

# Cross Pollinating Knowledge

International Strategic Partnerships in Research and Education



inspire

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The British Council would like to thank all INSPIRE partners both in the United Kingdom and in Pakistan, Higher Education Commission of Pakistan, Provincial Governments and other key stakeholders.

Images were contributed by Umar Farooque and Ali Najum.

“The partnerships formed under the INSPIRE programme demonstrate the strong relationship between British and Pakistani universities. The initiatives carried out under this programme are long-term and sustainable. These endeavours have led to considerable and growing interest in Pakistan to work with universities in the UK and other partners in the Higher Education sector leading to stronger UK-PK relations.”

Nishat Riaz  
Head of Programmes for International Higher Education  
British Council, Pakistan

## Message

The British Council started working with the Higher Education Commission (HEC) of Pakistan from 2004 with the launch of Joint Higher Education Links Programme, and later on phase II of the programme in 2006, to enhance the research and training capacity of Pakistani higher education institutions, contributing towards the institutional capacity building of the higher education sector of Pakistan and bringing Pakistani higher education institutions into a wider network of international partnership through educational and intellectual exchange and research. HEC and British Council built 50 research and capacity-building links between Pakistani and UK institutions under Phase 1 and Phase 2.



Dr. Javaid Laghari  
Chairman, HEC

David Martin  
Director, British Council, Pakistan

International Strategic Partnerships in Research and Education (INSPIRE) was co-designed and launched by the British Council and HEC in 2008, to create a significant step-change in the UK-PK relationship in HE. This is jointly funded by the British Council and HEC over 6 years. This is a bold and innovative programme, designed to embed the partnerships for long term sustainability, based on mutual benefit to the UK and Pakistan. 26 strategic university partnerships are currently running, in areas of national interest to the UK and Pakistan. INSPIRE strategic areas for research, jointly agreed by the HEC and the British Council are in the big global challenges: Environment, Power and Energy, Economics, Law Governance and Leadership, Clean Drinking Water, Health Sciences, Education and Intercultural Understanding and Dialogue.

Under INSPIRE 87% of all university vice-chancellors in Pakistan have attended leadership training programmes in the UK organised by the British Council; 66% of all current vice-chancellors contributed to policy dialogues on Knowledge Exchange in November 2011; 29870 researchers and 54602 students were involved in INSPIRE partnerships; 209 exchange visits from UK to Pakistan and vice-versa took place under the INSPIRE partnerships since 2008.

This document describes the impact the INSPIRE strategic partnerships have achieved so far. We are glad that under several programmes the strong ties that the UK and Pakistan have in Higher Education are flourishing. Over all 118 Pakistani Universities have developed partnerships with over 90 universities in the United Kingdom.

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## List of the 26 Partnerships between UK and Pakistani Universities under the British Council's INSPIRE Programme

SP No.	UK Partner	Pakistan Partner	Project
SP 15	Newcastle University	University of Engineering and Technology, Lahore	Development of water scarcity management strategies in the Upper Indus Basin
SP 19	London School of Hygiene and Tropical Medicine	COMSATS Institute of Information Technology, Islamabad	Tracking diarrhoea-causing bacteria in Pakistan
SP 39	University of Liverpool	Rawalpindi Medical College	Promotion of early childhood development and the psychosocial well-being of Pakistani children
SP 41	University of Belfast	University of Karachi	Restoration of the native oyster of Pakistan
SP 53	University of London	National Health Research Complex, Lahore	Developing local screening systems to detect congenital hypothyroidism in newborns
SP 54	University of Bradford	Fatima Jinnah Women University, Rawalpindi	Training and educating women parliamentarians
SP 55	University of Manchester	COMSATS Institute of Information Technology, Islamabad	Analysing the cause of hydrocephalus in newborns
SP 69	University of Southampton	NUST, Islamabad	Developing water turbines for electric power generation
SP 75	University of Birmingham	Aga Khan University, Karachi	Studying the biological and clinical importance of cytomegalovirus (CMV) infection
SP 77	University of Leicester	Hazara University, Mansehra	Archaeological investigations and their link to heritage in Chitral
SP 160	London School of Hygiene & Tropical Medicine	University of Peshawar	Assessment of cutaneous leishmaniasis, a skin disease, in KPK
SP 166	University of Bolton	Textile Institute of Pakistan, Karachi	Use of geosynthetic materials technology for provision of clean well water
SP 174	Newcastle University	Govt. College University, Faisalabad	Monitoring Indus River pollution using fish as a bio-indicator

SP No.	UK Partner	Pakistan Partner	Project
SP 178	University of Aberdeen	University of Vet and Animal Sciences, Lahore	Impact of environmental pollutants on fish and fisheries in Punjab
SP 190	University of Liverpool	University of Health Sciences, Lahore	Developing best practice in learning and teaching of Medical Education
SP 192	Oxford University	NUST, Islamabad	Wastewater reclamation at bench scale using advanced biological treatment technologies
SP 195	University of Central Lancashire	Beaconhouse National University, Lahore	Lancashire to Lahore: Exchanges to develop cultural understanding
SP 196	University of Essex	University of Sindh, Jamshoro	Development of bioinformatics research, teaching and infrastructure
SP 216	Roehampton University	Fatima Jinnah Women University, Rawalpindi	Treating and preventing anxiety among adolescents in Pakistan
SP 221	University of London	Bahauddin Zakariya University, Multan	Women empowerment and the crisis of good governance in Pakistan
SP 225	Cambridge University	Air University, Islamabad	Increasing the efficiency of wind energy systems
SP 227	University of Southampton	Institute of Management Sciences, Peshawar	Supporting SMEs in Khyber Pakhtunkhwa
SP 247	University of Nottingham	Mehran University of Engineering and Technology, Jamshoro	Building indigenous capabilities for Thar coal development
SP 254	University of Leeds	Pakistan Institute of Engineering and Applied Sciences, Mehran University, Jamshoro, University of Punjab, Lahore and Islamic International University, Islamabad	Co-combustion of Pakistani coal and biomass in pilot scale combustors
SP 266	University of Bradford	Mirpur University of Science and Technology (MUST) and University of Azad Jammu and Kashmir	The Bradford/Mirpur connection and the global citizenship of its young people
SP 271	University of Sussex	Quaid-i-Azam University, Islamabad	Migration, education and development



## Clean Drinking Water

Development of water scarcity management strategies in the Upper Indus Basin

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Use of geosynthetic materials to provide clean well water

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Wastewater reclamation using advanced treatment technology



# Development of water scarcity management strategies in the Upper Indus Basin

**UK Partner:** Newcastle University

**Pakistani Partner:** Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore

Newcastle University, UK and the Centre of Excellence in Water Resources Engineering, University of Engineering and Technology have joined hands under the INSPIRE banner to improve the techniques for seasonal forecasting of water inflows in the Indus and Jhelum rivers.

Lead researchers from both countries have shared expertise through bilateral research exchanges and capacity building.



Snow and glaciers from the mountainous region of the Hindu Kush – Karakoram – Himalaya (HKH) provides the main source of surplus water for the Upper Indus and Jhelum river systems in Pakistan. Management of water from these rivers is critical for irrigated agriculture. This is particularly important in Pakistan since agriculture provides for one-fourth of the country's GDP and half of total employment.

Newcastle University, UK and the Centre of Excellence in Water Resources Engineering, University of Engineering and Technology have joined hands under the INSPIRE banner to improve the techniques for seasonal forecasting of water inflows in the Indus and Jhelum rivers, facilitating adaptive management techniques for hydropower and irrigated

agriculture to cope with water scarcity and food security problems. The project outcome will be a great help for future water resources planning and development.

Lead researchers from both countries have shared expertise through bilateral research exchanges and capacity building. Monthly roundtable discussions/working group meetings are held between local stakeholders and the Pakistan-based research team to ensure sustainability of the project.

The partnership also intends to organise a workshop involving international experts on mountain climates, hydrology and water resources.

The intended outcome is both theoretical and practical; the theoretical work done would

provide a better understanding of environmental relationships between climate and water flow in the HKH mountain region. The practical aspect would provide guidance for water resources management decision making authorities i.e. WAPDA (Water resources And Power Development Authority) with relevance to the entire Indus Basin Irrigation System and its hydropower generating capacity.

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# Use of geosynthetic materials to provide clean well water

**UK Partner:** Institute for Materials Research and Innovation, University of Bolton

**Pakistani Partner:** Textile Institute of Pakistan, Karachi



Geosynthetics are a range of man-made materials used to improve the quality of soil that have revolutionised civil engineering works. Their high durability makes them ideal for use in construction works and in lining water bodies to remove contamination.

The World Bank has identified Pakistan as heading towards a major water crisis. A majority of the population does not have access to clean drinking water

contamination from wells. The partnership will assess the use of an innovative water purification scheme based on geosynthetic materials technology.

The partnership plans to use geotextiles, one of the many types of geosynthetic materials, to develop a filtration system to clean well water through a set up that employs lining technology. Apart from physical retention, the material developed would also employ chemical purification to

It will also have a significant economic impact by injecting life into Pakistan's sagging textile sector, allowing textile mills to expand their product portfolio to include these high value added but easy-to-manufacture products.

Most importantly, this project has the potential to change the life of Pakistan's rural population, giving them the opportunity to live in a disease-free and productive environment.

The innovative filtration system developed under this INSPIRE partnership could potentially be the answer to the global water-related issues. The research has a full capacity to be marketed at an international forum. The masses would greatly benefit through use of IXT (ion exchange textiles); and since the materials are regenerative in nature, the solution would be cost-effective.



and as a result, about 40% of the reported diseases in Pakistan are water-borne. A large proportion of population depends on open water sources for everyday domestic use such as; canals, rivers and wells, all of which are at a high risk of being contaminated.

The INSPIRE partnership between the Textile Institute of Pakistan and the University of Bolton aims to improve the availability of clean drinking water by removing

remove dissolved ions such as calcium, magnesium etc.

The innovative filtration system developed under this INSPIRE partnership could potentially be the answer to the global water-related issues. The research has a full capacity to be marketed at an international forum. The masses would greatly benefit through use of IXT (ion exchange textiles); and since the materials are regenerative in nature, the solution would be cost-effective.

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International Strategic Partnerships In Research and Education

# Wastewater reclamation using advanced treatment technology

**UK Partner:** University of Oxford

**Pakistani Partner:** Institute of Environmental Science and Engineering, NUST, Islamabad

Pakistan is an agricultural country with a population of approximately 180 million and a current growth rate of 1.8%. The rapid increase in population, coupled with growing urbanisation and industrialisation, has resulted in a shortage of fresh water supplies across the country, particularly in the major cities. Moreover, the few sources of fresh water still left are heavily contaminated because of untreated waste disposal.

The INSPIRE partnership between NUST, Pakistan and the University of Oxford poses a novel way to clean water and make it useable for the general public. The project will utilise a new technology known as a membrane bioreactor (MBR), an efficient and cost-effective system of treating sewage that is being introduced worldwide.

The facilities at Oxford and NUST will be used for evaluating the treatment technology, as well as training faculty and graduate

students in the field of environmental engineering. This partnership will also open up new avenues for research collaboration between Pakistan and other European countries, particularly the Netherlands, Germany and France. Research findings will also be regularly presented in specialised conferences on membrane technology, wastewater reclamation and reuse, and biological processes etc.

The project will involve setting up a laboratory-scale MBR at the Institute of Environmental Science and Engineering, NUST. This will allow students and faculty to interact with cutting edge technology on a first-hand basis and come up with innovative ways to overcome the country's current water woes. The combined efforts of both partners led to a successful international workshop, "Technological advances and challenges in water reclamation and reuse" on 8-9 December

2011 at the NUST campus in Islamabad in which 75 professionals and 200 graduate and postgraduate students participated.

Under this partnership, the exchange of PhD students between the institutions, particularly the short-term, four-month visits of PhD students from NUST to the University of Oxford, will help in achieving the research objectives and also add to their personal and professional development.

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The project will involve setting up a laboratory-scale MBR at the Institute of Environmental Science and Engineering, NUST. This will allow students and faculty to interact with cutting edge technology on a first-hand basis and come up with innovative ways to overcome the country's current water woes.





# Economics & Business Management

Supporting SMEs in Khyber Pakhtunkhwa



# Supporting SMEs in Khyber Pakhtunkhwa

**UK Partner:** School of Management, University of Southampton

**Pakistani Partner:** Institute of Management Sciences, Peshawar



The institute is collaborating with the School of Management, University of Southampton to develop a knowledge exchange and research programme in two new management disciplines—sustainable entrepreneurship and innovation.

This project seeks to establish the Institute of Management Sciences as the principal resource for the students as well as the SME industry in the region for teaching, learning and for the development of necessary new knowledge and applied research.



In recent times, the province of Khyber Pakhtunkhwa has had the misfortune of making headlines for all the wrong reasons – either as the hub of terrorist activity or as the scene of devastating bomb blasts. Yet the province has so much more to offer, in terms of culture and also in the field of academics.

The Institute of Management Sciences, Peshawar seeks to contribute to the uplift of a conflict-ridden and economically unstable region by equipping its graduates with skills that can help them function as successful professionals and entrepreneurs.

The institute is collaborating with the School of Management, University of Southampton to develop a knowledge exchange and research programme in two new management

disciplines—sustainable entrepreneurship and innovation. These areas have been chosen because small and medium enterprises (SME) in Pakistan, particularly in the north-west region, have traditionally struggled to perform well.

This project seeks to establish the Institute of Management Sciences as the principal resource for the students as well as the SME industry in the region for teaching, learning and for the development of necessary new knowledge and applied research.

This two-way flow of information will benefit both institutes. The Institute of Management Sciences will increase its research income and develop new connections. The students and faculty will gain international exposure and new skills. In the

longer term, the project aims to increase the number of start-ups in the region, and eventually improve SME performance.

This INSPIRE partnership will also make improvements to business development in the Peshawar region, and with the right support, these benefits, once tested and refined, could be amplified to other regions.

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# Education

Developing Medical Education in Pakistan

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Development of Bioinformatics  
research, Teaching and Infrastructure  
at the University of Sindh

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Migration, Education and Development



# Developing Medical Education in Pakistan

**UK Partner:** University of Liverpool

**Pakistani Partner:** University of Health Sciences, Lahore



The project would have a sustainable impact as Postgraduate programmes have been started at University of Health Sciences which are facilitated by University of Liverpool. Another new programme aimed at new staff members called “Introduction to Medical Education” is also in process under this partnership.



Disease, malnutrition, a lack of clean drinking water and high infant mortality rate – these are just some of the health problems that Pakistan faces today. Add to that the growing number of emergencies that have befallen the country – not only devastating natural disasters like the floods in last 2 years but also the surge of violence that occurs periodically – and you have a set of challenges that any developing country would find daunting. In such circumstances, it is important to invest in the training of local health professionals and constantly update their skills so that they are capable of meeting these challenges. Medical Education is a strand of medicine that focuses on these very areas – providing training and continuous professional development to health practitioners.

The University of Health Sciences in Lahore has over 24 affiliated medical colleges with

departments dedicated to Medical Education, but they realise that they lack the latest knowledge and skills required for efficient practise. Hence, the university is collaborating with the University of Liverpool under the INSPIRE banner to develop an innovative and sustainable project aimed to increase efficiency, enhance research and secure funding for health projects. Workshops and staff exchanges between the two institutions are being carried out and project progress and lessons learnt have been presented at International conferences. It is intended to support the publication of Pakistani research in international journals. Another important development underway is a postgraduate Certificate in Medical Education (UHS) administered by the University of Liverpool in Pakistan. Health in Pakistan receives a tiny portion of the total national expenditure. Any project that aims to strengthen the local medical

profession has the potential to affect millions. This INSPIRE partnership can be groundbreaking in terms of the positive changes it brings about in the health industry and the delivery of quality service.

The project would have a sustainable impact as Postgraduate programmes have been started at University of Health Sciences which are facilitated by University of Liverpool. Another new programme aimed at new staff members called “Introduction to Medical Education” is also in process under this partnership.

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# Development of Bioinformatics research, Teaching and Infrastructure at the University of Sindh

**UK Partner:** University of Essex

**Pakistani Partner:** University of Sindh, Jamshoro



Bioinformatics is the application of computer science and information technology to the field of biology and medicine. It is an important strategic field for development because it brings together ideas from biology, biochemistry, computer science, mathematics and statistics. At present, Pakistan has limited growth in technology and it is becoming increasingly important for it to take up ventures which would enhance its technological capabilities.

Bioinformatics at University of Sindh. This also includes the development of infrastructure for technological transfer and research commercialisation. Members of the Essex team will assist in conducting projects and workshops, leading to a detailed assessment of the gaps in Sindh's existing provision for research commercialisation and professional development relevant for bioinformatics. There will also be PhD projects available for students at the

on the long history of international engagement to further internationalise the university through a systematic strategic approach. The project at hand will provide the University of Essex a good start in their aim to internationalise the university through collaborations and partnerships.

**University of Essex will help in establishing the field of Bioinformatics at University of Sindh. This also includes the development of infrastructure for technological transfer and research commercialisation.**

**The aim is to further the professional development of research students and early career researchers, by raising their awareness of the exploitation of research.**



The University of Sindh in partnership with the University of Essex plans on building a strong and coherent bioinformatics group under the INSPIRE Strategic Partnership Programme.

This INSPIRE partnership will introduce an effective and comprehensive professional development programme for researchers in both institutes. University of Essex will help in establishing the field of

University of Sindh. The aim is to further the professional development of research students and early career researchers, by raising their awareness of the exploitation of research. Another course led by University of Essex, 'Communicating Your Research in the Media' will be delivered at the University of Sindh.

Essex University's International Strategic Agenda 2010-2013 includes a commitment to build

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International Strategic Partnerships In Research and Education

# Migration, Education and Development

**UK Partner:** University of Sussex

**Pakistani Partner:** Quaid-i-Azam University, Islamabad

University of Sussex, UK and Quaid-i-Azam University, Pakistan are working on a project that deals with the links between migration and education. This INSPIRE partnership will provide practical insight for policymakers in the field of education on how to respond to the consequences of migration as a means for attaining educational goals, and as a strategy to support future migration plans.

Through the INSPIRE partnership, there will be an analysis of all the remittances channelled towards supporting and improving educational institutions and resources in development contexts; how 'migrant children's' education might be affected by their movement between places; and how immigration policy have an impact on potential migrants' education. The starting premise is that whilst international

migration is generally associated with wide reaching social and cultural transformations, the direction of change in educational practices is unpredictable, being contingent not only on social, religious-cultural and political circumstances of migrant communities, but also on the specific life trajectories of migrant households.

A two-day workshop on "Qualitative Research Methodology" was organised at Quaid-i-Azam University before the data collection exercise. In this workshop over 150 students and 15 faculty members from Department of Anthropology and Sociology, Quaid-i-Azam University were sensitised about the project and extensive training was given to 25 research investigators. On completion, the project will

provide practical insight for policymakers and to forward academic debates on the association between migration and education. Different policy-related communications will address national and international policymakers, donors, national governments, local and regional governments and other local actors such as migrants and diasporic groups.

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This INSPIRE partnership will provide practical insight for policymakers in the field of education on how to respond to the consequences of migration as a means for attaining educational goals, and as a strategy to support future migration plans.

On completion, the project will provide practical insight for policymakers and to forward academic debates on the association between migration and education





## Environment

Impact of environmental pollutants on fish and fisheries in Punjab Pakistan

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Developing strategies to monitor pollution levels in River Indus

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Restoration of the native oyster of Pakistan



# Impact of environmental pollutants on fish and fisheries in Punjab Pakistan

**UK Partner:** University of Aberdeen

**Pakistani Partner:** University of Veterinary and Animal Sciences, Lahore



During the term of the project, researchers from UVAS will design academic courses for graduate/postgraduate students in Pakistan, with one diploma course planned to strengthen the educational status of fish farmers.

The project would develop an increased number of trained faculty and students to enhance Pakistan's knowledge and skills base; and research findings that can enhance aquaculture production for a sustained small-scale industry



Fisheries and aquaculture play a crucial role in the economy of many developed countries. Pakistan has plenty of water reservoirs that contain a diverse fish fauna, but with time pollution has become a major problem for its aquaculture industry.

An association of University of Aberdeen, UK and Environmental Toxicology Laboratory, University of Vet and Animal Sciences, Lahore plans to evaluate the impact of environmental pollution on fish and fisheries in the Punjab region. The project will pinpoint heavily polluted sensitive sites, by surveying and analysing water samples.

University of Aberdeen will provide technical assistance as well as training to faculty members from UVAS involved in

the project. The UK team will also visit Pakistan for exchange of ideas and information regarding environmental issues in both countries. During the term of the project, researchers from UVAS will design academic courses for graduate/postgraduate students in Pakistan, with one diploma course planned to strengthen the educational status of fish farmers.

The project has short-term impacts, such as strengthening the research capabilities of faculty and laboratories of the partner institutes, with the potential to publish higher quality scientific publications from work carried out.

The project would develop an increased number of trained faculty and students to enhance

Pakistan's knowledge and skills base; and research findings that can enhance aquaculture production for a sustained small-scale industry, with potential to contribute to the economy of the country.

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# Developing strategies to monitor pollution levels in River Indus

**UK Partner:** Newcastle University

**Pakistani Partner:** Government College University, Faisalabad



The mighty Indus, which once nurtured one of the greatest ancient civilisations, is now rated the tenth most threatened river in the world. Climate change and unchecked pollution have caused toxin levels to rise dangerously; a fact that does not bode well for a country whose economy is based on agriculture. But the Indus is more than just a water resource for farmers – it is one of the major sources of drinking water for the villages that surround it as well as a vital

accumulate metal toxins in their bodies and hence are an excellent gauge of pollution in their external environment. By devising strategies to minimise toxin levels in the Indus, the project will greatly improve the quality of life in the surrounding communities, where contaminated water is one of the major causes of disease. Moreover, they will be able to reap economic benefits from farming fish that is safe for consumption.

staff members will be trained in aquatic genotoxicological research and more trained staff will be available at general and public level for fish farming, and educating agricultural farmers about the hazardous and genotoxic effects of pollutants on aquatic fauna and flora including Fish. The findings of this project will be published in various reputed International Journals which will be the intellectual property of both HEIs.

**The INSPIRE collaboration between the Government College University, Faisalabad and Newcastle University, UK aims to monitor the levels of pollution in the Indus using fish as an indicator.**

**By devising strategies to minimise toxin levels in the Indus, the project will greatly improve the quality of life in the surrounding communities, where contaminated water is one of the major causes of disease.**



support structure for local industry.

Having been nurtured by it for centuries, it is now an important responsibility for the region to protect the Indus from total extinction. The INSPIRE collaboration between the Government College University, Faisalabad and Newcastle University, UK aims to monitor the levels of pollution in the Indus using fish as an indicator. Aquatic animals, particularly fish,

The partnership hopes to involve the local and national governments to devise a comprehensive awareness campaign to control river pollution and help save one of the country's greatest natural resources.

This project will have long term impact on reducing aquatic pollution by creating awareness in the community about the hazardous effects of pollutants on fish growth and production. At the end of INSPIRE project 50

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The Romans are believed to have paid for them with their weight in gold, yet Pakistan has paid very little attention to utilising its native oyster species and earning valuable revenue. Oysters remain popular with gourmet food lovers, and with them fast becoming extinct the world over, now is the time to harvest previously unexploited habitats for the benefit of the local economy.

The INSPIRE partnership between the Centre of Excellence in Marine Biology, University of Karachi, the University of Stirling and the Queens University, Belfast is designed to work on the rehabilitation of Pakistan's edible oyster stocks. These are found along the coasts of Sindh and Balochistan and are dwindling rapidly due to a lack of interest. The aim of the project is to encourage oyster aquaculture by involving government and private enterprise and exploring means of commercialisation that would make the harvesting of oysters a profitable venture. It

would also mean the development of little-known coastal communities by developing a local industry within them and creating new jobs.

The partnership has enabled exchange visits from both sides, which are beneficial particularly for local researchers. Faculty members from University of Karachi, have visited the partners in the UK to learn best practises, and gain practical knowledge about the latest research being undertaken in the field. Work is also being done to develop an oyster hatchery in Pakistan where local produce can be cultivated. The UK researchers also benefited from the research experiences of Pakistani researchers as the environmental conditions here are much different than in the UK.

In these times of economic uncertainty, it is imperative that the country put to use all its natural resources in an effective manner. Our oysters may not yield pearls but their worth can no longer be ignored.

The project aims to create a sustainable impact by:

- Initiating work on oyster restoration in Pakistan and recognizing their commercial and ecological importance
- Promoting ecological conservation and aquaculture-related studies and research
- Developing manpower with specialised skills in this domain
- Benefiting the coastal community
- Developing new links and widening of the network, as well as extension of student exchange programme

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SP41

International Strategic Partnerships In Research and Education

# Restoration of the native oyster of Pakistan

**UK Partner:** Queen's University, Belfast

**Pakistani Partner:** Centre of Excellence in Marine Biology, University of Karachi, Karachi

The aim of the project is to encourage oyster aquaculture by involving government and private enterprise and exploring means of commercialisation that would make the harvesting of oysters a profitable venture.

Faculty members from University of Karachi, have visited the partners in the UK to learn best practises, and gain practical knowledge about the latest research being undertaken in the field.





## Health Sciences

Tracking diarrhoea-causing  
bacteria in Pakistan

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Promotion of early childhood  
development and the  
psychosocial well-being of  
Pakistani children

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Developing a newborn  
screening system to detect  
congenital hypothyroidism

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Analysing the cause of  
hydrocephalus in newborns

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Studying the biological and  
clinical importance of  
cytomegalovirus (CMV) infection

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Assessment of Leishmaniasis,  
an infectious skin disease, in  
Khyber Pakhtunkhwa

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Treating anxiety among  
adolescents in Pakistan



# Tracking diarrhoea-causing bacteria in Pakistan

**UK Partner:** London School of Hygiene and Tropical Medicine

**Pakistani Partner:** COMSATS Institute of Information Technology, Islamabad



The INSPIRE partnership between the London School of Hygiene and Tropical Medicine, UK and the COMSATS Institute of Information Technology, Pakistan aims to develop rapid and inexpensive polymerase chain reaction (PCR) based methodologies to track diarrhoea-causing bacteria in various drinking water sources.



A trail of destruction spread across Pakistan in 2010 in the form of massive floods. Millions were rendered homeless, countless villages were swept away and infrastructure was destroyed. The survivors were hardly lucky, for they had to brave freezing temperatures in makeshift shelters, scrounge for food and worst of all, battle serious illnesses. According to the World Health Organisation (WHO), water-borne diseases, including diarrhoea and the deadly cholera, are still the most commonly reported diseases in the flood-affected locations and children are particularly at risk. We have all seen the heartbreaking images of children, as young as a month old, fighting for their lives as their parents helplessly await a miracle; it may take something less than a miracle to save them after all.

The INSPIRE partnership between the London School of Hygiene and Tropical Medicine, UK and the COMSATS Institute of

Information Technology, Pakistan aims to develop rapid and inexpensive polymerase chain reaction (PCR) based methodologies to track diarrhoea-causing bacteria in various drinking water sources. The main objective of this project is to study hospitalised cases of diarrhoea in order to develop effective methodologies for environmental surveillance of commonly occurring water-borne pathogens causing diarrhoea and to better understand how to control the spread of disease.

The findings so far suggest that two distinct geographically separate sub-lineages of *V. cholerae* strains are circulating in Pakistan which is an alarming situation for the health protection agencies in Pakistan and demands the immediate long term prevention policies based on environmental hygiene to control cholera outbreak in the country. This INSPIRE project can help saving the 230,000 children

in Pakistan that die of water-borne diseases each year by developing methodologies for quick identification of the potential pathogens in the environment and making use of GIS system to point out the affected areas. Under this partnership, exchange visits have taken place between UK and Pakistan. Two PhD scholars are in UK for research work and further two scholars will be visiting UK for a period of 4-5 months.

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# Promotion of early childhood development and the psychosocial well-being of Pakistani children

**UK Partner:** University of Liverpool

**Pakistani Partner:** Rawalpindi Medical College, Rawalpindi



Shazia, a resident of Mandra in rural Rawalpindi is pregnant with her second child. She, like one in every four women in Pakistan, suffers from prenatal depression. Due to lack of mental health awareness, her first pregnancy had been an extremely trying experience, because no one in the village could understand what was wrong with her.

This time around, however, Shazia is actually looking forward to the arrival of her baby. That is because she has been receiving a very special visitor for the last

issues of childhood development is being carried out in the west, where the cultural, social and intellectual environment is completely different. This project aims to develop culturally relevant research and apply the findings in practical settings, particularly the rural communities of Pakistan. This INSPIRE partnership believes that as positive childhood development is intrinsically linked to the mother's capacity to provide care, maternal health should be the starting point for such an endeavour.

Development Research Foundation, to set up a rural research centre which trains local personnel in the area of mental health. Two trainings in Pakistan and one in the UK have been conducted and bilateral exchange visits have also taken place to build the capacity of Pakistani researchers.

The project led to the team winning an international competitive research grant in collaboration with their UK and regional partners, which has enabled them to continue their

The project will also promote the exchange of information and strengthen the existing links between British and Pakistani scientists. The research under this partnership will have far-reaching implications for the rural population in Khyber Pakhtunkhwa, the majority of which lives in remote areas beyond the scope of national health programmes.

In order to make their work more accessible and sustainable, the INSPIRE team of specialists is working to transfer their skills to non-specialists e.g. lady health workers or ordinary primary care physicians, or even volunteers from within the community.

couple of months. Manzar Bibi is one of the many health workers trained under the collaborative project between Rawalpindi Medical College and University of Liverpool that works to counsel expectant and new mothers to deal with issues of maternal depression. Manzar Bibi has been helping Shazia come to terms with her condition.

In Pakistan, an estimated 42% of the population is below the age of 14; yet the area of childhood development has received surprisingly little attention. Most of the current work dealing with

In order to make their work more accessible and sustainable, the INSPIRE team of specialists is working to transfer their skills to non-specialists e.g. lady health workers or ordinary primary care physicians, or even volunteers from within the community. Hence, instead of the villagers having to travel long distances, or deal with cultural taboos to consult psychiatrists, trained locals like Manzar Bibi can go to the community themselves. The partnership is collaborating with a local non-governmental organisation, the Human

work in Rawalpindi for the next five years.

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SP53

International Strategic Partnerships In Research and Education

# Developing a newborn screening system to detect congenital hypothyroidism

**UK Partner:** Queen Mary, University of London

**Pakistani Partner:** National Health Research Complex, Lahore

Wardah is six, yet starting school is not an option for her.

Abnormally short for her age and with distinct facial features, she has the mental age of a one-year old. Instead her mother takes her to a centre for special children thrice a week, where she plays with other children who do not make her feel like an outsider. Wardah is one of the many children in Pakistan who suffer from a thyroid deficiency called congenital hypothyroidism.

The real tragedy is that her condition could have easily been prevented. Congenital hypothyroidism is among several metabolic disorders present at birth that can lead to growth failure and mental retardation. In the developed world, one in every 4000 babies are born with congenital hypothyroidism. But because treatment is so simple and inexpensive, all babies are screened at birth and are treated within one month, to prevent them for being mentally retarded.

In Pakistan, however, the incidence of congenital hypothyroidism is one case per 1000 newborns, which is about 4 times that of the west. More worryingly, there is no means to diagnose the condition at birth, meaning that those born with it

have to live with it for the rest of their lives.

This INSPIRE partnership between Queen Mary, University of London and National Health Research Complex, aims to start and strengthen newborn screening programmes to avoid late diagnosis of congenital disorders that result in unnecessary health and economic burdens for the country and emotional trauma for the family.

This project plans to develop testing kits locally to make the process of newborn screening inexpensive and accessible to all hospitals across Pakistan. A centralised screening lab has already been established, where blood spot samples are being screened from different hospitals.

National and international in-job technologists, researchers and post-graduate students are also using the facility of this lab, which has been equipped by the donation of the UK link coordinator, the late Dr. Raymond Edwards.

A very important aspect of the collaboration is to create awareness amongst local communities about congenital disorders so that early screening

and diagnosis can be made possible. The project team has carried out awareness campaigns that highlight how simple it is to treat the condition if it is revealed in time. A daily dose of the hormone thyroxin is all that is required to prevent more Wardahs from feeling like they don't belong.

The project would benefit the local community by;

- Introducing locally developed reagents that would be available for establishing a nationwide screening programme
- Ensuring the availability of affordable screening programme for congenital hypothyroidism
- Saving newborns from being mentally handicapped
- Creating a culture of further research in congenital hypothyroidism at an affordable cost

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This project plans to develop testing kits locally to make the process of newborn screening inexpensive and accessible to all hospitals across Pakistan.



# Analysing the cause of hydrocephalus in newborns

**UK Partner:** University of Manchester

**Pakistani Partner:** COMSATS Institute of Information Technology, Islamabad



The collaboration between the University of Manchester, UK and the COMSATS Institute of Information Technology, Pakistan aims to understand the cause of hydrocephalus in babies which would help in developing a preventative and/or cure for the condition.

Under this collaborative partnership, it is the first time there has been hope for a treatment for hydrocephalus, a major problem in Asia where termination is restrictive and/or not practised.



Hydrocephalus, also known as 'water in the brain', is a neurological condition caused by the abnormal accumulation of cerebrospinal fluid in the brain. It affects one in 500 live births worldwide, up to one in 100 in developing countries, and is associated with life-long neurological problems. Very little research has been carried out to improve treatment for hydrocephalus, even though it has existed for centuries, with references to it in ancient Egyptian and Greek medical literature. To this day, there is no known cure for it and terminating the foetus is the only control method being practised.

The collaboration between the University of Manchester, UK and the COMSATS Institute of Information Technology, Pakistan aims to understand the cause of hydrocephalus in babies which would help in developing a preventative and/or cure for the condition. The project builds on pre-clinical research on animals demonstrating a specific folate imbalance in the cerebrospinal fluid. In hydrocephalic rats, the

condition has been shown to be preventable and treatable with a combination folate supplement given to the pregnant mother.

The project will determine whether an imbalance of the cerebrospinal fluid is associated with hydrocephalus in humans as well, indicating the potential to prevent and treat the condition. Under this collaborative partnership, it is the first time there has been hope for a treatment for hydrocephalus, a major problem in Asia where termination is restrictive and/or not practised. The impact would be enormous given the numbers born with this condition in all social classes.

The project has been able to bring together neonatologists, neurosurgeons and scientists based at hospitals in Lahore, Manchester, Liverpool and Leeds to collect and work on samples of cerebrospinal fluid collected from babies.

The project also aims to raise awareness in the local communities about the defect.

Numerous government and non-government institutions have participated in a health campaign designed to educate parents and caregivers about how best to handle children afflicted with this life-threatening condition.

A major long-term and sustainable outcome of the project has been the setting up of the first research laboratory in Lahore Children's Hospital. The lab will initially be used for processing samples to send to the UK and Islamabad but will shortly have a permanent technician with the possibility of running two PhD projects

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# Studying the biological and clinical importance of cytomegalovirus (CMV) infection

**UK Partner:** University of Birmingham

**Pakistani Partner:** Aga Khan University, Karachi



You may be feeling on top of the world today but did you know that your body could be harbouring a viral infection without you even knowing it? Cytomegalovirus (CMV) is a species of virus that is present in more than 70% of the adult world population. An unusual characteristic of the virus is that it never clears from the host following the infection. In a normal, healthy adult, it poses no danger. However, chronic CMV infection in older people leads to a decrease in the ability of the

socio-economic classes and collect blood samples to determine the presence of CMV. The aim is to design interventions that will boost the body's immune system to fight the virus, which in turn will help combat other diseases such as Hepatitis C and cancer.

The partnership will develop a short course in virology for the mutual benefit of both universities. Faculty and student exchange is also a major component of this project. Under

would be improved understanding about the correct status of cytomegalovirus (CMV) in the local population; mainly so because such a large number of participants with demographical data has not been studied for the assessment of this particular virus.

This study would lead to the initiation of further projects in this area and would also assist in finding the association between the CMV infection with hepatitis C virus infection which is a much

**Under this partnership, a PhD student from the Aga Khan University was placed at the University of Birmingham for research while leading cancer specialist Dr. Paul Moss from the University of Birmingham delivered seven lectures in Pakistan to an audience of health practitioners, researchers and students.**



immune system to fight other, more dangerous infections. Moreover, CMV is one of the infections mostly easily passed on to fetuses and can prove fatal for newborns.

The Aga Khan University, Pakistan and the University of Birmingham, UK are studying the biological and clinical importance of CMV to determine its prevalence in several districts of Karachi. The research will study a cross-sectional rural/urban population from all

this partnership, a PhD student from the Aga Khan University was placed at the University of Birmingham for research while leading cancer specialist Dr. Paul Moss from the University of Birmingham delivered seven lectures in Pakistan to an audience of health practitioners, researchers and students. The partners plan to hold workshops in both countries and disseminate the findings of their research to a wider audience.

The major benefit of this project

greater and complex problem in the context of Pakistan.

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International Strategic Partnerships In Research and Education

# Assessment of Leishmaniasis, an infectious skin disease, in Khyber Pakhtunkhwa

**UK Partner:** London School of Hygiene & Tropical Medicine

**Pakistani Partner:** University of Peshawar, Peshawar

The Baghdad boil or the Lahore sore, as the name implies, is a skin disease prevalent in refugee camps in Afghanistan and in the northern parts of Pakistan. The scientific name for the disease is cutaneous leishmaniasis and it is common in the developing world, usually afflicting the poorest sections of the population.

The disease is caused by the bite of the female sandfly and manifests itself in the form of lesions, or sores, on exposed body parts such as the face, neck and arms. The social stigma associated with this infection is great, especially for women living in these conservative societies,

where the slightest disfiguration can mean a lifetime of isolation and ridicule.

The INSPIRE partnership between the University of Peshawar and the London School of Hygiene & Tropical Medicine is carrying out research to study the properties of drugs used to treat cutaneous leishmaniasis.

The aim of the project is to establish a cell culture laboratory in the department of zoology at the University of Peshawar. This will be a first-of-its-kind facility in the Khyber Pakhtunkhwa region and

students from all over the province can benefit from it. Experiments on skin cells will be carried out to investigate the properties of the drugs and to determine their reaction on the affected cells.

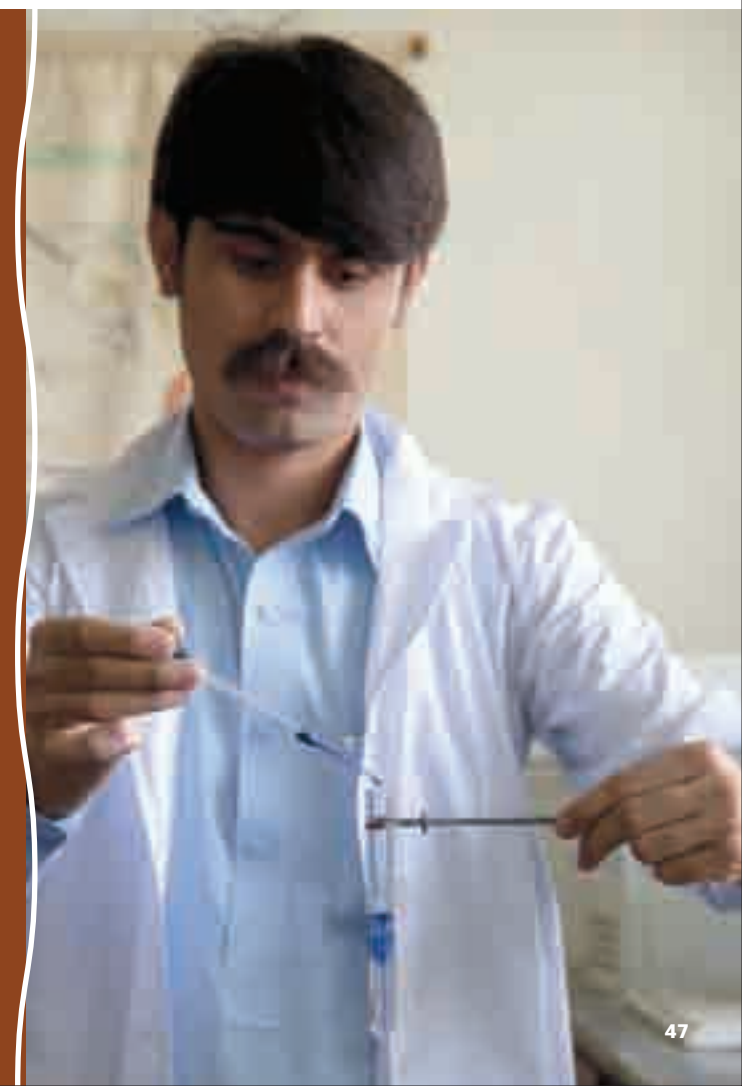
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The project will also promote the exchange of information and strengthen the existing links between British and Pakistani scientists. The research under this partnership will have far-reaching implications for the rural population in Khyber Pakhtunkhwa, the majority of which lives in remote areas beyond the scope of national health programmes.

The new developments in experimental design, cell culture, molecular techniques, molecular diagnosis and establishment of state-of-the-art cell culture lab at University of Peshawar would benefit the coming generations of Khyber Pakhtoonkhwa.





# Treating anxiety among adolescents in Pakistan

**UK Partner:** University of Roehampton

**Pakistani Partner:** Fatima Jinnah Women University, Rawalpindi



The development of cost-effective programmes under this INSPIRE partnership to prevent child and adolescent anxiety disorders will be beneficial not just for the child but also for the family and the society at large.



Being a teenager is a tough job – there is pressure to do well at school and get into a good college, the pressure to be socially accepted by peers who can be unquestionably cruel and there are the demands of unreasonable parents who seem to forget that they too were at this awkward stage once upon a time.

It is little wonder then that anxiety is one of the most common problems among adolescents in western countries, affecting up to 18% of people between the ages of 13 and 19. Various sociological and economic factors in Pakistan – escalating poverty, the lack of jobs, poor counselling services, to name just a few – have contributed to a significantly higher rate of anxiety disorders amongst its adolescents. However, no large-scale study has been conducted to date that aims to deal with this growing concern.

The partnership between the University of Roehampton and Fatima Jinnah Women University is seeking to change that by examining the prevalence of

anxiety disorders among adolescents in Pakistan and finding ways to control them.

Currently, there is one child psychiatrist in Pakistan for four million children and adolescents with mental health problems. Given the poor health infrastructure within the country, it is understandable that greater attention and resources are devoted to more pressing concerns, such as working with victims of natural disasters. Yet there is a need to recognise anxiety as a serious problem that affects human potential, and if unchecked, can trigger other mental disorders such as depression, substance abuse and dependence.

The main objective of the research is to narrow down those unique environmental and cultural factors that cause anxiety in Pakistani teenagers and develop an anxiety-prevention programme to be implemented at the national level. The project also aims to train the end users (caretakers, teachers NGOs etc.) to deliver the programme

effectively to a wide range of adolescents.

This would be the first study of its kind which will enable the researchers to identify the prevalence as well as the plausible risk factors for anxiety among Pakistani children and adolescents between the ages of 13-19. This will allow the team to manipulate the risk factors that are involved in the development of and maintenance of anxiety.

The development of cost-effective programmes under this INSPIRE partnership to prevent child and adolescent anxiety disorders will be beneficial not just for the child but also for the family and the society at large.

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## Intercultural Relations

Archaeological investigations and  
their link to heritage in Chitral

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Lancashire to Lahore: Exchanges  
to develop cultural understanding

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The Bradford/Mirpur connection  
and the global citizenship  
of its young people

# Archaeological investigations and their link to heritage in Chitral

**UK Partner:** University of Leicester

**Pakistani Partner:** Hazara University, Mansehra



The advanced technology provided by the University of Leicester has led to the location, excavation and documentation of numerous sites.

The project has generated interest at an international level, with its researchers participating in the 20th European Association of South Asian Archaeology and Art Conference held at the University of Vienna.



Nestled in the foothills of the magnificent Hindu Kush mountains lies the valley of Chitral, famed not only for its natural beauty but also for its unique heritage. A number of ancient archaeological sites dot the area, the study of which could uncover a great deal of new information about Chitral's past.

Hazara University, Pakistan and the University of Leicester, UK are collaborating to study these sites, hoping to develop better understanding of Chitral's history and culture. The advanced technology provided by the University of Leicester has led to the location, excavation and documentation of numerous sites. Researchers believe that the data collected can be used to investigate the development and form of many great cultural occurrences in this region, including the spread of Buddhism and Islam and their impact on local cultures. The INSPIRE partnership has the potential to re-write Chitral's history by exploring many elements of the past in form of archaeological sites and materials.

The project has generated interest at an international level, with its researchers participating in the 20th European Association of South Asian Archaeology and Art Conference held at the University of Vienna. Bilateral exchange visits have also taken place under the partnership, particularly for planning and data analysis. Another significant outcome of the partnership is the birth of a Journal of Pakistan Heritage; two volumes of which have been published, which they hope will begin to filter into schools and universities in order to help explain the history of Chitral.

A further key aspect of this study is the exploration of local attitudes towards heritage and tourism, and consideration of what local residents believe to be important and valuable. This exploration has included the well known Kalash valleys and people, who are the largest non Muslim group in the Hindu Kush, and who are particularly under threat from encroachment and pressures to conform. With the country's tourism industry in danger of

suffering a major blow if the picturesque Chitral valley falls off its radar, it is important that the region receive public attention.

Researchers have learnt a lot about the history of Chitral – hitherto only known through mythical narratives and a few stories about kings and other major (male) figures from the last few centuries

The project will have a prolonged impact on the local people of Chitral in terms of making them more aware of the value of both their tangible and intangible past.

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# Lancashire to Lahore: Exchanges to develop cultural understanding

**UK Partner:** University of Central Lancashire

**Pakistani Partner:** School of Visual Arts, Beaconhouse National University, Lahore



Visual arts embed in itself the cultural heritage of Pakistan, whether it is in the form of photography, calligraphy, landscape painting, printmaking or filmmaking. The arts community in Pakistan has a vibrant and diverse repertoire of work that represents the real face of the country.

The Beaconhouse National University has initiated a strategic partnership with the University of Central Lancashire to develop a communications

which was successfully piloted in 2010. Through visual communication, powerful political, personal and creative viewpoints were exchanged. There are also opportunities to chat informally in designated forums about global issues and discuss and develop future symposia topics and plan group exhibitions together. A highly interactive website is due to be launched soon where discussions will be carried out and an online facility with live video conferencing will be

The main aim of the linkage is to grow and develop the idea of 'international exchange through art' into the curriculum, maximise knowledge, skill and social interaction. Another significant outcome of the partnership is to have accredited modules and extracurricular activities for the students of Beaconhouse National University.

**This INSPIRE partnership will provide a platform for local communities in the two countries to engage and explore the personal perceptions of institutions within UK and Pakistan. This will lead to a dialogue between the communities and a fuller understanding of cultural differences.**



link that will document the contemporary culture of Pakistan. This INSPIRE partnership will provide a platform for local communities in the two countries to engage and explore the personal perceptions of institutions within UK and Pakistan. This will lead to a dialogue between the communities and a fuller understanding of cultural differences.

The program involves a small-scale postcard exchange

available, both by recording and presenting information on screen.

Staff exchanges between the two institutes are one of the key aims of the venture and the delivery of training will enable the development of new skills to support this project and instil this participatory learning into the curriculum. The learning and training set in place will provide a cornerstone in the policymaking of the institute.

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International Strategic Partnerships In Research and Education

# The Bradford/Mirpur connection and the global citizenship of its young people

**UK Partner:** School of Lifelong Education and Development, University of Bradford

**Pakistani Partners:** Mirpur University of Science and Technology (MUST), University of Azad Jammu and Kashmir (UAJK)

Caught between two cultures – no place in the world illustrates this dichotomy better than the city of Bradford in the UK, which has one of the highest percentages of people of Pakistani origin. More than 80% of these Bradford Pakistanis come from Mirpur, Kashmir. It is common for most families to regularly shuttle between the two countries and the two very diverse cultures. Statistics show that approximately 50% of Mirpuri-heritage Bradford children go on extended leave at least once in their school lifetimes.

The University of Science and Technology and the University of Azad Jammu and Kashmir have partnered with the School of Lifelong Education and Development, University of Bradford to study this interesting sociological phenomenon. The project aims to better understand the impact of extended leave and how best to educationally support young people who live cross-culturally.

Expert opinion on living between two cultures is divided. On the

one hand is the perception that prolonged absence from their hometown has a negative impact on children's education and is responsible for their underachievement and subsequent anti-social activities, whereas others believe that extended periods abroad provide vital cultural and social learning.

While research will be carried out to determine the effects of this cultural duality, the most important aspect of the project is to ensure that the young people involved feel at home in both places. To do so, partnerships between educational institutions in Bradford and Mirpur are being encouraged, in order to devise a collaborative curriculum for those children who are away from school for long periods.

It has become fashionable to talk of 'global citizenship' as a positive experience; but ask those who actually live between two countries and experience a sense of alienation from both. Through this project, the Pakistani and UK universities hope to provide children of

Mirpuri-origin living in Bradford some semblance of a normal academic life and help them in their struggle to fit in.

The project will also give students the opportunity to engage in and lead a piece of interesting research – student voice and students as agents of change.

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The project aims to better understand the impact of extended leave and how best to educationally support young people who live cross-culturally.

Through this project, the Pakistani and UK universities hope to provide children of Mirpuri-origin living in Bradford some semblance of a normal academic life and help them in their struggle to fit in.





## Law, Governance & Leadership

Women empowerment and the crisis  
of good governance in South Punjab

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Training and educating women  
parliamentarians in Pakistan



# Women empowerment and the crisis of good governance in South Punjab

**UK Partner:** Royal Holloway College, University of London

**Pakistani Partner:** Bahauddin Zakariya University, Multan



The empirical study and research being conducted by students and faculty has brought local stakeholders within the framework of informal discourse to discuss, share knowledge and learn about the effects of the operational barriers and cultural constraints that have hindered women from becoming active agents of social change.



17-year-old, Shakorwan Bibi woke up feeling feverish on the morning of July 19, 2010. Having been unwell for the past few days, she decided to visit the local hospital in her hometown, Dera Ghazi Khan, for a check-up. Little did she know that this simple decision would cost her her life. On her return home, she was brutally stabbed to death by her father who thought his daughter had defamed the family's honour by allowing a doctor to examine her.

Such outrageous cases of violence against women are, unfortunately, a common occurrence in Pakistan. According to the Human Rights Commission of Pakistan, 675 females were murdered for "honour" during the first nine months of 2011. Given their treatment as second class citizens in this male-dominated society, it is impossible for them to speak out and take action against such injustices.

Royal Holloway College and Bahauddin Zakariya have collaborated to provide women a voice and make them active participants of the political process. The underlying belief of this INSPIRE partnership is that unless women are given due

representation at the local level, they will remain incapable of protecting their rights. This study will also evaluate the performance of local government institutions and parallel power structures to see how far the status of women has been bolstered and whether their lot has improved since the substantial representation in political institutions was offered to women in 2001.

The researchers will work with non-governmental agencies operating in the area so that the academic output can be translated into practical results. Training and capacity building is a major output and five optional courses will be developed by faculty from Bradford University.

Bahauddin Zakariya University plans to implement gender research at the post graduate level and train its faculty members in gender-related issues through exchange programmes with the Royal Holloway College. This will create a team of researchers and academics who have the sensitivity and the expertise to tackle local customs that perpetuate violence against women while providing

counselling to victims who often have no one to turn to.

The empirical study and research being conducted by students and faculty has brought local stakeholders within the framework of informal discourse to discuss, share knowledge and learn about the effects of the operational barriers and cultural constraints that have hindered women from becoming active agents of social change.

This project will eventually produce a much clearer idea of the kinds of pressures operating at the level of local representative councils to inhibit or encourage female participation. The data collected will help identify the kinds of initiatives required to enhance female participation at this level.

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# Training and educating women parliamentarians in Pakistan

**UK Partner:** University of Bradford

**Pakistani Partner:** Fatima Jinnah Women University, Rawalpindi



Women in Pakistan have traditionally struggled against a male-dominated society to make their place in the country's politics. Their absence from decision-making posts at the national and provincial levels means that they have no power to influence laws that affect women or to work towards improving their conditions.

Surprisingly, Pakistan has one of the highest percentages of

weakness and educate female parliamentarians on matters of national importance. The researchers realise that the challenge in Pakistan is not simply to increase the numbers of females in the government, but more specifically to enhance the quality of their representation so that they have the power to make a difference.

The aim of the project is to develop a system of training on

Fatima Jinnah Women University that will provide ongoing parliamentary training and seek collaborations with local and international institutions on peace and conflict issues.

**Fatima Jinnah Women University and the University of Bradford are collaborating to address this weakness and educate female parliamentarians on matters of national importance.**

**The aim of the project is to develop a system of training on issues such as peace, conflict, security and democracy which will give women parliamentarians the knowledge and confidence to speak out and effect change.**



women in parliament in South Asia and in recent years, has increased the number of reserved seats for women in the provincial and national assemblies. Yet the quality of their representation remains poor due to inadequate training and exposure.

Fatima Jinnah Women University and the University of Bradford are collaborating to address this

issues such as peace, conflict, security and democracy which will give women parliamentarians the knowledge and confidence to speak out and effect change. This will be done through a series of peace studies modules that will develop their knowledge and competence.

The partnership also plans to establish a Research Centre of Peace and Security Studies at

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## Power & Energy

Developing water turbines for  
electric power generation

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Increasing the efficiency of wind  
energy systems

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Building indigenous capabilities  
for Thar coal development

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Co-combustion of Pakistani  
Coal and Biomass in Pilot  
Scale Combustors

# Developing water turbines for electric power generation

**UK Partner:** University of Southampton

**Pakistani Partner:** NUST College of Electrical and Mechanical Engineering, Rawalpindi



The idea of the partnership is to develop water turbines along rivers, which will provide electricity to nearby villages and cities independently or will be integrated into the main grid depending upon the amount of electricity developed.

A significant success for the project has been the International Conference on Energy Systems Engineering organised by NUST in October 2010.



Pakistan's electricity woes show no signs of abating. We have all become used to living at least a quarter of each day without power and unless someone somewhere wakes up to the fact that things will not get better without drastic action, we are headed towards an even darker future.

Fortunately, the University of Southampton in the UK and Pakistan's NUST College of Electrical and Mechanical Engineering have decided to come up with an alternative means of electricity generation.

Pakistan has one of the largest networks of canals, with five major rivers continuously flowing through its length all the year round. Given the current energy crisis, it makes sense to use the natural, renewable source that is readily available all over the country – water – and develop a cost-effective system of energy production.

The idea of the partnership is to develop water turbines along rivers, which will provide

electricity to nearby villages and cities independently or will be integrated into the main grid depending upon the amount of electricity developed.

The power created with this technology will be environment-friendly, as water turbines do not cause any contamination to the water that flows through them. Moreover, they make use of a renewable energy source and require very little maintenance.

One postgraduate and two undergraduate students at the two universities have aligned their final year research projects with the Strategic Partnership subject area. A significant success for the project has been the International Conference on Energy Systems Engineering organised by NUST in October 2010. The conference involved stakeholders, donor agencies, researchers and students.

The successful implementation of this research will help improve the quality of life for the millions who have been adversely

affected by power shortages.

This INSPIRE partnership would:

- Achieve cost effective ways of generating power
- Form an International Fluid Mechanics Research Group
- Raise public awareness of renewable energy resources
- Provide a platform for future small scale renewable energy products in rural areas of Pakistan
- Facilitate futuristic partnerships between industries and universities

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# Increasing the efficiency of wind energy systems

**UK Partner:** Cambridge University

**Pakistani Partner:** Air University, Islamabad



The Pakistan Electric Power Company (PEPCO) has admitted that the country is facing a massive electricity shortfall of 7200 MW, unparalleled in our history. With power plants shutting down across the country and the demand for power unmet by almost 40%, we need to turn to alternative energy sources to help us out of this crisis.

Wind energy is one such readily available option. Not only is it a renewable source of energy, it

A design for the sensor has already been conceived and patent protected by the team of researchers from Cambridge University and Air University. During the last phase of this project, on-turbine tests are planned on a 20kW wind turbine, which is owned by Cambridge Wind Technology and is located next to the Whittle Lab at the University of Cambridge. As a result, it provides an ideal location for quickly and efficiently testing the sensor.

Cambridge University. This INSPIRE partnership will also create a lasting impact by facilitating the introduction of world-class engineering courses (adopted from Cambridge) at a nascent Pakistani university.

This will improve the overall teaching and research standards at Air University and increase awareness of its cutting-edge research projects that aim to transform the way we live.

**Air University, in collaboration with the University of Cambridge, is developing a micro-machined sensor, the first of its kind in the world that would enable wind turbines to function more effectively. This would also allow the direct measurement of the performance of both gas and wind turbines.**



has a very low carbon footprint: an important consideration given the high levels of pollution in Pakistan. Globally, wind turbines generate about 2% of the entire electricity usage.

Air University, in collaboration with the University of Cambridge, is developing a micro-machined sensor, the first of its kind in the world that would enable wind turbines to function more effectively. This would also allow the direct measurement of the performance of both gas and wind turbines.

The sensors proposed in this project are and will be IP protected. Therefore, contingent upon their good performance, they can become commercial products. If that happens, both UK and Pakistan governments will benefit.

Through this partnership, Air University will be able to develop long-term research links with Cambridge. The faculty at Air University will benefit from the experience of the world's best academics and researchers at

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SP247

International Strategic Partnerships In Research and Education

# Building indigenous capabilities for Thar coal development

**UK Partner:** University of Nottingham

**Pakistani Partner:** Mehran University of Engineering and Technology, Jamshoro

In terms of the world energy consumption, coal still has the highest share in electricity generation and the second highest in primary energy consumption. The abundant supply of coal reserves in Thar, Pakistan can generate up to 40,000 MW of electricity for more than 200 years – a blessing considering the country's current electricity woes – yet there is a need to utilise this resource in an environmentally sustainable way.

The Mehran University of Engineering and Technology, Jamshoro, Pakistan has taken up the challenge to develop the Thar coal fields in Sindh in collaboration with the University of Nottingham, UK under the INSPIRE programme. Through this programme, the Mehran University intends on maximising capacity-building through transfer of knowledge and trainings. There is also proposed development of manpower through a proper training of personnel at the coal mines.

Pakistan possesses the seventh largest lignite resource in the world with 193 billion tonnes of lignite/coal reserves concentrated in Thar region in the eastern part of Sindh Province. Thar coalfield covers an area of approximately 9000 km<sup>2</sup> and is estimated to contain 175 billion tonnes of lignite resources. The design of safe high wall slopes is necessary to ensure mine safety and overall economical viability of the mining operations. The knowledge transfer between the universities will ensure an optimum model development.

The conversion of Thar coal into a syngas has the potential to meet the ever-increasing energy demand of the country and under this project research collaboration with Tsinghua University, China has been established to conduct joint research on coal gasification and coal combustion. There is also an opportunity of conducting a split PhD programme with Hacettepe

University, Turkey.

The ultimate goal of the programme is to develop local expertise and indigenous technology for coal mining, coal cleaning and coal gasification, through strong collaboration with research groups in foreign universities. It also aims to facilitate the strategic development in mining engineering, thermal engineering, chemical engineering and environmental engineering to meet the international standards.

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The Mehran University of Engineering and Technology, Jamshoro, Pakistan has taken up the challenge to develop the Thar coal fields in Sindh in collaboration with the University of Nottingham, UK under the INSPIRE programme.

The ultimate goal of the programme is to develop local expertise and indigenous technology for coal mining, coal cleaning and coal gasification, through strong collaboration with research groups in foreign universities





# Co-combustion of Pakistani Coal and Biomass in Pilot Scale Combustors

**UK Partner:** University of Leeds

**Pakistani Partners:** Pakistan Institute of Engineering and Applied Sciences, Mehran University, University of Punjab and Islamic International University



The project will focus on technical developments to bring about the clean combustion of Thar coal at a pilot scale to gain information on how this coal will perform in a power plant.

The project has vast potential for commercialisation. National and international power companies and the Government of Pakistan, itself, would be the main users of this technology.



A steady increase in atmospheric carbon dioxide levels each year is contributing to global climate change. Hence, there is a push to develop low carbon combustion technologies. Pakistan's huge coal reserves in Thar, provide an ideal alternative for power generation and can help significantly reduce the gap between power supply and demand that is crippling the country.

The Pakistan Institute of Engineering and Applied Sciences has come together with multiple universities in Pakistan - Mehran University, University of Punjab and Islamic International University, as well as industrial giant Engro - to come up with an alternative energy source. The University of Leeds is the UK partner under the INSPIRE brand umbrella.

The project will focus on technical developments to bring about the clean combustion of Thar coal at a pilot scale to gain information on how this coal will perform in a power plant. The

results will be compared with those from a database of results of world coal combustion tests. The project has vast potential for commercialisation. National and international power companies and the Government of Pakistan, itself, would be the main users of this technology.

The impact will be enormous in terms of economical development and improvement in the quality of life in general by provision of cheap, clean and uninterrupted electricity to the nation's individual consumers and industries.

The results of the research will be published on the 34th International Symposium on Combustion, the European Conference on Coal Research and Its Applications as well as the World Congress of Chemical Engineering. It will also be published in reputable international journals to gain wider audiences. The project will have a multidimensional effect in the region and will act as a catalyst for strong linkages with other national and international organisations.

An annual international workshop is being planned, which will help in developing better linkages regionally and internationally. This workshop would be telecasted live to all participating institutes and will allow participating countries and higher education institutes to benefit from the research. As a result, there will be a flow of research projects from the Pakistani industry to local universities, increasing the levels of industrial funding and interaction.

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<http://www.abdn.ac.uk>

**London School of Hygiene & Tropical Medicine**  
[www.lshtm.ac.uk](http://www.lshtm.ac.uk)

**Newcastle University**  
[www.newcastle.ac.uk](http://www.newcastle.ac.uk)

**Queen Mary, University of London**  
[www.qmul.ac.uk](http://www.qmul.ac.uk)

**Queens University, Belfast**  
[www.qub.ac.uk](http://www.qub.ac.uk)

**Royal Holloway College,**  
University of London  
[www.rhul.ac.uk](http://www.rhul.ac.uk)

**University of Birmingham**  
[www.bham.ac.uk](http://www.bham.ac.uk)

**University of Bolton**  
[www.bolton.ac.uk](http://www.bolton.ac.uk)

**University of Bradford**  
[www.bradford.ac.uk](http://www.bradford.ac.uk)

**University of Cambridge**  
[www.cam.ac.uk](http://www.cam.ac.uk)

**University of Central Lancashire**  
[www.uclan.ac.uk](http://www.uclan.ac.uk)

**University of Essex**  
[www.essex.ac.uk](http://www.essex.ac.uk)

**University of Leeds**  
[www.leeds.ac.uk](http://www.leeds.ac.uk)

**University of Leicester**  
[www2.le.ac.uk](http://www2.le.ac.uk)

**University of Liverpool**  
[www.liverpool.ac.uk](http://www.liverpool.ac.uk)

**University of Manchester**  
[www.manchester.ac.uk](http://www.manchester.ac.uk)

**University of Nottingham**  
[www.nottingham.ac.uk](http://www.nottingham.ac.uk)

**University of Oxford**  
[www.ox.ac.uk](http://www.ox.ac.uk)

**University of Roehampton**  
[www.roehampton.ac.uk](http://www.roehampton.ac.uk)

**University of Southampton**  
[www.soton.ac.uk](http://www.soton.ac.uk)

**University of Sussex**  
[www.sussex.ac.uk](http://www.sussex.ac.uk)

## List of Pakistani Universities

**Aga Khan University**  
[www.aku.edu](http://www.aku.edu)

**Air University**  
[www.au.edu.pk](http://www.au.edu.pk)

**Azad Jammu Kashmir University**  
[www.ajku.edu.pk](http://www.ajku.edu.pk)

**Bahauddin Zakariya University**  
[www.bzu.edu.pk](http://www.bzu.edu.pk)

**Beaconhouse National University**  
[www.bnu.edu.pk](http://www.bnu.edu.pk)

**COMSATS Institute of Information Technology**  
[www.ciit.edu.pk](http://www.ciit.edu.pk)

**Fatima Jinnah Women University**  
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**Government College University, Faisalabad**  
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**Hazara University**  
[www.hu.edu.pk](http://www.hu.edu.pk)

**National University of Science and Technology**  
[www.nust.edu.pk](http://www.nust.edu.pk)

**Institute of Management Sciences**  
[www.imsciences.edu.pk](http://www.imsciences.edu.pk)

**Mehran University of Engineering and Technology**  
[www.mu.edu.pk](http://www.mu.edu.pk)

**Mirpur University of Science and Technology**  
[www.must.edu.pk](http://www.must.edu.pk)

**National Health Research Complex**  
[www.pmrc.org.pk/nhrc.htm](http://www.pmrc.org.pk/nhrc.htm)

**NUST College of Electrical and Mechanical Engineering**  
[www.ceme.edu.pk](http://www.ceme.edu.pk)

**Pakistan Institute of Engineering and Applied Sciences**  
[www.pieas.edu.pk](http://www.pieas.edu.pk)

**Quaid-i-Azam University**  
[www.qau.edu.pk](http://www.qau.edu.pk)

**Rawalpindi Medical College**  
[www.rmc.edu.pk](http://www.rmc.edu.pk)

**Textile Institute of Pakistan**  
[www.tip.edu.pk](http://www.tip.edu.pk)

**University of Engineering and Technology, Lahore**  
[www.uet.edu.pk](http://www.uet.edu.pk)

**University of Health Sciences**  
[www.uhs.edu.pk](http://www.uhs.edu.pk)

**University of Karachi**  
[www.uok.edu.pk](http://www.uok.edu.pk)

**University of Peshawar**  
[www.upesh.edu.pk](http://www.upesh.edu.pk)

**University of Sindh**  
[www.usindh.edu.pk](http://www.usindh.edu.pk)

**University of Veterinary and Animal Sciences, Lahore, Pakistan**  
[www.uvas.edu.pk](http://www.uvas.edu.pk)





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