Self Assessment Report

Of

Department of
Forestry and Range Management
July 2011
(Under Graduate Program)

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Rawalpindi

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Introduction
Department of Forestry & Range Management

The Department of Forestry & Range Management was established in the year 2002 at the University of Arid Agriculture Rawalpindi, prior to this the subject of Forestry and Range Management was taught as minor subject to the undergraduate students of Faculty of Crop and Food Sciences. Now the department is offering the degree of 34 student in B.Sc. (Hons.) Agriculture major in Forestry & Range Management at undergraduate level.

The department of Range Management & Forestry has initiated the academic programmes at B.Sc. (Hons) and currently has enrollment of 34 students in B.Sc. (Hons.) The department already has published 91 research papers since its establishment.

The establishment of the department of Forestry & Range Management is a new addition to the University’s expanding academic programmes. The establishment of the department has a mandate to carry teaching and research, suggesting remedial measures to improve the problems of land degradation, with special emphasis on problems of rangeland degradation, deforestation and proper management of natural resources of a regions of the country.

A new scheme of studies has been implemented as recommended by HEC under revised syllabus of Forestry undergraduate program. The courses includes core forestry, range management, biodiversity and climate change aspects. The scheme of studies is also supported by adding referenc text books and journals.

The initial practical facilities were established both in the lab as well as in the field. A range forage grass, shrubs and tree nursery has been established in the research farm of UAAR at Koont Chakwal for providing practical training to the students about major forage species particularly the drought tolerant range plants. Under the HEC funded project, new infrastructure including research laboratories and field laboratory has been established in university. A fair number of latest books on the subject have also been purchased and placed in the Library for ready reference to the students. Necessary laboratory equipment (both field and lab.) related to Forestry & Range Management research activities has been purchased under the HEC project. The major equipment include the wood quality testing machine, wood seasoning chamber, wood preservation unit, wood workshop and allied laboratory equipment to support research studies on range germplasm evaluation and Forest inventory.

The projects and internship is focused on forest biomass and productivity estimations, above and below ground carbon stocks estimations in natural forests, nutritional quality and carrying capacity in rangelands of Pakistan, Phytosociology and effect of fire on natural forests.

In Future internship studies of the Department would address land degradation issues (both forest and rangelands) as well as developing range improvement techniques aimed at combating land degradation and desertification in semi-arid and arid areas of the country collaborative activities/projects.
A number of seminars have also been organized to highlight the land degradation issues among various stakeholders. A consultative workshop on status implementation of NAP and UNCCD in Pakistan was organized by the University of Arid Agriculture, in collaboration with Ministry of Environment, Government of Pakistan. About fifty participants from various organizations participated in the workshop and finalized draft report to be submitted to UNCCD secretariat.

Currently three research projects are running by the faculty of the department funded both by university and United Nation Development Programme worth Rs. 2.023 m. These projects have been completed now.

The department is having five PhD and three non-PhD Teacher who are also enrolled in PhD both National and Foreign University.
The self assessment is based on a number of criteria. To meet each criterion several Standards have been established. This section describes how the standards of the Criterion 1 are met.

**Standard 1-1: The program must have documented measurable objectives that support institution mission statements**

**Mission statement of Forestry & Range Management Department**

The mission of the department is to deliver quality education and producing quality graduate in the field of Forestry, Range Management, Agro forestry, Watershed Management and Environmental forestry and forest degradation to ensure scientific management of the natural forests of the country to cope with the demand of wood at national level.

**Objectives**

1. To provide quality training and education in the field of Forestry and Range Management to produce educated and skilled manpower.

2. The extension of newly developed technologies in the field of Forestry & Range Management to relevant stakeholders in rain fed areas through workshops, seminars and field days. .

3. To establish linkages with national and international research institutions and with the industry for mutual benefit and progress in the field of Forestry & Rangeland Management.

**Main elements of strategic plan to achieve mission and objective**

1. Development of a sound teaching system based on the experience and vision gathered from world reviews, literature, innovations, proceedings, symposia etc. for the award of degrees.

2. Designing of curricula involving core subjects, elective subjects, specialized areas, internship programs and study tours.

3. Setting up of well equipped specialized laboratories for the students and researchers, depending upon the available resources.

4. Publication of scientific papers, books, manuals etc.

5. Implement of research projects funded by the Universities and other agencies.

6. Arranging field tours to impart first hand knowledge to the students about field and Forest Management Techniques.

The assessment of the program objectives through different criteria is presented in Table 1.
Table 1: Program Objective Assessment

<table>
<thead>
<tr>
<th>S. #</th>
<th>Objective</th>
<th>How Measured</th>
<th>When Measured</th>
<th>Improvement Identified</th>
<th>Improvement made</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To impart training and education in the field of Forestry &amp; Range Management. To produce educated and skilled manpower</td>
<td>Background information and status of knowledge of students through previous academic qualification and students feedback</td>
<td>At the time of admission semester</td>
<td>Some basic courses to be included in the curriculum</td>
<td>Revision of curriculum made in year 2009 and 2010.</td>
</tr>
<tr>
<td>2</td>
<td>To extend newly developed technologies in the field of Forestry &amp; Range Management. To relevant stakeholders in rainfed areas.</td>
<td>Through surveys, monitoring of forests, assess manpower, farmers feedback and potential farmers interaction</td>
<td>Continuous activity</td>
<td>Problematic areas being identified/ New courses to be included in curriculum, research on new problem</td>
<td>Approval of new curriculum integrated approaches/ research initiated on identified areas.</td>
</tr>
<tr>
<td>3</td>
<td>To establish linkages with national and Int. research inst.&amp; with the industry for mutual benefit and progress in the field of F&amp; RM.</td>
<td>Through visiting forestry based industries/ by collaborative projects.</td>
<td>Continuous activity</td>
<td>By visiting forest based industries.</td>
<td>Collaboration established/ Enhancement of knowledge and vision</td>
</tr>
</tbody>
</table>

Standard 1.2: *The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.*

Program Learning Outcomes

All the students in Forestry & Range Management should possess the ability of:

1. Communication skills through presentations, oral discussions, review articles, etc.
2. Preparation of projects based upon identification of problems and use of new analytical techniques.
3. Identification of priority problems and their solution.
4. Enhancement of knowledge and vision.
5. Scientific writing and publication of research papers.

A number of survey based on the QEC questionnaires were conducted to assess the program outcomes of the department/graduates. Program outcomes are presented in Table 2.

Table 2: Program Objectives VS Program Outcomes

<table>
<thead>
<tr>
<th>Program Objectives</th>
<th>Program Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Develop communication skills</td>
</tr>
<tr>
<td>Education</td>
<td>++</td>
</tr>
<tr>
<td>Training</td>
<td>++</td>
</tr>
<tr>
<td>Extension of Technologies</td>
<td>++</td>
</tr>
<tr>
<td>Linkages with R&amp;D institutions</td>
<td>++</td>
</tr>
</tbody>
</table>

+ = Moderately satisfactory  
++ = Satisfactory  
+++ = Highly satisfactory.

Program Assessment Results

Teacher’s evaluation

There are seven teachers in the department namely:

1. Prof. Dr. Sarwat N. Mirza  Professor/ DEAN
2. Dr. Irshad A. Khan,  Associate Professor/ Chairman
3. Dr. Syed Moazzam Nizami,  Associate Professor
4. Dr. Abdul Khalilq,  Assistant Professor ( On study leave)
5. Dr. Aamir Saleem,  Lecturer (Leave Vacancy)
6. Mr. Saeed Gulzar,  Lecturer
7. Ms. Lubna Ansari,  Lecturer
8. Mr. Irfan Ashraf,  Lecturer (on study leave)

All the teachers are involved in teaching of different subjects in the department. They were evaluated by the students at the end of the semester in accordance with proforma-10
The scoring rates were fixed between 1-5 for outstanding performance, 4 for very good, 3 for good, 2 for fair, and 1 for poor performance. On these bases, the results were compiled from the proforma-10 (for fall 2009 and spring 2010 semester). Results are graphically presented in figure 1. The overall compiled result showed that the top scoring in the department is 4.67 and lowest is 3.64. The grading of the teachers is shown in Figure 1.

**Figure 1. Teacher’s Evaluation**

<table>
<thead>
<tr>
<th>Name</th>
<th>Course Title</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. S.M. Nizami</td>
<td>FR 501</td>
<td>4.67</td>
</tr>
<tr>
<td>Saeed Gulzar</td>
<td>FR 503</td>
<td>4.46</td>
</tr>
<tr>
<td>Lubna Ansari</td>
<td>FR 508</td>
<td>4.06</td>
</tr>
<tr>
<td>Dr. Irshad A. Khan</td>
<td>FR 401</td>
<td>3.64</td>
</tr>
<tr>
<td>Dr. Aamir</td>
<td>FR 611</td>
<td>4.38</td>
</tr>
</tbody>
</table>

Note: Dr. Abdul Khaliq - Assistant Professor was on study leave for Post Doctorate Fellowship in Canada during fall 2009 and spring 2010 semester.
Mr. Irfan Ashraf - Lecturer was on study leave for PhD in Canada during fall 2009 and spring 2010 semester.

Detail of individual performance of each teacher is obvious from the Pie-charts given below:

**Dr. Syed Moazzam Nizami - Assistant Professor (FR 501)**
The pie charts show that students were 100% satisfied with the teacher and are having a positive view of the teacher's knowledge, as indicated by the pie chart showing 100% strongly agree. The teacher has demonstrated knowledge very well.

1. Instructor is prepared for lecture
   - Strongly Agree 100%

2. Instructor demonstrates knowledge of subject.
   - Strongly agree 100%

3. Instructor has completed the course.
   - Strongly Agree 100%

4. Instructor provides material apart from text.
   - Agree 8%
   - Strongly Agree 82%

5. Instructor gives citations regarding current situation w.r.t Pakistan
   - Strongly Agree 100%

6. The Instructor communicates the subject matter effectively.
   - Strongly Agree 100%
7. Instructor shows respect to students.

8. The Instructor maintains environment that is conducive learning

9. The instructor arrives on time

10. Instructor leaves on time.

11. Instructor is fair in Examination

12. Instructor return the graded scripts
13. Instructor is available in off times

14. The course integrates the theory concepts with real world

15. The subject has increased the knowledge

16. The syllabus clearly states the objectives

17. The course integrates the theory concepts with real world

18. The Assignment & Exams cover the material presented.

19. The course is modern & updated.

100% Strongly Agree

39% Agree

100% Strongly Agree

72% Strongly Agree

23% Agree

67% Strongly Agree
Dr. Irshad A. Khan (FR 401).

The pie charts show that the students were satisfied with the performance of the teacher. However more than 8% students revealed that the teacher did not give citation regarding current situations with reference to Pakistani context. Similarly more than 8% students were not satisfied with teacher’s respect towards student.
General Comments of the Students about this Teacher

Weaknesses:

- Irrelevant topics should not be included in the syllabus by the tutor.
- Teacher should improve his teaching skills and should not dictate the lectures.
- Teacher should include modern concepts in his lectures.

Strengths:

- Teacher was good in behavior and friendly.
Dr. Aamir Saleem-Lecturer (FR 611)
The graph from the teacher’s evaluation shows that this teacher has knowledge of the subject and can communicate it to students easily.

1. Instructor is prepared for each class.
   - Strongly Agree: 92%
   - Agree: 8%

2. Instructor demonstrates knowledge of subject.
   - Strongly Agree: 100%

3. The Instructor has completed the whole course
   - Uncertain: 8%
   - Agree: 23%
   - Strongly Agree: 69%

4. The Instructor provides additional material apart from text
   - Agree: 14%
   - Strongly Agree: 79%

5. The Instructor gives citations regarding current situations with reference to Pakistani context
   - Agree: 8%
   - Strongly Agree: 92%

6. The Instructor communicates the subject matter effectively
   - Agree: 8%
   - Strongly Agree: 92%
7. The instructor shows respect towards students and encourages class participation
- Strongly Agree: 92%
- Agree: 8%

8. The instructor maintains an environment that is conducive to learning
- Strongly Agree: 100%

9. The instructor arrives on time
- Strongly Agree: 92%
- Agree: 8%

10. The instructor leaves on time
- Strongly Agree: 92%
- Agree: 8%

11. The instructor is fair in examination
- Strongly Agree: 77%
- Agree: 15%
- Uncertain: 8%

12. The instructor returns the graded scripts etc in a reasonable amount of time
- Strongly Agree: 100%
13. The instructor was available during the specified office hours and for after class consultations.

- Agree 8%
- Uncertain 8%
- Strongly Agree 84%

15. The subject matter presented in the course has increased your knowledge of the subject.

- Uncertain 8%
- Agree 23%
- Strongly Agree 69%

16. The syllabus clearly states course objectives, requirements, procedures, and grading criteria.

- Agree 3%
- Strongly Agree 77%

17. The course integrates theoretical course concepts with real-world applications.

- Strongly Agree 92%

19. The course material is modern & updated.

- Uncertain 17%
- Agree 33%
- Strongly Agree 50%

Students did not give any general comments on the teacher.
Mr. Seed Gulzar - Lecturer (FR 503)

The evaluation of this teacher is presented in the following pie charts. In the following graphs students are having opinion that teacher is always prepared for the class and tell the things in context to Pakistan also. Fifty percent are agree with the provision of material by the teacher.

1. Teacher is prepared for class

2. Teacher demonstrate knowledge of subject.

3. Teacher has completed the course.

4. Teacher provides additional material

5. Teacher gives citation in context to Pakistan

6. Teacher communicates subject matter effectively
In general comments students are having perception that teacher is jolly but very strict. He provides knowledge and behaves very well.
Ms. Lubna Ansari (RF 508)

Following charts represents the evaluation of this teacher according to Performa 1. In the following graphs it is concluded that teachers is mostly prepared for the class and demonstrate the knowledge very well.

1. The instructor is prepared for each class

- A: 17%
- SA: 83%

2. The instructor demonstrate the knowledge of the subject.

- A: 44%
- SA: 56%

3. Teacher has completed the course.

- A: 33%
- SA: 67%

4. Instructor provides material apart from text.

- UC: 17%

5. Instructor gives citation regarding current situation w.r.t Pakistan

- Agree: 44%
- Certain: 0%

6. The instructor communicates the subject effectively.

- Agree: 39%
- Strongly Agree: 61%
13. Instructor is available in off times also.

15. Subject has increased knowledge.

16. The syllabus clearly states the objectives.

17. The course integrates the theory with real world

18. The assignment & Exams covered the material presented.

19. The course is modern & Updated.
Student course evaluation

Following courses were offered by the department in the fall 2009-10 and spring 2010 Semester.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Course Code</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Agroforestry and watersheds</td>
<td>FR 401</td>
<td>Dr. Irshad A. Khan</td>
</tr>
<tr>
<td>General Silviculture</td>
<td>FR 501</td>
<td>Dr. S.M. Nizami</td>
</tr>
<tr>
<td>Forest Law and Policy</td>
<td>FR 611</td>
<td>Dr. Aamir Saleem</td>
</tr>
<tr>
<td>Principles of Agroforestry</td>
<td>FR 503</td>
<td>Mr. Saeed Gulzar</td>
</tr>
<tr>
<td>Range Vegetation and Livestock interactions</td>
<td>RF 508</td>
<td>Ms. Lubna Ansari</td>
</tr>
</tbody>
</table>

The courses of the respective teachers were evaluated per Performa 1 (Annexure II) and the results are shown in graphical form in the graph below. It is clear from the graph that the course number FR-501 is on the top and Course FR 401 is at lowest rank as per student evaluation. The position of other courses can be well judged from the graph below.
Assessment of each course is presented in the following pie charts:

**Introduction to Agro forestry and Watersheds. (FR 401) Dr. Irshad A.**

The course entitled “Introduction to Agro forestry and Watersheds” was taught by Dr. Irshad A. Khan and was evaluated by the students through proforma no: 1. The perception of the students for this course is well defined in the following pie charts.
9. I think the course was well constructed to achieve the learning outcomes (there was good balance of lecture, tutorials, practical.)

10. The learning & teaching method encouraged participation.

11. The overall environment in the class was conducive to learning.

12. Classrooms were satisfactory

14. Learning materials (lesson plans, course notes etc.) were relevant and useful.

15. Recommended reading books etc. were relevant and appropriate.
General Comments of the Students about the Course revealed that:

- Practical durations should be increased. Course can be improved by adding more practicals and new techniques.
The course entitled “Forest Law & Policy” was taught by Dr. Aamir Saleem and was evaluated by the students through proforma no: 1. The perception of the students for this course is well defined in the following pie charts.
9. I think the course was well constructed to achieve the learning outcomes (there was a good balance of lecture, tutorials, practical etc.):

- Agree: 23%
- Strongly Agree: 77%

10. The learning and teaching methods encouraged participation:

- Agree: 23%
- Strongly Agree: 77%

11. The overall environment in the class was conducive to learning:

- Strongly Agree: 69%
- Agree: 15%
- Uncertain: 8%
- Disagree: 6%

12. Class rooms were satisfactory:

- Strongly Agree: 46%
- Agree: 28%
- Disagree: 6%
- Uncertain: 8%

14. Learning materials (lesson plans, course notes etc) were relevant and useful:

- Strongly Agree: 84%
- Agree: 8%
- Uncertain: 8%

15. Recommended reading books etc were relevant and appropriate:

- Agree: 38%
- Strongly Agree: 62%
16 The provision of learning resources was adequate

17 The provision of learning resources on the web was adequate

19 The course stimulated by interest and thought on the subject area

20 The pace of the course was appropriate

21 Ideas and concepts were presented clearly

23 The method of assessment were reasonable
31. The material in the tutorial was useful

32. I was happy with the amount of work needed of tutorials

33. The tutor dealt effectively with my problems

34. The material in practical was useful

35. The demonstrators dealt effectively with my problems.
The course entitled “General Silviculture” was taught by Dr. Syed Moazzam Nizami and was evaluated by the students through proforma no: 1. The perception of the students for this course is well defined in the following pie charts.

1. Teacher has completed the course

2. The course workload was manageable.

3. The course was well organized (i.e., timely access to materials, notification of changes, etc)

5. Approximate level of your own attendance during the whole course

6. I participated actively in the course

7. I think I have made progress in the class
9. I think the Course was well structured to achieve the learning outcomes (there was a good balance of lecture, tutorials, practical etc.)

12. Classrooms were satisfactory

10. The learning and teaching methods encouraged participation.

14. Learning materials (Lesson Plans, Course Notes etc) were relevant and useful.

11. The overall environment in the class was conducive to learning.

15. Recommended reading Books etc. were relevant and appropriate
16. The provision of learning resources in the library was adequate and appropriate

- Strongly Agree: 46%
- Agree: 53%
- Disagree: 11%
- Uncertain: 10%

20. The pace of the Course was appropriate

- Strongly Agree: 42%
- Agree: 53%
- Disagree: 5%
- Uncertain: 0%

17. The provision of learning resources on the Web was adequate and appropriate (if relevant)

- Strongly Agree: 15%
- Agree: 47%
- Disagree: 11%
- Uncertain: 20%

21. Ideas and concepts were presented clearly

- Strongly Agree: 79%
- Agree: 19%
- Disagree: 5%
- Uncertain: 0%

19. The Course stimulated my interest and thought on the subject area

- Agree: 53%
- Strongly Agree: 47%

23. The method of assessment was reasonable

- Strongly Agree: 53%
- Agree: 37%
- Disagree: 5%
- Uncertain: 10%
24. Feedback on assessment was timely

- Strongly Agree: 44%
- Agree: 44%
- Disagree: 6%
- Uncertain: 6%

28. The material was well organized and presented

- Strongly Agree: 71%
- Agree: 23%
- Disagree: 6%
- Uncertain: 6%

25. Feedback on assessment was helpful

- Strongly Agree: 40%
- Agree: 40%
- Disagree: 20%
- Uncertain: 20%

29. The instructor was responsive to student needs and problems

- Strongly Agree: 78%
- Agree: 22%

27. I understood the lectures

- Strongly Agree: 56%
- Agree: 44%

30. Had the instructor been regular throughout the course?

- Strongly Agree: 67%
- Agree: 22%
- Disagree: 5%
- Uncertain: 6%
31. The material in the tutorials was useful

- Agree: 53%
- Strongly Agree: 18%
- Uncertain: 29%

32. I was happy with the amount of work needed for tutorials

- Agree: 35%
- Strongly Agree: 12%
- Uncertain: 47%
- Disagree: 6%

34. The material in the practicals was useful

- Agree: 28%
- Strongly Agree: 72%

35. The demonstrators dealt effectively with my problems

- Agree: 8%
- Strongly Agree: 77%
- Uncertain: 15%
- Disagree: 15%
The course entitled “Introduction to Rangeland & wildlife Management” was taught by Mr. Saeed Gulzar and was evaluated by the students through proforma no: 10. The perception of the students for this course is well defined in the following pie charts.
9. I think the course was well structured to achieve:
   - Strongly Agree: 43%
   - Agree: 50%
   - Strongly Disagree: 2%
   - Uncertain: 5%

10. The learning and teaching methods encouraged participation:
   - Strongly Agree: 44%
   - Agree: 46%
   - Disagree: 2%
   - Uncertain: 8%

11. The overall environment in the class was conducive to learning:
   - Strongly Agree: 31%
   - Agree: 50%
   - Disagree: 18%
   - Uncertain: 3%

12. Classroom were satisfactory:
   - Strongly Agree: 11%
   - Agree: 20%
   - Disagree: 9%
   - Uncertain: 20%

14. Learning material (Lesson Plans, Course Notes etc) were relevant and useful:
   - Strongly Agree: 49%
   - Agree: 44%
   - Disagree: 5%
   - Uncertain: 2%

15. Recommended reading books etc. were relevant and appropriate:
   - Strongly Agree: 22%
   - Agree: 51%
   - Disagree: 8%
   - Uncertain: 16%
31 The material in the tutorials was useful
Disagree 3%
Uncertain 5%
Agree 53%
Strongly Agree 33%

32 I was happy with the amount of work needed for tutorials
Disagree 3%
Uncertain 3%
Agree 61%
Strongly Agree 28%

33 The tutor dealt effectively with my problems
Disagree 6%
Uncertain 8%
Agree 51%
Strongly Agree 29%

34 The material in the practicals was useful
Disagree 8%
Uncertain 5%
Agree 57%
Strongly Agree 30%

35 The demonstrator dealt effectively with my problems
Disagree 6%
Uncertain 17%
Agree 51%
Strongly Agree 26%
The course entitled “Livestocks Interactions” was taught by Ms. Lubna and was evaluated by the students through proforma no: 9. The perception of the students for this course is well defined in the following pie charts.

1. The teacher has completed the course.

2. The course workload was manageable.

3. The course was well organized.

4. Approx. level of your attendance.

5. I participated actively.

6. I think I have made progress in the class.
9. I think the course was well structured to achieve outcomes.

- Strongly Agree: 39%
- Agree: 61%

10. The learning & teaching method encouraged participation.

- Strongly Agree: 56%
- Agree: 44%

11. The overall environment of class was conducive to learning.

- Strongly Agree: 44%
- Agree: 50%
- Uncertain: 6%

12. Class rooms were satisfactory.

- Strongly Agree: 33%
- Agree: 39%
- Strongly Disagree: 22%
- Uncertain: 6%

14. Learning material were useful.

- Strongly Agree: 44%
- Agree: 56%

15. Recommended books were relevant.

- Strongly Agree: 33%
- Agree: 50%
- Uncertain: 17%
16. Provision of learning sources were adequate in library.
- Strongly Agree: 28%
- Agree: 50%
- Uncertain: 17%
- Strongly Disagree: 6%

17. The provision of learning sources on Web were adequate.
- Agree: 33%
- Strongly Agree: 44%
- Uncertain: 17%

19. The course simulated my thoughts towards subject.
- Agree: 44%
- Strongly Agree: 56%

20. The pace of course was appropriate.
- Agree: 44%
- Strongly Agree: 56%

21. Ideas & concepts were presented clearly.
- Agree: 39%
- Strongly Agree: 56%
- Uncertain: 5%

23. The method of assessment were reasonable.
- Agree: 50%
- Strongly Agree: 50%
24. Feedback & Assessment was timely.
- Uncertain: 6%
- Disagree: 6%
- Agree: 44%
- Strongly Agree: 44%

25. Feedback & Assessment was helpful.
- Uncertain: 6%
- Agree: 50%
- Strongly Agree: 44%

27. I understood the lectures.
- Agree: 50%
- Strongly Agree: 50%

28. The material was well organised & presented.
- Agree: 50%
- Strongly Agree: 50%

29. The instructor was responsive to students.
- Agree: 47%
- Strongly Agree: 53%

30. Had instructor been regular throughout the course?
- Agree: 39%
- Strongly Agree: 61%
31. The material in the tutorial was **helpful**

- Strongly Agree: 23%
- Agree: 65%
- Uncertain: 6%
- Disagree: 6%

32. I was happy with the amount of work given in tutorials.

- Uncertain: 18%
- Strongly Agree: 23%
- Agree: 53%

33. The tutor dealt effectively with the problems.

- Uncertain: 12%
- Strongly Agree: 29%
- Agree: 53%
- Disagree: 6%

34. The material in the practical was **helpful**

- Uncertain: 6%
- Strongly Agree: 50%
- Agree: 44%

35. The demonstrator dealt effectively with the problems.

- Disagree: 6%
- Strongly Agree: 50%
- Agree: 44%
Teacher`s Course Review Reports
Revision of courses offered during fall 2009-10 and spring 2010 were reviewed by the teachers and their evaluation is given under (vide proforma 2).

![Teacher`s Course Review](image.png)

Each teacher was satisfied with the students evaluation of course and teacher vide proforma 1 and 10. All the courses run in conducive manner and 80% teacher are demanding more tours for clarity of concepts of the course.

Survey of Graduating Students
Results of survey of graduating students based on Proforma 3 (Annexure III) are given in Figure-3. The graduating students in the last semester were surveyed before the award of degree. On the average basis 52.66% students showed their high satisfaction regarding all the parameters, whereas 38.46% of the students surveyed were satisfied regarding all information asked. The results of graduating students are summarized and given in Figure No: 3.
**Affectivity of Internship Experience**

The internship experience was found effective in enhancing, ability to work in team, independent thinking, appreciation of ethical values, professional development, time management skills, judgment and discipline. It was first batch in 2010 who prepared working plan of the Chakwal Forest Division on request of Conservator of Forests in Chakwal as their internship. The facilities provided by Forest department affected the perception of the student. Those students (3%) who were staying in forest guard houses were not happy so categorized the internship experience in dissatisfaction category (Fig- 4; Table 3).
Table 3: The Internship Experience is Effective in Enhancing Professional skills of the graduating students

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Parameters</th>
<th>Very Satisfied (%)</th>
<th>Satisfied (%)</th>
<th>Uncertain (%)</th>
<th>Dissatisfied (%)</th>
<th>Very Dissatisfied (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ability to work in teams</td>
<td>75</td>
<td>19</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Independent thinking</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Appreciation of ethical Values</td>
<td>33</td>
<td>67</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Professional development</td>
<td>44</td>
<td>66</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Time management skills</td>
<td>38</td>
<td>62</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Judgment</td>
<td>44</td>
<td>44</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Discipline</td>
<td>50</td>
<td>31</td>
<td>19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>The link between theory and practice</td>
<td>56</td>
<td>44</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Alumni Survey
The alumni survey results was conducted associated with Proforma # 7. Ten students feedback was obtained from the Alumni survey. The programme assessment results are shown below:

Knowledge: 45% students were having view that they have received knowledge about math, humanities and professional students.
Communications Skills: 90% were satisfied the program oral communication, report writing and communication skill. About 62% were highly satisfied with program leadership development. About 805 were not satisfied with the department infrastructure in comparison with other reputed universities.

Skills and Capabilities Reflected In Performance as Foresters.
Our students develop ability to apply knowledge of Forest & Range Management to work as skilled and successful professionals in the respective field. While studying, students learn advance knowledge about the field, gain confidence, experience and skills to handle problems relating to their field of specialization independently as well as working in a team of experts.

Employer’s Survey
Feed back about 26 employees was obtained from organizations viz. Punjab Forest Department, Khyber Pakhtoon Khaw Forest Department, range Research Institute-National Agriculture Research Centre Islamabad (NARC), Pir Mehr Ali Shah Arid Agriculture University Rawalpindi and Banks. Their views were keen observed and discussed in the department for future improvements. The major emphasis was to know the employers.
Fig. 5. Employer survey for the determination of students skill level

comments on the quality of education regarding: knowledge, communication skill, work skill and interpersonal skill these students have. Survey reflects that our graduates fall above average and in all areas, their abilities were rated above 80%. This indicates that our graduates are well adaptable and show their better potential in any given environment. However, some employers have given general comments about some weaknesses, particularly the practical workability. The point has been well noted and will be tried to overcome for our future and current students.

| Standard 1-3: The results of Program’s assessment and the extent to which they are used to improve the program must be documented |

Regular Assessment Process started recently and in future assessments results will be incorporated accordingly. Following are the strength and weaknesses identified.

**Strength**

The Department of Forestry and Range Management (F&RM) has following items attributed to its strength

- Full time highly qualified and experienced faculty
- Affordable forestry study courses encompassing both theory as well as practical field training
- Field oriented four years degree program at under graduate according to approved HEC criteria
- Geographical position of PMAS Arid Agriculture University is a cause of attraction for most of students
- Enthusiastic faculty and support staff willing to work every where
- Research facilities both in the lab as well as in the field
- Envisaging changes in courses regular with emerging trends and challenges
- First ever university in Pakistan to produce Range / Ranch and Forest managers with special focus in arid and semi-arid areas of the country

**Weakness**

- Insufficient funds for laboratory research, library / reference books, medical and transport facilities
- The department lacks services of / is in dire need of Watershed and Timber technology experts
- Lack of adequate infrastructure for research and teaching facilities
- Insufficient scholarship for faculty and students
- No safety measures are in place in laboratory
- Insufficient transport facilities for research and study tours
- Insufficient IT devices Multimedia, computers, etc
- Underdeveloped campus life and facilities

**Opportunities**

- The Faculty / department members and students can have effective contact, conversation and collaboration, and closer partnership with local employees and NGOs owing to peculiar geographical location of the University / department.
- Having Agriculture degree, the graduates are eligible to apply in multiple (brown and green) sectors e.g., Agriculture, Forestry, Environment, Banking, corporate sectors
- Outstanding students and those with high caliber may opt for Competitive Exams
- The graduates may change their professional career from one field to other e.g., from agriculture to wildlife, environment, ecology etc.

**Threats**

- PFI has already taken a lead and possess all infrastructure in the forestry training
- Degree is not getting priority sometimes in the PPSC because of the monopoly of Forestry department
- Loss of potential faculty staff if no incentives in future in the field of Forestry and range Management

**Standard 1-4: The department must assess its overall performance periodically using quantifiable measures.**

The evaluation process indicated 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.)
Table 4: Present performance measures for research activities

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Jour, Publications (National and International)</th>
<th>Conference Publications (Proceedings Abstract)</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Dr. Sarwat N. Mirza</td>
<td>30</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Dr. Irshad A. Khan</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dr. Abdul Khaliq</td>
<td>19</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Dr. S. Moazzam Nizami</td>
<td>15</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Dr. Aamir Saleem</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mr. Saeed Gulzar</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ms. Lubna Ansari</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mr. Irfan Ashraf</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The department is well staffed with availability of expertise in all major fields of Forestry & Range Management.

**Significant Future Development Plans**

The Department of Forestry & Range Management has planned a number of future research studies addressing the land degradation issues of fragile arid and semi arid environments. Some of the studies include:

i) Preparation of the forest work plan at under graduate level as part of their internship in eight semester of B. Sc Hons Agriculture with major in Forestry & Range Management.

ii) Rangeland improvement through introduction of high yielding forage grasses and legumes and plantation of multipurpose trees and shrubs by using various moisture conservation techniques.

iii) Environmental impact assessment of land degradation caused by development activities like road construction and urbanization.

iv) Agro-forestry studies of promising multipurpose trees as an economically feasible enterprise for the farming communities.

v) Feeding studies on small ruminants by integrating grazing with crop based by products.

vi) Assessment of carbon sequestration through forest plantation in different ecological zones of Pakistan.

vii) To impart quality education in Forestry through audio visual aids and modern tools along with provision of latest literature, journals, books, reviews and access to internet.

viii) To extend facilities for field tours, herbarium, museum and field laboratory.

ix) To prepare hand outs, brochures and pamphlets for the farmers and advisory services.
x) To equip the post-graduate laboratories (Forest Surveying & Engineering, Forest ecology, and taxonomy) with the advanced equipments.

xi) Human Resource development in Forest & Range Management to meet future challenges for sustainable Forestry to cope with demand & Supply of wood.

xii) To emphasize problem oriented research on specific and serious issues prevalent in the arid ecology.

xiii) Over all enhancement of knowledge and skills of faculty members in relation to the latest global advancements in this discipline through exchange programs, short training and collaborative research project within and outside Pakistan.

**Community services by the department**

- Organization of farmers’ day (local Pothowar area)
- Advisory services to the farmers for tree growing as and when desired
- Guidance and supervision of students of various departments numbers about research
- Supervision of students on internship in various organizations in the Punjab.

A number workshops and seminars organized are given in Table 5.

**Table 5 : Short courses, Seminars, Workshops and Conferences arranged by the Department**

<table>
<thead>
<tr>
<th>Year</th>
<th>Short Courses</th>
<th>Seminars</th>
<th>Workshops/Conferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2004</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2004-2006</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2006-2008</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2008-2010</td>
<td>1(with ICARDA)</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Faculty satisfaction regarding the administrative services**

- The department maintains a ratio of 4:1 for the academic (technical) and administrative non-technical staff which fulfils this standard set by HEC
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required. Normally 1 meeting is held per month.
- Quick office disposal are never delayed, so far no complaint in this regard, received from authorities
- Proper records of each individuals, students thesis etc. are maintained.
- Quantitative assessment of the department since its establishment is given in the table 6.

**Table 6: Quantitative assessment of the department (Last 3 years)**

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Particular</th>
<th>No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Undergraduates (B.Sc. Hons) produced</td>
<td>86</td>
<td>Most of the students are now in M. Phil / M. Sc (Hons.) degree (44%), 32% got employment and did not continue education.</td>
</tr>
<tr>
<td>ii</td>
<td>Students: Faculty ratio</td>
<td>7:1</td>
<td>Fulfils HEC criteria</td>
</tr>
<tr>
<td>iii</td>
<td>Technical: Non-technical Ratio</td>
<td>4:1</td>
<td>Fulfils HEC criteria</td>
</tr>
</tbody>
</table>
Conclusion: The evaluation process indicated high efficiency of system and satisfactory impact of outcomes. Almost 90% of the graduate and post graduates got jobs in various organizations (Provincial Forest departments, universities, research organizations, banks and NGO’s and Environmental Research based organization. private firms). About 34 under graduate, 27 Postgraduate and 7 PhD Scholars are still involve in completing their higher education.

Criteria 2: CURRICULUM DESIGN AND ORGANIZATION

Degree Title: B.Sc. (Hons) Agriculture, Majoring Forestry & Range Management.

A. Intent:
   All the courses for degree program are being taught under HEC approved scheme of study for forestry. The scheme was approved by NCRC. The committee consisted of experts and learned professors, subject matter specialists from other universities and research organizations from Pakistan. When and if needed, curriculum for the Department of Forestry & Range Management is revised/updated through different bodies. At department level, Board of Studies, which comprised of senior faculty members, is responsible for updating the curriculum. This body is authorized to formulate syllabus and course content. The chairperson 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.

B. 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 per week. A credit hour carries 20 marks.

C. Degree Plan
   The department of Forestry & Range Management offers 3 degree programs namly; B.Sc. (Hons) Agri. (Major in Range Management & Forestry),

<table>
<thead>
<tr>
<th>Name of Degree</th>
<th>Pre-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc. (Hons) Agri.</td>
<td>F.Sc. Pre-medical /</td>
</tr>
<tr>
<td>(Major in Range Management &amp; Forestry)</td>
<td>Pre-engineering, after entry test</td>
</tr>
</tbody>
</table>

   The list of course and elective courses is attached in Table 2. The selection criterion for each course is:-
   o That the course is relevant to the degree program
It meets the material and international requirements for the degree
Adequate facilities are available in the department
The program contents meet the program objectives as highlighted and provided by the Higher Education Commission of Pakistan.

D. For each course in the program that can be complete for credit Specifying the following:
- Course title (FR)
- Course objectives and outcome (Given in course breakdown into lectures separately)
- Catalogue description (yes)
- Text book and reference (Given in course contents)
- Syllabus breakdown lectures (yes supplied to QEC separately)
- Computer usage: Internet facility is used by the faculty members to update their knowledge regarding each course, research, documentation of references. This facility is also by the students to solve their problems, facilitate their assignments and presentations.
- Laboratory facilities are provided to the students for their practical exercise, given in the curricula. Post-graduate students also do the work for their theses in the laboratories, basic equipment, material and chemicals and biochemical are provided.

Degree requirements (B.Sc Hons. Agriculture)

As a whole a student has to study 140 credit hours. In first four semesters, students study minor courses (Agriculture Sciences, Information Technology and Veterinary Sciences etc.) as approved by HEC for agricultural degree. After the completion of four semesters, students choose a specialized field (major) of study. In the next four semesters courses of major specialized (major) subject are taught including some minor courses of other departments (Table 8). The final semester includes internship of 15 credit hours (offered till Spring 2010 semester). In internship students are placed in Punjab Forest Department for preparation of working plan after forest inventories. Degrees are awarded after completing the required number of credit hours (courses) followed by internship report and its presentation. Minimum Grade Point Average (GPA) 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 Cumulative Grade Point Average (CGPA) in each semester to be on the role of the University.

<table>
<thead>
<tr>
<th>Semester</th>
<th>CGPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>0.75</td>
</tr>
<tr>
<td>Second</td>
<td>1.00</td>
</tr>
<tr>
<td>Third</td>
<td>1.25</td>
</tr>
<tr>
<td>Fourth</td>
<td>1.50</td>
</tr>
<tr>
<td>Fifth</td>
<td>1.75</td>
</tr>
<tr>
<td>Sixth</td>
<td>2.00</td>
</tr>
<tr>
<td>Seven</td>
<td>2.25</td>
</tr>
<tr>
<td>Eight</td>
<td>2.50</td>
</tr>
</tbody>
</table>
Examination and Weightage

a) Theory

In theory paper, student’s evaluation is done by mid-term examination, assignments/ quizzes 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/she will be deemed to have failed in that course. In theory, weightage to each component of examination is as prescribed here under:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Examination</td>
<td>30%</td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>60%</td>
</tr>
</tbody>
</table>

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 and 50% for post graduate.

Scheme of studies and Course contents of B. Sc. (Hons.) Agriculture

Scheme of studies for B.Sc. (Hons.) Agri. is given in (Table 7). Detailed course contents of under-graduate and post graduate schemes of studies are given in Annexure 13 and 14, respectively.

Table 7: Curriculum Course Requirements for B.Sc (Hons) Agriculture (Major in Range Management & Forestry) (Approved in 2009)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-302</td>
<td>Introduction to Rangeland &amp; Wildlife Management</td>
<td>3(2-2)</td>
</tr>
<tr>
<td><strong>Semester III</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-401</td>
<td>Introduction to agro-forestry &amp; water sheds</td>
<td>2(1-2)</td>
</tr>
<tr>
<td><strong>Semester V</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AEN-501</td>
<td>Farm Mechanization</td>
<td>2(1-2)</td>
</tr>
<tr>
<td>AGRO-501</td>
<td>Arid Zone Agriculture</td>
<td>2(2-0)</td>
</tr>
<tr>
<td>SOC-501</td>
<td>Rural postal Sociology</td>
<td>2(2-0)</td>
</tr>
<tr>
<td><strong>Major Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-501</td>
<td>General Silviculture</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>FR-503</td>
<td>Principles of Agro-Forestry</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>FR-505</td>
<td>Range Management</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>FR507</td>
<td>Forest Biometrics and Inventory</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>FR509</td>
<td>Wildlife Management</td>
<td>3(2-2)</td>
</tr>
</tbody>
</table>

**Semester VI**

**General Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEN-502</td>
<td>Conservation Engineering and Water Resources Development</td>
<td>2(1-2)</td>
</tr>
<tr>
<td>SS-508</td>
<td>Instrumentation &amp; Laboratory Techniques</td>
<td>2(0-4)</td>
</tr>
</tbody>
</table>

**Major Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-502</td>
<td>Forest Management</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>FR-504</td>
<td>Watershed Management</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>FR506</td>
<td>Biodiversity and Environment</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>FR-508</td>
<td>Range Vegetation –Livestock Interactions</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>FR-510</td>
<td>Forest Protection</td>
<td>3(2-2)</td>
</tr>
</tbody>
</table>

**Semester VII**

**General Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT-601</td>
<td>Experimental Designs</td>
<td>2(1-2)</td>
</tr>
<tr>
<td>MGT-601</td>
<td>Introduction to Agri. Business Management</td>
<td>2(2-0)</td>
</tr>
</tbody>
</table>

**Major Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-601</td>
<td>Range Improvement and Rehabilitation</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>FR-603</td>
<td>Forest Timber Science</td>
<td>3(2-2)</td>
</tr>
<tr>
<td>FR-605</td>
<td>Forest Utilization</td>
<td>2(2-0)</td>
</tr>
<tr>
<td>FR-607</td>
<td>Range Medicinal and Poisonous Plants</td>
<td>2(2-0)</td>
</tr>
<tr>
<td>FR-609</td>
<td>Project Planning and Scientific Writing</td>
<td>2(1-2)</td>
</tr>
</tbody>
</table>

**Semester VIII**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-602</td>
<td>INTERNSHIP</td>
<td>15(0-30)</td>
</tr>
</tbody>
</table>

Table 8 shows that the curriculum of the Department of Forestry & Range Management is consistent with the program objectives.

**Table 8: COURSES Vs OUTCOME**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Outcomes</th>
<th>Develop communication skills</th>
<th>Developing Research Projects</th>
<th>Analytical &amp; Problem solving skill</th>
<th>Develop of Knowledge &amp; vision</th>
<th>Development of professionalism &amp; Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 30201, FR 401</td>
<td>+++</td>
<td>-</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>FR 501, FR 503, FR 505, FR 507, FR 509</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>FR 502, FR 504, FR 506, FR 508, FR 510</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>FR 601, FR 603, FR 605, FR 607, FR 609</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>FR 602</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td></td>
</tr>
</tbody>
</table>
Assessment of the Department of Forestry & Range Management Curriculum

The assessment of curriculum given in Table 10 and the courses are cross tabulated according to the program outcomes.

1. The curriculum fits very well and satisfies the core requirements for the program, as specified by the respective accreditation body.

2. The curriculum satisfied the general arts and professional and other discipline required for the program according to demands and requirements set by the Higher Education Commission.

**Standard 2.2: Theoretical background, problem analysis and solution design must be stressed within the program’s core material**

Table-9: Detailed Courses representing theoretical background, Problem analysis and solution design:

<table>
<thead>
<tr>
<th>Elements</th>
<th>Courses</th>
<th>Title of Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical Background</td>
<td>FR-302</td>
<td>Introduction to Rangeland &amp; Wildlife Management</td>
</tr>
<tr>
<td></td>
<td>FR-401</td>
<td>Introduction to agro-forestry &amp; water sheds</td>
</tr>
<tr>
<td></td>
<td>FR-501</td>
<td>General Silviculture</td>
</tr>
<tr>
<td></td>
<td>FR-506</td>
<td>Biodiversity and Environment</td>
</tr>
<tr>
<td></td>
<td>FR-510</td>
<td>Forest Protection</td>
</tr>
<tr>
<td></td>
<td>FR-607</td>
<td>Range Medicinal and Poisonous Plants</td>
</tr>
<tr>
<td>Problem Analysis</td>
<td>FR-503</td>
<td>Principles of Agro-Forestry</td>
</tr>
<tr>
<td></td>
<td>FR-505</td>
<td>Range Management</td>
</tr>
<tr>
<td></td>
<td>FR-507</td>
<td>Forest Biometrics and Inventory</td>
</tr>
<tr>
<td></td>
<td>FR-509</td>
<td>Wildlife Management</td>
</tr>
<tr>
<td>Solution Designs</td>
<td>FR-502</td>
<td>Forest Management</td>
</tr>
<tr>
<td></td>
<td>FR-504</td>
<td>Watershed Management</td>
</tr>
<tr>
<td></td>
<td>FR-508</td>
<td>Range Vegetation –Livestock Interactions</td>
</tr>
<tr>
<td></td>
<td>FR-609</td>
<td>Project Planning and Scientific Writing</td>
</tr>
<tr>
<td></td>
<td>FR-601</td>
<td>Range Improvement and Rehabilitation</td>
</tr>
<tr>
<td></td>
<td>FR-603</td>
<td>Forest Timber Science</td>
</tr>
<tr>
<td></td>
<td>FR-605</td>
<td>Forest Utilization</td>
</tr>
</tbody>
</table>
While the curriculum was prepared, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program. Three computer and I.T. courses (6 credit hours) and two courses of statistics (6 credit hours) based on computer practical usage were included in the curriculum to fulfill the I.T. requirements for the students of B.Sc (Hons) Agri. (major in Range Management & Forestry) degree.

- Two seminars each of one credit hours are compulsory at the Post-graduate level
- A course of 3 credit hours entitled “Project Planning & Scientific writing” has been integrated in the curriculum of B.Sc. (Hons) Agriculture level.
- Assignments are given to B.Sc (Hons) students on specific titles (part of the course) which are presented orally and given as written report (assignments) by the students which increases their oral and written communication skills.

Criteria 3: LABORATORIES AND COMPUTER

- Laboratory Title: Forestry and Range Management Laboratory for the Undergraduate students.
- Location and Area: Faculty of Forestry, Range Management & Wildlife, D- Block Ground Floor
  Floor, Main Campus
- Objectives: Laboratory is used for: Practical exercise and demonstrations to graduate students in their introductory and major courses. Research work for the graduate and post-graduate students
- Adequacy for instruction: There is no computer for under graduate students in the laboratory.
- Major apparatus: The equipments like Microscopes, autoclave, incubator, deep freezer, refrigerators, laminar flow cabinet, pH meter, elective balance, slide and overhead projectors, shaker, hitter, puppeteers, etc have been purchased under HEC project & installed in the newly established laboratories for proper utilization.
- **Major Equipments:** The main equipments like saw mill, wood seasoning plant will also soon be installed in the newly established field lab.
- **Safety Regulations:** Safety measures are available against fire (Extinguishers), minor hazards and accidents, injuries (First Aid Kit). However, the University maintains a Medical Dispensary for such incidents.

**Standard 3.1: Laboratory manuals / documentation / instructions for experiments must be available and readily accessible to faculty and students**

Laboratory manuals of each subject are not available. The department library has not all the relevant books and manuals. However, individual teachers have their own books and manuals. Some manuals will be prepared by the academic staff themselves.

**Shortcomings in the laboratory**

The laboratory is not specious and inadequate. The equipments purchased will soon be installed in newly established labs. Equipments regarding molecular approaches are lacking e.g. Stereoscope, PCR Spectrophotometer, relevant software.

**Standard 3.2: There must be adequate support personnel for instruction and maintenance of laboratory**

Laboratory is maintained by:

The 2 laboratory assistant (responsible for equipment, glassware, chemicals, materials, etc) and one laboratory attendant who assist the students in practical, cleaning and washing, etc.

**Standard 3.3: The university computing infrastructure and facilities must be adequate to support program’s objectives**

The University has limited computer facility for undergraduate and post graduate level students. However, this facility is available at the department level to almost all faculty members independently.
The 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 activities and solves the students’ problems. However currently there is no Parent/Teacher association.

**Criteria 4: STUDENT SUPPORT AND ADVISING**

The 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 activities and solves the students’ problems. However currently there is no Parent/Teacher association.

**Standard 4.1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner**

- a. Courses are taught as per strategy of HEC.
- b. At undergraduate level subjects courses are offered as per scheme of study provided by HEC and approved by Academic Council and at postgraduate level courses are offered according to the availability of the teachers.
- c. Elective courses are offered as per policy of HEC and University

**Standard 4.2: Courses in the major must be structured to ensure effective interaction between students, faculty and teaching assistants**

- o Courses are structured and decided among the departmental faculty members and in board of study meeting
- o Decided at the commencement of the semester and the faculty members interact frequently among themselves and with students. Students are welcome to ask question in class and even after the class.
- o Emphasis is always given for an effective interaction between undergraduate and post graduate students.

**Standard 4.3: Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choice.**

- Students are informed about the program requirements through the office of the head of the department (Chairman) and through the personal communication of the teachers with the students
- The counseling of the students is continuous process and students can also contact with relevant teachers whenever they face any professional problem.
- Student can interact with the teachers / scientist in Universities or research organization whenever they needed and there is open option for the students to get the membership in the professional societies like WWF-Pakistan, Wetland and Houbra foundation, etc.
### Criteria 5: PROCESS CONTROL

#### Standard 5.1: The process by which students are admitted to the program must be based on quantities 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 criterion set by University both for undergraduate and post graduate programs.
- Admission criteria for undergraduate program: F.Sc. pre medical / pre engineering and marks in last attended certificate.
- All these entries are based on the recommendations of supervisory committee.
- Admission criteria is revised every year before the announcement of admissions.

#### 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.

- In the 4th semester students are allotted different majors (Like forestry, PP, ENTO, etc) by the Dean faculty of FC & FS.
- Students are evaluated through Mid, Final and Practical exams and through assignments.
- Registration is done once every year at the time of admission while a student once admitted for each degree is evaluated through his result of each semester. If the students 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.

- Recruitment policy followed by the University is recommended by HEC. Induction of all posts is done as per rule.
- Posts are advertised in the national newspapers, and the applicants are short listed on the basis of experience, qualification, publications and other qualities / activities as fixed 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 considered.
At present, no procedure exists for retaining highly qualified faculty members. However, the revised pay scales of structure is quite attractive.
HEC also supports appointment of highly qualified members as foreign faculty Professor, National Professors and deputes them in various departments of the University.

**Standard 5.4: 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.**

- It is done by periodically revising the curriculum depending upon requirements, innovations and new technology.
- With the emergence of new fields, new courses are set and included in the curriculum.
- Students usually buy cheap Asian editions of technology books. These are also available in the University library where documentation, copying and internet facilities are available off and on.
- Students make their own notes using class notes and consulting library books and journals.
- All efforts are made that the courses and knowledge imparted meet the objectives and outcomes.

**Standard 5.5: 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.**

- According to the examination system of the University which is clearly documented.
- The evaluation procedure consists of quizzes, mid and final examinations, practicals, assignments and reports, oral and technical presentations.
- The controller of examinations announces the date regarding commencement of examination. After each semester, the controller office notifies results of the students.
- The evaluation procedure consists of quizzes, mid and final examinations, practicals, assignments, reports, oral and technical presentations.
- The minimum pass marks for each course is 40% for undergraduate degree.
• 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

<table>
<thead>
<tr>
<th>Marks Obtained</th>
<th>Grade Grade point</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-100 %</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>65-79 %</td>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>50-64 %</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>40-49 %</td>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>Below 40 %</td>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

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

### Criteria 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.*

Currently there are eight full time faculty members out of which five are Ph.D. There are currently involve in Phd. The field of specialization of faculty members is Forest Management, Forest Ecology, Range Management, Watershed Management, Agro forestry/Social Forestry, Forest Biomass estimations, Carbon Sequestration assessments and wood technology (Table 10).

### Table 10: Faculty distribution by program area in Forestry & Range Management

<table>
<thead>
<tr>
<th>Program area of specialization</th>
<th>Courses in the area &amp; average number of sections per year</th>
<th>Number of faculty members in each area</th>
<th>Number of faculty with Ph.D. degree in each area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest/Agro-forest Management</td>
<td>10</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Forest/Range ecology</td>
<td>9</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
In each semester mixed courses are offered according to work load of faculty members
Division of students for supervision is made on the basis of faculty expertise/research interests

Existing faculty development programs at department and university level

From the project “strengthening of Forestry & Range Management department” two faculty members got chance for abroad for their professional development
Faculty members attended workshops/seminars out side and within university
Laboratory, Library and internet facilities are available for scholarly work and academics improvement
Support for attending conferences can lead to enhancement of research initiatives at the university.
There is university-funded program, which provides financial support for research projects by the young faculty members

Frequency of faculty program evaluation
As and when required

The young faculty is mobilized by timely back up and appreciation by the senior faculty members. Avenues for research funding are provided through university research fund.
There should be the programs and processes in place to attract good faculty members e.g. teaching and research awards annually, reasonable teaching load and class size, social activities and better salary package.

Results of faculty survey employing Proforma 5 (Annexure-V) were summarized and are given Table 12. It was filled by all the 6 faculty members during year 2009-10(Two faculty members are outside the country on study leave)

The results showed satisfaction of the teachers over most of the parameters. However, level of monitoring, cooperation with colleagues and the cooperation of teachers needs to be addressed.

Table 11. Results of the Faculty Survey (Proforma - 5)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Core Questions</th>
<th>Prof. Dr. Sarwat</th>
<th>Dr. Irshad</th>
<th>Dr. S.M. Nizami</th>
<th>Dr. Aamir Saleem</th>
<th>Lubna Ansari</th>
<th>Saeed Gulzar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Your mix of research, teaching and community service.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>The intellectual stimulation of your work.</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>Type of teaching/research you currently do.</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>Your interaction with students.</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>5</td>
<td>Cooperation you receive from colleagues.</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>D</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>6</td>
<td>The mentoring available to you.</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>7</td>
<td>Administrative support from the department.</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>8</td>
<td>Providing clarity about the faculty promotion process.</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>9</td>
<td>Your prospects for advancement and progress through ranks.</td>
<td>A</td>
<td>C</td>
<td>C</td>
<td>B</td>
<td>D</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Salary and compensation package.</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>D</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>11</td>
<td>Job security and stability at the department.</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>12</td>
<td>Amount of time you have for yourself and family.</td>
<td>C</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>13</td>
<td>The overall climate at the department.</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>Whether the department is utilizing your</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Experience and Knowledge</td>
<td>Cooperation of all faculty</td>
<td>Cooperation from Dean</td>
<td>Cooperation from Dean</td>
<td>Cooperation from Dean</td>
<td>Cooperation from Dean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What are the best programs/ factor currently available in your department that enhance your motivation and job satisfaction?</td>
<td>Provision of Infrastructure, Vigilant monitoring</td>
<td>Provision of more budget.</td>
<td>Easy access to field tours &amp; Research</td>
<td>House hiring &amp; SPS</td>
<td>Duty allocation</td>
<td>Space allocation.</td>
<td></td>
</tr>
</tbody>
</table>

A= Very Satisfied; B= Satisfied; C= Uncertain; D= Dissatisfied; E= Very Dissatisfied

**Criteria 7: INSTITUTIONAL FACILITIES**

According to this criterion, 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. Insufficient library’s technical collection of books. Recommended books and relevant journals of the programs are not available to the students. These aspects need to be strengthened in number and space. Class rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities.

**Standard 7.1: The institution must have the infrastructure to support new trends in learning such as e-learning**

**Supportive Infrastructure and Facilities in learning:**

a. The labs. are available in the department and students sits in them for reading and research.

b. Hot & Cold facilities, Dept. library with easy access make working/ research/ study environment conducive for higher learning. Unfortunately such facilities are not adequately / properly available and there is no continuity in their delivery.
• First of all library do not have space capacity as per number of students in the University.
• Secondly technical book collection is general not specifics to courses offered and books not properly arranged rather lying haphazardly.
• Thirdly scientific journals in take are negligible that is back bone of any scientific/technical writing.
• Fourthly library is not computerized and internet facility is very meager to the number of students at university level.
• Fifthly library should remain open from 08am to 10pm without any break including Sunday’s.

**Standard- 7.3:** Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities

The properly designed classrooms are less in number and are without proper maintenance and facilities. They are not updated according to new trends/technologies. Most of the graduate & post graduate (Major) classes held in labs which badly affects their research use. Similarly faculty offices are very less in number and not fully furnished to make working environment comfortable, rather they are over crowded and unattended on the part of works & finance dept.

**Criteria 8: INSTITUTIONAL SUPPORT**

The university administration has been struggling hard to strengthen all the Departments, upgrade them and establish new faculties and Institutes. The university is also trying to attract highly qualified faculty.

**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

There is no proper maintenance/ documentation and investment of GPF deducted from salary. Similarly no benefit/ welfare from BF deduction available to faculty. Very meager benefit for faculty children’s education at university level is available. Similarly very little attention is being paid for faculty residential facilities development at university campus and major proportion of the facility available mostly allotted to administrative staff and majority of faculty members remain in waiting list for a long time. Transport facility is not frequently and easily available for field works/ touring. Financial support is too low to meet the expenses in dept., only
about Rs. 26000/- is available per annum for office and lab expenses including student’s research.

**Technical Staff:** Works and internet net working depts. are very slow in response. Financial and accounting depts. are also slow in their delivery.

**Office equipment:** Sufficient office equipment is available to under take teaching and research activities.

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**Standard 8-2: There must be an adequate number of high quality graduates students, research assistants and Ph.D. students.**

The intake of B.Sc. (Hons) agriculture with major in Forestry & Range Management students is once in a year.

A detail of the students enrolled in the year 2009-10 is given in Table 12.

**Table 12: Enrollment in Different Programs from 2009-10**

<table>
<thead>
<tr>
<th>Year</th>
<th>B.Sc (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>30</td>
</tr>
<tr>
<td>2010</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
</tr>
</tbody>
</table>

**Graduate students and Faculty Ratio for 2009-10**

<table>
<thead>
<tr>
<th>Year</th>
<th>Faculty Nos.</th>
<th>Students Nos.</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6</td>
<td>54</td>
<td>1 : 9</td>
</tr>
<tr>
<td>2010</td>
<td>7</td>
<td>58</td>
<td>1 : 8.2</td>
</tr>
</tbody>
</table>

---

**Standard- 8.3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.**

The amount of about Rs. 32000/- per annum for books, laboratories and equipment and computer maintenances and consumable supplies etc in addition to projects funding if available is considered sufficient. Otherwise it is too low to maintain and run the departmental business and dept has to depend on central store for necessary supplies and maintenance.
SUMMARY

Given the importance of fragile arid and semi arid areas of the country, PMAS-Arid Agriculture University, Rawalpindi established the Department of Forestry & Range Management in 2002 to cater the need of producing skilled manpower in this specialized area of education as well as conducting area specific research. The overall objective of the Department of Forestry & Range Management is to impart high level education and undertake research on issues related to conservation and rehabilitation of range and forest resources. Initially, the Department worked under the faculty of Crop & Food Sciences and the degree programmes including B.Sc.(Hons.), M.Sc.(Hons.) and Ph.D were initiated. Realizing the importance of the subject, the University authorities approved a separate Faculty of Forestry, Range Management & Wildlife in 2006 and the Department of Forestry and Range Management started working under the new faculty with more zeal and dedication. The Department activities were strengthened with a modest funding from HEC under R&D project “Establishment of the Department of Range Management & Forestry” which not only provided the much needed equipment for both field and laboratory oriented research work but also provided sufficient number of faculty and support staff positions.

The mission of the Department of Forestry and Range Management is to impart undergraduate and post graduate education, training including internship as well as conduct problem oriented research on topics related to natural resource management in general and forest and rangeland resource conservation and improvement.

The comprehensive “Self Assessment Report” gives detailed analysis of programme objectives and outcomes in the light of feedback obtained through various evaluation proformas designed to achieve the objectives of self assessment report. The analysis showed a clear picture about teachers evaluation, course evaluation, alumni student evaluation, etc. Departmental strengths and weaknesses have also been highlighted in the report for future improvement in the academic and research programmes of the Department. Various bottlenecks hindering the active progress of departmental goals have been identified. Some of these bottlenecks include insufficient field visits and practical training facilities within the
tight schedule of semester system, etc. Efforts will be made to devise a mechanism to improve the practical training of students in collaboration with the institutions like Pakistan Forest Institute, Peshawar especially participation in their working plan exercise of forest resources.

Some of the major achievements of the Department of Forestry and Range Management include a well designed and structured curriculum at the level of undergraduate courses which is developed under the guidelines of the Higher Education Commission and in consultation with the Department of Forestry, Range & Wildlife of University of Agriculture, Faisalabad and Pakistan Forest Institute Peshawar. In addition, the internship of undergraduate programme is designed in collaboration with the leading institutions like PFI, NARC, IUCN, WWF, etc. to give on hand practical experience to the graduates on burning issues of land degradation and rehabilitations. The rules and regulations set forth by the University as well as the Higher Education Commission of Pakistan regarding admission, examination and evaluation of thesis, etc are strictly followed to ensure the implementation of quality standards. Various issues concerning the future improvement in education standards have also been highlighted including effective implementation of tutorial programmes to enable students to interact with teachers in TGMs to discuss academic issues and explore ways and means of better communication among teachers and students for effective learning as well as participation in co-curricular activities. Following actionable Recommendations have been proposed

A pragmatic and scientific system for newly inducted teachers training should be introduced at the University / department level encompassing important aspects of teaching.

Two labs are recommended to be established to cater the study requirement of graduate level students.

Annual budget allocation for operation and maintenance of lab is recommended to be increased to the extent of Rs. 100,000.

The biannual budget for department library is recommended to be to the allocation tone of Rs. 50000.
• The establishment of “Book Bank” at the department level is strongly recommended. The relevant cell may have provision of keeping 50 photocopies of reference books/material.

• Research labs are recommended to be established solely for undertaking research activities and not for classes.

• The needs of field tours in Forestry & Range Management cannot be overemphasized. To cater for such need, the Department of Forestry & Range Management should have its own convenience that can be used at liberty or special provision for transport to utilize at the times of hours when so ever required.

• To emphasize country wide importance of natural wealth and its protection and conservation, special funds may be allocated for the publication of textbooks (1500 in No.) and the reference material already written that requires funds for publication.

• Latest multimedia facility with all the accessories and photographing may be provided to the department to cater onsite tour record and subsequent changes / update prophesied in future.

• Orientation as well as refresher courses for the teaching staff may be arranged on regular grounds.

• Short foreign visits for teachers for boosting up research activities may be arranged.

• Credit for writing professional books may be granted as special incentive equivalent to 10 research papers.

• Forestry professional career should not be taken as gender specific and any discrimination in this regard should be discouraged both at field as well as office / research level.

Program Team Members

Dr Irshad A. Khan (Coordinator) .................................

Dr. Syed Moazzam Nizami (Member) ..............................

Dr Abdul Khaliq (Member) ..............................
Annexure 9

Resume of Faculty Members

<table>
<thead>
<tr>
<th>Name</th>
<th>DR. SARWAT N. MIRZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>H. No. 291, St. 38, G-9/1, Islamabad. 051-9062269</td>
</tr>
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<tr>
<th>Experience</th>
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<tr>
<td>Range Management</td>
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</tr>
<tr>
<td>Utah State University, USA</td>
<td></td>
</tr>
<tr>
<td>Senior Scientific Officer,</td>
<td>(1993-2002)</td>
</tr>
<tr>
<td>Range Management</td>
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</tr>
<tr>
<td>Associate Professor</td>
<td>(2002 to date)</td>
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<td>(Range Management &amp; Forestry), University of Arid Agriculture, Rawalpindi</td>
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<tr>
<td>-Supervising thesis research of post-graduate students at M.Sc.(Hons.) and Ph.D level as well as member of the supervisory committee of a number of post graduate students.</td>
</tr>
<tr>
<td>-Member of the Advanced Studies &amp; Research Board of the University of Arid Agriculture.</td>
</tr>
<tr>
<td>-Member of the Faculty Board and University Academic Council.</td>
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<table>
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<th>Memberships</th>
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<tr>
<td>Year</td>
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<tr>
<td>2002</td>
<td>Ahmad Hussain</td>
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<td>2003</td>
<td>Tariq Mehmood</td>
</tr>
<tr>
<td>2005</td>
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</tr>
<tr>
<td>Honors/M.Phil 2006</td>
<td>Hafiz M. Tayyab</td>
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<td>2006</td>
<td>Shakeel Abbas</td>
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<tr>
<td>2007</td>
<td>Syed Adil Zeeshan</td>
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<td>2007</td>
<td>Sadheer Ahmad</td>
</tr>
<tr>
<td>Five students as Internee</td>
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| Service Activity | Academics, Research and Administrations |
**Brief Statement of Research Interest**
(research specialization in sub-disciplines of range ecology/management, grazing management, diet selection behaviour of sheep, range resource inventory and assessment, rangeland monitoring and evaluation, shrub ecology and management, desertification control, sand dune stabilization, monitoring and evaluation of range projects).

<table>
<thead>
<tr>
<th>Publications</th>
<th>REFEREE JOURNALS</th>
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| Murtaza, G., R. Asghar, S.A. Majid, A.Waheed and S. N. Mirza. 2006. Anatomical and palynological studies on some Filicales from Neelum Valley,


<table>
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<th>Research Grants and Contracts</th>
<th>HEC project on RM&amp;F (Establishment of the Department of Range Management &amp; Forestry</th>
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<tr>
<td>Other Research or Creative Accomplishments</td>
<td>Working on Dean FRW</td>
</tr>
</tbody>
</table>
| Selected Professional Presentations | Worked as counterpart scientist with ICARDA expatriates from 1992-1994 as Team Leader of Range Section at AZRC Quetta. During 1992, invited to present findings of research programme at ICARDA Regional Meeting of Forage & Pasture Network at Ankara, Turkey.

As part of the collaborative research programme of AZRC and ICARDA, participated in the regional workshop on fodder shrub production and management in WANA region under System wide Livestock Initiative (SLI) held at Tunis in 1995 organized by ICARDA.

During 1996, participated as country coordinator in project development and planning workshop on fodder shrub production and utilization in WANA region organized by ICARDA at Aleppo, Syria. |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Name</td>
<td>DR. IRSHAD AHMAD KHAN</td>
</tr>
<tr>
<td>------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Personal</td>
<td>House No.2 Colony No.2 Pir Mehr Ali Shah Arid Agriculture University Rawalpindi</td>
</tr>
</tbody>
</table>
| Experience | **Period Served**  
Demonstrator and Teacher  
University Agriculture Faisalabad  
Agriculture Officer  
Agricultural Extension Department Lecturer  
Barani Agri. College, Rawalpindi  
Assistant Professor, (Range Management & Forestry), University of Arid Agriculture Rawalpindi  
State Care Officer  
UUAR  
Associate Professor  
|  
|  
|  
|  
| |  

| Honor and Awards |  
-Supervising thesis research of post-graduate students at M.Sc. (Hons.) and Ph.D level as well as member of the supervisory committee of a number of post graduate students.  
-Member of the Faculty Board and University Academic Council. |
| Graduate Students | Ph.D  
Year | Name  
2009 | Aamir Saleem  
Msc(Honr) Agri /M.Phil Frostry & Range Management  
2008 | Irfan Shabir  
2008 | Asif Khan  
2008 | Nafees Ahmad  
2009 | Raja Zaq-ul-Arfeen  
2009 | Muhammad Yasin  
Honour Student |
| Service Activity | Academics, Research and Administrations |
| Brief Statement of Research interest | Range Management, Watershed Management and enhancement of Mycorrhizal and Nodulation activities of the range plants and trees to increase the growth of range grasses, trees and shrubs in the Rangeland |
| Publications | Research Paper Published in HEC approved Journals.  
2009. Effect of diverse ecological conditions on biomass production of |
| **1.** | 
|---|---|


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<tr>
<td>Associate Professor FRM</td>
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<tr>
<td>University of Arid Agriculture, Rawalpindi</td>
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<tr>
<td>Forestry &amp; Range Management</td>
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<tr>
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<tr>
<td>University of Arid Agriculture, Rawalpindi</td>
</tr>
<tr>
<td>Assistant Research Officer / Tutor</td>
</tr>
<tr>
<td>Punjab Forest Department</td>
</tr>
<tr>
<td>Honor and Awards</td>
</tr>
<tr>
<td>• 1st Position in University of Peshawar In M.Sc Forestry session 1997-99.</td>
</tr>
<tr>
<td>• 2nd position in University of Peshawar In B.Sc Forestry session 1994-96</td>
</tr>
<tr>
<td>• Inspector General of Forests Gold medal for Standing 1st in M.Sc Forestry (1999)</td>
</tr>
<tr>
<td>• Director General Of Forests Gold Medal for Best Practical Forester(1999)</td>
</tr>
<tr>
<td>• Pakistan Forest Institute Silver Medal for standing 1st in Forest Management Plan in M.Sc(1999)</td>
</tr>
<tr>
<td>• Pakistan Forest College Silver Medal for standing 1st in Farm &amp; Energy Forestry Management Specialization(1999).</td>
</tr>
</tbody>
</table>
- Pakistan Forest Institute *Silver Medal* for standing 1ST in Forest Management Scheme (1997).

- Member of the Faculty Board and University Academic Council.

| Memberships | 1. On Line forester Association Pakistan  
2. Member of Global Online forester organization. |
|-------------|------------------------------------------------|

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<th>Graduate Students</th>
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<tr>
<td>Ph.D</td>
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</table>
1. Saeed Gulzar (Member, 2008) Growth, yield and BEF of Dalbergia sissoo in daphar irrigated plantation.  
2. Raja Zoq Ul Arfeen (Member, 2009) Estimation of Carbon stocks in temperate forests of Pakistan  |
| Honors/M.Phil     |  
Raja M. Ahsan (2008-10) Biomass Expansion Factor for *Acacia modesta* in Sub tropical forests of Pothwar.  
Mehreen Abbas (2008-10) Biomass production and its distribution in *Olea ferruginea* (Royle) under rainfed conditions of Pothwar  
Beenish Khanum (2008-10) Determining wood density of *Acacia modesta* in Sub tropical forest of Pothwar  
Mahwish Gul (2008-10) Determining wood density of *Olea ferruginea* in Sub tropical forest of Pothwar  |
| Previous students: |  
Zohaib Hassan (2007-09) Assessment of the economic benefits of natural vegetation as compared to field crop in gullied areas and its role in soil conservation  
Mohamad Asghar (2004-06) Status of Forest growing stock of Tret Forest Sub Division Murree Hills  
Arjumand Bano (2004-06) Household fuel wood Consumption and factors affecting fuel consumption in rural areas of Mangla |
<table>
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<th>Service Activity</th>
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</thead>
<tbody>
<tr>
<td>2. Ex-member of University Academic Council from 2004-2006</td>
</tr>
<tr>
<td>3. Coordinator Debating Society PMAS, Arid Agriculture University for 5years.</td>
</tr>
<tr>
<td>5. Visiting professor of University of Azad Jammu Kashmir Agriculture Faculty Rawalkot for the year 2005-2006</td>
</tr>
<tr>
<td>7. President rotary Club of Islamabad Margallah for year 2005.</td>
</tr>
<tr>
<td>8. Academics and Research</td>
</tr>
</tbody>
</table>
### Brief Statement of Research Interest

My research interests revolve around management of forests and estimation of biomass and linking ecosystem biomass with the carbon budgeting.

1. One focus has been the detailed estimation of Carbon stocks in forest Ecosystems.
2. Another focus has been Forest tree and stand measurements for yield regulation and scientific management of the watersheds under different environmental scenarios.
3. More recently, I have begun research to establish biomass expansion factors of the dominant species of Pakistani Forest Ecosystems to finally quantifying the carbon stock and sequestration potential.

My research has been applied to issues of:

1. Inventory of the forests.
2. Environmental Issues
3. Forest and Watershed Management

### Publications

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Journal</th>
</tr>
</thead>
</table>


( HEC non referred journals)


(Book )

| Research Grants and Contracts. | **International Center for Agricultural Research in the Dry Areas (ICARDA)**  
  
  Integrated Watershed Development for Food Security and Sustainable Improvement of Livelihood in Barani Areas of Pakistan (Focal Person for Forestry). Sponsored by Austrian Development Agency, CGIAR Targeted Funding (Budget: € 840,421)  
  
  **Ministry of Environment/ Punjab Forest Department/ HEC**  
  
  Estimation of Carbon stocks in managed and unmanaged sub tropical forests of Pakistan (PhD Thesis). Financed by Punjab Forest Department, MoE and Higher Education Commission  
  
  **Allama Iqbal Open University Islamabad**  
  
  Determining Potential of Participatory Forestry in District Jauharabad. |
|---|---|
| Selected Professional Presentations | **International:**  
  
  
  **National:**  
  
<table>
<thead>
<tr>
<th>Name</th>
<th>Dr. Abdul khaliq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assistant Professor, Department of Forestry &amp; Range Management, PMAS-Arid Agriculture University Rawalpindi. Ph. Off. 051-9290019, 051-9092269, Ext. 269</td>
</tr>
<tr>
<td></td>
<td>E-mail: <a href="mailto:abdulkhaliq@uaar.edu.pk">abdulkhaliq@uaar.edu.pk</a>, <a href="mailto:chaudhry_ak@hotmail.com">chaudhry_ak@hotmail.com</a></td>
</tr>
<tr>
<td>Experience</td>
<td>Period Served</td>
</tr>
<tr>
<td></td>
<td>- Sub-Divisional Forest Officer (Social Forestry) Punjab Forest Department (D. G. Khan &amp; Multan). (May 10, 1986 to Oct. 6, 1987)</td>
</tr>
<tr>
<td></td>
<td>- Research Officer (Forestry) Punjab Forestry Research Institute Faisalabad. (Nov. 16, 1987 to Mar. 28, 2005)</td>
</tr>
<tr>
<td></td>
<td>- Senior Research Officer (Agroforestry) Punjab Forestry Research Institute Faisalabad. (June 10, 1996 to Dec. 31, 2001)</td>
</tr>
<tr>
<td></td>
<td>- Assistant Professor, Forestry &amp; Range Management, PMAS-Arid Agriculture University Rawalpindi. (March 29, 2005 to date)</td>
</tr>
<tr>
<td>Honor and Awards</td>
<td>- Letter of Appreciation by Vice Chancellor, University of Agriculture, Faisalabad for completing Ph.D within stipulated period of seven semesters with cash prize of Rs. 5000/-</td>
</tr>
<tr>
<td></td>
<td>- Supervising thesis research of postgraduate students at MSc (Hons), M.Phil and Ph. D level as well as member of the supervisoty committee of a number of postgraduate students.</td>
</tr>
<tr>
<td></td>
<td>- Member department and faculty board of studies.</td>
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<tr>
<td>Memberships</td>
<td>- Member of Executive Committee on Nature Farming Research and Development Foundation (NFRDF), Faisalabad</td>
</tr>
<tr>
<td></td>
<td>- Member Environment Watch, Faisalabad</td>
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<td>M. Phil</td>
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<tr>
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<td>Abdul Raqeeb</td>
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<tr>
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<td>Wasim Ahmed</td>
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<tr>
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<td>Maqsood Ahmed</td>
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<tr>
<td>MSc (Hons)</td>
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<tr>
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<td>Jamal Tariq Satti</td>
</tr>
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<td>Zafar Iqbal Khan</td>
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<td>Samreen Sabir</td>
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<td>Safia Ramzan</td>
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<td>2007</td>
<td>Faria Kanwal</td>
</tr>
<tr>
<td>Name</td>
<td>Lubna Ansari</td>
</tr>
<tr>
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<td>-------------</td>
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<tr>
<td>Personal</td>
<td>H.No.2, St. 16, Model Colony, Rawalpindi</td>
</tr>
<tr>
<td>Experience</td>
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</tr>
<tr>
<td></td>
<td>Field worker                                          (08.5.2006 - 26.12.2006)</td>
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<td>Sungi Development Foundation, Abbot abad.</td>
</tr>
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<td></td>
<td>Forestry &amp; Range Management</td>
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<tr>
<td></td>
<td>Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi</td>
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<tr>
<td></td>
<td>Lecturer                                               (15.01.2008 – to date)</td>
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<td>- Supervising thesis research of post-graduate students at M.Sc.(Hons.) level as well as member of the supervisory committee of a number of post graduate students.</td>
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<tr>
<td>Service Activity</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Saeed Gulzar</td>
</tr>
<tr>
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<td>--------------------------------------------------</td>
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<tr>
<td>Personal</td>
<td>359, Street 13 Shahzad Town Islamabad</td>
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<td>Experience</td>
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<td>(17.08.2006 – to date)</td>
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<tr>
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<td>(25-10-2003 to 12-9-2005.)</td>
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<td>Service Activity</td>
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<tr>
<td>Conference and Seminar Attended</td>
<td>1- Crop improvement, Conventinal and Biotechnological approaches 28-30 August, 2006 arranged by Department of plant Breeding &amp; Genetics, UAAR. 2- Organizer in 2nd International symposium on issues in Higher Education in Pakistan, on 13th November 2006 Arranged by HEC &amp; UAAR. 3- Basic tools for identification and isolation of micro-organism from 27-29 December, 2006 Arranged by Department of Plant Pathology, UAAR.</td>
</tr>
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</table>
Annexure 13

Detailed Course Contents of Under Graduate Scheme of Studies in Forestry & Range Management Department.

FR-302 INTRODUCTION TO RANGELAND AND WILDLIFE MANAGEMENT  3(2-2)

THEORY:


PRACTICALS

Identification and preservations of important Grasses and Plant species of Pothowar. Visits to various Rangeland types and Plantations. Quantitative analysis of range vegetation, Range frequency, relative frequency, density, relative density, cover and relative cover. Measurements of Tree Height, Diameter and Age, etc.

BOOKS RECOMMENDED:

Theory


Practical


Books Recommended

FR-501   GENERAL SILVICULTURE   3(2-2)

THEORY:

Introduction to tree crop morphology and physiology. The Form and growth of trees. The locality factors of the forests, Forest Composition and distribution, Cultural and Tending operations. Forest protection and site maintenance. Forest Fire and its control.

Silvicultural systems: Introduction: Definition of silvicultural system, classification of silvicultural systems. Silviculture Systems. Execution, advantage, disadvantages, limitations and applicability of the following silvicultural systems in Pakistan. Clear felling system, Shelter wood system, Coppice systems, Pollarding Systems, Accessory systems: Silvicultural systems for Mazri and Ephedra forests according to their characteristics.

PRACTICALS:

Identification of forest trees practices of various operations. Visits to various forests and plantations. Techniques for raising nurseries of different forest tree species.

BOOKS RECOMMENDED:


FR-503   PRINCIPLES OF AGRO FORESTRY   3(3-0)

THEORY:


BOOKS RECOMMENDED:


FR-505 RANGE MANAGEMENT 3(2-2)

THEORY:

Range Ecological Zones of Pakistan, Basic terminology, Range Soils, Range vegetation, Range Condition and Trend, Range Site, etc. Principles of Range Management. Ecology in relation to Range Management; succession, retrogression. Vegetation Surveys, Range Inventory and Evaluation. Measures of vegetation; cover, density, frequency, forage production, carrying capacity, etc. Proper management of rangeland resources; proper kind of animals, proper season of use, proper distribution of livestock.. Planned Grazing Systems; rotation, deferred rotation, rest rotation, best block grazing etc. Range improvement technology and practices.

PRACTICALS:

Visit of range management project sites, demonstration of range management operations/technologies. Collection of data for range inventory and resource evaluation.

BOOK RECOMMENDED:


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PRACTICALS: Introduction to different instruments used for the determination of diameter, height, age, volume etc. Measurement of log volume. Measurement of forest crop diameter, height, age, basal area and volume. Determining quality class of a forest. Calculation of mean annual and current annual increment. Practice of measuring various parameters of different natural resources.

BOOKS RECOMMENDED:


BOOKS RECOMMENDED:


FR-502 FOREST MANAGEMENT 3(2-2)


The Regulation of the yield; Object of cutting, methods of yield regulation, area method, control by felling rules, by rotation and age-class distribution, periodic yield and regeneration block (Cotta’s formulation, equivalent volume). Periodic block, revocable periodic block, single periodic block. Volume and increment methods, Austrian formula, Hunde-Shagen formula, Von Mantel’s formula, Masson’s ratio and Flury’s constant regeneration area method, number and sizes of trees, the Blandford method, the method of control.

PRACTICALS:
Preparation of working plans by doing actual inventory in nearby forest area. Working plans and working schemes. Scope of the plans and their periods. Introduction to Remote Sensing and GIS (Geographical Information System) Technologies, Application of Remote sensing & GIS in Forest Management.

Books Recommended
5. Troup, R.S. Silvicultural Systems F.R.I. Dehra Dun (India).
FR-504 WATERSHED MANAGEMENT 3(2-2)

THEORY:

Basic concepts, hydrological cycle, fundamentals of Watershed Management such as objective, Management of snow pack in forest lands, Role of vegetation including protection as well as promotion of existing natural vegetation. Various land use operations and their suitable modifications, Engineering soil conservation practices in watershed management. Structural measures on farmlands and ranges: gully erosion control, diversion structures and surface water drainage, terracing, leveling, sub-soiling, weirs and ponds for storage of surplus water, streambank erosion control. Hydrologic effects of fire The planning process, administration, legislature, basic economic consideration, social implication.

PRACTICALS:


BOOKS RECOMMENDED:


BOOKS RECOMMENDED:


FR-508 RANGE VEGETATION-LIVESTOCK INTERACTIONS 3(3-0)


BOOKS RECOMMENDED:

THEORY: Mycology; fungi classification, modes of nutrition and reproduction. Bacteria, Viruses, Nematodes and other pathogens. Specific fungi causing different diseases such as wood decay, discoloration, cankers and foliage diseases etc.
Forest Pathology: Plant diseases and their effects. Pathology in relation to forestry practices. Principles of forest diseases control. Symptoms, causal organisms, modes of infection, biology and control of diseases of important forest tree species.
Forest Entomology: Biology and control of important pests of forest trees. Pests of shisham, kail, chir, deodar, poplar, Kikar, Eucalyptus, etc.
Important nursery pests, important seed pests. General control methods; silvicultural control, biological control, chemical control, use of fire in predatory insect control. Role of insects in human life, integrated pest management.

PRACTICAL

Identification of major fungi and insects causing diseases in forest trees. Field study of important insects of major forest tree species and their identification.
Identification of important diseases of forest trees. Field study of forest tree diseases in different ecological zones.

Books Recommended:

FR-601 RANGE IMPROVEMENT AND REHABILITATION 3(3-0)

without irrigation. Reclamation of denuded hills, regeneration in land slips, highway planting and aesthetic planting.

**BOOKS RECOMMENDED:**


**FR-603 FOREST TIMBER SCIENCE 3(2-2)**

**THEORY:**


**PRACTICALS:**

Identification of composite wood sample. Study of different characteristics of soft and hard wood in the laboratory. Wood testing and processing for different uses. Introduction to different sawing methods. Visit to Wood workshop. Visiting a pulp Mill, Match factory or sports industry.

**BOOKS RECOMMENDED:**

Theory:

**Felling and conversion.** Different methods of felling and conversion of timber. Types and description of different implements used. Seasons for felling. Hand and mechanical sawing.

**Extraction and transport.** Different methods of extraction and transport of timber particularly those in use in different forest areas of Pakistan. Various types of equipment used.

**Grading and storage Timber.** Grading of Chir, Kail, Deodar, Shisham and Mulberry; grading of railway sleepers. Storage of logs and timber, lay out and types of timber depots, maintenance of depot record, different methods of stacking with advantages and disadvantages, measures for protection of stock. Sale and disposal of forest produce. Different systems. Sale and disposal of forest product in different areas.

**Minor forest produce.** Definition and relation importance of minor forest products. Detailed study of different kinds of minor forest produce and their sources including fibres and flosses, grasses, bamboos and canes, distillation and extraction products, oil seeds, tans and dyes, gums and resins, drugs, spices and other edible products. Details of resin tapping and manufacture of turpentine and colophony. Charcoal manufacture. Visit to forest depot.

**BOOKS RECOMMENDED:**


**FR-607 RANGE MEDICINAL & POISONOUS PLANTS 2(2-0)**

**THEORY:** History, scope and classification of medicinal plants of forest/range lands. Collection, drying, storage of plants from wild sources. Introduction, uses, important chemical constituents, collection and adulteration of commonly used medicinal plants. Classification of poisonous plants. Cultivation and uses of dual nature plants. Important medicinal and poisonous plants of rangelands. Classification and identification of important chemical groups of medicinal plants. Role of pollen and anatomical characters for identifying medicinal plants. Methods for the cultivation, harvesting and processing of important medicinal plants.
FR-609 PROJECT PLANNING AND SCIENTIFIC WRITING 2(1-2)

Definition and concept of research; Selection of research topics; Scope and importance of project description. Project formulation, Review of literature; Objectives of research projects, methods and approach processing. Project costs and financing. Preparing the PC-1 Project Management team building. Implementation, monitoring, evaluation and appraisal of projects. Scientific Report Writing. Citations and technical references. Presentation of data, interpretation, generalization and inferences; scientific language development, Tabular and textural presentations. Editing and proof reading of manuscripts.

Practicals:
Each student will be required to select problems for project development. The student will develop a PC-1 for the same and write a scientific article on a given topic related to his/her discipline. In addition, the students will be required to conduct assignments on Literature review, Project planning of any Range Management and Agro-forestry projects and its evaluation, scientific writing assignments and presentations, Group discussions of different research topics, etc.

Books Recommended

Part-A: Forest Policy

Part-B: Forest Law

2. Acts and Regulations and Rules:
   Section by section study of the following Acts and regulations and rules:


Books Recommended:
2. Forest Act, 1927 Ideal Publisher, Karachi.
PRACTICALS:

ii. Practical training in the related discipline with research & development institutions/NGOs. Project writing, execution and report writing.

iii. Collection of data/conduct of assignments regarding the Internship under the supervision of local supervisor. Literature search regarding the study topic. Presentation of findings in the internship report and seminar.

BOOKS RECOMMENDED: