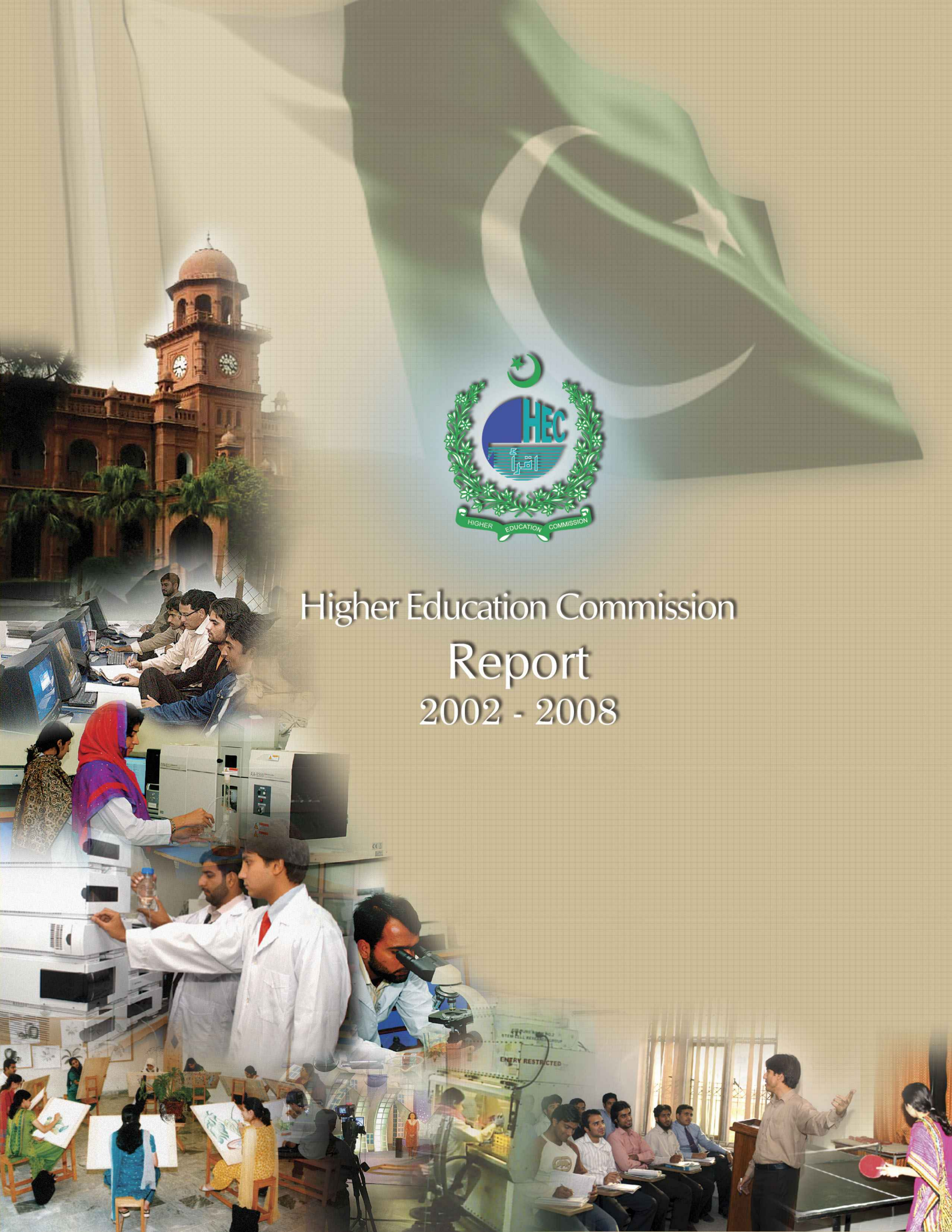


Higher Education Commission

Report

2002 - 2008

8

The Way Forward

It is historically proven that investment in education has remained low. It is time to realise that economic growth is conditional with quality education.

Vice Chancellors' Meeting 2005

Future Outlook

The HEC has made concerted efforts to increase enrolment in higher education. As a result of its initiatives overall enrolment in all HEIs increased from 475,000 in 2002 to 875,300 in 2007-08. Enrolment in universities has increased 2.34 times from 135,123 in 2001-02 to 316,278 in 2007-08.

Based on current projections it is expected that the enrolment ratio will increase from 4.1 percent in 2007-08 to 7.5 percent in 2016. The HEC planning process is designed to ensure that this growth is in line with the development needs of the country. As such the Engineering, Science, Agriculture and Medical disciplines are envisaged to grow faster than general disciplines.

While considerable investment has already taken place, much more is required. To cater to the projected increase in enrolment, massive investment will be needed in faculty development as well as in building the hard and soft infrastructure. All this will need to be accomplished strictly within the environment of Quality, Access and Relevance evolved by the HEC.

The Challenge of Resource Generation

The challenge of future resource generation remains as large as the one of actually building higher education standards and ensuring quality and relevance to the economy. Historically, the higher education sector in Pakistan remained ignored and received only a paltry share of the financial resource allocation of the Federal and Provincial Governments. With the inception of the HEC the financial outlay for higher education grew manifold. Between 2002 and 2006 total spending (Recurrent plus Development) grew by more than 340 percent in real terms. Yet this enormous increase is still a drop in the ocean. It came after years of under funding and still leaves Pakistan lagging far behind the comity of nations with less than half of one percent of its GDP spent on higher education. Further, the bulk of increase in spending was accompanied by a simultaneous growth in student enrolment. As a result, student recurrent spending rose by only 41 percent over this period.

Public-Private Partnership in higher education provides a feasible solution for the country to meet its obligations of educating the youth of our country and developing a knowledge based economy. However, these will have to be managed to ensure that quality standards are not compromised.

A three-day International Conference on 'Resource Generation and Diversification: From Vision to Reality' was organized by the Higher Education Commission. Over 31 participants including vice chancellors and academic leaders of the foremost public and private sector universities, eminent professionals, scholar and practitioners from around the world attended the Conference.

Several initiatives have been undertaken to focus on the issues of resource generation in universities. These include a three day international conference on 'Resource Generation and Diversification: From Vision To Reality' organized in Islamabad in May 2008.

This Conference was attended by 31 participants including vice-chancellors, academic leaders, and eminent professionals of the foremost public and private sector universities of the world. The Conference aimed to sensitize the leadership of universities and DAIs in the country to the importance of independent resource generation to reduce the independency on the public exchequer. The measures suggested included the need to compete globally through investments in R&D, commercialization of patents and services, alumni support, improved governance, better asset management and fund raising. The four main pillars in the resource generation drive identified at the Conference were faculty members, university administration, government and the private sector. The faculty members were expected to take the driving seat in these ventures and were urged to develop linkages with industry not only to make education more relevant to national needs, but also to provide incentives for philanthropy by the business community. In the western countries such philanthropy takes the form of major endowments which are the primary source of funds for universities.

There was a consensus to increase the attention paid to financial resources and all HEIs were urged to develop second and third stream income generation capabilities to meet at least 50 percent of their budgetary requirements.

A second initiative through a USAID funded programme is working for the establishment of dedicated Financial Aid and Development Offices in 25 HEIs. This exercise will pave the way for the launch of fund raising initiatives across the entire higher education sector.

Donations Can Be Used For Dreams

Public funding keeps institutions alive and supports only the known and the certain. The equality flavor it carries is also significant. But at the same time universities should receive support beyond public funding and that can come from the community which has abundant resources. It means mobilizing resources beyond government appropriation, and the money is used for the advancement of the institution in areas of prime importance which allows it to achieve excellence at a higher plane and empowers the institution to enjoy autonomy at a new level.

Government money is for recurring costs, merit based grants etc, while donations can be used for dreams

Professor Kai-ming-Cheng
Chair of Education
Master of Robert Black College
University of Hong Kong

Too Poor to Invest in Education

We must recognize that the government has never provided adequate financial support for education either in absolute terms or in comparison with the efforts being made in other countries. It is frequently argued that the level of support for education in Pakistan is related to the general economic position of the country and if our effort is to be judged in this light it is as much as can be managed. It is stated that because we are poor we cannot afford an extensive education programme. There is, of course, some truth in this....The Commission has no wish to make any such idealistic recommendations. But to argue that we are too poor to invest in education is to argue that we must always remain poor. This goes against the whole concept of economic planning.

National Commission on Education 1959

Road Ahead

The Government of Pakistan through a Presidential Directive is committed to gradually increasing the budgetary award for the higher education sector from its present one-half percent of GDP to one percent of GDP. However, budgetary constraints will continue to impinge on this commitment. Further, so much lost ground has to be covered that meeting the overall resource requirements from within the government exchequer will never be possible. It is therefore imperative for the academic community of Pakistan to give sustainability to these reforms by finding alternative means of funding and reducing their dependence on government grants and aid.

6

Enhancing Quality - Assessment and Accreditation

Quality is the means through which an institution can guarantee with confidence and certainty that the standards of its educational provision are being maintained and enhanced.

A Quality Assurance Forum

Concept

Quality assessment is a planned and systematic process of review of an institution or programme to determine whether acceptable standards of education, scholarship and infrastructure are being met, maintained and enhanced.

Quality adds value to higher education. Not only does low quality higher education adds little to national socio-economic growth, it moves the nation backwards in the race for competitiveness in this increasingly globalised environment. When the HEC was created there was little effective emphasis on quality in higher education. The HEC made enhancement of quality its primary focus and put in place an effective system to assure and maintain quality of the rapidly expanding higher education system of Pakistan.

The HEC faced several challenges during institutionalization of quality assurance systems. The culture of quality higher education had to be built from scratch. The HEC had to focus, not only, on development of quality assessment criteria and standards but also on devising effective systems for implementation. Significant capacity building of the system was required to ensure that the laid down criteria and standards were being met in a transparent manner across the board.

Quality Assurance

- Adds value to higher education
- increases the employability of graduates
- Helps transnational recognition of degrees and credit hours transfer
- Assists cross border mobility of students, faculty and academics

The overall process involved five major steps:

1. Sensitising academia and other stakeholders to the need for a Quality Culture in higher education
2. Development of the Quality Criteria and Standards
3. Development of the Quality Assurance Processes
4. Building capacity for implementation
5. Monitoring and evaluation of the Quality Assurance Processes.

A great deal of sensitivity and caution is required while making quality assessments, as these are judgmental and should take into account the academic values and norms of the system. The HEC made concerted efforts to develop generic formats and standards of assessment that suited the evolving higher education system of Pakistan and were applicable across the board. The instruments of assessment and accreditation adopted by the HEC were based on internationally compatible models and received general acceptance in Pakistan's higher education community.

Since quality embraces all major functions of higher education the criteria adopted covers all aspects of the HEIs that affect the quality of learning and research i.e. availability of trained faculty, relevance of curricula, availability of technology and infrastructure, research environment and administrative practices.

Criteria were developed and implemented in the following key areas:

- Quality criteria for the award of MPhil and PhD degrees
- Eligibility criteria for faculty appointments on Basic Pay Scales and on Tenure Track
- Criteria for the recognition of journals[1]
- Criteria for affiliation by the Degree Awarding Institutions (DAIs)
- Criteria for the ranking of DAIs
- Criteria and Guidelines for the appointment of Professor Emeritus, Meritorious Professors and Vice Chancellors.

Quality Assurance Programme

The HEC devised a quality assurance programme that provided a framework for stringent quality checks exercised through accreditation councils, examination reviews, curricula assessment and transparent performance rankings. A multi-pronged approach was adopted to meet its quality assurance objectives.

The institutionalization of the HEC's quality assurance programme involved:

- Development of an effective system of

1. The lists of recognized journals by different categories were published and this information was disseminated as widely as possible and made available to all scholars and researchers.

Objectives of the HEC's Quality Assurance Programme

- Enhance the capacity of the HEC to carry out activities pertaining to quality assurance outlined in its Charter
- Ensure that education imparted at domestic institutions meets certain basic quality criteria developed in line with international standards
- Renew and revise curricula to meet the advances in subjects
- Introduce innovative approaches, such as international collaboration and twinning arrangements between Pakistani and foreign universities
- Establish mechanisms for evaluating the quality of education in HEIs
- Introduce quality assurance methods at both institutional and systemic levels
- Inform the public on the quality and validity of institutions and academic programmes based on uniform evaluation criteria
- Build capacity at each university for a continuous quality assurance regime
- Take measures to keep sub-standard degree programmes and institutions under check.

Quality Assurance and Enhancement in the universities

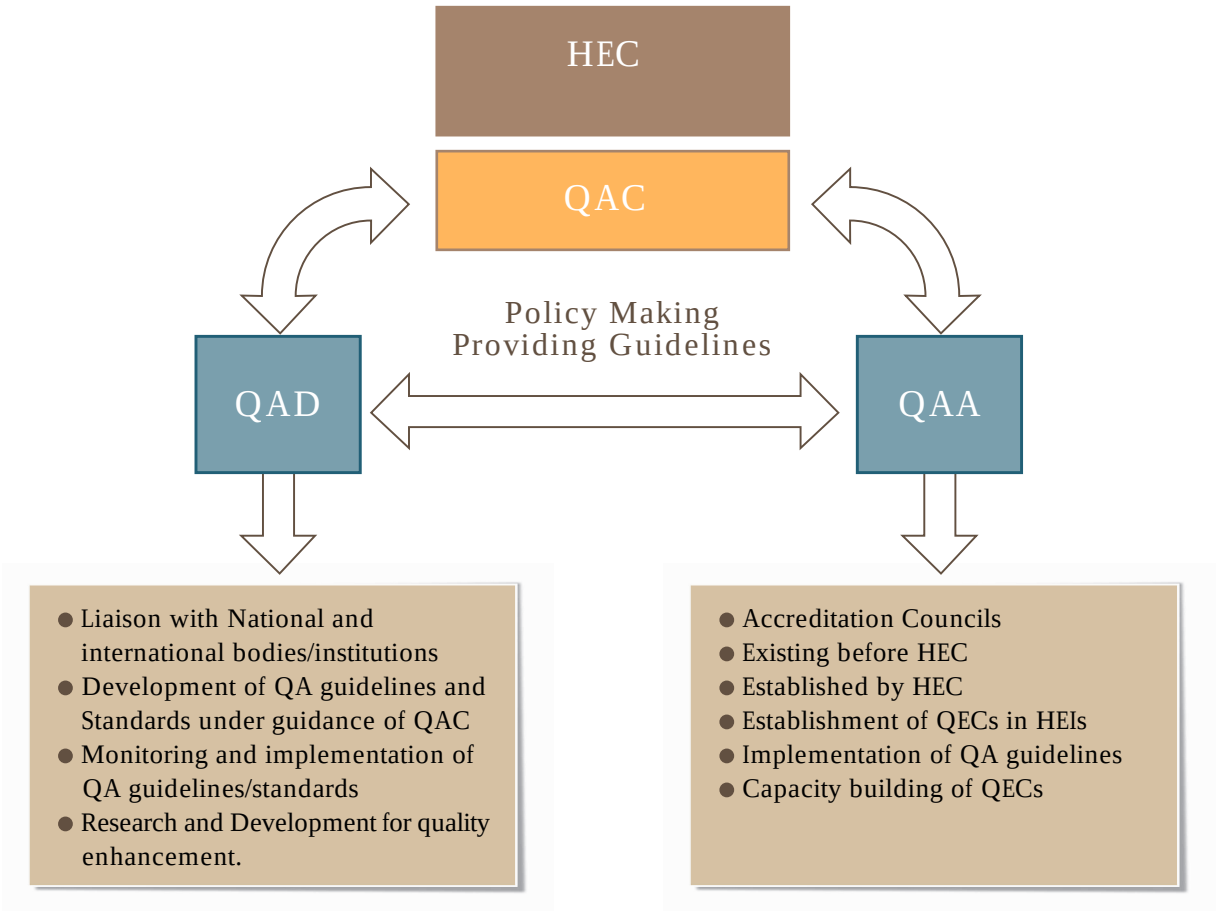
- Development of Minimum Quality Criteria and Parameters in line with international standards
- Development of guidelines and processes of Quality Assurance
- Building of capacity of the practitioners and programme managers
- Implementing a programme of Self-Assessment and Accreditation of HEIs in line with international standards.

The HEC has disseminated the good practices for accreditation councils; the policy to deal with plagiarism; and the manuals and guidelines for quality assurance as widely as possible. These guidelines, policies and good practice documents are also placed on the HEC website for easy access.

Quality Assurance Committee (QAC)

Constituted in 2003, the Quality Assurance Committee is chaired by Prof. Dr. A. Rauf, a Distinguished National Professor and is composed of Vice Chancellors and eminent scholars of various universities. It is an advisory body to the HEC for assuring provision of quality in the higher education sector. It reviews current policies for continuity and conformity with global advancements to provide HEIs with the enabling environment to meet the challenges. The Committee has developed a ranking system of universities. The system allows for the weaknesses to be addressed so that universities can improve their position in the ranking if it is necessary. This also creates a sense of positive competition all of which helps in improving standards.

Hierarchy of the Quality Assurance Setup



QAC Quality Assurance Committee,
QAD Quality Assurance Department
QAA Quality Assurance Agency
QEC Quality Enhancement Cells

The committee has also developed new criteria for the award of PhD degrees which are now being implemented by all DAIs.

Quality Assurance Agency (QAA)

The MTDF identified low quality as one of the main issues confronting the higher education sector of Pakistan. To attain international compatibility and competitiveness in higher education the HEC established a Quality Assurance Agency.

The guidelines developed by the Agency and provided to universities are helping to improve the quality standards of higher education in a systematic way. The QAA is also involved in the development of (a)

criteria for higher degree programmes, (b) overall capacity building, and (c) monitoring and evaluation. Currently, the QAA is working under the umbrella of the HEC. It will become an independent autonomous organization once the desired quality culture takes root in the HEIs.

Quality assurance and enhancement procedures have been introduced at 30 public sector universities under two projects through the establishment of Quality Enhancement Cells. The Quality Assurance Agency is building the capacity of these Cells through training and the development of procedures and guidelines.

Establishment of New Accreditation Councils

The QAA has setup four new Accreditation Councils and established linkages with the existing Councils to ensure minimum quality standards of the respective programmes.

A two tier process of accreditation has been introduced by the HEC. Under this programme, Institutional Accreditation is conducted by the HEC and Programme Accreditation is carried out by the respective Accreditation Councils. The new Accreditation Councils established since August 2007 are:

- National Computing Education Accreditation Council
- National Agriculture Education Accreditation Council
- Accreditation Council for Teachers Education
- Business Education Accreditation Council

Linkages with Existing Accreditation Councils

Linkages have been developed with existing accreditation councils and professional bodies so that degree programmes meet the minimum criteria and are developed in accordance with industrial needs. Special linkages have been formed with the:

- Pakistan Engineering Council
- Pakistan Council for Architects and Town Planners
- Pakistan Medical and Dental Council
- Pakistan Bar Council
- Pakistan Veterinary and Medical Council
- Pharmacy Council of Pakistan
- Pakistan Nursing Council

Linkages with International Higher Education Quality Assurance Agencies

To ensure that quality improvement programmes are at par with international standards, and to bring best international practices to Pakistan, the HEC has established linkages with the following international quality assurance agencies:

- Asia Pacific Quality Network (APQN), Australia
- International Network of Quality Assurance Agencies in Higher Education (INQAAHE), Germany
- National Accreditation and Assessment Council (NAAC), India

These linkages ensure that the quality assurance systems and procedures developed by the HEC are in line with international standards.

Revision of Curricula

National Curriculum Revision Committee (NCRC)

The revision and upgrading of curricula has been one of the greatest contributions of the HEC towards the development of the higher education sector of Pakistan. The move to a four year Bachelor degree programme with curricula of international standards is one of the most noteable milestones in the improvement of the standards of higher education in Pakistan. Graduate curriculum is a formal academic plan for the learning experiences of students in pursuit of college degrees. The term curriculum, broadly defined, includes goals for student learning (skills, knowledge and attitudes); content (the subject matter in which learning experiences are embedded); sequence (the order in which concepts are presented); learners; instructional methods and activities; instructional resources (materials and settings); evaluation (methods used to assess student learning as a result of these experiences); and adjustments to teaching and learning processes, based on experience and evaluation.

Recent international curricular innovations and reforms reflect three shifts in emphasis:

1. From learning goals that focus on mastery of content and content coverage to the demonstration of broad competencies
2. From learning in disparate disciplines to integrative learning experiences across the curriculum; and
3. From changes in subject matter as the primary means to improve learning to innovations in instructional methods and assessments as integral to curricular reforms. Diversity and global competency have emerged as major undergraduate curriculum issues, as well.

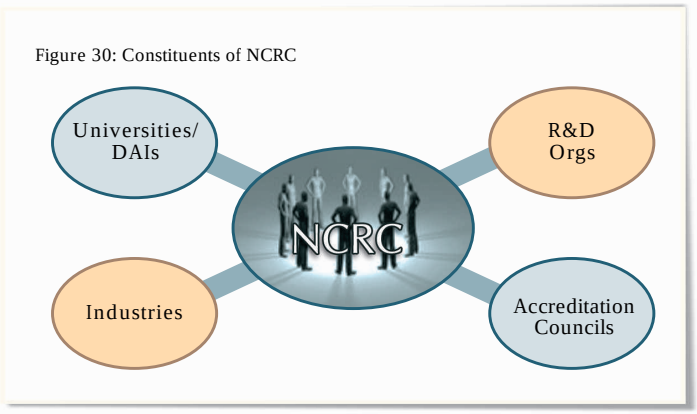
The HEC constituted the National Curriculum Revision Committee (NCRC) to address the need for revision in the higher education curricula and to ensure that the graduates have the skills needed by society in the 21st century.

The Committee is drawn from experts/ scholars of universities/degree colleges, user organizations, industries, councils and R&D institutions to help reform and develop uniform curricula for graduate and post graduate programmes. Recommendations received from reputed expatriate Pakistani education experts are also incorporated in the curricula.

Prior to the establishment of the NCRC there was no standardized curriculum for degree programmes in Pakistan. Universities designed their curricula independently. The number of qualifying credit hours and contents of the curriculum varied significantly. Most universities adhered to the two year Bachelors programme with a very narrow focus. There was a dire need to standardize our degree programmes in line with international standards to equip students with globalized skills which enhanced their employability.

A literature review of curricula offered by different universities of the world was carried out and relevant best international practices were tailored to specific needs of our country. Two committees of experts comprising Conveners of National Curriculum Revision Committees in Basic, Social and Applied Sciences and Engineering disciplines were tasked to define the features of degree programmes to standardize the Bachelor degree in the country and develop a generic curriculum framework/template.

Figure 30: Constituents of NCRC



The objective was to shift knowledge from a narrow base to broad base and provide interdisciplinary approach to make it more compatible with international standards which would consequently open new avenues for our graduates in the job markets not only at national but also at international level.

The NCRC, in consultation with all stake holders has:

- Developed a framework/template in the discipline of Engineering to harmonize Engineering education and make it compatible with international standards. The Engineering Degree will be of four year duration and will require the completion of 130-136 credit hours. It will devote 65 - 70 percent of the curriculum towards engineering and 30-35 percent towards non-engineering courses.
- Designed a template for the four year Bachelor Degree programme in the discipline of Basic, Natural and Applied Sciences to bring uniformity in our graduate curricula. Features of the degree programme have been defined to give broad-based knowledge to students and to ensure quality of education. The New BS degree shall be of four year duration and will require completion of 132-136 credit hours. For Social Sciences and Basic Sciences degree programmes, the curriculum will consist of 63.5 percent discipline specific courses and 36.5 percent of compulsory and general courses offered through other departments.
- Developed a roadmap for Business education graduate and postgraduate degree level programmes to standardize Business education.
- Developed compulsory courses for Islamic/Pakistan Studies, English and Mathematics for the Basic and Social Sciences four year degree programme.
- Developed special courses in Psychology, Sociology, Anthropology, Management and Statistics of Mathematics to be incorporated in BS Engineering Programme.

Table 27: Template for Bachelor Degree in Basic Social, Natural and Applied Sciences

Total Number of Credit Hours	130 - 136
Duration	4 years
Semester Duration	16-18 weeks
Semesters	8
Course Load per Semester	15-18 Cr hr
Discipline Specific Courses	65 percent
Compulsory and General Courses	30 percent

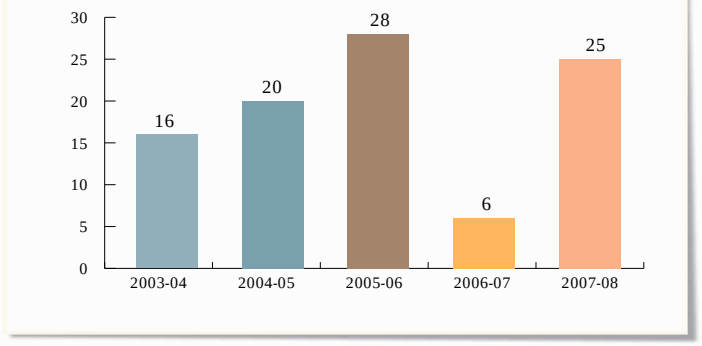
Categories	No. of courses Min-Max	Credit Hours Min-Max	Percentage
Compulsory Requirement (No Choice)	9-9	25-25	19.23
General Courses to be chosen from other departments	7-8	21-24	17.30
Discipline Specific Foundation Courses	9-10	33-33	24.23
Major Courses including research project/Internship	11-13	39-42	30.00
Electives within the major	4-4	12-12	9.23
Total	40-44	130-136	100.00

Table 28: Template for BE/BSc Engineering Education

Total Number of Credit Hours	130 - 136
Duration	4 years
Semester Duration	16-18 weeks
Semesters	8
Course Load per Semester	15-18 Cr hr
Engineering Courses	65-70 percent
Non Engineering Courses	30-35 percent

Categories	No. of Courses Min-Max	Credit Hours Min-Max
Compulsory Requirement (No. Choice)	11-12	32-34
General Courses to be chosen from other departments	9-9	27-29
Discipline Specific Foundation Courses	8-8	29-29
Major Courses including research project/Internship	7-7	25-26
Electives within the major	5-5	17-18
Total	40-41	130-136

Figure 31: Number of Curricula Revised



Details of the standardized templates for Bachelors Degree in Basic, Social, Natural and Applied Sciences and Engineering Discipline are given in Table 27 and Table 28 respectively.

Number of Curricula Revised

Over the past six years, 95 curricula have been revised, illustrating the commitment of the HEC and participating universities to update the graduate and post graduate programmes and ensure their relevance to today's needs. Figure 31 shows the number of curricula revised by NCRC during the period 2002-08.

Standardization of Degree Programmes

A significant achievement of the HEC Quality Assurance Programme has been the Standardization of the Degree Programmes. This standardization has been completed in 15 Engineering, 14 Basic and Social Sciences and six professional undergraduate degree programmes under a unified framework. The standardization

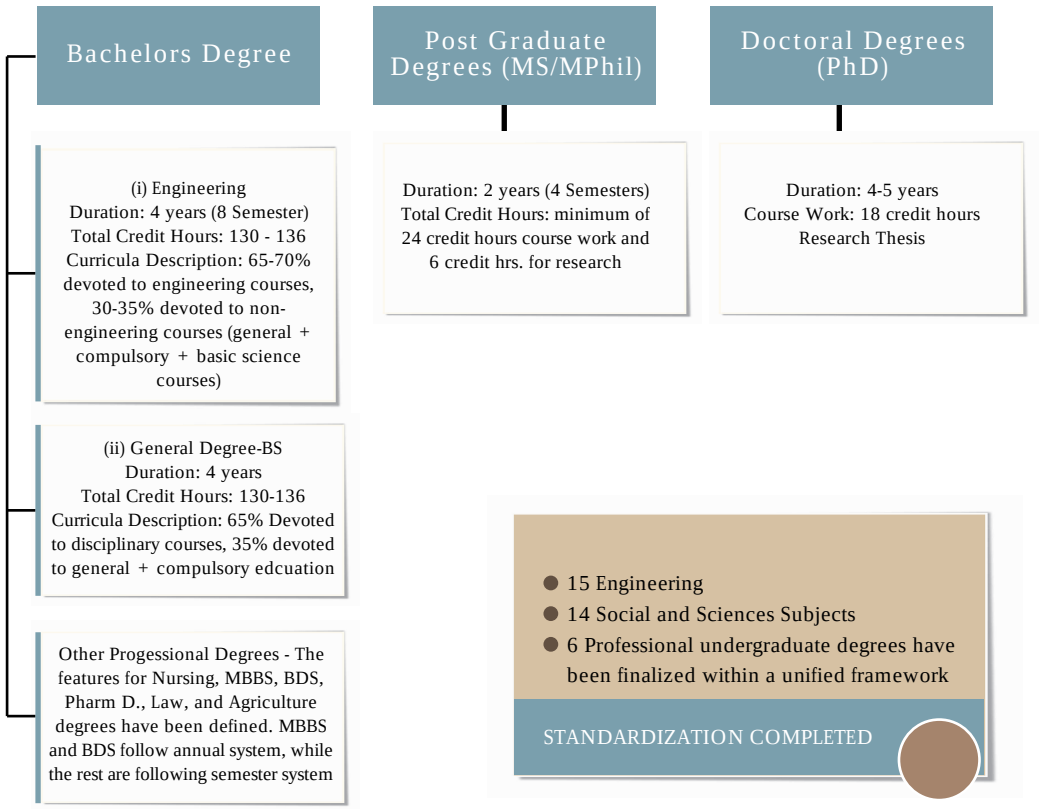
template of the various degree programmes is shown in Figure 32.

Review of Higher Degree Programmes

The HEC has provided guidelines to universities and DAIs for improvement of their PhD and MPhil programmes. Three Committees have been constituted to evaluate the progress on adoption of these guidelines for the MPhil and PhD degree programmes being offered by the public and private HEIs.

In the first review, 35 universities offering PhD programmes were evaluated and results were communicated to the universities for further improvements. The PhD programmes of six universities were discontinued on the recommendations of the Committee. In the second review, MPhil and PhD programmes offered by all public and private sector universities are being evaluated. Evaluation reports of 15 universities had been finalized till December 2008.

Figure 32: Standardization of Degree Programmes



Review of Examination Systems

To remove anomalies in the examination systems, the HEC has taken the following actions:

- The National Committee on Examination Systems (NCES) was constituted in 2004 and facilitated by the LID to review the existing examination policies, analyse weaknesses and propose improvements.
- Policy for Annual System of Examination was finalized and sent to HEIs for implementation.
- Policy Guidelines for Semester System were developed in consultation with universities to encourage a gradual shift to the new system of examination and standardize the evaluation procedure in line with international standards of quality.
- Guidelines for both undergraduate and Master/MPhil levels have been finalized and circulated to all public sector universities for implementation.
- 271 university faculty members and administrators have been trained by conducting various awareness seminars and workshops.
- 25 Master Trainers have been trained to conduct further training for the awareness of the requirements of the semester system of examinations.

Public Information and Awareness

The HEC accords great importance to sharing information with the faculty, students and other stake holders. As a part of its public information and awareness strategy, all the quality assurance criteria and procedures have been published in the form of booklets and circulated widely throughout the system. These are also available on the HEC website for easy access.

Zero Tolerance for Plagiarism

To ensure that quality standards are not undermined, the HEC has adopted a zero tolerance policy towards plagiarism. Any university refusing to take stringent action against plagiarists will have their grants frozen or even reduced. A blacklist has been created on the HEC website which highlights the policy as well as all the information regarding proven cases of plagiarism. All publications and research reports published by the universities and other institutes are expected to be scanned through special anti-plagiarism software before they are approved.

Scanning is also carried out using this anti-plagiarism software of all the research articles published by authors/researchers from Pakistan. The common practice is to screen all MPhil and PhD theses submitted to the universities and all papers submitted with the application for a travel grant or other incentives provided by the HEC. An agreement has been signed for one year with iThenticate: a web-based software/ service, for scanning 50,000 pages for 15 users. The HEC has arranged training/ tutorial meetings for officials from the universities to create awareness on intellectual honesty and the need to curb plagiarism. So far, more than 1000 theses of MPhil/PhD and 2000 research papers have been checked through this mechanism.

Recognition of Journals

Enhancing the quality of research in Pakistan to international levels has been a major goal of the HEC. Enhancement of the quality of the national research journals is an important step in this regard. The Quality Assurance Department is devoted to promoting the quality of research journals in Pakistan, through a process of assessment by a committee of experts in the relevant discipline against criteria developed by the HEC. One hundred research journals have been recognized by the HEC so far. The journals are categorized on the level of fulfilment of the quality criteria. HEC also provides financial support to these journals on the basis of this categorization to assist in building quality, capacity and coverage. This financial support is summarized in Table 29.

Table 29: Financial Support to Scientific Journals for the Year 2007-08

Category	No. of Journals	Financial Support (Rs million per Journal)
W	2	0.7
X	6	0.5
Y	43	0.43

Category W: Journals meeting criteria requirements
Category X : Journals having minor shortfalls in meeting criteria requirements
Category Y : Journals having major shortfalls in meeting criteria requirements
Category Z : Journals seriously deficient in meeting criteria requirements

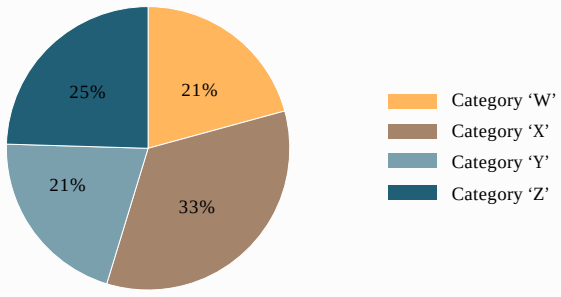
Establishment of New Universities/ DAIs

Under Section 10(1-f) of the Ordinance, the HEC has been mandated to advise the Federal and Provincial Governments on proposals for granting of charter to universities in the public and the private sector. During the report period, 53 new universities/institutions in the public and private sector have been granted charters by the Federal and Provincial Governments.

Improvement in Quality and Facilities of Private Sector Universities

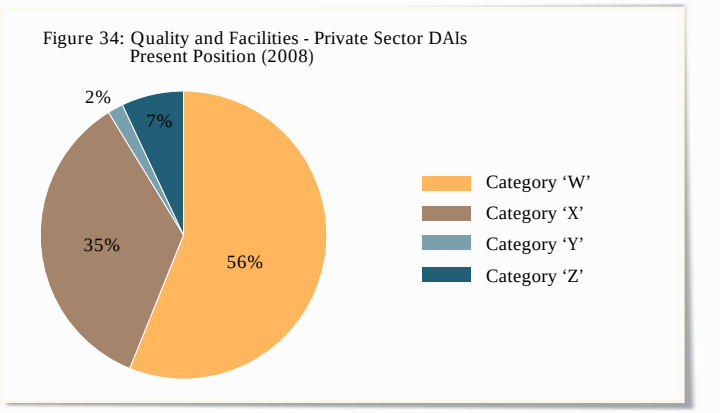
Two inspections have been carried out by the HEC, in 2004 and 2008 respectively, to ensure that all private sector universities meet certain quality criteria. The first inspection, in 2004, revealed that only 21 percent of the inspected HEIs were meeting the HECs laid down criteria (Figure 33). As a result of the inspection the HEC issued guidelines and instructions to the universities to upgrade their facilities.

Figure 33: Quality and Facilities - Private Sector DAIs Position after 1st Inspection (2004)



The second inspection was carried out in 2008. This inspection revealed that most universities, complying with the instructions, had substantially up graded their facilities. As shown in Figure 34, 56 percent of the universities were now able to achieve the criteria laid down by the HEC. The remaining are in the process of doing so.

Figure 34: Quality and Facilities - Private Sector DAIs Present Position (2008)



Category W: Universities/institutions meeting criteria requirements
Category X : Universities/institutions having minor shortfalls in meeting criteria requirements
Category Y : Universities/institutions having major shortfalls in meeting criteria requirements
Category Z : Universities/institutions seriously deficient in meeting criteria requirement

Ranking of Universities

On the directive of the Prime Minister of Pakistan the HEC constituted a board for the ranking of universities in Pakistan. The first ever ranking of Pakistani universities was conducted in the year 2006. These rankings were approved by the Board and disseminated to the public through the print media. The ranking system has introduced a healthy competitive spirit between the HEIs of Pakistan. This is instrumental in bringing about further improvement in these institutions.

An elaborate system for the ranking of universities has been established by the HEC. The system is in line with best international practices and ensures transparency. A scoring system has been laid down which quantifies the contribution of all aspects of a university's inputs for high quality education: faculty and research, students, facilities and finance. The details of the scoring system are given in Table 30.

Attestation and Equivalence of Degrees/ Asnaad

The HEC determines the equivalence of degrees awarded by foreign and local universities/ institutions/'Deeni Madaras' for their recognition. Section 10(1-0) of the Ordinance states that the HEC will "determine the equivalence and recognition of degrees, diplomas and certificates awarded by institutions within the country and abroad". The Attestation Department of HEC also carries out verification and attestation of degrees issued by Pakistani DAIs.

The Commission is carrying out attestation and equivalence of degrees and 'Deeni Asnaads' in accordance with procedures prescribed by the Equivalence and Accreditation Committee and competent authorities. Embassies, High Commissions, Universities, the Public Service Commission and recruiting organizations rely on the

Table 30: Scoring System for Universities Ranking

	Name of Fields	Score
1	Students	20
1.1	Students produced having 16 years of education	4
1.2	Students produced having MPhil / 16+ years of education	4
1.3	Number of PhDs produced	5
1.4	Student selectivity	4
1.5	% of students getting admission having 60% and above marks	3
2	Facilities	15
2.1	Number of books in main library	2
2.2	Number of journals subscribed in main library	3
2.3	Number of computers for students per student	2
2.4	Number of computers for faculty per faculty	1
2.5	Bandwidth per student	1
2.6	Laboratories for practicals	2
2.7	Number of teams participating in inter-university games	1
2.8	Ranking of university in Inter-university games	1
2.9	Equipment costing more than Rs. 2 million	2
3	Finances	15
3.1	Amount generated through own resources	2
3.2	Amount spent library + research as %age of total budget	4
3.3	Recurring expenditure per student	5
3.4	Non-Recurring expenditure per student	4
4	Faculty	25
4.1	Full-Time PhD faculty	6
4.2	Ratio of PhD faculty to total faculty	4
4.3	Full-Time faculty having Mphil/16+ years of education	2
4.4	National and international awards won by faculty	2
4.5	Student-Teacher ratio	5
4.6	Trainings received by faculty	4
4.7	Amount of funds obtained through competitive grants for research project/faculty	2
5	Research	25
5.1	Research papers published by faculty members and students during the past 3 years	4
5.2	Number of journals published by the university	2
5.3	Number of books published by faculty members	1
5.4	Papers presented and published at refereed international conferences by faculty members and students	1
5.5	Papers presented and published at refereed national conference by faculty members and students	1
5.6	Gross Score Point of all faculty members as determined by PCST	2
5.7	Gross Score Point per faculty member	2
5.8	University organized conferences/symposia/ seminars/workshops at national level sponsored by other agencies	1
5.9	University organized conferences/symposia/seminars/workshops at international level sponsored by other agencies	2
5.1	Number of patent designs/formulae/improved varieties/breeds etc	2
5.11	Number of international collaborative research projects	4
5.12	MPhils produced per faculty	1
5.13	PhDs produced per faculty	2
	Total Marks	100

Note: For Business Schools, the criteria and weights have been slightly modified.

HEC for authentic verification of degrees. During the period of this report, 434,128 educational documents were attested and 19,766 foreign/local degrees/deeni asnaad were granted equivalence (Table 31).

Table 31: Equivalence of Degrees and Deeni Asnad

Year	Cases received	Decided	Regretted
October 2002- June 2003	967	890	77
2003-04	2,090	1,867	223
2004-05	2,482	2,315	167
2005-06	2,873	2,717	156
2006-07	3,631	3,522	109
2007-08	4,926	4,796	130

University Ranking

The ranking based on data collected across five broad categories with a total of 40 sub indicators: student quality (17 percent of overall score), facilities (15 percent), finances (15 percent), faculty (27 percent) and research (26 percent). Much of the assessment is based on information received from the universities through a specially designed questionnaire.

Universities are ranked within their respective disciplines in a number of different fields: Agriculture/Veterinary, Art/Design, Business/ IT, Engineering, General and Health Sciences.

The University rankings are posted on the HEC website:
www.hec.gov.pk/new/QualityAssurance/Ranking_list.htm

Pakistani Universities among Top 600 Universities

In an exciting development in the higher education sector of Pakistan, three public sector universities have been included in the top 600 Universities of the world by the Times Higher Education Supplement , UK for the year 2007. These universities are;

- NUST ranked at 376
- University of Karachi ranked among the top 600 world universities
- Quaid-i-Azam University ranked at 564

The following universities are included in the top 600 universities of the world by Time Higher Education Supplement UK for the year 2008

- NUST stands at to 376 position in ranking
- The University of Lahore is included within the top 500 Universities
- The University of Karachi and UET, Lahore are among the top 600 universities

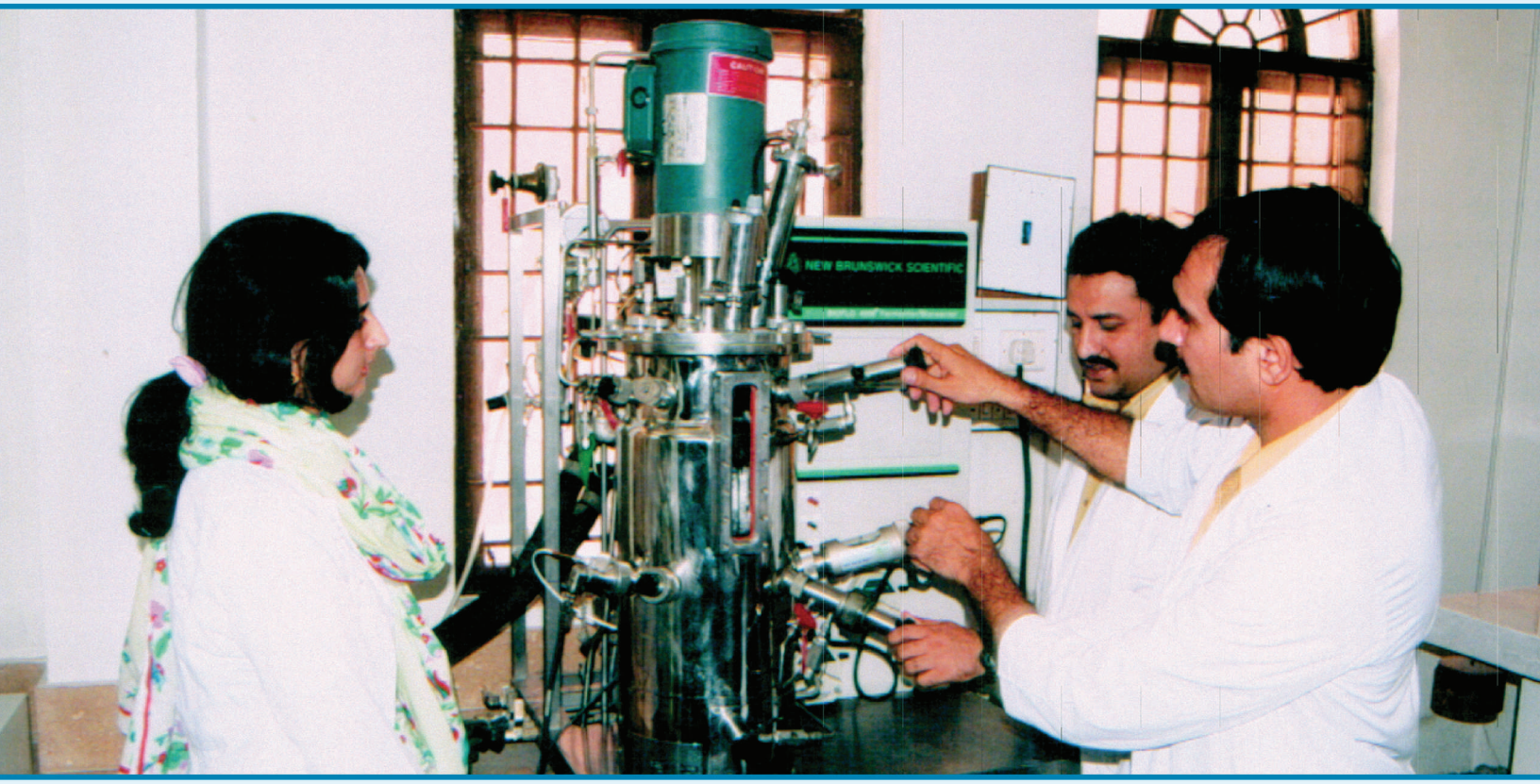
It is expected that with 10-15 years of sustained effort by the universities and support from the HEC, many Pakistani universities will appear in the top 100 universities.

New and Views

5

Ensuring Relevance to the Economy: Developing Academia–Industry Linkages

To promote interaction between the industrial and higher education sectors, to ensure alignment of the generation of human capital with economic activity and national development objectives.



Academia - Industry joint research

Concept

The changing shape of society, from resource based to knowledge based is evident to all. Higher education is the main engine that drives economic growth, alleviates poverty and gives potential to the people to become competitive and hold their position in the international world of commerce and trade. Higher education ensures that a knowledge culture permeates into every sphere of national activity, and contributes to the development of a progressive and enlightened society. The relevance of university education being imparted in building high level skills and creating cadre of enterprising innovators in industry is crucial for this socio-economic growth. The HEC has encouraged universities to conduct research that caters especially to industrial

The major objectives of the HEC's focus on relevance are to:

- Establish new departments and centres in universities focusing on issues of direct importance to the local, regional and national economy.
- Encourage university-industry collaboration for technological innovation and indigenisation.
- Promote industrial internship programmes.
- Technology Parks need to be set up next to the academic institutions or vice-versa, so that a fully serviced environment is provided to scientists and engineers.
- Involvement of industry experts in university bodies such as the curriculum advisory boards, etc

Installation/Upgradation of Material Fabrication

needs; plays a pivotal role in shaping the country's comparative advantage; and, brings about rapid industrial development. For this purpose, in addition to enhancing the overall level of research in our HEIs, world class Centres of Excellence have been set up in key disciplines so that they can contribute to the development of cutting-edge science and technology in the country.

Concerted efforts continue to be made to enhance the relevance of university education to make the HEIs suppliers of high-skilled manpower and a breeding ground for innovators and entrepreneurs for industrial development. Universities are encouraged to conduct research that caters especially to industrial needs and plays a key role in shaping the country's comparative advantage.

Operationalizing the Strategic Vision

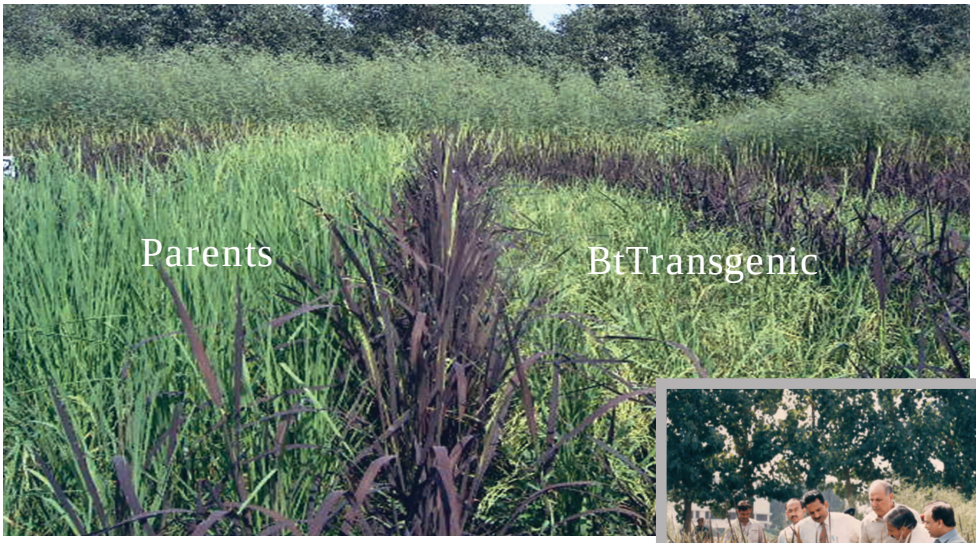
A key component of the HEC's technology based industrial vision and strategy is to provide support to research projects that are of value to Pakistan's industrial and commercial sector. The HEC facilitates access to resources that are necessary for this research, such as software, equipment, technology as well as international expertise.

The HEC has implemented several initiatives in support of its objectives.

Establishment of Industry Relevant Departments and Centres in HEIs

The HEC, realising the need for higher education to be the engine of economic

Field Trials of BT Rice and BT Cotton at CEMB Field



BT Transgenic and Parent Basmati 370 Rice Plants

BT Cotton Plants

growth and development, has encouraged and promoted the establishment of new departments and centres/facilities in our universities that would provide avenues for value addition to the local economy and promote economic growth. The approved development projects for the establishment of new departments and centres in our HEIs are:

- Data Palm Research Centre at Shah Abdul Latif University, Khairpur
- Advance Manufacturing Engineering at UET, Lahore
- Earthquake Engineering Centre, UET Peshawar & NED, Karachi
- Laboratory for Nuclear Physics, QAU, Islamabad
- National Institute of Vacuum Science, QAU, Islamabad
- Gemstone Training Centre at UET, Peshawar
- Institute for Sustainable Halophyte

HEC's Technology Based Industrial Vision and Strategy

Knowledge is the driver of a country's socio-economic growth. The academia-industry linkage is essential not only to ensure that our knowledge base has relevance to our needs but also to provide opportunity for industry to benefit from efforts of the academia.

To understand the needs of our economy and focus the efforts of academia, the Higher Education Commission in coordination with the Pakistan Institute of Development Economics conducted an in depth study of our industrial and economic needs. The study aimed to identify specific productive sectors in which Pakistan should invest to attain a high growth target and alleviate poverty from our country. This vision places science and technology at the helm of an industrial strategy which aims to develop a fast growing, internationally competitive, and export driven industrial sector that helps poverty reduction through provision of adequate employment opportunities to the growing labour force.

The study covers major productive sectors of the economy, agriculture, industry and services. It finds that in order to achieve growth in each sector, Pakistan will have to substantially strengthen research and development studies and create quality human resource which can face the challenges of globalization and international competition. All this can only be achieved if a triad is established between Pakistan's academia, business community and the government planning agencies. Recommendations offered in the report are invaluable and if included in the National Development Plan may contribute in building of a better future for Pakistan.

Utilization, University of Karachi
- Fruit and Vegetable Processing, Sindh Agricultural University, Tandojam
- Food Technology, University of Agriculture, Faisalabad
- Product Development Centre at NED University, Karachi

These projects have all been successfully implemented and are playing an important role in bridging the university-industry divide.

University-Industry Technology Support Programme (UITSP)

The HEC focuses on the industrial sectors that are major contributors to world trade, and those where there is high potential for promoting competitive international trade. HEC aims to foster tangible cooperation between academia and industry in order to capitalize on the emerging international demands for products and processes in manufacturing.

Fourteen different projects prepared by universities in collaboration with local industry have already been approved and funded.

UITSP support is awarded on a competitive merit based evaluation of research projects that are of direct relevance to the current needs of industry. The HEC mandates that the project proposals should pertain to products and processes needing improvement in the priority areas relevant to the socio-economic development needs of the country and be implemented by professionals from local industry.

In addition to the 14 projects already funded a number of projects are in the pipeline. Projects being considered for UITSP award for 2008-09 include:

- Design and development of electric motor cycle and three wheeler electric mini car.
- Waste minimization through cleaner production.
- Radio Frequency Identification (RFID) based access control and time attendance system.
- Studies on production and evaluation of Theileria Vaccine in cattle.
- Electrical energy saving through active PEC integrated energy analyser.
- Development of dialysate for patients suffering from Nephrotic Syndrome.
- Systematic investigation of friendly bio-diesel from non edible oil yielding plant species in Pakistan.
- Development of tissue culture protocols and methodology for micro propagation.

Microsoft Sponsors First Research Project in Pakistan

Microsoft is funding an ambitious research initiative led by Dr. Umar Saif at Lahore University of Management Science (LUMS). This initiative will address the bandwidth limitations faced by Internet users in the developing world.

Dr. Saif's research is one of the 17 projects selected out of 162 proposals submitted from 34 countries. Dr. Umar Saif's research, entitled “Poor Man's Broadband,” focusing on 'Developing World Technologies' is the first project funded by Microsoft Research in Pakistan.

University-Industry Interaction Project

This is an umbrella project that aims to create awareness regarding science and technology and to establish stronger connections between academia and industries of Pakistan for the uplift of the industrial sector through research. The main objectives of the project are to educate the youth about sophisticated scientific outcomes; and, create general awareness among students, the general public, legislators and industrialists about new inventions in frontier technologies. The project aims to highlight the socio-economic problems of the country and their possible scientific solutions.

The major activities under this project have included outreach through several channels, including workshops and seminars, meetings with Chambers of Commerce and Industry, and the setting up of a data base on experts for promoting academia industry linkages.

Workshops and Seminars

Under this project, 26 workshops were held in different universities/institutions of Pakistan. These workshops received

Bio-diesel - A Renewable Energy Resource in Pakistan

The HEC funded a research project under its University-Industry Technology Support Programme (UITSP) to identify bio-diesel producing plant species in Pakistan. Findings of this study will be useful for universities, students, industries and Ministries such as the Environment, Agriculture and Finance.

Achievements of this project

- Established a well-equipped Bio-diesel Laboratory in the Department of Plant Sciences for research and development
- Initiation of MSc, MPhil and PhD research work in Bio-diesel
- Successful road run test on Bio-diesel with Alternative Energy Development Board (AEDB)

Meeting of Karachi Chambers of Commerce and University - Industry Liason Committee.

extensive media coverage and brought the subject activity to the notice of industrialists, legislators, students and the general public. As an outcome of these workshops, some universities are in the process of signing MoUs with industries.

Meetings with Chambers of Commerce

To strengthen interaction between academia and industry, a series of meetings between HEC representatives, faculty members of universities and members of Chambers of Commerce and Industry were arranged in different cities. As an outcome of these meetings, focal persons in chambers and universities were appointed for continuous liaison.

Database of Experts for Interaction Between Academia and Industry

The HEC is building a Database of Experts serving in Pakistani universities with skills that could be useful for the academia industry linkages. This Database would acquaint the industrial sector with local academia and enable industries to use the available skills to solve industrial production, marketing, and management problems.

Access to Scientific Instrumentation

There is a shortage of sophisticated scientific equipment in most universities and research laboratories which impedes the development of scientific research in Pakistan. The HEC has initiated a unique programme to share scientific instrumentation facilities in universities and R&D organizations. The Access to Scientific Instrumentation Programme provides access to sophisticated equipment. The Programme provides HEI's with funding to rent the use of the scientific instrumentation from other institutions where these are available.

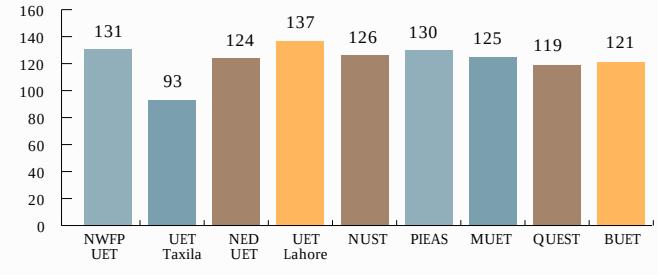
Under this programme, a total of 1,500 researchers/scientists from various public sector universities and R&D organizations have carried out spectroscopic and automated high-through put bio-assay analysis in 16 different highly technologically advanced

research institutes that are providing analytical services to researchers under the Programme.

These facilities are available at:

- National Institute of Biotechnology and Genetic Engineering, Faisalabad.
- Central Resource Laboratory, Peshawar.
- Dr. Panjwani Centre, Karachi.
- HEJ Institute of Chemistry, Karachi.
- Pakistan Council of Scientific and Industrial Research (PCSIR), Peshawar.
- Central Laboratories of Solid State Physics, University of Punjab, Lahore.
- Quaid-i-Azam University, Islamabad.
- Pakistan Council of Research in Water Resources (PCRWR), Islamabad.
- High Technology Resource Laboratory, University of Balochistan, Quetta.
- Pakistan Council of Scientific and Industrial Research (PCSIR), Karachi.
- National Centre of Excellence in Analytical Chemistry, Sindh University, Jamshoro.
- Centre for Applied Molecular Biology, Lahore.
- Geosciences Advanced Research Laboratories, Geological Survey of Pakistan, Islamabad.
- Pakistan Institute of Nuclear Science & Technology, Islamabad.

Figure 29: Engineering Software Provided under Phase I



Country Licenses of Advanced Design-Software for Teaching and Training in Engineering Institutions

Under a phased programme engineering universities are being provided country licences for advanced design software for teaching and training.

In the first phase professional universities were provided with advanced design software licences pertaining to Mechanical Engineering along with training of five to six faculty members on the newly installed software. The software has helped enhance the learning experience of the students and kept them abreast with modern technical knowledge and research and development. The advanced design software procured under this project with a total cost of Rs. 37.65 million includes:

- ANSYS
- Pro-Engineer
- Autodesk Inventor Professional
- CATIA
- Fluent
- Maple
- Adams

Software licences were provided to universities keeping in view their demand and the facilities available. The project was initiated in April 2005 and completed in

HEC facilitates access to scientific equipment through sharing research facilities

April 2007. Figure 29 shows the quantum of engineering software provided under Phase I.

In Phase II of this project, starting in August 2007, country licences for civil engineering software along with the training in their use are being currently provided to engineering universities/DAIs. These institutions, due to the expenses involved in acquiring the complete tool sets, had been using preliminary free software. This project has enabled the researchers to use the full engineering and industrial software packages and is helping to produce a more efficient and skilled workforce for the engineering industries capable of catering to the changing needs of the sector.

The second phase of the project which is expected to last two years will fund software licences up to a total cost of Rs. 38.8 million. Table 20 shows the Civil Engineering software and related training that has been approved and is being imparted.

Electronic Design Automation (EDA)

Very Large Scale Integration (VLSI) design tools help provide the necessary software tools to HEIs. These facilities can also be made available to the public and private sector for use on a commercial basis. With sufficient expertise developed over time, Pakistan too, like its neighbour India, can become a centre for off-shore VLSI design services. To compete in the global markets, it is imperative that our universities be equipped with this high level technology. The HEC plans to provide EDA tools listed in Table 21 and extensive training to the faculty members of Pakistan HEIs to enable them to support both academic and research activities in Pakistan.

Building the capacity of the faculty members of engineering universities in the use of the EDA tools is an important part of this project.

Table 20: Engineering Software Provided under Phase II	
A)	Structural Engineering
1.	SAP2000
2.	ETABS
3.	STAAD Pro.
4.	ANSYS
5.	DIANA
B)	Geo Technical Engineering.
6.	Geo-Studio
7.	Geoslope
8.	M Pile
9.	M Sheet
10.	Gwall
C)	Water Resource Engineering.
11.	Modflow
12.	HEC-RAS
13.	Fluent
14.	CROPWAT
15.	Surfer
D)	Transportation Engineering
16.	EMME 3
17.	DAR Win
18.	Trans CAD
19.	TSIS
20.	Kenslab
E)	Construction Management
21.	Primavera
22.	MS Project
F)	Overall Civil Engineering
23.	Mathematical

Table 21: EDA Tools
● FPGA Design Flow
● ASIC Design Flow
● Mixed-Signal / RF IC Design Flow
● PCB Design

Competitiveness Support Fund (CSF)

The HEC signed a Memorandum of Understanding in August 2006, with the CSF to support joint projects for the promotion of the knowledge-based enterprise sector to ensure long-term economic growth in Pakistan. The HEC/CSF joint initiatives complement the existing projects that USAID is supporting with the HEC.

Based on a jointly approved action plan a number of activities of the CSF and the HEC have already been implemented or are being implemented. These include research projects, information and trade fairs and the development of business incubators.

Collaborative Research Projects with CSF

The CSF/HEC scheme for promotion of relevant research is operated under stringent criteria. Projects are included if they have:

- high potential to generate investments, jobs, income and exports
- high potential to improve quality of products and services
- appropriate environmental, health and social impact
- participation of the "triple-helix" actors, specifically private sector involvement in financing 20% of the total project costs

Projects can range between US$20,000 to US$250,000. The CSF contributes 50 percent, the HEC 30 percent , and industry 20 percent.

As with all HEC programmes, a well defined and transparent procedure is laid down for the project submission, vetting and approval processes. Information about these processes is widely disseminated to ensure a level playing field.

CSF/HEC Sponsored Informative Workshops

A series of interactive workshops listed in Table 22, on promoting private sector involvement in the commercialization of

Table 22: CSF/HEC Sponsored Informative Workshops

		Number of Participants				
City	Date	Academia	Industry	Media	Govt	Total
Lahore	02/12/2006	84	46	18	5	153
Karachi	09/01/2007	52	78	5	8	143
Islamabad	31/01/2007	73	45	20	10	148
Peshawar	12/02/2007	48	55	12	5	90
Total		257	224	55	28	534

research projects in universities and research institutions of Pakistan have been conducted with the active participation of the academia, government and industry representatives. These workshops helped establish the basis for a "triple-helix" of industry, academia and government collaboration on the projects. The participation in these workshops has been wide ranging. The purpose of the workshops was two fold:

1. Help businessmen, academics and researchers to exploit the potential of applied research for innovation and identify areas of mutual interest. The workshops encouraged researchers to link with chambers of commerce, private sector associations and other business consortiums.
2. Introduce the details of HEC and CSF joint cooperation, including the financial criteria, application forms and approval criterion.

Pursuing the same objectives, CSF/HEC have agreed to undertake two other complimentary activities:

- The HEC and CSF will hold trade fairs in Islamabad and Karachi to promote academia-based research projects with knowledge-based commercial potential to private industry.
- Jointly develop a business incubator project to promote this concept for business development in Pakistan.

Strengthening of Universities and Institutions of Higher Learning in New and Emerging Technologies

The objective of the HEC to strengthen HEIs in new and emerging technologies focuses on two strands: 1) the emergence of technology from basic research to implementation, and 2) the commercial-isation of technology for lead markets. These are the two stages where uncertainty and risk are greatest, traditional business practices are most likely to fail, and new or different practices are required.

When a technology moves from basic research to the testing and implementation phase, there are often many competing modalities. For example, we can see this in the Telecommunications sector, where new digital content may be delivered through high-speed phone technology, fibre optic cable or wireless satellite communications, while other dominant technologies are still to be determined.

The second major transition point occurs when technologies move from the testing and implementation phase to the commercialization phase. Commercialization is generally defined as the point at which one or more lead markets embrace an emerging technology. The point at which a technology moves from implementation to commercialization often involves competing applications.

Table 23: New Disciplines and Cutting-edge Technologies

	New Disciplines	Universities
1.	Proteomics	University of Karachi
2.	Genomics	Center of Excellence in Molecular Biology, University of Punjab, Lahore
3.	Bioinformatics	- Quaid-i-Azam University, Islamabad, - COMSATS
4.	Space Science & Avionics	NUST, Air University
5.	Nanotechnology	- Quaid-i-Azam University, Islamabad - PIEAS
6.	Automotive Engineering	UET Taxila
7.	Earthquake Engineering	NWFP UET, Peshawar
8.	Mechatronics	- NWFP UET, Peshawar - UET Lahore
9.	Poultry & Dairy	University of Veterinary & Animal Sciences, Lahore
10.	Industrial & Manufacturing Engineering	NED University of Engineering & Technology, Karachi
11.	Range Management	University of Arid Agriculture, Rawalpindi
12.	Film & Television	NCA Lahore
13.	Bio Medics	MUET Jamshoro
14.	Bio Ethics	University of Karachi

Table 24: New Technology Centres

Centre	Institutions where Centre is Established	Cost (Rs. million)
National Centre of Nanotechnology	Pakistan Institute of Engineering & Applied Sciences (PIEAS), Islamabad	60.73
Bio-Organic Chemistry Laboratory	School of Biological Sciences, University of the Punjab, Lahore	60.16
Research and Development Facility for Exotic Cut Flowers and Value Added Products	HEJ Research Institute of Chemistry, University of Karachi	31.556

The HEC understands the importance of adopting emerging technologies to upgrade existing practices. HEC's new and emerging technologies programme, therefore, focuses on a number of key objectives:

- providing research-based insight and guidance to firms competing in emerging technologies
- identifying (and developing) new best practices and competitive strategies, to replace traditional practices that no longer apply to emerging technology-based industries
- reporting the results to corporate and academic communities
- including the results in classroom curricula, to be shared with faculty and students in undergraduate, graduate and executive management education

During the last five years, 25 new disciplines were introduced to meet the market demand and projected future needs of Pakistan. The new disciplines and cutting-edge technologies along with the sponsor institutions are shown in Table 23.

New Technology Centres

An umbrella project was started in October 2004, with a capital cost of Rs. 153.447 Million to set up Centres of Excellence. Under this project, three major Centres of Excellence have been established (Table 24).

Senior Expert Services (SES) from Germany

The HEC through the Government of Pakistan approached the German government to avail short term advisory services of senior experts from the "Honorary Service of the German Economy for International Cooperation GmbH". This service comprises more than 6,000 highly qualified and senior experts who work on an honorary basis in numerous branches of German industry and education.

The services range from management of HEIs, development of curricula and study courses, capacity building of faculty and

administrative staff, library management, laboratory up-gradation and management to the building of research infrastructure and capacity.

This project was started in 2005, and 27 German experts have already completed their assignments in different universities of Pakistan.

The Current Range of University-industry Linkages

The HEC's interventions for building university-industry linkages have already started to show results. There are a wide range of joint university-industry projects underway. The first technology incubator has been set up at a local university. A number of patents have been filed by academics from public sector universities.

Joint University-Industry Projects

Several projects prepared by universities in collaboration with local industry have been approved and funded under the UITSP. The main projects are listed in Table 25. These illustrate the range of areas in which academic research has been integrated with the industrial and commercial needs of the country.

Table 25: Joint University-industry Projects Funded under UITSP

Project Name	University	Industry
Development of Baby Cum School Children Food of High Nutrient Density and Diabetic Meal; Improved Edible Protein Film Packaging.	HEJ, University of Karachi	National Foods, Karachi
Development of Light Weight 3-Wheeler 4-Stroke Slim Car/Rickshaw (Prototype) utilizing Composite Material.	EME College, NUST	Aedesign Pvt Ltd, Lahore
Design and Development of Super Energy Saving Light for Urban, Rural and Industrial Application using Super Bright LEDs.	EME College, NUST	SPEAR Technologies
Re-Evaluation and Standardization of Selected Herbal Products for Exports.	Kohat University of Science and Technology	Qarshi Industries, Haripur
Solar Hybrid Water Heating System for Industrial Application	NUST Rawalpindi.	FW Fabrication (Pvt) Ltd. Lahore.
Design and Prototyping of an Electronically Controlled CVT (Continuously Variable Transmission).	EME College, NUST	Aedesign Pvt Ltd, Lahore
Indigenous Development of CNG Car Kit.	NUST Technology Incubation Centre, Islamabad	SPEL (Synthetic Products Enterprises Ltd.), Lahore.
Prevalence and Control of Pathological Conditions causing Skin Damage and consequently Reducing Market Value in Domestic Ruminants of Punjab	Department of Pathology, University of Veteranary and Animal Sciences, Lahore	Royal Leather Industry, Lahore
Mil-STD-1553 FPGA based Remote Terminal/ Bus Controler - Bus Monitor	NUST Institute of Information Technology, Rawalpindi.	Section Electronics, NEXTEK Services, 133, Street 65, F-11/4, Islamabad
Systematic Studies of Oil Yielding Plants and their Applications as Bio-Diesel Resources in Pakistan.	Quaid-i-Azam University, Islamabad	Clean Power (Pvt.) Islamabad
Kinnoo Quality Improvement for Export to Global Market. Faisalabad	University of Agriculture, Association of Pakistan.	Kinnoo Processors & Exporters
An Innovative Approach to Recycle Egg Laying Breeder	University of Agriculture, Faisalabad	Progressive Poultry Farmer with Environment Controlled Housing Facilities
Microbial Production of Lysine and its Use in Poultry Feed.	Quaid-i-Azam University, Islamabad	Feed and Breeding Farms, Rawalpindi
Design and Development of Electric Motor Cycle and 3-Wheeler Electric Mini Car	National University of Science and Technology	M/S Energen Pakistan, Energen Energy Generation 216 S.I.T.E Karachi

Other Projects of Relevance to National Economy Sponsored by the HEC

The HEC, understanding the importance of university-industry linkages sponsored 149 additional projects in collaboration with local industry which have relevance to the national economy and regional needs. These projects will help spurt economic growth. A list of 149 such projects is attached at Annex 10.

Technology Incubators

NUST is the first university of Pakistan to set up a Technology Incubation Centre (TIC) which provides a forum for Industry-Academia linkages to convert the Research and Development activities of academia into marketable products and to provide technology based services needed by local industry and commerce. The TIC is working to facilitate technology based start-up companies and transforming them into commercially viable enterprises.

Patent Filing

The HEC has developed an online patent filing system through which research ideas, published papers, thesis synopses and research materials that describe potential inventions, are evaluated for patentability. In case patentability is determined, the inventor is encouraged to file for an international patent. The researchers/ inventors/ scientists can monitor the progress of the evaluation process as well as the recommendations of experts on the internet. More than 150 inventions are in the process of evaluation in order to determine their

Table 26: Patents Issued to University, Faculty and Students

Inventor	Institution	Title of Invention	Place	Year
Prof. Viqar ud Din Ahmad	HEJ Research Institute of Chemistry, University of Karachi	Novel Alpha Glucosidase Activator Pulicarside 1	United States Patent and Trademark Office	2006
Prof. Viqar ud Din Ahmad	HEJ Research Institute of Chemistry, University of Karachi	New Treatment of Diabetes Mellitus	United States Patent and Trademark Office	2006
Dr. Nuzhat Ahmad	Centre of Molecular Genetics, University of Karachi	Antibiotic Bushrin	United States Patent and Trademark Office	2007
Mohammad Ahmad Mesaik	HEJ Research Institute of Chemistry	Use of Coagulin-H or Derivatives Thereof as Immunosuppressive Agents	United States Patent and Trademark Office	2007
Prof. Dr. Atta-ur-Rahman	HEJ Research Institute of Chemistry	New Tyrosine Inhibitors	United States Patent and Trademark Office	Jan, 2008
Prof. Dr. Atta-ur-Rahman	HEJ Research Institute of Chemistry	New Alpha-Glucosidase Inhibitors from Hydroxylation of Tibolone	United States Patent and Trademark Office	Jan, 2008
Dr. Rubina Farooq	Department of Environmental Sciences, CIIT, Abbotabad, NWFP.	Novel Sono-Electrolysis for Metal Removal	United States Patent and Trademark Office	Dec, 2007
Prof. Dr. M. Iqbal Choudhary	HEJ Research Institute of Chemistry	Novel Natural Antioxidants from Lichens	United States Patent and Trademark Office	Jan, 2008
Muhammad Jawwad Saif	University of the Punjab, Lahore	Aqueous Water and Oil Repellent Composition	United States Patent and Trademark Office	May,2008

patentability. An amount equivalent to US$ 5000/- is provided by the HEC to file these inventions in the US patent office.

To date 10 international patents have already been filed and a number are pending in various stages of the process. The patents that have already been filed are listed in Table 26.

4

Promoting Excellence in Research

Enhance the capacity of higher education institutions to carry out cutting-edge research in all areas of Science and Engineering, Humanities, Social Sciences, Economics and Finance.

Accelerator Laboratory at GCU, Lahore

Concept

Research is essential to the acquisition of new knowledge. A dynamic, world-class research sector is not only vital for a nation's academic health but is crucial for its economic, technical and social well-being. Research, and learning and teaching based on it, is at the heart of higher education. The perceptions of the stature of higher education institutions globally are based on the quality of their research output. Research that responds to new trends and developments in established and emerging fields of enquiry is the foundation of all knowledge.

The objective of the HEC is, therefore, to build a higher education system in Pakistan that provides a world class learning experience and research environment that is capable of holding its own in the comity of nations.

Establishing the competitiveness of the

Objectives of the HEC Strategy to Promote Excellence in Research

- The HEC aims at cultivating a dynamic research sector capable of responding to the changing global environment.
- Develop the enabling environment for a strong national system of research.
- Foster national and international collaboration.
- Provide a quality assurance framework.
- Provide the incentives that encourage excellence.
- Promote activities that enhance the quality of learning and teaching through research and its dissemination.

research base in the global context implies that we must create and nurture the requisite enabling environment, recognize and support truly excellent research, and foster effective collaboration nationally and internationally to strengthen it. Researchers, capable of responding to a changing world and exploring new frontiers, must be motivated to undertake cutting-edge research in areas that have relevance to Pakistan's economic and social health. Incentives must enable, nurture and reward outstanding research, thereby creating a "research culture" that is responsive to the changing needs.

The absence of a research culture in our institutions of higher learning was evident when the HEC was conceived. The HEC quickly put in place a strategy to address this shortcoming and build and nurture a research culture that ensured quality, competitiveness and relevance.

In addition to building and strengthening the physical infrastructure for cutting edge research the HEC put in place a national research programme for universities, built and strengthened international collaboration and provided a set of incentives to enhance its quality.

The strategic emphasis of the HEC has been focused on building a culture for scholarly authorship to ensure the quality of its output and the enhancement of its dissemination.

The continuing development of learning and teaching, under the auspices of the HEC, has been predicated on the simultaneous promotion and enhancement of quality research and on moving the entire edifice to a higher internationally competitive level where the former is increasingly based on the latter.

This is extremely important in view of the primary aim of the HEC to make the higher education system of Pakistan relevant to the country's current and future needs. The emphasis on focus area development through technology programmes is meant to support industrial growth and enhance the quality of life in Pakistan.

The direct relevance to Pakistan's economic development can only be ensured through quality research in key areas such as Engineering and IT, Pharmaceuticals, Agriculture, and Veterinary Sciences. The support of university-industry linkages by the HEC is also designed to strengthen this relevance. HEC's support of basic sciences in key institutions of higher education is

designed to build the base for present and future research and the development of advanced cutting edge technologies with the potential to build the future knowledge economy of Pakistan in these areas.

HEC is cognizant of the fact that maintaining research quality requires support in terms of funding and the provision of access to international resources that are generally outside the reach of the individual researcher.

The HEC has put in place several programmes to support its strategic objectives in promoting quality cutting edge research of direct relevance to Pakistan.

Strengthening Research

The HEC has focused on strengthening research through the building up of indigenous research programmes, strengthening institutional collaborations and building up the incentives framework for research. A major contribution that has brought about an enormous improvement in the quality and quantity of research is the setting up of the HEC Digital Library. The HEC has also focused considerable attention and resources on the building up of a culture of scholarly authorship to support its objectives in the area of promoting excellence in research.

Indigenous Research Programmes

These research programmes have included the National Research Programme for Universities, the Pakistan Organization of Collaborative Research, the Pakistan

A student carrying out high quality research

MSc students preparing samples using Metkon Polishing Machine in Materials testing laboratory

HEC's Support of Research Programmes

- strengthens quality research
- rewards world class quality
- encourages effective collaboration
- provides the capacity for developing and extending research capability in new areas of work
- fully reflects both the economic and social benefits of research
- responds to changes in the research environment and in the demands made on researchers
- enhances skill levels and working conditions for researchers and research students
- ensures transparency in the review process and all awards.

Research Repository and the Social Sciences and Humanities Research Council.

The National Research Programme for Universities (NRPU)

The National Research Programme for Universities (NRPU) is a mega recurring grant programme designed for faculty members and researchers who need modest financial support for research projects. The programme targets the strengthening of indigenous capacity and the reduction of the exodus of talent from the country. The research grant programme provides support for research in all disciplines and has also been extended to (see box) 15 private sector universities in addition to all the public sector universities.

Private Sector Universities funded under NRPU

1. The Aga Khan University, Karachi
2. Ghulam Ishaq Khan Institute, Topi
3. LUMS, Lahore
4. Riphah University, Islamabad
5. Foundation University, Islamabad
6. Institute of Business & Technology, Karachi
7. National University of Computer & Emerging Sciences, Islamabad
8. National Textile University, Faisalabad
9. Indus Institute of Higher Education, Karachi
10. University of Lahore, Lahore
11. Institute of Business Management, Karachi
12. Ziauddin University, Karachi
13. University of Management and Technology, Lahore
14. University of Faisalabad, Faisalabad
15. Dadabhoy Institute of Higher Education, Karachi

The HEC, after peer review and scrutiny, awards research grants of Rs one to six million. The grants are put at the disposal of the Principal Investigators (PI's), but administered by the University within approved rules and regulations. However, if the proposed research budget exceeds Rs. 6 million, the potential Impact Factor of the research output is brought into consideration to decide the award. Thus, depending upon the Impact Factor, a maximum of upto Rs. 15 million may be awarded. The duration of a research grant is from one to three years. An overhead of two percent of the total cost of the research grant is provided to the host institution to meet administrative and other expenses connected with the research.

Year-wise details of projects received and approved under this scheme are shown in Table 13.

Table 13: Financial Year-wise Status of NRPU (2002-03 to 2007-08) (Rs. million)

Years	Received Projects	Approved Projects	Rejected Projects	Annual Allocation	Expenditure Amount	Projects Carried Forward Next F.Y.
2002-03	319	34	18		14.89	267
2003-04	138	58	169	100	57.56	178
2004-05	191	74	108	90	90.6	188
2005-06	218	128	155	*200	**301.61	123
2006-07	284	196	94	445	449.659	117
2007-08	227	154	79	350	327	111

Note:
1.* Budget was Rs. 200 million plus balance of Rs. 43.44 million of the FY 2003-04 (carry forward amount)
2.** Amount released during the financial year represents the funds transferred to universities and contains amount of 1st, 2nd & 3rd installments released during this period. It also includes the amount released under FFHP, UITSP and honorarium for Focal Persons & Reviewers.

Mechanism of Funding

HEC has devised strict criteria for approving grants for research projects under the NRPU which ensures transparency in all awards.

XRD-A Central Facility

The main considerations are:

- Research grants are awarded on competitive merit for high-level and promising scientific research projects to be carried out in Pakistan by university teachers. The purpose of these grants is to promote scientific research in areas relevant to national needs.
- The applicant (PI) should be a faculty member of a university. He/she should have an advanced academic degree and relevant research experience.
- HEC has designated Focal Points in all disciplines / sub disciplines. They are the leading experts in their fields. All research grant proposals are forwarded to these Focal Points to be evaluated by at least three experts. Focal Points carry out the initial screening of the projects sent to them by HEC. In case they do not consider a project suitable for funding, they can reject the proposal at their level or send it back to HEC for revision by PI, if need be.
- The comments of focal points and reviewers are considered as the final decision in the case.

Figure 24 shows that out of a total 1,377 projects received, 644 were approved and 111 are under process. The rejection rate is quite high (45 percent) indicating the stringent quality control on the award of these projects. Figure 25 shows the discipline-wise grants for research awarded under NRPU.

Figure 26 shows that out of the total of 664 projects awarded, 53 (or about eight percent) have been completed and 591 (or nearly 92 percent) are ongoing.

Pakistan Organization of Collaborative Research

The Pakistan Organization of Collaborative Research (POCR) project was designed to

Figure 24: Overall Status of NRPU - January 2003 to June 2008

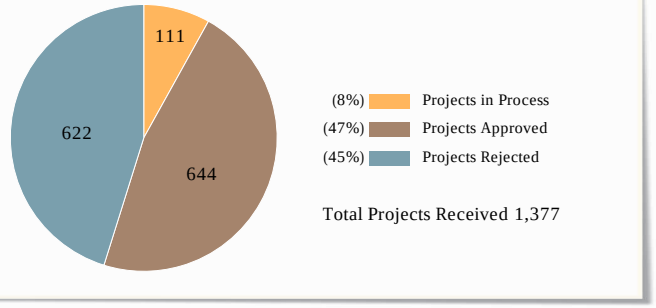


Figure 25: Discipline-wise Research Grant Under NRPU

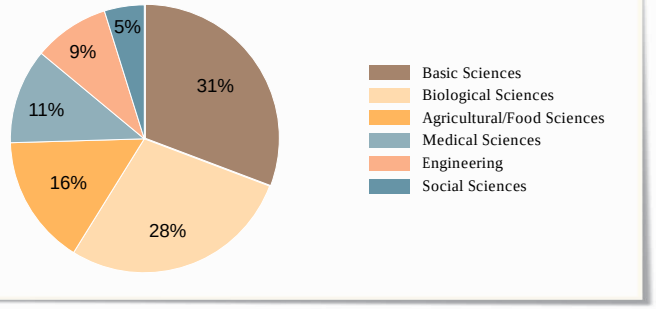
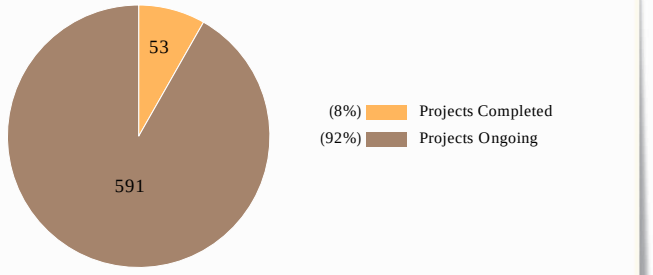


Figure 26: Completed Research Projects of NRPU



provide a one-window facility through which Pakistani researchers can collaborate with their counterpart researchers and organizations anywhere in the world to enhance R&D activities in public sector universities/ DAI's.

The objective of the POCR is to promote quality academic research in all disciplines by initiating collaboration between faculty members abroad and those in Pakistan. This collaboration will strengthen the indigenous capacity in academic research and will, in general, raise the overall standard of teaching and research.

A total of 28 International Research Grants have been awarded. Additionally, 71 cases have been approved and funded for exchange of visits of both local faculty members to foreign universities and foreign experts to Pakistani universities.

The project ended in April 2008. However, keeping in view the importance of the project and its objectives, the competent authorities decided to continue this programme as a permanent part of HEC. The project has now been included in the Recurring Budget of HEC and an amount of Rs. five million has been allocated for FY 2008-09.

Social Sciences and Humanities Research Council

The Social Sciences and Humanities Research Council (SSHRC) has been established to create a permanent forum to look into the affairs of the Social Sciences and Humanities sectors and to ensure constant and timely development. The SSHRC is providing funding for the holding of conferences, the establishment of linkages with foreign universities and the funding of research programmes. So far, Rs. 7.32 million have been provided to convene these conferences.

Funding has also been awarded for the setting up of 18 foreign and five domestic linkages and 20 research projects. A total amount of Rs. four million has been released for various research projects through the Council.

International Collaborations

International Research Support Initiative Programme (IRSIP)

In order to ensure that the standard of doctoral studies carried out in Pakistan are at par with those from any international institution of repute, the HEC is offering six-month research fellowships abroad to full-time PhD students enrolled in Pakistan. This serves to enhance their research capabilities as well as to build linkages with the foreign universities. Under the programme, 357 scholars had been selected by August 2007; of these 212 have availed the facility and proceeded abroad and 56 have already completed their research and returned. Table 14 shows that the research papers published in international journals under the IRSIP increased by 71.8 percent. The cumulative increase of local and foreign publications combined is 61.7 percent.

HEC-British Council Higher Education Links Programme

As a result of the collaboration between the HEC and the British Council, a links programme between Pakistani and British universities was established in 2004. The purpose of the programme is to enhance the research and training capacity of HEIs, improve teaching methodologies and management systems and develop course curriculum and faculty. These links were created with a focus on science-related disciplines. Subjects include Engineering, Pharmaceuticals, Biotechnology, Information Technology, Agriculture, Health Sciences, Social Sciences and Management Sciences. These links have been established between departments rather than individuals or institutions.

In Phase I (July 2004-July 2007) of the project, 15 public sector universities established links with their counter parts in the United Kingdom. Phase II of the project covers the period from July 2006 to June 2009. Private universities have also joined the Phase II programme. In this phase, an additional 35 links have been planned with various institutions of higher learning in the United Kingdom.

Core Objectives of the Link Programme

- Development of the research and training capacity of the HEIs in Pakistan
- Improved teaching methodologies
- Improved management systems within the departments
- Course and curriculum development
- Faculty development

Table 14: Achievements of IRSIP Scholars

Particulars	Before Award	After Award	%age Increased
Accumulative international research papers published	39	67	71.8
Accumulative local research papers published	21	30	42.9
Total	60	97	61.7

Dr. Atta-ur-Rahman, Chairman HEC and Ms. Sue Beaumont, Director British Council Pakistan signed a Memorandum of Understanding to launch the second phase of 'Higher Education Links with British Universities' which would see establishment of 35 linkages between Pakistani universities and departments of universities in the United Kingdom.

Details of the links established in Phase I and Phase II are given in Annex 5.

Linkages with Other Foreign Universities

This project envisions creating academic linkages between Pakistani higher learning institutions and foreign universities to provide opportunities to the academia of both for the sharing of knowledge. The scope of the project includes:

- Provision of training opportunities to scholars through study and research abroad. This includes joint/split PhD programmes of three years at a local university and one year at the collaborating university abroad
- Joint research projects with foreign institutions
- Mutual visits by academia to share expertise and knowledge

Academic linkages between 25 Pakistani and foreign universities have already been established. Details of these linkages are tabulated in Annex 6.

Pak-US Joint Academic and Research Programme

This programme has been designed in collaboration with USAID and the Ministry of Science and Technology (MoST)under which eligible proposals submitted jointly by one Pakistani and one American institution can compete for project funding. In the first phase, 11 proposals have been approved; of which eight will be funded jointly by HEC and USAID and the other three will be funded by the MoST and USAID. In the second and third phase, nine and 14 projects have been approved respectively. These will be funded by the HEC and USAID. Details of Phase I, II and III projects are given in Annex 7.

Pakistan Given "Rising Star" Status

The leading international publishing house, Thomson Reuters, in its publication "Science Watch" has recognized the efforts of the Higher Education Commission by rating Pakistan as a "Rising Star" in several fields of science and engineering. The five fields in which Pakistan has achieved the highest increase in total citations in the world are Computer Science, Engineering, Materials Science, Mathematics, and Plant and Animal Science.

It is the first time in history that Pakistan has been given "Rising Star" status in so many different fields and this is directly attributable to the efforts of HEC in the last six years.

The HEC in a short period of six years, has sent over 2500 scholars for Ph.D. level studies to leading universities in the USA and Europe, tripled university enrolments, brought about a 400 percent increase in research output, launched a Digital Library which provides free access to 45,000 textbooks and research monographs and 23,000 international journals and introduced a four year undergraduate system.

These and other such achievements have been termed as "spectacular" in a recent USAID report and applauded in a World Bank report as well as by the world's top science journal Nature in an editorial published on August 28, 2008.

Incentives for Research

Apart from providing the necessary structure and wherewithal for fostering quality research in Pakistan, the HEC also provides incentives to research scholars to undertake quality research work. The following incentives were offered to scholars undertaking research:

Travel Grants to Teachers / MPhil & PhD Students

With the aim of boosting research activities, this project awards travel grants to teachers and students whose work has received acceptance as an "oral presentation" in a peer reviewed international conference. Poster presentations are also eligible depending upon the potential Impact Factor Score. The programme provides researchers international exposure and encourages interaction with leading experts. The scheme also provides:

- Airfare to scholars proceeding abroad to join an accredited foreign university for PhD studies
- Airfare to faculty members of public sector universities proceeding abroad

for post-doctoral studies of at least nine month duration

- Travel grants to faculty members of public sector universities on their nomination, against any facility under a Cultural/Exchange Programme.

Details of these travel grants and number of cases funded are summarized in Table 15 and Figure 27.

Grants for Organizing Seminars/ Conferences/ Workshops etc.

Under this scheme, partial support is provided to public sector universities and DAI's to organize seminars, conferences, workshops etc., with the aim of encouraging academic interaction, sharing of knowledge and new research, and to give faculty the opportunity to gain international exposure. Discipline-wise distribution of grants for organizing seminars and conferences is shown in Table 16. During the period 2003-2008, a sum of Rs. 136.234 million was sanctioned to organize 399 such events as shown in Table 17.

HEC Outstanding Research Award Series

Under this programme, achievements of Pakistani scholars in their respective fields of specialization are acknowledged through a series of annual cash awards. These awards range from Rs. 50,000 to Rs. 500,000 as shown in Table 18.

HEC Digital Library

The National Digital Library (NDL) Programme launched in 2003 is one of the

Table 15: Travel Grants to Teachers and PhD Students

Year	Grants (Rs. million)
2003-04	4.257
2004-05	8.474
2005-06	33.051
2006-07	72.835
2007-08	128.85
Total	247.467

Figure 27: Travel Grants-Number of Cases Funded

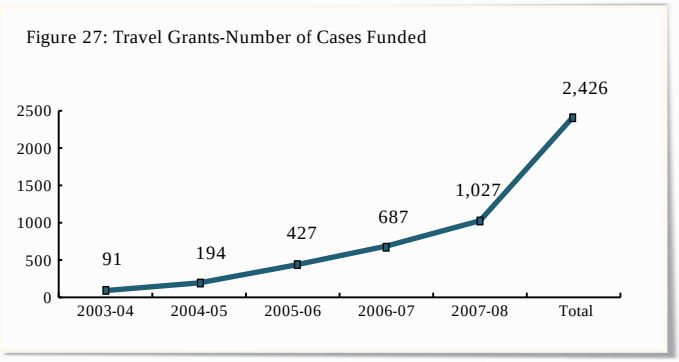


Table 16: Grants to Organize Seminars & Conferences Discipline-wise

Discipline	No. of Cases Funded	Grants Rs. million)
Engineering	39	13.804
Pharmacy	2	0.633
Biotechnology	16	4.764
IT & Telecommuncation	34	14.212
Basic Sciences	194	67.880
Social Sciences	40	13.289
Agriculture	26	9.267
Business Administration	26	6.749
Environmental Sciences	22	5.634
Total	399	136.234

Table 17: Grants to Organize Seminars and Conferences Year-wise

Year	No. of Cases Funded	Grants (Rs. million)
2004-05	13	3.038
2005-06	91	23.113
2006-07	145	53.609
2007-08	150	56.473
Total	399	136.234

major achievements of the HEC. This programme provides students, faculty and researchers with access to international scholarly literature based on electronic (online) delivery. The facility is a part of the HEC strategy to address the information needs of researchers and students in institutions across Pakistan. It provides access to high calibre peer-reviewed journals, databases, books and articles in a variety of disciplines. The great promise of the NDL is the potential it affords for human interaction with other students and researchers from around the globe.

Table 18: HEC Outstanding Research Award - Series (2002-08)

Award Category	Award Amount(Rs.)	No. of Awards/Year
Best Research Paper	50,000	20
Best Young Research Scholar	100,000	4
Best Innovator	150,000	1
Best Book Publication	300,000	4
Lifetime Academic Achievement Award	500,000	4

NIT Wins US$ 85,000 Research Grant

The National Institute of Transportation (NIT), Islamabad a constituent Institute of NUST, has been awarded a collaborative research grant for the "Development of Guidelines for Asphalt Pavement Recycling in Pakistan", a project jointly submitted by NIT and Michigan State University (MSU), USA.

Dr. Tayyeb Akram, Dean NIT and Professor Dr. Gibert Baladi, MSU are the joint Principal Investigators. The proposal was evaluated by the National Academy of Science USA, while the project is jointly sponsored by Pakistan (the HEC/MoST) and USAID. The project duration is three years, having commenced from January 2006.

The promising approach of roadway recovery/recycling involves the usage of existing roadway materials. The development of indigenous guidelines for recycling asphalt pavements will help in improving the conditions of the existing highway infrastructure at much lesser cost and will, therefore, have immense environmental and economic impact.

ASEAN Young Investigator Award

Dr. Ali Khan Khuwaja, Assistant Professor, Family Medicine and Community Health Sciences, Agha Khan University (AKU) conducted a multi-centre, clinic-based research study to estimate the proportion of long-term complications and its associated factors among people with type 2 diabetes and to assess the quality of care provided to them in different clinical settings in Karachi. He was awarded the Young Investigator Award for the year 2004-2005 for his work entitled 'Metabolic syndrome and its association with ischemic heart disease in patients with type 2 diabetes mellitus'.

This award is made by the ASEAN countries' Federation of Endocrine Societies. This year, 145 research papers were submitted from all over the world including United States, Europe, Asia Pacific region and South Asia.

Khawarizmi International Award

Prof. Muhammad Iqbal Choudhary, Acting Director of the International Centre for Chemical Sciences, HEJ Research Institute of Chemistry and the Dr. Panjwani Centre for Molecular Medicine and Drug Research, University of Karachi, has been awarded the prestigious Khawarizmi International Award 2006 by the President of Islamic Republic of Iran. He was selected for this award by a panel of reviewers from out of 800 nominations received from 49 countries. As part of the award he received a Gold Medal, a Shield, Certificate, and cash award of US$ 800.

The research work of Dr. Choudhary has also resulted in a number of important scientific discoveries including the discovery of plant materials with pronounced anti-diabetic, anti-epileptic and cholesterol-lowering activities. Over 800 new natural products including steroids, tri-terpenoids, alkaloids, fiavones, etc. have been isolated from a variety of medicinal plants, sea algae, marine invertebrates and microorganisms by his research group. Many of the structurally novel compounds isolated by his research group were found to have interesting pharmacological profiles and are in different stages of efficacy trials.

The NDL is accessible through approximately 290 institutions. Access to the information resources is exclusively restricted to institutions recognized by the HEC i.e. public universities, private institutions, R&D organizations, and non-profit organizations where the primary focus is either on education or on research.

Features of the National Digital Library (NDL)

Electronic database

Member institutions can access the NDL through various electronic databases. The number of full-text journals available has grown to over 23,000. These cover multiple areas such as:

- Subject specific and multi disciplinary resources
- Medicine, social sciences and humanities
- Scholarly database for reference searching

Electronic Books

(http://www.digitallibrary.edu.pk.books.html)

To complement its collection of e-journals, the NDL has also acquired access to the following e-book collections:

- McGraw Hill collection
- Elibrary platform
- Oxford University Press e-books

Together these three platforms provide approximately 50,000 e-books to institutions across Pakistan.

British Library Document Supply Centre

The HEC Digital Library, through an understanding with the British Library, has been providing the requisite articles, which are not available in its e-resources. Until early 2008, these requisite documents were being supplied in print format which usually took approximately two weeks to be delivered. Since March 2008, the NDL initiated the electronic delivery of these documents from the British Library. The delivery time has been reduced to 1-2 days. This arrangement helps provide access to documents from a database of over 20,000 key research journals, in addition to over 16,000 conferences each year.

Open Access Resources

Besides the subscribed e-journals and e-books, some quality resources are available through Open Access. The NDL is constantly updating the available documents and adding these to the Open Access resources on its website.

NDL Training

The NDL also conducts training programmes across Pakistan on the optimum utilization of e-resources. Initially, the training was focused on e-journals. However, since 2007, training programmes on e-books have also been initiated. NDL resource persons visit universities and institutions to conduct these training sessions. The NDL also plans to launch specialized workshops based on different subjects. The first such workshop will be on Chemistry where a renowned researcher will conduct a 3-4 day workshop for selected final-year students in the MS programme. The Digital Library also plans to invite known publishers to Pakistan to conduct simultaneous training sessions based on their products. A large audience is expected to benefit from this opportunity.

Other Digital Links

Other links include the Pakistan Research Repository, IEEE Computer Society, C&EN for ACS Members, Scientific Search Engines, Free Medical Journals, EBSCO Information Services, and SciDev.Net.

Pakistan Research Repository

The Pakistan Research Repository (PRR) was established to promote the international visibility of research originating from Pakistan and to be in line with global initiatives which promote open access to scientific literature. The aim of this service is to maintain a digital archive of the intellectual output of Pakistani institutions and provide a single-entry access point to view this research, and to distribute it as widely as possible. Currently, 1,917 theses published in Pakistani universities have been uploaded on to the repository.

Building the Culture of Authorship

Scholarly authorship was not a strong element of the academic culture of Pakistan.

The HEC has focused considerable attention on building this culture in Pakistan through several schemes.

Monograph and Textbook Writing Scheme

The tradition of authorship in the scientific and technical disciplines in Pakistan is particularly deficient. This has resulted in a serious shortage of good quality indigenously produced textbooks and other supporting materials. Imported books are often beyond the purchasing power of local teachers and students.

The Monograph and Textbook Writing Scheme (2003-09) was approved at a cost of Rs. 35.312 million to develop an authorship cadre in Pakistan through the development of 138 books (78 textbooks and 60 monographs) in the specialized and curriculum oriented topics. The Scheme aims to reduce the shortage of quality textual and support materials and build a cadre of recognized authors.

The specific objectives of the Scheme are as follows:

- make available low-cost textbooks to students and teachers
- develop authorship cadre in the universities and post-graduate colleges
- develop monographs in core subjects, along side special topics and areas, for the purpose of providing depth and variety to a subject
- develop textbooks in the specified areas of subjects of the curriculum
- produce at least 60 (36 Master level and 24 Bachelor level) monographs on selected topics of the curricula in six years
- produce at least 78 textbooks on the specified areas of curriculum related subjects in six years

The Scheme has the following features:

Confidence Building of Authors

The Scheme has provided authors with a vehicle for reasonable reward and exposure and a platform for showcasing the quality of their work and skills. The blind review process has added a litmus test for boosting the quality of the output and the confidence of local academia.

Broadening the Authorship Cadre

The scheme has helped to broaden the cohort of technical authors. Senior professors, junior lecturers, researchers, PhD scholars and HEC Foreign Faculty Members have all shown interest in writing under this scheme.

Blind Review Process

In line with its policy, the identity of both the authors and reviewers is kept strictly secret so as to avoid any bias during the review process.

HEC Monographs/Books/Web-Display

A Book House Programme has recently been launched on HEC's main e-portal. Monographs and textbooks can be viewed with their brief descriptions along with the contents, abstract and author's information.

A limited preview of the books, a user discussion forum, an author's discussion forum, and online requests for purchasing of books etc are also provided. These books are displayed on the web at:

http://publications.hec.gov.pk/

HEC Monographs and Text Books

Promotion of Pakistani Languages in Higher Education

To promote Pakistani languages, the Scheme has also accepted book proposals in different regional/local languages such as Sindhi, Balochi, Brahavi and Pushto. Table 19 lists some Journals/Text Books and Mongraphs published by HEC.

Research Publications

The success of the strategies adopted by HEC for the improvement of research in Pakistan can be benchmarked against the research output which has emanated from the institutes of higher learning in the last six years (2002-2008).

A comparison of research output before and after the HEC shows that, in the five years prior to its inception, 3,260 articles were published. During the six-year after its inception a total of 10,824 articles have been published in leading academic journals (Figure 28).

This more than 300 percent increase in a period of six years is a good indicator of quantitative performance. However, this achievement is even more remarkable in light of the fact that the post HEC publications are all in peer reviewed and HEC recognized and approved journals. There is thus remarkable progress in terms of both the quantity as well as the quality of the research output under the HEC.

A list of the top 25 research institutions of Pakistan during 2005-07 is given in Annex 8. The main fields of research are listed in Annex 9.

Figure 28: Total Number of Research Publications

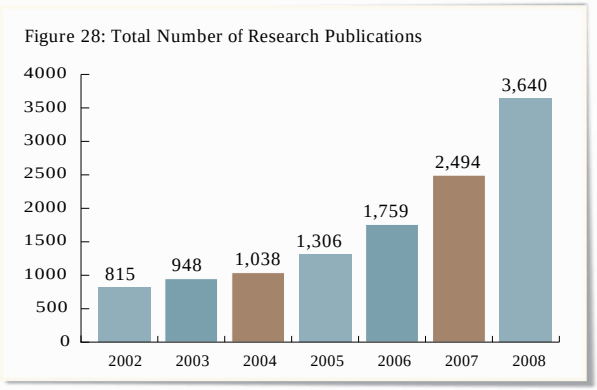


Table 19: Pakistani Languages Journals, Textbooks and Monograph of Recognized / Published by HEC

HEC Recognized Journals	Language	HEC Approved Books/Monographs	Language
Pushto Quarterly (Peshawar University)	Pushto	Kahieen Balochi Shairee: Bangeeg-aou-Daimeruee	Balochi
'Danesh' (Iran-Pakistan Institute of Persian Studies)		Sindhi Nasar Je Kin Sinfen Jo Ibhayas	Sindhi
'Safeenah' (Persian Dept. Punjab Univesity)	Persian	Brahavi Poskna Shairee (Road-ue-Shundaree)	Brahavi
'Khoj' (Punjabi Deptt. Punjab University	Punjabi	Urdu Nasri Adab Main Tanz-o-Mizzah Ki Riwayat-Aur-Fun	
'Karachi' (Shah Abdul Latif Chair, Karachi University)	Sindhi	Jamiaat Main Urdu Taheeq	Urdu
Brahavi (Brahavi Deptt. Balochistan University, Quetta) (Funding provided by HEC)	Brahavi	Ramozay Oqaf, Tahreer ka Hussan	
		Urdu Aadab Key Afsanvi Asloob	
		Allama Iqbal Key Asattaza	

HEC Scholar Wins 'Best Paper' Award in Switzerland

Mr. Rashid Jalal Qureshi has won the award of "Best Paper" in the recently held ninth International Francophone Conference on Document Image Analysis (CIFED) at Fribourg, Switzerland. Mr. Qureshi is doing a PhD under the HEC's scholarship programme in France.

Of 48 research papers submitted by world renowned researchers, Mr. Qureshi's research article was declared the most outstanding. The reviewers were impressed by the novel idea presented by Mr. Qureshi and during the Conference they suggested that he classify his method of graph matching as a new category due to having hybrid positive features of other categories.

UAF Professor Declared Best Agricultural Scientist

The Third World Academy of Sciences has declared Prof. Dr. Muhammad Arshad, Director, Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, the 'Best Agricultural Scientist' for the year 2007. This was revealed during the 18th general meeting of the Academy held on November 12, in Italy. This unique prize, which consists of a cheque of US$ 10,000 and a personalized plaque, will be presented to him at a special ceremony to be held in Mexico next year. Dr. Arshad is the first Pakistani scientist to be decorated with the prestigious award of the Academy. Earlier, he was honoured with 'Tamgha-e-Imtiaz 'in 2005 and awarded Best Performance Shield by the President of Pakistan on the eve of the Centennial Celebrations of UAF.

Dr. Riazuddin, QAU, Elected Fellow of American Physics Society

Prof. Dr. Riazuddin, Director General of the National Centre of Physics, Quaid-i-Azam University, Islamabad has been elected as a fellow of the American Physics Society (APS).

According to the APS citation, Prof. Riazuddin was elected a fellow for "Original and Outstanding Contributions to Theory and Phenomenology of Strong and Electroweak Interactions, especially where an interplay of such interactions is involved and for internationalization of Physics in developing countries".

In 1966, Prof. Riazuddin established the Institute of Physics at the newly created University of Islamabad (now known as Quaid-i-Azam University). The Institute soon established itself internationally by the quality and quantity of its research work.

Future Transformation

The need for excellence in higher education which reverberates in our corridors has to be paid heed to. In the initial years of the existence of HEC, paucity of research activities was the hallmark of higher education in Pakistan. Out of the scanty budget allocated to education, there was hardly any amount devoted for infrastructure development, libraries, equipment, or supplies which are the key ingredients of research establishment.

The HEC adopted a proactive policy to noose the existing gaps in the higher education of the country. The Research & Development Division of HEC launched a number of endeavours to foster a viable and a sustainable research culture at national level across the board for every area of study – Science & Technology, Social Sciences, and Humanities. This has been possible through efficient utilization of the existing meager sources, allocation of more funding for capacity building of the human resource and the development of research infrastructure. The researchers and scholars were provided with opportunities to share research at the national and international forums. Through collaborative research and faculty exchange programmes, universities have been furthered to cultivate linkages with international universities, by identifying and working jointly in areas of mutual interest.

Now that the HEC has traveled a few strides in the right direction, there is all the more requirement for channelizing its energies.

- There is a need to be proactive in approach so as to utilize the influx of scholars being trained indigenously and abroad by providing them the right environment and resources.
- A thematic approach is to be devised for identification of priority research areas in the field of Science, Engineering, Technology, Medicine, and Humanities. These should be reflective of the coherent national policy and pursued with a definitive approach.
- Prevailing research evaluation/ assessment mechanism has to be refined, and based, as far as possible, on quantitative measures. This however, needs to be configured through consultation with research institutions and industry.
- There is a need to develop a culture of entrepreneurship, especially by establishing interdisciplinary, hybrid research incubators, technology parks, and centres of excellence; in consultation with academia and industry. This would not only guide our research, but also facilitate the production and absorption of quality resource into the industry.

The HEC is aware of the national responsibility and stands committed to move ahead with a sure pace. A national perpetual education policy, coupled with a futuristic vision can endorse the commitment.

3

Improving Access to Higher Education

To maximize opportunities for acquisition of quality higher education for the 17 to 23 years old age group in Pakistan.

Students at work in a computer laboratory

Concept

Only qualified and skilled human capital can lay the foundations of a prosperous and peaceful Pakistan as envisaged by the Quaid-i-Azam.

The HEC is focused on improving access to quality higher education as a key element of its strategy to bring about a higher education revolution in the country.

Improved access to quality higher education can ensure that the country reaps the benefits from globalization and increased productivity in the domestic production processes. Such productivity gains also result in a more equitable distribution of incomes thereby addressing the inherent inequities of the system. Increasing access to higher education also results in enormous social benefits through the development of a tolerant and inclusive society, crime control, civic responsibility and environmental awareness.

While the benefits are enormous, the

Objectives of HEC strategy to Improve Equitable Access to Higher Education

- to significantly increase enrolment in undergraduate and postgraduate degree programmes
- to provide opportunities for higher education to talented students regardless of gender or socio-economic background
- to support quality distance education
- to introduce new areas of teaching and research in universities in response to market demands and projection of the future needs of Pakistan
- to provide institutions with the necessary infrastructure to absorb an increased student population
- to provide on-campus residential opportunities to students so that deserving students are not deprived access to quality higher education

challenges are huge also. The Task Force on Higher Education (2002) highlighted the poor state of the inadequate access to higher education in Pakistan; "The total number of students in Pakistan's higher education system, in 2002, was 475,000, equivalent to a higher education enrolment ratio of 2.6 percent of the total youth aged between 17-23 years. Of this meagre number, only 135,000 (less than 0.8 percent) attended universities." This low participation of the youth in higher education put Pakistan amongst the worst performing countries in the world. India had an enrolment ratio of 10 percent, several times that of Pakistan in that year. The ratio for South Korea for that year (2002) was 68 percent. The HEC, therefore, was mandated to improve access to higher education and ensure that all youth with potential, irrespective of their socio-economic backgrounds, were provided equal opportunity to higher learning.

The HEC looked at access to higher education not just as a numbers game, but as a crucial socio-economic means of development and prosperity. This access had to be widened on geographical, social and gender basis to ensure equitable and rapid development of the country. Because of this policy focus of the HEC, more students from geographically backward areas and from the lower rungs of the social hierarchy have entered the higher education system in Pakistan than ever before.

Today, talented students from remote regions of Sindh, Balochistan and Azad Kashmir, and from all social classes, who probably had never ventured beyond their closest town can be found studying not only at the best HEIs universities of the country but also at the top universities of the world such as Harvard, Oxford, MIT etc.

The MTDF ensures that the disadvantaged and the neglected social groups are provided equitable opportunities by offering a level playing field and ample financial resources. In the search for cost-effective methods to increase the coverage of higher education in Pakistan, the HEC has devoted considerable attention to expanding the distance learning programmes of the Virtual

University of Pakistan and the Allama Iqbal Open University (AIOU). This has enabled access to higher education opportunities to increasingly growing numbers of students from remote inaccessible areas of the country at fairly reduced costs.

To increase access to higher education and to improve enrolment, the MTDF focuses on capacity building and financial assistance in a variety of forms as the key strategies. In its multi-pronged approach the HEC focuses on a range of capacity building and financial assistance programmes to achieve its objectives.

The issues of equity in the provision of higher education were addressed through grant of a large number of scholarships to the talented students. The HEC has managed to provide financial assistance to the needy students with the help of the donor agencies (namely USAID and JICA; and from its own resources) and is also endeavouring to launch a major educational loans scheme to provide further opportunities for higher education to less privileged but talented students. To provide residential facilities to the students of rural and distant areas, the HEC is providing adequate funds to the universities for construction of hostels at their campuses.

Physical Capacity Building

The ever-increasing population and a growing realization of the importance of higher education put enormous pressure on the higher education system to establish new HEIs and strengthen the existing ones to accommodate as many students as possible. The MTDF envisaged increasing the enrolment rate in higher education from 0.8 percent in 2002-03 to 10 percent in the shortest possible time.

The HEC undertook a number of initiatives to facilitate access to quality higher education, particularly, in the remote areas of the country. A systematic process of setting up new universities and seats of higher learning, especially, in the neglected regions of the country was one of the major initiatives taken in this direction. Mega projects were also developed and financed by the HEC to build capacity in the existing HEIs to sustain a greater number of students. The public sector universities were encouraged to set up their sub-campuses in the disadvantaged areas of the country to augment access to higher education in the those regions.

Increased Number of Universities and DAIs

The HEC, at its advent, inherited a higher education system with inadequate infrastructure to cater for the higher education needs of a population of 170 million people. The system, before the inception of the HEC, could only afford to set up 59 HEIs in the country during the 55 years of its history. The HEC through its sound planning and pragmatic implementation has increased that number to 124 in a period of only six years. This represents a more than 100 percent increase. The data in Figure 15 highlights this amazing metamorphosis.

Mega Projects for Expansion of Universities

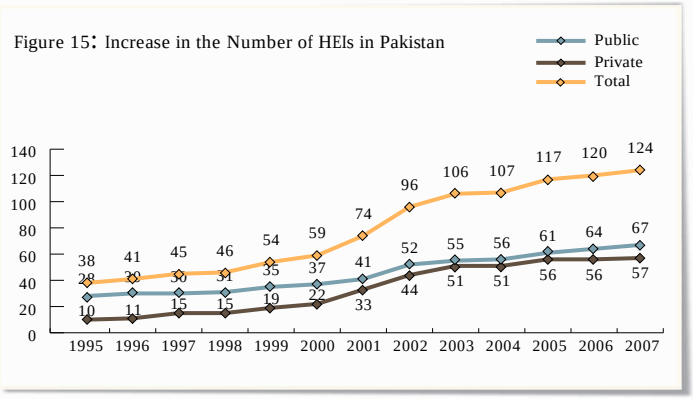
One of the major reasons for low enrolment

New campuses of Public Sector Universities

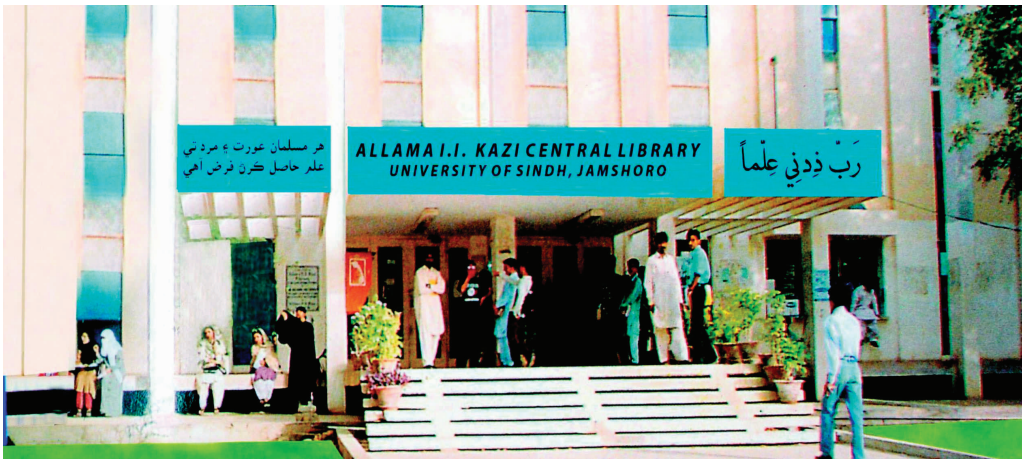
1. Gujranwala Campus of University of the Punjab, Punjab
2. Faisalabad Campus of University of Engineering & Technology, Lahore
3. Kala Shah Kako Campus of University of Engineering and Technology, Lahore
4. D.G Khan Campus of Bahauddin Zakariya University, Multan
5. Sahiwal Campus of Bahauddin Zakariya University, Multan
6. Chakwal Campus of University of Engineering & Technology, Taxila
7. Sahiwal Campus of COMSATS Institute of Information Technology, Islamabad
8. Attock Campus of COMSATS Institute of Information Technology, Islamabad
9. D.G. Khan Campus of University of Agriculture, Faisalabad
10. Dipalpur Campus of University of Agriculture, Faisalabad
11. Rahim Yar Khan Campus of Islamia University, Bahawalpur
12. Bahawal Nagar Campus of Islamia University, Bahawalpur
13. Jhang Campus of Lahore College for Women University, Lahore
14. Okara Campus of University of Education, Lahore
15. Shringal Campus of University of Malakand, Dir
16. Abbottabad Campus of NWFP University of Engineering & Technology, Peshawar
17. Mardan Campus of NWFP University of Engineering & Technology, Peshawar
18. Bannu Campus of NWFP University of Engineering & Technology, Peshawar

in HEIs was the inadequate attention paid to the expansion and upgradation of the infrastructure facilities. The HEC encouraged not only bringing the teaching environment at par with the international norms of higher education but also expanding these facilities to accommodate the increasing number of students envisaged in the strategic thrust to improve access to higher education. Adequate funds were provided to the HEIs for upgrading and expanding the teaching facilities to internationally acceptable norms. Proposals on mega projects and upgrading plans from the public sector HEIs were invited, evaluated and duly funded on the basis of the feasibility of these plans.

Figure 15: Increase in the Number of HEIs in Pakistan



A number of new campuses of public sector universities have also been opened in towns away from the main campuses to facilitate access of the students from the more remote regions (see box above).



View of Allama I. I. Kazi Central Library

Enhancing Equitable Access through Distance Education

The inadequacy of facilities and infrastructure to cater to the higher education needs of a society of 170 million members was evident from the fact that there were only 59 HEIs in 2002. A highly cost-effective and efficient intervention, was the promotion of Distance Learning. This strategy made access possible for a vast segment of the eligible population at very little cost. Moreover, it enabled quality higher education at very low cost to be provided at the doorstep of students in geographically remote areas and socially disadvantaged segments such as girls who could not travel away from their homes. The HEC is establishing Directorates of Distance Education in six public sector universities to ensure that the distance students could enjoy a learning experience compatible to the regular students and could also compete with them in academics and employment. This is also enabling the universities to expand enrolment


Virtual Biggest Broadcast Centre


Broadcast in process - Virtual University

through taking on an increasing number of private students.

The pilot phase of the project includes establishment of Directorates of Distance Education on at:

1. University of the Punjab, Lahore
2. Bahauddin Zakariya University, Multan
3. University of Peshawar, Peshawar
4. University of Karachi, Karachi
5. University of Sindh, Jamshoro
6. University of Balochistan, Quetta

Number of Students Enrolled in Distance Education Programmes

The HEC very correctly identified the potential of improving access to higher education through distance education initiatives in Pakistan. Enrolment in distance education programmes have shown an incredible increase of 623 percent during the 2002-08 period. The number of students in distance learning programmes was 89,749 in 2001-02. By 2007-08 this number had risen to 559,289.

Incentives to the Private Sector

Realising that the public sector HEIs alone could not cater to the huge demand for higher education in the country, the HEC also took effective measures to motivate the private sector to play its part in addressing this shortfall.

Private universities that meet the Cabinet Criteria for establishment of universities, which are not for profit and implement a policy of "need based" admission for all students are eligible to receive financial support from the Government in the following manner:

- 100 percent support for research growth
- 50 percent matching support for the Digital Library Programme
- 50 percent matching support for Internet Bandwidth through Pakistan Education & Research Network
- 50 percent matching support for Foreign Faculty Hiring Programme

The HEC extended financial and strategic support to the private sector HEIs. The best ('W') category private sector HEIs based on the HEC's grading of universities were allocated 50 percent of the total cost of their expansion projects. The private HEI faculty were encouraged to benefit from some of the faculty development projects of the HEC. Most of the financial support schemes for students were extended to both private and public sector universities. And the private sector was encouraged and facilitated to set up new HEIs across the country so that access to higher education could be maximised.

Improving Equitable Access through Financial Sponsorship

Due to the high cost of higher education the vast majority of financially disadvantaged youth remained deprived of higher education facilities. The HEC, therefore, encouraged enrolment in higher education through a variety of financial incentive schemes for students. These schemes

The Journey of IBA Sukkur

- Sukkur IBA started its journey in 1994 working in two hired rooms of Public School Sukkur. Within 5 years (November, 2000), Sukkur IBA was shifted to its own campus.
- IBA's academic block covers a spacious area of 21,000 sq feet, constructed at a cost of Rs. 15.928 million sanctioned by the Ministry of Education, Government of Pakistan in 1998-99. Phase II of the project costing Rs. 39.0 million was approved by the HEC in 2003-2004.
- From 1994-2005, Sukkur IBA was academically affiliated to IBA Karachi. In April 2006 it was granted charter by Sindh Government on Model Act of HEC as a public sector degree awarding institute.
- Sukkur IBA possesses state-of-art teaching equipment and facilities. It also has highly qualified and competent faculty.
- About 1,000 students are studying at Sukkur IBA in various programmes, of whom 40 percent are girls, mainly from the rural areas.
- Sukkur IBA is not only producing employable graduates whose acceptance level in the job market is high, but it is also promoting knowledge-based economic development of this region.

The Story of Muhammad Tahir

Muhammad Tahir was born to parents of a humble origin in Shehr Sultan - a remote, inaccessible village in Jatoi Tehsil of Muzaffargarh District.

After matriculation, Tahir studied in Government Degree College, Alipur, entailing a daily commute of 46 kilometers. He completed his BSc in 1999, ranking first in the College and winning a scholarship for higher studies. Tahir completed his MPhil degree in Physics at QAU in 2004.

Tahir then took up a position of Lecturer at the University of Sargodha. He was awarded a scholarship by the HEC for a foreign PhD programme at Imperial College London under the supervision of Prof. Angus Mackinnon. Tahir went on to publish seven articles in the American Physics Society Journal. This is a prime example of how, with continued support, guidance and perseverance, one can achieve the near impossible.

The scholarship programme of Higher Education Commission is benefiting people across the country and as a result students from the lower-middle class and from far-flung areas get a chance to study in the top class universities of the world.

The programme awards local and foreign scholarship to students and faculty members. Presently 2,500 scholars are studying abroad in countries such as America, England, Germany, Austria and France.

Herbarium Techniques Demonstration at Shah Abdul Latif University, Khairpur

included both need-based and merit-based programmes to support the disadvantaged and the talented youth respectively.

All the HEC financial support programmes were designed to ensure equity and were based on transparent procedures which guaranteed that merit would prevail. The Government of Pakistan earmarked substantial funds for this effort. The HEC also managed to attract sponsorships from major international donor agencies.

Need-based scholarships are particularly important for developing countries like Pakistan where large segments of society cannot afford the full cost of higher education. The HEC offered comprehensive financial assistance packages under its need-based programmes which covered the costs for:

- Tuition Fees
- Lodging
- Transportation
- Books
- Incidental costs

The fundamental objectives of these need based programmes are to:

i. enable the academically qualified yet financially deserving and needy Pakistani students to continue university studies
ii. provide financial support for the students whose families cannot afford the cost of higher education
iii. patronize talented students by providing financial incentives
iv. design and develop award processes to ensure transparent, fair and unbiased selection

Transparent Evaluation Processes for Award of Scholarships

A transparent and impartial selection process was adopted by the HEC to select the most deserving candidates for all the Need-based Scholarship Programmes. The HEC set up the Institutional Scholarship Award Committee to scrutinize the data and supporting documents of all the potential

candidates for the Scholarship Management Committee (SMC). After a thorough review, the SMC, finally, approves the scholarships for the most deserving students.

Financial Support for Meritorious Needy Students at the Graduate Level

The Meritorious Need-based Scholarship Programme was launched to sponsor graduate level studies of the talented but needy students for higher education in the top public/private HEIs.

This HEC funded programme offered 300 scholarships to Pakistani students enrolled in the Life Sciences discipline at the top public/private HEIs of Pakistan. Twelve Pakistani HEIs offering graduate level courses in Bio-technology, Bio-medics, Pharmacy, Pathology and Genetics etc, were selected for the execution of this programme. The awardees of these scholarships were needy students from financially weak families who were able to secure admission in the approved discipline.

Commenting on USAID funded Need based Scholarships a selected candidate Ms. Nisha Kumari from IBA, Sukkur said that

"Imagine a girl from the interior of Sindh, not ready to give up before the so called cultural taboos never allowing a female to go beyond the four walls of the house. I successfully faced all odds but there grew cash trouble and there was no one who could finance my expenses. I was left with no choice but to pack up for my home.
How strange, I am a business graduate now from one of the most prestigious institution of Sindh- Sukkur IBA. Thanks to USAID, who made it possible for me—THANK YOU, USAID"

Converting Challenges into Advantages through Higher Education

Awais Ali S/O Khadim Hussain studied at the Institute of Management Science, Peshawar. His father was working as a receptionist in a photo developing shop while he was doing a part time reception job in Askari Medical Laboratory. Their total monthly income was Rs. 5000/-. He is currently working as Finance Manager in a Dubai based firm at a salary of 3000 Dhm pm. He was awarded a Merit and Need-based Scholarship allowing him to complete his studies.

After successful completion of his course Mr Awais, an awardee of Merit and Need-based Scholarship Programme working at his office.

Seven Young Scholars attend 57th Meeting of Nobel Laureates

Seven young scholars were selected on merit from all over the country to attend the 57th Meeting of Nobel Laureates (19th Meeting in Medicine/Physiology) from July 1-6, 2007, under the Programme for Interaction of Young Pakistani Scholars with Nobel Laureates in Lindau Germany.

Eight to ten Pakistani students and young researchers, sponsored by HEC and Pakistan Atomic Energy Commission have been participating in Lindau Annual Meetings regularly since 2003. During their stay, they meet and discuss their scientific pursuits with Nobel Prize Winners as well as more than 500 fellow participants from over 40 countries.

The process for the selection of candidates started in January 2007. Apart from the announcements in the media, all the Vice Chancellors as well as Chairmen/Heads of Department of relevant universities/institutions/medical centres were requested to nominate their best graduates for this highly competitive award. After scrutiny in the light of prescribed criteria, 25 candidates were short-listed out of 122 applicants. The interviews were held at Pakistan Science Foundation, Islamabad. Apart from the regular members of the organizers/selection committee, subject specialists in the field of medicine/physiology were also invited for thorough evaluation. Finally, seven candidates were selected by the German Lindau Council.

The selected scholars for the year 2007 are Fozia Fatima, Ayub Teaching Hospital, Abbottabad; Junaid Ashraf, KRL Hospital, Islamabad; Lubna Siddiq, CMH, Rawalpindi; Pashtoon Murtaza Kasi, Aga Khan University, Karachi; Syed Hammad Hassan, AFID., Rawalpindi; Talha Vaqar, Aga Khan University, Karachi; and Waqas Tariq Qureshi, Rawalpindi Medical College, Rawalpindi.

Japanese Need-based Scholarship Programme

This financial assistance programme was initiated by the HEC in collaboration with the Japanese Government to open the avenues of higher education for 1500 Pakistani needy students undertaking studies at the HEIs across the country. The Japanese Need-based Scholarship Programme provided financial assistance to 1150 deserving students in the following six disciplines:

1. Agriculture and Natural Sciences
2. Business Administration
3. IT & Telecommunication
4. Engineering
5. Social Sciences
6. Basic Sciences

US Need-based Merit Scholarships for Students Enrolled in Agriculture & Business Administration Study Programmes

This Need-based Scholarship Scheme was initiated in collaboration with the United States Agency for International Development (USAID). The HEC signed an agreement for US$ 7.33 million in July 2004 with the USAID to fund 1000 scholarships in the field of Agriculture and Business Administration at the undergraduate and postgraduate level. Out of these 1000 scholarships, 530 scholarships were reserved for the meritorious needy students in the field of Agriculture. In the field of Business Administration, 240 undergraduates and 230 postgraduate students undertaking studies at the leading Pakistani public and private HEIs were awarded scholarships. This number also included 32 students from the earthquake affected areas.

Talent Farming Scheme

The aim of this exclusively meritorious scholarship scheme was to award financial support to the talented BSc and MSc students studying in the field of basic science. Under this HEC funded financial assistance programme, more than 783 brilliant students were sponsored to pursue their studies at public sector HEIs in Pakistan. Out of 783 scholarships, 383 were awarded to BSc students and 400 to MSc students during the last six years.

Fee Exemption for Students of Earthquake Affected Areas

The earthquake of October 2005 was a major natural disaster for Pakistan. Several districts in the Northern Areas and in Azad Kashmir were totally devastated. The HEC, in order to provide higher education access to the students from these devastated areas earmarked Rs. 158.67 million to 47 public sector HEIs. This amount was meant to provide scholarships to 20,215 students from the earthquake affected areas.

Book Bank Scheme

In addition to the direct financial assistance to students the HEC has also provided support to make books more accessible. The Book Bank Scheme was launched by the HEC, in collaboration with the Government, at a cost of Rs. 39.914 million in 2002. The National Book Foundation

was assigned the job of supplying textbooks of various disciplines to universities, DAIs and colleges. The lists of textbooks finalized by the experts in the relevant fields were provided to the National Book Foundation for publishing and distributing to the HEIs. The HEIs, then, issued these books to the students on loan for a specific period. This scheme helped in reducing the associative cost of higher education.

Book Bank Scheme Phase III was approved by the CDWP at a revised cost of Rs. 148.780 million for a period of two years. The envisaged aim of the project was to provide 234,000 copies of text books for the departmental libraries of 52 universities and DAIs. Till December 2008, 160,680 books have been provided to 52 universities and DAIs under this scheme.

Support to Scientific Talent Scheme

The project was approved by the CDWP in 1995 at the capital cost of Rs. 120.02 million. The aim of the project is to give Subsistence Allowance to the unemployed 1st class MSc, MPhil and PhD degree holders from recognized universities. During the last six years 2,838 unemployed MSc, MPhil graduates were granted subsistence allowance at the given rates, (MSc Rs.1,200 p.m., MPhil Rs.1,800 p.m., PhD Rs. 2,400 p.m.)

Enrolment at a Glance

Enrolment levels in higher education are the most obvious indicator of improved access to higher education. The HEC's efforts to improve access to higher education have borne fruit. As a result of the different initiatives taken by the HEC overall enrolment, in the HEIs, increased 2.34 times (135,123 to 316,278) excluding distance education during the period from 2002 to 2008. Figure16 shows the year-wise increase in higher education enrolment between 2002 and 2008.

The data on total enrolments by type of HEI during 2007-08 is presented in Table 11. These data show the large share of student enrolment in distance learning programmes. Within the mainstream universities, a larger proportion of students are enrolled in general universities, while a relatively smaller proportion of students are enrolled in the medical, engineering and agriculture universities.

Table 11: Total Enrolment by Type of HEI 2007-08

	Total Enrolment of Students		Enrolment of MPhil & PhD Students			
	Number	% of Total	MPhil	PhD	Number MPhil & PhD	% of Total
General Universities	220,733	25.2	7,504	4,121	11,625	63.8
Agriculture Universities	27,881	3.2	1,087	1,302	2,389	13.1
Engineering Universities	30,766	3.5	154	227	381	2.1
Medical Universities	11,924	1.4	116	630	746	4.1
DAIs	18,588	2.1	700	130	830	4.6
Other Institutes	4,107	0.5	486	242	728	4
Centres	2,015	0.2	514	277	791	4.3
AIOU & VU	559,289	63.9	673	58	731	4
Grand Total	875,303	100	11,234	6,987	18,221	100

Number of Students at Different Levels of Study (2002-08)

During the last six years (2002-08), enrolment in higher education has grown by 168 percent implying an average annual growth rate of 17.9 percent. Enrolment of students improved at all levels of higher education; however, the most significant growth occurred at the Bachelor's level. Figure 17 shows the relative enrolment in higher education at the Bachelor's, Master's and 'All' levels.

The annual picture of higher education enrolment at the MPhil, PhD and PGD level is presented in Figure 18. The rising trend of enrolment at all these levels during 2002-08 reflects the effectiveness of the strategies out-lined in the MTDF. Over this period, MPhil enrolment grew constantly and remained much higher than PGD and PhD levels. The rate of growth of PhDs, which had increased rapidly between 2002-03 and 2003-04, tapered off in the following three years, but began to grow rapidly again between 2006-07 and 2007-08. The slack in the intervening three years reflected the catching up as universities made the adjustments necessary to cater to the demands of PhD studies.

Figure 16: Enrolment in Universities 2001 -02 to 2007-08
Excluding Distance Education

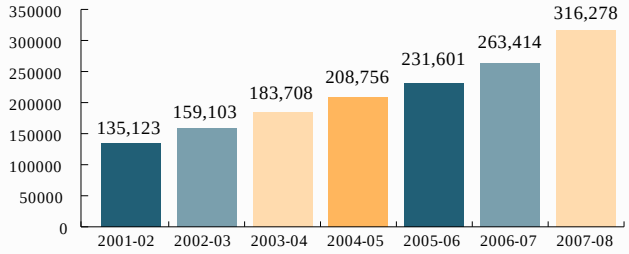


Figure 17: Number of Students in Masters, Bachelors Levels of Study

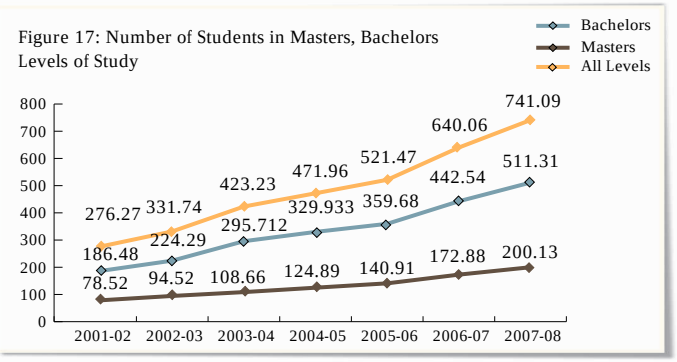
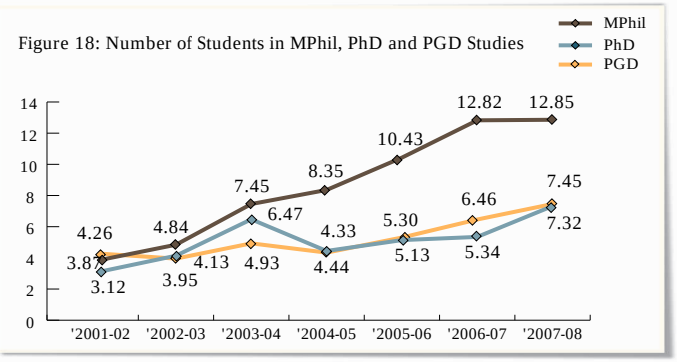


Figure 18: Number of Students in MPhil, PhD and PGD Studies



Gender-Wise Distribution of Enrolment

The HEC's implementation is based on the principles of collaborative national involvement and equitable opportunity. Special measures are taken to encourage greater female participation in the higher education system. The total number of HEIs devoted exclusively for women, have doubled from three to six (a 100 percent increase) during the last six years. Moreover, the HEC has also managed to significantly improve the participation of females in the general public and private HEIs of the country.

Lecture via Video conferencing in progress

To maximize the impact of higher education in Pakistan it is imperative to enhance the enrolment of women. The HEC made this the centre point of its strategy. The gender gap in higher education, so obvious when the HEC was created, has all but disappeared. Female participation in higher education has risen from 36.8 percent (2002) to 46.2 percent (2008). Figure 19 highlights this amazing trend. This is perhaps the most significant of all of HEC's remarkable achievements during the past six years.

Figure 19: Male Female Student Enrolment Percentage (2001-02 to 2007-08)

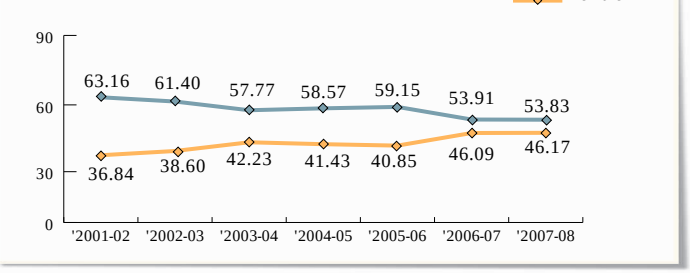
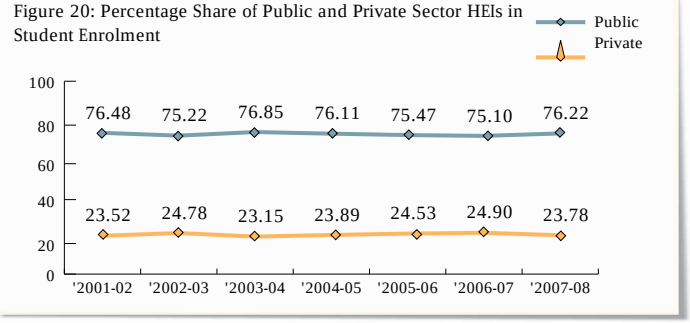


Figure 20: Percentage Share of Public and Private Sector HEIs in Student Enrolment



The Distribution of Enrolment between the Public and Private Sectors

Although 57 of the 124 HEIs in Pakistan are in the private sector, the share of students in private sector universities has remained more or less constant. The private sector caters to approximately a quarter of the total enrolment (excluding distance education), and this share has remained more or less the same over the past six years (Figure 20). Private universities tend to be smaller in terms of student numbers. Although they account for 46 percent of the number of universities they represent only 24 percent of the students. The bulk of the higher education in Pakistan continues to be provided by the public sector universities.

Summing up

There has been a remarkable increase in enrolments in higher education in Pakistan between 2002 and 2008. This has come about as a result of both the growth in the number and physical capacity of the HEIs facilitated by the HEC as well as the financial assistance support offered to students. It has come about also from the massive awareness that has resulted from the growth momentum generated by the vigorous pursuit of the HEC's mandate and the Governments wholehearted support of the expansion of the higher education sector.

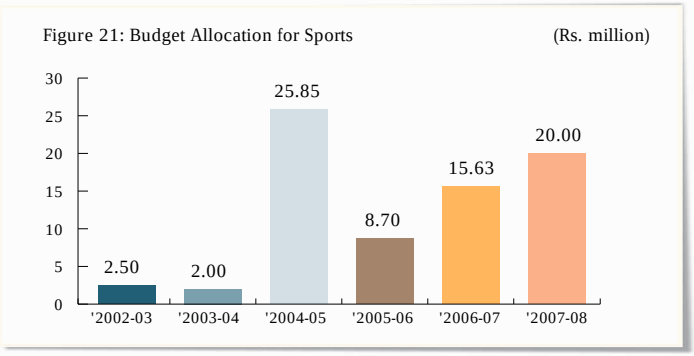
This improved access has also come in disadvantaged regions and within hitherto neglected segments of society. Most of the new institutions/campuses established during this period are in the remote and disadvantaged regions of the country and have focused their enrolment efforts on women and the less privileged. Financial assistance schemes that also contributed significantly to augmenting the rapid increase in enrolment in higher education were focused principally on the economically disadvantaged students. The efforts of the HEC also focused on reducing the associated cost of higher education. These efforts reflect the set of interventions undertaken by the HEC as part of its MTDF and represent its coordinated and holistic strategy for improving higher education across the country.

Sports

Sports activities are essential to improve the students' physical health, honing the mental abilities, build character and teamwork skills. The HEC promotes sports in all institutions of higher learning.

The HEC assists public sector HEIs in improving their existing sports facilities and developing new ones. The HEC also helps organize sports meets, sports galas and inter-varsity events to foster the sports culture in the HEIs. The sports budgets have been increased manifold. This can be seen in Figure 21.

Figure 21: Budget Allocation for Sports (Rs. million)



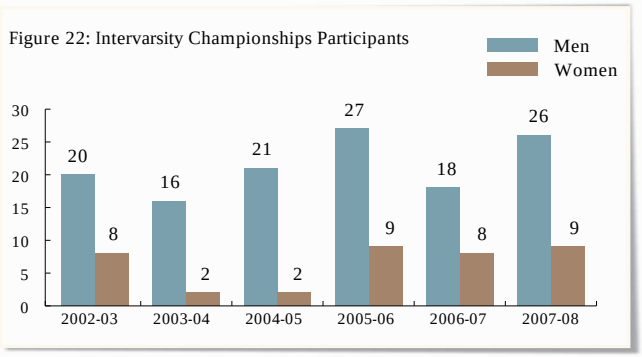
The HEC's sports programme is implemented through the universities. The universities organize inter-department/ affiliate college sports competitions for both men and women. From these they select teams for the intervarsity sports competitions. The intervarsity sports competitions are sponsored and coordinated by the HEC Sports Board. These events are the apex of all sports activities at the university level. Through these competitions, the HEC teams are selected for participation in national and international level competitions.

Sports Events Organized at Intervarsity Level

Intervarsity competitions are organized to provide opportunities for social contact and

understanding amongst all regional university students. As a result of HEC's encouragement, the overall participation of universities and the performance of participants have improved considerably. This can be seen in Figure 22.

Figure 22: Intervarsity Championships Participants



Sports Events Organized as Part of Pakistan University Games

Following the pattern of World University Games (Universiade) and Asian University Games (Asiade) Pakistan University Games were organized during 2003-04 and 2004-05. The Games proved very successful and a record number of universities participated.

Prize Award Ceremony Intervarsity Games

Sports Galas Organized at the Federal & Provincial level

Sports Galas were organized as recreational events to encourage students' sports activities. Events contested during the galas were Athletics, Football, Badminton, Shooting Ball, Table Tennis, Cricket, Volleyball, Tug of War and Basketball, etc. The main organizers were IIUI, PU, QAU, BUITMS, Mehran, Karachi, Balochistan and Sargodha Universities.

Sport Gala QAU 2006

Participation in National Sports Competitions

The HEC is affiliated with various national and international sports bodies including Pakistan Olympic Association and Pakistan Sports Board and the HEC sports teams participate regularly in national championships.

HEC Team Participating in Asiade

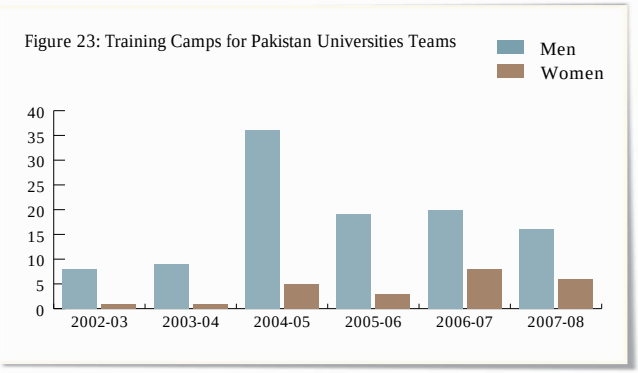
Participation in International Competitions

HEC teams have been participating in "Universiade" and "Asiade". A university student boxer won the Bronze Medal in the 1st World University Boxing Championship held in Turkey in 2004-05.

Training Camps for Pakistan Universities Teams

HEC organizes regular training camps for sports teams prior to their participation in national and international competitions. Figure 23 shows the number of training camps for men and women, organized by HEC.

Figure 23: Training Camps for Pakistan Universities Teams



Training Courses and Conferences

HEC has organized a number of training courses and conferences for both male and female sports officials through out the universities and degree colleges of the country.

Cash Awards and Scholarships

The HEC is encouraging student players to excel in sports along with their academic pursuits. As an incentive, cash awards and scholarships are being awarded to student players who win medals in these competitions. So far 180 student players and sports officials have been awarded cash prizes and scholarships.

Cash Award Ceremony GCU, Lahore, 2008

Development of Sports infrastructure

Funds were provided to eight universities during 2004-05 to develop their sports infrastructure facilities as given in Table 12.

A scheme titled "Promotion of Sports in the Universities of Pakistan" was launched in 2004-05 for the development of Sports infrastructure and uplift of sports activities in the universities.

Table 12: Sports Facilities Developed by HEC at Universities

University	Purpose
University of Vet. & Animal Sciences, Lahore	Hockey Ground
University of Karachi, Karachi	Hockey Ground
Gomal University, D.I. Khan	02 Volleyball courts
University of Malakand	Tractor & Accessories
MUET, Jamshoro	Hockey Ground
University of Balochistan, Quetta	Football Ground
B.Z University, Multan	02 Volleyball Courts
University of Arid Agriculture, Rawalpindi	02 Badminton Courts

University Fitness Centres

The HEC has provided funds to 25 universities during 2006-07 to establish Fitness Centres at their campuses.

A New Fitness Centre at a Women University

Provision of Sports Coaches

Fifty five sports coaches were hired during 2006-08 and provided to 23 universities to conduct training programmes for their teams, players and sports officials.

A training course for sports coaches conducted by HEC

2

Faculty Development

To enhance the quality of teaching and research support in HEIs through targeted programmes for improving the qualifications and pedagogical skills of faculty members.

Participants of 10th Faculty Professional Development Programme

Concept

In 2002-2003, less than 26 percent of the faculty at the HEIs in Pakistan held PhD degrees, of whom most were aging and exiting the system at retirement. This low percentage indicated a large shortfall in qualification of faculty. Adding to this plight was the absence of processes to enhance pedagogical skills of the faculty. The HEC immediately focused on the need to address both shortcomings through a combination of short and long term recruitment strategies, training in pedagogical skills and incentive schemes designed to enhance the professional and academic skills of faculty and ensure their retention in the system. Concerted efforts were initiated to enhance both faculty quality and faculty strength.

MTDF outlined a comprehensive and multidimensional faculty development programme that was designed to create strength and quality necessary in faculty to address needs of the higher education system of Pakistan. Implementation of the programme has formed the basis of the HEC's faculty development efforts.

Objectives of the HEC - Faculty Development Programme (FDP)

- Increase the percentage of faculty members holding PhD degrees
- Provide opportunities for the enhancement of qualifications of existing faculty members to PhD or equivalent
- Provide greater incentives to attract talented individuals to careers in higher education
- Provide training for faculty members on modern pedagogical skills and techniques

Three Pronged Strategy

The HEC followed a three pronged strategy for faculty development which included a combination of short term measures, long term measures and a host of cross cutting incentive schemes.

The combination of the short and long term measures was designed to kick start the process so that urgent needs would start to be met immediately while long term capacity was being built simultaneously to address the larger overall and strategic needs.

Existing faculty deficit was met through extended and short duration hiring of faculty from abroad. Since a significant number of current PhD faculty were due to retire in the coming few years, measures were introduced to re-hire/re-employ the more productive from amongst them. In addition, appointments of renowned researchers and scholars were made as Eminent Professors in universities across the country.

Domestic and foreign PhD scholarships were offered under special programmes to build faculty strength over the longer term. Relevant areas, where capacity to provide quality doctoral level education existed within the country, were strongly supported. In other areas, where capacity in Pakistan was found to be weak, foreign scholarships were offered to ensure that all the existing and emerging needs were addressed in a comprehensive manner.

Training programmes were also developed for faculty members to enhance their subject knowledge as well as their teaching, communication (including English language comprehension and expression skills), problem analysis, problem solving and IT skills. The National Academy for Higher Education (NAHE) works under Learning Innovation Department (LID) to train faculty in HEIs across the country to enhance basic competencies in teaching. The NAHE provides training for junior faculty at the level of Lecturers and Assistant Professors.

Faculty development was carefully monitored. Continuous assessment of the performance and effectiveness of the individual components of the Faculty Development Programme was made through third party evaluations. Different panels of experts, local as well as international, provided on-going critical review of the performance and processes set up for these programmes.

The different elements of the HEC's three pronged strategy for faculty development are described in greater detail below:

Three Sets of Faculty Development Measures

Short Term Measures	Long Term Measures	Incentive Schemes
i. Faculty Hiring Programme	i. Overseas Scholarships	i. Upward Revision of Pay Scales of the HEI Faculty
ii. Faculty Exchange Programmes	ii. Indigenous Scholarships	ii. Tenure Track System
iii. Visiting Scholar Programme	iii. PhD Fellowship Public Sector Universities	iii. Placement of Fresh PhDs at HEIs
iv. Faculty Professional and Pedagogical Skills Development Programmes under LID	iv. Post Doctoral Fellowships	iv. Distinguished National Professor Programme
		v. Best University Teacher Awards

Short Term Measures

Faculty Hiring Programmes

In line with its manifesto, the HEC introduced a variety of Faculty Hiring and Faculty Exchange Programmes in order to attract the best educationists from within the country and abroad to meet the shortage of qualified staff in the shortest possible time. These programmes not only helped to improve the ratio of PhD staff but also revitalized the teaching and research experience of the existing higher education faculty. Faculty hiring was pursued under:

- Foreign Faculty Hiring Programme (FFHP)
  – extended duration
  – short duration
- Hiring of Eminent Educationists and Researchers having PhD (Expansion Programme)
- Short-Term Teacher Exchange Programme (local)
- Visiting Scholars Programme

Foreign Faculty Hiring Programme

Foreign Faculty was hired through two programmes the Extended Duration Programme of hiring for one to five years and the Short Duration Programme of hiring for three to six months.

Extended Duration Foreign Faculty Hiring Programme

In addition to directly meeting part of the deficit for quality faculty the FFHP has also helped to meet the overall need indirectly through significant increase in the indigenous PhD output that has resulted from their supervision. The foreign faculty hired under the FFHP has put the local HEIs on the path to attaining self-sufficiency in qualified

manpower. This programme has proved to be a highly cost-effective element of the overall strategy to develop a strong PhD base in the HEIs of the country in the minimum possible time. It was envisaged that each hired foreign professor would be able to train 4-6 PhD scholars every year of his/her stay and the increasing output of local PhD scholars bears testimony to the success of this initiative.

Moreover, the foreign faculty professors brought to the Pakistani HEIs an international culture of research and pedagogy. The foreign faculty professors have helped to restructure their host departments in line with the international standards of higher education which was also one of the major objectives of the HEC reform agenda.

Under this programme, the candidates having a minimum of five years of post-doctoral international experience in a reputable academic and/or R&D institution were hired. The candidate for a FFHP position could be foreign nationals (other than India and Israel) or expatriate Pakistanis permanently settled abroad. The candidates were required to have at least two publications in an international refereed journal with Impact Factor during the last five years of their service. The programme was open to all disciplines. An attractive salary package and lodging facilities were offered. As many as 289 foreign professors have joined the Pakistani universities so far. Figure 1 shows the Extended Duration hiring of foreign faculty under FFHP for each year since the inception of this Programme in 2003-04.

Figure 2 shows that the largest number of foreign faculty members were hired in the fields of Natural Sciences and Mathematics. Placement of foreign faculty in public sector HEIs is given in Annex 1.

Figure 1: Extended Duration Foreign Faculty Hiring Year-wise

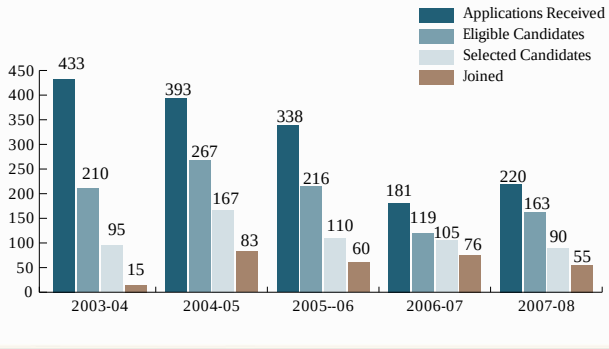
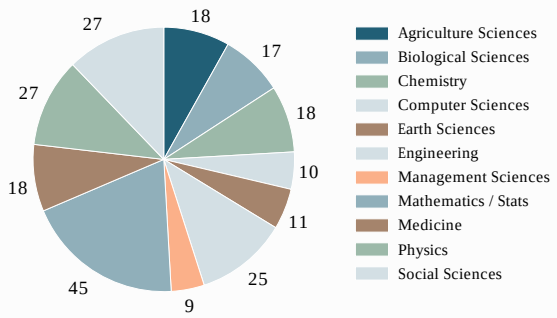


Figure 2: Distribution of Foreign Faculty Discipline-wise



Abdus Salam School of Mathematical Sciences - A Success Story

Introduction

People of our subcontinent have historically shown an innate ability in mathematics. For centuries they have made fundamental and far reaching contributions in this field. They were among the pioneers to introduce the decimal counting system in antiquity, thereby laying the key milestone for scientific discovery. Their contributions continued through the golden age into medieval times with significant developments spreading from Asia to the other continents.

The early years of the last century witnessed the prodigious talents of Ramanujan, a renowned mathematician, who surprised the English mathematical community with his insights. Then another genius emerged, the Nobel laureate Dr Abdus Salam. He stunned the world scientific community with his vision and versatility. Abdus Salam served as a professor of mathematics at Government College, Lahore. He received the Nobel Prize in 1979 and finally established the world famous International Centre for Theoretical Physics (ICTP), Italy, the centre that serves the Third World community.

Challenges

In today's world of knowledge-based global economies, prosperity depends largely upon science and engineering. However, high level modern mathematics remains the theoretical foundations of these subjects. That is the underlying reason for the importance of the subject in any developed or developing country. It is no coincidence that all the world's most successful economies have developed a strong base in mathematics.

In Pakistan, there is a nationwide serious shortage of PhDs in mathematics. Maintaining a strong mathematics base should be an accepted part of good governance but is hindered by the fact that the role of mathematics in its applications is largely hidden. Mathematicians found patterns and developed general theories within which it was easier to think. The result has been continuous development culminating in the solutions of major problems. Cutting edge technological development requires mathematical applications at the highest contemporary levels, substantially beyond those of the previous decades.

Solution

The combination of high level mathematical understanding with computing is an astonishing and effective tool in understanding a wide spectrum of physical phenomena such as earthquake prediction, climate change, equity markets, computer vision and genetics, etc.

In the last few decades another major factor has emerged, namely the spectacular development of computing. The stage has already been reached where computing provides a major investigative tool in geometry and algebra, the two great pillars of classical mathematics. The kinds of computation that occupied the lives of some of the greatest mathematicians can now be completed by a student in a few hours using freely available software on a home computer.

In 2003, the Government College University, Lahore, supported by the Government of

Punjab and the Higher Education Commission (HEC), set up a Centre of Excellence in Mathematics. This centre was formerly known as the School of Mathematical Sciences (SMS) and now it has been given a new name `Abdus Salam School of Mathematical Sciences' (ASSMS) in honour of Pakistan's Nobel Laureate.

The guiding hand behind ASSMS is its director general Dr A.D.R Choudry. His extensive mathematical experience in Europe and the USA has led to the appointments of internationally established mathematicians, to teach high level courses and supervise research.

Impact

In ASSMS's four year existence, the institution has a remarkable record. It already has the largest full time doctoral programme in South Asia, with 93 PhD scholars, many of whom are already publishing in highly reputed journals. The faculty comprises 36 internationally established mathematicians, mostly European.

The Programme has attracted a number of overseas post doctoral fellows to pursue their studies in ASSMS, thereby reversing the traditional flow of graduate students away from Pakistan. On the international scene, the school has initiated two new journals i.e. one for research and the other especially for graduate students, hosted a number of international conferences, workshops, seminars, international schools and introduced exchange programmes with numerous universities world wide.

ASSMS recognizes the needs of the national mathematics community, and has taken robust measures to improve matters. Intensive courses in core areas have been introduced to train the faculty nationwide along with a series of workshops initiated to address questions of professional development.

Pakistan has also been admitted to the largest international mathematics event, namely the annual International Kangaroo Mathematics Contest for school children of all ages. It is an effective way of promoting and popularizing mathematics, with over four million participating pupils worldwide. Pakistan is the first South Asian country to be admitted to this event. In 2007, over 30,000 young Pakistanis took part, representing a five fold increase over the previous years. Enthusiasm for mathematics at the school level is clearly on the rise which is a very encouraging sign.

ASSMS provides the focus within Pakistan for top level mathematics training. It will enable promising young mathematicians to reach international standards of competence in their subject, and to make their own contribution to Pakistan's success.

The faculty represents a national resource in mathematical modelling, ready to collaborate with the government, commerce, business and industry. The Government of Punjab and the HEC deserve all the credit for having the courage and foresight to support long term investment in an academic area of crucial importance for the future.

Short Duration Foreign Faculty Hiring Programme

This programme enables the recruitment of foreign faculty who can only avail of sabbatical leave for one or two semesters from their home universities or others who do not want a longer time assignment in Pakistan. The emphasis of this programme is on training the faculty and the students of the host institutions in the university identified areas of deficiency in learning and research. The short term foreign faculty members provide impetus and necessary guidance to the local faculty in completing the on-going research and pedagogical projects. The programme has managed to provide international orientation to the public sector HEIs in the shortest possible time. It has generated a wonderful experience of collaborative learning and research for local faculty and helped to promote the culture of knowledge sharing and excellence in scholarship.

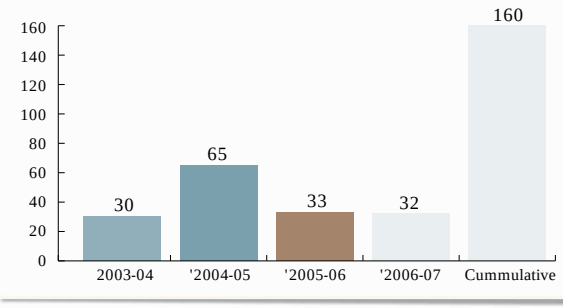
Under this programme, candidates with a minimum of one year of post-doctoral experience of working abroad in reputable academic and/or R&D institutions are eligible. The candidates must have published Research Articles in internationally refereed scientific journals, during the past five years. An attractive salary package and lodging facilities are provided. As many as 160 foreign professors/experts have joined the 37 public sector Pakistani universities so far and have contributed significantly in their various areas. Figure 3 shows the yearly hiring of foreign faculty under the Short Duration FFHP each year since 2003-04

Dr. Kazi guides one of his students in a laboratory at NARC

when the programme was initiated. Figure 4 shows their discipline wise distribution. Foreign Faculty hired under this programme was distributed in 37 universities across the country as shown in Annex 2.

The success of the FFHP programme can be judged by the performance of the foreign faculty professors which is reflected in their research output, research grants awarded by HEC, their participation in conferences and

Figure 3: Foreign Faculty Hiring Programme - (Short Duration)



workshops and the number of PhD scholars they have produced (Table 1).

Hiring of Eminent Educationists and Researchers

In order to further promote research activities and overcome the acute shortage of PhD scholars in universities, a programme was launched in 2005 to initially induct 30 eminent scholars on a two year contract basis. After successful launch of the first phase a second phase was launched in June 2005. A total of 178 scholars have been hired so far under this programme.

In-country Short-Term Teacher Exchange Programme

The HEC realized that the research expertise and scholarship existing within the country could also be tapped for faculty development. Accordingly, the HEC initiated the In-country Short-Term Teacher Exchange Programme to facilitate the movement of faculty members and professionals within the public sector HEIs for short durations of one to four weeks. This programme facilitated the availability of qualified faculty to address immediate needs and build capacity through training.

The project received overwhelming response from the faculty members as well as professionals working in R&D organizations within the country. Through this programme, a total of 109 highly qualified professionals visited different HEIs to train higher education faculty and research scholars. The programme, in addition to its human resource development aspect, was also welcomed by the higher education community for promoting feelings of good-will, brotherhood, national cohesion and unity. Figure 5 shows the yearly exchange of faculty and experts under this programme.

Table 1: Achievements of the Projects

Student Supervision in Process			Research Papers in Impact Factor journals	Papers Presented in Conferences	Research Grants Awarded by HEC	Startup Research grant (one million for each FP)
MS	MPhil	PhD	1,165	515	52 research projects were awarded from R&D Division of HEC worth Rs. 327 million	Rs. 202 million
420	154	277				
Student Graduated						
MS	MPhil	PhD				
303	102	97				

Figure 4: Discipline-wise Distribution of Foreign Faculty Hiring Programme - (Short Duration)

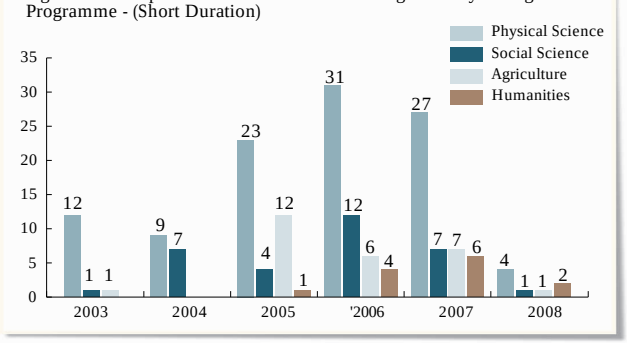
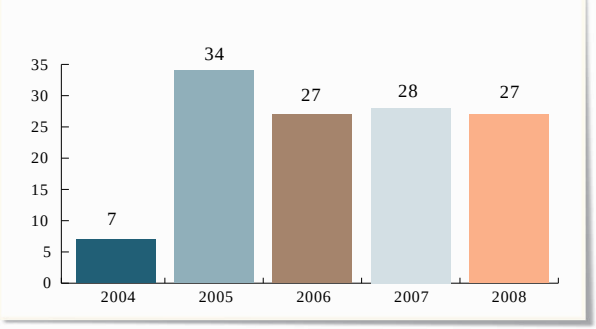


Figure 5: Short Term Teacher Exchange Programme



Visiting Scholars Programme

The Visiting Scholar Programme offered short-term fellowships in pubic sector HEIs to scholars serving at responsible teaching or research positions at reputable foreign institutions. A total of 76 scholars visited various public sector universities in Pakistan for 2-8 weeks duration and shared their specialized expertise with the faculty and the students of the host HEIs.

Pedagogical and Administrative Skills

A major element of ongoing faculty development strategy of the HEC is enhancement of pedagogical and administrative skills of the existing faculty and administrators.

Fresh lecturers inducted into HEIs neither have prior teaching experience nor is there a mandatory requirement for acquiring these learning-teaching skills later on in their careers. The HEC, therefore, decided to make up for this major deficiency by organizing special short courses. The Learning Innovation Department (LID) was set up as the hub for the in-service continuous capacity building and professional development of the higher education teaching faculty and administrators. The LID was established in 2003 to assist HEIs in maintaining academic excellence and governance levels by supporting their professional needs through general and customized training programmes.

The Learning Innovation Department also runs the National Academy of Higher Education (NAHE) and the English Language Teaching Reforms (ELTR) project for conducting continuous professional development programmes for capacity building and customized skill development of the higher education faculty across Pakistan.

A number of programmes are conducted by the LID directly and through its two projects to build capacity and to train Master Trainers who are expected to replicate these programmes in their respective universities. The three broad categories of the LID programmes are:

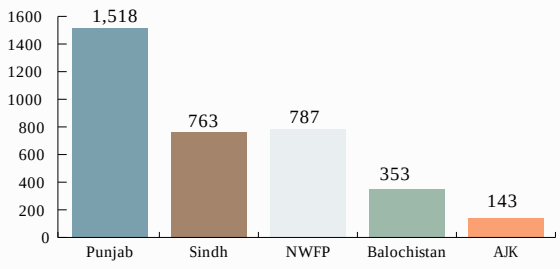
1. Continuous Faculty Professional Development Programmes
2. Open and Customized Orientation Workshops/Seminars for higher education faculty and administrators
3. Special Programmes

The National Academy of Higher Education (NAHE) was established in September 2004 to serve the on going in-service professional development needs of academia by providing one month intensive training to faculty at the university door steps.

In Phase I, the project established 38 Human Resource Development Centres (HRDCs) in the public sector universities across Pakistan and trained 3564 faculty members. This can be seen in Figure 6.

The second phase of the project has now been approved under which 2500 faculty members will be provided opportunities of professional development.

Figure 6: Teachers Trained Through Staff Development Courses by NAHE



LID Interventions

- Indigenous long term fellowships were awarded for two year Masters in TESL, TEFL and Linguistics, and one year PGD in TEFL, TESL, and ICELT
- Self Access Centre (SAC) was awarded to Allama Iqbal Open University, besides Training 135 teachers under the ELTR Progamme titled Computer Assisted Language Learning (CALL)
- HEC also funded the establishment of National Centre of English Language Teaching and Research at Peshawar University.
- In order to promote indigenous research culture in higher education academics, 195 HEI teaching faculty were oriented to research skills and methodology.
- The Research and Publication Sub-committee also funded national and international seminars and conferences in this regard.

In order to address the English language constraints in the higher education teaching system, the English Language Teaching Reforms (ELTR) Project was initiated in July 2004 with the aim of building up the English language teaching and research standards in Pakistan. The project is focused exclusively on the capacity building of English language teachers in HEIs. Under the ELTR Project, 164 indigenous fellowships have been awarded to faculty members in the public sector universities to complete MS/PhD and Diploma studies in selected national public and private universities. Three foreign scholarships, one for PhD and two for Masters level programmes, in British universities were also awarded.

Table 2 shows the number of faculty members trained by the HEC under the various programmes. A total of 10,710 faculty members have benefited from the various professional development programmes conducted by HEC.

Of the total number trained so far, 4,272 faculty members have been trained under the continuous professional development programmes and 6,438 have been trained under various open and customized programmes.

Based on reviews of curricula by the National Curriculum Revision Committee, the training of teachers on Curriculum Based/Content Based courses in their respective disciplines was provided by HEC to 2,434 teachers of different disciplines.

Introduced in June 2006, open and customized short courses/workshops /seminars have been designed to nurture the academic abilities of faculty members, providing them with opportunities to access modern tools of knowledge and learning innovation. These initiatives have benefited 1,427 faculty members so far.

"As Course Coordinator I conducted 10 courses, each had about 35 participants. The modules of the course were Educational Psychology, Advance Teaching Skills, Administrative Planning and Communication Skills, Curriculum Development, Research Skills and Assessment and Evaluation along with Microteaching and Computer Training. These modules were conducted by highly qualified and competent resource persons.

All the participants highly appreciated these courses which were the first of their kind in Pakistan. These courses not only groomed their teaching skills and behaviour but also their personality and approach to life. Many participants have implemented the newly acquired methodologies and consequently influenced their colleagues and friends to undertake these courses."

Dr. Rana Qamar Masood,
Course Coordinator
DOW University of Health
Sciences, Karachi.

Table 2: Higher Education Faculty Trained under Various Professional Development Programmes Conducted by LID

Executed by	Programme	Year					Total
		2003 - 04	2004 - 05	2005 - 06	2006 - 07	2007 - 08	
Learning Innovation Division	-Twelve Week Master Trainers Programme	28	62	64	56	88	298
National Academy of Higher Education	-Staff Development Courses	-	585	1032	1947	--	3564
English Language Teaching Reforms Project	- Fellowships	--	--	21	80	63	164
National Academy of Higher Education	International Computer Driving Licence	--	--	--	146	100	246
	Total Trained						4,272
Learning Innovation Division	-Modern University Governance Programmes for University Administration	--	--	--			
	- Asian Institute of Technology (AIT)				14	--	14
	-Leading Transformation Change				89	61	150
	-Curriculum Based Programmes	320	433	342	610	729	2,434
	-Open and Customized Short Courses/Workshops/Seminars	--	--	902	386	139	1,427
	-Lectures/Seminars by eminent Foreign and Pakistani Scholars.	--	--	--	142	58	200
	-Capacity Building of HEC Employees	--	--	281	190	90	561
	-National Committee on Examination System, Seminars/ Workshops	--	--	73	118	80	271
English Language Teaching Reforms Project	-National Committee on English /ELTR, Seminar and Workshops	--	270	316	367	428	1,381
	Total Trained						6,438
	Grand Total	348	1,350	3,031	4,145	1,836	10,710

Participants at one workshop held at - Army Medical College, Rawalpindi

Impact Analysis of the Training Programmes

A Third Party Evaluation of the NAHE Project was conducted in order to analyse the impact of faculty development courses. A research grant of Rs 1.250 million was provided to two Pakistani research scholars through an open bidding process that was advertised across Pakistan for conducting this third party evaluative research.

The majority of participants interviewed as part of this study voted in favour of the continuation of such trainings. All resource persons and course coordinators were of the view that this training has brought significant improvement in the pedagogical skills of the university faculty and should be made compulsory for all university and college faculty. Findings of this research are being used to further improve these courses.

NAHE - Findings

The study found that the training programme had helped to develop the teaching skills of the participants in the following areas:

- Confidence in teaching, use of teaching aids and communication skills
- Knowledge of individual differences,
- Knowledge of educational psychology and student- teacher inter activity
- Lesson planning skills
- Classroom management skills and problem solving skills etc.

The concluding session of the worksop titled, “To get Empowered to Shape your Destiny”, April 2008

1st National Conference on Professional Development of HEI Teaching Faculty, January 2007

Participants at the 4th workshop for “University Administrators” held in Islamabad, 2007

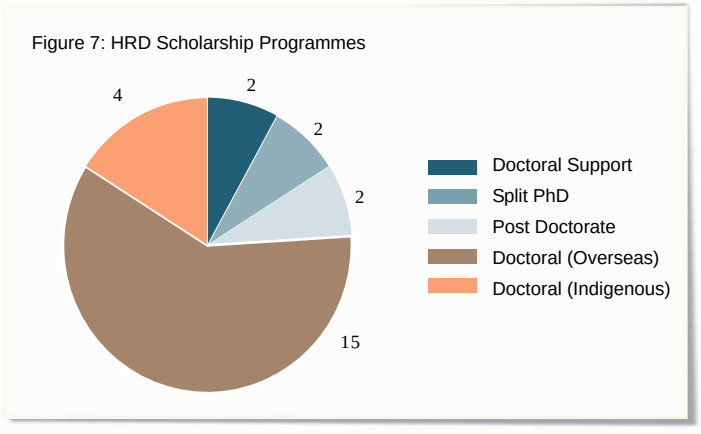
Long-Term Measures

Scholarships under HRD

In its endeavour to develop a cadre of highly qualified and professional higher education faculty in Pakistan, the HEC launched a series of scholarship programmes. Through these scholarship programmes, the HEC aimed to provide the much needed impetus to academia by offering indigenous as well as foreign PhD degrees. It was cognizant of the need for customizing the existing scholarship programmes as well as opening up new avenues for the pursuit of higher education at home and abroad. With the objective of reinforcing the universally accepted principle of excellence in academia, the scholarship programmes were designed to be offered not only in established disciplines but also in the crucial emerging fields.

It was ensured that all HEC scholarships are offered only on merit through a transparent and widely advertised competitive process. Candidates meeting the minimum eligibility criteria were allowed to take the GRE equivalent test administered by the National Testing Service (NTS). In the case of foreign scholarships, final selection of scholars qualifying the NTS test was made by a team of foreign experts; while in the case of indigenous scholarships, the final selection was made by the university in which the scholar intended to pursue a PhD.

Figure 7: HRD Scholarship Programmes



Several scholarship schemes for indigenous as well as foreign scholarship/fellowships were offered by the HEC. Under these schemes a large number of PhD scholars joined reputable domestic and foreign universities and research centres to pursue studies in various disciplines of national importance. The HEC introduced these schemes as a strategic intervention to build highly qualified faculty in the HEIs over the long term.

The scholarships are open to all the faculty members of HEIs as well as the higher education students under two categories, 'Indigenous Scholarships' and 'Foreign Scholarships'. The scholarships are available for all disciplines of Science and Technology, IT, Social Sciences and Humanities.

The scholarships under the HEC-HRD project were administered through 25 programmes. The breakdown of these programmes is shown in Figure 7.

During the period 2003-08 a total of 6,749 scholarships were awarded under various programmes. Of these, 5,503 scholarships i.e. 85 percent were awarded in various science, engineering and technology

disciplines; clearly reflecting HECs strong focus on developing quality faculty and research in these critical fields.

Overseas Scholarships

The Overseas Scholarship Scheme(OSS) was aimed at creating a pool of specialized scientists and highly skilled professionals trained internationally in the areas critical to the country's economic growth. The HEC offered a number of scholarships to the Pakistani scholars to pursue their PhD, MS leading to PhD and postgraduate studies abroad. This Scheme has also provided awards for PhD scholarships to the leading universities in European and Asian countries (including Austria, France, Germany, Netherlands and China) with low tuition fees. Up to 10 percent of the available seats are reserved for PhD level training in the elite universities of the world (e.g. Cambridge, Harvard, MIT etc).

Table 3 shows the year-wise award of foreign scholarships at all levels.

Table 4 shows the breakdown of the total number of overseas scholarships awarded at all levels, (including PhD), by subject categories. It indicates that 1,209 (43 percent) were awarded for Engineering and Technology, 652 (23 percent) for Life Sciences, 526 (19 percent) for Physical Sciences, 231 (7.5 percent) for Social Sciences, 121 (4 percent) for Business Education and 86 (3.3 percent) for Arts and Humanities.

Academic Performance of Scholars Abroad

A sample of results from the Overseas Scholarship Scheme (OSS) confirms that the merit-based selection system followed by the HEC has proved successful. This can be seen in Figure 8.

Nearly 64 percent of the sample of scholars evaluated under the OSS had performed at

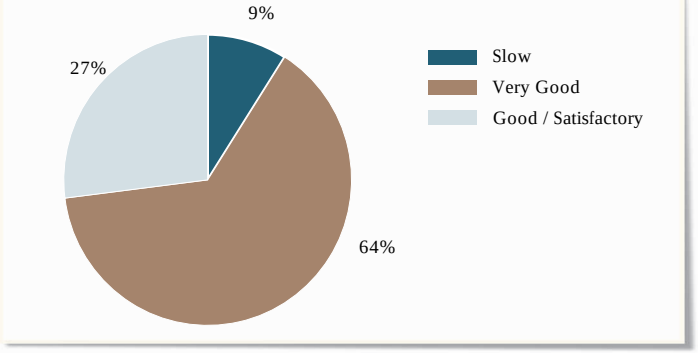
Table 3: Foreign Scholarships Year-wise Award

Year	Applications Received	Candidates Short listed	Scholarships Awarded
2003	93	35	35
2004	12409	546	252
2005	9921	806	272
2006	11,017	4,485	431
2007	72,932	8,495	1,835
Total	106,372	14,367	2,825

Table 4: Foreign Scholarships Discipline-wise Award

	2003	2004	2005	2006	2007	2008	Total
Life Sciences	5	24	66	63	199	295	652
Arts & Humanities	0	1	4	17	20	44	86
Social Sciences	0	10	25	27	36	133	231
Physical Sciences	28	67	53	89	105	184	526
Engineering & Technology	55	53	135	207	310	449	1209
Business Education	1	3	6	19	27	65	121
Total	89	158	289	422	697	1,170	2,825

Figure 8: Performance of Pakistani Students on Overseas Scholarships



Outstanding performance by HEC scholars abroad

Awards for two HEC Scholars at AIT, Thailand

Two HEC scholars have won awards for outstanding performance at the 107th graduation ceremony at the Asian Institute of Technology (AIT), Thailand. Mr. Naveed-ul-Islam and Mr. Shahid Iqbal were given the outstanding student awards in the fields of Microelectronics and Telecommunications respectively.

Mr. Naveed received the Infineon Prize in recognition of his outstanding academic performance in the field of Microelectronics. He was admitted to AIT on HEC scholarship in August 2005 and completed his Master of Engineering degree with research on “Fabrication of Dye Sensitized Solar Cell (DSSC) focusing on Improvement in Cell Performance”.

The other scholar, Mr. Iqbal Shahid, won the Wireless Personal Multimedia Communications (WPMC) Prize in recognition of his outstanding academic performance in the field of Telecommunications (Wireless Multimedia). Mr. Shahid was awarded HEC scholarship and joined AIT in August 2005. He completed his Master of Engineering degree with a thesis entitled “Bit-Interleaved Space-Time Coded Modulation with Interactive Decoding over Correlated Fading Channels”.

American Oil Chemists Society Award for HEC Scholar

The scientific abstract of Mr. Umer Rashid, HEC scholar, has been selected as 'Outstanding Student Abstract' by the American Oil Chemists Society (AOCS), an international scientific society dedicated to lipids research and development.

Mr. Rashid has been enrolled under the HEC's 5,000 PhD Fellowship Programme at the Department of Chemistry, University of Agriculture, Faisalabad under the supervision of Dr. Farooq Anwar.

The abstract, entitled "Optimization and Characterization of Alkali-catalyzed Transesterification of Rapeseed Oil for Production of Bio-diesel," has been given the award by the Industrial Oil Products Division of the AOCS. The key consideration was given to the relevance of Mr. Rashid’s suggested scientific approach to meet today's big technical challenges in industrial oils including developing lipid-based alternatives for current petrochemicals, advancing lipids reaction and measurement modeling, using advanced processing technologies and preparing a sound experimental design.

levels described as very good and a further 27 percent at levels described as good /satisfactory. Only 9 percent were rated to have slow progress.

Indigenous Scholarships

The primary objective of these programmes is to increase indigenous research capacities in all fields of knowledge. The regular higher education faculty of public sector universities, colleges and research and development organizations and other local graduates are eligible for these scholarships in all fields. Only high quality public and private HEIs were eligible to enrol HEC indigenous scholars in qualifying departments having sufficient number of HEC approved supervisors. The doctoral programme of study followed by the indigenous scholars meets that the HEC approved criteria for doctoral programmes and also ensures the HEC indigenous scholars are only enrolled for PhD study with active researchers who are fulfilling the HEC approved supervision criteria. HEC approved supervisors are offered a stipend and remuneration respectively.

Under the Indigenous Scholarship Programme, 3,516 awards have been made for doctoral studies. As shown in Table 5 there has been a 100 percent increase in the number of students availing indigenous PhD scholarships in 2007-08 as compared to the numbers for 2003-04 when the programme was started.

Out of 3,516 indigenous PhD scholarships awarded to date, the largest proportions (39 percent) have been for the Physical Sciences followed by Biological and Medical Sciences (17 percent), Agriculture and Veterinary Sciences (13 percent), Social Sciences (12 percent), Engineering Technology (8 percent), Arts and Humanities (7 percent) and Business Education (4 percent). This can be seen in Table 6.

Table 5: Indigenous PhD Scholarships

Batch	Total No of Applicants	No of Scholarships Awarded	No of Scholars Availing
Batch – I (2003-04)	22,000	1,297	606
Batch – II (2004-05)	16,000	1,621	810
Batch – III (2006-07)	9,321	2,231	888
Batch – IV (2007-08)	3,572	3,572	1,212
Total	56,393	8,721	3,516

Table 6: Subject-wise break down of Indigenous PhD Scholarships

Discipline	2003-04 Batch-I	2004-05 Batch-II	2006-07 Batch-III	2007-08 Batch-IV	Total
Agriculture & Veterinary Sciences	65	83	111	194	453
Biological & Medical Sciences	58	158	119	251	586
Arts & Humanities	32	58	81	60	231
Social Sciences	80	128	133	84	425
Physical Sciences	271	290	332	480	1373
Engineering & Technology	60	50	75	111	296
Business Education	40	43	37	32	152
Total	606	810	888	1,212	3,516

A large proportion of indigenous PhD scholarships was awarded in the fields of Science and Technology. Figure 9 shows that of the 129 PhDs already completed 114 related to Science and Technology. Of the Science and Technology doctorates 58 had completed their studies under the Merit Scholarship Scheme for PhD studies in Science and Technology and 56 under the Development of S&T manpower through indigenous PhD.

Figure 10 shows that the largest percentage

Achievements of Indigenous Scholars

179 scholars have completed their doctorate programme and joined their parent departments.
24 scholars have submitted their PhD thesis for external review.
01 scholar has been selected as a best researcher at the GCU, Lahore.
510 research publications have been published by these scholars.
01 scholar from GCU has been included in Top 25 of the Science Direct (International Journal) at Sr. No.12.
A scholar aged 24 is the youngest PhD degree holder in Mathematics at GCU.
Young Speakers Award (1st Prize) at Third International Conference on 21st Century Mathematics 2007.
32 publications during PhD studies by an indigenous scholar.
21 publications included in Science Direct Journal of an indigenous scholar.

Figure 9: PhD Studies Completed Under Indigenous Scholarship Schemes by type of Scheme

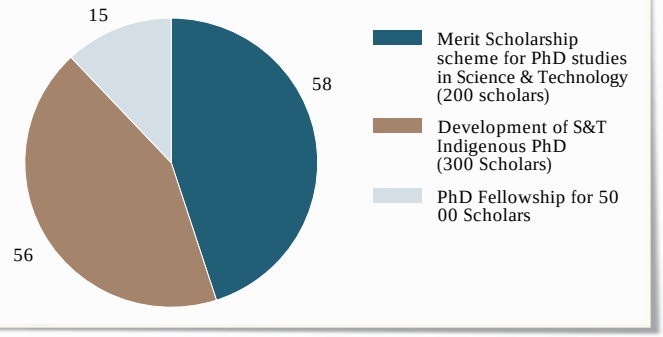
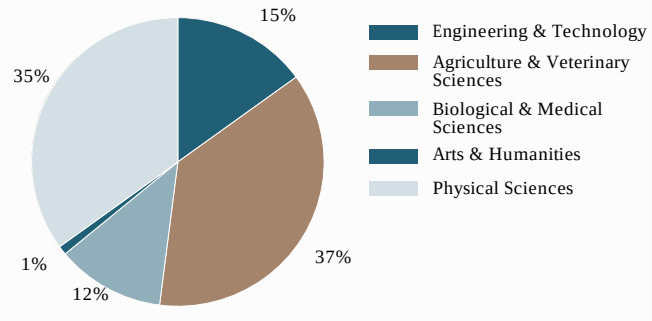


Figure 10: PhD Studies Completed Under Indigenous Scholarship Schemes by type of Discipline



of completed PhDs (37 percent) under the indigenous scholarship schemes are in the area of Agriculture and Veterinary Sciences followed by Physical Sciences (35 percent), Engineering and Technology (15 percent), Biological and Medical Sciences (12 percent) and Arts and Humanities (1 percent).

PhD Fellowships by Public Sector Universities

The principles of 'equity' and 'need' are fully reflected in the award of scholarships under the public sector universities approved projects. The region-wise allocation of PhD awards in public sector universities in Table 7 shows that the smaller and more backward Provinces have been given priority. Out of 600 PhD fellowships awarded by Public Sector Universities, 162 (27 percent) were in Sindh, 139 (23 percent) in NWFP, 101 (17 percent) in the Federal Areas, 92 (15

Table 7: Public Sector Universities - PhD Scholarships

Summary of Public Sector Universities Approved Projects

Province	No of Scholarships Approved in PC-1	Scholarships Awarded	Scholarships Under Process
Balochistan	173	87	86
Sindh	643	162	481
NWFP	595	139	456
Punjab	1161	92	1069
AJK	48	19	29
Federal	331	101	230
Total	2951	600	2351

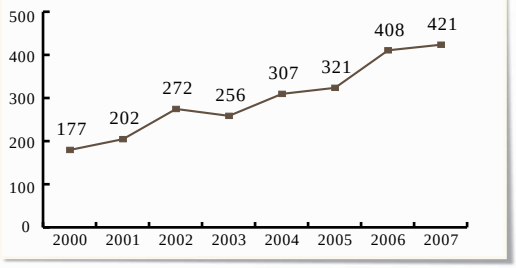
percent) in Punjab and 87 (15 percent) in Balochistan. The remaining 19 (3 percent) were awarded to candidates from the Azad Jammu and Kashmir.

Out of 2,351 cases under process for the award of PhD fellowships in the public sector universities, 1069 (45 percent) are from Punjab, 481 (20 percent) are from Sindh and 456 (19 percent) are from the NWFP. There are only 86 cases (4 percent) under process from Balochistan.

Number of PhD s Produced by Universities in Pakistan

It can be seen in Figure 11 that the number of PhDs produced by HEIs in Pakistan in 2001 was a mere 202 which in these six years has more then doubled to 421.

Figure 11: Number of PhDs Produced by Pakistani Universities 2000-07



Considering that more than 7,000 students are enrolled in PhD programmes currently, this number is expected to go up substantially over the coming years.

Post-Doctoral Fellowships

The Post-Doctoral Fellowship Programme was initiated by the HEC to provide opportunities for post-doctoral research abroad to 1200 PhD faculty members from the Pakistani HEIs (both public and private).

This scheme provides post-doctoral fellowships to such PhD faculty who have no previous academic exposure abroad and are keen to work in well equipped laboratories in an internationally competitive environment. The programme provides 80 percent of these fellowships to public sector universities. 70 percent of the fellowships are reserved for Science subjects and the remaining 30 percent for Social Science and Humanities.

The data in Table 8 shows that a total of 394 post-doctoral fellowships have been awarded under this Programme. These fellowships have been awarded mainly in the areas of Agriculture (including Veterinary)

Table 8: Post Doctoral Fellowship Programme

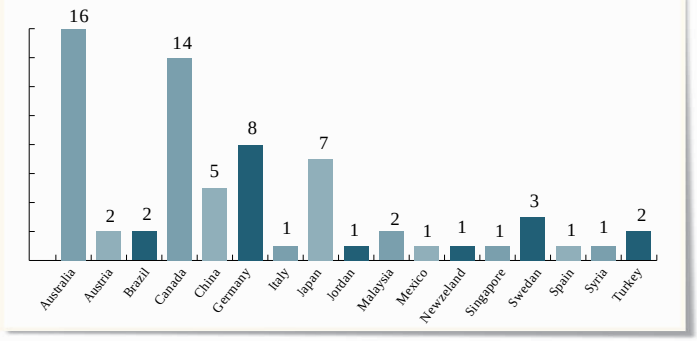
Discipline	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	Total
Engineering & Technology	0	14	0	6	5	2	27
Physical Sciences	0	18	10	30	36	10	104
Agriculture & Veterinary Sciences	29	5	0	35	33	3	105
Biological & Medical Sciences	0	8	7	32	31	0	78
Business Education	0	0	0	3	4	0	7
Social Sciences	1	15	9	27	18	3	73
Total	30	60	26	133	127	18	394

Sciences and the Physical Sciences (105 and 104 respectively) followed by the Biological Sciences (78), the Social Sciences (73), Engineering and Technology (27) and Business Education (7).

Table 8 also highlights that the largest number (133) of post-doctoral fellowships were awarded in 2006-07 followed by 127 in 2007-08. There has been a sharp decline in 2008-09 and only 18 post-doctoral fellowships have been awarded to date. Given the uncertainty over funding it is unlikely that this number will increase during the remainder of the current fiscal year.

A total of 255 scholars have already returned after completing their fellowships. The majority have returned after post-doctoral work in the United Kingdom and the United States. Out of the 255 who returned, 130 returned from the United Kingdom and 57 from the United States. The remaining 68 as shown in Figure 12 have returned from 15 countries including Australia (16 cases), Canada (14 cases), Germany (8 cases), Japan (7 cases), China (5 cases), Sweden (3 cases), Brazil, Malaysia, Austria and Turkey (2 cases each).

Figure 12: Country-wise (excluding UK and USA) break down of Returning Post Doctoral Fellows



Incentive Schemes

The HEC adderssed Faculty Development as an HRD strategy to overcome the shortage of qualified and professionally competent higher education faculty. One major reason for this shortage was the in-adequacy of attractive incentives for higher education faculty. This had led to a brain drain with the more qualified and competent academics leaving the country for better incentives both in terms of salary, other benefits and possibilities for academic progression. In order to address this brain drain university jobs needed to be made more alluring. The HEC offered some very exciting incentives to quickly attract new faculty and retain the existing ones.

Upward Revision of Pay Scales

In recognition of the importance of higher education, the pay scales of the university faculty were upgraded in 2006. According to the revised grades, a university Lecturer was placed in BPS 18, Assistant Professor in BPS 19, Associate Professor in BPS 20 and full Professor in BPS 21. This strategy motivated the existing faculty and will helped attract qualified individuals towards university jobs.

Direct Appointment of PhDs as Assistant Professors (BPS-19) in the HEIs

The HEC took a revolutionary step to augment the falling number of PhD faculty by offering a direct entry as Assistant Professor (BPS 19) to the PhD degree holder. This scheme was not merely limited to the

newly appointed faculty but also to the existing staff holding PhD degrees. As a result, a large number of qualified professionals were attracted towards the HEI jobs and supplemented the number of existing PhD faculty who now had less reason to leave.

Revised PhD Allowance

The HEC, immediately after its inception, made a massive increase in the qualification allowance of the public sector higher education faculty. The PhD faculty were previously receiving Rs. 1500/- as qualification allowance. This was increased more than three times to Rs 5000/-.

Tenure Track System

A Tenure Track System was introduced in 2004. Under this system, the initial appointment of faculty members was to be made on a contractual basis. Permanent tenure was granted in time but based on the recommendation of a panel of renowned international peers who were requested to evaluate their performance. Such faculty appointments carry an attractive salary package, comparable to that offered by reputable private sector HEIs. This option, which applies only to PhD staff is also open to existing faculty who want to opt for it. The HEC has provided funds for all such appointments. This system has helped to inculcate a competitive academic environment in the HEIs of Pakistan.

Tenure Track Salary Scale

On the recommendations of the HEC, the Government of Pakistan approved a rational increase in the Tenure Track salary scale in September, 2007 which is reflected in Table 9. Details of funds released under Tenure Track System are given in Annex 3.

Placement of Independent PhD Scholars Returning from Abroad Programme (PPSAP)

A careful analysis of the shortage of skilled and qualified manpower at the HEIs in the country indicated that a large number of PhDs from abroad did not join the Pakistani HEIs. The HEC offered assured placement in the public sector HEIs to those Pakistani nationals who had completed or were about to complete their PhD studies from reputed foreign universities. This programme helped attract qualified manpower to increase the existing number of PhD faculty in the public sector HEIs of the country.

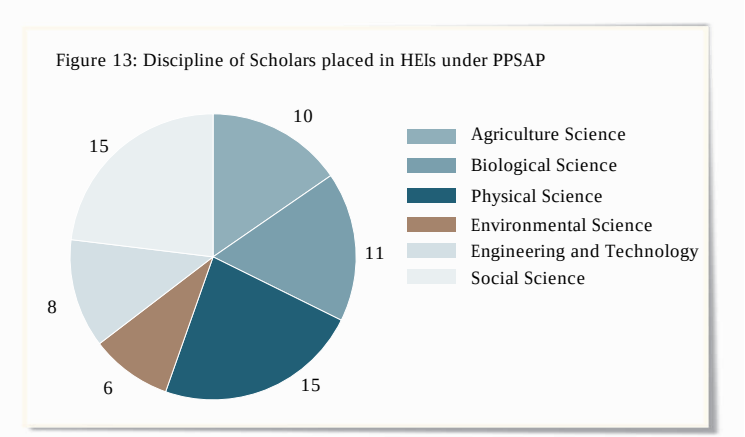
A total of 65 PhD scholars in different disciplines were granted placement in the local HEIs. As many as 51 out of these 65 scholars joined the universities under PPSAP during 2005-07. The discipline -wise placement of the fresh PhD scholars returning from abroad is shown in Figure 13.

HEC Distinguished National Professors Programme

To acknowledge the services rendered by the outstanding professors and scientists and

Table 9: Tenure Track Salary Scale

Rank	Salary Scale			Stages
	Minimum	Increment	Maximum	
Professor	180,000	8,800	31,2000	15
Associate Professor	120,000	7,000	22,5000	15
Assistant Professor	80,000	5,500	16,2500	15



to further utilize their services in universities and research institutions, the HEC launched a programme of National Professorship. The HEC has selected 32 Distinguished National Professors since the programme was initiated in 2004. These scholars are engaged in supervising PhD/MPhil students as well as conducting research in different public sector HEIs.

The list of HEC Distinguished National Professors is given in Annex 4.

Best University Teacher Awards

The Best University Teacher Award Programme was launched by the HEC to provide due recognition to the teachers who demonstrate exceptional teaching and research ability. Judged independently by a jury of their peers and students the awards provide an incentive to the teachers to further improve the quality of their teaching and research.

The HEC confers these awards, based on the nominations made by the respective universities to the outstanding HEI faculty (one from each public sector HEI each year). Under this scheme, a cash award of Rs 0.1 million is made to the Awardee.

These awards have helped generate an environment of healthy competition both within and across universities and there by raise the standards of teaching and research.

Faculty Development - Increase in Faculty strength in Universities and DAIs

The number of faculty members in the universities and DAIs has increased by 132 percent since 2002. This can be seen from the data presented in Table 10 and Figure 14.

Faculty with PhD degrees has increased by 76 percent while that with non PhD degrees has increased by 154 percent over this period.

The overall ratio of PhD faulty to the total has, however, decreased because of the large increase in the number of non-PhD faculty over this period. The increase in non-PhD faculty is due to the major expansion in the number of the HEIs in the

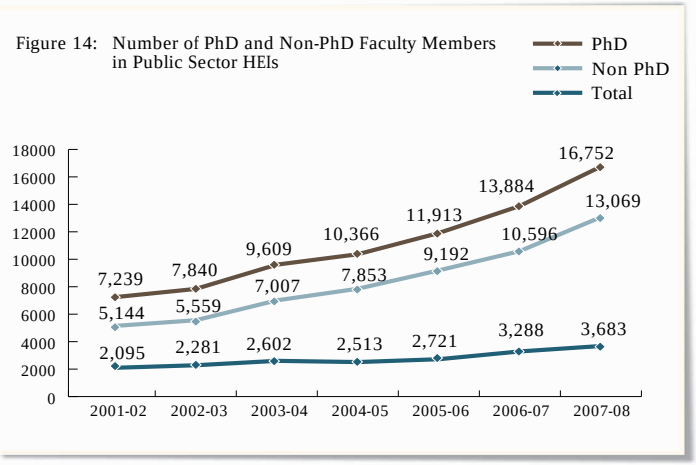
Table 10: Faculty in Public Sector Universities - Classified

Years	PhD	Non PhD	Total	% of PhD Faculty
2001-02	2,095	5144	7239	28.9
2002-03	2,281	5559	7840	29.1
2003-04	2,602	7007	9609	27.1
2004-05	2,513	7853	10366	24.2
2005-06	2,721	9192	11913	22.8
2006-07	3,288	10596	13884	23.7
2007-08	3,683	13069	16752	22
% age Increase	76%	154%	132%	

country and the enormous expansion in enrolment of students.

Most of the newly inducted non-PhD faculty are, however, on their way to PhD degrees since the entire incentive structure is geared towards ensuring that they do so. The percentage of PhDs in the overall faculty of the HEIs will improve greatly when the faculty members currently pursuing doctoral degrees in Pakistan and abroad return to join the system and additional new PhD staff are inducted.

Figure 14: Number of PhD and Non-PhD Faculty Members in Public Sector HEIs



1

The Genesis

Introduction

Public sector universities are the main vehicles for higher education in Pakistan. Historically, private sector had an insignificant role in the higher education system and was almost non-existent till the 1980s. The public sector HEIs continued to be plagued by the inattention of successive governments and remained burdened with chronic problems of the poor quality of teachers and curriculum, gender biases, on campus politics, low levels of student motivation, poor discipline and lack of relevance of course contents to social and economic needs, rote learning, over-crowding, and non-transparent examination systems. Research work was marked by low quality and negligible quantity. Very little serious effort was made to rid the higher education system of its plight. The HEIs remained incapable of serving the country's needs to meet the challenges of globalization, corporate development and technological innovations.

The few attempts to reform the higher education sector made by successive governments were faced with a great deal of opposition from various stakeholders and a lack of strong will and commitment for effective implementation. Financial resources required for these reforms to be put in place were generally not available. Pakistan's inability to increase investment in education beyond 2.5 percent of GNP (one of the lowest in the world) signified this sad neglect.

Historical Background

When Pakistan was founded in 1947, the country inherited two institutes of higher education; one of which is the University of the Punjab. The Pakistan Education Conference was held in 1947 to set a vision for the education system of the infant country but little came of that effort. Later, in 1952, a higher education body, the Inter-university Board, was established to develop liaison among the universities of the country. However, it was inherently ineffective and lacked a clear administrative or financial role. In 1959, the Commission on National Education was established. Once again the Commission, like earlier bodies of its nature, took a very general view of the education system. School and college education continued to cry out for reform.

During the next decade, as a result of the nationalization of all educational institutes of Pakistan, the entire system of education went under the direct control of the State.

The participation of the private sector in education system was totally eliminated. However, in 1979, a government commission reviewed the consequences of nationalization and concluded that in view of the poor participation rates at all levels of education, the public sector could no longer be the country's sole provider of education. By the mid-1980s, private educational institutions were, once again, allowed to operate on the condition that they complied with government recognized standards.

University Grants Commission

The University Grants Commission (UGC), the predecessor of the Higher Education Commission of Pakistan, was established, in 1974, by an Act of Parliament. It was mandated that the UGC maintain the standards of education and establish a uniform policy aimed at bringing about national unity and cohesion. Assessment of the financial needs of universities, disbursement of grants, and building institutional capacity were also placed under the preview of the Commission.

The UGC had very limited funds for research projects and little ability to enhance universities' capacity for research. It assisted the government in the accreditation of new institutions and the determination of the equivalence of degrees granted abroad in relation to those awarded by institutions in Pakistan. The UGC did not play an active role in the assessment of financial needs of the universities, disbursement of grants, and building of institutional capacity. It was a transmitter of universities' annual budgetary requests to Ministry of Education and distributor of Federal Government's grants to the universities. These funds were generally less than requested and were not always delivered in time. The UGC neither had control on requests from the universities for funding nor on distribution of recurring and non-recurring grants.

Further complications in the system resulted from the lacunae where no clear role of the UGC was defined with respect to quality assurance or the accreditation process. The charter was therefore treated as a licence in perpetuity to initiate programmes at any level and disciplines without taking cognizance of relevant international best practices for the provision of higher education.

The Reform Process

Pakistan has had a chequered history of educational reforms with shifting emphasis and focus. In 1959 the National Commission on Higher Education made an in-depth study of the problems and challenges facing the education sector at that time. Some of its recommendations remain valid even today. The Education Policies of 1970, 1972, 1979, 1992 and 1998 and the eight Five Year Plans, all set unrealistic targets without providing the funds and the required political will to ensure their successful implementation. The problems continued to escalate and reflected the little importance given to education by various political and military governments over time. This was reflected in the extremely low levels of

public funds allocated to it. The Pakistan Economic Survey 2001-2002 summed this up when it concluded that "one of the factors in the slow improvement of education indicators has been the low level of public expenditure in education."

The latest education reform process was catalyzed by the publication of the report on higher education in developing countries complied by the Task Force on Higher Education of UNESCO and the World Bank. This report was published in 2000 and Syed Babar Ali who was a member of the Task Force and Shams Kassim-Lakha who made substantive contributions to the report succeeded in convincing the Minister of Education to establish a task force for higher education in Pakistan. Resultantly a Task Force on Higher Education (TFHE) was established in April 2001. The Task Force carried out extensive consultations with all key stake holders and formulated its recommendations in the form of a report. Formation of the Higher Education Commission was a key recommendation of the TFHE. Recognizing that a focus on Science and Technology was crucial to transform Pakistan into a knowledge based economy, Prof. Dr. Atta-ur-Rahman, the Minister for Science and Technology at that time formulated a Study Group on Science and Technology in October 2001 to focus on the promotion of Science and Technology in HEIs. The TFHE and the Study Group on Science and Technology made a joint presentation to the President of Pakistan. The President appreciated the efforts of study groups and directed that an implementation mechanism be determined to ensure the realization of the specified objectives.

Genesis of the HEC

"The Task Force recommends that a central body is needed for facilitating quality assurance of higher education in both the public and private sectors, and linking funding by the Federal Government for public universities to the quality of performance, akin to the principle used by the Higher Education Funding Councils in the U.K."

Task Force on Higher Education
March 2002

The Steering Committee on Higher Education (SCHE)

Based on the recommendations of the Task Force the Federal Minister for Education set up a Steering Committee on Higher Education (SCHE) under the chairmanship of Shams Kassim-Lakha. The SCHE was tasked to develop an implementation plan for the joint recommendations of the Task Force and the Study Group. The Steering Committee used a broad based and consultative approach for evolving a workable implementation plan. To make the plan inclusive and socially acceptable, the SCHE elicited the views of all stakeholders in the higher education sector. It carried out meetings with Governors, Provincial Ministers and Secretaries to obtain

their views on the recommended reform process. In order to give wider ownership to these reforms, the Steering Committee also carried out 10 public consultations with over 900 participants. Dialogues were held with Vice Chancellors, Faculty Associations and Faculty Members to finalize the recommendations. The SCHE not only prepared a roadmap for higher education reforms but also paved way for smooth implementation of the proposed reforms.

The SCHE recommended setting up of a performance-based enabling environment characterized with more autonomy, academic freedom, good governance, effective management and financial and human resources for universities as a prerequisite for the successful execution of the envisaged higher education reforms. This meant a comprehensive restructuring of the higher education system of the country. In addition to different social and organizational factors, this agenda called for adequate funds to meet the reform objectives. Chancellors and Vice Chancellors of HEIs across the country were consulted to finalize a Model University Ordinance (MUO) in which radical changes, in areas relating to governance and management of HEIs, were proposed. For the sake of good governance the MUO proposed reorganization of the governing bodies - the Senate and Syndicates - of the HEIs. The Act also proposed changes to the working conditions for the faculty and functional responsibilities of various administrative positions. Restructuring of the UGC into a financially and administratively dynamic and autonomous body of national stature was the foremost recommendation of this reform process.

Establishment of the Higher Education Commission (HEC)

On September 11, 2002, the recommendations of SCHE were translated into action, through Presidential Ordinance No LIII of 2002. The HEC was established as a central body that would facilitate quality assurance of higher education in both the public and private sectors, and link funding by the Federal Government for public universities to quality performance. Ultimately, the HEC, an independent autonomous body, under its own Commission, with the Prime Minister as the controlling authority, replaced the UGC. The HEC opened up new vistas of reformative change in the field of higher education.

Prof. Dr. Atta-ur-Rahman was appointed as the founder Chairman of the HEC with the status of a Federal Minister. The Chairperson, Members, Servants, Consultants and Advisors of the Commission are all deemed, by law, to be public servants.

Powers and Functions of the HEC

The Presidential Ordinance, for the evaluation, improvement, and promotion of higher education, research and development, mandated the HEC to exercise several functions. In summary the HEC was mandated to:

- Provide support for enhancement of the quality of higher education and research.

- Facilitate funding for higher education based on quality of performance and needs.
- Serve as a national resource for higher education, based on its comprehensive nation-wide information, and data on experience in other countries.
- Participate in the formulation of Federal Government policy on matters of higher education.
- Advise institutions, the Provincial Governments and the Federal Government on the planning and development of higher education.
- Advise the Federal and Provincial Governments on all proposals for granting a charter to award degrees, in both the public and private sectors.
- Co-ordinate the initial and subsequent periodic assessment of the quality of academic programmes in established and new institutions of higher education, in order to support accreditation and maintenance of academic standards.
- Guide the public, the Provincial Governments and the Federal Government, on the legal status and functional value of degrees and other certification of academic achievement given by public and private institutions of higher education, and recommend appropriate action.
- Support the cause of national integration and cohesion through co-curricular activities.
- Perform such other functions incidental or consequential to the discharge of the aforesaid functions.

The Rationale for the HEC

"Part of the rationale for creating the HEC was the weakness and ineffectiveness of the University Grants Commission (UGC) in overcoming the general decline in higher education over many years and its inability to foster change.

In spite of a number of thoughtful and critical reviews of the crisis in higher education in Pakistan, including Higher Education and Scientific Research Strategy for Development and Reform(1992) and the report of the Higher Education Task Force (2002), no major efforts were made to follow up on problems identified on the recommendations made.

The breadth and extent of the problems-including issues of governance, the flight of many of the best faculty members to institutions abroad, inadequate funding, etc, were beyond the capacities of the universities to resolve individually or collectively.

The UGC had neither the authority nor the inclination to tackle these problems. Pakistan faced a situation in which the UGC, educators and policy makers were aware of critical problems but no one was able to do anything to resolve them.

In the meantime the quality and relevance of higher education continued to deteriorate and access remained one of the lowest in the world in terms of the percentage of the population attending university at the age cohort."

World Bank Higher Education Policy Note
Report No. 37247, June 28, 2006

The range of functions and powers vested in the HEC empowered it to emancipate higher education from the archaic academic and administrative orthodoxy. A dynamic vision to lead higher education to this cherished objective was required. On December 11th, 2002, in the first meeting of the Board of Governors, the Chairman HEC, Prof. Dr. Atta-ur-Rehman presented to its members the "Vision of the HEC."

> The HEC Vision
>
> "Transformation of our institutions of higher education into world class seats of learning, equipped to foster high quality education, scholarship and research, to produce enlightened citizens with strong moral and ethical values that build a tolerant and pluralistic society rooted in the culture of Pakistan."

The Medium Term Development Framework (MTDF)

The Government extended full support to HEC in the form of political will and financial resources to put the higher education system on track. It was now up to the HEC to define the reform framework and implementing strategy and carry it forward.

The next step was to develop a reform plan to articulate a strategic direction for the Commission. Based on extensive and wide ranging deliberations and in line with its vision, the HEC managed to evolve a Medium Term Development Framework (MTDF). The MTDF – a five year action plan, identified major issues faced by higher education sector and offered a sustainable vision and a strategy to resolve them.

This strategic framework was built around four core, and three cross cutting aims.

Core aims:

(i) Faculty Development
(ii) Improving Access and Learning
(iii) Excellence in Research
(iv) Relevance to National Priorities.

Supporting aims:

(i) Leadership, Governance and Management
(ii) Quality Assessment, Standards and Accreditation and
(iii) Infrastructure Development: Physical and Technological.

The Structure of MTDF

The structure followed by the HEC for MTDF was exactly in line with the logical frameworks in use for such strategic planning around the world. MTDF clearly defined its structural elements (i.e. general aims, specific objectives, major programmes, and performance indicators). It outlined activities and projects to implement the MTDF and developed a Monitoring and Evaluation (M&E) system to follow up on the progress made in achieving the targets.

In addition, the MTDF provided a vision of the role of the HEC as a "key driving force

for provision of accessible and world class higher education." To become such a force, the HEC was designed to play a threefold role i.e., evaluate, improve, and promote higher education and R&D.

The MTDF framework embodied HEC's vision for higher education in responding to the domestic and global challenges.

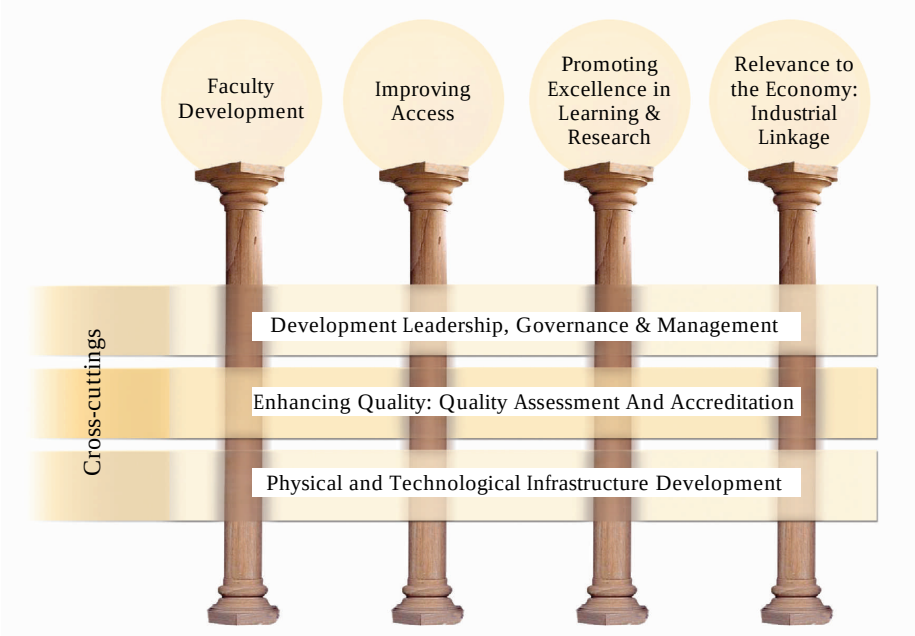
The Faculty Development programme comprises of a number of measures designed to achieve this crucial objective for improving higher education in Pakistan. These included training of new and existing faculty, re-hiring of retired faculty, recruitment from abroad, institutionalization of the Tenure Track System and increasing the percentage of faculty members holding a terminal degree, i.e. PhD.

The HEC was aware of the fact that a quantum change in the quality of research and education could only be brought about by improvement in the quality of the faculty. A poor faculty produced poor graduates who would then go on to generate further lower quality output. And so the cycle of poor quality would continue perpetually. The prime need therefore was to invest in creating a high quality faculty which would become the engine to help break out of the low quality cycle.

Improving Access envisages increasing the geographical spread of education and overcoming social biases of class, gender and religion, to extend equitable opportunity to all those eligible for higher education.

MTDF provided a vision of the role of the HEC, as a "key driving force for provision of accessible and world class higher education."

Core Strategic Aims



Promoting Excellence in Learning and Research recognizes high quality learning and research as the cardinal activity for all HEIs.

Research is a mandatory precondition for acquiring new knowledge and fostering better understanding. The transition towards a four-year undergraduate programme was an essential feature of this aim.

Ensuring Relevance, is the fourth core aim of the MTDF. Realizing the undeniable fact that industrial development lies at the heart of the economic revival in Pakistan, this aim focuses on supporting greater collaboration between academia and industry. As a developing nation with limited resources Pakistan needs to focus on the areas with direct relevance to its socio-economic development. Developing a culture of innovation aimed at productive entrepreneurship and job creation as opposed to the traditional strategy of employment in the public sector was required. The interventions to support this aim addressed this need.

Developing Leadership, Governance, and Management for improvement in the quality of education and research, improvements in university management and administration were essential. The HEC aims to assist HEIs in identifying areas requiring reforms, identifying best practices, and suggesting a mechanism for improvement. The main emphasis, of this aim is on training and accountability in administration and management matters.

> "The MTDF is embedded in a series of analyses and plans, particularly those issued by the Task Force on Improvement of Higher Education and by the Steering Committee (2002). It is also aligned with the vision developed in the National Macro MTDF, which aims at moving towards "a technologically driven knowledge economy for rapid and sustainable growth", and focuses on human resource development and technology to build the future....
>
> The MTDF reflects the fact that, in addition to its power of action, the HEC also has a vision and a strategic capacity. The MTDF contains all the necessary ingredients of a genuine strategic framework to revamp universities in Pakistan....
>
> Still a young institution, the HEC already has a legacy. Since its inception, it has been startlingly active and has shaken up the world of the universities."
>
> Pakistan Higher Education Policy Note
> World Bank Report No. 37247, June 28, 2006

Enhancing Quality: Quality Assessment and Accreditation suggests that quality cuts across all the core aims of MTDF i.e. Faculty Development, Access, Research and Learning, and Relevance. Both internal self-evaluation and external review were made the vital components of this cross cutting aim.

Physical and Technological Infrastructure is a composite of two sub aims; the first involves an estate strategy and covers conventional development of facilities and equipment to accommodate the huge expansion in enrolment, while the second focuses on the development of an information strategy and is devoted to networking, computerization, and digitalization throughout the university system in order to boost the quality of teaching and research.

MTDF was structured in such a manner that each core and supporting aim had its own strategy and programme of interventions. Targets measurable in terms of qualitative and quantitative performance indicators were clearly laid down. The targets set out in MTDF for each strategic aim were made compatible to the international best practices. The structure of MTDF permitted ongoing review and lesson learning for enhanced effectiveness. The subsequent chapters of this report present an in-detail deliberation on the implementation of these concepts.

ANNEXURES

Annex 1:University Wise Distribution of Extended Duration Foreign Faculty

Host Institution	Number
Air University, Islamabad	1
Allama Iqbal Open University, Islamabad	2
Bahria University Islamabad	2
Bahudin Zakaria University Multan	3
Balochistan University of Information Technology and Management Sciences	1
COMSATS Institute of Information Technology	19
DOW University of Health Sciences, Karachi	2
Fatima Jinnah Women University, Rawalpindi	1
Federal Urdu University of Arts, Science and Technology, Karachi	5
Ghulam Ishaq Khan Institute of Engineering Sciences & Technology, Swabi	6
Government College University, Lahore	10
Hazara University, Manshera	1
University of Karachi, Karachi	8
Institute of Business Administration, Karachi	2
Institute of Space Technology, Islamabad	2
International Islamic University, Islamabad	11
King Edward Medical University, Lahore	8
Kohat University of Science & Technology, Kohat	1
Lahore College for Women Universities, Lahore	2
Lahore University of Management Sciences, Lahore	1
Mehran University of Engineering & Technology, Jamshoro	2
National College of Arts, Lahore (Rawalpindi)	7
National University of Science & Technology, Rawalpindi	9
NED University of Engineering & Technology, Karachi	1
NWFP University of Engineering & Technology, Peshawar	2
Quaid-i-Azam University, Islamabad	9
Riphah International University, Islamabad	2
School of Mathematical Sciences GC University, Lahore	32
University of Agriculture, Faisalabad	5
University of Arid Agriculture, Rawalpindi	4
University of Azad Jammu and Kashmir, Pakistan	1
University of Engineering & Technology, Lahore	6
University of Engineering & Technology, Taxila	5
University of Gujrat, Gujrat	3
University of Health Sciences, Lahore	8
University of Malakand, Malakand	2
University of Peshawar, Peshawar	4
University of the Punjab, Lahore	10
University of Sargodha, Sargodha	4
University of Sindh, Jamshoro	1
University of Veterinary of Animal Sciences, Lahore	2

Annex 2: University Wise Distribution of Short Duration Foreign Faculty

Host Institution	Number
University of Balochistan, Quetta	2
Bahria University, Islamabad	1
COMSATS Institute of Information Technology (CIIT), Islamabad	15
HEC	1
Institute of Space Technology (IST) , Islamabad	2
Quaid-i-Azam University, Islamabad	5
Pakistan Institute of Engineering & Applied Sciences (PIEAS), Islamabad	1
International Islamic University (IIU), Islamabad	6
National Centre for Physics (NCP), Islamabad	2
Gomal University, DI Khan	1
Kohat University of Science and Technology (KUST), Kohat	2
University of Engineering & Technology, Peshawar	6
Peshawar University, Peshawar	1
Arid Agriculture Univeristy, Rawalpindi	1
Fatima Jinnah Women University (FJWU), Rawalpindi	1
Government College University (GCU), Lahore	10
National Centre of Excellence in Molecular Biology (NCEMB), Lahore	8
National College of Arts (NCA), Lahore	2
National University of Sciences and Technology (NUST), Rawalpindi	4
School of Mathematical Sciences, GCU, Lahore	7
University of Agriculture, Faisalabad	2
Punjab University (PU), Lahore	4
University of Engineering & Technology, Lahore	5
University of Engineering & Technology, Taxila	7
Sargodha University, Sargodha	6
University of Veterinary and Animal Sciences (UVAS), Lahore	1
King Edward Medical University (KEMU), Lahore	4
University of Health Sciences (UHS), Lahore	2
University of Education, Lahore	3
Gujrat University, Gujrat	4
DOW University of Health Sciences, Karachi	5
Husein Ebrahim Jamal Research Institute of Chemistry (H.E.J.), Karachi	6
Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro	6
NED University of Engineering & Technology (UET), Karachi	2
University of Karachi, Karachi	2
Institute of Business Administration (IBA), Karachi	1
Shah Abdul Latif University (SALU), Jamshoro	6

Annex 3: Funds Released Under Tenure Track System

S #.	Name of University / Institute	2005-06	2006-07	2007-08
1	Liaquat University of Medical & Health Sciences, Jamshoro	11,037,038	-	-
2	Government College University, Lahore	11,478,300	-	32,196,885
3	Lahore College for Women University, Lahore	2,521,200	-	-
4	University of Education, Lahore	415,355	-	-
5	University of Engineering. & Technology, Lahore	26,671,428	-	21,529,655
6	University of Balochistan, Quetta	13,880,766	-	-
7	University of Azad Jammu & Kashmir, Muzaffarabad	2,536,029	-	5,407,000
8	COMSATS Institute of IT, Islamabad	5,575,088	-	28,610,768
9	DOW University of Health Sciences, Karachi	-	537,112	-
10	Kohat University of Science & Technology, Kohat	193,207	593,164	13,975,400
11	Bahauddin Zakariya University, Multan	-	2,943,879	17,504,581
12	University of Agriculture, Faisalabad	-	-	8,270,000
13	University of Science & Technology, Bannu	-	-	6,604,595
14	University of Health Sciences, Lahore	-	-	1,736,960
15	Hazara University, Mansehra	-	-	2,660,325
16	University of Veterinary & Animal Sciences, Lahore	-	-	3,152,790
17	International Islamic University, Islamabad	-	-	8,415,318
18	University of Sargodha, Sargodha	-	-	4,344,000
19	Centre of Excellence in Analytical Chemistry, Jamshoro	-	-	495,700
Total		74,308,411	4,074,155	154,903,977

Annex 4: List of HEC Distinguished National Professors

First Batch (16.01.04)

1. Dr. Nasir-ud-Din (Biochemistry)
   Institute of Molecular Sciences & Bioinformatics
   35/1, Nisbat Road, Lahore

2. Dr. Qasim Jan (Geology)
   Vice Chancellor
   Quaid-i-Azam University
   Islamabad

3. Dr. Viqar Uddin Ahmed (Chemistry)
   HEJ Research Institute of Chemistry
   University of Karachi
   Karachi

4. Dr. Ahmed Hassan Dani (Archaeology)
   Director
   Taxila Institute of Asian Civilization
   Quaid-i-Azam University

5. Dr. Asghar Qadir (Mathematics)
   Director General
   NUST
   CAMP College of Electrical & Mechanical Engineering
   Peshawar Road Rawalpindi

6. Dr. S.I Ali (Botany)
   Department of Botany
   University of Karachi,
   Karachi

7. Dr. Saeed Akhtar Durrani (Engineering)
   Pakistan Institute Engineering & Applied Sciences
   Islamabad

8. Dr. Tariq Rahman (Pakistan Studies / History)
   National Institute of Pakistan Studies (NIPS)
   Quaid-i-Azam University
   Islamabad

9. Dr. Anwar-ul-Hassan Gilani (Microbiology)
   Department of Pharmaceutical Sciences
   The Aga Khan University
   Karachi

10. Dr. S. Riazuddin (Molecular Biology)
    Centre of Excellence of Molecular Biology
    University of the Punjab

11. Dr. Riaz Uddin (Physics)
    Department of Physics
    Quaid-i-Azam University
    Islamabad

12. Dr. Rabia Hussain (Microbiology)
    Department of Microbiology
    The Aga Khan University
    Karachi

13. Dr. Mohammad Iqbal Chaudhry (Chemistry)
    HEJ Research Institute of Chemistry
    University of Karachi
    Karachi

14. Dr. Abdul Raouf (Engineering / Management Sciences) Institute of Quality and Management Technolgy
    University of the Punjab
    Lahore

15. Dr. M. Akhtar (Biology)
    Director General
    School of Biological Sciences
    University of Punjab
    Lahore

16. Dr. Sheikh Arshad Saeed (Pharmacology)
    Dr. Panjwani institute of Molecular Medicine and Drug Research,The International Centre of Chemical Sciences,
    University of Karachi
    Karachi

Continued...

17. Dr. S. Qasim Mehdi (Bio-Chemistry)
Biomedical and Genetics Engineering Division
KRL Hospital,
Islamabad

Second Batch (23.07.05)

1. Dr. Anwar Waqar (Biochemistry)
University of Karachi
Karachi

2. Dr. Ajmal Khan (Botany)
University of Karachi
Karachi

3. Dr. Muhammad Ashraf (Botany)
210/B Satellite Town,
Jhang Saddar

4. Dr. Bina Siddiqui (Chemistry)
HEJ Research Institute of Chemistry
University of Karachi

5. Dr. Abdul Rauf Shakoori (Zoology)
School of Biological Sciences
University of the Punjab

6. Dr. Kausar Abdullah (Micro Biology)
House 46, Street 23, F-10/2
Islamabad

7. Dr. Sharif al Mujahid (Mass Communication)
C-110, Block-D, North Nazimabad
Karachi -74000

8. Dr. Syed Nawab Haider Naqvi (Economics)
House No. 10
Nizam-u-Din Road
F-11/4
Islamabad

9. Dr. Waseem Ahmed (Bio Chemistry)
Associate Prof.
Department of Biological Sciences
Quaid-i-Azam University
Islamabad

Third Batch (25.05.06)

1. Prof. Dr. M. Aslam Baig (Physics)
Quaid-i-Azam University
Islamabad

2. Dr. Ishrat Hussain (Economics)
12 Fatima Jinnah Road
Karachi

3. Dr. Iftikhar Ahmed Malik (Medicine)
129 Hali Road, Westridge-I
Rawalpindi

4. Dr. Fayyazuddin (Physics)
House No 28, Street No. 12, E-7
Islamabad

Continued...

Fourth Batch (26.05.07)

1. Dr. Tasawar Hayat (Mathematics)
   Department of Mathematics
   Quaid-i-Azam University
   Islamabad

2. Dr. Muhammad Ata-ur-Rahman (Biochemistry)
   Dean of Post Graduate Programme
   Basic Health Sciences
   Ziaudidn Medical University
   Karachi

3. Dr. Zulfiqar Ahmed Bhutta (Medical)
   Department of Pediatrics & Child Health
   The Aga Khan University Hospital
   Karachi 74800

Annex 5: List of Links under HEC – British Council Joint Higher Education Links Programme 2003-2007

Phase – I

S.No	Link Title	Field/Area	UK-Institution	Pakistan-Institution
1.	Developing Research capacities of health care educational institutions	Health care studies	Nuffield Institute for International Health, University of Leeds	Rawalpindi Medical College
2.	Sustainable Design practices in Built Environment	Architecture/ Environmental Design	School of Design at University of Dundee	Department of Environmental Design Allama Iqbal Open University, Islamabad National College of Arts, Lahore
3.	Training Women in Higher Education Management	Professional Development	Institute of Education University of London	Fatima Jinnah Women University, Rawalpindi
4.	Orientation to Agricultural Research and Methodology	Agriculture/Plant Sciences	Centre for Arid Zone Studies University of Wales Bangor	Department of Agronomy , NWFP Agricultural University Peshawar
5.	Education and Research	Education	School of Education, University of Sussex, Brighton	Institute of Education and Research, Peshawar
6.	Capacity Building Through Curriculum Development and Training	Psychology/Social Sciences	School of Psychology , University of Birmingham	Department of Psychology Government College University Lahore
7.	Capacity Building of Small and Medium Entrepreneurs	Social sciences/Management	Cranfield School of Management Cranfield University	Department of Economics, Government College University Lahore
8.	Biotechnology (Assay Kits for Diabetes)	Biotechnology	NETRIA, St. Bartholomew's Hospital, Queen Mary College, University of London	School of Biological Sciences Punjab University , National Health Research Complex, Pakistan, Medical Research Council, Sheikh Zayed Medical Complex Lahore
9.	Education	Education	School of Education, University of Manchester	Department of Education, Islamia University of Punjab, Lahore
10.	Engineering and Management Sciences	Engineering and Management Sciences	Centre for Rapid Product Development, North Umbria University	Institute of Quality & Technical Management, University of Punjab, Lahore
11.	Agriculture Sciences (Fisheries and Aquaculture)	Fisheries and Aquaculture	Aquaculture Wales, School of Biological sciences, University of Wales, Swansea	Department of Fisheries and Aquaculture, University of Veterinary and Animal Sciences, Lahore
12.	Teacher Training and Research in DNA Sequencing/ Genetics	Biological Sciences (Genetics)	Dept. of Pathology and Neuroscience, Nine Wells Medical School, University of Dundee	Centre for Molecular Genetics University of Karachi
13.	Marine Biodiversity Conservation in Pakistan	Marine Biodiversity	University Marine Biological Station at Millport(UMBSM) Isle of Cumrae, Scotland	Center for Excellence in Marine Biology, University of Karachi
14.	Postgraduate Curricula Revision and infrastructure Development at TIP	Textile	Institute of Science and Technology, University of Manchester	Textile Institute of Pakistan, Karachi
15.	Faculty Development in Postgraduate Research in Sustainable Infrastructure	Engineering Sciences	Water, Engineering and Development centre at Loughborough University	Faculty of Civil Engineering and Architecture, NED University of Engineering and Technology, Karachi

Continued...

Phase – II

S.No	Link Title	Field/Area	UK-Institution	Pakistan-Institution
1.	Natural Product Chemistry for New Medicines	Sciences	University of Oxford	HEJ Research Institute of Chemistry
2.	Education	Social Sciences	Institute of Education, University of London	Institute of Educational Development, AKU
3.	Nutraceutical Foods of Industrial Importance	Health Sciences	Department of Food Biosciences, University of Readings	HEJ Research Institute of Chemistry
4.	Development of Sepecialisim in Shellfish Aquaculture	Environment	University of Sterling	CEMB, University of Karachi
5.	Waste Treatment Management	Environment	Brunel University	University of Sindh, Jamshoro
6.	Field Rock Mechanics	Engineering	School of Civil Engineering	MUET, Jamshoro
7.	Development of Faculty of Community Health Sciences	Health Sciences	University of Birmingham	LUMHS & Baqai Medical University
8.	To Identify the root causes of Hepatitus B & C in District Kech, Balochistan	Health Sciences	University of Nottingham	Kech, Balochistan
9.	Bio-Nano-technology Research Initiative	Health Sciences	Division of Physical Biochemistry, MRC National Institute of Medical Research	UMT, Lahore
10.	Wildlife and Natural Resources Conservation	Environment	University of Essex	UVAS, Lahore
11.	Strengthening & Development of Environmental Training & Research Center	Environment	Imperial College, London	LCWU, Lahore
12.	Development of Collaborative Postgraduate Programme on Environmentally Sustainable Design	Environment	University of Edgehill, Lancashire	National College of Arts, Lahore
13.	Research & Split PhD Collaboration	Sciences	University of Aberdeen	Government College University, Lahore
14.	Development of SMES through Skills Enhancement	Social Sciences	Strathclyde University	University of Punjab
15.	Film & TV Studies	Social Sciences	Glasgow University	Becanhouse National University
16.	Receptor Binding Studies of Modified Bovine Growth Hormone	Health Sciences	University of London	University of Punjab
17.	Isolation of Novel Anti-MRSA Lead Agents from the Guttiferae	Health Sciences	Portsmouth University	LCWU, Lahore
18.	Capacity Building in Molecular Genetics	Health Sciences	University of Newcastle Upon Tyne	University of Faisalabad
19.	Capacity Building for Molecular Biology Studies in Fish Production	Sciences	University of Newcastle Upon Tyne	GCU, Faisalabad
20.	Multan Area Study Center	Social Science	University of London	Bahauddin Zakariya, Multan
21.	Socio-Cultural & Economic Factors involved in the spread of HIV/AIDS in Pakistan	Social Sciences	University of Sussex	QAU, Islamabad
22.	Teaching & Research	IT	Coventry University	Iqra University, Islamabad
23.	ESO/EF IIU/TOEFL	Social Sciences	International Islamic University	University of Wales
24.	Developing Bilingualism in Pakistan	Social Sciences	University of Birmingham	Fatima Jinnah Women University
25.	Undergraduate & Postgraduate Training & Research in the field of Mental Health	Health Sciences	University of Manchester	Rawalpindi Medical College
26.	Centre for Trauma Research & psychosocial Interventions	Health Sciences	Robert Gordan University	NUST-Military Hospital
27.	Electrical Engineering	IT	University of Essex	COMSATS, Wah Campus
28.	Improvement of Teaching & Research Methodologies	Sciences	University of Glasgow	NWFP Agriculture University
29.	Biological Sciences	Sciences	University of Bristol	NWFP Agriculture University
30.	Psychology	Social Sciences	University of Leicester	Frontier Woman University
31.	Gender Studies	Social Sciences	University of Warwick	University of Peshawar
32.	Archeology	Social Sciences	University of Cambridge	University of Peshawar
33.	HEC-BC Joint Higher Education Links Programme	Social Sciences	University of Luton	University of AJK
34.	Natural Sciences & Bioinformatics	Sciences	Liverpool John Moores University	Kohat University of Science & Technology
35.	Targeted Drug Delivery Systems	Health Sciences	University of Bradford	Gomal University, NWFP

Annex 6: Linkages Established under 'Linkages with Other Universities' Programme

S #	Name of Pakistani University	Name of Foreign Universities	Total Cost (Rs. million)	Field of Study
1.	International Islamic University, Islamabad	1. University of London, UK 2. National University of Singapore 3. Multimedia University, Malaysia 4. Kent State University, Ohio 5. Erfurt University, Germany	7.71	1. Telecommunication 2. Management Sciences, Library Material
2.	Balochistan University of Information Technology & Management Sciences, Quetta	University of Glasgow, UK	12.71	1. Engineering & Applied Science 2. Biotechnology & Informatics
3.	Institute of Quality & Technology Management, University of Punjab, Lahore	Institute of Retail Studies, University of Sterling, Scotland.	2.00	Management Sciences
4.	Gomal University Dera Ismail Khan	Department of Agricultural, Environmental & Analytical Chemistry, University of Glasgow, UK	5.00	Agriculture
5.	KIBGE, Karachi	Unit of Molecular Prevention & Therapy of Human Disease, Pasteur Institute Paris, France	10.10	Biotechnology & Genetic Engineering
6.	Bahauddin Zakarya University, Multan	La Trobe University, Australia	13.91	Business Administration
7.	University of Engineering & Technology, Texila	Queen's University, Belfast Northern Ireland, UK	3.54	Engineering
8.	Liaquat University of Medical & Health Sciences, Jamshoro	1. Karolinska Institute, Huddinge University, Stockholm, Sweden 2. Gleneagles Hospital Singapore	1.80	Medical & Public Health
9.	University of Sargodha, Sargodha	Friedrich Schiller University of Jena, Germany	4.91	Pharmacy
10.	COMSATS Institute of Information Technology, Islamabad	Texas A&M University, College Station, Texas USA	16.91	Physics
11.	National University of Modern Languages, Islamabad	Faculty of Governance & Organizational Science, Utrecht University, Netherlands	15.41	Organizational Science Linguistic, Literature & HRD
12.	NWFP Agriculture University Peshawar	1. University of Illinois, Urbana, Champaign, USA 2. University of California, Davis 3. University of Bonn, Germany	16.91	Agriculture
13.	University of Engineering & Technology, Lahore	Queen Mary University of London, UK	10.41	Civil, Electrical & Petrolium Engineering
14.	Mehran University of Engineering & Technology, Jamshoro	1. University of Leeds, UK 2. Colorado State University, USA 3. University of Nottingham, UK 4. Montan University of Leoben, Austria 5. University of Illinois, Urbana, Champaign, USA 6. Kyushu Institute of Technology, Japan	8.91	Engineering
15.	Sindh Agriculture University, Tandojam	1. Washington State University, USA 2. University of Wales Bangor, UK 3. Timiryazey Agriculture Academy, Moscow, Russia	16.91	Animal Husbandry & Veterinary Sciences
16.	Kohat University of Science & Technology, Kohat	University of Tsukuba, Japan	15.41	Biotechnology
17.	University of Engineering & Technology, Peshawar	University of Illinois at Urbana Champaign, Urbana, USA	15.91	Civil Engineering
18.	Fatimah Jinnah Women University, Rawalpindi	Indiana University, Bloomington, USA	4.18	Education
19.	Islamia University of Bahawalpur	Department of Geography & Geology Salzburg University, Austria	11.90	Geography & Geology
20.	Pakistan Institute of Engineering & Applied Sciences, Neelore, Islamabad	Harvard Medical School, Harvard University, USA	12.71	Physics
21.	University of Health Sciences, Lahore	1. University of Reims, France 2. Institute Alfred Fassord De Neurosciences, France	6.77	Material Engineering
22.	University of Karachi.	University of Tsukuba, Japan	12.71	Botany
23.	National University of Science & Technology, Rawalpindi	University of Witwatersland Wits, Johanesburg, South Africa	0.099	Mathematics
24.	NWFP Agriculture University Peshawar, University of Punjab Lahore	School of Land, Crop and Food Sciences, The University of Queensland, Australia	12.71	Weed Sciences
25.	Pakistan Institute of Development Economics, Islamabad	Harvard University USA	5.00	Economics

Annex 7: Approved Projects PAK-US Joint Academic and Research Programme Phase I

Title	Pakistani Collaborative	Foreign Collaborative
Development of Strategic model for improvement of construction project management education, research and practice in Pakistan	NED University of Engineering & Technology, Karachi	Florida International University, USA
Development of Guidelines for asphalt pavement recycling in Pakistan	National University of Sciences & Technology, Rawalpindi	Michigan State Univeristy E. Lansing, MI, USA
Development of computational mechanics infrastructure and human resources for advancing engineering design practices in Pakistan industry	GIK Institute of Engineering Science & Technology Topi, Swabi	University of Illinois, Champaign, USA
Establishment of Extrusion centre at Institute of food science and technology, University of Agriculture Faisalabad	University of Agriculture, Faisalabad	Texas A & M University System, USA
Determination of heavy metals and PAHs in airborne particulates in Lahore, Pakistan & Madison, WI, USA	University of Engineering & Technology, Lahore	University of Wisconsin, Madison, USA
Antimicrobial resistance in Pakistan: A programme to develop & strengthen capacity for surveillance and diagnosis through public-private sector	Aga Khan University, Karachi	Centres for Disease & Prevention, Atlanta, USA
Improving lifestyles of villagers in remote areas of Federally Administrated Tribal Areas of Pakistan by using renewable energy	Institute of Environmental Science & Engineering, NUST, Rawalpindi	Solar Energy International, Colorado, USA
Capacity building for research, education and training in water resources management in Pakistan	University of Engineering & Technology, Lahore	University of South Carolina, Columbia, USA

Continued...

Annex 7: Approved Projects PAK-US Joint Academic and Research Programme Phase II

Title	Pakistani Collaborative	Foreign Collaborative
Building molecular biology capacity for preventing tick transmitted diseases	Sindh Agriculture University, Sindh	University of Rhode Island, RI, USA
Multiplex Immunoassays for the detection of tuberculosis	University of Arid Agriculture, Rawalpindi	University of California, CA, USA Texas A & M University System,TX, USA
Development of biosecure, sustainable and cost-effective culture technologies for edible shrimp (Fenneropenaeus merguiensis) in Pakistan and production of Farfantepenaeus aztecus viral-pathogen-free broodstock populations and live-bait shrimp in the U.S.	University of Karachi	Texas Agriculture Experiment Station Shrimp Mariculture Research Facility, TX, USA
Nanomedicine for cancer research	HEJ Research Institute of Chemistry, International Center for Chemical Sciences, University of Karachi	College of Applied Health Sciences University of Illinois, Champaign, USA
Association of Particulate Matter with Daily Morbidity in Urban Population	Aga Khan University, Karachi	University of Albany, USA
Secure Pakistan Wheat Production through Controlling Rusts	Quaid-i-Azam University, Islamabad	Washington State University, WA, USA
Assessment and development of Renewable Groundwater Resources in the Quetta Valley, Pakistan	University of Balochistan, Quetta	Western Michigan University, MI, USA
Capacity building in Research Ethics and for Research on Ethics	Aga Khan University, Karachi	Johns Hopkins University, MD, USA
Development of an ITS-based Traffic Management Model for Metropolitan Areas of Pakistan with Karachi as a Pilot Study	NED University of Engineering and Technology, Karachi	University of Mississippi, MS, USA

Continued...

Annex 7: Approved Projects PAK-US Joint Academic and Research Programme Phase III

Title	Pakistani Collaborative	Foreign Collaborative
Synthesis and Characterization of Polymer Microgels for Biomedical Applications.	Department of Chemistry, Quaid-i-Azam University, Islamabad	Department of Chemistry of College of Smart Staten Island and the Graduate Center, The City University of New York.
Hepatitis C virus (HCV) of Management in Pakistan	National Center of Virology and Immunology NUST	The Rockefeller University Laboratory Virology & Infectious Disease Center for the Study of Hepatitis Agriculture Research Service, USDA
Novel triple acting chimeric antimicrobials for eradication of multidrug resistant strains of Staphy lococcus aureus	Centre of Excellence in Molecular Biology University of the Punjab, Lahore	
Upper Indus river flow reconstruction using tree-rings implications for agriculture and hydroelectricity	Department of Botany Federal Urdu University of Arts, Science & Technology, Karachi	Trustee of Columbia University in the city of New York
Bioremediation of Chromium and Arsenic from industrial wastewater	Department of Microbiology & Molecular Genetics, University of the Punjab, Lahore	Department of Botany and Microbiology, The University of Oklahoma, Norman, Oklahoma, USA
Enhance the sugarcane production in Pakistan by modern breeding technology	School of Biological Sciences, University of the Punjab, Lahore	Research Plant Molecular Geneticist, USDA-ARS, Sugarcane Research Laboratory 5883 USDA
Implementation of Superpave Binder and Asphalt Mix Specifications to Improve Pavement	UET, Department of Transportation Engineering & Management Lahore	Michigan State University Department of Civil & Environmental Engineering
Capacity Building of Lady Health Workers in rural Mardan, NWFP through the use of ICT based Telemedicine	NIIT, 166-A, Street 9, Chaklala Scheme III, Rawalpindi	APPNA, 6414 South Cass Avenue, Westmont, IL-60559, USA
Response Modification Factors of Typical Pakistani Reinforce Concrete and Masonry Buildings for the Pakistan seismic Code Development	Director, Earthquake Engineering Center, Department of Civil Engineering, NWFP UET, Peshawar	3122 Newmark Civil Engineering Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA
Telephone-based Speech Interface for Access to Information by Non-Literate Users	National University of Computer & Emerging Sciences	Carnegie Mellon University School of Computer Science, 5000 Forbes Avenue Pittsburgh, PA 15213
Management of greening by producing healthy plants, Plants, monitoring vectors an identification of tolerance	University of Agriculture, Faisalabad	Research Plant Oathologist USDA ARS National Clonal Germplasm Repository for Citrus and Dates 1060 Martin Luther King Blvd. Riverside, California 92507-5437 USA
Technology for Poor: Low-cost Information and Computing Technology for the Masses in Pakistan	Lahore University of Management Lahore	623 Soda Hall University of California at Berkeley Berkeley, CA 94720-1776 USA
Development of Materials Connection Centre	Department of Physics (Materials Research Laboratory) University of Peshawar, 25120 NWFP	Department of Materials Science & Engineering Boise State University USA
Discovery of Genetic Variation that enhances improvement of dairy production and health in cattle and buffalos.	Department of Livestock Production University of Veterinary and Animal Sciences, Lahore	Research Geneticist USDA, ARS, USA

Annex 8: Top 25 Research Conducting Universities/Institutions 2005 - 2007 (Minimum 10 publications)

Institution Name	2007	2006	2005	Total
Quaid-i-Azam University	390	322	166	878
University of Karachi	276	221	238	735
Aga Khan University	186	192	177	555
University of Agriculture, Faisalabad	251	149	67	465
University of Punjab	162	92	79	333
Government College University	97	60	31	188
COMSATS	92	64	27	183
University of Peshawar	77	58	43	178
National Institute of Biotechnology & Genetic Engineering	49	48	33	130
University of Sindh	59	40	23	122
Bahauddin Zakariya University	50	44	21	115
Pakistan Institute of Engg. & Applied Sciences	54	31	18	103
University of Engineering & Technology, Lahore	52	25	12	89
National University of Science & Technology	48	19	11	78
University of Arid Agriculture	49	21	7	77
University of Baluchistan	28	18	17	63
Islamia University, Bahawalpur	22	23	16	61
GIK Inst. Of Engineering & Technology, Topi	16	19	22	57
Gomal University	12	22	19	53
University of Sargodha	38	13	0	52
Lahore University of Management Sciences	16	13	10	39
NWFP Agriculture University	13	14	7	34
DOW University of Health Sciences	11	9	6	26
University of Azad Jammu & Kashmir	13	8	4	25
Allama Iqbal Open University	9	7	7	23

Annex 9: Top 25 Research Areas

S #	Subject Area	2007	2006	2005	Total
1	CHEMISTRY, MULTIDISCIPLINARY	146	196	187	529
2	PLANT SCIENCES	148	205	151	504
3	CRYSTALLOGRAPHY	124	101	29	254
4	CHEMISTRY, MEDICINAL	64	85	69	218
5	BIOCHEMISTRY & MOLECULAR BIOLOGY	65	69	65	199
6	PHARMACOLOGY & PHARMACY	60	61	60	181
7	MATERIALS SCIENCE, MULTIDISCIPLINARY	75	48	36	159
8	PHYSICS, APPLIED	67	60	32	159
9	CHEMISTRY, APPLIED	55	57	46	158
10	MATHEMATICS, APPLIED	75	64	19	158
11	ENVIRONMENTAL SCIENCES	70	47	32	149
12	BIOTECHNOLOGY & APPLIED MICROBIOLOGY	67	41	38	146
13	CHEMISTRY, INORGANIC & NUCLEAR	43	49	49	141
14	NUCLEAR SCIENCE & TECHNOLOGY	40	49	51	140
15	FOOD SCIENCE & TECHNOLOGY	74	35	19	128
16	AGRONOMY	45	41	32	118
17	MEDICINE, GENERAL & INTERNAL	39	41	35	115
18	PHYSICS, MULTIDISCIPLINARY	41	44	30	115
19	CHEMISTRY, ORGANIC	33	38	42	113
20	CHEMISTRY, ANALYTICAL	37	42	33	112
21	PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	30	41	31	102
22	CHEMISTRY, PHYSICAL	35	29	27	91
23	ENGINEERING, CHEMICAL	39	23	26	88
24	MECHANICS	44	30	13	87
25	PHYSICS, CONDENSED MATTER	46	29	11	86

Annex 10: Projects Sponsored by HEC - Relevance to National Economy, Regional Needs and Socio Economic Development

#	Name of the Project	Institution	Capital Cost
1.	Integrated Geo Sciences Research Project to enhance socio economic development in selected areas of University of AJK, Muzaffarabad	AJ&K	39.059
2.	Establishment of Earthquake Engineering Centre in the NWFP UET, Peshawar (Revised)	UET Peshawar	38.932
3.	Establishment of Advance Technical Research Centre in the NWFP Univ. of Engg. & Tech. Peshawar (App)	UET Peshawar	37.910
4.	Establishment of Institute of Bio-Technology & Genetic Engg. at NWFP Univ. of Agri. Peshawar	NWFP Agri Uni Peshawar	39.650
5.	Genetic Improvement of Brassica Oilseed Yield through Integrated Conventional & Biotechnological Approaches, NWFP Univ. of Agri. Peshawar	NWFP Agri Uni Peshawar	4.175
6.	Strengthening of Labs and Libraries of Faculties of crop production, crop protection, Nutrition Animal Husbandry and Veterinary and rural sciences NWFP agriculture Peshawar	NWFP Agri Uni Peshawar	39.885
7.	Establishment of Nuclear Medicine Research Lab. in the Deptt. of Chemistry, Univ. of Peshawar	University of Peshawar	17.000
8.	Establishment of Computer Based Learning at College of Home Economic at University of Peshawar	University of Peshawar	10.360
9.	Establishment of Center for Bio-technology, University of Peshawar	University of Peshawar	21.915
10.	Microbial ACC - Deaminase Bio Technology for Sustainable Production of Cereals. Department of Soil Sciences, Agricultural University, Faisalabad	University of Agriculture Faisalabad	4.464
11.	Food Industrial Waste Management for the Production of Lactic Acid through Biotechnology Applications, Agriculture University Faisalabad	University of Agriculture Faisalabad	12.350
12.	Adaptation of Infectious Bursal Disease Virus on Cell Culture for Production of Vaccine from the Indigenous Virus, Department of Veterinary Microbiology, Agriculture University, Faisalabad	University of Agriculture Faisalabad	10.600
13.	Up gradation of Department of Horticulture to Institute of Horticultural Sciences. Food Technology, Agriculture University, Faisalabad	University of Agriculture Faisalabad	32.330
14.	Up gradation of Department of Food Technology to Institute of Food Technology, Agriculture University Faisalabad	University of Agriculture Faisalabad	37.800
15.	Pilot Scale Production Purification and Characterization of Xylonite from Hyper Expressed Mutant of Chaetomium Thermopile, Agriculture University, Faisalabad	University of Agriculture Faisalabad	11.730
16.	Cloning Over - Expression of Somata - Tropin and its Use as a Lectogen agent in indigenous buffalo breeds, Arid Agriculture University, Rawalpindi	ARID University Rawalpindi	29.625
17.	Strengthening of Department of Soil sciences & Soil & Water Conservation Arid Agriculture University, Rawalpindi	ARID University Rawalpindi	33.580
18.	Strengthening of Labs & Libraries of Deptt. of Environment Sc. & Remote Sensing & Physics, Fatima Jinnah Women University, Rawalpindi	Fatima Jinnah Women University Rawalpindi	38.995
19.	Rejuvenation of High Tension Laboratory, Government College University, Lahore	GCU Lahore	69.221
20.	Sustainable Development Study Centre Government College University, Lahore.	GCU Lahore	9.975
21.	Process Dev. For the Production of Celluloses for the Industrial use, Government College University, Lahore (App)	GCU Lahore	9.815

Continued...

#	Name of the Project	Institution	Capital Cost
22.	Strengthening of teaching facilities at the College of Conventional Medicines by setting up Herbal - Analytical and Histopathology Laboratories at Islamia University, Bahawalpur	Islamia University Bahawalpur	37.400
23.	Characterization and application of Bio-Regulators of Economic Importance Instt. Of Chemistry and Bio-Technology, University of the Punjab, Lahore	University of the Punjab Lahore	32.153
24.	Strengthening of School of Biological Sciences, University of the Punjab (Training of PhD Fellows and Development of Scientific Manpower on Biological Sciences)	University of the Punjab Lahore	33.492
25.	IT Application in Management Sciences, University of the Punjab, Lahore	University of the Punjab Lahore	34.696
26.	Establishment of National Centre for Genomics (CoE in Molecular Biology, Univ. of Punjab, Lahore	CoE in Molecular Biology	188.724
27.	Development of Plant Genomic Lab. for Studies of Gene Discovery and Plant Pathogen Interaction, (CoE in in Molecular Biology, Univ. of Punjab, Lahore)	CoE in Molecular Biology	34.341
28.	Repair of Damaged Cochlear Function by Stem Cells Therapy at Centre of Excellence in Molecular Biology University of Punjab, Lahore	CoE in Molecular Biology	39.300
29.	Setting up of Architectural Engineering Labs. Studios and Library at Architecture Department, University of Engg. & Tech., Lahore	UET Lahore	37.814
30.	Setting up of Polymer Engineering Laboratories and Library at Chemical Engg. Deptt. University of Engg. & Tech., Lahore	UET Lahore	39.781
31.	Setting up of Geological Engineering Labs. and Library in the Deptt. of Mining UET, Lahore	UET Lahore	36.022
32.	Establishment of Advance Manufacturing System (AMS) Lab in Mechanical Engineering Department, UET, Taxila	UET Taxila	35.110
33.	Establishment of Video and Image Processing (VIP) Laboratory at University of Engg. & Tech., Taxila	UET Taxila	20.093
34.	Establishment of Centre for Industrial IT Control & Automation of Electrical Engg. Deptt. at UET, Taxila	UET Taxila	39.200
35.	Up gradation of Research Laboratories of Transportation Engineering at University of Engg. & Tech., Taxila	UET Taxila	37.800
36.	Establishment of industrial analytical centre (HEJ research institute of chemistry)	HEJ Karachi	39.250
37.	Mass Multiplication of Virus and Diseases Free Banana & Orchards Plants using Tissue Culture, Technology, HEJ, Research Instt. of Chemistry, Univ. of Karachi	HEJ Karachi	6.850
38.	Strengthening of Industrial Analytical Centre for the Support of the Export-based Industries, HEJ, Research Institute of Chemistry, University of Karachi.	HEJ Karachi	29.548
39.	Estab. of Tissue Culture Technology Park HEJ Research Institute of Chemistry, University of Karachi.	HEJ Karachi	14.900
40.	Establishment of diagnostic and Clinical Research facilities at International Centre for Chemical Sciences, HEJ, Karachi.	HEJ Karachi	25.460
41.	Institute of Sustainable Halophyte Utilization in University of Karachi.	University of Karachi	37.140
42.	Establishment of Botanical Gardens at University of Karachi	University of Karachi	29.289
43.	Establishment of Herbarium at University of Karachi.	University of Karachi	23.412
44.	Application of Bio-Tech and Genetic Engineering for the Diagnosis & Treatment of Human Diseases (KIBGE), Dr. A.Q. Khan Institute	Dr A Q Khan Institute Karachi	198.000
45.	Establishment of Bio-medical Engg. Laboratory in the Deptt. of Electronic & Telecommunication Engg. at Mehran University of Engg. & Tech. Jamshoro	MUET Jamshoro	31.857

Continued...

#	Name of the Project	Institution	Capital Cost
46.	Strengthening of Laboratories of Department of Mining Engineering Mehran Univ. of Engg.& Tech., Jamshoro	MUET Jamshoro	37.934
47.	Estab. of Centre for Automotive Engineering, NED University of Engg. & Tech, Karachi. Phase-l)	NED University of E & T Karachi	169.000
48.	Centre for Simulation and Modeling, NED University of Engg. & Tech., Karachi	NED University of E & T Karachi	32.760
49.	Development of Department of Industrial and Manufacturing Engg. at NED UET Karachi	NED University of E & T Karachi	32.540
50.	Establishment of Product Development Centre NED, UET, Karachi.	NED University of E & T Karachi	37.900
51.	Identification and Cloning of Inherited Alopecia, Ectrodemal and Nail Dysplasia Genes, Quaid-i-Azam University	QAU Islamabad	20.670
52.	Multimedia Courseware Design Center	AIOU	33.396
53.	Development of Grid Enabled Knowledge Management System Through Joint Collaboration Between NUST Rawalpindi and Caltech, USA	NUST Rawalpindi	9.516
54.	Strengthening and Up-gradation of Research Centre for Bio-Technology, Army Medical College, NUST.	NUST Rawalpindi	36.269
55.	Establishment of International Institute of Peace and Stability Conflict Resolution NUST	NUST Rawalpindi	39.737
56.	Support to Bio-tech. Educational and Research Programme of NWFP Univ. of Agriculture, Peshawar.	NWFP Agri Uni Peshawar	38.644
57.	Date Palm Research Institute (DPRI), Shah Abdul Latif Univ. Khairpur	SALU Khairpur	30.735
58.	Establishment of Department of Range Management and Forestry, University of Arid Agriculture, Rawalpindi	ARID Rawalpindi	35.976
59.	Production of Pathogen Free Horticultural Plants (Strengthening of Department of Horticulture) University of Arid Agriculture, Rawalpindi	ARID Rawalpindi	35.884
60.	Establishment of Institute of Industrial Biotechnology, Government College University, Lahore	GCU Lahore	48.087
61.	Strengthening of Facilities at the University Diagnostic Lab. and Establishment of Animal House at University of Veterinary & Animal Sciences, Lahore	UVAS Lahore	38.108
62.	Manufacturing Technologies Development Centre, University of Engineering and Technology, Lahore	UET Lahore	120.000
63.	Institute of Communication Technologies, Mehran University of Engg. & Tech; Jamshoro.(Phase-l)	MUET Jamshoro	189.426
64.	Strengthening of Deptt. of Archaeology, Shah Abdul Latif University, Khairpur	SALU Khairpur	20.846
65.	Strengthening and Expansion of Cowasjee Earth Quake Study Centre (CESNED), NED University of Engineering & Technology, Karachi.	NED University of E & T Karachi	37.614
66.	Estab. of IT for Integration with Medical Curriculum and Research, Liaquat University of Medical and Health Sciences, Jamshoro, Sindh	LUMHS Jamshoro	39.500
67.	Capacity Building for Multipurpose Basic Medical Sciences Liaquat University of Medical & Health Sciences, Jamshoro.	LUMHS Jamshoro	37.900
68.	Development of Chemicals of Industrial and Agricultural Significance by using Indigenous Resources, Punjab University	University of the Punjab Lahore	27.448
69.	Establishment of Scientific Ophthalmology Laboratory for conducting diagnosis and research at Liaquat University of Medical & Health Sciences Jamshoro.	LUMHS Jamshoro	26.950
70.	Establishment of National Schools of Nursing at Liaquat University of Medical & Health Sciences, Jamshoro	LUMHS Jamshoro	194.853
71.	Strengthening of Veterinary Clinical Services at University of Veterinary & Animal Sciences, Lahore	UVAS Lahore	36.902

Continued...

#	Name of the Project	Institution	Capital Cost
72.	Agro bacterium mediated transformation of Artemisia sp for enhancement of Artemisinin an anti-malarial compound, Quaid-i-Azam University, Islamabad.	QAU Islamabad	9.734
73.	Establishment of Institute of Nursing at Dow University of Health Sciences, Karachi.	DOW University of Health Sciences Karachi	182.077
74.	Establishment of Centre for Advanced Studies in Vaccinology and Biotechnology UoB Quetta	UoB Quetta	180.000
75.	Establishment of Forensic DNA Laboratory at CEMB, University of the Punjab, Lahore	NCoE Excellence in Molecular Biology	37.499
76.	Computerization and Networking of University of Veterinary and Animal Science, Lahore. (Phase-II)	UVAS Lahore	32.619
77.	Strengthening of Department of Food Sciences and Technology, University of Karachi	University of Karachi	37.810
78.	Establishment of Laboratory Facilities in Forensic & Toxicology Department, Liaquat University of Medical and Health Sciences, Jamshoro	LUMHS Jamshoro	14.700
79.	Insulation and Up gradation of Materials Fabrication & Characterization Facilities at Govt. College University, Lahore.	GCU Lahore	36.956
80.	Establishment of Department of Medical Education, University of Health Sciences, Lahore	UHS Lahore	21.788
81.	Establishment of Medicinal and Aromatic Plant Collection and Processing Facility at New Murree, HEJ	HEJ Karachi	17.321
82.	Computer Control Flexible Manufacturing Lab. at Baharia University, Islamabad	Bahria University Islamabad	20.000
83.	Establishment of the Department of Forestry Education at University of Malakand Campus II, Sheringal.	Malakand University Chakdara	28.771
84.	Efficient use of Land and Water Resources for Poverty Alleviation, Sindh Agricultural University, Tandojam.	SAU Tandojam	39.840
85.	Establishment of Microelectronics Research Centre at University of the Punjab, Lahore	University of the Punjab Lahore	38.500
86.	Establishment of the Department of Allied Health Sciences at University of Health Sciences, Lahore.	UHS Lahore	33.670
87.	Food Technology: A Tool for Poverty Alleviation for Rural Area, Sindh Agriculture University, Tandojam.	SAU Tandojam	36.404
88.	Establishment of Botanical Gardens at University of Peshawar, Peshawar.	UoP	37.861
89.	Strengthening of Institute of Clinical Psychology, Univ. of Karachi	UoK	31.531
90.	Establishment of Institute of Nursing at University of Health Sciences, Lahore	UHS Lahore	38.880
91.	Preservation and Research on High Valued Medicinal Plants at High Altitude Research Centre, Sheringal, University of Malakand.(Revised)	Malakand University Chakdara	32.808
92.	Establishment of a Satellite Large, Animal Teaching Cum Research Hospital at Postgraduate Agriculture Research Station, University of Agriculture, Faisalabad.	UoA Faisalabad	32.368
93.	Development of Powder Metallurgy Lab., Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad.	PIEAS Islamabad	35.400
94.	Development of Animal Product Technologies (Milk and Meat) at Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University, Tandojam	SAU Tandojam	34.819
95.	Establishment of Grid Node at NUST Instt.of Information Tech. (NIIT) at National University of Science & Technology, Rawalpindi.	NUST Rawalpindi	34.832
96.	Development of Fruit and Vegetable Processing Centre, Sindh Agriculture University, Tandojam	SAU Tandojam	29.985
97.	Agro. Information Technology Centre (ATIC) , Sindh Agri. University, Tandojam	SAU Tandojam	34.076

Continued...

#	Name of the Project	Institution	Capital Cost
98.	Establishment of Electronic System Design Automation (ESDA) Centre, National University of Science & Technology (NUST), Rawalpindi.	NUST Rawalpindi	25.670
99.	Markers Assisted Transfer Between Oil- Seed Rape & Mustard for Improved Oil Content and Quality NWFP Univ. of Agri. Peshawar	NWFP Agriculture University Peshawar	31.750
100.	Strengthening of the Department of Plant breeding and genetics	ARID Rawalpindi	37.783
101.	Establishment of Institute of Materials Science (Phase-I) at Bahauddin Zakriya University, Multan	BZU Multan	173.744
102.	Development of Lasers and Bio-Photonics Lab., Pakistan Institute of Engineering and Applied Sciences (PIEAS), Islamabad.	PIEAS Islamabad	35.206
103.	Establishment of Research Facilities for Development of Wildlife & Ecosystem at Bhuniky Campus, University of Veterinary & Animal Sciences, Lahore.	UVAS Lahore	38.728
104.	Establishment of Bio-Pharmaceutics Laboratory, University of Peshawar	UoP	34.527
105.	Development and Study of Magnetic Nanostructures Quaid-i-Azam University, Islamabad	QAU Islamabad	132.639
106.	Development of Botanical Garden, Department of Botany, University of Balochistan Quetta	UoB Quetta	22.380
107.	Establishment of Undergraduate Marine Science Laboratories and Facilities at LUAWMS, Uthal Balochistan	LUAWMS, Uthal	477.840
108.	Strengthening Department of Water Resources Management, NWFP Agriculture University Peshawar	NWFP Agriculture University Peshawar	36.387
109.	Establishment of Centre for Photo-Pharmaceutical and Nutraceuticals Research, University of Peshawar.	UoP	39.114
110.	Strengthening of Centre of Excellence in Geology, University of Peshawar.	NCE in Geology, UoP, Peshawar	652.138
111.	National Institute of Urban Infrastructure Planning at the NWFP University of Engg. & Tech., Peshawar	UET Peshawar	190.601
112.	Establishment of Institute of Earthquake Engineering and Engineering Seismology by Upgrading its existing earthquake Engineering Centre at University of Engg. & Tech., Peshawar.	UET Peshawar	487.219
113.	Establishment of Botanical Garden & Herbarium, University of Malakand, Campus-I	Malakand University Chakdara	38.316
114.	Development of on Farm Research Facilities, University of Arid Agriculture, Rawalpindi.	ARID Rawalpindi	343.224
115.	Establishment of Bahauddin Zakariya University College of Textile Engineering, Multan.	BZU Multan	248.965
116.	Strengthening of Institute of Food Science and Technology into National Institute of Food Science and Technology, University of Agriculture, Faisalabad.	UoA Faisalabad	169.856
117.	Study of Protein Biomarkers for Early Diagnosis of Diseases, School of Biological Sciences, University of Punjab Lahore.	UoP Lahore	31.642
118.	Establishment of National Centre for STEM Cell and Regenerative Medicine, Centre of Excellence in Molecular Biology, University of the Punjab, Lahore.	CoE in Molecular Biology	384.390
119.	Establishment of Renewable Energy Research and Development Centre, University of Engg. & Tech; Taxila.	UET Taxila	38.804
120.	Establishment of Poultry & Dairy Animals Training & Research Center at New Campus at Bhunnekey, UVAS, Lahore	UVAS Lahore	432.644
121.	Dairy Training and Development Centre at University of Veterinary and Animal Sciences, Lahore.	UVAS Lahore	109.815
122.	Establishment of Research and training facilities for Pet Breeding at University of Veterinary and Animal Sciences, Ravi Campus Lahore	UVAS Lahore	29.971

Continued...

#	Name of the Project	Institution	capital cost	Sector
123.	Establishment of Research and Training Facilities for Fisheries and Aquaculture Department at New Campus University of Veterinary and Animal Sciences, Lahore, Bhuniky (Pattoki)	UVAS Lahore	39.331	
124.	Establishment of Medical College at Sargodha University. (President Directive)	UoS	802.158	
125.	Establishment of Center for research in Endocrinology and reproductive sciences, University of Health Sciences Lahore.	UHS Lahore	31.771	
126.	Establishment of Experimental Facilities for Fabrication and Characterization of Functional Nonoceramics at Centre of Excellence in Solid State Physics, University of the Punjab, Lahore.	Centre of Excellence in Solid State Physics University of the Punjab Lahore	38.533	
127.	Conversion of traditional knowledge and Resources into Modern Sciences, Industries and Environmental Protection using Pakistan Indigenous (Plant) Genetic Resources, University of Karachi.	UoK	31.992	
128.	Establishment of Bio-Equivalence centre at Dr Punjwani Centre, University of Karachi	HEJ Karachi	249.130	
129.	Industrial Linkages - Technology Parks and Technology Incubators, HEJ Research Institute of Chemistry, Karachi University, Karachi.	HEJ Karachi	184.000	
130.	Strengthening of Department of Bio-Medical Engineering, Environmental Engineering & Management and Provision of Communal Facilities at MUET	MUET Jamshoro	469.080	
131.	Establishment of the Department of City & Regional Planning at Mehran Univ. of Engg. & Tech; Jamshoro	MUET Jamshoro	38.669	
132.	Establishment of Medical Genetics and Infectious diseases, DUHS	DOW University of Health Sciences Karachi	425.639	
133.	Institute of Avionics and Aerospace at Air University, Islamabad. Phase-I).	Air University Islamabad	288.195	
134.	Designing and Fabrication of Micro and Nanoelectronic Devices for Applications, COMSATS IIT, Islamabad.	CIIT Islamabad	185.448	
135.	Establishment of Department of Robotics & Artificial Intelligence at College of EME NUST.	NUST Rawalpindi	324.397	
136.	Establishment of NUST Centre for Virology and Immunology.	NUST Rawalpindi	38.530	
137.	National Centre for Bio-Informatics, Quaid-i-Azam University, Islamabad. Phase-I)	QAU Islamabad	183.000	
138.	Establishment of A 5 MV Tandem Accelerator at Deptt. of Physics, Quaid-i-Azam University, Islamabad.	QAU Islamabad	241.000	
139.	Establishment of Experimental Physics Laboratory at Quaid-i-Azam University, Islamabad.	QAU Islamabad	225.000	
140.	Establishment of Institute of Vacuum Science and Technology, Quaid-i-Azam university, Islamabad.	QAU Islamabad	195.000	
141.	Strengthening of Institute of Space Technology, Islamabad.	IST Islamabad	458.567	
144.	G. Total		12842.640	

Annex 11: Recurring and Development Grants to Universities/DAIs/Centres 2002-08

Rs. million

Category	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities	1,915.485	2,702.908	4,618.393	2,716.180	2,481.627	5,197.807
Agriculture Universities	520.041	270.266	790.307	693.379	382.221	1,075.600
Engineering Universities	563.768	306.627	870.395	845.068	572.967	1,418.035
Medical Universities	-	16.332	16.332	35.000	37.000	72.000
Degree Awarding Institutes	51.180	103.475	154.655	97.794	83.493	181.287
Other Institutes	170.759	-	170.759	265.173	-	265.173
Centres	129.330	-	129.330	194.053	-	194.053
Total	3,350.563	3,399.608	6,750.171	4,846.647	3,557.308	8,403.955

Category	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities	3,287.000	5,060.615	8,347.615	4,882.000	4,883.653	9,765.653
Agriculture Universities	823.000	514.347	1,337.347	1,150.000	417.996	1,567.996
Engineering Universities	1,164.470	1,005.749	2,170.219	1,598.000	1,563.500	3,161.500
Medical Universities	105.000	178.713	283.713	225.000	364.214	589.214
Degree Awarding Institutes	123.564	416.004	539.568	210.000	569.742	779.742
Other Institutes	340.470	-	340.470	523.800	48.615	572.415
Centres	250.853	-	250.853	403.000	-	403.000
Total	6,094.357	7,175.428	13,269.785	8,991.800	7,847.720	16,839.520

Category	2006-07			2007-08		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities	6,866.619	4,824.131	11,690.750	5,924.752	4,230.976	10,155.728
Agriculture Universities	1,509.261	573.822	2,083.083	1,320.079	616.119	1,936.198
Engineering Universities	2,038.517	2,194.712	4,233.229	1,782.993	1,975.798	3,758.791
Medical Universities	329.850	516.699	846.549	356.091	498.725	854.816
Degree Awarding Institutes	379.807	958.781	1,338.588	414.100	1,076.957	1,491.057
Other Institutes	767.614	16.040	783.654	646.451	4.369	650.820
Centres	486.484	-	486.484	417.131	-	417.131
Total	12,378.153	9,084.185	21,462.338	10,861.597	8,402.944	19,264.541

Continued...

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities						
Universityof Karachi, Karachi	226.855	853.767	1,080.622	307.127	308.084	615.211
University of Sindh, Jamshoro	213.347	15.053	228.400	277.351	105.435	382.786
Shah Abdul Latif University, Khairpur	52.625	51.144	103.769	71.407	76.319	147.726
Federal Urdu University of Arts, Science & Technology,Karachi	-	-	-	109.977	71.208	181.185
University of the Punjab, Lahore	288.347	12.943	301.290	374.851	175.279	550.130
Bahauddin Zakariya University, Multan	80.960	43.196	124.156	105.248	50.000	155.248
Islamia University, Bahawalpur	93.341	93.052	186.393	121.343	97.000	218.343
Fatima Jinnah WomenUniversity, Rawalpindi	23.000	39.390	62.390	32.200	26.682	58.882
Government College University, Lahore	-	11.750	11.750	15.000	59.683	74.683
Lahore College for Women University, Lahore	-	5.280	5.280	10.000	72.180	82.180
Government College University, Faisalabad	-	-	-	-	-	-
University of Sargodha, Sargodha	-	-	-	10.000	-	10.000
University of Education, Lahore	-	-	-	10.000	13.000	23.000
University of Peshawar, Peshawar	220.468	36.123	256.591	286.608	71.595	358.203
Gomal University, D.I. Khan	122.086	59.072	181.158	158.712	79.850	238.562
Kohat University of Science& Tech., Kohat	-	14.190	14.190	10.000	15.000	25.000
University of Malakand, Chakdara, Dir	-	-	-	10.000	22.179	32.179
Hazara University, Dhodial, Mansehra	-	15.000	15.000	10.000	36.460	46.460
University of Balochistan, Quetta	119.126	26.301	145.427	154.864	120.426	275.290
Balochistan University of I.T. & Management Sciences, Quetta	-	19.670	19.670	5.000	41.244	46.244
Quaid-i-Azam University, Islamabad	112.529	164.193	276.722	157.541	201.465	359.006
International Islamic University, Islamabad	121.486	5.700	127.186	157.932	10.363	168.295
National University of Modern Languages, Islamabad	27.775	72.797	100.572	36.108	58.203	94.311
AJK University, Muzaffarabad	98.151	97.576	195.727	137.411	75.915	213.326
Karakurum International University, Gilgit	25.000	80.000	105.000	37.500	50.000	87.500
Sardar Bahadur Khan Women University, Quetta	-	-	-	-	-	-
University of Science & Tech., Bannu	-	-	-	-	-	-
Frontier Women University, Peshawar	-	-	-	-	-	-
Allama Iqbal Open University, Islamabad	90.389	32.812	123.201	110.000	15.000	125.000
Virtual University of Pakistan, Lahore	-	78.229	78.229	-	250.000	250.000
Air University, Islamabad	-	-	-	-	10.000	10.000
NUST, Rawalpindi	-	875.670	875.670	-	369.057	369.057
Bahria University, Islamabad	-	-	-	-	-	-
Sub-Total	1,915.485	2,702.908	4,618.393	2,716.180	2,481.627	5,197.807

Continued...

Name of Institution	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities						
Universityof Karachi, Karachi	400.000	482.466	882.466	575.000	525.169	1,100.169
University of Sindh, Jamshoro	305.000	182.988	487.988	450.000	219.532	669.532
Shah Abdul Latif University, Khairpur	92.000	73.379	165.379	130.000	44.905	174.905
Federal Urdu University of Arts, Science & Technology, Karachi	115.000	80.143	195.143	142.000	109.512	251.512
University of the Punjab, Lahore	482.000	484.946	966.946	638.000	547.449	1,185.449
Bahauddin Zakariya University, Multan	142.000	207.184	349.184	218.000	149.524	367.524
Islamia University, Bahawalpur	156.000	130.556	286.556	235.000	67.238	302.238
Fatima Jinnah Women University, Rawalpindi	46.000	44.000	90.000	75.000	80.905	155.905
Government College University, Lahore	17.000	111.799	128.799	65.000	56.060	121.060
Lahore College for Women University, Lahore	15.000	56.702	71.702	50.000	91.016	141.016
Government College University, Faisalabad	30.000	68.363	98.363	60.000	57.749	117.749
University of Sargodha, Sargodha	25.000	86.632	111.632	65.000	176.347	241.347
University of Education, Lahore	20.000	38.844	58.844	50.000	1.000	51.000
University of Peshawar, Peshawar	310.000	351.374	661.374	430.000	197.144	627.144
Gomal University, D.I. Khan	173.000	72.372	245.372	225.000	37.609	262.609
Kohat University of Science& Tech., Kohat	15.000	40.662	55.662	40.000	106.837	146.837
University of Malakand, Chakdara, Dir	10.000	45.072	55.072	40.000	73.824	113.824
Hazara University, Dhodial, Mansehra	10.000	72.258	82.258	50.000	42.688	92.688
University of Balochistan, Quetta	180.000	262.081	442.081	245.000	143.113	388.113
Balochistan University of I.T. & Management Sciences, Quetta	20.000	55.730	75.730	50.000	123.979	173.979
Quaid-i-Azam University, Islamabad	178.000	364.067	542.067	276.000	608.982	884.982
International Islamic University, Islamabad	190.000	674.562	864.562	238.000	40.750	278.750
National University of Modern Languages, Islamabad	46.000	24.717	70.717	90.000	15.795	105.795
AJK University, Muzaffarabad	158.000	80.121	238.121	220.000	119.337	339.337
Karakurum International University, Gilgit	42.000	150.000	192.000	60.000	116.827	176.827
Sardar Bahadur Khan Women University, Quetta	-	-	-	15.000	14.877	29.877
University of Science & Tech., Bannu	-	-	-	-	-	-
Frontier Women University, Peshawar	-	-	-	-	30.000	30.000
Allama Iqbal Open University, Islamabad	110.000	19.312	129.312	150.000	354.773	504.773
Virtual University of Pakistan, Lahore	-	162.500	162.500	-	179.780	179.780
Air University, Islamabad	-	47.000	47.000	-	126.138	126.138
NUST, Rawalpindi	-	538.407	538.407	-	404.794	404.794
Bahria University, Islamabad	-	52.378	52.378	-	20.000	20.000
Sub-Total	3,287.000	5,060.615	8,347.615	4,882.000	4,883.653	9,765.653

Continued...

Name of Institution	2006-07			2007-08		
	Rec.	Dev.	Total	Rec.	Dev.	Total
General Universities						
Universityof Karachi, Karachi	765.489	238.040	1,003.529	628.190	89.405	717.595
University of Sindh, Jamshoro	647.428	238.000	885.428	548.782	109.477	658.259
Shah Abdul Latif University, Khairpur	180.638	55.513	236.151	157.996	25.000	182.996
Federal Urdu University of Arts, Science & Technology, Karachi	213.527	70.372	283.899	186.762	3.000	189.762
University of the Punjab, Lahore	902.615	728.223	1,630.838	709.662	428.519	1,138.181
Bahauddin Zakariya University, Multan	297.164	236.067	533.231	255.144	227.721	482.865
Islamia University, Bahawalpur	302.723	28.000	330.723	264.777	106.475	371.252
Fatima Jinnah Women University, Rawalpindi	93.265	43.571	136.836	81.575	26.250	107.825
Government College University, Lahore	99.573	104.187	203.760	87.092	56.232	143.324
Lahore College for Women University, Lahore	83.916	80.234	164.150	73.398	49.778	123.176
Government College University, Faisalabad	101.451	30.103	131.554	88.734	24.960	113.694
University of Sargodha, Sargodha	103.890	167.208	271.098	90.868	152.069	242.937
University of Education, Lahore	79.252	2.000	81.252	69.318	31.000	100.318
University of Peshawar, Peshawar	597.769	262.059	859.828	514.889	293.469	808.358
Gomal University, D.I. Khan	276.805	53.296	330.101	242.109	84.399	326.508
Kohat University of Science& Tech., Kohat	61.511	119.000	180.511	53.801	168.697	222.498
University of Malakand, Chakdara, Dir	59.721	134.346	194.067	52.235	72.070	124.305
Hazara University, Dhodial, Mansehra	75.078	158.962	234.040	65.667	62.220	127.887
University of Balochistan, Quetta	307.804	139.868	447.672	262.860	203.720	466.580
Balochistan University of I.T. & Management Sciences, Quetta	73.610	190.203	263.813	64.383	90.965	155.348
Quaid-i-Azam University, Islamabad	381.553	258.713	640.266	330.546	282.933	613.479
International Islamic University, Islamabad	296.006	13.452	309.458	258.903	79.660	338.563
National University of Modern Languages, Islamabad	138.443	69.255	207.698	121.089	38.035	159.124
AJK University, Muzaffarabad	273.384	180.045	453.429	231.164	100.179	331.343
Karakurum International University, Gilgit	75.646	82.580	158.226	66.164	53.016	119.180
Sardar Bahadur Khan Women University, Quetta	49.311	30.000	79.311	27.830	56.920	84.750
University of Science & Tech., Bannu	52.099	44.163	96.262	45.569	110.000	155.569
Frontier Women University, Peshawar	43.253	44.518	87.771	37.831	1.000	38.831
Allama Iqbal Open University, Islamabad	233.694	19.000	252.694	198.783	48.453	247.236
Virtual University of Pakistan, Lahore	-	195.773	195.773	68.874	22.000	90.874
Air University, Islamabad	-	90.608	90.608	39.757	105.551	145.308
NUST, Rawalpindi	-	697.872	697.872	-	987.803	987.803
Bahria University, Islamabad	-	18.900	18.900	-	40.000	40.000
Sub-Total	6,866.619	4,824.131	11,690.750	5,924.752	4,230.976	10,155.728

Continued...

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Agriculture Universities						
Sindh Agriculture University, Tandojam	166.022	109.941	275.963	215.829	96.541	312.370
University of Agriculture, Faisalabad	238.396	91.219	329.615	309.915	122.828	432.743
University of Arid Agriculture, Rawalpindi	13.687	18.991	32.678	20.118	70.451	90.569
NWFP University of Agriculture, Peshawar	101.936	50.115	152.051	132.517	52.401	184.918
University of Veterinary & Animal Sciences, Lahore	-	-	-	15.000	40.000	55.000
Lasbela University of Agriculture, Water & Marine Sciences, Uthal (Balochistan)	-	-	-	-	-	-
Sub-Total	520.041	270.266	790.307	693.379	382.221	1,075.600

Name of Institution	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Agriculture Universities						
Sindh Agriculture University, Tandojam	235.000	98.864	333.864	315.000	72.404	387.404
University of Agriculture, Faisalabad	348.000	180.191	528.191	465.000	140.403	605.403
University of Arid Agriculture, Rawalpindi	65.000	102.318	167.318	110.000	76.627	186.627
NWFP University of Agriculture, Peshawar	150.000	84.081	234.081	210.000	40.238	250.238
University of Veterinary & Animal Sciences, Lahore	25.000	48.893	73.893	50.000	88.324	138.324
Lasbela University of Agriculture, Water & Marine Sciences, Uthal (Balochistan)	-	-	-	-	-	-
Sub-Total	823.000	514.347	1,337.347	1,150.000	417.996	1,567.996

Name of Institution	2006-07			2007-08		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Agriculture Universities						
Sindh Agriculture University, Tandojam	427.616	78.904	506.520	374.016	46.931	420.947
University of Agriculture, Faisalabad	572.173	128.870	701.043	493.296	111.397	604.693
University of Arid Agriculture, Rawalpindi	129.654	70.577	200.231	113.402	174.060	287.462
NWFP University of Agriculture, Peshawar	249.369	138.002	387.371	218.111	111.578	329.689
University of Veterinary & Animal Sciences, Lahore	78.949	147.469	226.418	69.053	115.703	184.756
Lasbela University of Agriculture, Water & Marine Sciences, Uthal (Balochistan)	51.500	10.000	61.500	52.201	56.450	108.651
Sub-Total	1,509.261	573.822	2,083.083	1,320.079	616.119	1,936.198

Continued...

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Engineering Universities						
NED University of Engg & Tech., Karachi	95.483	62.162	157.645	137.878	65.134	203.012
Mehran University of Engg. & Tech., Jamshoro	85.391	120.282	205.673	136.732	69.271	206.003
Quaid-i-Awam University of Engg., Science & Tech., Nawabshah	38.344	28.280	66.624	62.025	79.863	141.888
University of Engg. & Tech., Lahore	170.382	64.303	234.685	254.017	92.835	346.852
University of Engg. & Tech., Taxila	43.761	20.671	64.432	63.938	74.177	138.115
NWFP University of Engg. & Tech., Peshawar	104.868	0.929	105.797	156.000	96.582	252.582
Balochistan University of Engg. & Tech., Khuzdar	25.539	10.000	35.539	34.478	95.105	129.583
Sub-Total	563.768	306.627	870.395	845.068	572.967	1,418.035

Name of Institution	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Engineering Universities						
NED University of Engg & Tech., Karachi	210.000	209.682	419.682	290.000	236.324	526.324
Mehran University of Engg. & Tech., Jamshoro	257.000	144.319	401.319	275.000	201.202	476.202
Quaid-i-Awam University of Engg., Science & Tech., Nawabshah	78.000	91.830	169.830	118.000	98.223	216.223
University of Engg. & Tech., Lahore	313.000	215.215	528.215	490.000	540.584	1,030.584
University of Engg. & Tech., Taxila	77.470	120.442	197.912	125.000	125.012	250.012
NWFP University of Engg. & Tech., Peshawar	180.000	163.342	343.342	235.000	333.389	568.389
Balochistan University of Engg. & Tech., Khuzdar	49.000	60.919	109.919	65.000	28.766	93.766
Sub-Total	1,164.470	1,005.749	2,170.219	1,598.000	1,563.500	3,161.500

Name of Institution	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Engineering Universities						
NED University of Engg & Tech., Karachi	376.983	449.318	826.301	329.729	337.854	667.583
Mehran University of Engg. & Tech., Jamshoro	383.834	285.618	669.452	335.721	257.534	593.255
Quaid-i-Awam University of Engg., Science & Tech., Nawabshah	136.672	113.884	250.556	119.540	65.650	185.190
University of Engg. & Tech., Lahore	622.051	536.712	1,158.763	544.079	636.391	1,180.470
University of Engg. & Tech., Taxila	155.061	253.448	408.509	135.624	69.618	205.242
NWFP University of Engg. & Tech., Peshawar	288.624	546.732	835.356	252.446	601.217	853.663
Balochistan University of Engg. & Tech., Khuzdar	75.291	9.000	84.291	65.853	7.534	73.387
Sub-Total	2,038.517	2,194.712	4,233.229	1,782.993	1,975.798	3,758.791

Continued...

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Medical Universities						
Liaquat University of Medical & Health Sciences, Jamshoro	-	16.332	16.332	25.000	37.000	62.000
Dow University of Health Sciences, Karachi	-	-	-	-	-	-
University of Health Sciences, Lahore	-	-	-	10.000	-	10.000
Khyber Medical University, Peshawar	-		-	-		-
King Edward Medical University, Lahore	-	-	-	-	-	-
Sub-Total	-	16.332	16.332	35.000	37.000	72.000

Name of Institution	2004-05			2005-06		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Medical Universities						
Liaquat University of Medical & Health Sciences, Jamshoro	90.000	121.925	211.925	140.000	160.837	300.837
Dow University of Health Sciences, Karachi	-	-	-	50.000	147.127	197.127
University of Health Sciences, Lahore	15.000	56.788	71.788	35.000	56.250	91.250
Khyber Medical University, Peshawar	-		-	-		-
King Edward Medical University, Lahore	-	-	-	-	-	-
Sub-Total	105.000	178.713	283.713	225.000	364.214	589.214

Name of Institution	2006-07			2007-08		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Medical Universities						
Liaquat University of Medical & Health Sciences, Jamshoro	210.179	146.000	356.179	183.834	99.000	282.834
Dow University of Health Sciences, Karachi	76.188	252.631	328.819	66.638	346.000	412.638
University of Health Sciences, Lahore	43.483	118.068	161.551	38.032	52.725	90.757
Khyber Medical University, Peshawar	-		-	27.830	-	27.830
King Edward Medical University, Lahore	-	-	-	39.757	1.000	40.757
Sub-Total	329.850	516.699	846.549	356.091	498.725	854.816

Continued...

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Degree Awarding Institutes (DAIs)						
Institute of Business Administration, Karachi	16.782	-	16.782	25.509	19.551	45.060
COMSATS Institute of IT, Islamabad	-	84.918	84.918	20.000	10.000	30.000
Pakistan Institute of Engg. & Applied Sciences (PIEAS), Islamabad	-	10.000	10.000	-	50.500	50.500
Institute of Management Sciences, Peshawar	-	-	-	-	-	-
Insttitute of Space Technology, Islamabad	-	-	-	-	-	-
Sukkur Institute of Business Administration, Sukkur	-	5.822	5.822	-	3.442	3.442
Pakistan Institute of Development Economics, Islamabad	-	-	-	-	-	-
National College of Arts, Lahore	34.398	2.735	37.133	52.285	-	52.285
Dawood College of Engineering, Karachi	-	-	-	-	-	-
Kinniard College for Women, Lahore	-	-	-	-	-	-
Sub-Total	51.180	103.475	154.655	97.794	83.493	181.287
Total (Universities & DAIs)	3,050.474	3,399.608	6,450.082	4,387.421	3,557.308	7,944.729

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Degree Awarding Institutes (DAIs)						
Institute of Business Administration, Karachi	33.564	27.980	61.544	45.000	-	45.000
COMSATS Institute of IT, Islamabad	90.000	233.008	323.008	165.000	363.792	528.792
Pakistan Institute of Engg. & Applied Sciences (PIEAS), Islamabad	-	21.143	21.143	-	87.000	87.000
Institute of Management Sciences, Peshawar	-	-	-	-	20.000	20.000
Insttitute of Space Technology, Islamabad	-	-	-	-	-	-
Sukkur Institute of Business Administration, Sukkur	-	-	-	-	-	-
Pakistan Institute of Development Economics, Islamabad	-	-	-	-	-	-
National College of Arts, Lahore	-	34.000	34.000	-	18.950	18.950
Dawood College of Engineering, Karachi	-	99.873	99.873	-	80.000	80.000
Kinniard College for Women, Lahore	-	-	-	-	-	-
Sub-Total	123.564	416.004	539.568	210.000	569.742	779.742
Total (Universities & DAIs)	5,503.034	7,175.428	12,678.462	8,065.000	7,799.105	15,864.105

Name of Institution	2002-03			2003-04		
	Rec.	Dev.	Total	Rec.	Dev.	Total
Degree Awarding Institutes (DAIs)						
Institute of Business Administration, Karachi	57.528	40.000	97.528	50.317	1.000	51.317
COMSATS Institute of IT, Islamabad	238.880	531.648	770.528	199.395	785.581	984.976
Pakistan Institute of Engg. & Applied Sciences (PIEAS), Islamabad	-	188.117	188.117	-	82.830	82.830
Institute of Management Sciences, Peshawar	33.400	73.553	106.953	29.213	18.584	47.797
Insttitute of Space Technology, Islamabad	50.000	30.000	80.000	43.733	90.000	133.733
Sukkur Institute of Business Administration, Sukkur	-	-	-	19.878	30.000	49.878
Pakistan Institute of Development Economics, Islamabad	-	-	-	35.781	18.978	54.759
National College of Arts, Lahore	-	76.672	76.672	-	47.984	47.984
Dawood College of Engineering, Karachi	-	18.791	18.791	-	-	-
Kinniard College for Women, Lahore	-	-	-	35.781	2.000	37.781
Sub-Total	379.807	958.781	1,338.588	414.100	1,076.957	1,491.057
Total (Universities & DAIs)	11,124.056	9,068.145	20,192.201	9,798.015	8,398.575	18,196.590

Continued...

Name of Institution	2002-03		2003-04	
	Rec.	Total	Rec.	Total
Other Institutes				
Applied Economics Research Centre,University of Karachi, Karachi	14.558	14.558	22.128	22.128
HEJ Research Institute of Chemistry, University of Karachi, Karachi	44.432	44.432	67.537	67.537
Third World Centre for Science &Tech., University of Karachi, Karachi	25.000	25.000	38.000	38.000
Dr. Panjwani Centre for Molecular Medicine & Drug Research, University of Karachi, Karachi	-	-	-	
Dr. A. Q. Khan Institute of Bio-Technology & Genetic Engg., University of Karachi, Karachi	-	-	-	
Institute of Biochemistry & Biotechnology, University of Punjab, Lahore	1.244	1.244	1.816	1.816
Institute of Clincial Psychology, University of Karachi, Karachi	4.842	4.842	7.069	7.069
Centre for Clincial Psychology, University of Punjab, Lahore	2.623	2.623	3.830	3.830
Z.A. Bhutto Agriculture College, Dokri (Sindh Agriculture University, Tandojam)	11.345	11.345	16.564	16.564
University College of Agriculture, B.Z. University, Multan	3.149	3.149	4.598	4.598
University College of Engg. & Tech., B.Z. University, Multan	6.387	6.387	9.325	9.325
School of Biological Sciences, University of Punjab, Lahore	-	-	10.000	10.000
Water Management Research Centre, University of Agriculture, Faisalabad	4.504	4.504	6.576	6.576
Scientific Instrumentation Centre, UET, Peshawar	2.047	2.047	2.866	2.866
Shaikh Zayed Islamic Centre, University of Peshawar, Peshawar	4.887	4.887	6.842	6.842
Shaikh Zayed Islamic Centre, University of Punjab, Lahore	4.887	4.887	6.842	6.842
Shaikh Zayed Islamic Centre, University of Karachi, Karachi	4.887	4.887	6.842	6.842
Quaid-i-Azam Chair, Quaid-i-Azam University, Islamabad	1.903	1.903	2.778	2.778
Shah Abdul Latif Bhitai Chair, University of Karachi, Karachi	1.782	1.782	2.602	2.602
Seerat Chair, University of Karachi, Karachi	0.264	0.264	0.385	0.385
Seerat Chair, Islamia University, Bahawalpur	0.393	0.393	0.574	0.574
Salam Chair in Physics, Govt. College University, Lahore	1.150	1.150	1.679	1.679
Dawah Academy, International Islamic University, Islamabad	30.475	30.475	46.320	46.320
School of Physical Sciences, University of Punjab, Lahore	-	-	-	-
School of Mathematical Sciences, Govt. College University, Lahore	-	-	-	-
COMSTECH Islamabad	-	-	-	-
Al-Khawarzmi Institute of Computer Sciences, UET, Lahore	-	-	-	-
Sub Total	170.759	170.759	265.173	265.173

Continued...

Name of Institution	2004-05		2005-06		
	Rec.	Total	Rec.	Dev.	Total
Other Institutes					
Applied Economics Research Centre, University of Karachi, Karachi	29.116	29.116	43.000		43.000
HEJ Research Institute of Chemistry, University of Karachi, Karachi	88.864	88.864	134.000		134.000
Third World Centre for Science &Tech., University of Karachi, Karachi	50.000	50.000	75.000		75.000
Dr. Panjwani Centre for Molecular Medicine & Drug Research, University of Karachi, Karachi	-	-	25.000		25.000
Dr. A. Q. Khan Institute of Bio-Technology & Genetic Engg., University of Karachi, Karachi	-	-	-		-
Institute of Biochemistry & Biotechnology, University of Punjab, Lahore	2.488	2.488	5.000		5.000
Institute of Clincial Psychology, University of Karachi, Karachi	9.684	9.684	12.500		12.500
Centre for Clincial Psychology, University of Punjab, Lahore	5.246	5.246	10.000		10.000
Z.A. Bhutto Agriculture College, Dokri (Sindh Agriculture University, Tandojam)	19.049	19.049	28.000		28.000
University College of Agriculture, B.Z. University, Multan	6.298	6.298	14.000		14.000
University College of Engg. & Tech., B.Z. University, Multan	12.774	12.774	18.000		18.000
School of Biological Sciences, University of Punjab, Lahore	20.000	20.000	40.000		40.000
Water Management Research Centre, University of Agriculture, Faisalabad	7.562	7.562	10.000		10.000
Scientific Instrumentation Centre, UET, Peshawar	3.296	3.296	5.500		5.500
Shaikh Zayed Islamic Centre, University of Peshawar, Peshawar	7.868	7.868	11.500		11.500
Shaikh Zayed Islamic Centre, University of Punjab, Lahore	7.868	7.868	11.500		11.500
Shaikh Zayed Islamic Centre, University of Karachi, Karachi	7.868	7.868	11.500		11.500
Quaid-i-Azam Chair, Quaid-i-Azam University, Islamabad	3.195	3.195	4.500		4.500
Shah Abdul Latif Bhitai Chair, University of Karachi, Karachi	2.992	2.992	3.600		3.600
Seerat Chair, University of Karachi, Karachi	0.443	0.443	1.000		1.000
Seerat Chair, Islamia University, Bahawalpur	0.660	0.660	1.200		1.200
Salam Chair in Physics, Govt. College University, Lahore	1.931	1.931	4.000		4.000
Dawah Academy, International Islamic University, Islamabad	53.268	53.268	55.000		55.000
School of Physical Sciences, University of Punjab, Lahore	-	-	-		-
School of Mathematical Sciences, Govt. College University, Lahore	-	-	-		-
COMSTECH Islamabad	-	-	-		48.615
Al-Khawarzmi Institute of Computer Sciences, UET, Lahore	-	-	-		-
Sub-Total	340.470	340.470	523.800		572.415

Continued...

Name of Institution	2006-07		2007-08	
	Rec.	Total	Rec.	Total
Other Institutes				
Applied Economics Research Centre, University of Karachi, Karachi	51.435	51.435	44.988	44.988
HEJ Research Institute of Chemistry, University of Karachi, Karachi	171.602	171.602	150.092	150.092
Third World Centre for Science &Tech., University of Karachi, Karachi	99.186	99.186	86.754	86.754
Dr. Panjwani Centre for Molecular Medicine & Drug Research, University of Karachi, Karachi	33.411	33.411	29.223	29.223
Dr. A. Q. Khan Institute of Bio-Technology & Genetic Engg., University of Karachi, Karachi	30.540	30.540	26.712	26.712
Institute of Biochemistry & Biotechnology, University of Punjab, Lahore	5.579	5.579	4.880	4.880
Institute of Clincial Psychology, University of Karachi, Karachi	15.630	15.630	13.671	13.671
Centre for Clincial Psychology, University of Punjab, Lahore	12.820	12.820	11.213	11.213
Z.A. Bhutto Agriculture College, Dokri (Sindh Agriculture University, Tandojam)	37.669	37.669	32.842	32.842
University College of Agriculture, B.Z. University, Multan	22.395	22.395	19.588	19.588
University College of Engg. & Tech., B.Z. University, Multan	29.624	29.624	25.910	25.910
School of Biological Sciences, University of Punjab, Lahore	52.909	52.909	46.277	46.277
Water Management Research Centre, University of Agriculture, Faisalabad	11.266	11.266	9.406	9.406
Scientific Instrumentation Centre, UET, Peshawar	6.181	6.181	5.160	5.160
Shaikh Zayed Islamic Centre, University of Peshawar, Peshawar	13.153	13.153	10.981	10.981
Shaikh Zayed Islamic Centre, University of Punjab, Lahore	13.253	13.253	11.065	11.065
Shaikh Zayed Islamic Centre, University of Karachi, Karachi	13.590	13.590	11.347	11.347
Quaid-i-Azam Chair, Quaid-i-Azam University, Islamabad	5.064	5.064	4.228	4.228
Shah Abdul Latif Bhitai Chair, University of Karachi, Karachi	4.003	4.003	3.342	3.342
Seerat Chair, University of Karachi, Karachi	1.118	1.118	0.933	0.933
Seerat Chair, Islamia University, Bahawalpur	1.328	1.328	1.108	1.108
Salam Chair in Physics, Govt. College University, Lahore	4.336	4.336	3.620	3.620
Dawah Academy, International Islamic University, Islamabad	61.524	61.524	51.366	51.366
School of Physical Sciences, University of Punjab, Lahore	20.000	20.000	-	-
School of Mathematical Sciences, Govt. College University, Lahore	30.000	30.000	25.047	25.047
COMSTECH Islamabad	-	16.040	-	4.369
Al-Khawarzmi Institute of Computer Sciences, UET, Lahore	20.000	20.000	16.698	16.698
Sub-Total	767.614			
		783.654	646.451	650.820

Continued...

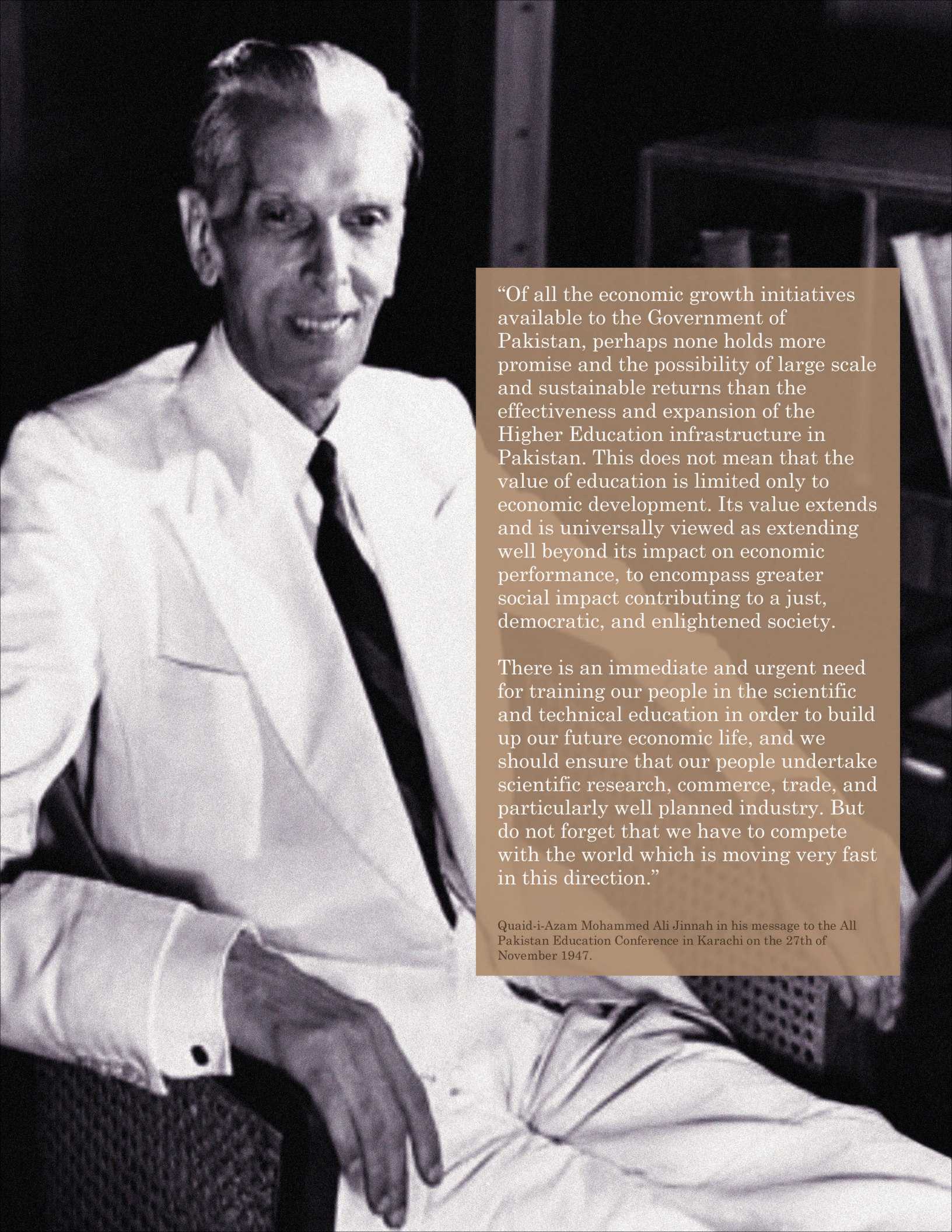
Name of Institution	2002-03		2003-04	
	Rec.	Total	Rec.	Total
Centre of Excellence in:				
Geology, University of Peshawar, Peshawar	6.243	6.243	8.740	8.740
Physical Chemistry, University of Peshawar, Peshawar	7.164	7.164	10.889	10.889
Solid State Physics, University of Punjab, Lahore	6.789	6.789	9.505	9.505
Water Resources Engg., UET, Lahore	8.142	8.142	11.887	11.887
Molecular Biology, University of Punjab, Lahore	21.467	21.467	32.630	32.630
Marine Biology, University of Karachi, Karachi	7.180	7.180	10.483	10.483
Analytical Chemistry, University of Sindh, Jamshoro	6.416	6.416	9.752	9.752
Mineralogy, University of Balochistan, Quetta	4.740	4.740	6.636	6.636
Psychology, Quaid-i-Azam University, Islamabad	7.192	7.192	10.500	10.500
History & Cultural Research, Quaid-i-Azam University, Islamabad	10.556	10.556	14.778	14.778
Arts & Design, Mehran University of Engg. & Tech., Jamshoro	-	-	5.000	5.000
Gender Studies, Quaid-i-Azam University, Islamabad	-	-	-	-
Area Study Centre for:				
South Asian Studies, University of Punjab, Lahore	5.428	5.428	7.600	7.600
Europe, University of Karachi, Karachi	2.664	2.664	3.890	3.890
Far East & South East Asia, University of Sindh, Jamshoro	4.009	4.009	5.853	5.853
Russia, China & Central Asia, University of Peshawar, Peshawar	4.477	4.477	6.805	6.805
Middle East & Arab Countries, University of Balochistan, Quetta	1.868	1.868	2.615	2.615
Africa, North & South America, Quaid-i-Azam University, Islamabad	3.717	3.717	5.650	5.650
Pakistan Study Centre at:				
University of the Punjab, Lahore	2.739	2.739	4.000	4.000
University of Karachi, Karachi	2.876	2.876	4.200	4.200
University of Sindh, Jamshoro	3.021	3.021	4.230	4.230
University of Peshawar, Peshawar	4.219	4.219	5.904	5.904
University of Balochistan, Quetta	2.474	2.474	3.464	3.464
National Institute of Pakistan Studies, Quaid-i-Azam University, Islamabad	5.949	5.949	9.042	9.042
Sub-Total	129.330	129.330	194.053	194.053
Grand Total	3,350.563	6,750.171	4,846.647	8,403.955

Continued...

Name of Institution	2004-05		2005-06	
	Rec.	Total	Rec.	Total
Centre of Excellence in:				
Geology, University of Peshawar, Peshawar	12.486	12.486	25.000	25.000
Physical Chemistry, University of Peshawar, Peshawar	14.328	14.328	25.000	25.000
Solid State Physics, University of Punjab, Lahore	13.578	13.578	25.000	25.000
Water Resources Engg., UET, Lahore	16.284	16.284	25.000	25.000
Molecular Biology, University of Punjab, Lahore	42.934	42.934	62.000	62.000
Marine Biology, University of Karachi, Karachi	14.360	14.360	24.000	24.000
Analytical Chemistry, University of Sindh, Jamshoro	12.832	12.832	25.000	25.000
Mineralogy, University of Balochistan, Quetta	7.631	7.631	15.000	15.000
Psychology, Quaid-i-Azam University, Islamabad	12.075	12.075	18.000	18.000
History & Cultural Research, Quaid-i-Azam University, Islamabad	16.995	16.995	22.000	22.000
Arts & Design, Mehran University of Engg. & Tech., Jamshoro	8.000	8.000	14.000	14.000
Gender Studies, Quaid-i-Azam University, Islamabad	-	-	3.000	3.000
Area Study Centre for:				
South Asian Studies, University of Punjab, Lahore	8.740	8.740	12.000	12.000
Europe, University of Karachi, Karachi	5.328	5.328	10.000	10.000
Far East & South East Asia, University of Sindh, Jamshoro	8.018	8.018	12.000	12.000
Russia, China & Central Asia, University of Peshawar, Peshawar	8.954	8.954	13.000	13.000
Middle East & Arab Countries, University of Balochistan, Quetta	3.407	3.407	7.000	7.000
Africa, North & South America, Quaid-i-Azam University, Islamabad	6.498	6.498	9.000	9.000
Pakistan Study Centre at:				
University of the Punjab, Lahore	4.600	4.600	6.500	6.500
University of Karachi, Karachi	5.752	5.752	8.500	8.500
University of Sindh, Jamshoro	4.865	4.865	7.500	7.500
University of Peshawar, Peshawar	6.790	6.790	9.500	9.500
University of Balochistan, Quetta	4.500	4.500	9.000	9.000
National Institute of Pakistan Studies, Quaid-i-Azam University, Islamabad	11.898	11.898	16.000	16.000
Sub-Total	250.853	250.853	403.000	403.000
Grand Total	6,094.357	13,269.785	8,991.800	16,839.520

Continued...

Name of Institution	2006-07		2007-08	
	Rec.	Total	Rec.	Total
Centre of Excellence in:				
Geology, University of Peshawar, Peshawar	32.474	32.474	28.403	28.403
Physical Chemistry, University of Peshawar, Peshawar	29.442	29.442	25.751	25.751
Solid State Physics, University of Punjab, Lahore	30.913	30.913	27.035	27.035
Water Resources Engg., UET, Lahore	28.455	28.455	24.888	24.888
Molecular Biology, University of Punjab, Lahore	76.850	76.850	67.217	67.217
Marine Biology, University of Karachi, Karachi	30.106	30.106	26.333	26.333
Analytical Chemistry, University of Sindh, Jamshoro	29.303	29.303	25.630	25.630
Mineralogy, University of Balochistan, Quetta	18.530	18.530	16.207	16.207
Psychology, Quaid-i-Azam University, Islamabad	23.638	23.638	19.735	19.735
History & Cultural Research, Quaid-i-Azam University, Islamabad	25.237	25.237	21.070	21.070
Arts & Design, Mehran University of Engg. & Tech., Jamshoro	17.780	17.780	14.844	14.844
Gender Studies, Quaid-i-Azam University, Islamabad	3.311	3.311	2.765	2.765
Area Study Centre for:				
South Asian Studies, University of Punjab, Lahore	13.484	13.484	11.258	11.258
Europe, University of Karachi, Karachi	11.606	11.606	9.690	9.690
Far East & South East Asia, University of Sindh, Jamshoro	13.500	13.500	11.271	11.271
Russia, China & Central Asia, University of Peshawar, Peshawar	14.819	14.819	12.372	12.372
Middle East & Arab Countries, University of Balochistan, Quetta	9.538	9.538	7.963	7.963
Africa, North & South America, Quaid-i-Azam University, slamabad	10.531	10.531	8.793	8.793
Pakistan Study Centre at:				
University of the Punjab, Lahore	7.466	7.466	6.233	6.233
University of Karachi, Karachi	9.881	9.881	8.250	8.250
University of Sindh, Jamshoro	8.648	8.648	7.220	7.220
University of Peshawar, Peshawar	11.433	11.433	9.542	9.542
University of Balochistan, Quetta	10.915	10.915	9.112	9.112
National Institute of Pakistan Studies, Quaid-i-Azam University, Islamabad	18.623	18.623	15.549	15.549
Sub-Total	486.484	486.484	417.131	417.131
Grand Total	12,378.153	21,462.338	10,861.597	19,264.541



"Of all the economic growth initiatives available to the Government of Pakistan, perhaps none holds more promise and the possibility of large scale and sustainable returns than the effectiveness and expansion of the Higher Education infrastructure in Pakistan. This does not mean that the value of education is limited only to economic development. Its value extends and is universally viewed as extending well beyond its impact on economic performance, to encompass greater social impact contributing to a just, democratic, and enlightened society.

There is an immediate and urgent need for training our people in the scientific and technical education in order to build up our future economic life, and we should ensure that our people undertake scientific research, commerce, trade, and particularly well planned industry. But do not forget that we have to compete with the world which is moving very fast in this direction."

Quaid-i-Azam Mohammed Ali Jinnah in his message to the All Pakistan Education Conference in Karachi on the 27th of November 1947.

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List of Acronyms

Acad	Academics
ACS	Australian Computer Society
AFPGMI	Armed Forces Post- Graduate Medical Institute
AGPR	Accountant General of Pakistan Revenue
AIOU	Allama Iqbal Open Univeristy
AJK	Azad Jammu Kashmir.
AKU	Aga Khan University
APQN	Asia Pacific Quality Network
BPS	Basic Pay Scale
BUITMS	Balochistan University of Information Technology & Management Sciences
C&EN	Chemical & Engineering News
CDWP	Central Development Working Party
CRI	Children Resource International
CSF	Competitiveness Support Fund
CVT	Continuously Variable Transmission
DAIs	Degree Awarding Institutions
DDWP	Departmental Development Working Party
ECNEC	Executive Committee of the National Economic Council
e-journals	Electronic Journals
ELTR	English Language Teaching Reforms
FANA	Federally Administered Northern Areas
FATA	Federally Administered Tribal Areas
FFHP	Foreign Faculty Hiring Programme
FPDP	Faculty Professional Development Programme
Gbps	Giga bites per second
GNP	Gross National Product
HEC	Higher Education Commission
HEIs	Higher Education Institutions
HRDC	Human Resource Development Centre
IBA	Institute of Business Administration
IEEE	Institute of Electrical and Electronics Engineers
IIU	International Islamic University
INQAAHE	International Network of Quality Assurance Agencies in Higher Education
IRSIP	International Research Support Initiative Programme
IT	Information Technology
JICA	Japanese International Cooperation Aid
LID	Learning Innovation Department
M&E	Monitoring and Evaluation
MCU	Multi-point Control Unit
MoST	Ministry of Science and Technology
MoU	Memorandum of Understanding
MTDF	Medium Term Development Framework
MUO	Model University Ordinance
NAAC	National Accreditation and Assessment Council
NAHE	National Academy of Higher Education
NCES	National Committee on Examination Systems
NCRC	National Curriculum Review Committees
NDL	National Digital Library
NIS	Network & Information Systems

NIT	National Institute of Transportation
NREN	National Research and Education Network
NRPU	National Research Programme for Universities
NTS	National Testing Service
NUST	National University of Science and Technology
NWFP	North West Forntier Province
OSS	Overseas Scholarship Scheme
PERN	Pakistan Education & Research Network
PI	Principal Investigator
pm	per month
POA	Pakistan Olympic Association
POCR	Pakistan Organization of Collaboration Research
PRP	Pakistan Research Repository
PSB	Pakistan Sports Board
PU	Punjab University
QA	Quality Assurance
QAA	Quality Assurance Agency
QAC	Quality Assurance Committee
QAD	Quality Assurance Department
QAU	Quaid-i-Azam University
R&D	Research & Development
Rs	Rupees
SCHE	Steering Committee on Higher Education
SMC	Scholarship Management Committee
SSHRC	Social Sciences and Humanities Research Council
TFHE	Task Force on Higher Education
UAF	University of Agriculture Faisalabad
UGC	University Grants Commission
UITSP	University-Industry Technology Support Programme
USAID	United States Aid for International Development

The Higher Education Commission (HEC) was established in year 2002 vide Ordinance LIII of 2002 issued on September 11, 2002.

The Prime Minister is the Controlling Authority of the Commission which was established for the evaluation, improvement and promotion of higher education in the country.

The Chairperson of the Commission, appointed by the Controlling Authority, must be a person of international eminence and proven ability who has made significant contributions to higher education as a teacher, researcher or administrator. Prof. Dr. Atta-ur-Rahman was appointed as first Chairman of the Commission and served from 2002 to 2008. The Commission is composed of eighteen ex-officio and regular members who are appointed for a term of four years by the Controlling Authority. The broad base of members, their professional and academic credentials and their commitment to higher education reform in Pakistan has provided energy for the quantum leap in improvement of our higher education sector.

In 2005 the Commission approved a five year Medium Term Development Framework (MTDF) which provided a set of interlinked strategies and programmes for the reform of the higher education sector of Pakistan.

Prime Minister Syed Yusuf Raza Gilani chairing a meeting of Higher Education Commission

"The provision of quality education to masses is the Government's top priority" said Prime Minister Syed Yusuf Raza Gilani while chairing a meeting on the Higher Education Commission in Islamabad on May 12, 2008. He said that "efforts would be made to empower people with knowledge and utilize their skills for the socio-economic development of Pakistan. The Government would continue to strengthen existing institutions of higher learning".

Founding Chairman of HEC

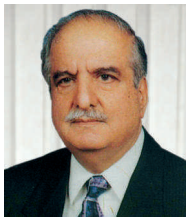
Prof. Dr. Atta-ur-Rahman

Founding Members of HEC

Mr. Shafqat Ezdi Shah
Secretary Education,
Government of Pakistan

Mr. Khushnood Akhtar Lashari
Secretary Education,
Government of Punjab

Lt. Gen. (R) M. Akram Khan
Vice-Chancellor,
University of Engineering
and Technology, Lahore

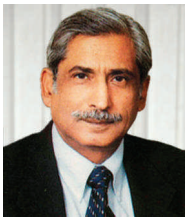


Lt. Gen. (R) Shujaat Hussain
Former Rector,
NUST, Rawalpindi

Prof. Dr. Pirzada Qasim
Raza Siddiqui
Vice-Chancellor,
University of Karachi

Prof. Dr. M. Qasim Jan
Vice-Chancellor,
QAU, Islamabad

Dr. Shahid Amjad Chaudhry
Rector,
Lahore School of Economics,
Lahore



Engr. Dr. Muhammad Akram
Sheikh
Former Executive Director,
HEC

Dr. Anwar Nasim
Adviser Science,
COMSTECH, Islamabad

Prof. Dr. Saadia Chishti
UCI Scholar and Fellow Council
for International Exchange of
Scholars, Washington DC and
Ex-Member of the Council of
Islamic Ideology Pakistan

Prof. Dr. Maqsood Ali
Former Principal,
G.A. Quetta

Prof. Dr. Abdul Matin
Former Vice-Chancellor,
University of Peshawar

Mrs. Nadira Panjwani
Chairperson,
Panjwani Foundation &
Trust, Karachi

In Charge HEC

Ms. Shahnaz Wazir Ali
Special Assistant to Prime Minister on Social Sector
and In Charge, HEC, Islamabad

Members of the Commission (2008)

Prof. Dr. Atta-ur-Rahman
(TI, SI, HI, NI)
Chairman, HEC (upto October 2008)

Two Nominees of the Federal Government

Mr. Abdur Rauf Chaudhry
Federal Secretary,
Ministry of Education,
Islamabad

Mr. Parvez Butt
Federal Secretary,
Ministry of Science & Technology,
Islamabad

Four Nominees of the Provincial Governments

Mr. Azhar Hussain Shamim
Secretary Higher Education,
Government of Punjab,
Lahore

Mr. Ajmal Khan
Vice Chancellor,
Islamia College University,
Peshawar

Prof. Dr. Masood Hameed Khan
Vice Chancellor,
Dow University of Health Sciences,
Karachi

Professor Dr. Syed Mohsin Raza
(TI) Meritorious Professor,
University of Balochistan,
Quetta

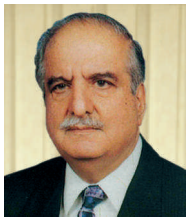
Ten Members appointed in the manner specified in sub-section (3) and (4) of HEC Ordinance

Dr. Nighat Agha
Senator

Dr. Shams Kassim-Lakha (HI)
Former Federal Minister for
Education, Science &
Technology, Islamabad

Ms. Sadia Rashid
President,
Hamdard Foundation,
Karachi

Mrs. Nadira Panjwani (SI)
Chairperson, Panjwani
Foundation and Trust,
Karachi



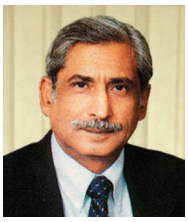
Lt. Gen.(R) Syed Shujaat
Hussain (HIM)
Former Rector,
NUST, Islamabad

Mr. Shahzad Alam
Chief Executive,
Unitech Electronic (Pvt),
Lahore

Mr. Abdul Razak Dawood
Rector, Lahore University
of Management Sciences,
Lahore

Prof. Dr. M. Qasim Jan
(SI, TI)
Vice Chancellor,
Quaid-i-Azam University,
Islamabad

Mr. Mazharul Haq
Sidddiqui (SI)
Vice Chancellor,
University of Sindh,
Jamshoro



Engr. Dr. Muhammad
Akram Sheikh (HI)
Former Deputy Chairman,
Planning Commission,
Islamabad

Secretary

Prof. Dr. S. Sohail H. Naqvi
Executive Director,
HEC, Islamabad

NI: Nishan-i-Imtiaz
HI: Hilal-i-Imtiaz
HIM: Hilal-i-Imtiaz (Military)
SI: Sitara-i-Imtiaz
TI: Tamgha-i-Imtiaz

Commission's Message

The Higher Education Commission (HEC) of Pakistan was established in 2002. This was the result of a growing realization that the education sector in Pakistan, especially the higher education sector, had been neglected for decades and was lagging far behind the needs and aspirations of the country to develop as a competitive and vibrant economy and a modern civil society capable of leading us to a place of eminence in the comity of nations.

Investment in human resource development is the only route through which developing economies can compete in an increasingly globalized world. In this environment science and technology are central to the creation of the human capital required to generate high growth and equitable distribution. Improving productivity and increasing the competitiveness of Pakistan's human resource is the surest pathway to socio-economic development and sustained poverty alleviation. The Higher Education Commission was mandated to ensure that higher education becomes a central/significant driving force and engine for the socio-economic development of Pakistan.

Continued neglect and apathy had pushed the higher education sector of Pakistan far behind its contemporaries in the modern world - both in terms of its quality to compete with peers as well as its capacity to provide equitable access to the aspirants of higher education. The twin tasks were indeed challenging and in many ways very difficult to surmount. Firstly, addressing these challenges required a dramatic change of mindset within the academic community. Secondly, a vision had to be generated to transform the institutions of higher education into world class seats of learning; to foster high quality education scholarship and research; and to produce enlightened citizens with strong moral and ethical values to build a tolerant and pluralistic society rooted in the culture of Pakistan. Thirdly, a work plan had to be devised and its sustainable implementation ensured so as to achieve the clearly specified aims that emerged from the HEC vision.

Since its establishment, the HEC has undertaken a systematic process of implementation of the five year agenda for reform outlined in the HEC Medium Term Development Framework (MTDF). Quality with a focus on excellence in research and relevance to Pakistan's socio-economic needs and enhanced access for the young men and women seeking to enter the tertiary domains of learning and research, are the key challenges that this process seeks to systematically address.

The HEC, since its inception, has endeavoured to identify and implement the most appropriate intervention strategies that

could assist institutes of higher learning in providing an environment conducive to enhanced higher education. The issues of relevance are addressed by taking into consideration the direct and indirect linkages of the different disciplines to the current and future needs of the development process. These focus areas, by necessity, are in harmony with the national industrial and social development plans. The current intervention strategies of the HEC and their implementation plans are designed to lead to improved access to higher education while simultaneously overcoming the inherent gender bias, and greatly improving the quality of the Higher Education Institutions (HEIs) in the process of ensuring academic excellence.

There is no escaping the fact that the youth of Pakistan are its real wealth. Pakistan needs to invest massively in this valuable resource to maximize its potential. It is the youth who will create the Pakistan of tomorrow that is prosperous and peaceful. They have to be equipped adequately to take Pakistan forward. Education is the only vehicle for this journey.

Sustained socio-economic development of Pakistan can only be predicated on the development of the education sector; and, more particularly, on the development of the higher education sector. The higher education sector provides the core competencies without which it is impossible to create value in the other sub-sectors of education, i.e. primary, middle, secondary and college education. This is as true today as it was in 1947 when the Quaid-i-Azam stated "Of all the economic growth initiatives available to the Government of Pakistan, perhaps none holds more promise and the possibility of large scale and sustainable returns than the effectiveness and expansion of the higher education infrastructure". This report documents the measures put in place and the progress achieved from 2002, when the Commission was created, uptil 2008. The record of achievements is significant and heartening given the immensity of the challenges that the HEC has faced in breaking the inherent inertia of the higher education system. The evidence presented here shows the potential to replicate and scale up the interventions in the years to come. This up-grading will require the continued support and commitment of the successive governments to ensure that higher education remains at the forefront of the development agenda of Pakistan.

The present Government remains strongly committed to higher education in Pakistan. The President and Prime Minister have both on numerous occasions reiterated their support for the Commission and the cause of higher education in the country. Today's challenges are far more overwhelming. The country's financial difficulties have to be factored in the Commission's programmes but the more important challenge for higher education is to win the Battle of the Minds against the surge of militancy and obscurantism which is devouring the youth of our nation

Key staff in all the Divisions of the HEC and in the Institutions of Higher Learning under its aegis have provided materials and input for the writing of this report. I would like to put on record my gratitude for their efforts.

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Executive Summary

Introduction

The HEC was set up by the Government of Pakistan in 2002, to facilitate development of indigenous universities into world-class centres of education, research and development. By actualizing this process, the HEC is continuously playing its part in spearheading the building of a knowledge-economy in Pakistan.

The HEC is, in fact, a metamorphosis of the Universities Grants Commission (UGC). It came into existence because UGC, handicapped by its charter and methods of conducting business, was unable to provide the requisite pace and direction for improvement of the higher education sector in Pakistan.

The mission laid down for the HEC was clear, 'the Higher Education Commission will facilitate Institutions of Higher Learning to serve as Engines for the Socio-Economic Development of Pakistan.'

Viewed in the context of the state of affairs in the higher education sector of Pakistan in 2002, this mandate presented immense challenges for the nascent HEC. This six year report of the HEC, attempts to put forward a holistic picture of all the efforts made by the Commission between 2002 and 2008 in addressing these challenges.

Focus of the Report

The HEC, at its inception, carried out a visioning exercise to clarify and prioritize its challenges. This formed the basis of the Medium Term Development Frame Work (MTDF) which laid out the four core and three supporting aims of the Commission along with clearly specified objectives and interventions required to achieve them. The overall framework focused on creating the knowledge-economy necessary for taking Pakistan towards sustainable development in the most efficient possible manner.

This six year (2002 to 2008) report is, therefore, focused on the HEC aims and the numerous direct and indirect interventions undertaken to achieve them. Given the well defined MTDF and effective monitoring processes adopted by the Commission, the report highlights progress made against pre-determined performance indicators. While it is too early to determine the overall impact, such analysis does indicate that the reform process is in the right direction and the initial herculean effort required to break the inertia has been made to great effect. Evidence indicates that the silent revolution

HEC is spearheading the building of a knowledge-based economy in Pakistan.

taking place in the corridors of higher learning in the country is generating far greater rewards than the resources committed to it.

The report outlines the joint efforts of the HEC and its associated HEIs in the search for quality, improved access, excellence in research and relevance of higher education to Pakistan's development needs.

The major emphasis on relevance of the higher education system in the HEC's strategic focus is reflected not only in the drive to make the entire higher education system more supportive of Pakistan's overall socio-economic needs but also in the growing number of linkages with industry that have been established by the HEC and its affiliates.

Faculty Development

The quality of higher education is recognized by the quality of faculty in the system. The development of a high quality faculty was, therefore, the foremost consideration of the HEC. To achieve this objective the HEC followed a three pronged strategy. It implemented a number of mutually supportive short and long term measures and a system of incentives designed to build and retain academic faculty in HEIs. These measures were aimed at enhancing both the quantity as well as the quality of academic faculty in the HEIs. The short term measures consisted of interventions such as faculty hiring, teacher exchanges and visiting scholars programmes. The long term measures focused on indigenous and foreign scholarships strongly biased towards PhD studies and ongoing training programmes to enhance pedagogical and administrative skills of the existing domestic faculty. A system was also designed to provide incentives to attract and retain good academics.

A total of 6,749 scholarships were awarded through a transparent and merit based selection process for the pursuit of Master's, MPhil and PhD degrees. Out of these, 3,924 scholarships were indigenous and 2,825 foreign. HEC's strong thrust for developing quality faculty and research in the fields of various sciences, engineering and technology is evident through the fact that 5,503 scholarships (85 percent) were awarded in these disciplines.

The HEC has also started a placement programme for the PhD scholars returning from abroad and has placed a large number of PhDs in different HEIs throughout the country.

The Foreign Faculty Hiring Programme has been a great success in building the human resource capacity of this sector. Through this programme talented and renowned Pakistani expatriates and foreigners have joined the higher education faculty in Pakistan for long and short tenures. A total of 278 professors have joined the universities under the Extended Duration Foreign Faculty Hiring Programme. An additional 166 foreign faculty members have contributed to higher education in public sector institutions under the Short Duration Foreign Faculty Hiring Programme.

The presence of foreign faculty has considerably enhanced the learning environment of the host universities.

The Learning Innovation Department (LID) of the HEC has developed nearly 300 Master Trainers from within the existing faculty who will go on to build capacity of faculties in their respective institutions. Through its various programmes and initiatives the LID has imparted pedagogical skills training of one form or the other to over 10,000 teachers and administrators involved in the higher education sector.

Several seminars, workshops and training sessions have been arranged so that eminent expatriate Pakistani and foreign scholars can share their expertise with the local academics.

A comprehensive set of incentives has been put in place to attract and retain the best academic faculty. There has been an upward revision of pay scales and direct appointment of PhDs as Assistant Professors in the Basic Pay Scale 19. The PhD allowance was revised upwards and a Tenure Track System was also introduced with extremely attractive emoluments. A Sabbatical Leave Fellowship Programme was introduced and a system of recognizing faculty performance in the form of the HEC Distinguished National Professors Programme and a Best University Teacher Award was initiated.

Improved Access

The HEC has focused on improving access by enhancing capacity of the HEI's through development and funding of expansion plans of public sector HEIs and providing incentives to the private sector. There has been a major focus on distance learning and setting up universities and campuses in remoter areas in order to provide access to the geographically disadvantaged. Equitable access has also been promoted through provision of financial support in the form of scholarships and fee exemptions. Equity has been ensured through the institution of transparent evaluation processes for the award of scholarships and admissions.

Rapidly increasing enrolment in higher education is a good indicator of improved access. According to the Task Force on Higher Education report (2002), only 135,000 students attended universities in Pakistan in that year. The available data indicate that during the last six years (2002 to 2008), enrolment in higher education, in aggregate, has grown to 283,500 (a remarkable 210 percent increase). Enrolment in distance learning programmes has also increased remarkably from 89,700 students in 2002 to 559,289 students in 2008. Thus, total enrolments have increased 3.75 times; from 224,700 in 2001-02 to 842,789 in six years due in large part to the efforts of the HEC to expand access to higher education.

Gender gap, in enrolment, in higher education has seen a significant decline over this period. In 2001-02, females accounted for 37 percent of the total number of students enrolled. In 2007-08, this proportion had improved to 46 percent of the total. The gender bias in higher education in Pakistan has all but disappeared.

HEC has implemented a strategy of strengthening indigenous research and building international collaboration to keep research at the cutting edge and provide international peer review.

The number of universities, public and private combined, has increased from 56 (in 2001-02) to 94 (in 2007-08). The number of higher education institutions (universities plus Degree Awarding Institutions) has increased from 74 to 124 over this period. The number of HEIs devoted exclusively for women has doubled from three to six over the six years.

Although, 57 (i.e. 46 percent) of the 124 HEIs in Pakistan are in the private sector, their share in total student enrolment, has not seen much improvement. The private sector caters approximately to a quarter of the total enrolment (excluding distance education), and this share has remained more or less constant over the past six years. The majority of students are still catered for by public sector HEIs.

Excellence in Research

Quality research is an essential requirement for generating and acquiring new knowledge and fostering better understanding.

The HEC Digital Library has been a key initiative in enhancing the quality of research in Pakistan.

HEC has implemented a strategy of strengthening indigenous research and building international collaboration to keep research at the cutting edge and provide international peer review.

A dynamic world-class research sector is not only vital for a nation's academic health but is also crucial for its economic and social cohesion. Learning through research is at the heart of achieving the aims and objectives of higher education.

HEC has promoted academic linkages through the provision of grants and the facilitation of collaborative institutions and programmes.

Setting up of the HEC Digital Library has been a key initiative in the efforts to encourage research. Great emphasis has been placed on building a culture of scholarly authorship and the whole incentive structure is geared towards generation of quality research.

Twenty central research laboratories have been created at public sector HEIs across the country. These centres are meant to drive quality research and are supported with major investments in information technology, such as the creation of Digital Library.

To ensure that Pakistan's HEIs gain enhanced credibility and international stature, it was considered imperative to establish linkages with numerous leading foreign universities. The British Council Linkage Programme is an example through which 50 institutes of higher learning from UK have been linked with Pakistani universities for joint ventures of research and improvement in education.

More than 333 research programmes have been funded and further collaborations with international universities have been strongly encouraged. The National Research Programme for Universities (NRPU) is a mega recurring grant programme which provides support for research in all disciplines and has also been extended to 15 private universities in addition to all public sector universities.

Several other specific interventions have helped to strengthen education and research.

The Access to Scientific Instrumentation Programme provides the researchers and the scientists with an easy access to laboratories and scientific instruments hitherto not available to them. More than 1106 Country Licences of Advanced Design Software for teaching and training have been provided to nine engineering universities.

Several workshops and seminars have been conducted in the Life Sciences. Documentaries on Stem Cell Research and Transgenic Crops have been made and disseminated. Knowledge Sharing Services are provided so that important discoveries and news of latest events in the fields of Life Sciences and Medical Biotechnology are shared widely with scientists of Pakistan. A website of the NCGLS has been launched and a Life Sciences Directory containing contact information of more than 1000 life scientists is also being published.

The University-Industry Technology Support Programme (UITSP) has facilitated 14 collaborative projects including one to identify bio-diesel producing plant species in Pakistan. This project has successfully established a well-equipped bio-diesel laboratory for research and development. A successful road run test on bio-diesel conducted under this project by the Alternative Energy Development Board (AEDB) has also been undertaken.

Digital Library Programme is one of the greatest accomplishments of the HEC. Digital Library is accessible to approximately 250 institutions and provides open-access to e-books and journals in various fields of study. A selection of over 43,000 e-books and 22,000 online journals is available for researchers. The HEC sponsored Digital Library is allowing students and faculty connectivity to the global research community.

The HEC has extended the internet facility to all public sector universities by providing a fibre optic link with 2 mbps.

The HEC web information portal is an example of effective outreach and communication. It has become one of the most frequented portals in Pakistan. An aura of change and progress now abounds in the institutes of higher learning where Pakistani youth can dream of a better future for Pakistan.

Quality post graduate teaching and research cannot be conducted without access to good reference material. The HEC's Book Bank Scheme is providing 234,000 text books to university libraries at a cost of Rs. 148.78 million.

The HEC's Institutional Strengthening and Up-gradation of Laboratories and Libraries programme has provided Rs. 44.73 million for the implementation of 50 proposals received from different universities.

All these efforts have resulted in a noticeable improvement in the quantity and quality of the research output. A comparison of research output before and after the HEC

The Access to Scientific Instrumentation programme provides the researchers and the scientists with an easy access to laboratories and scientific instruments hitherto not available to them.

With the systematic involvement and consultation of national and international associates and other stakeholders, the Quality Assurance Programme of the HEC is being implemented under a participatory approach from beginning to end.

highlights that, in the six years prior to the HEC's inception, 3,260 research articles were published. During HEC's six years, a total of 11,185 research articles were published in leading academic journals. This escalation of more than 300 percent is an indicator of the quantitative performance of the HEC. The full measure of the achievement of the HEC, in this area, should be seen in light of the fact that the publications during the HEC era are in peer recognized journals whereas previously there was no such stress on quality. There is, thus, remarkable progress in terms of both quantity as well as quality of the research output under the HEC.

Quality Assurance and Accreditation

At the time of establishment of HEC, the universities did not have any formal system for quality assurance or monitoring of academic programmes. The HEC had to take start from scratch in this regard. Numerous initiatives have been taken to ensure quality in all aspects of higher education. These involved the setting up of Quality Assurance Programme; setting of standards and the revision of curricula; move towards a four year degree programme; setting and enforcement of standards for academic recruitment; student intake and ongoing review and standardization of higher degree programmes and examinations.

The reform of curricula has been a major step towards ensuring quality and academic excellence. The curricula, produced by the National Curriculum Revision Committee are designed in a holistic manner to create all the positive attributes that society would want in a graduate. During 2003-2008, curricula of 95 disciplines covering the Basic, Social, Natural and Applied Sciences and engineering were revised and upgraded to ensure relevance and reflection of the state of the art in each field.

After an aggressive campaign of sensitizing the faculty about quality issues on standards, specific criteria to ensure quality of education were developed. The implementation is supported by on-going programmes of capacity building and strict monitoring. The hallmark of the HEC initiatives is the establishment of the central Quality Assurance Agency and 30 Quality Enhancement Cells in universities for self assessment and implementation of quality assurance measures.

The HEC has also obtained membership in the Asia Pacific Quality Network (APQN), as well as in the International Network of Quality Assurance Agencies in Higher Education (INQAAHE), Netherlands.

A system of ranking of universities and a ranking criteria has been developed. The first ranking of Pakistani universities was done in 2006. Quality criteria for MPhil and PhD degree programmes were developed and implemented and a review committee is constituted with the objective of quality review and improvement. Reports on 35 HEIs have been finalized to date and recommendations of these reports are being implemented.

For improvement of distance learning the Directorates of Distance Education are being established in six universities to meet the needs of private students and to provide higher education to the ones located in remote areas.

Eligibility criteria for faculty appointment were developed and a Tenure Track System for faculty hiring was introduced.

A standard for recognition of journals has been developed and since, 100 journals have been recognized (43 for Social Sciences, 38 for Basic Sciences, 10 for Languages and 9 Multidisciplinary).

The National Committee on Examination Systems (NCES) was constituted and guidelines developed both for annual and semester system examinations.

A Plagiarism Policy has been issued for strict compliance. The IT Department at HEC has taken on the challenge of dealing with the problem of plagiarism. The web-based and widely-used anti-plagiarism software, "iThenticate/ Turnitin" has been purchased and is now being used to scrutinize theses and research papers.

The quality of MPhil and PhD programme has been given special attention and three parallel committees have been constituted by the HEC to evaluate these programmes according to the criteria developed by the HEC for award of these degrees. All universities and DAIs, both in the public and private sector are inspected by the respective committees. Their reports are presented before the Commission. Sub-standard PhD programmes of a few universities were discontinued on the recommendations of the committees.

Ensuring Relevance to the Economy: Developing Academia-Industry linkages

Knowledge is the driver and engine of a country's socio-economic growth. The HEC was set up to make higher education relevant to the socio-economic needs of Pakistan's development. Academia-industry linkages are essential not only to ensure that the knowledge base has relevance to a country's needs but also to provide opportunity for industry to benefit from the efforts of academia. Concerted efforts continue to be made to enhance the relevance of university education to make the HEIs suppliers of high-skilled manpower and a breeding ground for innovators and entrepreneurs for industrial development. Universities are encouraged to conduct research that caters especially to industrial needs and plays a key role in shaping the country's comparative advantage.

A key component of the HEC's technology based industrial vision and strategy is to provide funding and support to research projects that are of value to Pakistan's industrial and commercial sector.

The HEC facilitates access to those resources that are necessary in research, such as software, equipment, technology as well as international expertise that may not be otherwise available.

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The HEC has also established new departments and centres in areas of direct relevance to industry such as the Food Technology, Advance Manufacturing, Automotive Engineering, Product Development and Saline Agriculture departments.

The HEC strategy in this regard is designed to encourage university-industry collaboration for technological innovation and indigenisation; promote industrial internship programmes; encourage setting up of technology parks next to the academic institutions so that a fully serviced environment is provided to scientists and engineers; and, the involvement of industry experts in university bodies such as the curriculum advisory boards. The HEC encourages and facilitates university-industry interaction through workshops, seminars, meetings with chambers of commerce and the development of a data base on interaction between academia and industry.

The collaboration between the USAID funded Competitiveness Support Fund (CSF) and the HEC has focused on encouraging projects that have high potential to generate jobs, income, exports and investments and the potential to improve the quality of products and services with appropriate environmental, health and social impact.

Projects valued between US$20,000 to 250,000 can be undertaken under this scheme for which the CSF will contribute 50 percent, HEC 30 percent, and industry 20 percent. The HEC and CSF will hold trade fairs in Islamabad and Karachi to promote academia-based research projects with knowledge-based commercial potential to private industry and jointly develop a business incubator project to promote this concept for business development in Pakistan.

The HEC focuses on strengthening HEIs in new and emerging technologies through the introduction of new disciplines and courses. Several new cutting edge disciplines are now being taught at Pakistani universities. These disciplines include Proteomics, Genomics, Bioinformatics, Space Science and Avionics, Nanotechnology, Automotive Engineering, Earthquake Engineering, Mechatronics, Range Management, Bio Medical and Bio Ethics.

There are several diverse University-industry Linkage Projects underway. These include the development of Baby Cum School Children Food of High Nutrient Density and Diabetic Meals; Improved Edible Protein Film Packaging; Light Weight 3-Wheeler 4-Stroke Slim Car/Rickshaw (Prototype) utilizing Composite Material; Super Energy Saving Light for Urban, Rural and Industrial Application using Super Bright LEDs; Prototyping of an Electronically Controlled CVT (Continuously Variable Transmission); Indigenous Development of CNG Car Kit; Control of Pathological Conditions causing Skin Damage and consequently Reducing Market Value in Domestic Ruminants of Punjab; and, Kinnoo Quality Improvement for Export to Global Market.

The HEC encourages the development of new patents and contributes upto US$5000 towards the fees for filing international

patents. A total of 150 patents have been filed and 10 patents have been registered already.

Building the Hard and Soft Infrastructure

A major contribution of the HEC to development of higher education has been the assistance it has rendered in supporting the visioning exercises of public sector universities. These exercises helped formalize the processes for systematic policy decision making for future plans by specifying quantifiable targets, identifying redundancies and duplications and highlighting avenues for efficient expansion. Individual visioning exercises also helped the HEC make decisions at the aggregate level and hence assisted in determination of future progression of the higher education sector in line with the requirements of the national and strategic priorities laid out by the HEC.

HEC was able to focus effectively on both the development of estates as well as on the information architecture required to nurture the needs of a modern higher education sector. The HEC has given considerable attention to the development of public university infrastructure and the provision of facilities for students and staff. Projects have been approved and initiated involving the setting up of hi-tech central resource and departmental laboratories and the provision of other research facilities. Hostel facilities have been provided in 64 public sector universities/DAIs for approximately 10,000 students and accommodation for foreign and visiting faculty members is being systematically developed. Since 2002, 111 projects for the provision of library facilities (central and departmental) for students and 127 projects for the provision of transport facilities have been approved. In addition, 154 projects were approved for the provision of IT and Networking facilities.

The HEC is also successfully implementing programmes for the provision of Pakistan Educational Research Network (PERN) connectivity. PERN provides high speed internet and intranet facilities to the national educational and research centres.

Video conferencing facilities, digital library and ICT infrastructure development has also been provided in the HEIs. A Multi-point Control Unit has been installed at the HEC, which interlinks multiple campuses with international organizations/systems. The installation of the latest video conferencing equipment has made the HEC a hub for online events for government bodies, ministries and universities.

This infrastructure development has been carefully monitored. Systems have been developed to ensure ongoing monitoring and evaluation of all development projects. These provide the control mechanisms to ensure that the development proceeds in the most effective manner possible.

The Way Forward

While considerable progress has been made; much more is still needed. The need to

The HEC continues to focus on finding other means to ease the financial burden on the government. Since this is an enormous task, HEIs of Pakistan will also have to look for independent resource generation strategies to become financially self-reliant and minimize the dependence on government funding.

enhance quality and improve access shall continue to pose challenges for the future. The greatest challenge shall, however, remain on how to cater to the rising demand for higher education given the inherent scarcity of resources in the system. Extrapolation based on the rate of increase of enrolment at universities over the last six years indicates that enrolment which stood at 349,000 in 2007-08 will rise to 875,300 by 2016, if present trends continue. Accommodating this enormous increase is the real challenge for the HEC and government policy makers in the days to come.

The HEC continues its search to find innovative solutions to address this ever-growing demand. The HEC has already developed guidelines for supporting private institutions. One promising option is the establishment of public-private partnerships in the field of higher education. A comprehensive framework for public-private partnerships is needed so that the private sector can be stimulated to play its obligatory role in promoting higher education in the country.

Recommendations, coming out of the International Conference organized by the HEC in June 2008 on Resource Generation Strategies for Pakistani HEIs, highlighted the importance of developing and strengthening linkages with the business community and industry in particular, to encourage private philanthropy and the setting up of endowment funds. The people of Pakistan, its intelligentsia and academia, in particular, need to come forward and champion this reform.

Conclusion

This report shows that the efforts of the HEC in the six years from 2002 to 2008 have resulted in a significant improvement in Pakistan's higher education sector. This is evident in both the quality of higher education and in its outreach. This can be seen through the performance indicators benchmarked in this report. The optimism of students seeking higher education clearly indicates that they know they are being provided an increasingly supportive environment which will equip them to become internationally competitive players on a level playing field and help to fulfil their dreams for themselves and their country.