



**National Agriculture Education Accreditation Council**

---

**84**

**Report of the  
Accreditation Inspection Committee  
(AIC)**

on the

**Department of Soil and Environmental Sciences  
Gomal University, DI Khan**

by

**Prof. Dr. Zahir Shah**

**Prof. Dr. Shafqat Nawaz**

---

NAEAC Secretariat, Room # B-022, Crop Sciences Institute, NARC, Chak Shahzad Islamabad

Ph # 051-9255746, 051-9255012-20, ext 3522, Fax # 051-9255746

Website: [www.naeac.org](http://www.naeac.org), Email: [infonaeac@yahoo.com](mailto:infonaeac@yahoo.com)

## **ACKNOWLEDGMENT**

The support and cooperation of all staff of the Gomal University, D.I. Khan including Vice Chancellor, Dean Faculty of Agriculture, and Chairman, Faculty Members, Students and Support Staff of the Department of Soil and Environmental Sciences is acknowledged. The guidance and support of members of the accreditation council including Mr. Naseer Alam Khan (Secretary) and Raja Mehtab Yasin (Admin/Finance Officer) is also highly appreciated.

**Accreditation Inspection Committee (AIC), NAEAC**

## Table of Contents

<b>Contents</b>	<b>Page No.</b>
Acknowledgment	02
Executive Summary	04
Introduction	05
Criterion Wise Analysis	06
SWOT Analysis	10
Actionable Recommendations	11
Annexure	14
I.    TORs	14
II.   Faculty and support staff profile	15
III.  Inventory of equipment and text books	16
IV.   Last 3 years completed and on-going research projects	20

## **Executive Summary**

The Accreditation Inspection Committee (AIC) constituted by the National Agriculture Education Accreditation Council (NAEAC) for the external assessment of the Degree Programs of B.Sc (Hons) and M.Sc (Hons) offered by the Department of Soil and Environmental Sciences, Gomal University, DI. Khan, visited the institute on April 29-30, 2013. The AIC reviewed their programs through interviews with faculty members, students and support staff of the department and through visits their teaching and research facilities including class rooms, libraries, laboratories and farm facilities. The department offers B.Sc (Hons) (since 1982), M.Sc (Hons) (since 1988) and PhD degree programs covering broad array of subjects relevant to Soil and Environmental Sciences. The Department has 5 full time and 2 visiting faculty members, and has produced 62 B.Sc (Hons) and 42 M.Sc (Hons) graduates so far. Currently, the department has enrolled 9 Ph.D, 12 M.Sc (Hons) and 35 B.Sc (Hons) students. Faculty members of the department have published over 155 research papers of which 36 are in impact factor (IF) journals.

The overall evaluation of the bachelor and master degree programs offered at the Department of Soil and Environmental Sciences indicated that both programs are progressing well to a large extent. The department has basic infrastructure facility including well equipped research labs, research farm and dedicated cooperative faculty staff for these degree programs. However, there are some shortcomings that need immediate attention to further strengthen these degree programs. The major shortcomings include limited number of qualified teaching staff, lack of trained and qualified lab staff, limited number of class rooms, computer and internet facility, text books and limited exposure of students to farmers fields, industries and research organizations.

In order to further strengthen their degree programs, the AIC recommends; i) provision of more trained and qualified faculty and technical Lab staff, ii) training of the existing faculty members in technologically advanced countries, iii) immediate installation of the uninstalled equipment, vi) up gradation of library with latest text books, v) provision of un-interrupted power supply to Labs and offices, vi) provision of computer and internet facilities to students and faculty, vii) exposure of students to field/practical, viii) provision of separate class rooms, and ix) adoption of new curriculum and semester system in true spirit.

The overall assessment of AIC of these degree programs is 65.1%.

## **Introduction**

The Accreditation Inspection Committee (AIC) constituted by the National Agriculture Education Accreditation Council (NAEAC) for the external assessment of the Degree Programs of B.Sc (Hons) and M.Sc (Hons) offered by the Department of Soil and Environmental Sciences, Gomal University, D.I. Khan, visited the institute on April 29-30, 2013. The Secretary, Mr. Naseer Alam Khan, NAEAC welcomed the AIC and members of the host institute in the office of the Dean, Faculty of Agriculture and highlighted the aims and objectives of this review process. The Dean, Prof. Dr. Saeed Khattak presented an overview of the faculty. The AIC then visited the Department of Soil and Environmental Sciences and reviewed their programs through interviews with faculty members, students and support staff of the department and through visits their research programs including Lab and farm facilities and offices. The report of the AIC is presented below.

## **The Faculty of Agriculture**

The faculty of Agriculture was established in the Gomal University, DI Khan in 1979 with the objective to impart agricultural education with particular reference to improve agriculture in the arid region of DI Khan. There are 10 departments and 52 teaching staff in the faculty. The total enrolled students in various degree programs are 488. So far the Faculty of Agriculture has produced 1586 graduates of which 232 are M.Sc (Hons) and 31 PhDs.

## **The Department of Soil and Environmental Sciences**

The Department of Soil and Environmental Sciences is one of the major departments of the Faculty of Agriculture at Gomal University, DI Khan, and has been offering B.Sc (Hons) (since 1982), M.Sc (Hons) (since 1988) and PhD degree programs. These programs offer broad array of subjects that deals with Soil & Environmental Sciences, and specific issues of importance to the DI Khan region. The Department has 5 full time and two visiting faculty members So far the department has produced 62 B.Sc (Hons) and 42 M.Sc (Hons) students. Currently, the department has enrolled 09 Ph.D, 12 M.Sc (Hons) and 35 B.Sc (Hons) students. Faculty members of the department have published over 155 research papers of which 36 are in impact factor (IF) journals.

## **Criterion Wise Analysis**

### **Criteria I: Strength and Quality of Faculty**

The department has 05 full time and 02 supporting/visiting faculty members (Annexure-II). Of 07 faculty members, 4 are Ph.Ds, 3 M.Sc (Hons)/M.Phil and one post doc. The teaching loads of faculty of various cadres at the department are 8 credit hours per week for professor, 8 for Associate Professor, 12 for Assistant Professor and 12 for lecturer. The course review report is prepared and submitted regularly by each faculty member. The program monitoring systems do exist and practice at the department by the Quality Enhancement Cell (QEC) of the university. However, there is no system of training for the newly inducted faculty members to encompass the important aspects of teaching. Similarly, proper faculty development and career plan is not in place. Faculty members and support staff of the department were generally satisfied with their jobs, and believed that the salaries and benefits are reasonable. Majority of faculty members believed that the working environment in the department is generally good. There is however, some tussle among few faculty members on promotion which should be resolved so that faculty can concentrate more on academic activities. The faculty stability index is good. One faculty member is recently nominated for Best University Teacher award by HEC which is a good sign of improvement. The participation of Faculty members in professional seminars/conferences/workshops is reasonable but mostly limited to local conferences. On average, 3-4 M.Sc (Hons) students are supervised by each faculty member.

### **Criteria II: Curriculum Design and Development**

The department is still following the 2005 curriculum for the undergraduate classes while 2010 curriculum for M.Sc (H). The 2010 curriculum for undergraduate program has not yet been approved by the Faculty Board and therefore not yet adopted by the department. The department should switch to the new curriculum to become at par with other institutions in the country. Both undergraduate and post-graduate students were contacted for their views about the contents of the courses, the method of teaching, use of teaching aids, the conduct of practical and field exposure. The students were generally satisfied with the teaching methodology of the faculty members although they were greatly satisfied with some and least others. The students suggested that there should be more focus on practical than on theory. The recommended new editions of the required textbooks and reference books are limited in the faculty main library and are not easily available in the market. The contact hours are one hour (one credit hr) for theory and two hours (one credit hr) for practical. The length of a semester is 19 weeks which is within the HEC

guidelines. The course files showed that courses are completed within the prescribed period. It is important to point out that the department is following term system for B.Sc (Hons) and semester system for M.Sc (Hons) degree programs. The course registration and withdrawal policy is well spelled out. Similarly, the course evaluation system is in place and effective. Course files are maintained by all faculty members. Admission policy for each program is well documented and followed. Board of Studies (BS) and Board of Faculty (BF) meetings are regularly held i.e. BS meetings are held almost one in a month while BF meetings about two in a year.

### **Criteria III: Infrastructure and Learning Resources**

All faculty members have independent offices (each measuring 12 x 12 ft) in the Department. The department has one under-graduate-cum-teaching Lab (measuring 30 x 25 ft), one post-graduate-cum-teaching Lab (measuring 30 x 25 ft) and one central laboratory (measuring 30 x 25 ft). The department has easy access to the required size of land for research at the university farm and also has one small screen house for pot experiments. The laboratories have almost all basic necessary equipments for research and training of the students and all are properly utilized. The department recently purchased some sophisticated equipments including Gas Chromatograph (GC) and Atomic Absorption Spectrophotometer and are yet to install. However, the available laboratory staff are neither properly trained nor qualified for the job. The technical competency of laboratory staff is poor. No separate class room is available with the department for teaching. The Lab and office space with the department is currently sufficient but teaching space is insufficient. There are no proper safety arrangements and no security plan is available in case of emergency. No fire extinguishers have been installed in any laboratory. No first aid kits/facilities provided in the laboratories/department. Annual budget for maintenance and operation of Labs and purchase of books and journals is controlled centrally and inadequate. No book or international journal has been purchased during the past two years. The university do have a website which is maintained and updated regularly.

### **Criteria IV: Students Feedback**

As per feedback from students, the teachers mostly take only mid-term and final exams with less quizzes and assignments. The teachers mostly use blackboards for teaching but also casually use multimedia and overhead projector. The students perception about the quality of curricula is good and about teachers performance varies from teacher to teacher. Although course practicals are regularly arranged, there is less exposure of students to the field work. A total of 192 text books and 182 reference books related to the soil subjects are available in the faculty main library. In addition, there are some personal books in the office of Chairman and are issued to

students when needed. There is however no computer, photocopier or other equipment in the library for students use. Students opinion about the quality of services provided by the library is unsatisfactory. There is one common computer Lab in the faculty for students use with no internet facility and many computers non-functional. The students are mostly unaware about the need based and merit scholarships or interest free loans from various banks. However, we come across with one student who got merit scholarship for FATA students from HEC. The hostel accommodation is adequate. The university does possess sports facilities both for indoor and outdoor games, and also has a swimming pool but no gym facility. The transport facility is sufficient to cater the need of students. The university has a dispensary where two full time doctors, one male and one female serve the faculty, students and support staff of the university. There is however no tutorial arrangements for students counseling. There is an internship program in the scheme of studies and is effectively conducted. Students interaction with the teaching faculty is good and their attitude towards studies is encouraging. Students believe that their degree programs are useful. There is however limited facilities/resources for students to participate in seminars/conferences/field tours. Chairman of the department maintain contact with alumni through facebook. The department regularly prepare calendar of activities for each degree program. The university publishes an university newsletter.

#### **Criteria V: Faculty Research and Consultancy activities**

This part of the department is not very strong as limited external research projects are run by the faculty and no regular research fund is available from HEC or other sources. The faculty members are mostly involved in students research programs sponsored by the university from its own resources. So far the department has completed 4 research projects and three are in pipeline. No HEC indigenous Ph.D Scholar is currently enrolled in the department. The department has some collaboration with the University of Glasgow (UK) and University of Kasetsart Bangkok (Thailand), and with national organizations including Agricultural University Peshawar, NARC Islamabad, Agricultural Research Institute Rathakolachi (DI Khan) and others. There is no regular provision of funds for participation and organization of conferences, seminars in the university budget but the faculty do get funding from HEC, particularly during the last few years, for such activities. The department normally provides advisory services to National Environmental Agency, Sugar industry, fertilizer companies and local farmers. The department often publishes leaflets, brochures and flyers for dissemination of research results. The department also regularly organizes farmers' field days, farmers moot and colloquia.

## **Criteria VI: Governance and Leadership of the Institution**

The authority and responsibility of the department are clearly defined. Similarly, the organizational setup and academic infrastructure of the university as a whole are well laid out. The rules regulations are well documented and statutory bodies like syndicate, academic council, board of faculty and board of studies are properly functioning. Although budget is allocated to the department, the finances are centrally controlled through the treasurer office. The financial resources of the university/department are mainly granted from HEC and self-finance study programs. There is no generation of funds from internal resources of the department. The department/university has no placement bureau and has not yet developed Alumni's association.

## **Criteria VII: Adoption of Good Practices**

### **7.1 Please describe at least two good practices adopted related to Curriculum Review and Development and Faculty Development.**

1. Regular revision of curriculum
2. Faculty International exposure

### **7.2 Please describe at least two good practices adopted pertaining to quality instructions and teaching methods by the faculty.**

1. Use of variety of teaching aids i.e. multimedia etc
2. Assignments and quizzes to students

### **7.3 Please describe at least two good practices adopted for Students-Teachers Assessment.**

1. Confidential questionnaire feedback
2. Alumni feedback

### **7.4 Please describe at least two good practices adopted for Knowledge Acquisition and Skill Development in Graduate Students.**

1. Lab demonstrations
2. Students presentation and seminars

## **SWOT Analysis**

### **Major Strengths:**

The department has the following strengths:

- New building, Office and Lab facilities equipped with almost all basic/necessary equipment.
- Adequate land for research and practical demonstration at the university research farm.
- Reasonably well qualified and cooperative faculty members with vision and full acquaintance of their respective subjects, having vast knowledge of local agriculture production systems.
- Availability of hostels, transport and accommodation facilities on campus for students.

### **Major Weaknesses:**

Following weaknesses were observed while visiting and contacting the stake holders:

- Insufficient PhD and post doc faculty staff, and lack of trained and qualified Lab technical staff
- Limited/insufficient class rooms
- Inadequate computer and internet facilities for faculty and students
- Non availability of funds to department/faculty members for research and none enrollment of HEC indigenous Ph.D scholars
- Lack of un-interrupted power supply / generators, and safety measures in Labs

### **Major Opportunities:**

- There is lot of opportunities for academic trainings and organizing seminars/workshops/conferences with HEC and other organizations. The faculty members must explore such opportunities for the benefits of the students, institute and for themselves.

- The department of Soil and Environmental Sciences is reasonably well set academically as having good faculty and well equipped Labs, office and farm facilities. They have lot of opportunities to win national as well as international research projects to do both basic and applied research and serve the farming community of the country in addition to training of students. Various national and international organizations are offering research projects to university faculty on competitive basis.
- Based on the qualification of faculty and infrastructure facilities, there are large opportunities to develop collaboration with reputable international organizations for exchange of scientific experiences with each other and for students exchange programs.

### **Major Threats:**

- Harsh natural environment for work particularly in the field in summer
- Provision of fund from Government is squeezing so the university/department has to generate its own resources
- The provision of power supply is getting worse so the university/development has to look for alternative on sustainable basis
- There is competition of development with other departments in the country for students so the department has to improve facilities (Labs, computer, internet, research etc) and performance to attract more students.
- The department has to address the farmers problems of low crop yields, inefficient fertilizers and water use, low soil fertility, salinity, water logging and erosion.

### **Actionable Recommendations**

In order to further strengthen their degree programs, the Department of Soil and Environmental Sciences need improvement in the following areas:

- The department should adopt new curriculum and semester system for all degree programs to be at par with other departments in the country.

- The department must be provided trained and well qualified faculty and Lab staff. Recruitment of faculty on TTS must be encouraged to attract trained and qualified teachers. The existing faculty must also be promoted on merit-cum-seniority/experience.
- The departmental budget must be at the discretion of the chairman to meet the daily needs. In addition, budget for promotion of research should be included in the departmental budget heads. Faculty must be encouraged to prepare and submit project proposals on important topics to various national (PSF, PARC-ALP, HEC, DOST and others) and international (ACIAR, IAEC, European Union and others) organizations.
- There should be easy access of teachers to participate and present their research at national and international conferences/seminars. Moreover, weekly or bi-monthly seminars for faculty members and post-graduate students should be arranged and must be declared essential for both.
- The departmental/faculty library needs up-gradation in terms of provision of new edition of text books, access to national and international journals and provision of other facilities such as photocopiers, computers and internet.
- There must be separate space for the students in the Lab to sit and plan the experiments, fed data to computer for analysis especially for post-graduate students.
- The student's field tours/study tours must be made mandatory for their field exposure and first hand knowledge of the crops and problems especially for the undergraduates. Students' tours to various organizations and institutions are very important in the learning process and to broaden the vision of the students, the department should consider and promote the activity even across the province.
- Strong system of students' scholarships from the university sources and from the donating agencies such as HEC/Zakat, Baitulmal need to be established. In addition, students must be made aware of interest free-loan for education by various banks.
- The university should establish placement bureau and alumni association.

- Computer Lab must be made functional and must be equipped with latest computers, a heavy duty printer and internet facility.
- The Department must be provided with un-interrupted power supply/heavy duty generators for the smooth operation of Lab and office work.

**Signatures of AIC Members**

**Name and Designation**

**Signatures**

<p><b>Dr. Zahir Shah</b> Professor and Chairman Department of Soil and Environmental Sciences, The University of Agriculture, Peshawar</p>	<p>(Convener)</p>	
<p><b>Dr. Shafqat Nawaz</b> Professor of Soil Science Principal, UCA, DG Khan</p>	<p>(Member)</p>	
<p>Dated: May 17, 2013</p>		

**Comments and Signatures of Chairman**

I agree with the observations and recommendations made by the peer team in this report.

**Accreditation of Agriculture Education Institutions in Pakistan**

In pursuance to its mandate given by the HEC under clause 10 subsections (d) and (1) of the byelaws of NAEAC, an Accreditation Inspection Committee (AIC) was constituted comprised of the following scientists to review the Department of Soil and Environmental Sciences, Gomal University, DI Khan for assessment and accreditation of their degree programs:

- i. Dr. Zahir Shah Convener  
Professor and Chairman  
Department of Soil and Environmental Sciences,  
The University of Agriculture, Peshawar
- ii. Dr. Shafqat Nawaz Member  
Professor of Soil Science  
Principal, UCA, DG Khan

**TORs of AIC**

Following were the Terms of Reference (TORs) of the AIC:

- To validate the self-assessment report (SAR) of the degree programs (B.Sc and M.Sc (Hons) prepared by the department
- To carry out an external assessment of the degree programs of the Department of Soil and Environmental Sciences, Gomal University, DI Khan in a transparent, neutral, holistic and participatory manner for accreditation and rating of degree programs based on the evaluation criteria of NAEAC.
- To submit synthesized and concise analytical report consisting of short introduction, brief criterion-wise analysis, self-explanatory SWOT Analysis and explicit actionable recommendations along with completely filled-in and signed Evaluation Manual (Toolkit) based on the validation of SAR and interaction with the Chairman, faculty Members, Students and Support staff and alumni as well as detail on-site visit of physical infrastructure, facilities and other teaching-learning resources available for the offering of degree programs.
- To submit clear, precise and justified actionable accreditation and rating recommendations about the degree programs to the Chairman NAEAC.

**Regular Academic Staff**

<b>S.No.</b>	<b>Name</b>	<b>Designation</b>	<b>Highest Qualification</b>	<b>Experience</b>	<b>Area of Interest</b>
1	Dr. M. Jamil Khan	Professor	Ph.D. Soil Science	20 Years	Fertilizer Use efficiency and heavy metal contamination
2	Dr. QudratUllah Khan	Assistant Professor	Ph.D. Soil Science	8.5 Years	Soil Chemistry and Plant nutrition
3	Mr. Said Ghulam	Assistant Professor	M. Phil. Soil Science	17 years	Soil Salinity
4	Mr. Imdadullah	Lecturer	M. Phil. Soil Science	More than 10 years	Soil and Plant Analysis
5	Mrs. Salma Shaheen	Lecturer	M. Phil. Soil Science	9 years	Soil Microbiology and Biochemistry

**Visiting Faculty Staff**

<b>S.No.</b>	<b>Name</b>	<b>Designation</b>	<b>Highest Qualification</b>	<b>Experience</b>	<b>Specialization</b>
1	Prof. Dr. Muhammad Umer Khan	Professor	PhD	32 years	Agriculture Chemistry and Plant nutrition
2	Dr. Muhammad SafdarBaloch	Associate Professor	PhD, Post Doc (UK)	15 years	Crop Production

**Laboratory Staff**

<b>S.No.</b>	<b>Name</b>	<b>Designation</b>	<b>Education</b>	<b>Experience</b>
1	Syed Bashir Hussain Shah	Lab Superintendent	B. Com	34 Years
2	AmeerBaksh	Naib Qasid	--	29 years
3	Sher Muhammad	Naib Qasid	Under Matric	33 years

**List of equipments working status**

<b>S.No.</b>	<b>Name of Equipments</b>	<b>Status</b>
1	Analytical Balance	Working
2	UV – VIS Spectrophotometer	Working
3	pH Meter	Working
4	Water Bath Digital	Working
5	Plant Sample Grinder	Working
6	Flame Photometer	Working
7	Ultra low temperature Freezer	Working
8	Laboratory Refrigerator	Working
9	Colony Counter	Working
10	Water Distillation Plant	Working
11	Micropipettes	Working
12	Rotary Evaporator	Working
13	Conductivity Meter	Working
14	Digital Orbital Shaker	Working
15	HPLC	Working
16	Atomic Absorption Spectrophotometer (double beam)	Working
17	Water Deionizer	Working
18	Laptop computer	Working
19	Climatic Test Chamber	Working
20	Ultra low Deep freezer	Working
21	Hot plate	Working
22	Microscope	Working
23	Oven	Working

24	Vacuum Pump	Working
25	Furnace	Working

### List of Books of Soil and Environmental Sciences

S.No	Book	Author	Quantity
1	Pedology: concept of appl:	J. Sehgal	8
2	Salt affected soil	A. Ghafoor et al.	16
3	Fundamental of soil science	Foth	31
4	Nitrogen excretion	Wright	4
5	Soil fertility (2 <sup>nd</sup> edn)	Nelson	21
6	Soil fertility and Fertilizen (4 <sup>th</sup> edn)		4
7	Soil the nature and properties of soil (8 <sup>th</sup> ed)	Brady	31
8	Soil an Introduction	Singh	2
9	Soil fertility and fertilizer (7 <sup>th</sup> Ed)	Beaton	2
10	Fertilizers	Barak	2
11	Soil fertility 3 <sup>rd</sup> ed	Tisdale	3
12	Manual of soil and Water cons:	Joshi	4
13	The nature and properties of soil (12 <sup>th</sup> ed.)	Brady	2
14	Fundamental of soil	Sahai	3
15	Soil condition	Russell	1
16	soil and land farm	Garrard	2
17	Soil and water conservation		1
18	Soil chemical analysis	Jackson	1
19	The themodynamics ....	Spirit	1
20	Soil and soil management	Gustafson	1
21	Soils and foundation	Evet	1
22	Soil pollution and soil org.	Mishra	7
23	Foundation of Theroretical ....	Harr	3
24	Soil Survey	Mackney	1
25	Soils of the tropics	Mongia	3

26	Soils / and other growth media		1
27	Mgt of tropical agroeso system	Reddy	1
28	Fundamental and appl: of Pediology	Sarkan	1
29	The soil resources	Moss	1
30	The study of the soil	Clarke	1
31	A dictionary of Earth	Striegler	1
32	Soil chemistry	Orlov	1
33	Trace elements in soils	Pinta	1
34	Perspectives in environment	Agarwal	1
35	Hand book of Pedology		1
36	Agri: soil Mechanics	Kuipers	1
37	Soil chemistry (2 <sup>nd</sup> ed)	O'Connor	1
38	Soil physics 3 <sup>rd</sup> ed	Barer	1
39	Soil physics application	Bard	1
40	Soil biotechnology	Luich	1
41	Manual of soil, plant, water	Upardhyay	1
42	Agri: microbiology	Bhosh	1
43	Fertilizer and soil Amed:	Follett	2
44	Fundamental of surveying	Roy	1
45	Soil conservation	Stallings	1
46	Chemistry of the soil 2 <sup>nd</sup> ed.	Bear	1
47	Fundamental of soil sickness	Turk	1
48	Agri: in the tropics	Wilson	1
49	Soil and soil fertility	Thompson	1
50	Topics in applied geography	Morgan	1
51	Fertilizer and their use in the Pak	NFDC	1
52	Soil physics	Kohnkey	1
53	Physical methods of soil Characteristics	Behair	1
54	Applied soil trace elements	Davies	1
55	Drainage of agri: Lands	Luthai	1
56	Soil plant relationship	Black	1
57	Land and soils	Khoshoo	1
58	Soil mechanics	Jumikis	1

59	Soil structure (modified)	Emerson	1
60	Fertilizer mgt(2 <sup>nd</sup> ed)	Tandon	1
61	Water, air and soil pollution vol: 14		1

**List of completed projects in last 3 years and on going projects**

1. Impact of sewage wastes (effluent and sludge) on soil properties and quality of vegetables. **Funded by the PARC, Islamabad under the “Agriculture Linkage Programme (Worth Rs. 4.153 million).** Quality of Soil and crops as influenced by urban waste water. **Funded by HEC** (and operated jointly by the University of Glasgow, UK and Gomal University D.I. Khan).
2. Heavy metals contamination in soil due to industrial and municipal wastes and their phytoremediation by Castor. Funded by **Pakistan Science Foundation** (worth 0.631 millions).
3. Carbon-sequestration as influenced by land use management using natural abundance (<sup>13</sup>C and isotopic technique). (Soil and Water Management & Crop Nutrition, Joint FAO/IAEA Division of Nuclear Techniques in Food & Agriculture Vienna, Austria).
4. Effect of doses of agrotain treated urea (Urease Inhibitor) on the yield and quality of wheat in calcareous soil (Ballance Agri-Nutrients Limited New Zealand)