**Courses**
Theoretical backgrounds	Hort-301, Hort-302, Hort-501, Hort-503, Hort-504, Hort-505, Hort-603, Hort-604
Problem analysis	Hort-507, Hort-602, Hort-607, Hort-506
Solution design	Hort-508, , Hort-601

Standard 2-3 to standard 2-5

The above cited standards have already been justified in table 8.

Standard 2-6: Information Technology Component of the Curriculum must be developed and applied in the Program.

While the curriculum was prepared, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program as:

- Computer, I.T. and statistics courses based on computer practical usage are included in the curriculum to fulfill the I.T. requirements for the students of B.Sc (Hons) Agric. degree.

Standard 2-7: Oral and written communication skills of the student must be developed and applied in the program.

- A course of 2 credit hours developing communication skills has been integrated in the curriculum of B.Sc. (Hons) level.
- Assignments are given to BSC (Hons) students on specific titles (part of the course) which are presented orally and are submitted as written report, to increase their oral and written communication skills.

Criterion 3: LABORATORIES AND COMPUTING FACILITIES

There are four laboratories in the department. The facilities and shortcomings of these laboratories are listed as under.

- Laboratory Title:
  1. Tissue Culture Laboratory I,
  2. Tissue Culture Laboratory II
  3. Horticulture Analytical Laboratory
  4. Horticulture Analytical Post harvest laboratory.
- Location and Area: Faculty of Agriculture and Food Sciences, A-Block, 1st Floor and ground floor, Main Campus
- Objectives: Laboratories are used for: Practical exercise and demonstrations to graduate students in their

	introductory and major courses. Research work for the graduate.
• Shortcoming:	The number of labs is not sufficient. The standard requirements in view of operation and quality, available resources and expansion programs are vitally required. Major apparatus viz. equipment: along with necessary chemicals are needed. Teachers usually arrange the lecture material and helping literature at their own expense. Some manuals/broachers are being prepared by the academic staff.
• Safety Regulations:	Safety measures are not available against fire (Extinguishers), minor hazards and accidents, injuries (First Aid Kit). However, the University maintains a Medical Dispensary for such incidents where the required apparatus is insufficient.

<u>Standard 3-1:</u> Laboratory Manuals/ documentation/instructions experiments must be available and readily accessible to faculty and students.

Laboratory manuals (tissue culture lab, horticulture manuals etc) are available. The department library has the collection of books but still a number of books are required.

<u>Standard 3-2:</u> There must be adequate support personnel for instruction and maintaining laboratories

There is shortage of laboratory assistants and laboratory attendants and are direly needed to maintain laboratory, equipment, glassware, chemicals, material etc.

<u>Standard 3-3</u>: The University computing infrastructure and facilities must adequate to support program's objectives.

- **Computing facilities support*:*** Not available to all students.
- **Shortcoming in computing infrastructure:** Computers with internet facilities should be available to all students.
- **Safety Arrangements:** There are no proper safety arrangements and no security plan is available in case of emergency. The department is located on the 2nd floor; there are no emergency exits for the labs. No fire extinguishers have been installed in any laboratory or in the offices. No first aid kits/facilities provided in the laboratories/department.

Criterion 4: STUDENT SUPPORT AND ADVISING

Our University organizes support programs for students and provide information regarding admission, scholarship schemes etc. Department in its own capacity arranges orientation and guided tours of the department. Director Students Affairs is also there and arranges various cultural and social activities and solves the students' problems. However currently there is no Parent/Teacher association.

<u>Standard 4-1:</u> Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner.

- Courses are taught as per criteria of HEC.

- At undergraduate level subjects/ courses are offered as per scheme of study provided by the HEC and approved by Academic Council.
- Elective courses are offered as per policy of HEC and the University.

<u>Standard 4-2:</u> Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

To ensure effective interaction and understanding between students, faculty and teaching assistants, at the time of course formulation both theoretical and field/practical aspects are focalized. Theoretical problems are explained and assignments are also given to the students whereas practical are carried out in the labs and filed. Field visits and study tours to various research organizations are also organized to keep them update on the latest developments in the area and to stimulate them for discussion through teacher/student interaction.

- Courses are developed and decided in the board of studies meeting.
- At the commencement of the semester, faculty members interact frequently among themselves and with students. Students are welcome to ask question in class and even after the class.
- Emphasis is always given for an effective interaction between each section of B.Sc. (Hons) classes.

<u>Standard 4-3:</u> Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and career choices.

Several steps have been taken to provide students guidance such as:

- Students are informed about the program requirement through the office of the head of the department.
- Through the personal communication of the teachers with the students.
- Monthly meetings are organized by the head of the department for counseling of the students. In addition, students can also contact with the relevant teachers whenever they face any problem.
- It is necessary for the students to participate in the monthly meeting.
- In case of some problem Director Student Affairs appointed by the university, helps the students. Tutorial System in all departments has been efficiently

working. Tow period on Thursday are reserved for students for extracurricular activities. However, there is no such counseling Cell in the department.

- Student can interact with the teachers/scientist in universities or research organization whenever they needed and there is an open option for the students to get the membership in the professional societies like National Rose Society Islamabad, Horticultural Society of Pakistan, National Horticulture Society, Pakistan Horticulture Society, Pakistan Botanical Society and other relevant professional societies.
- Realizing the need for exploring job opportunities for the university graduates, Directorate of Placement Bureau has been established.

Criterion 5: PROCESS CONTROL

It includes student admission, students' registration, faculty recruitment activities, which are dealt by various statutory bodies and the university administration.

Standard 5-1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

- The process of admission is well established and followed as per rules and criteria set by HEC. For this purpose an advertisement is published in the National News Papers by the Registrar Office.
- Admission criteria for B.Sc. (Hons) Agri. F.Sc. pre medical and pre engineering and entry test.

Standard 5-2: The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented This process must be periodically evaluated to ensure that it is meeting its objectives.

- The student name, after completion of the admission process, is forwarded to the Registrar Office for proper registration in the specific program and the registration number is issued to the student.

- After the 4th semester students are allotted different majors (e.g. Horticulture, in our case) by the Dean Faculty of Crop and Food Sciences.
- Students are evaluated through Mid, Final and Practical exams and through Assignments.
- Registration is done for one time for each degree but evaluation is done through the result of each semester. Only those students who fulfill the criteria of the University, they are promoted to the next semester.
- In general, the students are registered on competition bases keeping in view the academic and research standards.

Standard 5-3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives.

- Vacant and newly created positions are advertised in the national newspapers, applications are received by the Registrar office, and call letters are issued to the short-listed candidates on the basis of experience, qualification, publications and other qualities/activities as determined by the University.
- The candidates are interviewed by the University Selection Board and Principal and alternate candidates are selected.
- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.
- Induction of new candidates depends upon the number of approved vacancies.
- Standard set by HEC are followed.
- At present, no procedure exists for retaining highly qualified faculty members. However, the revised pay scales structure is quite attractive.
- HEC also supports appointment of highly qualified members as foreign faculty Professors, National Professors and deputes them in concerned departments of the University.

<u>Standard 5-4:</u> The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.

- To provide high quality teaching, department periodically revises the curriculum depending upon requirements, innovations and new technology.
- With the emergence of new fields, new courses are introduced, and included in the curriculum.
- The easily available books in the University library are provided to the students for the preparation of different courses. Additionally, copying and internet facilities are also available to the students.
- Notes are also prepared by the teachers and given to the students other than different handouts
- Most of the lectures are supplemented by overheads, slides and pictures.
- All efforts are made that the courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings.

<u>Standard 5-5:</u> The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

- The controller of examinations announces the dates of commencement of examination. After each semester, the controller office notifies the results of the students. The evaluation procedure consists of quizzes, mid and final examinations, practicals, assignments and reports, oral and technical presentations. The minimum pass marks for each course is 40% for undergraduate and Master degree and 50 % for Ph.D. in theory and practical separately.
- In theory, weightage to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

Marks obtained	Grade	Grade point	Remarks
80-100 %	A	4	Excellent
65-79 %	B	3	Good
50-64 %	C	2	Satisfactory
40-49 %	D	1	Pass
Below 40 %	F	0	Fail

- Gold medals are awarded to the students who secure highest marks. Degrees are awarded to the students on the annual convocation that is held late every year.

Criterion 6: FACULTY

Standard 6-1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/ courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline.

Table-10: Faculty distribution by program areas in Horticulture

Program area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D. degree
Post-harvest	2	1	1
Tissue Culture	2	2	1
Protected Cultivation	2	2	1
Floriculture	2	2	1
Landscape Horticulture	1	1	-
Fruit crops	3	2	2

<u>Standard 6-2:</u> All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place.

- Professional training and availability of adequate research and academic facilities are provided to the faculty members according to the available resources.
- Currently two faculty members are abroad on study leave for doctoral degree as sponsored by the different organizations.
- Incentives in the form of allowances to theses supervisors have been implemented lately to promote high standard research.
- Existing facilities include mainly internet access, which is available through networking system in addition to library facility with latest books is also available.
- Effective programs for faculty development have been just introduced since the last semester.

<u>Standard 6-3:</u> All faculty members should be motivated and have job satisfaction to excel in their profession

- Time to time provision of enthusiasm to the young faculty by the senior faculty members.

Faculty survey

The results of faculty survey were summarized in the form pie charts quoted in the previous pages.

Survey of graduating students

The graduating students in last semester were surveyed as per Performa 3 before the award of degree. The results of graduating students were summarized in the form of pie charts in the previous pages.

Criterion 7: INSTITUTIONAL FACILITIES

The university administration has been struggling hard to strengthen all the departments and up-gradation of departments and establishing new faculties and Institutes. The university is also trying to attract highly qualified faculty. Following needs to focus on:

- The institution must have the infrastructure to support new trends in learning such as e-learning including digital publications, journals etc.
- The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel. In-sufficient library's technical collection of books. Recommended books, relevant journals of the programs are not available to the students and to the teachers as well.
- These aspects need to be strengthened in number and space.
- Class rooms must be adequately equipped, especially the multi media facility and offices must be adequate to enable faculty to carry out their responsibilities**.** In horticulture, offices for faculty staff are not available, thus they are accommodated minimum two/room, inspite the rooms are quite narrow in space, subsequently affecting the quality performance.

<u>Standard 7-1:</u> The institution must have the infrastructure to support new trends in learning such as e-learning

The faculty has access to E-library which is very helpful for the high quality education and producing research of international standard. They also have access to the internet. However the department has the following shortcomings/problems:

- Majority of the faculty members do not have access to the PCs. Computers are not provided by the university.
- The internet services provided by the university are poor. The speed of internet is slow and often internet does not work. The telephones are also connected with the internet and the services are often breached.
- Breach of power intermittently, due to which research and academic work both are suffered.
- Majority of equipments is either out of order or outdated.
- Latest and modern molecular equipments or apparatus are lacking.

- Untrained supporting staff.
- Faculties lack practical knowledge of modern and molecular techniques.
- Scanty budget for consumables.
- Fans and tube lights are out of order and are not properly and timely repaired.

Standard 7-2: The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

The University Central Library has very limited number of books, journals and periodicals. It's a small library in term of space and facilities with no catalogue systems. It does not meet the standards of a University Library. However department itself owns few books.

Standard 7-3: Class-Rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

Currently the class rooms are not enough and the space is not only limited but also some basic facilities are lacking. Multimedia are not available for the lecture halls. Practical lab space is also lacking. This affects the quality of teaching. The faculty offices are another serious problem of the department. Some faculty members are sharing small rooms and the other are having their desks in the laboratories.

Criterion 8: INSTITUTIONAL SUPPORT

The following are mentioned against this criterion:

- Due to unavailability of class rooms, classes are taken in the laboratories. Therefore, it is imperative to arrange more classes for quality teaching.
- As mentioned earlier, faculty offices are inadequate and therefore two or three teachers have one office room.
- Space limitation is the major constraint in the development and strengthening of discipline.
- There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.

- The experienced teachers are not provided the house accommodation by the university and are living in the rented houses with exorbitant rent within the source of mere salary, thus become difficult to concentrate on the efficient working. Therefore house accommodation is indispensably required for the department staff.
- Insufficient secretarial support, technical staff and office equipment.
- Staff attendant/s not available.

Standard 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars.

- At present department is not having sufficient financial resource to maintain the present needs of the department. Individual research grants for students and faculty are mainly supporting the departmental research activities. Due to lack of proper facilities like fruit orchard the students conduct their research at different areas. There is a dire need for increasing the financial resources allocated to the department to establish a library, laboratories and computer facilities. Horticulture department has submitted a project for strengthening of department and it is hoped to be funded during the next year. Suggestions and factors that can contribute to the motivation of the faculty are given as follows:
- Research grants for young faculty members may be allocated.
- Trainings should be arranged in abroad to train the faculty members.

Standard 8-2: There must be an adequate number of high quality graduate students.

The intake of B.Sc. (Hons) and M.Sc. (Hons) students is once in a year. A detail of the Students enrolled during the past seven years is given in the following Table.

Table-11: Enrollment in different programs from 2001-2012

Discipline	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2009-10	2010-11	2011-12
B.Sc. (Hons)	12	13	11	11	11	08	16	23	27	28

<u>Standard 8-3:</u> Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.

Total budget of the department for the financial year 2011-12 is **Rs 5,40,000** which hardly fulfill the departmental needs particularly for the purchase of contingency items. Limited resources are provided from the university budget. The computing facilities were provided on limited basis from the approved HEC project of Horticulture department, where more facilities for library, laboratories and computers are suggested for quality improvement of the department.

Executive Summary

Horticulture department initiated functioning during 1979 with in shortest possible time; the department achieved the possible success in the area for teaching, research and training. The degree courses of BSc Hons, MSc Hons and Ph.D in Horticulture are being offered with the ratio of 20,20,5 each year respectively. Short courses on various aspects of horticulture are also conducted for skilled labour/gardeners for those who are unable to continue higher education in horticulture. Different research projects have been completed / approved or in the pipeline for higher degree programmes. Problem oriented research matters are emphasized for better sharing of horticulture discipline in the agriculture section. A number of constrains and their solution have also been reported in the report for efficient improvement of the department which consequently will bring a positive change in the coming years.

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Annex-XI

DETAILED COURSE CONTENTS OF SCHEME OF STUDIES FOR B.Sc (Hons) AGRICULTURE MAJORING HORTICULTURE

HORT-301 INTRODUCTION TO HORTICULTURE 3(2-2)

THEORY

Introduction, history, importance and future scope, Definition and divisions of horticulture, Classification of horticultural crops, Plant parts, their modifications and functions, plant environment; climate (temperature, light, humidity etc.) and soil (structure, texture, fertility etc), propagation of Horticultural plants, Concept of tissue culture.

PRACTICAL:

Visit of experimental gardens and nurseries with general identification of important horticultural plants, Garden tools and their uses, Techniques of propagation, Visit of tissue culture laboratory.

Books Recommended:

1. Janick, J. 1979. Horticulture Science. W.H. Freeman and Co., San Francisco.
2. Malik, M.N. 1994. Horticulture. National Book Foundations, Islamabad.
3. Edmond, J.B., T.L. Senn, F.S. Andrews and R.G. Halfacre. 1977. Fundamentals of Hortifcuture. Tata McGraw Hill Publishing Co., New Delhi.

4. Reliey, H. E., C. L. Shry (Jr). 2002. Introductory Horticulture (6^{th} Ed.) Thompson Learning Inc., Delmar, USA.

HORT-302 PRINCIPLES OF HORTICULTURAL PRACTICES 2(1-2)

Theory:

Establishment of gardens; site selection, layout methods, wind breaks; Management practices; irrigation, fertilizers and manures, training and pruning, cultivation and weed control; Plant protection measures and sanitation. Basic principles involved in harvest and post harvest handling; Establishment and maintenance of lawns, Concept of protected horticulture.

PRACTICAL:

Practice in layout methods, Selection of plants from nursery; Planting, after care, hoeing and weeding etc. identification and nomenclature of important fruits, vegetables and ornamental plants; Planting and maintenance of lawns, visit of plant growing structures and storages.

Books Recommended:

1. George A., 1999. Horticulture Principles and Practices. Simon & Schuster/ A Viacom Company, New Jersey, USA.

2. Laurie A., / Victor H. Ries. 2004. Floriculture Fundamentals and Practices. Agrobios India.
3. Ali, N., M.N. Malik and A.H. Gilani. 1979. Practical Manual for Fruit culture. Univ. of Agri., Press, Faisalabad.
4. Edmond, J.B., T.L. Senn, F.S. Andrews and R.G. Halfacre. 1977. Fundamentals of Horticulture. Tata McGraw Hill Publishing Co., New Delhi.
5. Malik, M.N. 1994. Horticulture. National Book Foundation, Islamabad.

HORT-401 INTRODUCTION TO HORTICULTURE 3(2-2)

THEORY

Importance of horticulture and its branches, Definition and explanation of horticultural terminologies, classification of horticultural plants with special references to arid zone. Principles of site selection plat nurseries. Raising of plants and nurseries for flowers, fruits, and vegetables and their maintenance. Layout systems, preparation of soil / field seedling transplanting in orchards. After care of plants and cultural practices in arid areas.

PRACTICAL

Identification of horticultural plants, field practices and maintenance of horticultural plants. Visit of nurseries and fruits orchards.

Books Recommended

1. Janick, J. (1979). Horticultural Sciences W. H. Freeman and Co. San Francico. USA.
2. Malik, M. 1994. Horticulture. National Books Foundation, Islamabad.
3. Purseglove, J.W. 1972. Tropical crops. (1) Monocotyledons (ii) Dicotyledon Longman Group Limited, London.

HORT-402 PROPAGATION OF HORTICULTURAL PLANTS 3(2-2)

THEORY

Sexual and asexual propagation and their importance, Seed and bud wood dormancy, its causes and controls. Various techniques of asexual propagation with special emphasis on grafting, budding and layering methods. Protective propagation. Commercial nurseries and their managements.

Practical

Seed dormancy test. Field practice in selected asexual propagation techniques such as grafting, budding and layering. Visits to commercial nurseries.

Books Recommended

1. Bose, T. K, S. K. Mitra and M. K. Sadhu (1986). Propagation of Tropical and Subtropical Horticultural Crops. Naya Prokash, Calcutta.
2. Davidson, II, and R. Meeklenburg (1981). Nursery Management. Administration and culture. Prentice Hall International Inc., New Jersy
3. Hartmann, H. T., D. E. Kester, F. T. Davis and R. L. Geneve (1997). Plant propagation principles and practices (6^{th} Ed.). Prentice-Hall International Inc., New Jersey
4. Malik, M. N. 1994. Horticulture, National Book Foundation, Islamabad.

HORT-501 PRINCIPLES OF FRUIT PRODUCTION 3(2-2)

THEORY

Introduction to fruit science, fruit bud formation, development, along with their controlling factors, pollination and fruit setting problems, Mutations and bud variations. Parthenocarpy and seedlessness. Biennial bearing. Techniques to improve / select fruit strains for arid areas of Pakistan. Basic Principles involved in harvesting, grading, packing, transportation. Storage and marketing of fruits. Fruits marketing system in Pakistan and its scope for improvement.

PRACTICAL

Identification of fruit plants, pruning and training of important fruit trees. Study of fruits. Fruits bearing habit. Market survey for the study of fruits damage and their control.

BOOKS RECOMMENDED

1. Gardner, V. R. (1966). Principles of Horticultural production. Michigan State University Press, Michigan, U.S.A.
2. Halfacre, R. B. and J. A. Barden. (1979). Horticulture. The McGraw Hill Book Company New Yord.
3. Malik, M. N. 1994. Horticulture. National Book Foundation, Islamabad.
4. Purseglove, J. W. 1972. Tropical Crops (I) Monocotyledons (ii) Dicotyledon Longman Group London.
5. Ryugo, K. 1988. Fruits culture-its science and art. John Wiley and Sons Inc., New Yord.
6. Westwood, M. N. (1978). Temprate Zone Pomology. W. H. Freeman & Company, San Francisco.

HORT-503 WINTER VGETABLES 3(2-2)

THEORY

Classification of winter vegetables. Climate/ soil requirements, cultural practices, harvesting, grading, transportation, storage, marketing. Production cost of winter vegetables. Description of important varieties of winter vegetables including tuber and bulbous crops. Basic concepts on vegetable breeding.

PRACTICAL

Identification of winter vegetables and seeds, their sowing and maintenance in the field. Visits of different vegetable farms. Vegetables floral studies.

BOOKS RECOMMENDED

1. Malik, M. N. 1994. Horticulture. National Book Foundation, Ibd.
2. Perice, Lincoln C. 1987. Vegetables, Characteristics, Production and Marketing. John Willey and Sons, Inc., NewYork.
3. Tindall, H. D. 1986. Vegetables In The Tropics. Mac Millan Edu. Ltd. Hampshire, R G 212xS.
4. Thompson, H. C. and W. C. Kelly. 1957. Vegetable Crops. Mac Graw Hill Stock Co., NewYork.
5. Ware, George W. and Mecollum, J. P. 1980. Vegetable Crops Interstate. Printers Pub. Inc., Illions.

HORT-505 ORNAMENTAL HORTICULTURE 3(2-2)

THEORY

Importance, present status and future scope; Growing of annual, perennials, Cacti, succulents and flowering bulbs: their propagation and maintenance; classification of ornamentals trees, Palms, shrubs, climbers and turf grasses: their propagation, growth requirements, and their suitability for various purposes and locations.

PRACTICAL

Raising and transplanting of seasonal flowers; identification of annuals, perennials, cacti, succulents, flowers bulbs, trees, shrubs, palms, climbers and their propagation methods.

BOOKS RECOMMENDED

1. Arora, J. S. (1992). Introductory Ornamental Horticulture. Kalyani Publishers,
   New Dehli, Ludhinana, India.
2. Chada, K. L and B. Chaudhary (1986). Ornamental Horticulture in India. Indian council of Agricultural Research, New Dheli.
3. Carpenter, P.L., T. D. Walker and F. A. Lanphear (1975). Plants in the Landscape. W. h. Freeman and Co., San Francisco.
4. Flener, W., (1965). Shade and Ornamental Trees in colour. Grosset and Dunlop Inc. Publishers, New York.
5. Helber, A. (1981). Ornamental Garden shrubs. The Hamlyn Publishing Group Ltd., London.
6. Larson, R.A. (1980). Introduction to floriculture. Academic Press, New York.
7. Laurie, A., and V. H. Ries (1950). Floriculture: fundamental and Practice. McGraw Hill, New York.
8. Mcdaniel, G. L. (1982). Ornamental Horticulture, (2nd Ed.). Reston Publishing Co., Reston. Virginia.

HORT-506 HARVEST AND POST HARVEST TECHNOLOGY OF HORTICULTURAL CROPS 3(2-2)

THEORY

Introduction and importance; Indices of fruit maturity/ripening of important horticultural plants; Climacteric and non-climacteric commodities; Harvesting and curing/ripening of different fruits; Packing house operations (culling, grading, washing, cleaning, coloring, waxing and packing of important fruits, vegetables and flowers); Packing materials and containers; Storage (Principles and types, factors affecting shelf life of fruits, vegetables and flowers); Shipment of fruits, vegetables and flowers for local and foreign markets.

PRACTICAL

Determination of harvest indices; Practices in harvesting, grading, curing and packing techniques; Machinery and equipments used for various operations; Visits to the fruit, vegetable and floral markets, packing houses and cold storages etc.

BOOKS RECOMMENDED

1. Heard, N. F., and D.K. Salunkhe (1975). Post harvest Biology and Handling of Fruits and Vegetables. The AVI pub. Company Inc., Connecticut.
2. Kader, A.A. (1992). Post harvest Technology of Horticultural Crops. University of California, Division of Agriculture and Natural Resources.
3. Mitra, S.K. (1997). Post harvest Physiology and Storage of Tropical and Sub tropical Fruits. CAB International, Wallingford, U.K.
4. O' Breen, M, B.F. Garill and R.B. Findlay (1983). Principles and Practices for harvesting of Fruits and Nuts. AVI pub Co. Inc., Westport, Connecticut.
5. Tnompson, A.K. (1996). Post-harvest Technology of Fruits and Vegetables. Blackwell Science Ltd., Oxford.
6. Wills, R. B. H., T. H. Lee, D. Graham, W. B. McGlasson and E. G. Hall (1989). Post- Harvest (3rd Ed.). BSP Professional Books, Oxford.

HORT-507 PRODUCTION OF TROPICAL AND SUB-TROPICAL FRUITS 3(2-2)

THEORY

Cultivation of individual fruits with special reference to Botany, Climate, Soil Propagation, root stock, cultural practices, maturity, ripening, harvesting production of fruits such as mango, Banana, Date Palm, Ber, Jamman, Olive, Litchi, Cashew nut etc.

PRACTICAL

Identification and Botanical description of available tropical, subtropical fruits, inflorescence and fruits. Visit to different fruits orchards.

BOOKS RECOMMENDED

1. Ball, J. S. (1997). Fruit Browing, Kalyani Publishers, Ludbiane, India.
2. Malik, M. N. 1994. Horticulture, National Book Foundation, Islamabad
3. Nagy, S., and Shaw P. E., 1980. Tropical and Subtropical fruits. The AVI publishing company Inc. West Port Connecticut.
4. Popenoe, W. 1974. Manual of Tropical and Subtropical Fruits. Hafner Press New York.
5. Sawson, J.A. (1986). Tropical fruits. Longman Scientific and Technical, Harlow, Essex. U.K.
6. Showmaker, J. S. 1978. Small Fruit culture. The AVI publishing company Inc.

HORT-508 INDOOR HOUSE PLANT 3(2-2)

THEORY

Introduction and importance of indoor plants. The indoor environment: light, temperature, humidity, Cultural requirements; production of flower and foliage plants for shade and semi shade; Growing medium, moisture and aeration ; essential nutrient elements and fertilizer; Propagation; watering pests and diseases; acclimatization; Culture of important indoor and house plants.

PRACTICAL

Field trips; Identification of indoor plant; practice in watering and fertilization; Preparation of soil mixtures; Potting and repotting; propagation; Diagnosis of problems and treatments.

Books Recommended

1. Davidson, W. (1991). House plant. Tiger Books International, London.
2. Herwing, R. (1985). The Hamlyn Dictionary of House and Garden plants. The Humlyn Publishing Group Ltd. England.
3. Manaker, G.H. (1981). Interior plant Scape Installation: Maintenance & Mangmant Prentice Hall Inc., New Jersey.
4. Pyenson, L.L.P. (1981). Plant Health Handbook. A Guide to Better Gardening Indoor and Outdoors Avi Publications, West Port, Connecticut.
5. Rice, L.W. and R. P. Rice (1986). Practical Horticulture a Guide to Growing Indoor and out door plants. Prentice-Hall, New Jersey.
6. Schjenk, G. (1984). The complete Shed Gardeners. Houghton Miffin and Co., Boston.

HORT. 601 COMMERCIAL FLOWR PRODUCTIONS 4(3-2)

THEORY

Introduction; Present Status and future scope; Environmental factors influencing plant growth; Soils: soil preparation, manures and fertilizers; propagation, harvesting, packing and storage of the following (1) Major cut flower crops: Carnation, ChrY8anthemum, Roses, Snapdragon, Orchids etc., (2) Miscellaneous cut flower cropws' marigold Jasminum Sambac (Motia), Aster, Calendula, Oerbea, Nomesia, Pausy, Stock, sweet Peas, Zinnia, (3) Bulbls: Amaryllis, Anemonel Freesia, Gladiolus, Hyacith, Iris, Ltlltum, Narcisus, Tulip, Tuberose etc.

PRACTICAL

Identification, Nursery raising, planting and cultural operation, Harvesting and Packing of important flowers.

BOOKS RECOMMENDED

1. Bose, T. K. and L. P. Yadva (1989). Commercial Flowers. Naya Prokash, Calcutta, Indian.
2. Chadha, K., I. And B. Choudhary (1986). Ornamental Horticultural in India. Indian council of Agricultural Research New Dehli.
3. Larson, R. A. (1980). Introduction to Floriculture. Academic Press, New York.
4. Randhawa, G. S. and A. Mukhopadhay (1986). Floriculture in India. Applied Publishers Private Limited New Dehli.
5. salinger, J. P. (1985). Commercial Flower Growing. Butterworth, Horticultural Book.
6. Yadav, I. S. and M. L. Choudhary (1997). Progressive Floriculture-Production Technologies of Important Commercial Flower Crops. The House of Sarpan, Banglore.

HORT- 603 CERTIFIED SEED PRODUCTION OF HORTICULTURAL CROPS 3(2-2)

THEORY

Importance of seed production. Seed germination and its controlling factors in arid areas. Cultivation. harvesting, extraction, drying, cleaning processing, storage and marketing of certified seeds of Root, bulk, fruit and leafy vegetables; various flowers and important fruits of and areas.

PRACTICAL

Seed identification, germination tests. Selling and Crossing Techniques in horticultural crops extraction, drying and storage of seeds.

BOOKS RECOMMENDED

1. Agrowal, R. M. 1980. Seed Technology. Oxford and IBH Publishing company, New Dehli Bombay
2. George Raymond, A. T. 1985. Vegetable Seed Production: Longman Group New York, London.
3. Robert, E. H. 1974. Viability of Seeds. Chapman and Hall Ltd. London.
4. Thompson, J. R. 1979. An Introduction to Seed Technology. John Wiley and sons. New York, Toronto.

HORT- 605 USES OF GROWTH REGULATORS IN HORTICULTURAL CROPS 3(3-0)

THEORY

Classification, importance, mode of action of growth regulators, their uses in various physiological functions of the plants such as seed dormancy, rooting and plant growth, flowering, fruit set and parthenocarpacy, fruit thinning, fruit maturity, fruit ripening, senescence and plants resistance in relation to uses of growth regulators.

BOOKS RECOMMENDED

1. Delvin, R. M. and F. M. Witman (1983). Plant Pathology Willard Grants Press, Boston.
2. F. B. Salisbury & C. W. Ross (1985). Plant Physiology (2nd Ed.). Wadsworth Publishing Company. Inc.
3. Nickell, L. g. (1982). Plant Growth Regulators (Agri. Uses). Springer Verlagj, Berlin, Heidelberg, New York.
4. Wareing, P. F. and 1. D. J. Philips (1981). Growth and Differentiation Plants. Pergamon Press, New York
6. Weaver, R. V. 1992, Plant Growth Substance in Agricultures. W. H. Freeman Co. San Francisco.

Faculty Resume

The brief summary of CV's regarding all faculty staff is given below, where as detail of each faculty member is given in the proceeding paragraphs:

Name	Position	Qualification	Specialization
Dr. Ishfaq Ahmed Hafiz	Associate Professor	Ph. D	1. Protected Vegetable Farming 2. In-Vitro propagation of Horticultural Crops 3. Certified Seed and Nursery Production of Horticultural Crops
Dr. Khalid Mahmood Qureshi	Associate Professor	Ph. D	1. Arid Zone Horticulture
Dr. Imran Hassan	Assistant Professor	Ph.D	1. Introductory Horticulture 2. Commercial Flower Production 3. Horticultural Crop Production
Ms. Najma Yousaf Zahid	Assistant Professor	M. Sc. (Hons)	1. Production of Tropical & Sub-tropical Fruits 2. Medicinal and Aromatic Plants
Dr. Shahid J. Butt	Assistant Professor	Ph.D	1. Winter Vegetables 2. Temperate Fruit Production

Dr. Muhammad Azam Khan	Assistant Professor	Ph.D	Protected Vegetable Farming
Mr. Umer Habib	Lecturer	M. Sc. (Hons)	Ornamental Horticulture
Ms. Mehwish Yaseen	Lecturer	M. Sc. (Hons)	Physiology of Horticultural Plants
Ms. Qurat-ul-Ain Farooq	Lecturer	M.Sc. (Hons)	Introductory Landscape Gardening

Name	**Dr. Ishfaq Ahmad Hafiz**
Personal	**Father's Name** : Muhammad Sharif **Date of birth** :July 19, 1960 **N.I.C. No.** :266-60-064671 **Postal Address** : Department of Horticulture, University of Arid Agriculture Murree Road Rawalpindi Pakistan **Permanent Address** : Main Bazar Ashraf Town Pindorian Distt. & Teh. Islamabad **E.mail** : decenthafiz60@yahoo.com
Experience	**Date:**. 2/88-12/89 **Title:** Agricultural Officer **Institution:** Agriculture Extension Wing,Agriculture Deptt. **Date:** 1/90-8/98. **Title:** Assistant research officer **Institution:** Barani Agriculture Research Institute Chakwal Agriculture Research Wing,Agriculture Deptt. **Date:** 21.07.98 to 07.04.2000 **Title:** Assistant research officer **Institution: Mango Research Station, Shujabad, Multan** **Date:** 08-04-2000 to 29-8 2003 **Title:** Assistant research officer **Institution: Horticulture Research Institute**

	Faisalabad **Date:** 30-8-2003 to 01-08-2006 **Title:** Assistant Professor **Institution:** Department of Horticulture, PMAS-Arid Agriculture University Rawalpindi **Date:** 2-08-2006 to date **Title:** Associate Professor **Institution:** Department of Horticulture, PMAS-Arid Agriculture University Rawalpindi
Honor and Awards	• Member, M.Sc.(hons) Horticulture written and oral committee PMAS-AAUR • Member Accademic Committee Horticulture PMAS-AAUR • Referee for J of Botany, Botanical Society of Pakistan • Referee for Intl J Agri and Bio (IJAB), Pakistan • Referee for Intl J Argi and Social Sci, Pakistan • Referee for Pakistan J. of Agriculture (PARC) • External Examiner University of Agriculture Faisalabad • Participated more then 3 national and international forums for horticulture/agriculture presentation • Competitive merit scholarship for PhD. • First Position in the Horticulture department during B. Sc. (Honors). • Throughout merit scholarship holder during 2 years university tenure.
Memberships	• Horticultural Foundation of Pakistan • Pakistan Botanical Society
Publications	Ibrahim, M., N. A. Abbasi, H. Rehman, A.

	Hussain and I. A. Hafiz. 2011. Phenological behaviour and effect of different chemicals on pre-harvest fruit drop of sweet orange cv. 'Salustiana'. Pak. J. Bot., 43(1): 453-457. (**IF 0.947).** Abbasi, N. A., A. Hussain and I. A. Hafiz. 2011. Loquat production in Pakistan and strategies for improvement. Acta Hort. 887: 117-121. Baig, M.M.Q. , I.A. Hafiz, A. Hussain, T. Ahmad and N.A. Abbasi. 2011. An efficient protocol for *in vitro* propagation of *Rosa gruss an teplitz* and *Rosa centifolia.* African J. Biotechnol., 10(22): 4564-4573. (**IF 0.573).** Hussain, A., N. A. Abbasi, I. A. Hafiz and S. Z. Hasan. 2011. A comparative study of five loquat Genotypes at Tret, Muree, Pakistan. Pak. J. Bot., 43(5): 2503-2505. **(IF 0.947**). Hussain, A., N.A. Abbasi, I.A. Hafiz and S. Zia-ul-Hasan. 2011. A comparison among five loquat genotypes cultivated at Hasan Abdal and Wah. Pak. J. Agri. Sci. 48(2): 103-107. Baig, M. M. Q.., I.A. Hafiz, N. A. Abbasi, M. Yaseen, Z. Akram, and D. J. Donnelly, 2012. Reduced-stature Rosa species through *in-vitro* mutagenesis. Canadian J. Plant Science, 10.4141/cjps2011-199. (**IF 0.547**). Abbas G., I. A. Hafiz, N.A. Abbasi and A.

	Hussain 2012**.** Determination of processing and nutritional quality atributes of potato genotypes in Pakistan. *Pak. J. Bot*., 44(1): 201-208. (**IF 0.83**). Tareen, M.J., N.A. Abbasi and I.A. Hafiz. 2012. Effect of salicylic acid treatments on storage life of peach fruits cv. "Flordaking". Pak. J. Bot. 44(1): 119-124(**IF 0.83**). Zahid, N.Y., N. A. Abbasi, I. A. Hafiz, A. Hussain and Z. Ahmad. 2012. Antifungal activity of local fennel (*Foeniculum vulgare* Mill) extracts to growth responses of some soil diseases. African Journal of Microbiology Res., 6(1): 46-51. (IF **0.533**). Yaseen M, Ahmad T, Sablok G, Standardi A, Hafiz IA**.** 2012 Review: role of carbon sources for in vitro plant growth and development. Mol Biol Rep. 10.1007/s11033-012-2299-z 2012 Dec 5. **(IF 2.93).** Mahmood I., A. Razzaq, Z. D. khan, I. A. Hafiz, and S. Kaleem, 2012, Evaluation of tissue culture responses of promising wheat(*Triticum Aestivum L*.) cultivars and development of efficient regeneration system. *Pak. J. Bot*., 44: 277-284. (**IF 0.83**) Abbasi, N.A**.**, A. Rehman and A. Hussain. 2012. Foliar spray of ethanol affected fruit growth, yield and postharvest performance of 'Sahil' tomato. Acta Hort. (ISHS) 945:363-368. Shabbir, K., T. Ahmad, I. A. Hafiz, A. Hussain, N. A. Abbasi and J. Ahmad. 2012. In vitro regeneration of *Gerbera jamesonii* cv. Sunglow. African Journal of Biotechnology

	11(42), 9975-9984. Iqbal, D., U. Habib, **N**. A. Abbasi and A. N. Chaudhry. 2012. Improvement in postharvest attributes of zinnia (*Zinnia elegans* cv. Benary's Giant) cut-flowers by the application of various growth regulators. Pak. J. Bot., 44(3): 1091-1094. **(IF 0.83).** Tareen, M. J., N.A. Abbasi and I.A. Hafiz. 2012. Postharvest application of salicylic acid enhanced antioxidant enzyme activity and maintained quality of peach cv. 'Flordaking' fruit during storage. Scientia Hort., 142:221-228. **(IF 1.527).** Abbasi, N. A.*, M. Zahoor, H. A. Khan and A. A. Qureshi. 2012.Effect of encapsulated calcium carbide application at different growth stages on potato (*Solanum tuberosum* L.) growth, yield and tuber quality. Pak. J. Bot., 44(4): 1543-1550. **(IF 0.83).** Riffat Ayesha [1], Noreen Fatima [2], Atif Kamal [4], Khalid Mahmood Qureshi [1], Ishfaq Ahmad Hafiz [1], Khalid Saifullah Khan[1.] 2011. Influence of Different Growth Media on the Fruit Quality and Reproductive Growth Parameters of Strawberry(*Fragaria ananassa*). J. Med. Plants Res., 5(26): 6224-6232. **(IF**: **0.879).**

Name	**Dr. Khalid Mahmood**
Personal	**Father's Name** : Allah Loke Qureshi **Date of Birth** : 07-03-1959 **N.I.C. NO.** : 61101-1748794-1 **Nationality** : Pakistani **Postal Address** : University of Arid Agriculture, Murree Road Rawalpindi. **Permanent Address** : Village & P.O. Panjwarian, The: Kharian Distt. Gujrat, Pakistan or House # 359, Street # 13, Shehzad Town Islamabad **Phone** : +92-51-9290771; 0300-5241628 **Email** : kmq_2008@hotmail.co.uk
Experience	**Date:** January 10. 06.1985 to 02. 02. 2000. **Title:** Scientific Officer **Institution:** Fruit Crops, National Agriculture Research Centre. Park Road Islamabad. **Date:** 02. 02. 2000 to 29-02-2007 **Title:** Senior Scientific Officer **Institution:** Fruit Crops, National Agriculture Research Centre. Park Road Islamabad.

	Date: 01.03. 2007 to date **Title:** Associate professor **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi
Honor and Awards	• Awarded University BSc and MSc Merit Scholarships during 1980-1984. • Awarded six months training on citrus production and management in 1989 • Won ARP 11 Merit Scholarship for Ph.D. in 1994 funded by USA. • Got merit scholarship for Post doctorate in 2007 from Higher Education Commission, Islamabad.
Memberships	*Islamabad Horticultural Society, Islamabad.
Publications	1. Qureshi K. M, F. Hassan, Hassan. Q, Qureshi, U. S,Chughtai S, Saleem. A. 2012. Impact of cultivation systems on growth *and yield of* strawberry cv. "chandler". Pakistan Journal of Agricultural Research.Vol 25 (2) 129-135.. 2. Khalil. F., K.M. Qureshi, A.Khan, F. Hassan, N. Bibi **2012**. Effect of girdling and plant growth regulators on productivity in olive (Olea *europaea*) Pakistan Journal of Agricultural Research. Vol.25 (2) 120-128. 3. Khalid Mahmood Qureshi, Saman Chughtai, Usman Shoukat Qureshi and Nadeem Akhtar Abbasi. Impact of exogenous application of salt and growth regulators on growth and yield of strawberry. Presented in 7th international strawberry symposium ISHS Beijing China 18-22 February, 2012 4. Khalid Mahmood Qureshi, Naheed Akhtar, Imran Hassan and Nadeem Akhtar Abbasi. 2011. Effect of mulches on vegetative and reproductive growth of

	strawberry cv. “chandler” Presented in 7th international strawberry symposium ISHS Beijing China 18-22 February, 2012

Name	Dr. Imran Hassan
Personal	**Father Name** : Maqsood-ul-Hasan **Date of Birth** : 23-03-1970 **N.I.C No** : 37405-5803547-7 **Nationality** : Pakistani **Domicile** : Rawalpindi **Marital Status** : Married
Experience	Fourteen years & 10 months work experience of teaching, research and conducting examination of the under-graduate & post-graduate student in the Department of Horticulture**,** Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi **Additional Managerial Charge Experience:** Worked for **7 years** in all on additional charge as **Incharge University Lawns** from August, 1997 to May, 2000 and from May 2005 to May 2009 in PMAS, AAUR. Served for **12 years and 8 months** in all as from August, 1997 to Feb, 2002 and from May, 2005 to May 2009 nominated by Chairmen, Department of Horticulture, PMAS, AAUR. Worked **as Coordinator, Time Table & Date Sheet** of Horticulture Department from 2010 to date as nominated by Dean, FC& FS, PMAS, AAUR Served for **7 years** from 1997 to 1999 and from May, 2005 to May 2009 as Incharge Laboratory, Department of Horticulture, PMAS, AAUR
Publications	Nil

Name	**Najma Yousaf Zahid**
Personal	**Father's Name** : Najma Yousaf Zahid **Date of Birth** : 17-04-1970 **N.I.C. NO.** : 37405-0555365-2 **Nationality** : Pakistani **Postal Address** : University of Arid Agriculture, Murree Road Rawalpindi. **Permanent Address** : House no 2, St no 2.Khanqah Dogran, Distt. Sheikhupura, Pakistan. **Phone** : +92-51-9062261; 0345-5909858 **Email** : honey_neema2003@yahoo.com najma.zahid@uaar.edu.pk
Experience	**Date:** Aug 16, 1995 to March 30, 1998. **Title:** Consultant Agriculturist (Horticulture) **Institution:** The Aga Khan Rural Support Programme,Gilgit. NAs Areas of Pakistan. **Date:** 27-04-1998 to 30-11-2005 **Title:** Lecturer **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi **Date:** 02-12-2005 to date. **Title:** Assistant professor **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi
Honor and	• Indigenous Scholarship for Ph.D. in 2001

Awards	from Higher Education Commission Islamabad. Pakistan.
Memberships	*Islamabad Horticultural Society, Islamabad. * Member of Pakistan Botanical Society.

Publications	• Zahid,N.Y;N.Abbassi,Z.Ahmed;H.Ishfaq(2012). Antifungal Properties of local fennel (*Foeniculum vulgare* Mill.) response to some soil diseases.Afrincan J of Microbiology research.vol 6(1) pp 46-51.jan 2012 • Zakia ,S; Zahid,N.Y;N.Abbassi;H.Ishfaq;M.Nasir. Booklet on Micropopagation of Aloe vera (Aloe barbadensis). Laplambert Accadamic Publishing Germany.ISBN:978-3-8443-23788.2012 • Zakia,S.Zahid,N.Y;N.Abbassi;H.Ishfaq;M.Nasir.Standarization of micro propagation for Aloe vera-A Pharamaceutically important Plant.Accepted for Pak.J.of Pharmaceutical Sciences, Oct 2012.

Name	**Umer Habib**
Personal	**Father's Name** : Umer Habib **Date of Birth** : 01-10-1980 **N.I.C. NO.** : 33303-2924087-7 **Nationality** : Pakistani **Postal Address** : University of Arid Agriculture, Murree Road Rawalpindi. **Permanent Address** : Chak #401 J.B, Toba Tek Singh **Phone** : +92-333-6503650 **Email** : horticulture@hotmail.com umer@uaar.edu.pk
Experience	**Date:** 01-06-2003 to 30-05-2007 **Title:** Landscape Consultant **Institution:** Self-employed (Faisalabad) **Date:** 01-06-2007 to 30-12-2007 **Title:** Consultant Horticulturist **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi **Date:** 25-01-2008 to date. **Title:** Lecturer **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi
Honor and Awards	• Won Merit Scholarship for B.Sc. (Hons.) at University of Agriculture, Faisalabad. • Won Merit Scholarship for Ph.D. in 2008

	(Under process) by HEC.
Memberships	*Agricultural Foundation of Pakistan. *Rotary International, District 3270 (Pakistan, Afghanistan) *Rover Scouts Unit, University of Agriculture, Faisalabad, Pakistan. *Horticulture Society of Pakistan, Inst. of Hort. Sci., University of Agri., Faisalabad, Pakistan. *SRCD (Society for Research in Child Development), New York, U.S.A. *Pakistan Botanical Society *Pakistan National Rose Society
Service Activity	• Teaching of courses of horticulture science at graduate and postgraduate Levels. • Research and execution of developmental projects. • To look after administrative and developmental affair of the University lawns. • To coordinate departmental activities • To look after development of horticultural activities at University Research Farm, Koont.
Brief Statement of Research Interest	• Landscape/Landscape ecology • Ornamental horticulture

Publications	Nil

Name	**MEHWISH YASEEN**
Personal	**Father's Name** : Muhammad Yaseen **Date of Birth** : 19-01-1984 **N.I.C. NO.** : 37406-1585984-6 **Nationality** : Pakistani

	Postal Address : University of Arid Agriculture, Murree Road Rawalpindi. **Permanent Address**: A-327, Gulistan Colony, Wah Cantt **Email** : wahct_uaar@yahoo.com mehwishyaseen_108@hotmail.com
Experience	**Date:** 18-03-2009 to 18-09-09. **Title:** Research Fellow **Institution:** Horticultural Research Institute (HRI), National Agriculture Research Center, Islamabad **Date:** 15-09-2009 to date. **Title:** Lecturer **Institution:** Department of Horticulture, University of Arid Agriculture, Rawalpindi
Memberships	*Islamabad Horticultural Society, Islamabad. * Pakistan Botanical Society.
Service Activity	• Teaching of courses of horticulture science at graduate, postgraduate levels. • Organizing and managing tissue culture labs. • Standardization of micropropagation protocols for different horticultural crops. • Supervision of M.Sc (Hons). students in research activities.
Brief Statement of Research	• Production of Horticultural Crops • In vitro/Plant tissue culture studies • Application of biotechnological techniques in

Interest	horticulture
Project	• Reward of project entitled **"Development of low cast tissue culture technology for the mass scale production of disease free seed potato"** from PMAS-AAUR**.**
Publications	