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THE AGA KHAN UNIVERSITY



Research Outlook

January 2016
Issue 7

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Dean of Research and Graduate Studies | Professor El-Nasir Lalani
 Director | Professor Anwar Siddiqui
 Editors | Saher Muslim, Jack Fernandes
 For feedback, write to: saher.muslim@aku.edu

Welcome

The modus operandi, which has governed research in many disciplines continues to evolve from one that used to be individual centric to a model which is multidisciplinary. This shift is essential to address the challenge of complexity in understanding our world. The traditional approach has been one of trying to comprehend the challenge of complexity via the reductionist approach, creating disciplines and sub-disciplines. There has been a realization in recent years that researchers and students can better unravel and understand the nature of a problem through a multidisciplinary, team approach.

Inter and multidisciplinary research moves beyond simple collaboration. It brings together researchers from across disciplines into teams. These teams explore together, utilizing state-of-the-art core research facilities and data sets, integrating data, concepts and methodologies from various disciplines to address real local and global problems.

As AKU evolves into an international multicampus, multicountry comprehensive university, its education and research programmes engage faculty and students from different disciplines, embracing a multidisciplinary approach to education and research, resulting in better research, innovative teaching, generation of knowledge, with direct impact on the quality of lives of people the University serves.

The Office of Research and Graduate Studies strives to expand AKU's research enterprise – people, collaborations, facilities and services – in the areas of education, health, human development, media and communications and humanities. We work closely with deans, directors and faculty to create and promote an environment, which fosters a multidisciplinary approach. We also identify potential grant funding opportunities, and work in concert to develop the commensurate support services and programmes to attract and develop the brightest minds and the most promising students.

The faculty, staff, students and research associates are our greatest strength and their success as individuals and as teams determines the collective success of the university. One of the aims of *Research Outlook* is to share their work and success stories with the AKU family, funders, external partners and the wider community. The publication is a way to stay informed, feel inspired and invite collaborations in relation to research across all campuses and regions.

In this issue, we have highlighted the development of AKU-Centre for Regenerative Medicine. You will also find a report on the Inaugural ceremony of the Institute for Human Development and findings from completed research projects.

I hope you will find *Research Outlook* informative and stimulating. Please share it with a wider audience and provide your feedback.

Professor El-Nasir Lalani

Dean of Research and Graduate Studies



Pre-Award Review Process Made Easy for Researchers

The Office of Research and Graduate Studies recently introduced the PeopleSoft Grants Module that will enhance the efficiency of the review process of grant applications intended for submission to funding agencies. The module has been implemented at the Pakistan campus with high anticipation of offering this feature to other campuses as well.

The potential advantage of the Module is that it maps University-wide processes and potentially improves the turnaround time. Ultimately, it facilitates collection of data of the grant applications which will consequently lead to documentation that the Office can use to devise quick and accurate reports and strategically plan to further enhance research support. This shift will enable AKU to improve research infrastructure. The PeopleSoft Grants Module is an electronic submission process to replace the paper filing system. It allows the applicant to create a proposal in the system. Once the user enters the Module, the software shares the data with respective units or department for a review process by notifying

all the relevant administrative departments. The stakeholders of the proposal receive notifications for actions taken on their proposal. After approval from relevant administrative units, Department Head, Entity Head and the approval of the Dean of Research, the grant proposal is ready to be submitted to the funding agency. The module provides research support to the candidate by setting a standardized grant submission process to ensure that all aspects of the proposal for extramural funding (e.g. space, legal, health & safety, finance) have been reviewed.

In case of system query, contact: ro.preaward@aku.edu

Kawasji Kheswalla
Director, Office of Sponsored Research

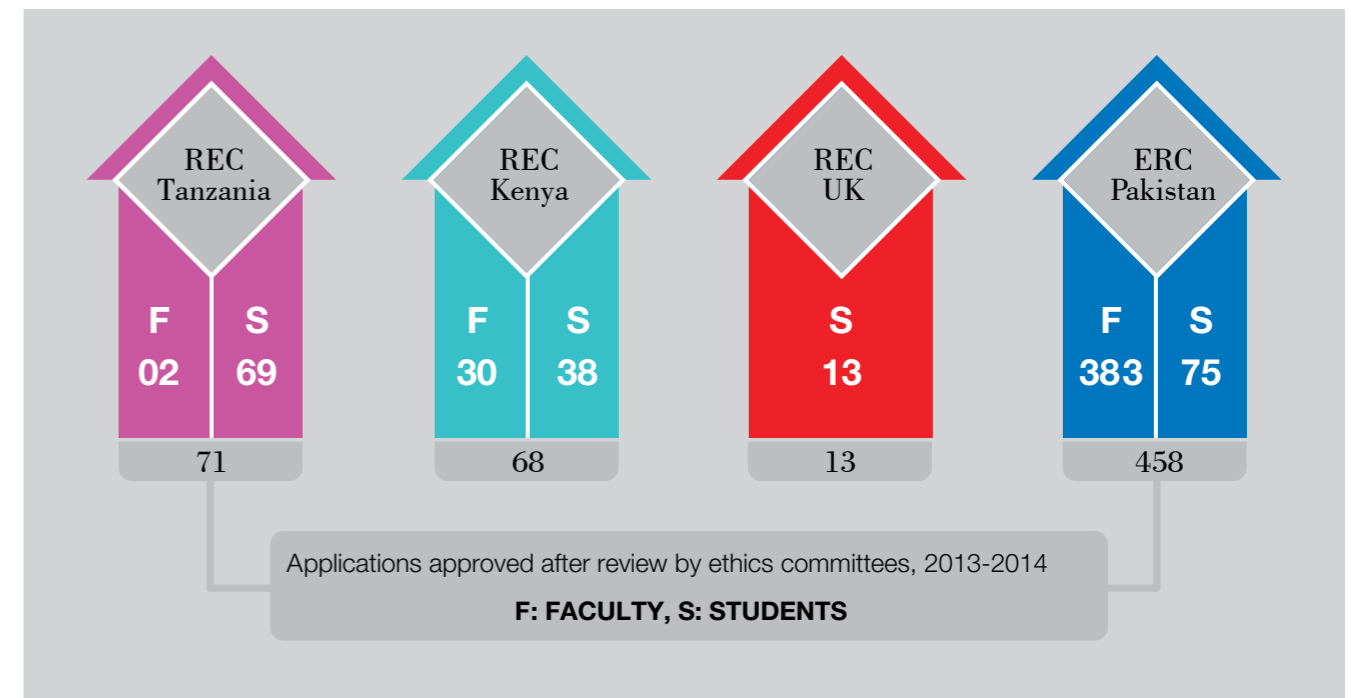
Ethics and Integrity

The Aga Khan University promotes a culture of research integrity that stresses upon awareness and adherence to ethical principles on all aspects of research ranging from observation and data collection to analysis and reporting of outcomes. All ethics review committees across the University are engaged in review of research in close coordination with their respective national committees and regulatory bodies to provide efficient administrative support.

Submitting an ERC Application was organized at the Karachi campus in collaboration with the Postgraduate Medical Education programme. The aim was to expedite the review process by addressing inconsistencies prior to submission.

Five studies from various departments were reviewed and ethical compliance issues were amicably addressed.

In the process of review, the challenges observed were mainly related to:



The year 2014 witnessed a visible increase in applications for ethics review. In East Africa and UK, the increase of applications was mainly due to students' projects, whereas in Pakistan, the growth was more faculty-led.

The Ethics Review Committee Pakistan received 504 applications of which 460 were from Faculty of Health Sciences and 44 from the Institute for Educational Development. Research Ethics Committee Tanzania received 71 applications of which 63 were from IED and 8 from School of Nursing and Midwifery. Kenya received 85 applications and UK received 13.

In May 2015, a session on Preparing and

- eligibility criteria of participants enrolled;
- discrepancies in recording consent;
- weak security of stored data; and
- lack of training in handling biological samples and associated documentation.

For more on ethical compliance issues, contact: erc.pakistan@aku.edu

Saher Muslim
Assistant Manager, Office of Research and Graduate Studies

DID YOU KNOW?

You can now submit multi-project grant applications electronically to National Institutes of Health via ASSIST

ASSIST is used to prepare and submit grant applications electronically to NIH and other Public Health Service agencies. Prior to using ASSIST, applicants should identify a Funding Opportunity Announcement (FOA) to which they would like to apply. FOAs are posted in the NIH Guide for Grants & Contracts and/or in Grants.gov - each of which has robust search capabilities. The FOA will indicate whether ASSIST can be used. You will need the FOA number (e.g. PA-15-987) to initiate an application.

The Office of Research and Graduate Studies will facilitate your application submission.

For details: <https://grants.nih.gov/grants/ElectronicReceipt/assist.htm>



Research Policies and Procedures Updates

The University Research Council has developed research support policies to safeguard the interest of the University as well as individual investigators. These policies undergo review at various forums of the University before the final approval by the Academic Council. These policies apply to full and part-time faculty, staff and students.

Recently, the Authorship Policy, Publications Policy and the Policy on Intellectual Property Rights have been legally vetted and endorsed by the Board of Trustees.

The Authorship Policy

The Authorship Policy seeks to establish guidelines and requirements for publishing scholarly work by individuals associated or affiliated with the Aga Khan University and other collaborators/partner universities. The policy implies authors' responsibility and accountability for scholarly publications including manuscripts, grant applications, presentations, review articles, case reports, and abstracts. It marks the criteria of an author or authors who have made "substantial intellectual contributions to a scientific investigation".

The Policy removes much of the ambiguity regarding contributors' claim of authorship. The issue of multiple authors and the order of their

appearance are clearly addressed in the policy. Authors are advised to obtain ethics approval for every manuscript intended for publication.

It emphasizes that the source of funding must be appropriately acknowledged in the note or clearly specified as "Work undertaken at Aga Khan University" if an author publishes after leaving AKU.

The Publications Policy

The Publications Policy recognizes the freedom of its faculty to publish their work in scholarly journals and other recognized outlets.

It is stressed that they choose the journals that have the widest possible access, are not primarily profit-oriented and maintain bona fide peer review process. A list of such journals is occasionally circulated by the University library.

Before sending the paper for publication, the members must ensure that their work has been cleared and there are no breaches of copyright in the use of images, diagrams or any other content.

The Office of Research and Graduate Studies can be consulted for assistance and information on all matters relating to the publication of scholarly works. Faculty should be conscious of the reputational risk to the University when publishing the topics of particular sensitivity

in the public domain. When writing on topics other than their areas of professional expertise, faculty is advised not to use AKU's affiliation.

The Policy on Intellectual Property Rights

The Policy on Intellectual Property Rights (IPR) was first developed in 2008 and recently revised in context to the regions where AKU operates.

The scope of IPR is still not adequate, particularly in developing countries and generally does not have an enviable record of effective enforcement. AKU's IPR, tries to incorporate most common rights into this policy and conforms that the University owns all rights, titles and interests in and to intellectual property developed as a result of University support.

Ownership of intellectual property emerging from all sponsored research including clinical trials and partnerships is negotiated separately taking this Policy and the interests of the University into account. Intellectual property rights include patents, copyright, trade secrets, trademarks, and the likes are elaborated in the Policy.

The Office of Research and Graduate Studies is responsible for the management of all activities pertaining to the evaluation, patenting and licensing of new inventions and discoveries made at the University.

The Office provides educational resources on Intellectual Property issues; generates collaborations with industrial partners for new sources of research sponsorship; protects intellectual property while protecting academic priorities, interests and values; evaluates whether the research results and/or inventions are patentable and navigating it through the patenting process with the assistance of the Legal Office of the University; transfers discoveries and inventions from the classroom and laboratory into commercial development; monitors research and license agreements to ensure the development and commercialization of the technologies; and manages the Intellectual Property portfolio of the University.

For access to the policies, visit Research webpage: <http://www.aku.edu/research/downloads/Pages/downloads.aspx>

Milestone

FIRST US PATENT OF AKU:
VECTOR-CARDIO-GRAPHIC SIGNAL ANALYZER

The device relates to indicating extent and location of myocardial ischemia in a patient. Electrodes can be placed on a body of the patient. Signal amplifiers can receive orthogonal electrical signals from the electrodes via three bipolar leads. The signal amplifiers can amplify the signals and send the amplified signals to analog to digital converters.

The analog to digital converters can convert the amplified signals to digital signals. A computing device can execute a data analysis application that can receive these digital signals, generate QRS complexes associated with these signals, generate depolarization vectors associated with these QRS complexes, and then determine changes in magnitudes and directions of these vectors. Based on the changes in magnitudes and directions, the data analysis application can determine and display extent and location of myocardial ischemia in the patient.

Dr Camer Vellani, Mohammad Yusuf,
Dr Sadia Mahmud
Appl. No.: 13/972,654
Publication Date: Jan 1, 2015

Jack Fernandes
Assistant Manager, Office
of Research and Graduate
Studies

Workshop on Principles of Laboratory Animal Science



A two-day workshop was jointly organized by Department of Biological and Biomedical Sciences, AKU and the Office of Research and Graduate Studies on November 24-25, 2014. The workshop – first of its kind – was attended by 13 researchers and participants from Khyber Medical University, Peshawar, Liaquat University of Health and Medical Sciences, Hyderabad, Dow University of Health Sciences, Karachi and AKU.

The workshop encapsulated a wide range of talks and practical skills related to animal research. Dr Rafiq Dar, veterinarian at the Animal Research Facility, spearheaded the activities and demonstrated rudimentary techniques on handling and drug administration of laboratory animals.

The participants learned the non-experimental factors that affect the quality and reproducibility of research and the importance of zoonotic diseases – facts known by few participants.

Dr Malik Hassan Mehmood and Dr Salman Siddiqi talked about the utility of different samples taken from laboratory animals for research, and demonstrated techniques of collecting different samples from laboratory animals.

Dr Naveed Ahmad Khan, Professor and former Chair, Department of Biological and Biomedical Sciences, shared some insights on the importance of research on insects in context to Pakistan where malaria, dengue haemorrhagic fever and Crimean Congo haemorrhagic fever prevail.

Dr Anwar Ali Siddiqui, Director, Office of Research and Graduate Studies, delivered a lecture on ethics and integrity in biomedical research.

Dr Tashfeen Ahmad, the co-director of the workshop elaborated on the anatomy of rodents and different surgical procedures. He performed surgery on a rat to demonstrate a procedure. Dr Ahmad emphasized on anaesthesia methods and euthanasia techniques that comply with international norms and ethics.

Dr Rafiq Dar
Specialist, Office of
Research and Graduate
Studies

Improving Community Case Management: Nigraan Project



Pakistan's Lady Health Workers (LHWs) Programme covers about 60 per cent of the rural population, but has had limited impact on improving mortality due to pneumonia and diarrhoea which contribute to 30 per cent of all deaths in children under five in Pakistan. Project NIGRAAN is an ongoing cluster-randomized trial in district Badin, Sindh, working towards improving supervisory capacity of Lady Health Supervisors (LHSs).

NIGRAAN is an Urdu word, meaning "supervision". It involves a novel approach to implementation science and explores better supervision by LHSs that simultaneously translates into improved LHW performance leading to enhanced case management of childhood pneumonia and diarrhoea by the community caregivers. The intervention consists of a management training to build LHS knowledge and skills on the basic aspects of childhood pneumonia and diarrhoea, clinical mentorship and written supportive feedback to LHWs. Through this project, the knowledge and skills of LHW and LHS related to childhood pneumonia and diarrhoea are being actively monitored qualitatively and quantitatively, pre and post intervention.

This research initiative has identified deficiency in practical skills of LHWs and LHSs even though they have fundamental knowledge about danger signs of diarrhoea and pneumonia. NIGRAAN has developed a coordinated system of case identification, reporting and timely management of childhood diarrhoea and pneumonia by promoting communication between LHWs and LHSs. However, shortage of tools for feedback, non-availability of medicines, and inadequate supplies are critical issues. As anticipated, NIGRAAN surveys have also confirmed that few caregivers seek care from LHWs for

childhood diarrhoea and pneumonia which results in lower rate of success through intervention.

The project has been conducted in collaboration with Department of Health, Government of Sindh, and funded by the Alliance for Health Policy and Systems Research, WHO and registered with the Australian New Zealand Clinical Trials Registry.



A Lady Health Supervisor is measuring the respiratory rate of a child at a household in District Badin.

Related reading

- Rabbani, F, Mukhi, AAA, Perveen, S, Gul, X, Iqbal, SP, Qazi, SA, Azam, SI, Shaikh, KH, and Aftab, W. (2014). Improving community case management of diarrhoea and pneumonia in district Badin, Pakistan through a cluster randomised study—the NIGRAAN trial protocol. *Implementation Science*, 9 (186). doi:10.1186/s13012-014-0186-9
- Rabbani, F, Perveen, S, and Aftab, W. Investing in universal health coverage for childhood diarrhea and pneumonia: lessons learnt from NIGRAAN implementation research. *Pak J Public Health* 2015, 5 (1): pp.28-30.

Dr Fauziah Rabbani
Chair, Department of Community
Health Sciences, Medical College,
Pakistan

Dr Shagufta Perveen
Senior Instructor, Medical
College, Pakistan

Governance Project: The Role of Values and Traditions in Water Resource Management



View of the ancient water management system in Fes, Morocco where the two-day project workshop was held.

Water security against the backdrop of global growth and climate change has become an issue of pressing concern. Multiple water challenges threaten global social and political stability. The criticality of these challenges is reflected in the World Economic Forum's 2015 Global Risks Report where water was ranked as the global risk with the greatest potential impact on economies and societies over the next 10 years.

Given today's accelerated pace of human development and the slow pace of managing issues as complex as water resources, tomorrow's challenges are already at our door. Today, water scarce regions account for 36 per cent of global population (2.5 bn) and 22 per cent of global GDP (USD 9.4 trillion). If we continue with 'business-as-usual', then by 2050, half of the world's population, half of the global grain production and 45 per cent of GDP will be in regions at risk due to water stress.

Major shifts in conceptual approaches to water governance are thus called for in order to reach a more desirable future and limit calamities. This is particularly relevant as many societies are currently facing socio-economic transformation processes which need to be reflected in changes to the respective systems of governance.

Responding to these challenges, the Governance Project jointly organised a workshop on The Governance of Water Resources: Values, Traditions and Contemporary Policies with the General Council of Agricultural Development (CGDA) in Rabat, a high-level policy think tank of the Ministry of Agriculture and Fisheries in Morocco. A follow-up session was hosted by the University of Fes the following day.

Mohamed Ait Kadi, President of the CGDA in Morocco and Chair of the Global Water Partnership Technical Committee, commented, "Knowledge can stimulate behavioural change towards a new 'water culture.' We must monitor continuously and learn as we act in order to promote a real evolution in thinking, not just



a change in emphasis of current activities."

One of the aims of the Project is to think about norms and their application in concrete situations relating to governance in Muslim contexts. Given the Project's research interests and the water challenges that many Muslim communities face today, the workshop aimed to explore the values underlying water management and policies in the past and present to help develop a sustainable water future. Highlighting the case of Muslim communities, with a particular focus on case studies from Morocco, it explored whether lessons could be learned from traditional water management systems and the ways in which they were designed, maintained and organised as well as the role played by religious traditions in defining and implementing consensual rules in the management of water.

In response to the discussion, Dr David Groenfeldt, Founder and Director of the Water Culture Institute in New Mexico, USA, said, "I am hopeful that by exploring the underlying value principles motivating our water policies and practices, we can blend traditional values [...] into new governance solutions for the future."

The workshop concluded that a renewed sense of shared values regarding the governance of water resources as well as an ethics-

based approach to the use of water could potentially help contemporary communities to better face current and future challenges.

Professor Klaus Leisinger, President of the Foundation Global Values Alliance in Basel, Switzerland said, "Dedicating this conference to the governance of water resources and addressing values, traditions and contemporary policies under the auspices of the research programme on 'Governance for the Public Good' is a wise and timely decision for which I congratulate the organisers."

The discussions resulted in policy recommendations which are currently being drafted by the CGDA in Morocco. Papers resulting from the workshop will be published in a book form and made available online.

Find more on ISMC Governance Project web page: www.aku.edu/gov-project
Contact: ismc.governance@aku.edu

Dr Charlotte Whiting
Project Manager,
Governance & Law,
Institute for the Study of
Muslim Civilisations



Study and Scholarship: Research Endeavours at IED Pakistan

The focus on research and scholarship has been at the core of Institute for Educational Development in Pakistan. To enrich its research culture, immense attention is given to generate resources for undertaking studies to examine critical issues in education as well as to develop strategic research and scholarship position.

The Institute has been heavily engaged in four research studies funded mainly through external sources.

- **Exploring decision making structures and processes in and around schools: A case of educational governance in Pakistan**
Funding source: Department of Foreign Affairs, Trade and Development, Canada and Aga Khan Foundation, Canada
Researchers: Dr Dilshad Ashraf and Dr Takbir Ali,

Dr Ali Abdi and Dr Lynette Schultz

- **Science classroom research for inquiry process in teaching (SCRIPT)**
Funding source: HEC Pakistan
Researcher: Dr Nelofer Halai
- **Role of civil society institutions in promoting cultural diversity and pluralism in Chitral District of Khyber Pakhtunkhwa**
Funding source: HEC Pakistan
Researchers: Dr Mir Afzal Tajik, Ali Nawab and Abdul Wali Khan
- **Pakistani early childhood teachers' beliefs and practices about early literacy development**
Funding source: Department of Foreign Affairs and Trade, Australia

Researchers: Dr Almina Pardhan and Cassandra Fernandes

IED is currently working on eight new research studies and projects among which seven are externally funded (DFATD and AKF, Canada-funded studies under STEP Project) and the project of Dr Nusrat Fatima Rizvi and Dr Almina Pardhan is funded by URC, AKU.

New Studies Initiated

- **Exploring the transformation of pedagogy in ICT rich learning spaces**
Funding Source: URC, AKU
Researchers: Dr Nusrat Fatima Rizvi and Dr Almina Pardhan
- **Exploring mentoring practices for effective primary teaching**
Researchers: Dr Sadia Bhutta, Dr

Takbir Ali and Naheed Parveen

- **The nature of experience of STEP sponsored MEd graduates: A phenomenological study**
Researchers: Dr Ayesha Bashiruddin & Dr Mir Afzal Tajik
- **Mentoring Science teachers in rural Sindh (M-STARS): A case of expertise enhancement and identity construction**
Researchers: Dr Nelofer Halai, Umm-e-Farwah, Rakhshinda Meher & Tahira Firdous
- **How does action research contribute to professional development of teacher educators?**
Researchers: Dr Nusrat F. Rizvi & Salima Rajput
- **The effects/influence of the professional**

development intervention on understanding and institutional development: Case of professional development of teacher training college principals in Sindh, Balochistan and Gilgit-Baltistan under STEP Project

Researchers: Dr Kulsoom Jaffer, Zube-da Bana and Khushal Khan

• **Rethinking masculinity and femininity: STEP mentors' and lead teachers' experiences of shifting position**

Researcher: Dr Dilshad Ashraf

• **Developing teachers' professional learning communities in Pakistan: Opportunities and challenges**

Researchers: Dr Takbir, Shahid Karim and Anya Hosain

[All under STEP Project: DFATD and AKF, Canada-funded studies]

The faculty at IED has successfully published their research in different journals, books, newsletter and dailies while also disseminating them through presentations in multiple conferences nationally and internationally. One such participation was by faculty members in the 58th Annual Conference of the Comparative and International Education Society held in Toronto, Canada from March 8-21, 2014.

As part of dissemination, IED regularly organises the Kazim Bacchus Research Seminar to display the work of scholars. Last year, nine seminars were organized which were also made available through WebEx to PDC North and PDC Chitral. These seminars attracted speakers from across continents and disciplines such as the session on 'Understanding Educational Markets: A Sentinel Approach' by Professor Tahir Andrabi of Department of Economics, Pomona College, USA; seminar on 'Making a better life: The stories of people from poor rural background in Sindh, Pakistan' by Ambreen Shahriar, Assistant Professor, Institute of English, University of Sindh; and seminar on 'Schools without Stones: Closing the Gender Gap through Community-Based Education in Afghanistan' conducted by Dr Dana Burde: Assistant Professor, International Education, New York University.

RAPS also launched a Graduate Student's Research Forum on December 19, 2014. The forum has been developed to provide opportunities to graduate students to deliberate on issues related to research such as, conceptualizing research, selecting the right methodology, issues in the field and ethics of research.

Through its efforts, IED effectively creates a favourable environment for researchers to initiate new studies and disseminate that newly-formed education derived through the study. It



Students benefit from participating in Science classroom research for inquiry process in teaching (SCRIPT)

creates its space to be conducive for research by adding to tools and resources required for the study; it hones the faculty, staff and students to develop skills to initiate and conduct research work; most significantly, it provides a platform to make the findings available and accessible to the core to contribute in response to the real needs of communities and people.

Dr Ayesha Bashiruddin
Associate Professor, Head
of Research and Policy
Studies, Institute for
Educational Development,
Pakistan

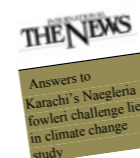


The Express Tribune reports the results of NIGRAAN, a two-year research project in Badin District by the Aga Khan University's Department of Community Health Sciences in collaboration with the Health Department, Government of Sindh, Pakistan. The project "aimed to identify ways to strengthen structured, supportive supervision of LHWs and lady health supervisors (LHS) in order to improve community case management of pneumonia and diarrhoea in children under the age of five."

The article reports that the project was meant to provide training to female workers who provide health facilities in far flung areas. Under this project, 36 of Badin's LHWs were trained. "The training of LHWs is very important," says Dr Shagufta, the investigator of the project, adding that a majority of the LWHs had forgotten when they were last trained.

The article suggests that the project can be replicated in other districts given its success in Badin. Speaking to *The Express Tribune*, Dr Mehbood Khawaja, Badin district coordinator, said, "The female workers of his district received training after a long time; they even received hospital based training."

This story first appeared at tribune.com.pk on August 20, 2015



The News - International reports the study of AKU researchers in reference to *Naegleria fowleri* – the brain eating amoeba. "Researchers at the Aga Khan University have found a connection

between the emergence of *Naegleria fowleri* infections in Karachi in 2008 and steep rise in temperature this part of the country has been experiencing for the last several years. Their research published in a health journal reveals that most cases of *Naegleria fowleri* infections were reported during the months when the temperature in Karachi and its surrounding areas touched 40 degrees Celsius or higher."

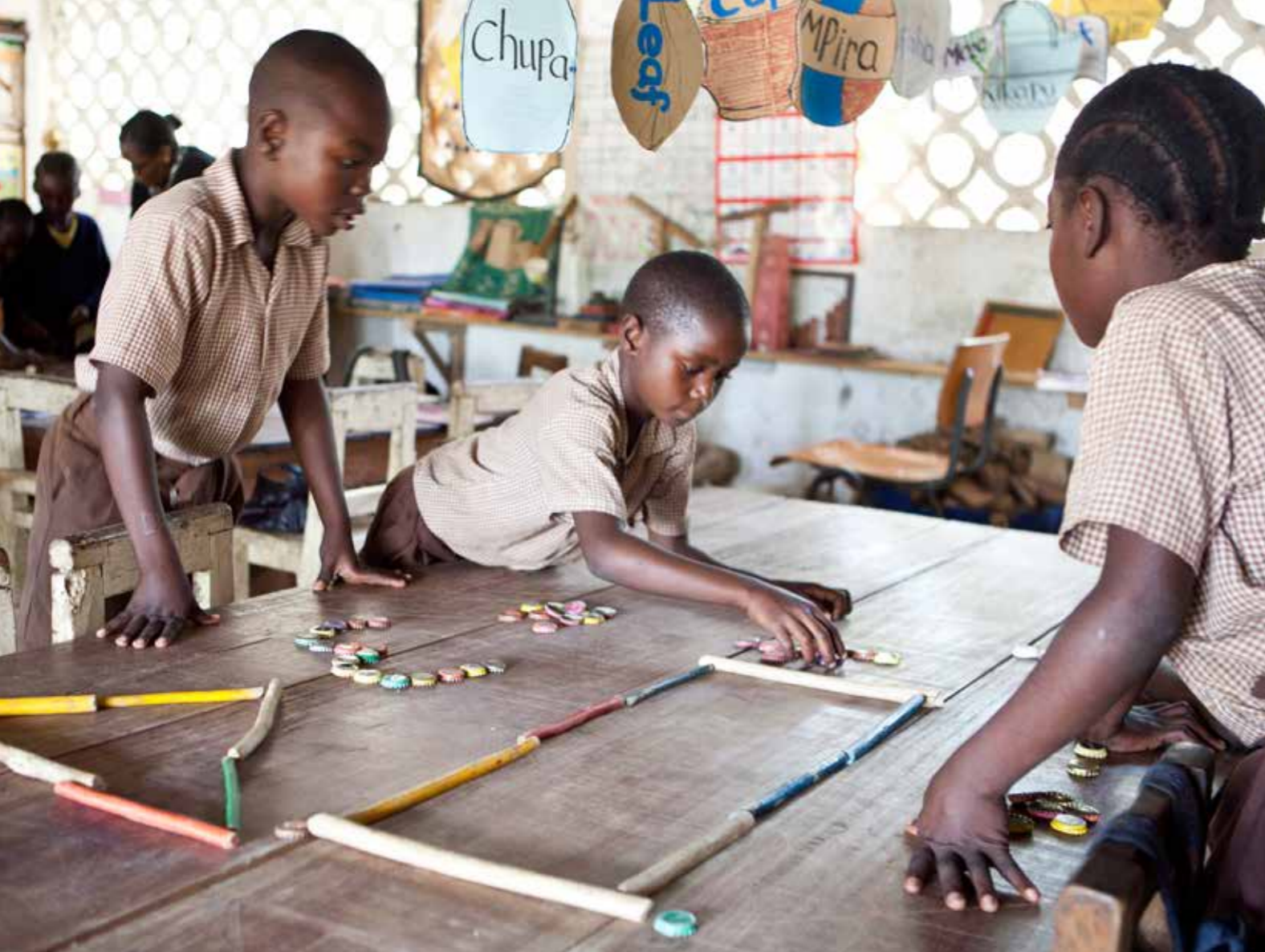
This story first appeared at the-news.com.pk on October 26, 2015

TunisiaLive and *openDemocracy* publishes two op-eds on The Governance Project, ISMC, entitled 'Building consensus in post-revolutionary Tunisia.' These online publications in the international press report on the project pertaining to its relevance to the Muslim context. The extracts are based on the project's seminar series which aims to provide a forum for a continuous, all-inclusive dialogue involving innovative researchers and thinkers, leading actors in civil society and the public sector to share new approaches to governance.

Launched in 2014, the project is led by Professor Abdou Filali-Ansary and supported by Project Manager, Dr Charlotte Whiting, as well as an Academic Advisory Committee composed of ISMC faculty members and external scholars. The primary goal of the project is to improve the quality of life by promoting the public good in the developing world, with a particular interest in Muslim contexts, by giving access to information to a wide range of audiences beyond academia.

This story first appeared at opendemocracy.net on January 30, 2015 and at tunisia-live.net on March 3, 2015

The BBC Radio 4 Analysis transmits a 30 minutes programme on "The Idea of the Caliphate." Among other well-known scholars specialising in this subject, it features Professor Abdou Filali-Ansary, the founding director of ISMC who speaks about one of the publications he edited in the *In Translation: Modern Muslim Thinkers* series. The programme explores the concept of caliphate and how it has evolved over the years. Professor Abdou Filali-Ansary speaks in reference to the controversial work of Ali Abdel Razek, *Islam and the Foundations of Government* which challenges the idea of caliphate. Professor Ansary states, "He was showing that it was part of the history of Muslims, not part of the dogmas or the creeds that are exposed or offered in the scriptures or even by the example of the Prophet." *This story first appeared at bbc.co.uk on October 26, 2014*



Capacity and Network Project in Mathematics Education

Almost 80 mathematics teachers and teacher educators from Tanzania, Kenya, Uganda and Rwanda participated in CANP4, a research and development event hosted in 2014 by the Aga Khan University, Institute for Educational Development, East Africa in Tanzania. It involved experts from East Africa, Botswana, Canada, France, Italy, Mozambique, Pakistan and the United Kingdom who led the two-week conference aimed at advancing mathematical education in East Africa.

CANP4 was supported by the IED, the International Council of Science, the International Mathematical Union, the International Commission of Mathematical Instruction, UNESCO and the IMU Secretariat in Berlin, Germany.

In the increasingly global and technological

world of the 21st century, mathematics, mathematical thinking, and mathematical literacy is crucial for success in the ever progressive digital society and in integrating disciplines like medicine, social sciences, environment studies, climate, business and finance among others. This conference emphasized mathematics teaching and learning which must reflect and be responsive to the radical changing needs of society in this dynamic digital age.

The programme demonstrated lectures and workshops on mathematical modelling on real life issues, and panel discussions – all with a special focus on improving mathematics education in East Africa. Salient topics of interest within mathematics including ICT integration, gender, language, culture and mathe-



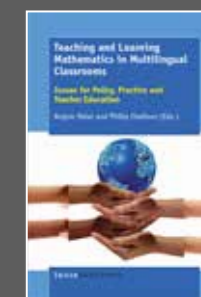
The International Organizing Committee
Front row (left to right): Veronica Sarungi, Peter Kajoro, President ICMI Ferdinando Arzarello, Anjum Halai, Jill Adler, Masabha Masur, Mussa Mohammed, Pauline Rea-Dickins, Alphonse Uworwabayeho
Back row (left to right): A member, Geoffrey Tennant, Samuel Bengmark, Pierre Arnoux, Angelina Bijura

tics for planet Earth were undertaken with the engagement of media and public lectures for a wider dissemination of the message.

The CANP4 initiative has significantly led to the establishment of East Africa Mathematics Education Research Network. With office bearers from Kenya, Tanzania, Rwanda and Uganda, this network aims to create synergy in similar efforts already established in Southern Africa and West Africa. In collaboration with local partners, the Network has already organized several events in Dar es Salaam, Nairobi and Rwanda.

The success of the CANP4 programme led to a unanimous resolution by the CANP4 community to host the annual African Mathematics Education Congress (AFRICME) in Tanzania in 2017. Another success of the CANP4 has attracted international publishers to accept the CANP4 research manuscript for publication entitled “Mathematics Education in East Africa: Towards harmonization and quality enhancement” which will hopefully be well received by readers.

Teaching and Learning Mathematics in Multilingual Classrooms *Issues for Policy, Practice and Teacher Education*



Anjum Halai (Aga Khan University, Tanzania) and Philip Clarkson (Australian Catholic University, Australia) (Eds.)
2016 | 274 pages

The book discusses studies situated in various countries, giving voice to especially novice researchers in low income countries. The collection “draws on recent, emerging insights and understandings about the approaches to improving policy and practice in mathematics education and mathematics teacher education in multilingual settings” presenting key issues for research in education in language diverse settings.

Professor Anjum Halai
Associate Director & Head
Research, Institute for
Educational Development,
East Africa

Investing in a Better World: The Institute for Human Development

The Institute for Human Development was launched in an interdisciplinary conference titled ‘Investing in Early Childhood Development for a Better World’, in Nairobi on February 12-14, 2015. The conference was funded in part through a grant from Department of Foreign Affairs, Trade and Development, Canada, awarded to support the setting of strategic directions for the Institute under the Institutional Partnerships for Human Development initiative. The conference had two overarching goals: (1) to draw on the collective expertise and experience of a selected group of internationally renowned scholars to guide the Institute’s strategic planning; and (2) to offer rich blend of interdisciplinary expertise to the Institute’s ultimate stakeholders and future partners in the region. The conference was immediately followed by strategic planning meetings involving IHD’s Interim Advisory Committee and representatives of IHD’s Canadian partner institution, the Fraser Mustard Institute for Human Development at the University of Toronto.

The launching ceremony held in the evening of the first day of the conference was overwhelmingly attended by participants representing the diplomatic corps, higher education, government, international and local NGOs, civil society leaders and AKU leadership. In the keynote speech delivered by President Firoz Rasul, a theme from the 2005 address delivered by His Highness in Oslo, Norway, was invoked in which he stressed the need to study human development as a critical ingredient for the attainment of democracy and pluralism. Describing the Institute’s larger mission, President Rasul said that the Institute, “Aims to be the resource that furthers AKU’s and

AKDN’s commitment to help create more pluralistic and engaged civil societies in the long run.”

AKU Provost Professor Greg Moran highlighted the Institute’s unique geographic location in his brief introductory remarks. He underscored the need for the Institute to become a leader in producing and translating knowledge that addresses various challenges surfacing in the region. Similarly, the Dean of Research and Graduate Studies, Professor El-Nasir Lalani highlighted the Institute’s role in forging a common understanding of evolving nature of the genetic, ecological, and psychological factors that influence physical, social, emotional, and cognitive development, especially in the early years of life. He stressed on the importance of research that benefit from perspectives and methodologies

across multiple disciplines. Following the launch, the conference offered intensive three days to learn about the interlinking factors namely health, nutrition, psychology, education and child welfare that influence early human development and innovative approaches to meet challenges faced by children especially in low-income communities. It brought together academic researchers,

research trainees, programme development and evaluation specialists, policy makers, development aid specialists, and frontline health, education, and social welfare experts from over 22 countries. There were speakers from various universities who conducted plenary sessions, concurrent session papers, poster and media presentations which represented diverse disciplines including biomedical/health sciences, education and the learning sciences, information and communication technologies, and social and behavioural sciences. The overwhelming

response to the conference is indicative of a yearning for knowledge and professional engagement in the region. More importantly, it underscores IHD’s relevance in the search for solutions to the challenges of child and youth development faced by families, communities, national governments and the global community.

IHD will be a major instrumental agent, locally as well as globally, for advancing knowledge about the earliest years of children’s development and harnessing such knowledge for the purposes of shaping policies and interventions that ensure a strong start in life for all children wherever they may live.
Dr Kofi Marfo

Professor Kofi Marfo assured that the Institute will embrace its primary mandate of generating knowledge with contextual relevance to influence public policy and inform the design and delivery of services in the public as well as private sectors. The programmes will respond to the developmental challenges and possibilities for all categories of children: normal and atypically developing children as well as those whose developmental trajectories are threatened by conditions of social strife, conflict or war, natural disasters, and poverty. Consequently, the Institute will contribute to a global knowledge based on human development through research on contexts and processes that have received little or no attention in mainstream inquiry in the health, developmental and learning sciences.

In particular, IHD will engage in curricular and pedagogical research to ground instruction and interventions in which children naturally construct their worlds in their local contexts prior to school entry and pursue research that expands societally valued intervention outcomes beyond those traditionally tied to schooling.



Dr Kofi Marfo with His Excellency David Angell, Canada’s High Commissioner to Kenya

Through such efforts, the Institute will build capacity and develop programmes based on the latest human development evidence from around the world specifically designed to respond to challenges that affect the populations in the resource-poor regions of the world.

The Institute is currently working on a joint undergraduate course – Social and Developmental Determinants of Human Health – which brings together students from Pakistan, Canada and Africa in a virtual collaborative classroom. Professor Marfo also emphasized the need to nurture generations of socially responsible and tolerant citizens who are sensitive to and respectful of differences, mindful of the social good, and able to see their own role to attain it. “These are societally valued ideals that should be reflected in the measurement of educational and other intervention outcomes,” concludes Professor Marfo.

Dr Kofi Marfo
Professor and Foundation Director, Institute for Human Development

Gaps in Child Injury Research

In Pakistan, injuries are generally perceived as inevitable accidents that are an essential component of raising children. Unintentional injuries are a significant contributor to child mortality with approximately 830,000 children under 18 years of age dying each year. Unintentional injuries include road traffic injuries, falls, poisoning, burns, drowning, etc. Road traffic injuries are the leading cause of death among children 15-19 years of age and second leading cause in children 5-14 years of age.

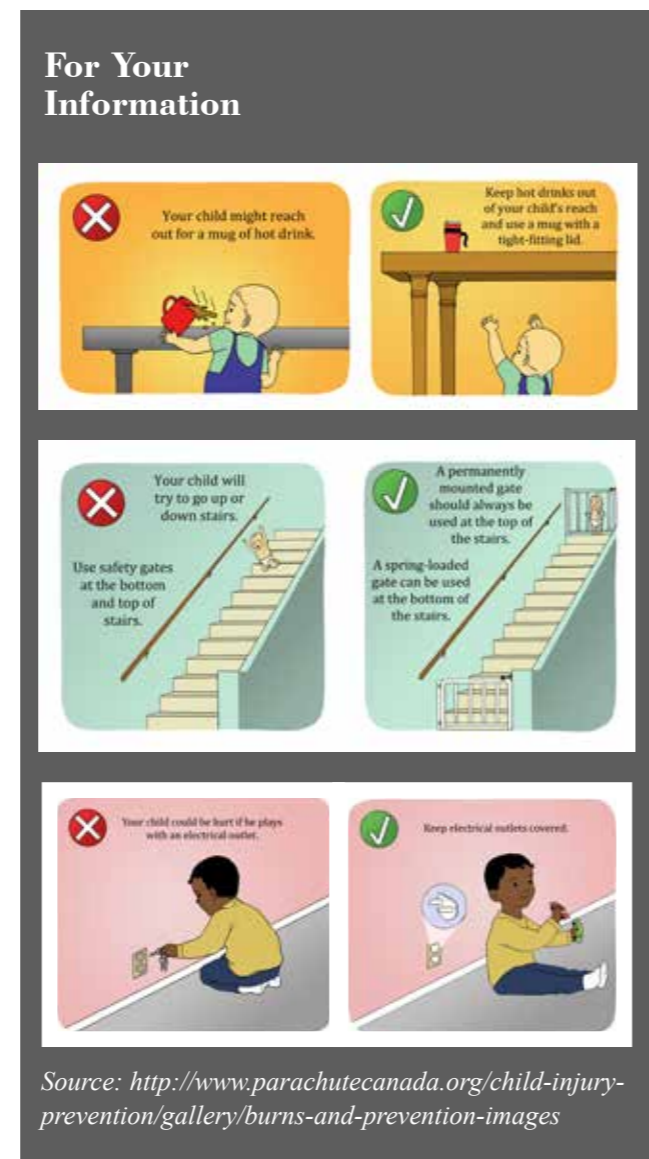
Unfortunately, the burden of injuries is skewed towards lower middle income countries like Pakistan. According to the Pakistan Demographic Health Survey 2006-07, injuries were the third leading cause of death after pneumonia and diarrhoea in Pakistani children aged 1-4 years.

Despite the gravity of the issue, there is a dearth of research work in the domain of public health in Pakistan. Some projects have been conducted with substantial focus on injuries such as hospital-based surveillance of road injuries, community based study to assess hazards and deliver education to caretakers of children on how to lower injury risk and national-level pilot surveillance in emergency departments of seven major tertiary care hospitals in Pakistan.

Through the mutual efforts of AKU and Johns Hopkins University, NIH Fogarty funded International Collaborative Trauma Injury Research Training programme made a grant available to 15 individuals who are either trained through skills course in general research or injury research methods. This collaboration has now expanded to Peshawar, the largest city of Khyber Pakhtunkhwa supporting students in Khyber Medical University. The JHU-AKU collaboration has also successfully introduced a course, "Injury Prevention and Control: Principles and Practice" at AKU, Karachi.

Traditionally, global child health agenda lacks focus on accidental injury. It is important

to pitch in injury prevention in child survival programmes in order to succeed in reducing child mortality. Targeted interventions for countries like Pakistan need to be tested and implemented with well-planned investment of financial resources.



Uzma Khan
Senior Instructor, Medical College, Pakistan

Research Challenges: Water Privatisation, Entrepreneurship and Corruption

A three-month research project investigated the relationship between water privatisation, entrepreneurship and corruption in Malaysia. The research aimed to explain why infrastructure and water privatisation continue to be promoted despite the failure to finance capital investment and improve efficiency. In the case of Malaysia, this failure culminated in sweeping reforms in the water sector centred on the re-nationalisation of water assets but which also involved the renewal of the concessions of failed private water operators.

The project represents the latest part of an on-going research and builds on earlier works investigating the drivers and economic outcomes of privatisation, entrepreneurship and wealth creation. The first part (published in *Development Policy Review*, 2011) provided a theoretical critique of infrastructure privatisation and evidence of the failure of infrastructure privatisation globally. The second part (published in *World Development*, 2012) then examined Malaysia's water sector reforms as a case study of privatisation failure.

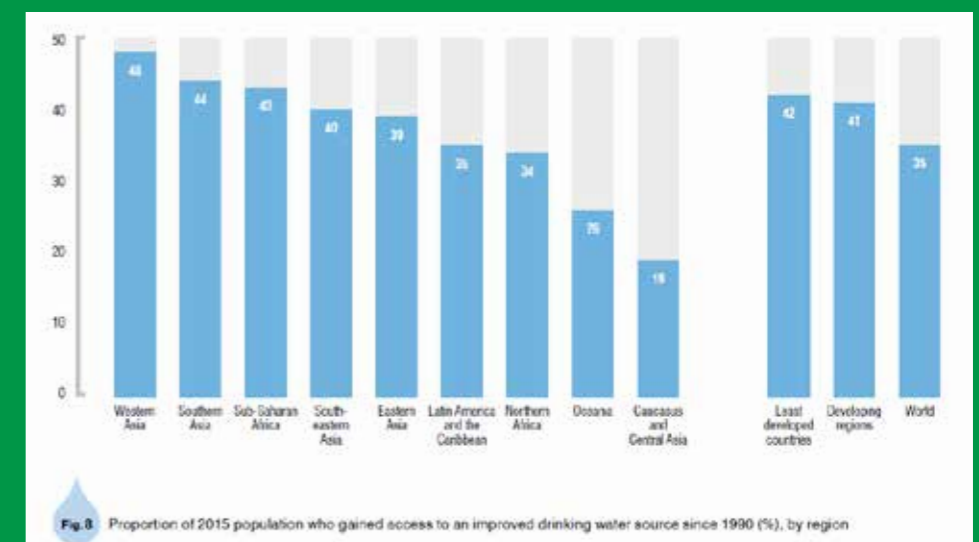
The immediate challenge was to determine how to analyse a database of around 9,000 registered water contractors. As this data included project details for each contractor, these had to be categorised manually before running any statistical analysis. The data is collected in stag-

es by first narrowing down the list to 1,500 of the largest water contractors, and eventually to 217 of the largest water contractors registered in the richest state (Selangor). Even this proved to be more time consuming than anticipated, given that data had to be collated, processed, analysed and presented in just three months.

The research was made possible by a three-month fellowship at the Institute of Southeast Asian Studies (ISEAS) in Singapore. The research findings were presented at a public seminar as part of the Malaysia Studies Programme Seminar series at ISEAS on March 26, 2015, and subsequently submitted to the *Journal of Southeast Asian Economies* for review. As this research shared a segment of the collected data, there is currently work planned to provide a clearer picture of water privatisation, entrepreneurship and corruption in Malaysia through the wider data set. It will be supplemented with ethnographic research on individual water contractors in order to document the profile and evolution of entrepreneurship in Malaysia.

Dr Jeff Tan
Associate Professor,
Institute for the Study of
Muslim Civilisations

More than a third of the current global population gained access to improved sources of drinking water since 1990



Source: http://www.who.int/water_sanitation_health/publications/jmp-2015-update/en/



Centre for Regenerative Medicine

The University initiates a new facility at Karachi, Pakistan to enable researchers to create, study, and essentially use stem cells to develop ground-breaking regenerative medicine therapies for a host of life-threatening diseases.

The plan is to be executed in partnership with the University of California, San Francisco to augment medical research that connects North American researchers with AKU, a university already creating an impact in Pakistan, Central Asia and East Africa. This joint venture aims to establish a Centre for Regenerative Medicine (CRM) that will tap new sources of talent in the developing world and expand the overall volume of exploration in a field that could revolutionize the treatment to combat numerous diseases.

Their shared goal is to advance the state of stem cell science by developing new capacities for research and training at AKU. The partnership with UCSF will enhance its capacity in the field to emerge as a leading Centre for Regenerative Medicine of the region. Their collaboration will create

the flow of potential researchers who can contribute to the overall stem cell enterprise at AKU.

Aim

It will consist of wet lab, core facilities, support facilities along with an animal facility in the basement segregated in a way to minimize cross contamination and ensure biosafety. In later stages, it will establish a state-of-the-art CRM located at AKU's Stadium Road campus in Karachi, Pakistan.

The CRM will undertake cutting-edge research and offer graduate education, training programmes and infrastructure for up to 100 researchers. As facilities are added in East Africa, the CRM will further extend its reach to that region, where AKU is already renowned for its leading hospitals and health care education programmes.

Expected Outcome

As AKU aspires to be a research-led University

making meaningful contribution in health, it particularly aims to find solutions to the problems of the developing countries like Pakistan and Kenya. In these countries, significant morbidity and mortality rates are documented that attribute to non-communicable diseases like hypertension, diabetes, heart diseases, cancer.

Approximately 80 per cent of deaths are attributed to non-communicable diseases. It would be appropriate to refer to the World Bank which reports that NCDs impose the largest health burden in Pakistan. In terms of the number of lives lost due to ill-health, disability, and early death, two NCDs (inclusive of injuries) account for 59 per cent of the total disease burden while 41 per cent is from communicable diseases, maternal, child health and nutrition issues combined.

With the worldwide burden of non-communicable diseases continuing to rise, the need for long lasting and effective treatments is much greater than ever. Effective stem cell therapies have the potential to decrease disease burden by

providing safe and efficient treatment for nearly all the diseases including cardiovascular diseases, cancer, neurological and haematological diseases.

A full understanding of the stem cell biology, its application in all aspects of biomedicine and disease, including developmental abnormalities, degenerative diseases, immune dysfunction and cancer is timely, fundamentally when the world is looking for new solutions to the diseases. Such studies provide critical new approaches for drug discovery which will consequently enable improved treatments and greater protection from devastating side effects.

Dr Anwar Siddiqui
*Director, Office of
Research and Graduate
Studies*

Flowcytometry and Cell Sorting Facility



Cell sorter

In compliance with the Chancellor’s vision to become the leading regional centre in stem cell research and regenerative medicine, the Aga Khan University is dedicated to advance research projects by provision of flowcytometry and cell sorting facility to the community of researchers within and outside the University. The core offers access and training to shared use instrumentation for analytical flowcytometry, services for fluorescence activated cell sorting (FACS) as well as trained staff to provide technical consultation and assistance on execution of experiments, panel design, data analysis and interpretation.

The facility is equipped with the most advanced flowcytometer fitted with multi parameter analysis and cell sorting features. BD FACSAria™ III has 3 lasers, Blue (488nm), Red (633nm) and Near UV (375nm) with an option of nine color detection. Additionally, it has the capability to sort four independent cell populations simultaneously from a single sample.

These unique features make the facility ideal to perform in-depth and valuable research of high impact in various areas including the emerging field of cancer stem cells biology. It would also provide a number of antibodies, isotopic control, viabilities dyes and tubes depending on the user’s project and choice. The offline softwares like Flowjo and BD FACSDiva™ are also made available to facilitate researchers to perform flowcytometric data analyses.

Flowcytometry has a wide range of applications in diagnostics and biomedical research as it allows studying the properties of cells by the use of lasers and fluorochromes. It works on a model where individual cells move in a liquid stream by hydrodynamic focusing. These particles are illuminated by laser generated from the optics system which is then directed to the detectors.

The light signals from the detectors are converted to electronic signals to be processed by the computer. The scattered light represents the cell size and granularity whereas fluorescence represents the phenotype. This process makes it possible to study the complexities of cells in

terms of its phenotype and characteristics.

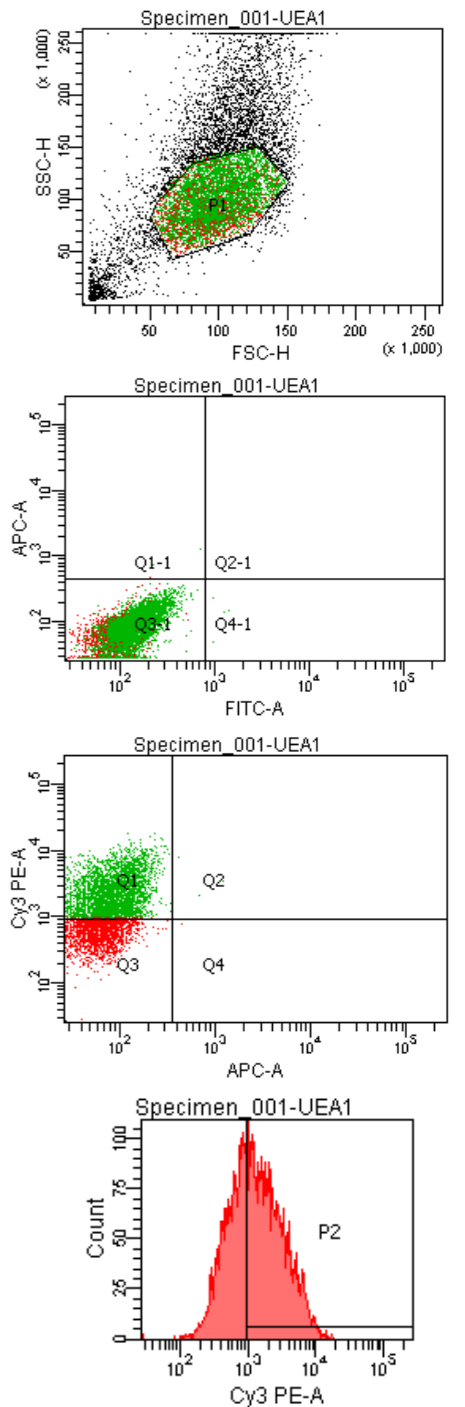
Cells express unique cluster of differentiation (CD) markers which are used in their identification. With the use of specific antibodies, these CD markers could be detected by flowcytometry to identify and distinguish the phenotype of a specific cell in a given population. It allows easy and rapid identification of specific cells types, even if they belong to a class that exists in a very small per centage such as T-regulatory and cancer stem cells.

Flowcytometry can also determine the fate of the cells, whether cells are about to undergo death, necrosis or apoptosis after a certain treatment. The application has huge scope in the field of cancer research where researchers are striving to design drugs that can slow down the progression of cancerous cells or induce cell death.

Flowcytometry becomes a method of preferred choice for analysis of cells including measurement of DNA content, enzymes activities, and molecules such as hormones. The facility could be used to perform several applications including but not limited to, immunophenotyping, cell cycle analysis, DNA analysis, apoptosis, cancer stem cell analysis, reticulocyte analysis, platelet analysis, flow karyotyping, flow fish, bacteria analysis, drug efflux, etc.

Such an innovation and expansion pushes the boundary of research work and our understanding of human biology. The study conducted in these laboratories will revolutionize the clinical treatment for patients with the help of the knowledge extracted by application of the new technology.

Abdul Wahab
 Research Associate,
 Office of Research
 and Graduate Studies



Population	#Events	%Parent	%Total
All Events	10,000	###	100.0
P1	5,944	59.4	59.4
Q1-1	3	0.1	0.0
Q2-1	0	0.0	0.0
Q3-1	5,937	99.9	59.4
Q4-1	4	0.1	0.0
Q1	3,625	61.0	36.2
Q2	4	0.1	0.0
Q3	2,313	38.9	23.1
Q4	2	0.0	0.0
P2	3,608	60.7	36.1

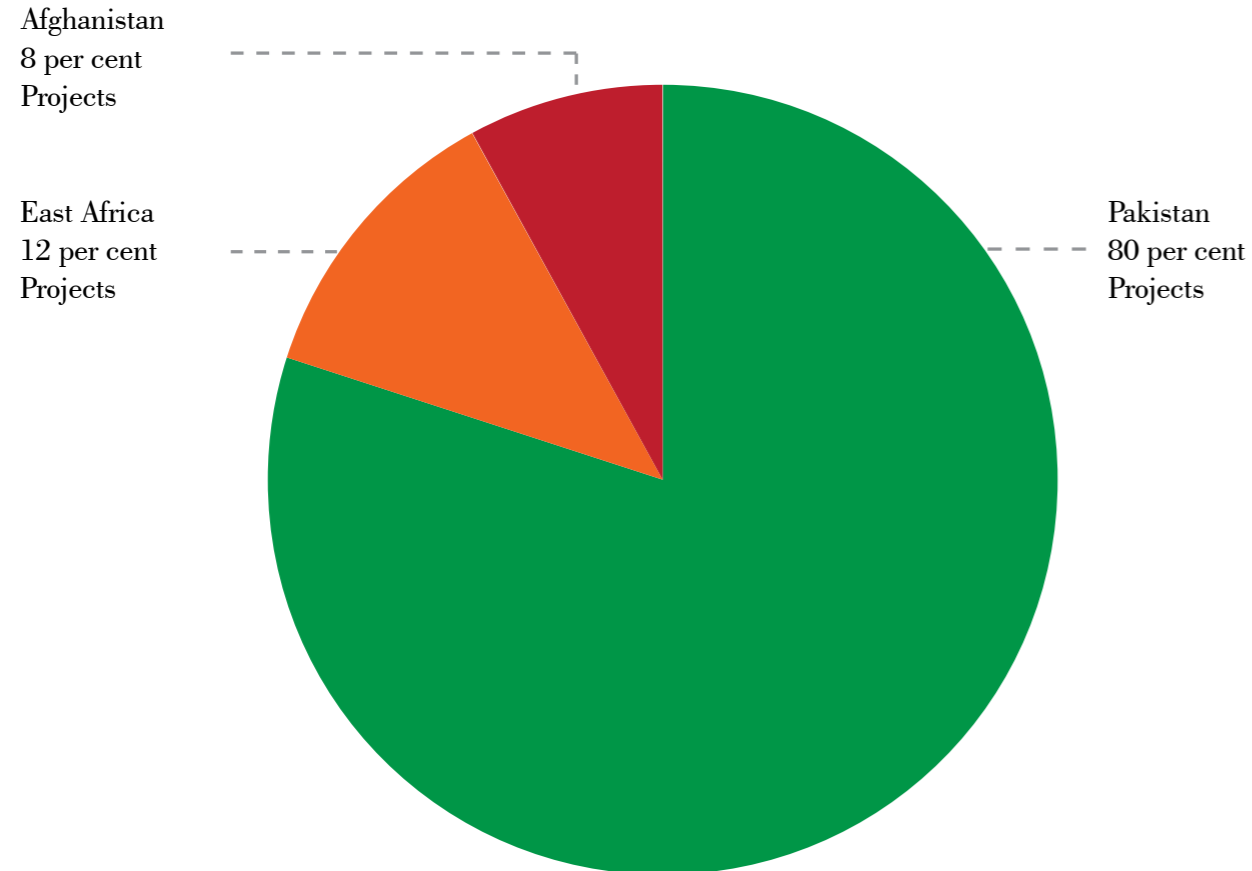
Differential expression of Fucose on cell surface of breast carcinoma (MCF7) cells.

At a Glance

Most Grants 2014
Medical College
Pakistan

\$9.04 million

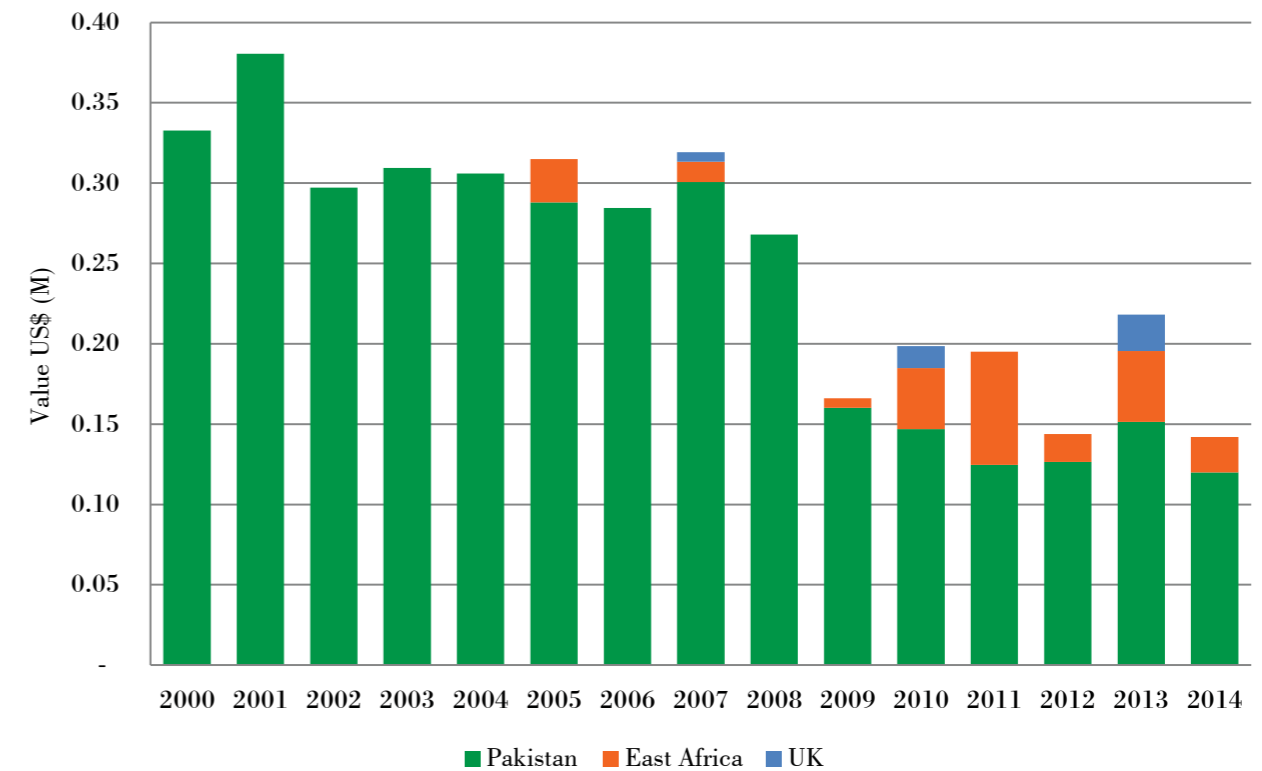
2010-2014 Utilization From 327 Extramural Grants (\$91 million)



2013-2014 URC Awarded Grants

Entity	No. of Grant	Amount
MC, EA	4	\$45,293
MC, PK	18	\$225,116
SONAM, PK	3	\$30,260
IED, EA	1	\$19,739
IED, PK	1	\$15,181
ISMC, UK	1	\$21,343

URC Grants 2000-2014



Over the past 15 years, the URC has disbursed 310 grants amounting \$3.82 million

Research Outlook is published annually by the Office of Research and Graduate Studies to highlight research, scholarship, and creative activity in and across disciplines at the Aga Khan University. Opinions expressed do not necessarily represent the views of the Aga Khan University.

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