Pir Mehr Ali Shah

Arid Agriculture University Rawalpindi

Self Assessment Report

3rd Cycle (2010-2012)

M.Phil/Ph.D. Wildlife management

Department of Wildlife Management

Prepared by:

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INTRODUCTION

The Department of Wildlife Management was established in 2007 at Pir Mehr Ali Shah Arid Agriculture University Rawalpindi with a mandate to carry out teaching and research on various aspects of wildlife, suggesting measures for conservation of wildlife populations and their habitat, especially focusing on threatened species, management of protected areas and wetlands, and management of human-wildlife conflict. The department is offering postgraduate degrees of M.Sc., M. Phil. and Ph.D. in wildlife management. The students' enrollment during the reporting period was 19 in M. Phil. and 5 scholars in Ph.D. programme. The faculty members and students of this department have published more than 40 research papers (as senior author or co-author) during the last two years.

Partial requirement of taught courses to fulfill the needs of these degrees is met from an extensive scheme of study (consisting of more than 30 courses), which has been developed for post graduate degree programme in the field of wildlife management including all major aspects such as wildlife study techniques, wildlife population, management, diseases and captive breeding, management of protected area, wetlands and terrestrial habitats, wildlife policy, laws, conservation strategies and conventions, wildlife damage management, threatened species management, etc. The courses are supported by latest text books and research publications.

Presently, the research studies conducted by the students and faculty focus on population density and size, wildlife habitat analysis, evaluation and preference, food habits and diet composition, breeding habits and breeding biology, distribution of wildlife species in their habitat, baseline data on protected areas and threatened species, wetland ecology, population size and trends of water birds, threats to wildlife species, etc. In future, the department would address major issues on wildlife population, habitat and threats, developing strategies for their conservation and environmental education/awareness among the public.

The research facilities have been established both in the field as well as in the laboratory. Necessary field equipments required for conducting wildlife research studies have been procured under HEC funded development and research projects as well as university funded research projects. This includes; live traps, nets, binoculars, spotting scopes, cameras, GPS, camping gear, glassware, refrigerators, ovens, deep freezers, chemicals, etc.

A development project on "Strengthening the Department of Wildlife Management" funded by HEC amounting to Rs 36.141 m for a period of two years is in progress. Most of the field and laboratory research equipment, glassware, chemicals, books, and other items have been purchased under this project.

A research project on "Baseline studies on wildlife diversity in selected protected areas of Pakistan" funded by HEC for a period of three years (2009-12), amounting to Rs. 1.364 m has been completed and final progress report has been submitted to HEC which has been

approved. Another research project "Eology of Indian pangolin (*Manis crassicaudat*a) in Potohar region" funded by HEC amounting to Rs. 2.158 m is in progress.

As per policy of the university, lectures and assistant professors level faculty members are eligible to submit research projects for funding from university's own resources. Under this scheme, the relevant faculty members of this department have completed one research projects during 2010-11 (Rs. 0.1397m). Another research study with allocation of funds of Rs. 0.136 m is currently in progress.

About 200 books related to the subject of wildlife management and conservation have been purchased and placed in the university library for ready reference to the students. In addition, students are encouraged to get electronic copies of latest research papers related with their area of research by contacting relevant authors, institutions, publishers, etc.

This Self Assessment Report (SAR) is based on eight criteria. The first criterion outlines the program mission and objectives. Criterion 2 provides information about the curriculum development. Criterion 3 enlists the laboratories and other relevant information. The fourth criterion is pertinent to the information about students' support and advising. The last four criteria provide information about process control, faculty characteristics and institutional facilities and support.

CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Standard 1.1. The program must have measurable objectives to support Mission

Mission Statement: To provide in-depth knowledge on wildlife biology/ecology especially threatened species, wildlife laws and conventions, study techniques and habitat management; generate knowledge through thesis research for conservation of this significant natural resource of Pakistan.

Objectives:

1. To create a corps of wildlife biologists for management of wildlife of the country.
2. To impart training for data collection and analysis about wildlife species and their habitat for promoting its conservation.
3. To impart knowledge about global issues related to biodiversity/wildlife conservation

Main elements of strategic plan to achieve mission and objectives:

- Development of sound teaching system based on experience and vision gathered from literature, reviews, symposia, workshops, etc. for the award of degrees.
- Designing of curricula including core subjects, elective subjects, specialized areas, internship programs and study tours.
- Setting up of well equipped laboratories for students as per available resources.
- Conducting research studies through writing of synopses and theses.
- Development of scientific writing and presentation skills assignments and research reports.
- Publication of scientific papers, popular articles, books, etc.
- Arranging study tours to provide knowledge to students about wildlife management.

The assessment of the program objectives through different criteria is presented in Table 1.

Table 1. Program Objectives Assessment for M. Phil./Ph.D.

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement made
1	To create a corps of wildlife biologists for management of wildlife of the country.	Test their knowledge about Wildlife management techniques through tests / comprehensive exams	During the semesters and at the time of written & oral comprehensive exams	Courses to be updated by inducting new knowledge/ techniques & induct new courses when required	Revision of curriculum and induction of new courses in 2009.
2	To impart training for data collection and analysis about wildlife species and their habitat for promoting its conservation.	Assessing the interest of students, quality of their thesis research studies	During synopsis writing for starting of research and thesis writing on completion of research	Students to make presentations and submit reports	Presentations, seminars started for communication skill development
3	To impart knowledge about global issues	Assess their knowledge about	During the semesters and	Courses to be regularly	Revision of relevant course

	related to biodiversity / wildlife conservation	these aspects through tests / comprehensive exams / presentations	at the time of written & oral comprehensive exams	updated by inducting new knowledge on global issues and trends	contents and induction of new courses in 2009

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

Students of M. Phil./Ph.D.in Wildlife Management should possess the ability of:

- Identification of problems in wildlife management/conservation and suggest appropriate solutions
- Preparation of problem based research proposals and use of scientific study techniques.
- Communication skills through presentations, oral discussions, scientific and review articles, etc.
- Scientific writing skills and publication of research papers and popular articles in scientific journals.

Questionnaire surveys results for M.Phil./Ph.D. are presented in Table 2.

Table 2. Relationship of Program Objectives with Program Outcomes

Program Objectives	**Program Outcomes**			
	Wildlife management Skills	**Developing Research Proposals**	**Communication skills**	**Scientific writing/ publishing**
Education	+++	++	++	++
Research	++	+++	+++	++
Global issues	++	+	+	

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

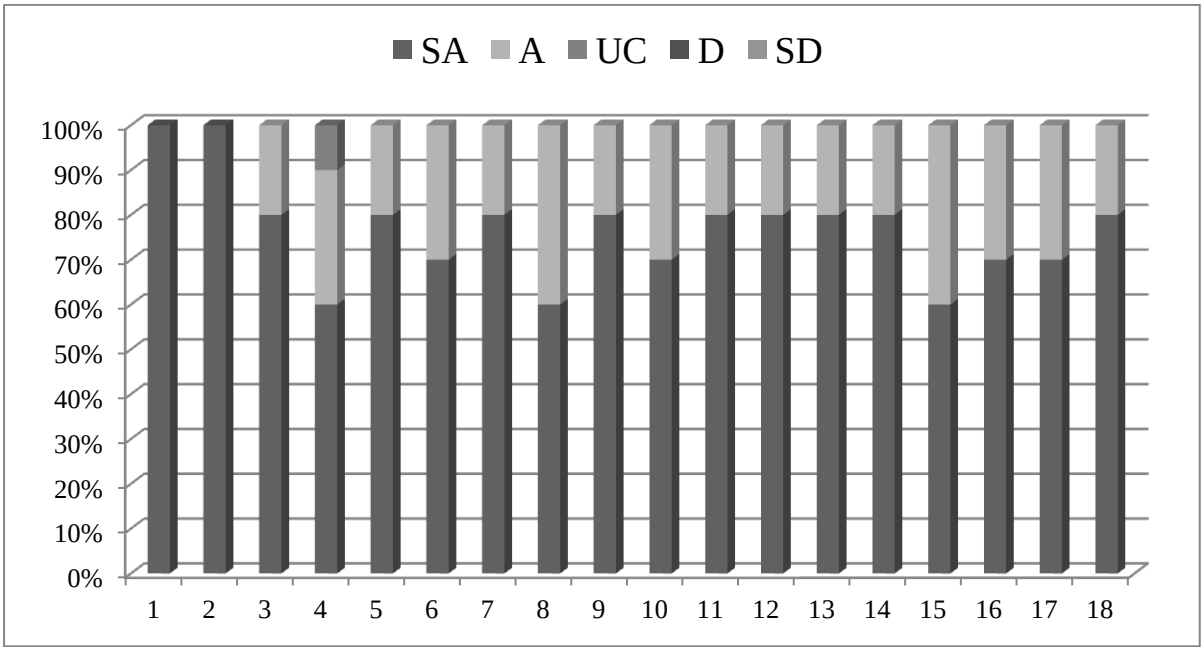
Teacher's evaluation

Three teachers of the department teach classes to M. Phil./Ph.D. students namely:

1. Dr. Iftikhar Hussain Professor
2. Dr. Maqsood Anwar Associate Professor
3. Dr. Tariq Mahmood Assistant Professor

The teachers were evaluated by the students at the end of course completion through the proforma-10 (Annex-II). Detail of performance of each teacher is given in Figs. 1-8.

WL-703



Key: SA=Strongly Agree, A=Agree, UC=Uncertain, D=Disagree, SD=Strongly Disagree
Fig. 1. Teacher Evaluation for WL-703 during Fall-2011

Comments
Instructor: Excellent methodology, very dedicated, cooperative behavior.
Course: innovative, knowledgeful, contents well organized, manageable, informative.

WL-704

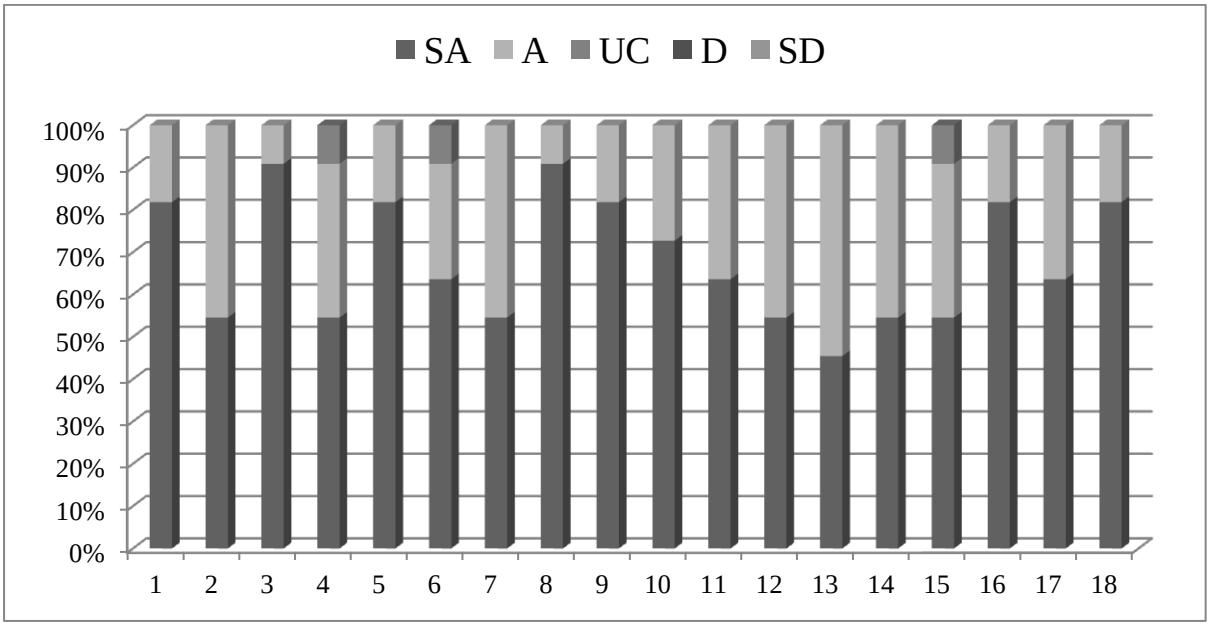


Fig. 2. Teacher Evaluation for WL-704 during Fall-2011

Comments:
Instructor: Cooperative, teaching method good, punctual, honest, helpful.
Course: Informative but lengthy, easily manageable, need to be more specified, interesting, informative.

WL-705

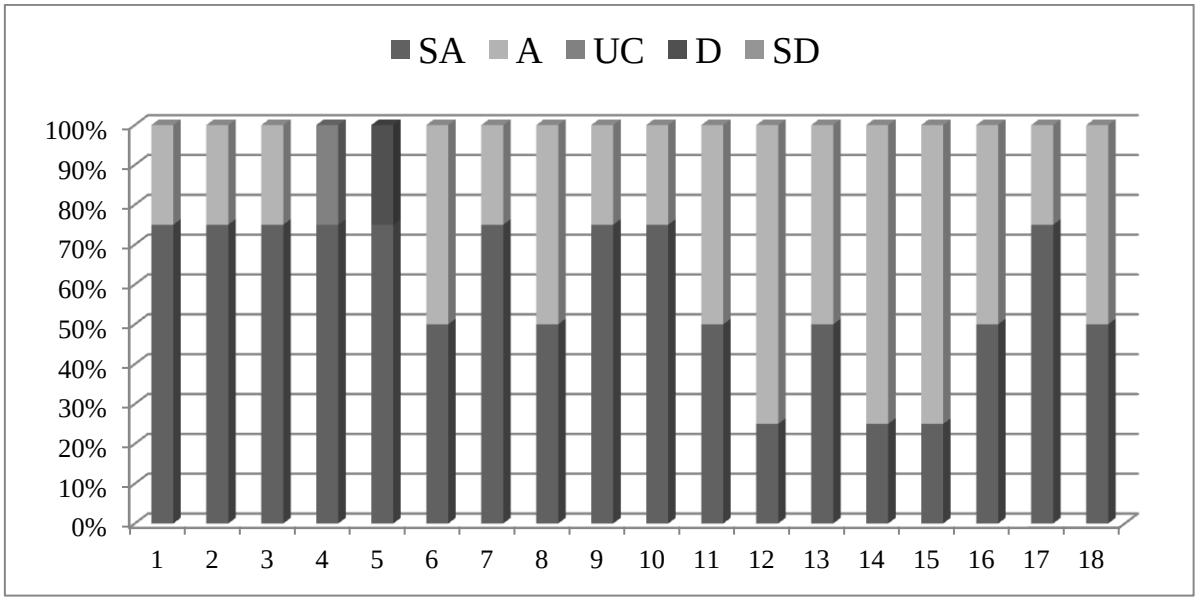


Fig. 3. Teacher Evaluation for WL-705 during Spring-2011

Comments:

Instructor: Supportive, friendly attitude, cooperative, encourages students, quality of lecture is good.

Course: Well organized and up-to-date, comprehensive and informative about habitat & techniques, may be upgraded for practical work.

WL-710

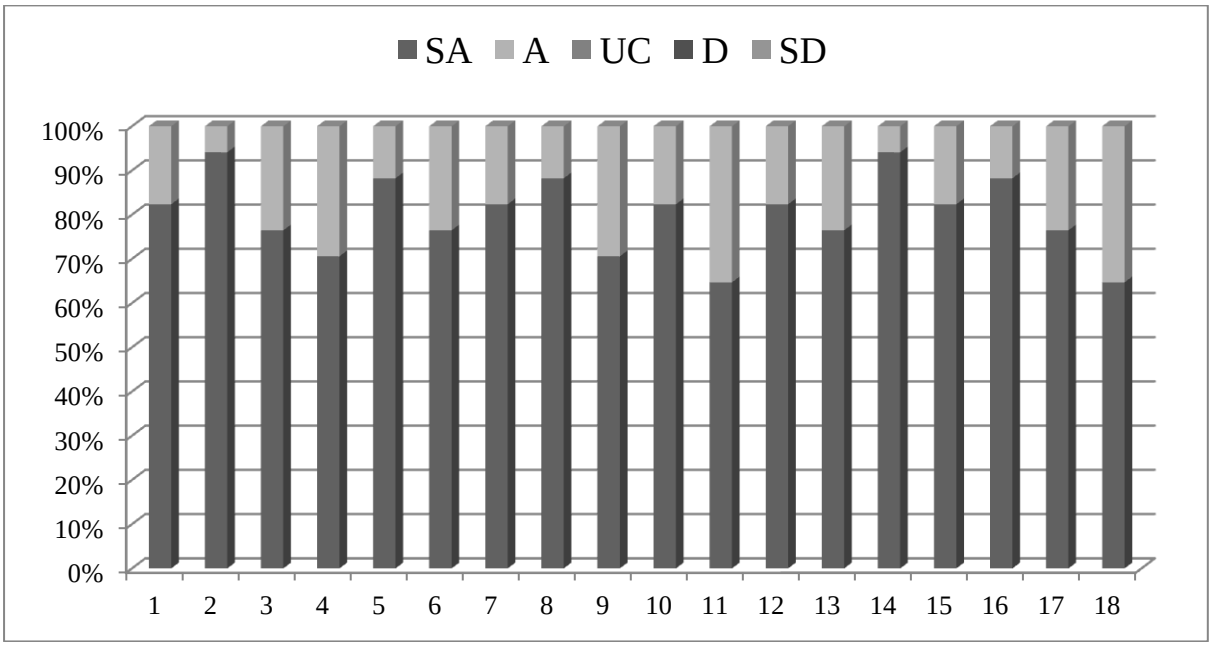


Fig. 4. Teacher Evaluation for WL-710 during Fall-2011

Comments:

Instructor: provided useful knowledge, cooperative, maintained friendly environment in class, prepared for lectures, helpful, guided well,

Course: contents clear and helpful, updated, well managed, comprehensive, interesting & relevant, understandable, important regarding wildlife, comprehensive.

WL-713

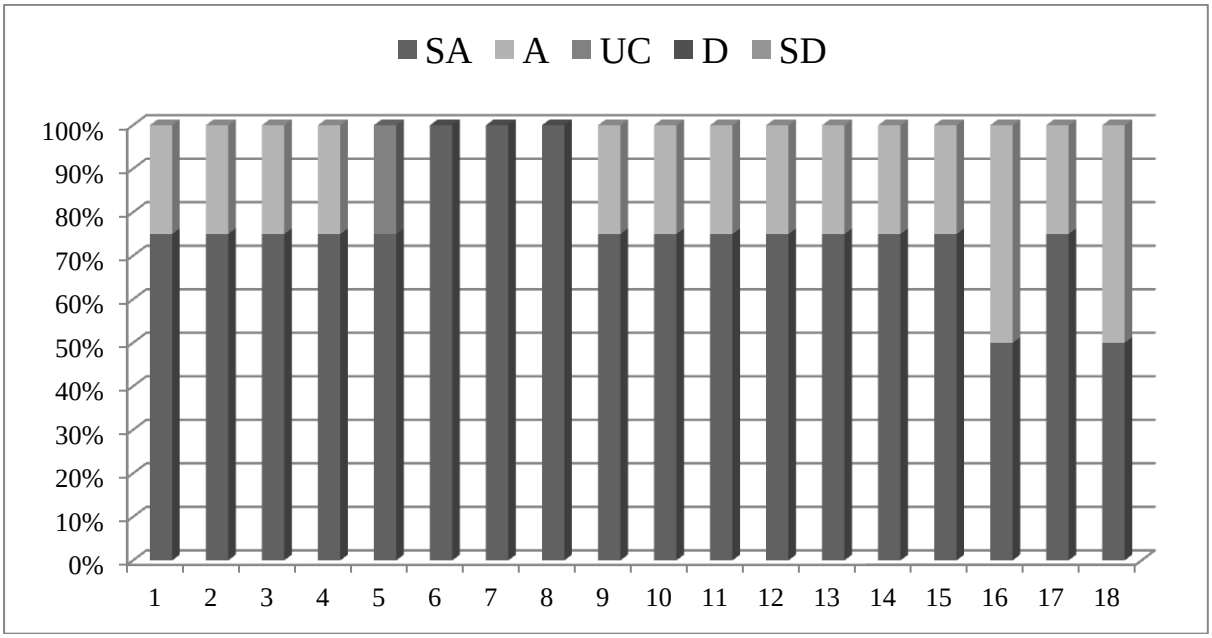


Fig. 5. Teacher Evaluation for WL-713 during Spring-2011

Comments:
Instructor: Very cooperative, helping, polite behavior, has good ability to deliver lectures
Course: Well organized and comprehensive, practical may be included.

WL-715

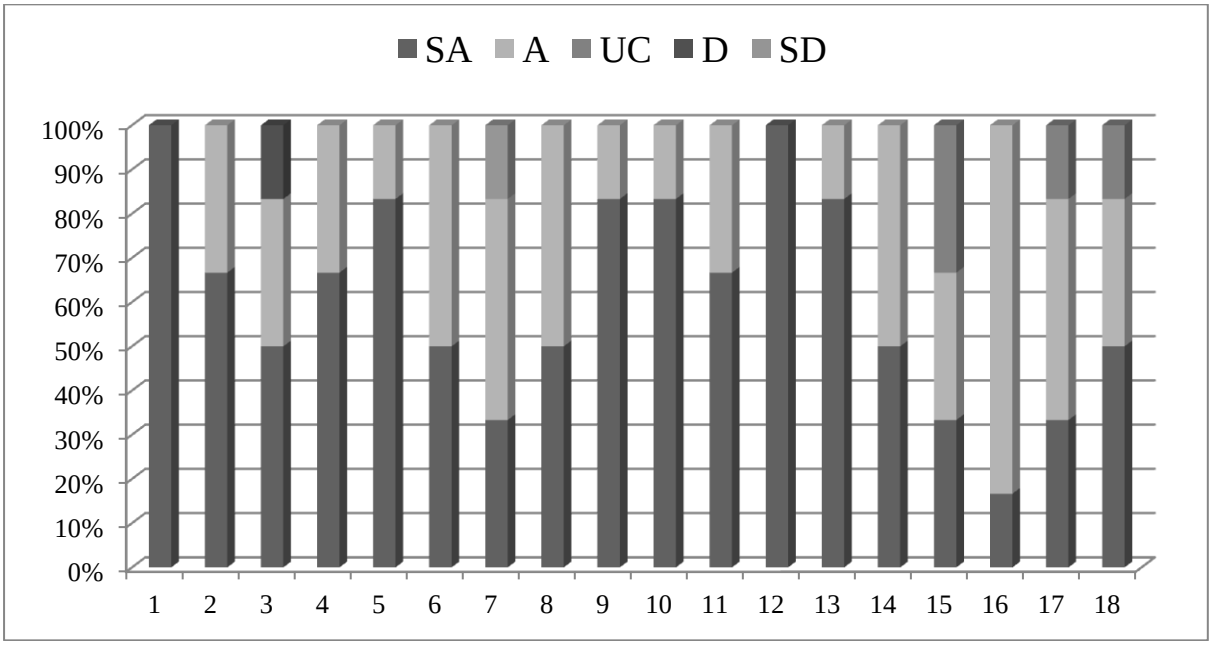


Fig. 6. Teacher Evaluation for WL-715 during Spring-2011

Comments:
Instructor: Provided field and practical knowledge, honest with profession.
Course: learned about wildlife management, wildlife behavior, contents are comprehensive and manageable, interesting.

WL-717

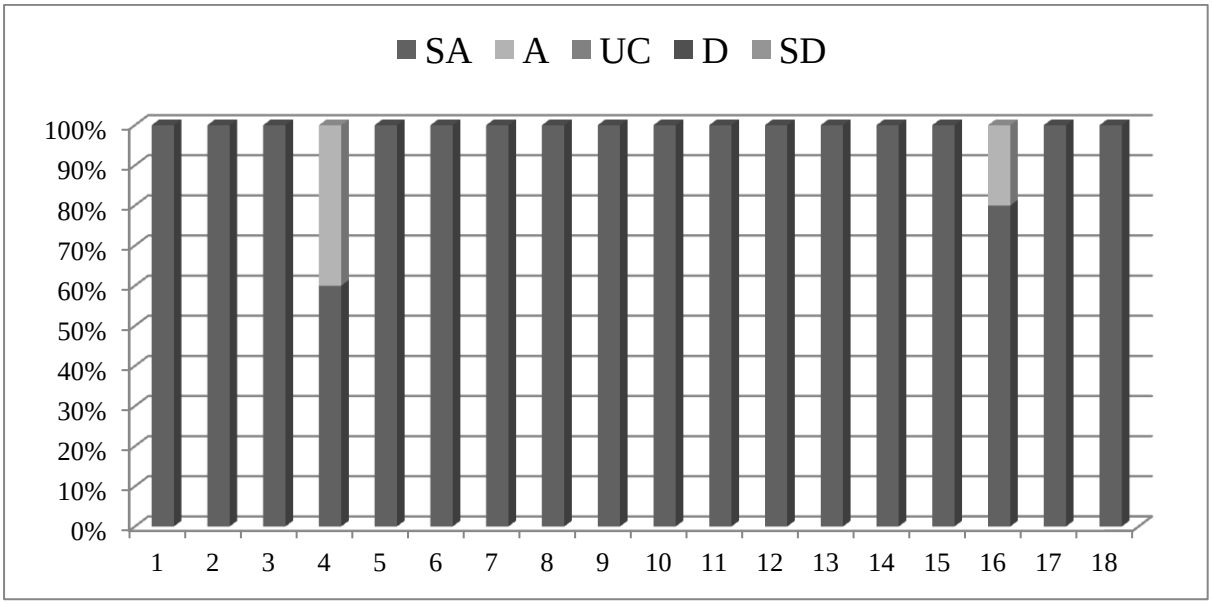


Fig. 7. Teacher Evaluation for WL-717 during Spring-2011

Comments:
Instructor: method of teaching fair, provided much knowledge, well mannered with grip on subject, communication problem with him,
Course: Very interesting and knowledgeable, increased knowledge about conservation and community participation, tours needed.

WL-728

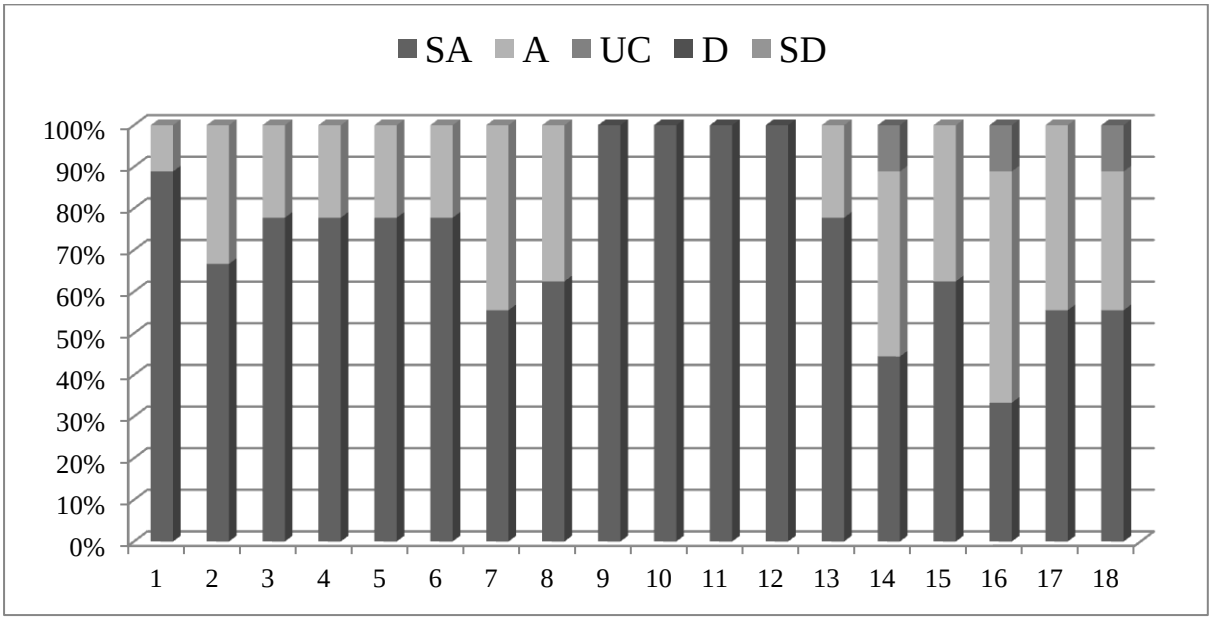


Fig. 8. Teacher Evaluation for WL-728 during Spring-2011

Comments:
Instructor: Cooperative, deals students with care, teaching method good, well prepared for lectures, hardworking. Fair with profession.
Course: contents sufficient and fulfill needs of subject, comprehensive and manageable, informative, up to date, too lengthy, provided much information on wildlife laws.

Course Evaluation

Courses offered during report period are given in Table 3. These were evaluated by students at the end of course completion through proforma-1 (Annex-I). Detail of evaluation of each course is given in Figs. 9-16.

Table 3. Courses offered and evaluated for M. Phil./Ph.D. from Fall 2010 to Spring 2012

#	Code	Course Title	Semester	Teacher
1	WL-703	Principles of Wildlife Management	Fall 2010	Dr. Tariq Mahmood
2	WL-704	Wildlife Study Techniques-I: Biological Aspects	Fall 2010	Dr. Iftikhar Hussain
3	WL-705	Wildlife Study Techniques-II: Management Aspects	Spring 2011	Dr. Iftikhar Hussain
4	WL-710	Protected Areas and their management	Fall 2010	Dr. Maqsood Anwar
5	WL-713	Wildlife Food and Foraging	Spring 2011	Dr. Tariq Mahmood
6	WL-715	Management Aspects of Wildlife Behavior	Spring 2011	Dr. Maqsood Anwar
7	WL-717	Endangered Species and their Management	Fall 2010	Dr. Maqsood Anwar
8	WL-728	Wildlife policy, legislation and international conventions	Fall 2010	Dr. Maqsood Anwar

WL-703

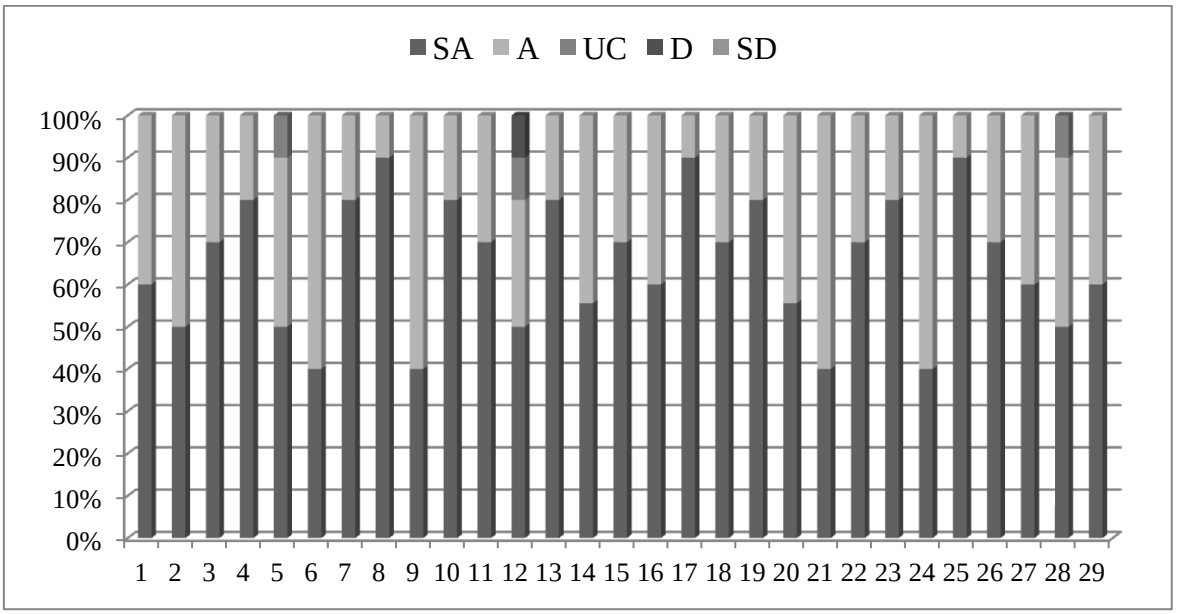


Fig. 9. Course Evaluation of WL-703 during Fall-2011

General comments about the course: The results revealed that majority of students were satisfied with the course.

Strengths: Course is descriptive & relevant, helpful in wildlife management, international examples.

Weaknesses: Adding practical work, providing more books on wildlife, field applications.

WL-704

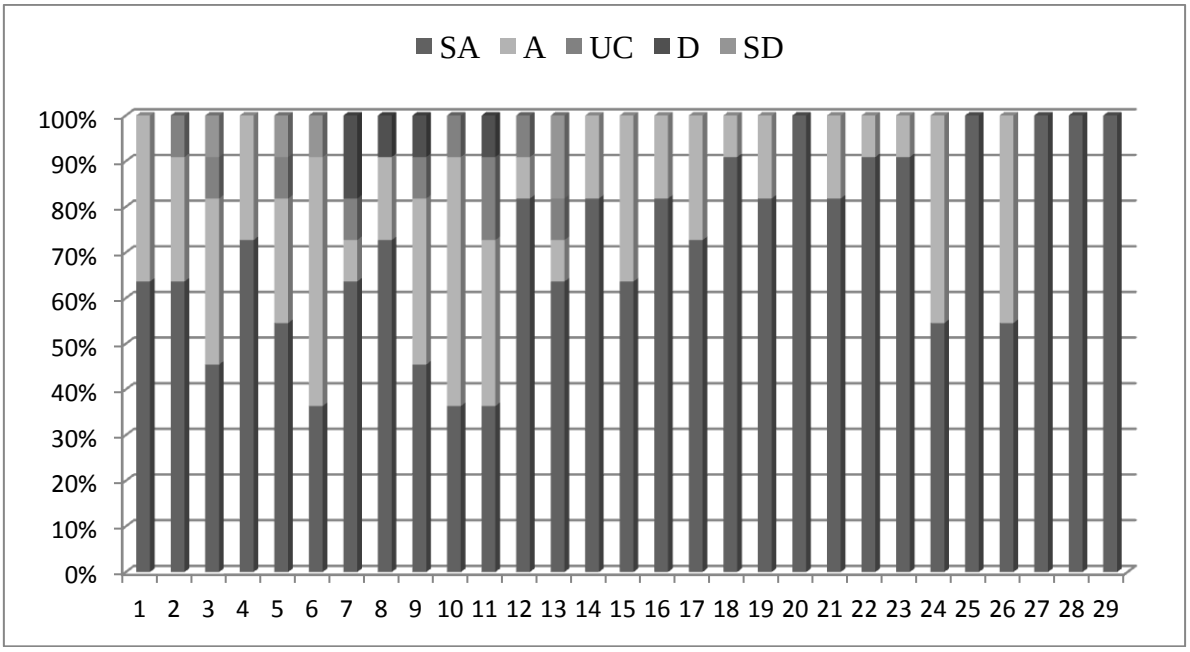


Fig. 10. Course Evaluation of WL-704 during Fall-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 6% were uncertain about course contents & organization, 3% about student contribution.
Strengths: Provided basic knowledge on wildlife studies, well organized and delivered, Practical work.
Weaknesses: Lengthy with extra material, making contents precise, adding more field work.

WL-705

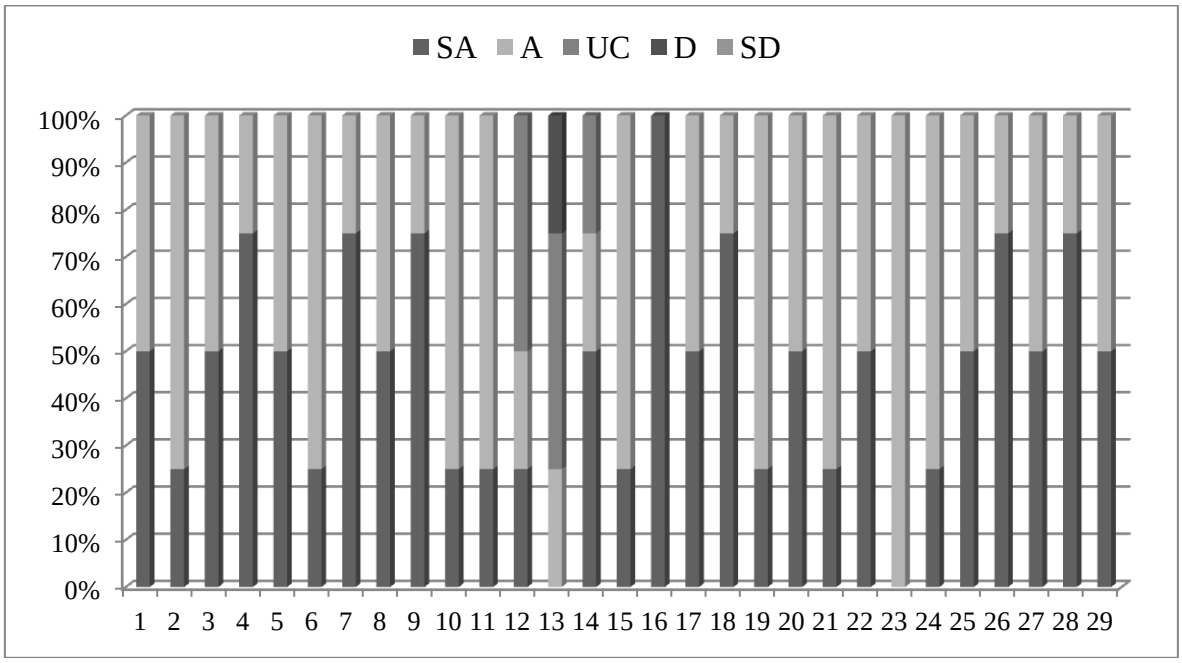


Fig.11. Course Evaluation of WL-705 during Spring-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 6% disagree and 31% were uncertain about learning resources.
Strengths: Techniques to assess & improve habitat and population estimation, use of modern techniques & equipment.
Weaknesses: Adding more field work.

WL-710

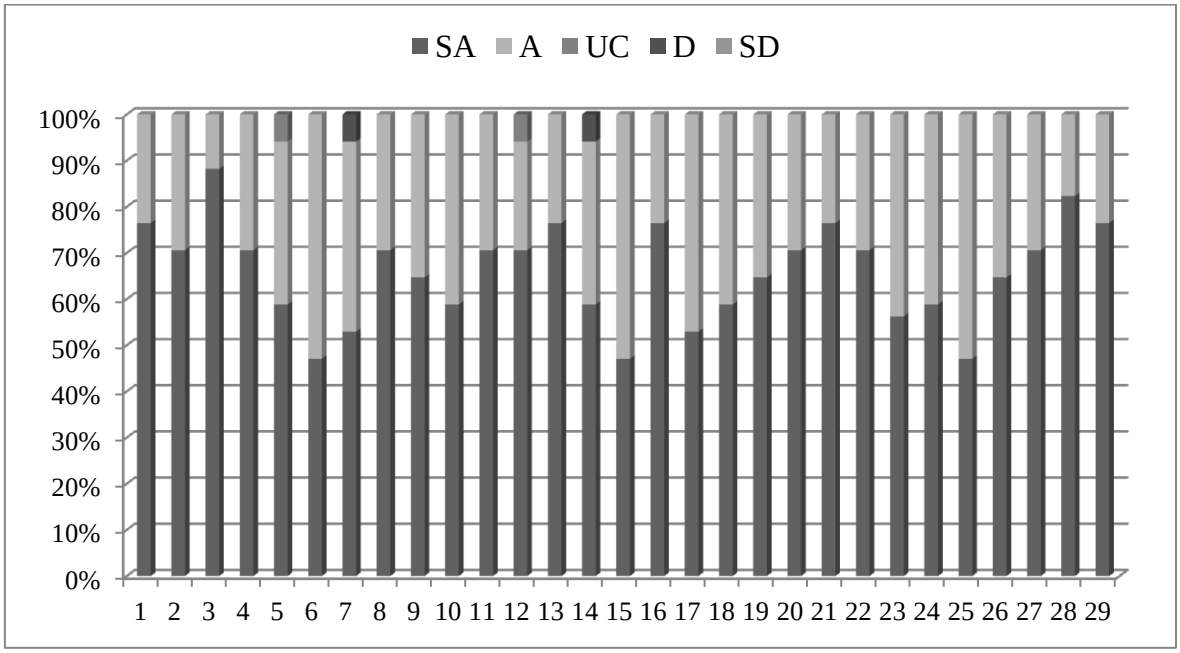


Fig. 12. Course Evaluation of WL-710 during Fall-2011

General comments about the course: The results revealed that majority of students were satisfied with the course.
Strengths: The practical, updated, advance knowledge on PAs, PA categories of Pakistan & IUCN, International perspective.
Weaknesses: More field tours and seminars, student's participation in discussion, include new research.

WL-713

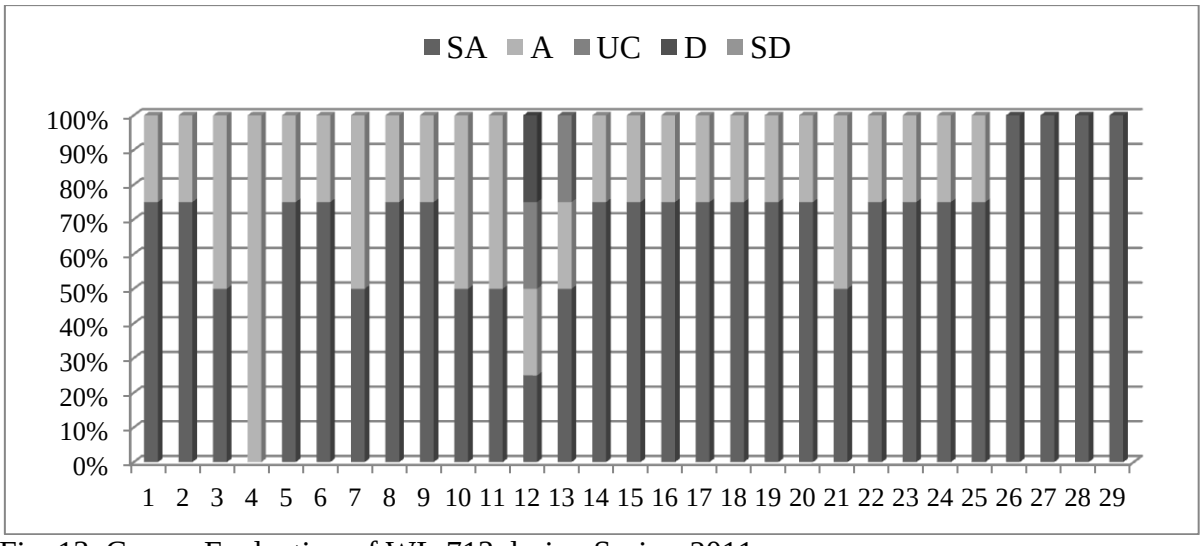


Fig. 13. Course Evaluation of WL-713 during Spring-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 13% were uncertain and 6% disagree with learning resources.
Strengths: Information on foraging behavior and studies.
Weaknesses: Interaction between foraging and conservation.

WL-715

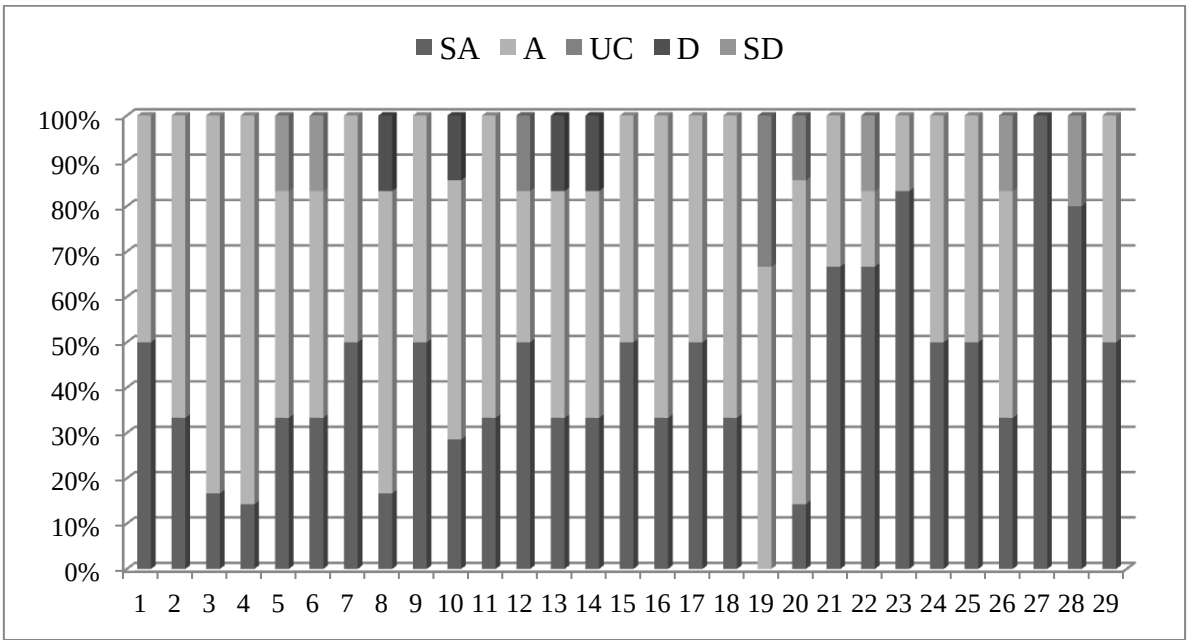


Fig. 14. Course Evaluation of WL-715 during Spring-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 11% disagree with student contribution and 14% uncertain about learning resources.
Strengths: Interaction of behavior and conservation, Behavior and wildlife management. Informatory.
Weaknesses: Books and material on the subject.

WL-717

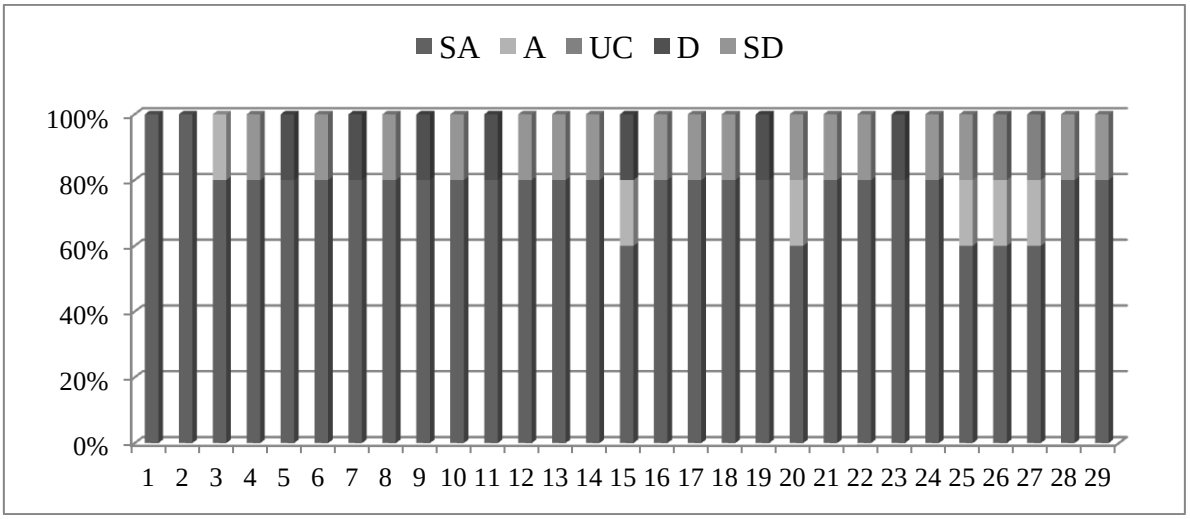


Fig. 15. Course Evaluation of WL-717 during Spring-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 10% strongly disagree with learning environment, 15% with learning resources and 13% with quality of delivery and assessment.
Strengths: Plans/strategies of different countries, informative & interesting.
Weaknesses: Needed field tours. Audio-visual aids.

WL-728

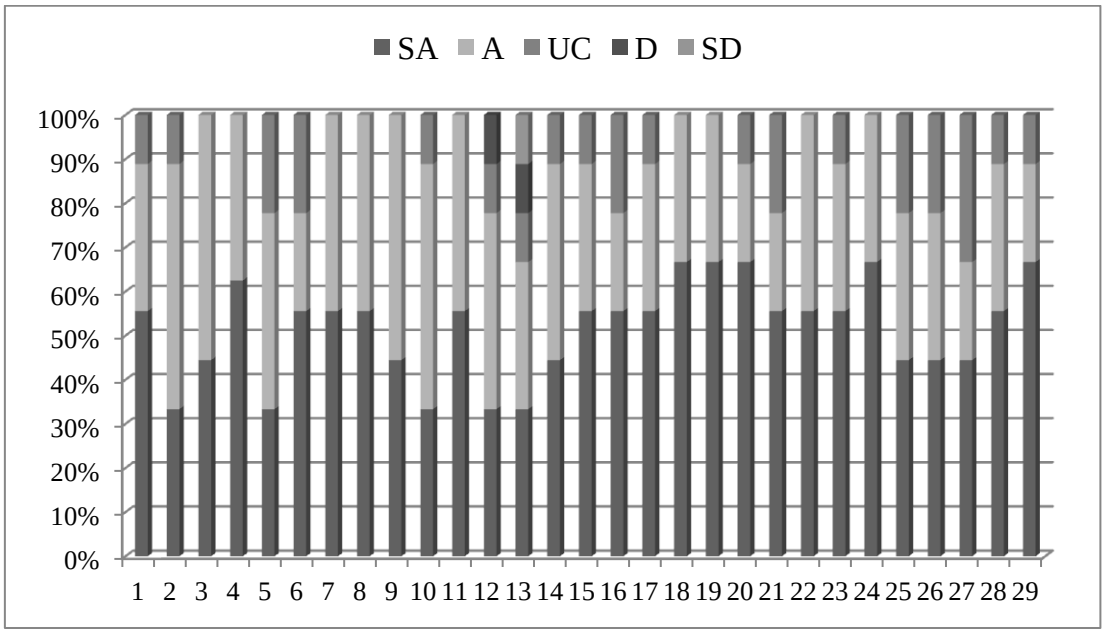


Fig. 16. Course Evaluation of WL-728 during Spring-2011

General comments about the course: The results revealed that majority of students were satisfied with the course. However, 5% disagree with learning resources and 15 were uncertain about quality of delivery and 7% with course contents and organization and 8% about learning resources.
Strengths: Knowledge on wildlife laws & regulations, international environmental initiatives & conventions.
Weaknesses: Books on the subject needed, update the material on subject.

ALUMNI SURVEY RESULTS
Feedback of students graduated during 2010 and 2011 was acquired through Proforma-7. Majority of the Alumni have rated the knowledge imparted by the department and career opportunities as excellent. Communication skills, interpersonal skills and management/ leadership skills have also been rated high, a mix of excellent & very good. Results of the survey are presented below (Fig. 17).

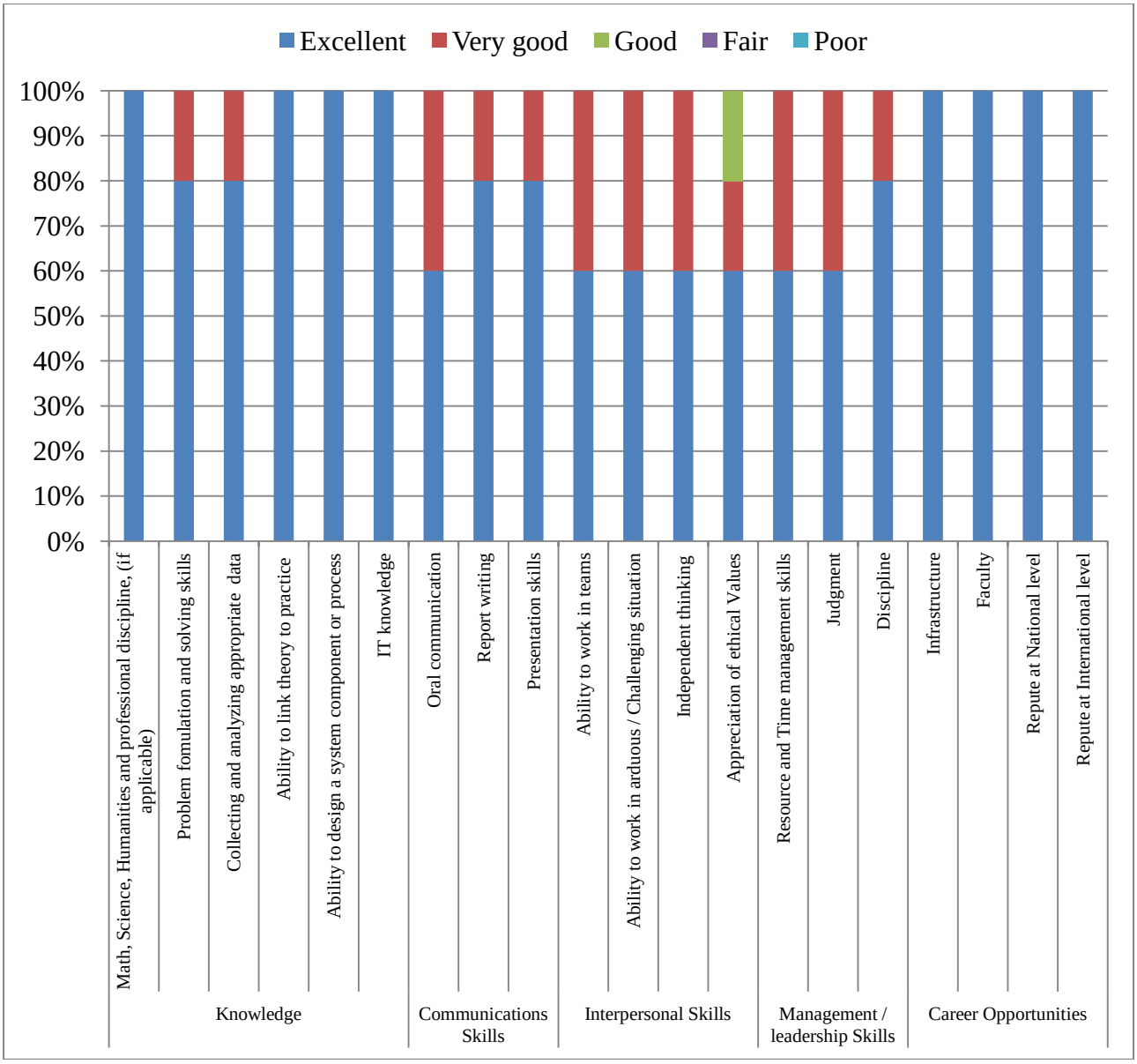


Fig. 17. Alumni Survey Results (M. Phil.)

General comments:

A course on wildlife diseases, their treatment and prevention is needed. More facilitation to the students for field research is required. More focus on wildlife handling and translocation. Include latest study techniques i.e. camera trapping & site occupancy survey. Improve evolution and taxonomy aspects. More specialized degrees in Ph.D. wildlife such as ecology, evolution etc. may be mentioned on the degree along with wildlife management. Overall program is doing good work in wildlife management and conservation. Department is doing excellent research work in wildlife field.

Career opportunities:

Job opportunity after getting this degree is there if study with dedication. Lot of work needs to be done on wildlife in our country. Internship programmes may be started with concerned organizations to get experience in the field and can provide good opportunities to work in NGOs, research organizations, etc. Has a wide spectrum of employment in this field at national and international level.

SURVEY OF GRADUATING STUDENTS

Survey of graduating students was conducted through Performa 3. Students showed their high satisfaction program effectiveness for enhancing team work, support for learning, meeting objectives of program and conducive environment for learning. Other aspects of the program have also been rated high. They were dissatisfied only with infrastructure of department. The results of the survey are given in Fig. 18.

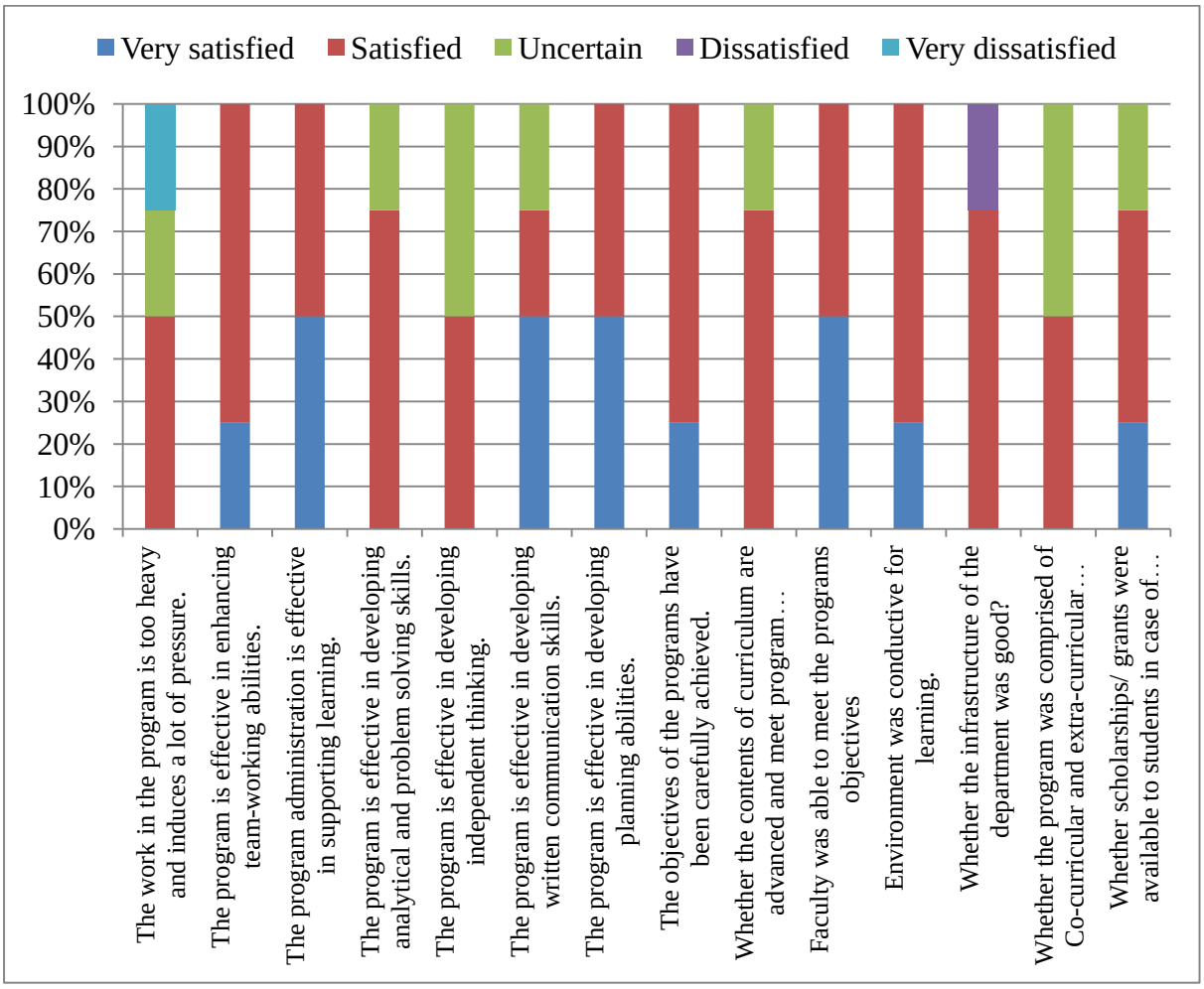


Fig. 18. Graduating student's survey results (M. Phil.)

Best aspects of the Program:

- Development of better working in field as a team
- Program is conducive and improved learning skills
- Field visits and wildlife observations
- Confidence building, field work, research and writing abilities
- Understanding importance of natural resources and biodiversity
- Enhanced writing, professional and management skills of wildlife

Aspects of Program in need of improvement:

- More study tours to natural areas
- Trained field staff and own transport facility
- More research equipment/facilities in laboratories and for field
- More scholarships for the students

RESEARCH STUDENTS PROGRESS REVIEW

Survey of M. Phil. research students progress review was conducted through Performa 2. Results are given below in graphs.

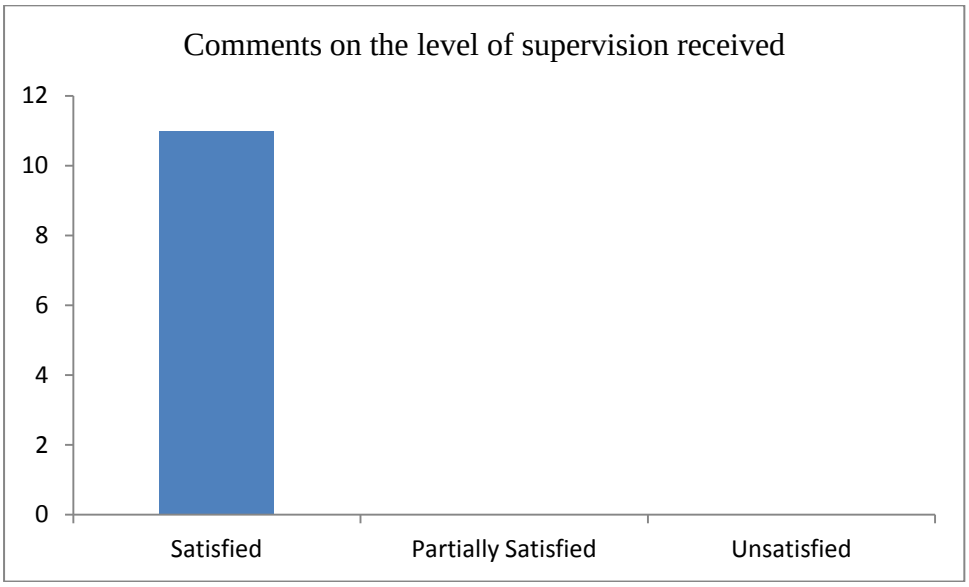


Fig. 19. Level of supervision received by M. Phil. students

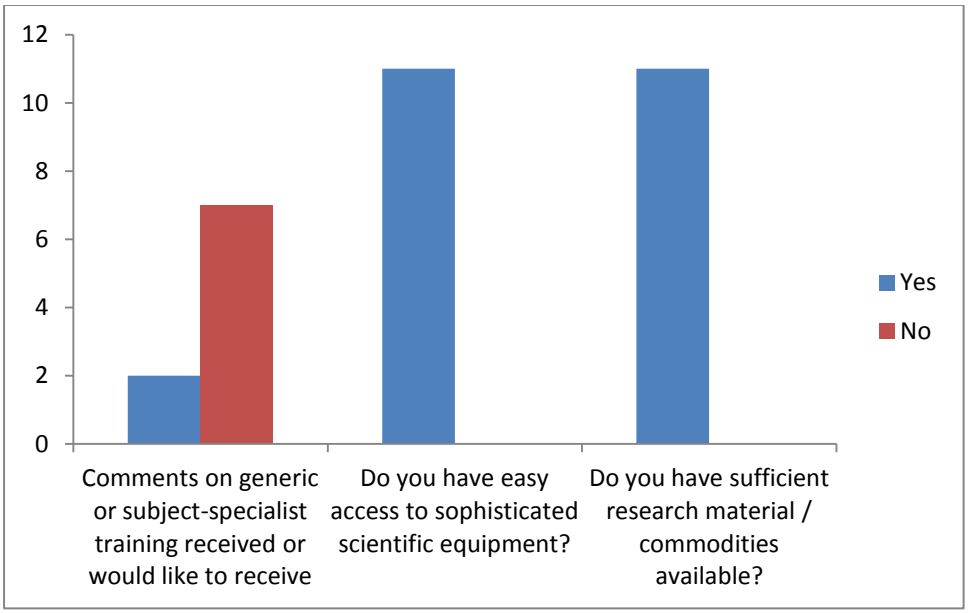


Fig. 20. Response of M. Phil. students on Misc. issues

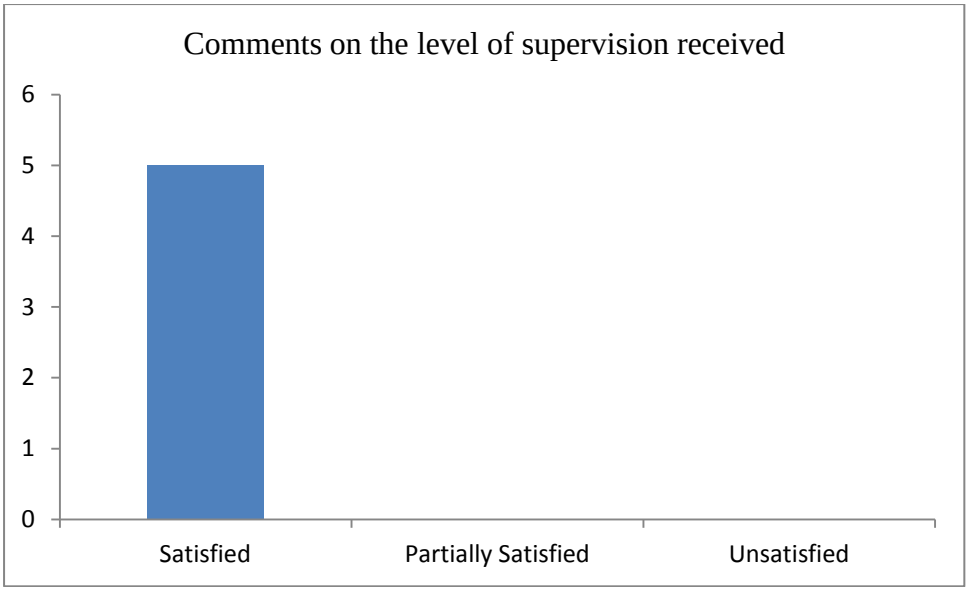


Fig. 21. Level of supervision received by Ph.D. students

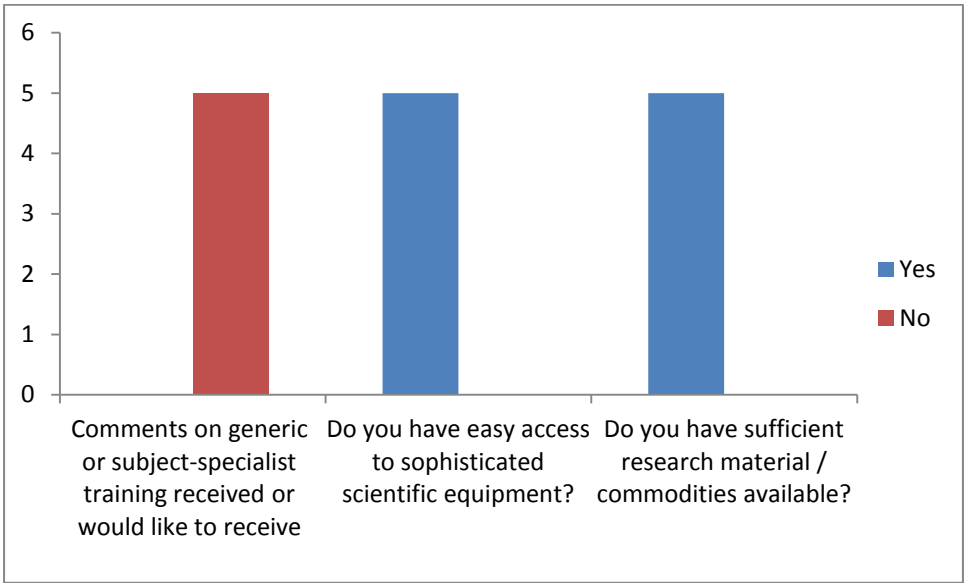


Fig. 22. Response of Ph.D. students on Misc. issues

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 will be continued and the results will be incorporated accordingly. Following are the strengths and weaknesses of program identified.

Strengths of the Program

1. The department is having qualified teachers with full acquaintance of their respective subjects, knowledge of research and management techniques for study of wildlife.
2. There is one professor, one associate professor in the department both are foreign qualified, one assistant professor who got Ph.D. degree from Quid-i-Azam University, Islamabad, one lecturer with Ph.D. in Zoology (with specialization in wildlife) from Karachi University and one lecturer has completed her M. Phil. (Wildlife Management)

from PMAS-AAU Rawalpindi. Three faculty members are HEC approved supervisors who can supervise Ph.D. students.
3. All faculty members are involved in research directly or indirectly as supervisor and committee member of the post-graduate students.
4. Two faculty members (one assistant professor and one lecturer) have got six months training in wildlife from foreign universities (USA and Malaysia).
5. All faculty members have got research projects funded from various funding sources.
6. Two laboratories have been established with basic necessary equipment in addition to having equipments to carry out field studies on wildlife species.
7. The department has got a development project funded by HEC under which necessary field and laboratory equipment and class room aids have been purchased to strengthen academic and research activities of the department.
8. Department has signed MoUs with five public and private sector organizations to facilitate its research projects and students' theses research.

Weaknesses of the Program

1. There is scarcity of space as there is only one class room due to which difficulty is facing difficulty in adjusting simultaneous classes.
2. Two faculty members are housed in cabins within the laboratories due to which working and sitting place (for Ph.D. students) has become insufficient. The laboratories are also filled with equipments purchased under the HEC project. Therefore, at least two faculty office rooms, one store room and one laboratory are needed to meet the needs.
3. Wildlife is an applied, field-based subject which needs extensive touring for imparting firsthand knowledge to the students and therefore, there is need of having a suitable field vehicle.
4. Coordination with federal and provincial wildlife departments and other organizations is currently under development which needs to be further facilitated/ enhanced for field tours and research studies.

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 (Table 4).

Table 4. Performance measures for research activities

Faculty	Publications in Journals	Research & Development Projects
Dr. Iftikhar Hussain	13	1
Dr. Maqsood Anwar	10	1
Dr. Tariq Mahmood	12	2
Mr. Muhammad Rais	11	2
Ms. Bushra Allah Rakha	11	1

Future Plans

The Department of Wildlife Management has planned a number of research studies in future addressing the issues of wildlife conservation and protected areas management including

wetlands and collecting data on biology/ecology of wildlife species particularly the threatened species. Some of the studies/activities include:

1. Population density/size, habitat utilization/preference, breeding habits/biology of wildlife species, especially rare and threatened species
2. Food habits, diet composition and food preference of wildlife species, particularly focusing on ungulates, carnivore and threatened bird species.
3. Distribution range/pattern of wildlife species especially focusing on Pothwar area.
4. Baseline data on protected areas including wildlife diversity, threatened or rare species studies, social issues and major threats to the PAs.
5. Baseline data on wetlands including both resident and migratory waterfowl and threats to the ecosystem.
6. Wildlife damage assessment / management particularly of rodent pests, porcupine and wild boar.
7. To impart quality education in wildlife management/conservation through study tours, audio visual aids along with provision of latest literature, journals, books and internet.
8. To impart training to employees of wildlife/forest departments, other relevant organizations and NGOs in wildlife research and management.
9. To develop strong collaboration and linkages with wildlife related government departments and NGOs for wildlife conservation and research.
10. To equip the department with the advanced equipments both for laboratories and field surveys/studies of wildlife species.
11. To enhance knowledge and skills of faculty members about latest advancements in wildlife/biodiversity research and conservation through exchange programs, short trainings and collaborative research projects within and outside Pakistan.

Faculty satisfaction regarding the administrative services

- The department maintains a ratio of 4:1 for the academic (including technical) and administrative/support (non-technical) staff which fulfils the standard set by HEC
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required.
- Office matters/files are disposed regularly and so far no complaint has been received from higher administrative authorities.
- Proper records/file of each employee and students are maintained.

Quantitative assessment of the department for the last two years is given in the Table 5.

Table 5. Quantitative assessment of the department (Fall 2010 to Spring 2012)

Sr. #	Particular	No.	Remarks
1	M. Sc. degree awarded	14	
2	M. Phil. degree awarded	19	
3	Ph.D. degree awarded	Nil	
4	Post-Doc fellowship	Nil	-
5	Students: Faculty ratio		Fulfils HEC criteria
6	Technical: Non-technical Ratio		Fulfils HEC criteria

EMPLOYER SURVEY

As there was no graduating student working in the departments by the end of spring semester 2010, the employer survey under Performa 8 was not conducted.

CRITERIA 2: CURRICULUM DESIGN AND ORGANIZATION

A. Intent

All courses for M. Phil./Ph.D. were initially developed by faculty members and finalized after sharing with relevant government departments, NGOs, universities and individual experts. During the course of time, a few courses have been revised and some new courses added based on the need felt by the department. Curriculum and course contents are finally approved by the University Academic Council.

B. Definition of credit hour

One credit hour is one theory lecture or two hours laboratory practical per week. A credit hour carries 20 marks.

C. Degree plan - pre-requisites

M. Phil. Wildlife Management

B.Sc.(Hons.)/B.S. or master degree examination (16 years education in aggregate) with a minimum of 50% marks or its equivalent from a recognized institution in related subjects (Wildlife/Zoology/Biology/Forestry & Range Management) or an equivalent qualification in relevant discipline from a HEC recognized institution. GAT score of 50.

Ph.D. Wildlife Management

M.Sc.(Hons.)/M.S./M. Phil. in first division or 3.00/4.00 CGPA or an equivalent examination from a recognized institution in the field of study related to the subject, NTS-GAT (Subject) test with 60% marks and interview.

The selection criterion for each course is as follows;

- The course is relevant to the degree program
- It meets the national and international requirements for the degree
- Adequate facilities are available in the department to offer the courses
- The course contents meet the program objectives as highlighted and provided by the Higher Education Commission of Pakistan.

Each course in the program is to be completed for credits specifying the following:

- Course title (WL)
- Course objectives and outcome (Given in course breakdown into lectures separately)
- Catalogue description (yes)
- Text book and reference (Given in course contents)
- Syllabus breakdown in lectures (yes supplied to QEC separately)
- **Computer usage**: Internet facility is used by faculty members to update their knowledge regarding each course, research studies and recent references. Students also use this facility to solve their problems, assignments and presentations.
- **Laboratory facilities** are provided to the students for their practical exercise, given in the curricula. Post-graduate students also use laboratories for their theses research where equipment, material and chemicals are provided.

D. Degree requirements

M. Phil. Wildlife Management

The duration of course for M. Phil. degree shall not be less than four semesters for whole time students and not less than six semesters for part time/partial residents and not more than six and eight semesters, respectively. Each student has to complete 40 credits for the award of degree including 30 credits of course work and 10 of research/thesis/dissertation (not counted towards calculation of CGPA) based on the approved programme of research. All students of M. Phil. degree will be required to pass comprehensive examination after qualifying the course work. The recommendations of HEC regarding compulsory requirements of 124 credit hours for admission in M.S./M. Phil is adopted. . List of major courses for M. Phil. is given in Table 6.

Ph. D. Wildlife Management

The duration of course of Ph.D. degree in full residence shall not less than six semesters for whole time students and eight semesters for part time students. The maximum limit shall be 10 semesters. A student admitted in the course shall be required to be in residence during first two semesters of the course. A minimum 18 credits of course work is compulsory for Ph.D. degree out of which 9 credits are of core/compulsory courses and 9 credits from minor courses. After completing the course work, a written and oral comprehensive examination is taken. Student is required to defend his/her synopsis in a seminar and submit thesis to be approved by the University and examined by two foreign internationally recognized scientists from the universities of technologically advanced countries.

Ph.D. Courses

Note*: According to HEC criteria, only 18 credit hours courses (including 9 credit hours of minor courses) are needed to fulfill Ph.D. degree requirement. The courses assigned to the students are generally selected on the basis of students past academic record and the Ph.D. research topic needs. Therefore, there are not any specific courses for Ph.D. students but are assigned on the case to case basis from the available post-graduate level courses.*

Table 6. Course Requirements for M. Phil./Ph.D. in Wildlife Management

Sr. No.	Course No.	Course Title	Credit hours
1	WL-703	Principles of Wildlife Management	3 (3-0)
2	WL-704	Wildlife Study Techniques-I: Biological Aspects	3 (2-2)
3	WL-705	Wildlife Study Techniques-II: Management Aspects	3 (2-2)
4	WL-710	Protected Areas and their Management	3 (3-0)
5	WL-713	Wildlife Food and Foraging	3 (3-0)
6	WL-715	Management Aspects of Wildlife Behavior	3 (3-0)
7	WL-717	Endangered Species and their Management	3 (3-0)
8	WL-728	Wildlife Policy, Legislation and International Conventions	3 (3-0)
9	WL-719	Special Problem	1 (1-0)
10	WL-720	Seminar-I	1 (1-0)

Standard 2-1. The curriculum must be consistent and support the program's documented objectives.

The curriculum of Department is consistent with the program objectives (Table 7).

Table 7. Courses with relation to their outcomes

Course	Objectives		
	HRD	**Priority of Research**	**Integrated approaches**
Wildlife management/ conservation	++ +	++	+ +++
Wildlife study/ management techniques	+ + +	++ ++	+ + + +
Wildlife ecology	+ +	+ + +	+ + +
Wildlife biology	+ +	++	+ +
In-situ conservation	++	++	++
Ex-situ conservation	+	+	+
Policy/law/social issues	+	+	+ +

+ = Relevant, ++ = Relevant & satisfactory, + + + =Very relevant & satisfactory,
+ ++ + = highly relevant & highly satisfactory

Assessment of the Department of Wildlife Management Curriculum

The assessment of curriculum is given in Table 16 above 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 8. Courses representing theoretical background, problem analysis and solution design

Elements	Courses	Title of Courses
Theor-etical Back-ground	WL-713	Wildlife Food and Foraging
	WL-723	Wildlife Eco-toxicology
	WL-725	Museum Science
Problem Analysis	WL-710	Protected Areas and their Management
	WL-704	Wildlife Study Techniques-I: Biological Aspects
	WL-705	Wildlife Study Techniques-II: Management Aspects
	WL-721	Wildlife Habitat Evaluation and Restoration
	WL-719	Special Problem
	WL-727	Capture, Care and Transportation of Wildlife
	WL-728	Wildlife Policy, Legislation and International Conventions
Solution Designs	WL-703	Principles of Wildlife Management
	WL-715	Management Aspects of Wildlife Behavior
	WL-717	Endangered Species and their Management
	WL-720	Seminar
	WL-722	Predator Ecology and Management
	WL-724	Wildlife Diseases and their Management

	WL-730	Captive Breeding and Assisted Reproduction in Wildlife
	WL-731	Wildlife Farming and Ranching

Standard 2-6. Information technology component of the curriculum must be integrated throughout the program

During curriculum development, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program. Two courses of statistics (6 credit hours) based on computer practical were included in the curriculum to fulfill the requirements of the students.

Standard- 2.7. Oral and written communication skills of the student must be developed and applied in the program.

- Two seminars each of one credit hour are compulsory for students.
- Special problem (one credit hour) is offered to the students which require writing a comprehensive report on a topic and presenting it in the class.
- Assignments are given to all students in each course on specific titles relevant to the course which are presented orally and given as written assignments by the students which improve their oral and written communication skills.

CRITERIA 3. LABORATORIES AND COMPUTER FACILITIES

- Laboratory Title: Wildlife Management Laboratory -1
  Wildlife Management Laboratory-2
- Location and Area: Faculty of Forestry, Range Management and Wildlife,
  Ground and 1st Floor of Spur-D, Main Academic Block.
- Objectives: Laboratories are used by students and faculty for research studies including; autopsy of animals, micro-histological studies and food/diet composition analysis studies.

Research work for the graduate and post-graduate students

- Adequacy for instructions: Laboratories meet the requirements in terms of equipment, chemicals, furniture and general facilities, however, not spacious enough for demonstration purposes and analysis studies.
- Major apparatus: Major equipments available in the Labs. include; microscopes, deep freezers, refrigerators, pH meters, electric balances, electric oven, slides, glass ware, centrifuge machine, spectrophotometer, tissue homogenizers etc. purchased from HEC funded research & development projects.
- Field Equipments: Binoculars, GPS, Cameras, Cages, live traps, spotting scopes, spring balances etc.
- Safety Regulations: Safety measures such as fire extinguishers, first aid kit are not available in the Labs. However, the University maintains a Medical Dispensary for minor 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 in the departmental library. However, books and manuals owned by individual faculty are used by the students. A number of books and manuals have been prepared in the department.

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

Laboratories are maintained by two laboratory attendants and one laboratory assistant who assist the students in research studies, practical, cleaning and washing, etc. Students are instructed for Lab. work by respective faculty members.

Standard 3.3. The university computing infrastructure and facilities must be adequate to support program's objectives

The University has limited computer facility for students. Computer facility is available at the department level to most of faculty members independently. However, it is not adequate to meet the objectives of the programme and needs improvement

CRITERIA 4. STUDENT SUPPORT AND GUIDANCE

Directorate of Students Affairs of the University organizes support programs, cultural activities for students and guides them in case of any problem. The university staff provides information regarding admission, scholarships, career opportunities, etc. The university arranges orientation programme for new students and guided tours to various departments. However, currently Parent/Teacher association in the university does not exist.

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

- Courses are taught as per strategy and guidance provided by HEC.
- Subject courses are offered as per scheme of study of the department after approval of Academic Council of the university. Courses are offered by faculty trained in the relevant subject and as per their availability.
- Elective courses and minor 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.

- Courses are structured and decided among the faculty members in the departmental board of study meeting.
- Courses to be offered are decided before the commencement of semester and the faculty members interact frequently among themselves and with students.
- Students are encouraged to ask question, give comments and take part in the discussions in the class.
- Emphasis is given on effective interaction between the students and between students and teachers.

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 program requirements through office of chairperson of the department and through personal communication of teachers with them.
- The counseling of students is continuous process and students are free to contact relevant teachers whenever they face any professional problem.

- Students are also facilitated for interaction with faculties/scientists in other universities and research organizations whenever they need and there is open option for the students to get membership of professional societies.

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 for post graduate students of M.Sc., M. Phil. and Ph.D.
- Admission criteria for M. Sc. program: Sixteen years of education in relevant field/subjects.
- Admission criteria for M Phil. program: M.Sc. in relevant field/subjects with GAT score of 50.
- Admission criteria for Ph.D. program: Eighteen years of education in relevant field/subjects and GAT subject test in wildlife.
- All these entries are based on the recommendations of admission committees.
- Admission criteria is revised when required 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.

- Registration of students is done once every year at the time of admission. When a student is admitted for each degree, he/she is evaluated through the result of each course for each semester. If the students fulfill the criteria of the University (a specific CGPA after each semester) they are promoted to the next semester.
- Students are evaluated through Mid, Final and Practical exams and through written assignments and oral presentations.
- 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.

- The University follows the recruitment policy and rules recommended by HEC.
- Posts are advertised in national newspapers and university website, and 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.

- Recently, Tenure Track System (TTS) has been introduced by the University which is a good incentive for retaining highly qualified faculty members.
- HEC also supports appointment of highly qualified members as foreign faculty professor, national professors and deputes them in various departments.

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.

- Periodical update of curriculum is done depending upon the requirements, innovations and new knowledge generated.
- New courses are developed and included in the curriculum when need arises.
- Books on various aspects of wildlife are available in the department and in University library where documentation, photocopying and internet facilities are also available. .
- Students also take notes during the classes and photocopies of slides/transparencies are also provided in addition to printed material.
- All efforts are made to impart the course material and knowledge to meet the objectives of the curriculum.

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.

In the examination system of the University, the following are clearly mentioned;

- The evaluation procedure consists of quizzes, mid and final examinations, practical, assignments, reports and oral presentations.
- The controller of examinations announces the dates of examinations. After each semester, the controller office notifies results of the exams.
- The minimum passing marks for each course is 40% for M.Sc. and M. Phil. and 50 % for Ph.D. in theory and practical, separately.
- In theory, weight age of each component of examination is as under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

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

- Gold medals are awarded to the students who secure highest cumulative marks in each department. Degrees are awarded to the students in the convocation which 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 five full time faculty members out of which four are Ph.D. and one M. Phil. in wildlife management. The fields of specialization of faculty members include; wildlife management/conservation, wildlife study/management techniques, wildlife ecology, wildlife biology, in-situ conservation, ex-situ conservation and policy/law/social issues (Table 9).

Table 9. Faculty distribution by program area in wildlife management

S. No.	Area of specialization	Relevant Courses	Number of faculty members	Number of faculty with Ph.D. degree
1	Wildlife management/ conservation	7	4	4
2	Wildlife study/management techniques	4	4	4
3	Wildlife ecology	3	5	3
4	Wildlife biology	7	5	3
5	In-situ conservation	4	3	4
6	Ex-situ conservation	5	2	3
7	Policy/law/social issues	3	2	3

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

- In each semester 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

- Faculty members attended conferences/workshops/seminars outside and within university.
- Laboratory, library and internet facilities are available for scholarly work and academic improvement
- Support for attending conferences lead to enhancement of research initiatives.
- All faculty members got financial support for research projects from HEC and university-funded program specifically designed for junior faculty members.

Standard 6-3. All faculty members should be motivated and have job satisfaction to excel in their profession

The young faculty is mobilized by timely back up and appreciation by the senior faculty members. Avenues for research funding are provided to them through university research programme. There are 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 the faculty survey

Results of faculty survey (Performa 5) are summarized in Fig. 23. The results generally showed satisfaction of the teachers over most of parameters. However, level of monitoring, cooperation with colleagues and the cooperation of teachers needs to be improved.

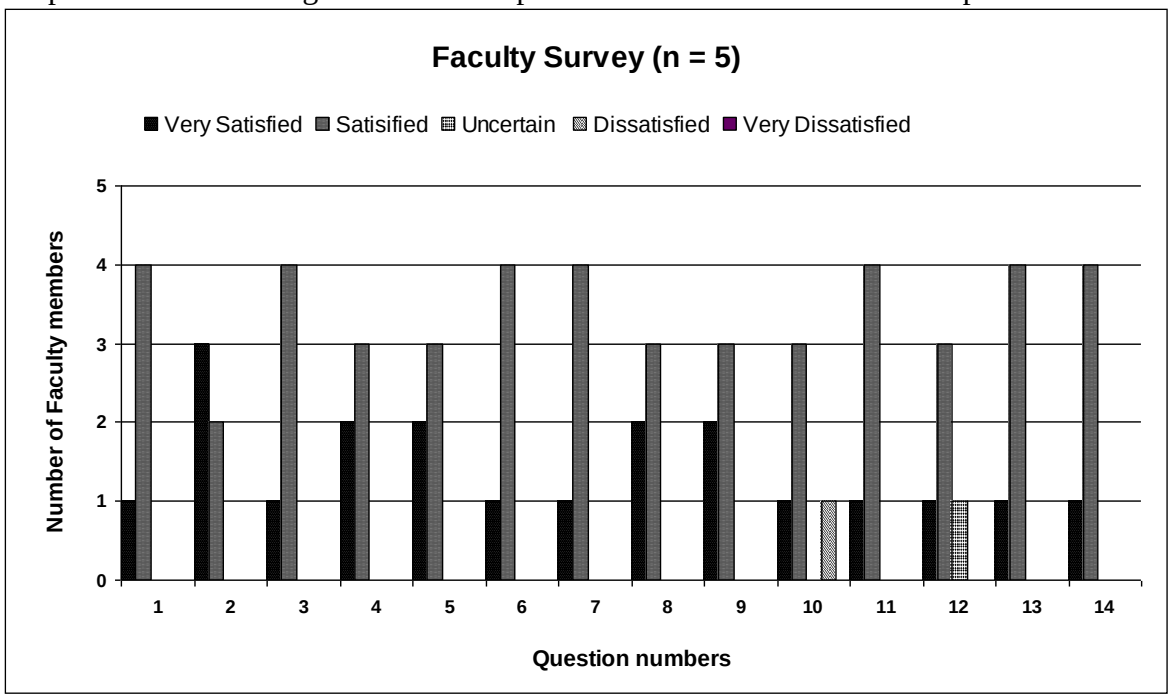


Fig. 23. Results of faculty survey

Best Program Features:

- Supervision of students for research
- Cooperation from colleagues
- Conducive environment at the department
- Teaching and research together
- Clear job description
- Funds for research projects

Programs that could improve your motivation:

- More computer and internet facilities for students
- Opportunities for improving teaching skills and knowledge

CRITERIA 7. INSTITUTIONAL FACILITIES

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. Two well-equipped labs. and one class room with teaching aids (multimedia, over head projector) and number of books are available in the department.
b. However, more sitting place for faculty members and Ph.D. students with computer and internet facility is desired to make working/research/study environment conducive for higher learning.

Standard- 7.2. The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.

- Central library has been recently up-graded with provision of computer and internet facility to the post-graduate students.
- The department is regularly suggesting to the central library for provision of new books related to wildlife sciences.
- The department under its HEC funded project, Strengthening of the Department of Wildlife Management" is purchasing more than 200 books in the area of wildlife studies.
- Only a small number of scientific journals are available in the central library; even Pakistani Journals are not available. Provision of major journals related to wildlife is highly desired for research and scientific/technical writing.

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

There is only one classroom with the department which possesses proper teaching facilities such as multimedia projector and overhead projector. Classroom is inadequate for all classes. Sometimes classes are taken in the laboratories. Similarly, space for faculty offices is not appropriate and two faculty members are housed in the cabins built inside the Labs. This makes Lab. space insufficient for practical and research use by the students.

CRITERIA 8. INSTITUTIONAL SUPPORT

The university administration is making all possible efforts for strengthening the existing departments by attracting highly qualified faculty and by getting financial support through R&D Project. One such project of Rs. 36.141 million was awarded by HEC for Strengthening of the Department of Wildlife Management.

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 attractive investment of GPF deducted from salary of the employees. Similarly, no benefit/welfare from BF deduction is available to the faculty except a meager benefit for faculty children's education at university level. Similarly, little attention is being paid for faculty residential facilities at university campus and majority of faculty members remain on waiting list for a long period. Transport facility is

not frequently and easily available for field works/touring. Financial support is too low to meet expenses of the department and only Rs. 43,000/- were allocated for the year 2010-11 and 2011-12 for office and Lab. expenses including student research. However, the department can get chemicals, glassware, stationery and other office use items from central stores of university by submitting special request.

Technical Staff: Civil Works and internet networking departments are very slow in response. Financial and accounting departments are also slow in their delivery.

Office equipment: Sufficient office equipment is available to meet the current teaching and research activities of the department.

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

The admission of M.Sc. and M.Phil. students is held once a year and Ph.D. twice a year i.e. in each semester. A strict merit policy is applied for admission and GRE is required for Ph.D. and GAT for M.Phil. Detail of students enrolled during last two years is given in Table 10 and student-faculty ratio in Table 11.

Table 10. Enrollment in different degree programs in 2010 and 2011

Year	Number of graduate students			Research assistants	Total
	M.Sc	M.Phil.	Ph.D.		
2010	7	6	0	1	14
2011	12	13	5	1	31
Total	19	19	5	02	45

Table 11. Graduate students and Faculty Ratio in 2010-2011

Year	No. of Faculty	No. of Students	Ratio
2010	5	13	1:2.6
2011	5	30	1:6

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

An amount of about Rs. 43,000/- per annum is considered sufficient to meet the needs of the department which is too low to maintain and run the departmental business.

SUMMARY AND CONCLUSIONS

The Department of Wildlife Management at PMAS-Arid Agriculture University, Rawalpindi was established in 2007 with a mandate to carry out teaching and research in wildlife for its conservation in the country, particularly in Pothwar region. There are five faculty members out of them four having doctoral degrees and three are HEC approved supervisors. The courses have been prepared keeping in view the latest developments in wildlife management and conservation. During the report period 19 students in M. Phil. and 5 in Ph.D. were enrolled. The department has published more than 40 research papers during the period under report.

Basic equipment for field surveys of wildlife and its habitats has been procured through various funding sources which include binoculars, spotting scopes, global positioning system (GPS), camera, telemetry equipment, camping gear, etc. Two laboratories have been established with basic necessary equipment for micro-histological, taxonomy, food habit studies and food/diet composition. More than 200 latest books on the subject of wildlife/biodiversity have also been purchased and placed in the main library and in the department for ready reference to the students.

Young faculty members have got six research projects from the university funding programme while senior faculty has earned three research projects from HEC. The departmental reaching and research capacity has been enhance through PSDP/HEC funded project titled "Strengthening of Department of Wildlife Management" amounting to Rs. 36.141 m. Research studies currently being conducted focus on wildlife population density and size, wildlife habitat analysis, food habits and diet composition, breeding habits and breeding biology, distribution patterns, data on protected areas and threatened species, wetland ecology, population trends of water birds, threats to wildlife species, wildlife damage assessment and management, etc.

Proper steps are taken to guide the students for programme requirements, communication, meetings, study tours, students-teacher interaction, etc. They are well informed of relevant scientific societies, job opportunities and other such activities. University and HEC rules and guidelines are followed for process control covering admission, registration, recruiting policy, courses and delivery of material, academic requirements, performance and grading.

Curriculum design, development and organization is based upon approved criteria. Pre-requisites are fully observed, examinations are conducted as per schedule, academic schemes are prepared and courses for each semester are developed. Their efficacy was found to range between satisfactory to highly satisfactory. Self assessment report has shown programme outcomes as satisfactory. Teachers' evaluation and course evaluation by the students' revealed highly satisfactory standards. Faculty survey results were variable but with overall satisfactory rating. Graduating students also showed their satisfaction over the knowledge being provided and research studies conducted about wildlife management in the department.

Performance of the department could be improved considering the following points.

1. There is need for refresher courses for teachers pertaining to teaching methodology, education psychology, research and developments and evaluation of students.
2. Professional and behavioral training of support staff will improve their abilities for enhancing the quality of research and teaching.
3. Advance laboratory equipments are needed to carry out molecular/DNA analysis in food habits and species verification.
4. Department budget may be increased to fulfill its requirements for purchase of chemicals, glassware and other items required for conducting of research.
5. The department is in dire need of office rooms for two faculty members, one store room, one library room, one class room and one laboratory room.
6. Regular provision of transport facility for field visits is highly desired.

Thanks

Program Team Members

1. **Prof. Dr. Iftikhar Hussain (Coordinator)**
2. **Dr. Maqsood Anwar (Member)**
3. **Dr. Tariq Mahmood (Member)**

Annexure-I

Proforma - 1 Student Course Evaluation Questionnaire

1. The course objectives were clear
2. The Course workload was manageable
3. The Course was well organized (e.g. timely access to materials, notification of changes, etc.)
4. Approximate level of your own attendance during the whole Course
5. I participated actively in the Course
6. I think I have made progress in this Course
7. I think the Course was well structured to achieve the learning outcomes (there was a good balance of lectures, tutorials, practical etc.)
8. The learning and teaching methods encouraged participation.
9. The overall environment in the class was conducive to learning.
10. Classrooms were satisfactory
11. Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful.
12. Recommended reading Books etc. were relevant and appropriate
13. The provision of learning resources in the library was adequate and appropriate
14. The provision of learning resources on the Web was adequate and appropriate (if relevant)
15. The Course stimulated my interest and thought on the subject area
16. The pace of the Course was appropriate
17. Ideas and concepts were presented clearly
18. The method of assessment were reasonable
19. Feedback on assessment was timely
20. Feedback on assessment was helpful
21. I understood the lectures
22. The material was well organized and presented
23. The instructor was responsive to student needs and problems
24. Had the instructor been regular throughout the course?
25. The material in the tutorials was useful
26. I was happy with the amount of work needed for tutorials
27. The tutor dealt effectively with my problems
28. The material in the practicals was useful
29. The demonstrators dealt effectively with my problems

Annexure-II

Proforma-10 Teacher Evaluation Form

1. The Instructor is prepared for each class
2. The Instructor demonstrates knowledge of the subject
3. The Instructor has completed the whole course
4. The Instructor provides additional material apart from the textbook
5. The Instructor gives citations regarding current situations with reference to Pakistani context.
6. The Instructor communicates the subject matter effectively
7. The Instructor shows respect towards students and encourages class participation
8. The Instructor maintains an environment that is conducive to learning
9. The Instructor arrives on time
10. The Instructor leaves on time
11. The Instructor is fair in examination
12. The Instructor returns the graded scripts etc. in a reasonable amount of time
13. The Instructor was available during the specified office hours and for after class consultations
14. The Subject matter presented in the course has increased your knowledge of the subject
15. The syllabus clearly states course objectives requirements, procedures and grading criteria
16. The course integrates theoretical course concepts with real-world applications
17. The assignments and exams covered the materials presented in the course
18. The course material is modern and updated

Annexure-III

1. CURRICULUM VITAE

1. Personal Data

Name: DR. IFTIKHAR HUSSAIN
Present Position & Address: Professor & Chairman; Department of Wildlife Management, Faculty of Forestry, Rangeland and Wildlife, PMAS-Arid Agriculture University, Rawalpindi-46300
Telephone: 051-9291021
E-mail: ifthussain@edu.com.pk

2. Academic Qualification

Degree	Year	Institution/University	Subjects
Ph.D.	1998	University of Reading, UK.	Rodent Management
M. Phil.	1990	Quaid-i-Azam University, Islamabad.	Endocrinology
M.Sc.	1979	University of Punjab, Lahore	Zoology
Post-Graduate Diploma	1986	Karachi University, Karachi	Statistics

3. Area of Specialization: Wildlife Biology and Management
4. HEC approved Ph.D. Supervisor
5. Professional Experience (Research and Teaching): 31 Years
6. Trainings Received (Research & Management): 12
7. Fellowship/Membership of Professional Associations/Societies: 5
8. Research Projects Planning and Implementation: 8
9. Participation in: 10 Conferences; 9 Training Courses and 48 Workshops

10. **Supervision of Post-Graduate Theses: a)** Ph.D.: 01 (Co-supervised) & 05 (in progress); b) M. Phil.: 13; c) M.Sc.: 07.

11. PUBLICATIONS

a. Papers Published in Peer Reviewed Journals/Proceedings: 47
b. *Books & Manuals:* 2
c. Chapters In Books & Manuals: 15
d. Abstracts (Papers Presented in Conferences): 42
e. Research/Technical Reports (Unpublished): 13
f. Popular Articles/Booklets: 7
g. *Audio-Visuals (Training Materials):* 4

12) **Publications during the report period (2011-2012)**

i. **Hussain, I**., A. A. Chaudhry and U. Khalid (2011). Wildlife Management. In: Wildlife of Western Himalayan Region of Pakistan (Northern Mountains). (Eds. G. Akbar and M. Anwar). pp. 209-233. WWF-Pakistan. ISBN:978-969-8283-67-4.

ii. Mahmood, T., **I. Hussain** and M.S. Nadeem. 2011. Population estimates, habitat preference and the diet of small Indian mongoose (*Herpestes javanicus*) in Potohar Plateau, Pakistan. *Pakistan Journal of Zoology*, 43(1):103-111. *(IF: 0.338).*

iii. Rais, M., M. Anwar, T. Mahmood, and **I. Hussain**. 2011. Bird diversity and conservation at Kalla Kahar lake with special reference to water birds. *Pakistan Journal of Zoology*, 43(4):673-681. *(IF: 0.338)*.

iv. M. Naeem, M., I. Ahmed, **I. Hussain** and M. S. Ahmedani. 2011. Performance of taste enhancers mixed with cereal bases and evaluation of the most preferred bait

composition for *Bandicota bengalensis* (Gray). *African Journal of Biotechnology*, 10(9):3938-3944 ***(IF: 0.573).***

v. Tabassum, T., M. Rais, M. Anwar, T. Mehmood, **I. Hussain** and S. A. Khan. 2011. Abundance and breeding of the common skittering frog (*Euphlyctis cyanophlyctis*) and bull frog (*Hoplobatrachus tigerinus*) at Rawal lake, Islamabad, Pakistan. Asian Herpetological Research, 2(4):245–250. DOI: 10.3724/SP.J.1245.2011.00245.

vi. Bilal, S., M. Rais, M. Anwar, T. Mahmood, **I. Hussain**, M. S. Nadeem. 2011. Trend in the diversity of migratory ducks at Rawal Lake, Islamabad. *Berkut* (Ukrainian Journal of Ornithology), 20(1-2):65-69

vii. **Hussain, I.**, A. Nisa and S. Khalil. 2012. Population Biology of Grey Francolin (*Francolinus pondicerianus*) in Agro-Ecosystem of Pothwar Plateau, Pakistan. Chinese Birds, 3(2):91-102 China, DOI 10.5122/cbirds.2012.0009.

viii. Rais, M., S. Baloch, J. Rehman, M. Anwar, **I. Hussain** and T. Mehmood. 2012. Diversity and conservation of amphibians and reptiles in north Punjab, Pakistan. The Herpetological Bulletin (UK), 122:16-25.

ix. Mushtaq, M., **I. Hussain** and A. Mian. 2012. Effectiveness of groundnut-maize bait as carrier of coumatetralyl against Indian crested porcupine, *Hystrix indica* Kerr. *Pakistan Journal of Zoology*, 44(2):579-581. *(IF: **0.338***).

x. Mahmood, T., R. Hussain, M. Rais, **I. Hussain** and M.S. Nadeen. 2012. Habitat analysis and population estimates of three falcon species, Red-headed Merlin (*Falco chicauera*), Common Kestrel (*Falco tinnunculus*) and Saker Falcon (*Falco cherritg*), inhabiting district Chakwal, Pakistan. *Pakistan Journal of Zoology*, 44(3):787-798. (*IF: 0.338*).

xi. Khan, A.A., S. Munir and **I. Hussain**. 2012. Evaluation of in-burrow baiting technique for control of rodents in groundnut crop. *Pakistan Journal of Zoology*, 44(4):1035-103. (*IF: 0.338*)

xii. Mehmood, A., M. S. Ansari, S. Akhter, A. A. Khan, **I. Hussain**, Shams-ul-Hassan, T. Z. Qureshi and B. A. Rakha. 2012. Occurrence of pathogenic bacteria in small mammals-inhabiting poultry aarms of Rawalpindi/Islamabad, Pakistan. *Pakistan Journal of Zoology*, 44 (4): 1185-1187 *(IF: 0.338*).

xiii. Qureshi, N. A., M. S. Ansari, S. Akhter, A. A. Khan, **I. Hussain** and B. A. Rakha. 2012. Feeding habits of common quail (*Coturnix coturnix*) migrating through Rawalpindi, Pakistan. *Pakistan Journal of Zoology*, 44 (6): 1760-1762. *(IF: 0.338*).

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2. CURRICULUM VITAE

1. Personal Data

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Department of Wildlife Management, Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi, Pakistan.

Telephone 0334-5434784

E-mail maqsoodanwar@uaar.edu.pk

2. Academic Qualification

Degree	**Year**	**Institution**	**Specialization**
Ph.D.	1989	Utah State University, Logan Utah, USA	Wildlife Science
M.Sc.	1982	University of Agriculture, Faisalabad, Pakistan	Zoology
B.Sc.	1978	Punjab University, Lahore, Pakistan	Biological Sciences

3. Area of Specialization: Wildlife biology / ecology / conservation

4. HEC approved supervisor
5. Professional Experience (Research and Teaching): 30 years
6. Trainings Received (Research & Management): 8
7. Fellowship/Membership of Professional Associations/Societies: 3
8. Research Projects Planning and Implementation: 5
9. Participation in Conferences/Workshops: 13 International, 55 national
10. Supervision of Post-Graduate Theses: a) Ph.D.:4 (in progress); b)M.Phil.: 19; c)M.Sc.:1.

11. PUBLICATIONS

h. Papers Published in Peer Reviewed Journals: 38
i. Proceedings: 8
j. Books / proceedings: 4
k. Chapters in Books & Manuals: 3
l. Abstracts (Papers Presented in Conferences): 13
m. Research/Technical Reports (Unpublished): 10
n. Popular Articles/Booklets: 8

12. **Publications during the report period (2011-2012)**

i) **Anwar, M.** 2011. Major ecological zones and associated wildlife. In: Wildlife of Western Himalayan Region of Pakistan (Northern Mountains). (G. Akbar and M. Anwar Eds.). WWF-Pakistan. ISBN:978-969-8283-67-4. p. 17-28.

ii) **Anwar, M.** 2011. Selected Large mammals. In: Wildlife of Western Himalayan Region of Pakistan (Northern Mountains). (G. Akbar and M. Anwar Eds.). WWF-Pakistan. ISBN:978-969-8283-67-4. p. 30-79.

iii) Rais, M., **M. Anwar**, T. Mahmood, and I. Hussain. 2011. Bird diversity and conservation at Kalla Kahar Lake with special reference to water birds. *Pakistan Journal of Zoology*, 43(4):673-681. *(IF: 0.338)*.

iv) Tabassum, T., M. Rais, **M. Anwar,** T. Mehmood, I. Hussain and S. A. Khan. 2011. Abundance and breeding of the common skittering frog (*Euphlyctis cyanophlyctis*) and bull frog (*Hoplobatrachus tigerinus*) at Rawal lake, Islamabad, Pakistan. Asian Herpetological Research, 2(4):245–250. DOI: 10.3724/SP.J.1245.2011.00245.

v) Bilal, S., M. Rais, **M. Anwar**, T. Mahmood, I. Hussain, M. S. Nadeem. 2011. Trend in the diversity of migratory ducks at Rawal Lake, Islamabad. *Berkut* (Ukrainian Journal of Ornithology), 20(1-2):65-69.

vi) Arshadullah, M., M. Rasheed S. I. Hyder and **M. Anwar**. 2011. Screening of *Panicum antidotale* grass species under spring and Monsoon seasons in the mesic climate of Pothowar Plateau (Pakistan). J. Anim. Plant Sci, 21(3):531-534.

vii) **Anwar**, M., M. Arshadullah, A. S. Rana and S. Maqsood. 2012. Evaluating the performance of Australian annual medics in sub-tropical and sub-humid ecological zones of Pakistan. Pak. J. Agri. Sci., 49(2):185-188.

viii) Rais, M., S. Baloch, J. Rehman, **M. Anwar**, I. Hussain and T. Mehmood. 2012. Diversity and conservation of amphibians and reptiles in north Punjab, Pakistan. The Herpetological Bulletin (UK), 122:16-25.

ix) Arshadullah, M., **M. Anwar,** S. N. Mirza and M. Rasheed. 2012. Forage production and nutritional quality of grasses in mesic climate of Pothwar plateau, Rawalpindi. J. Anim. Plant Sci, 22(3):781-784.

x) Qamar, Z. Q., U. Ali, R. A. Minhas. N. I. Dar and **M. Anwar.** 2012. New Distribution Information on Woolly Flying Squirrel (*Eupetaurus cinereus* Thomas, 1888) in Neelum Valley of Azad Jammu and Kashmir, Pakistan Pak. J. Zool., 44(5):1333-134

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3. Curriculum Vitae

Personal Details:

Nnme: **Dr. Tariq Mahmood**

Present position and Address: Assistant Professor, Department of Wild life Management, PMAS Arid Agriculture University, Rawalpindi 46300, Pakistan

Contact No. Cell #: 0313-5307794; Office: 051-9291021

E-mail address: tariqjanjua75@uaar.edu.pk.

Academic Qualification:

Degree	Year	Subject	Institution
Ph.D.	2009	Animal Physiology	QAU Islamabad
M.Phil.	2002	Animal Physiology	QAU Islamabad
M.Sc.	1994	Zoology	PU Lahore

1. Research Projects: a. Ongoing Project:

Donor Agency	Project Title	Duration	Amount Rs.
HEC Islamabad	Ecology of Indian pangolin *Manis crassicaudata* in Potohar Plateau	2010-13	21,58,422/-

b. Projects completed (PMAS-AAUR-Funded) = 01

3. Professional Experience (Research and teaching) : 17 years

4. Field of Specialization: Wildlife Ecology, Animal Physiology, Toxicology

5. HEC-Approved Supervisor

6. Fellowship/Membership of Professional Associations/Societies: 2

7. Research Projects Planning and Implementation: 4

8. Supervision of Post-graduate students:

a. Numbers of M.Phil. Produced: 13

b. Students Currently Enrolled**:** **Ph.D**. = 03 No.; **M. Phil**.: 03 No.

9. Conferences/Seminars/Workshops Attended:

a. International: 01 (September 2011, Kuching, Malaysia), National: 12

10. PUBLICATIONS

a. Papers Published in Peer Reviewed Journals/Proceedings: 29

d. Abstracts (Papers Presented and published in Conferences): 18

e. Research/Technical Reports (Unpublished): 04

f. Popular Articles/Booklets: 01

11) List of Publications during the report period (2011-2012): 12 Nos.

i. **Mahmood, T**., I. Hussain and M.S. Nadeem. 2011. Population estimates habitat preference and the diet of small Indian mongoose (*Herpestes javanicus*) in Potohar Plateau, Pakistan. *Pakistan Journal of Zoology*, 43(1):103-111. ***(IF: 0.338).***

ii. **T. Mahmood,** S. M. A. Shah, M. Rais and M. S. Nadeem. 2011. An Investigation into the Trade of Animal species at pet shops of Rawalpindi and Multan cities. *The JAPS*, 21(4):822-829. ***(IF: 0.585).***

iii. S. Yousaf, **T. Mahmood,** M. Rais and I. Z. Qureshi. 2011. Population Variation and food habits of Ranid frogs in the rice-based cropping system in Gujranwala Region, Pakistan. *Asian Herpetological Research*, 1(2): 123-130. ***(IF: 0.294)***

iv. M. S. Nadeem**, T. Mahmood,** M. Asif and M. M. Hassan**.** 2011. Annual reproductive success of Hoopoe Lark *Alaemon alaudipes* in Nag valley (1999-2001) Kharan, Pakistan. *Pakistan Journal of Zoology*, 43(2): 279-284. ***(IF 0.338)***

v. Rais, M., M. Anwar, **T. Mahmood**, and I. Hussain. 2011. Bird diversity and conservation at Kalla Kahar Lake with special reference to water birds. *Pakistan Journal of Zoology*, 43(4):673-681. ***(IF: 0.338)*.**

vi. Tabassum, T., M. Rais, M. Anwar, **T. Mehmood**, I. Hussain and S. A. Khan. 2011. Abundance and breeding of the common skittering frog (*Euphlyctis cyanophlyctis*) and bull frog (*Hoplobatrachus tigerinus*) at Rawal Lake, Islamabad, Pakistan. *Asian Herpetological Research*, 2(4):245–250. DOI: 10.3724/SP.J.1245.2011.00245. ***(IF: 0.294)***

vii. Bilal, S., M. Rais, M. Anwar, **T. Mahmood,** I. Hussain, M. S. Nadeem. 2011. Trend in the diversity of migratory ducks at Rawal Lake, Islamabad. *BERKUT* (Ukrainian Journal of Ornithology), 20(1-2):65-69

viii. **T. Mahmood,** N. Amin, M.Rais. 2011. Captive breeding of demoiselle crane in Lakki Marwat, Khyber Pakhtunkhwa, Pakistan. BERKUT (Ukrainian Journal of Ornithology): 20 (1-2): 153-158.

ix. M.S. Nadeem, S.M.K. Imran, **T. Mahmood,** A. R. Kyani, and S. I. Shah. 2012. A comparative study of the diets of Barn Owl (*Tyto alba*) and Spotted Owl (*Athene brama*) inhabiting Ahmadpur East, southern Punjab, Pakistan. *Animal Biology*, 62(1): 13-28. ***(IF: 0.721)***

x. **T. Mahmood**, M. K. Siddiq, M. Rais and M. S. Nadeem. 2012. Distribution and abundance of freshwater turtles in Korang River Islamabad-Rawalpindi, Pakistan. *Pakistan Journal of Zoology*, 44 (3): 889-893. ***(IF: 0.338)***

xi. Rais, M., S. Baloch, J. Rehman, M. Anwar, I. Hussain and **T. Mehmood.** 2012. Diversity and conservation of amphibians and reptiles in north Punjab, Pakistan. *The Herpetological Bulletin* (UK), 122:16-25.

xii. **Mahmood, T.,** R. Hussain, M. Rais, I. Hussain and M.S. Nadeen. 2012. Habitat analysis and population estimates of three falcon species, Red-headed Merlin (*Falco chicauera*), Common Kestrel (*Falco tinnunculus*) and Saker Falcon (*Falco cherritg*), inhabiting district Chakwal, Pakistan. *Pakistan Journal of Zoology*, 44(3):787-798. **(*IF: 0.338*).**

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