ARUA
African Research Universities Alliance

INTERNATIONAL LAUNCH CONFERENCE

Theme

RESEARCH IN AFRICA RISING

PROGRAMME & BOOK OF ABSTRACTS

Guest of Honour

Nana Addo Dankwa Akufo-Addo
President, Republic of Ghana

Keynote Speaker

Dr. Bernie Fanaroff
Former Director, The Square Kilometre Array (SKA) South Africa Project

ARUA UNIVERSITIES

Rhodes University
University of Lagos
University of Ghana
University of Rwanda
University of Pretoria
Addis Ababa University
University of Ibadan
Makerere University
University of Nairobi
University Cheikh Anta Diop
Stellenbosch University
University of Cape Town
University of Dar es Salaam
University of Kwa-Zulu Natal
University of the Witwatersrand
Obafemi Awolowo University Ile-Ife

Venue:
ISSER Conference Facility,
University of Ghana

Date:
3rd - 4th April, 2017

Time:
9:00am

ABOUT THE AFRICAN RESEARCH UNIVERSITIES ALLIANCE

1. INTRODUCTION

The *African Research Universities Alliance* (ARUA) was inaugurated in Dakar in March 2015, bringing together fifteen (15) of the region's leading universities. Membership has since increased to 16 universities[1]. It is a network of universities from different countries and different historical backgrounds, but with a common vision. The network is about expanding and enhancing significantly the quality of research done by African researchers.

The prime motivation behind ARUA is countering the weakness of the research environment in the region. As a consequence of the muted research interest among governments and other stakeholders, African research accounts for only 1% of the world's research output. Most of this comes from South Africa. It may be observed that, following recent marginal improvements in the funding of research in the region, especially from international funding agencies, some improvements have taken place. Thus, the research output of African researchers (excluding South Africa) increased from 0.44% of the global total in 2003 to 0.72% in 2012. Despite pledges that governments and other funders make to support scientific research, Science, Technology, Engineering and Mathematics (STEM) research accounts for only 29% of Africa's total research output, compared to an average of 68% for Malaysia.

Apart from the low numbers of research undertaken in the region there have sometimes been questions about quality. These have been concerns about the absence of rigour in a lot of the regional research.

[1] The member universities are University of Lagos, Nigeria; University of Ibadan, Nigeria; Obafemi Awolowo University Ile-Ife, Nigeria; University of Ghana, Ghana; University of Dar es Salaam, Tanzania; University of Nairobi, Kenya; University of Cape Town, South Africa: University of the Witwatersrand, South Africa; University of Rwanda; University Cheikh Anta Diop, Senegal; Makerere University, Uganda; University of Stellenbosch, South Africa; University of Pretoria, South Africa; Rhodes University, South Africa; University of Kwa-Zulu Natal, South Africa; Addis Ababa University, Ethiopia.

ARUA is largely influenced by the fact that hardly any university in the region is in a strong enough position to make the desired impact on the region on its own. The *Alliance* is intended to develop local research excellence through collaboration to help find solutions to the problems of Africa. It is set to become a pan-African network for bringing research and academic excellence to the fore.

The membership of ARUA reflects a number of considerations, including largely acknowledged excellence and leadership roles in their countries. In their respective countries they are the leading universities that have shown considerable interest in research growth and have responded the most to changing global circumstances. It is agreed that the potential for each university in the network would be much better enhanced as they make use of their comparative advantage. It is also intended to bring in some of the leading universities from North Africa and additional francophone countries as soon as possible. ARUA universities will work closely with other universities.

2. A VISION AND MISSION FOR ARUA

ARUA's vision is to make African researchers and institutions globally competitive while contributing to the generation of knowledge for socio-economic transformation.

ARUA is on a mission to strengthen African universities through effective capacity-building that comes from working together as leading institutions for the task of increasing significantly their research output.

3. GOVERNANCE AND MANAGEMENT OF ARUA

ARUA is currently governed through a Board of Directors, which is made up of the 16 Vice Chancellors of member universities. The Board meets annually and is concerned with general policy and oversight of programmes and operations, while leading the development of strategic objectives.

Six of the members of the Board constitute an Executive Committee, which meets every quarter. The Committee is required to take responsibility for carrying out the oversight responsibilities of the Board on a more regular and frequent basis. The Secretary-General manages the affairs of ARUA on a day-to-day basis. The Secretariat is currently located at the University of the Witwatersrand.

4. STRATEGIC OBJECTIVES

- To increase Africa's contribution to global cutting edge research output to 5 percent from 1 percent over a 10-year period
- To increase the number of African universities in the top 200 universities of the world to at least 10 from 1 over a 10-year period
- To ensure that a minimum of 75 percent instead of 45 percent of the faculty of member universities have PhDs over a 10-year period
- To contribute significantly to developing good quality PhD graduates for other African universities
- To develop strong links between research universities and industry and other productive sectors
- To become a strong and effective advocate for funding research in Africa by national governments and international agencies

5. CURRENT PRIORITY AREAS OF ARUA

ARUA currently pushes its agenda in four areas, namely

- Collaborative research;
- Training and support for PhDs;
- Capacity building for research management;
- Research advocacy.

Collaborative Research

Under collaborative research, the Alliance will pursue a number of large multi-university projects in both the natural sciences and social sciences/ humanities. These will be in the following areas:

Natural Sciences	***Social Sciences/Humanities***
1. Climate change	1. Mobility and migration
2. Food security	2. Poverty and inequality
3. Non-communicable diseases	3. Unemployment and skills development
4. Materials development and nanotechnology	4. Notions of identity
5. Energy	5 Good governance
6. Water conservation	6. Post-conflict societies
	7. Urbanisation and habitable cities

PhD Training

Under training and support for PhD, ARUA has strong interest in providing significantly improved infrastructure and human resources. The initiatives under consideration include the following:

- an audit of research laboratories and facilities in order to determine how these resources can be shared and accessed by postgraduate students of member institutions
- harmonization of quality standards for the award of doctoral degrees
- co-supervision of doctoral students across the *Alliance*
- a student exchange programme
- joint postgraduate programmes
- a doctoral academy for training in research methodology, ethics and proposal writing
- doctoral seminars on thematic areas, with experts in their respective fields.

Capacity Building for Research Management

One of the major bottlenecks to mobilising resources for research in Africa is the poor capacity to manage the resources as well as the research projects adequately. ARUA will therefore do the following:

- Conduct a review of current research management database systems nationally and regionally, including a consideration of how to synchronise these for increased access.
- Conduct skills training workshops for research management officers and principal investigators.
- Engage in research management staff exchanges to enhance the capacity of all.

6. THE ARUA APPROACH

The **resource mobilisation strategy** will work as follows:

1. Self-reliance

ARUA member universities have pledged to dedicate a significant amount from their annual budgets to research. ARUA member universities have also pledged to contribute a minimum of US$10,000 annually towards the work of the Secretariat.

2. Engagement with regional bodies

ARUA will work closely with such regional bodies as the African Union (AU), African Development Bank (AfDB) and the United Nations Economic Commission for Africa (UNECA) in the development of research and training projects that reflect the aspirations of the regional bodies with respect to the economic transformation of Africa.

3. Engagement with governments

A major thrust of the ARUA approach will be advocacy work through dialogue with the governments of member universities.

4. Engagement with international funding agencies

ARUA will help its member universities to overcome the challenges in developing competitive grant applications.

5. Engagement with the Private Sector

ARUA will coordinate engagement with the private sector, focusing especially on large firms doing business in the countries of member institutions.

PROGRAMME FOR THE ARUA LAUNCH CONFERENCE

ARUA
African Research Universities Alliance

Theme: "Research in Africa Rising"

Dates: 3-4 April 2017

Venue: ISSER, University of Ghana

Opening Ceremony: 9.00 am (Main ISSER Conference Hall)

- General Introduction of the Conference, **Professor Ernest Aryeetey**, Secretary-General, African Research Universities Alliance, (ARUA)
- Welcome address by Vice Chancellor, University of Ghana, **Professor Ebenezer Oduro Owusu**
- Statement from ARUA Board Chair, **Dr. Max Price**
- Statement from the Secretary-General, Association of African Universities, **Professor Etienne Ehilé**
- Statement from **Dr. Mo Ibrahim**, Mo Ibrahim Foundation
- Keynote Speaker: **Dr. Bernie Fanaroff, Former Director of the Square Kilometre Array (SKA)** - South Africa Project
- Formal Opening of Conference by **His Excellency Nana Addo Dankwa Akufo-Addo**, President of Ghana

Plenary Session 1: 9.45 am (Main ISSER Conference Hall)

Sub-theme: **What is New in Social Science/Humanities Research Worldwide?**

Chair: **Professor Cheryl de la Rey, Vice Chancellor and Rector, University of Pretoria**

1. **Prem Ramburuth,** University of New South Wales -- *Disruption and Emerging Trends in Social Science and Humanities Research*
2. **Dee Smythe,** University of Cape Town – *Law and the Social Sciences*

General Discussion
Break: 11.15 am

Parallel Sessions 1: 11.45 am

1. Mobility and Migration (Venue: Main ISSER Conference Hall)

Chair: **Professor Rwekaza Mukandala, Vice Chancellor, University of Dar es Salaam**

(a) **Franca Attoh, University of Lagos** -- *Mobility, Migration and its Discontents: Insights from Nigeria*

(b) **Chris Nshimbi, University of Pretoria** – *The Governance of Migration in Africa's Regional Economic Communities. Current State of Affairs and the Way Forward*

(c) **Elias Ayiemba, University of Nairobi** – *Problematizing Mobility and Migration in Africa*

(d) **Hendrik Bosman, Stellenbosch University** -- *Migration and Colonialism in Nineteenth Century Southern Africa: the Witbooi and Griqua Examples*

(e) **Peter Quartey, Charles Ackah and Monica Lam-bom-Quayefio, University of Ghana** -- *Inter-linkages between International and Internal Remittances and Savings in Ghana*

2. **Poverty and Inequality (Venue: Room NB 11, ISSER Conference Facility)**

Chair: Professor Ernest Aryeetey, Secretary-General, ARUA

(a) Murray Leibbrandt, University of Cape Town—*Why a Centre of Excellence in African Inequality is an Urgent Priority and Why ARUA Provides the Appropriate Platform*

(b) Robert Osei and Isaac Osei-Akoto, University of Ghana – *Longitudinal Studies for Monitoring Poverty and Inequality in Africa: an Example of a Partnership That Works*

(c) Abayomi Adebisi , University of Lagos -- *Poverty, Inequality, Social Contract Failure and Implications for Sustainable Economic Policies in Nigeria: Can Any Lessons be Learned from China?*

(d) Yoseph Getachew, University of Pretoria -- *Redistributive Innovation Policy, Inequality and Efficiency*

(e) Tassew Woldehanna, Addis Ababa University -- *Measuring Multidimensional Poverty: Capabilities, Deprivation, and Social Exclusion in Rural and Urban Ethiopia*

3. **Unemployment and Skills Development (Venue: Twum-Barima Seminar Room, ISSER Main Building)**

Chair: Professor John Ddumba-Ssentamu, Vice Chancellor, Makerere University

(a) Kefyalew Endale, Addis Ababa University – *The Role of Skill Development in Unemployment Reduction in Developing Countries: The Case of Ethiopia*

(b) Stephen Oyebande, University of Lagos -- *Tackling Unemployment of University Graduates in Developing Countries: Issues, Challenges and the Way Forward*

(c) S. Adedeji, University of Ibadan, *Research and Training Responses to the Employability Challenges in Nigeria*

Lunch: 1.30 pm

Plenary Session 2: 2.30 pm (Venue: Main ISSER Conference Hall)

Sub-theme: New Trends and Developments in Global Scientific Research and the Role of Universities

Chair: Dr Max Price, Vice Chancellor University of Cape Town

1. **Gordon Awandare, University of Ghana** -- *Building Scientific Capacity for Competitive Biomedical Research in Sub-Saharan Africa*
2. **Ijeoma Uchegbu, University College London** -- *Delivering High Impact Research*
3. **Akintunde Babatunde, University of Leeds** -- *African Water Research in the Global Context*

General discussion

Break: 4.00 pm

Parallel Session 2: 4.30 pm

4. **Climate Change (Venue: Room NB 11, ISSER Conference Facility)**

Chair: **Professor Lucy Irungu, Deputy Vice Chancellor (Research), University of Nairobi**

(a) **Barend Erasmus, University of the Witwatersrand** -- *Spatiotemporal Dynamics of Landscapes – Urban Transitions for a Sustainable Future*

(b) **Bruce Hewitson, University of Cape Town** – *Advancing the Critical Research Frontier of Decision-Relevant Climate Information for Africa?*

(c) **Babajide Alo, University of Lagos** -- *Climate Change in Africa: Risks and Vulnerabilities*

(d) **Deogratius Mulungu, University of Dar es Salaam** – *Shaping the Future Climate Resilient Socio-Economic Development in Africa*

(e) **Belay Semani, Addis Ababa University** -- *Building Resilience to Climate Change at Community Level in Africa*

5. **Food Security (Venue: Twum-Barima Seminar Room, ISSER Main Building)**

Chair: **Professor Ebenezer Oduro Owusu, Vice Chancellor, University of Ghana**

(a) **Lise Korsten, University of Pretoria** – *Can Africa move Beyond the Water-Energy-Plant Nexus to a Food Sovereign State?*

(b) **Oluwatoyin T. Ogundipe, University of Lagos** -- *Securing the Genetic Resource Base of Underutilised Plants: the Building Blocks for Consolidating the Sustainable Development Goals (SDGs) on Food Security in Nigeria*

(c) **Lilian D. Kaale, University of Dar es Salaam** – *Enhancing Food Security through Innovative and Inclusive Research along Value Chain in Tanzania*

(d) **Gunnar Sigge, Stellenbosch University** -- *Opportunities for Multidisciplinary Research to Address Food and Nutrition Security Issues in Sub-Saharan Africa*

(e) **Kassahun Tesfaye, Addis Ababa University,** *Improving the Productivity of a Highly Nutritious but Underutilized Cereal Crop in Ethiopia: The Case of Finger Millet*

6. **Non-Communicable Diseases (Venue: Main ISSER Conference Hall)**

Chair: **Professor Stephanie Burton, Deputy Vice Chancellor (Research), University of Pretoria**

(a) **Tollulah Oni, University of Cape Town – Non-communicable diseases in the Context of African Urbanization and Epidemiological Transition**

(b) **Lynne Schepartz, University of the Witwatersrand,** -- *Maternal and Child Oral Health of Hausa Women: The Effect of Parity and Socio-Behavioural Factors*

(c) **Ng'weina Francis Magitta, University of Dar es Salaam** – *New- Cancer Surveillance And Exploration Of Genomics Of Breast Cancer For Optimal Therapy And Control In Africa*

(d) **Tiaan de Jager, University of Pretoria,** *Research, Innovation and Education towards Malaria Elimination*

(e) **Ama de-Graft Aikins, University of Ghana,** -- *Addressing Chronic Non-Communicable Disease Prevention and Care in Africa: A Critical Psychology Perspective*

7. **RUFORUM: Mobilising Private Sector Support for HE Transformation in Africa (Venue: Auditorium, School of Law)**

Chair: **Professor Idowu Olayinka, Vice Chancellor, University of Ibadan**

(a) **Adipala Ekwamu and Moses Osiru, RUFORUM**

(b) **Masafumi Nagao and Emmanuel Mutisya, United Nations University**

Cocktails and Conference Dinner at the Great Hall, University of Ghana: 6.45pm

Day 2

Plenary Session 3: 9.00 am (Venue: Main ISSER Conference Hall)

Sub-theme: Recent Developments in Social Science/Humanities Research in Africa

Chair: **Professor Adam Habib, Vice Chancellor, University of the Witwatersrand**

1. **Samuel Agyei-Mensah University of Ghana** -- *Emerging Research Areas in the Social Sciences*
2. **Tayo Adesina, University of Ibadan** – *Interdisciplinarity and 'Engaged Research': Trends in Cutting Edge Research on African Cosmology and the Public Sphere*

Break: 10.30 am

Parallel Sessions 3: 11.00 am

8. **Notions of Identity (Venue: Main ISSER Conference Hall)**
   Chair: **Professor Hester Klopper, Deputy Vice Chancellor, Stellenbosch University**
   (a) **Ayodele V. Atsenuwa, University of Lagos** -- *Identity, Diversity and Citizenship: The Future of African States*

   (b) **Grace Musila, Stellenbosch University** – *Ethno-Cultural Citizenship, Opacities and the Softness of Official Documents in the Julie Ward Murder in Kenya*

   (c) **Elgidius B. Ichumbaki, University of Dar es Salaam** – *Negotiating Local Identities through Cultural Productions for Inclusive Growth*

   (d) **Bekele Gutema, Addis Ababa University** -- *The Multiple Dimensions of Identity*

   (e) **Adebola Ekanola, University of Ibadan** -- *Interrogating the Idea and Politics of Identity*

9. **Good Governance (Venue: Room NB 11, ISSER Conference Facility)**
   Chair: **Professor Urmilla Bob, Deputy Vice Chancellor, University of KwaZulu-Natal**
   (a) **E.O. Oyewo, University of Lagos** -- *Good Governance and Accountability in Democratizing Sub-Saharan States: Comparative Study of Nigeria and Ghana*

   (b) **Sope Williams Elegbe, Stellenbosch University** – *Exploring the Next Phase of Anti-Corruption Mechanisms in Sub-Saharan Africa: A Focus on Citizen Action against Corruption*

   (c) **John A. K. Jingu, University of Dar es Salaam** – *The Political Economy of Governance in Africa: Past, Present and Future*

(d) **Ransford Gyampoh, University of Ghana** – *Governance and Winner-Takes-All Politics in Ghana*

(e) **'Bayo Okunade, University of Ibadan** -- *Leadership - Followership Nexus and Good Governance*

10. Post-Conflict Societies (Venue: Twum-Barima Seminar Room, Main ISSER Building)

Chair: **Dr. Tassew Woldehana, Deputy Vice Chancellor (Research), Addis Ababa University**

(a) **Mopelola A. Olusakin , University of Lagos** -- *Peace Counselling in Post-Conflict Societies*

(b) **Anthoni van Niekerk, University of the Witwatersrand** – *Promoting a Pan-African Approach to the Study of African Security*

(c) **Pumla Gobodo-Madikizela, Stellenbosch University** -- *New Intellectual Framework for Historical Trauma: Troubling the Intergenerational Trauma Paradigm*

(d) **Mesfin Gebremichsel, Addis Ababa University** -- *State Building and Post Conflict Political Settlement in Africa: The Ethiopian Experience*

11. Urbanisation and Habitable Cities (Venue: Auditorium, School of Law)

Chair: **Professor Francis Dodoo, Pro-Vice Chancellor (ORID), University of Ghana**

(a) **Jane Battersby, University of Cape Town:** *The Role of African Research Universities in an Urbanising Africa*

(b) **Timothy G. Nubi, University of Lagos:** *Urban Regeneration as a Tool for Sustainable Housing Delivery in Nigeria*

(c) **Noëleen Murray, University of the Witwatersrand** – *Towards Sustainable Cities - A Pan African Research College*

(d) **Samuel Owuor and Teresia Mbatia, University of Nairobi** – *Some Aspects of Food and Nutrition Security in Nairobi*

(e) **Karina Landman, University of Pretoria,** *Changing Cities, Changing Public Spaces: Reconsidering the Role of Public Space in the Development of Habitable Cities*

Lunch: 1.00 pm

Plenary Session 4: 2.00 pm (Venue: Main ISSER Conference Hall)

Sub-theme: Significant Recent Advances in Scientific Research in Africa

Chair: **Professor Rahamon A. Bello, Vice Chancellor, University of Lagos**

1. **Tom Kariuki, African Academy of Sciences** -- *Impacting Africa's Development through Strengthened Research Ecosystems: Funding Opportunities for R&D from AESA*
2. **Mayowa Owolabi, University of Ibadan** -- *Unravelling Stroke among People of African Ancestry*

General Discussion

Break: 3.30 pm

Parallel Sessions 4: 4.00 pm

12. **Materials Development and Nanotechnology (Venue: Main ISSER Conference Hall)**

Chair: **Professor Cuthbert Kimambo, Deputy Vice Chancellor, University of Dar es Salaam**

(a) **Nuru R. Mlyuka, University of Dar es Salaam** – *Developing Novel Nanomaterial from Locally Available Resources for Industrial Applications in Africa.*

(b) **Mmantsae Diale, University of Pretoria** -- *Science of Sustainability with Advanced Materials and Nanostructres*

(c) **Peter Mallon, Stellenbosch University** -- *Exploiting the Opportunities of Polymer Nanofibers and Nanocomposite Nanofibers to Address Health and Environmental Challenges*

(d) **David Dodoo-Arhin, University of Ghana, --** *Innovations in Engineering Materials and Nanotechnology for National Development*

(e) **Oyeronke A. Odunola, University of Ibadan,** *Prospects in Nanotechnology Development and Application for Africa*

13. **Energy (Venue: Room NB 11, ISSER Conference Facility)**

Chair: **Dr. Peter Clayton, Deputy Vice Chancellor, Rhodes University**

(a) **Aggrey Mwesigye, University of the Witwatersrand** -- *Design and Performance Optimisation of Renewable Energy Systems for Distributed Power Generation*

(b) **Xiaohua Xia, University of Pretoria** – *Energy Efficiency is the First Fuel!*

(c) **Madara Ogot, University of Nairobi** – *An Overview of Energy Research Initiatives and Potential Collaboration Areas at University of Nairobi*

(d) **Eugene van Rensburg, Stellenbosch University --** *Valourisation of Wastes and Biomaterials into Foods, Chemicals and Energy through Alternative Processing Approaches*

(e) **Harro von Blottnitz, University of Town --** *What [Energy] Research when Society Plays Catch-up? Notes on Innovation, Technology Transfer and Indigenization*

14. **Water Conservation (Twum-Barima Seminar Room, Main ISSER Building)**

Chair: **Professor Zeblon Vilakazi, Deputy Vice Chancellor (Research), University of the Witwatersrand**

(a) **Sandow Mark Yidana, University of Ghana --** *The Utility of Groundwater Resources for Climate Resilient Irrigation in the North of Ghana - Challenges and Opportunities.*

(b) **Ezechiel Oladapo Longe, University of Lagos --** *Water Conservation in Industrial Process: A Tool for Enhancing Sustainable Environmental Quality in Lagos*

(c) **Evans Chirwa, University of Pretoria** – *Spatial Water Allocation and the Impending Crisis for the Southern African Water Reserves*

(d) **Zerihun Woldu, Addis Ababa University** -- *Complementarities between Development and Watershed Management and Rehabilitation in the Highlands of Ethiopia*

(e) **Kevin Winter, University of Cape Town** -- *The Water Hub: A Centre for New Technologies and Innovation for Treating Urban Water Runoff Flowing from an Underserviced Settlement in South Africa*

Closing Round-Table: Making Research in Africa Rise Faster: 6.00 pm

(Venue: Main ISSER Conference Hall)

Chair: Dr. Albert Jaarsveld, Vice Chancellor, University of KwaZulu-Natal

1. African Development Bank

2. ISSER, University of Ghana

3. Association of African Universities

4. African Union/RUFORUM

5. Private Enterprise Foundation, Ghana

Conference Ends: 7.00 pm

Cocktails: 7.15 pm -8.30 pm

ABSTRACTS

SUB-THEME: WHAT IS NEW IN SOCIAL SCIENCE/HUMANITIES RESEARCH WORLDWIDE?

DISRUPTION AND EMERGING TRENDS IN SOCIAL SCIENCE AND HUMANITIES RESEARCH

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Social Science and Humanities (SSH) research is of vital importance to the improvement of people's lives in all aspects and to the future of the world. It generates important new knowledge which has a deep and intrinsic value, contributing to relevant solutions. Discussion in this plenary presentation will seek to (a) identify what is new in the world today that has implications for high impact SSH research; (b) provide brief insights into SSH research in which I have been involved; and (c) put forward viewpoints for consideration by ARUA.

One of the most challenging developments in the current global environment is that of 'disruption' and rapidly changing local and global contexts. SSH research enables us to understand, accommodate and respond to these changes and how to live, work, be resilient, survive and succeed in a time of disruption on so many fronts – political, social, economic, cultural and environmental. In this time of 'disruption' (now the new norm), further research will also provide knowledge and understanding of changes in the flow of people across geo-political borders and cultures, be they asylum seekers, refugees or migrants, and their needs and predicaments. It will also create new knowledge and understanding on the blurred lines of cultures and cultural differences which have led, and continue to lead to misunderstandings and misperceptions. It will deepen our knowledge on the disadvantaged and vulnerable groups in societies and nations, and provide the basis for appropriate solutions. In the business world, further research into changing trends and disruption in the process of globalization, economic realities and challenges would be vital, including global growth in Africa, and the role of China.

The presentation will incorporate some of my own areas of research and research interests in emerging economies such as BRIC (Brazil, Russia, India, China); China's global growth and outward FDI into Africa; Cross Cultural Values and Ethical Behaviour (in Business); Education as a driver for economic and social development; Capacity Building in developing countries; Equity and Diversity in Higher Education; and Gender Equity in the Workplace. It concludes with a focus on the importance of continued strengthening of research connections and outreach initiatives; developing a global research 'presence' and leveraging the benefits of regional and national expertise in Africa to be shared globally; connecting the disciplines through interdisciplinary initiatives especially in targeted areas (current and new); viewing Education as foundational to Research expertise and development; and highlighting the importance of research impact (including institutional and disciplinary rankings and reputation) to attain some of the key goals set by ARUA.

MOBILITY AND MIGRATION

MOBILITY, MIGRATION AND ITS DISCONTENT: INSIGTS FROM NIGERIA

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This paper interrogates the phenomenon of mobility, migration and its discontent using insights from Nigeria. International migration is a growing phenomenon both in its range and complexity. The United Nations Department of Economics and Social Affairs estimates that there are over 214 million international migrants worldwide representing three per cent of the global population. The growing trend is from developing economies and countries in conflict to the developed countries of the world. The social, economic and political underpinnings are diverse and often not manifest even though they could be linked to globalization. These factors include the asymmetry in the international political order, demand for cheap labour in the developed countries, ease of international transportation and availability

of information technology. In addition, countries such as Nigeria, have developed strong kinship networks in Europe and America. Fundamentally, what impels decision to migrate is not unconnected with unemployment and the need to achieve better well-being. However, migration has generated a myriad of discontent both in countries of origin and destination as many developed countries perceive migrants as responsible for some social problems such as crime, terrorism and growing youth unemployment. Using library resources and online materials, and anchoring the analysis on Caldwell's theory of Intergenerational Wealth-flow and Political Economy theories, the paper avers that migrants discontent stems from their inability to be fully integrated in host countries and given rights and opportunities to earn legitimate livelihood. The paper concludes that Nigerians have been singled out for xenophobic attacks in countries such South Africa and Libya and disparaged in some other countries.

Key Words: Migration, Globalization, International Political Order, Asymmetry, Xenophobia.

THE GOVERNANCE OF MIGRATION IN AFRICA'S REGIONAL ECONOMIC COMMUNITIES. CURRENT STATE OF AFFAIRS AND THE WAY FORWARD

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On the African continent, migration – especially within the sub-regions – has always been part of everyday life, with the causes for migration being different from region to region. This paper assesses the current state of affairs and the way forward for regional migration governance in the African continent. The assessment fulfils two specific objectives. First, to provide an overview over the current migration policies of the African Union (AU) and of selected regional economic communities (RECs) including, the East African Community (EAC), the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC). Second, to develop a set of criteria and recommendations to further develop

and improve these policies and their implementation. An in-depth analysis of existing migration policies and practices at the African continental level and in the three RECs was conducted. Relevant scientific publications and policy reports, and global, continental and regional legislation on migration were also thoroughly reviewed. Furthermore, an experts' workshop of experts and practitioners on African migration from civil society and government was also hosted. The workshop concluded with a scenario exercise that scoped future macro dynamics for regional migration in Africa. The future of migration in Africa will be shaped by the degree of political and economic inclusivity. In the next decade or so, Africa may be faced with a combination of increasingly inclusive or exclusive political systems and, simultaneously, economic growth may lead to an exclusive or inclusive development trajectory. The combination of these two structural forces helps identify four potential scenarios for African migration, by 2030. The first presents a progressive case, in which inclusive political governance and equitable development create a fertile terrain for free moment across the regions and Africa. The second and third scenarios outline intermediate cases, in which the degree of inclusivity is mixed, leading to a localization of migration and tensions at the borders. The fourth scenario constitutes complete exclusivity, leading to instabilities across the regions, across Africa, and to migration crises. Based on this, the paper makes a series of policy recommendations to shape migration governance towards a more favorable outcome including, the establishment of integrated economies, regional innovations, circular migration, awareness campaigns and structural redistribution.
Keywords: regional migration governance; migration legislation; migration policy; EAC; ECOWAS; SADC; AU

MIGRATION AND COLONIALISM IN NINETEENTH CENTURY SOUTHERN AFRICA: THE GRIQUA AND WITBOOI EXAMPLES

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Rapidly increasing forced migration and mobility across international borders affect the lives of millions of people throughout the world and across Africa. In many ways migration defines the first part of the 21st Century since more people are moving than at any time in recent history. Migration is not

only a current phenomenon but has a history that goes back many centuries and in which different modalities of colonialism played a significant role. To illustrate the effect colonialism had on migration in Africa two examples of forced migration will be focused upon: The Griqua (a group of Khoi descent) migrated in 1861 – 1862 across the Drakensberg Mountains in South Africa to avoid British colonialism; while the Witboois resisted German colonialism between 1880 and 1904 in South West Africa (as Namibia was then called). It will be argued that both Griquas and Witboois resisted British and German colonialism by means of mimicry that resulted in resilient hybrid identities

INTER-LINKAGES BETWEEN INTERNATIONAL AND INTERNAL REMITTANCES AND SAVINGS IN GHANA

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The increase in volumes and circulation of internal and international remittances have become a substantial part of resource flow for economic development especially in developing countries with a significant impact on household welfare. Over the years however studies on remittances have focused almost exclusively on international remittances while internal remittances receive less attention. This paper, in sharp departure from existing remittance literature, adds two key aspects to the debate focusing on the linkage between internal and international remittances and savings mobilization. The current wave of the GLSS 6 data is used. The paper finds that a significant proportion of respondents receive international remittances and recipients save more than non-recipient of migrant remittances. Households that receive international remittances appear to be less likely to remit internally. Remittance receiving status of a household and the value of remittances received increase saving balances of households as well as the propensity to save. However, the frequency of remittances received

negatively influences the likelihood of saving. We conclude that the positive effect of remittances on the propensity to save has policy implications for financial sector development.

Key Words: Remittances, Savings, Development
JEL Classification: E44, F22, F29

POVERTY AND INEQUALITY

LONGITUDINAL STUDIES FOR MONITORING POVERTY AND INEQUALITY IN AFRICA: AN EXAMPLE OF A PARTNERSHIP THAT WORKS

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The Yale-ISSER Socioeconomic Panel Survey is a collaboration between the Economic Growth Center (EGC) at Yale University and the Institute of Statistical, Social, and Economic Research (ISSER) at the University of Ghana, Legon. The survey which was designed by both the EGC and ISSER, is carried out under the direct supervision of ISSER. Already two waves of the surveys have already been carried out with the third wave in the planning and preparatory stage.

The main objective of the survey is to provide a scientific framework for a wide range of potential studies of the medium- and long-term changes that are taking place during the process of Ghana's development. The survey is meant to remedy a major constraint on the understanding of development in low-income countries - the absence of detailed, multi-level and long-term scientific data that follows individuals over time and describes both the natural and built environment in which the individuals reside.

The benefits of this collaboration have been numerous. Some of the important spin-offs from this collaboration include the following. First, this collaboration has contributed to an increase in both quantity and quality of

research output. Second, the ability of the ISSER to attract research funds has improved. Third, this collaboration is providing a critical (good quality data) input for graduate training at both University of Ghana and also Yale University. Fourth, it has provided a basis for an expansion of policy relevant research that ISSER undertakes. Finally, it has contributed to widening the international research network of ISSER and its faculty.

We conclude by noting that even though potential challenges exist with such collaborations, these can be reduced considerably when the relationship is developed on the relative strength of the partners and mutual respect.

POVERTY, INEQUALITY, SOCIAL CONTRACT FAILURE AND IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT GOALS IN NIGERIA: CAN ANY LESSON BE LEARNED FROM CHINA?

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Nigeria is a nation of great resources and potential in Africa. It is one of the very few countries in Africa that is naturally resource based with competitive and comparative advantages in most of these natural resources. But today, poverty, inequality, weak policies, Government and leadership failures have pervaded her strength; threatening the realization of the global Sustainable Development Goals (SDGs) of the United Nations' (UN) as global agenda to scale-up the standard of living and quality of life across the world. Available indexes have shown from this paper, the weak positions of Nigeria as it regards innovation and infrastructures, affordable clean energy, purchasing power parity, numbers of poor as a percentage of the population living at $1.25 a day, and the Nigeria income inequality etc. This study therefore, has combined Archival and Causal (Explanatory) research designs to identify what the basic challenges are in a bid to providing sustainable solutions that will allow the nation pursue and realize the main cardinal points of the SDGs that will improve the quality of life for her citizens. Curiosities were raised about the continued negative performance indexes of Nigeria in comparison with China which was once very poor like Nigeria but has methodologically overcome poverty and closing the inequality gap with improved human development index (HDI) and economic prosperity in the last three decades.

REDISTRIBUTIVE INNOVATION POLICY, INEQUALITY AND EFFICIENCY

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Using a heterogenous-agent growth model with in-house R&D and incomplete capital markets, we examine the efficiency and distributional effects of alternative public R&D policies that target high-tech and low-tech sectors. We find that such policies have important implication for efficiency, inequality and social mobility. A regressive public R&D investment financed by income tax could boost growth and welfare via a positive effect on individual savings and effort. However, it could also discourage them via its effect on the efficiency inequality trade of. The relationship between public R&D spending and welfare is therefore hump shaped admitting an optimal degree of regressivity in public R&D spending. A case for optimal progressive public R&D investment, however, can be made with a properly designed R&D policy that combines consumption tax and investment subsidy policies.

UNEMPLOYMENT AND SKILLS DEVELOPMENT

(a) **Kefyalew Endale,** Addis Ababa University – *The Role of Skill Development in Unemployment Reduction in Developing Countries: The Case of Ethiopia*

TACKLING UNEMPLOYMENT OF UNIVERSITY GRADUATES IN DEVELOPING COUNTRIES: ISSUES, CHALLENGES AND THE WAY FORWARD

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This paper x-rays the various issues on rising university graduates unemployment rate, the challenges facing families and societies of the unemployed, as well as the various ways some developing nations have explored in tackling the problem. The paper relies on information gathered from published research documents and country reports of the UNESCO, the British Council and the World Bank.

NEW TRENDS AND DEVELOPMENTS GLOBAL SCIENTIFIC RESEARCH AND THE ROLE OF UNIVERSITIES

BUILDING SCIENTIFIC CAPACITY FOR COMPETITIVE BIOMEDICAL RESEARCH IN SUB-SAHARAN AFRICA

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Advances in computational biology and the growing consensus in favor of open access publishing and data sharing, have significantly increased the power of biological investigation. Customized algorithms can now be applied to probe online genomic, transcriptomic and metabolomic databases for novel proteins that fit a specific profile. These approaches are now being routinely applied in combination with conventional wet laboratory techniques for discovery of novel vaccines and drugs. To maintain competitiveness in scientific research, African Universities must build the necessary high performance computing capabilities to enable their scientists incorporate the power of computational biology into their research.

DELIVERING HIGH IMPACT RESEARCH

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University translational research is a vital contributor to innovative products and services. Examples of translational research will be provided from various departments, including the UCL School of Pharmacy, where translational drug development research is a major focus. The examples will include a medicine developed within UCL's laboratories that has recently been licensed for development, by one of UCL's spin out companies. This successful translation has emerged due to there being an emphasis on creating differentiated medicines, using new science and technologies. Such differentiated medicines show, as they should, real alignment with the needs of the relevant patient population. Other areas of translational research

will also be highlighted in the talk. The role of UCL, and indeed the UK government, in creating the optimum environment for such research will also be emphasised. UCL is a world leading multi-faculty university, home to 4,000 academics and 38,000 students. The university is almost 200 years old and was recently ranked top of the research power list in the UK's most recent Research Excellence Framework (REF 2014) exercise.

CLIMATE CHANGE

SPATIOTEMPORAL DYNAMICS OF LANDSCAPES – URBAN TRANSITIONS FOR A SUSTAINABLE FUTURE

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The Africa of the future is an urban Africa. This urban Africa will consist of existing megacities, that have expanded and developed, as well as secondary cities that have their roots in rural origins, but that have been overtaken by the pressures, opportunities, demands and afflictions of urbanisation. The remaining areas, those that we currently known as rural areas or sparsely populated wildernesses, have an uncertain future, given the likely demands to feed an urban Africa of the future.

The processes that determine the nature, pace and degree of urbanisation, in different places are complex, and varied. Some of the drivers are location based, such as religious fanaticism, climate change impacts, food insecurity, water scarcity, whereas others are institutional in nature, such as poor governance, uncertain policy environments and one-sided global trade agreements. The one common thread, though, is the transition from rural-dominated to urban-dominated environments and structures.

In an attempt to untangle the causality in complex social-ecological systems (SES) that sets the scene for these transitions, we rely on long term data on settlements patterns, natural resource use, human demography and environmental variability. At a rural savanna field station in the eastern Lowveld savanna of South Africa, we used a combination of remotely sensed data and detailed household-level field studies spanning 50 years of data collection, to understand energy and food security in these SES.

We synthesize the findings of 11 researchers over 13 years of research at this site, and explore the policy and management implications from these long-term spatiotemporal studies on ecosystems and urban patterns. Without a critical examination of the adaptation options for African smallholder farmers, effective responses to urbanisation, and other global change challenges, is likely to remain elusive.

With these findings as a point of departure for future work within ARUA, we explore opportunities for an African network to take such integrated studies to the next level, in support of regional policy needs.

ADVANCING THE CRITICAL RESEARCH FRONTIER OF DECISION-RELEVANT CLIMATE INFORMATION FOR AFRICA?

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While climate change and variability are central factors to shaping Africa's vulnerability and development, the climate information basis for the decision scale is weak. Within the Intergovernmental Panel on Climate Change's (IPCC) reports and assessments are many robust and quality messages appropriate to mitigation and national policy, yet fundamentally disconnected from relevance to the actual adaptation decision-scales. Instead there is predominance of structured supply chains in which a research data are treated as information, progressively transferred and translated and often over-interpreted, usually inadequately communicated, are scale inappropriate, and at times contradictory. These data are being operationalized through a plethora of dissimilar portals and self-authorized boundary organizations that have little or no accountability, with unclear assumptions complicated by ambiguous or opaque terminology.

This raises three challenges; what constitutes climate information, how to construct climate information, and how to maximize the added value of climate information? The future resilience of African society, risk management of socio-ecological systems, and the framing of appropriate development pathways are inherently dependent on addressing these questions. At the core is determining what constitutes decision-relevant information.

Climate scientists would, for example, consider a statistically significant result as information, yet in the decision world information only has meaning in context: knowledge is information in context. To address this requires that physical climate scientists become engaged with stakeholders to co-explore the meaning of climate information alongside the myriad of non-climate stressors. In the University of Cape Town we have established multiple approaches to this task, particularly in the critical urban context of cities (see www.fractal.org.za). The second question is how to construct information from the multi-model, multi-ensemble, and multi-resolution data; all of which include uncertainty from natural variability of the climate system, and from model bias and error, which leads to contradicting messages of little value to decision makers - this is the data distillation dilemma. We have made significant strides in this respect to develop approaches in filtering signal from noise to construct new salient messages of climate change. Third is the question of maximizing information value in society; this is a task requiring co-exploration through equal partnership with decision makers to bring complementary knowledge together in addressing an information challenge.

This research takes places through projects that explicitly engage in collaborative partnerships within Africa and internationally. Examples include the CORDEX-Africa program that seeks to develop fundamental understanding of regional scale climate variability and change, and is used to also develop the capacity of early career scientists. A second example is the FRACTAL project: an international consortium led by UCT which works with city governance in 8 African cities to push the frontiers of developing climate information at the city scale, and partners with city decision makers in building decision relevant narratives and data products to inform urban development.

CLIMATE CHANGE IN AFRICA: RISKS AND VULNERABILITIES

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There is now global expert consensus that climate change (CC) is a reality with undue impacts facing the future of a number of societies across the globe. In Africa, the consequences of the impacts of climate change aggravate poverty

due to the level of existing vulnerabilities and low adaptive capacities even though the continent makes relatively little contribution to global greenhouse gas (GHG) emissions. Projected impacts of climate change will exacerbate existing socio-economic challenges, affecting the realisation of some of the Sustainable Development Goals towards reducing poverty.

The paper will present summaries of current understanding on CC as well as results on risks, vulnerabilities and climate change linkages to the development goals (DGs) showing that every sector of the economy in Africa is climate sensitive and susceptible. The possible mitigation and adaptation responses including good practice principles as well as policy options and elements for climate-proofing African economies will be discussed.

The overall intent is to draw attention to the necessity for research to keep climate change impacts from becoming a catastrophe in Africa. It is posited that addressing climate change risks is a veritable African development strategy for vulnerable groups and poverty alleviation.

SHAPING THE FUTURE CLIMATE RESILIENT SOCIO-ECONOMIC DEVELOPMENT IN AFRICA

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Climate Change is occurring and is widely recognized to be serious risks to development especially in developing countries due to their dependence on climate sensitive economic sectors, such as rain-fed agriculture (IPCC, 2007). Africa is often cited as the most vulnerable continent to the adverse impacts of climate variability and change due to its low capacity to adapt. As such climate change is expected to have far-reaching impacts on Africa's development. It is recognised that climate change is a crosscutting theme. This implies that in order to undertake climate change related researches effectively, it would be important to establish multi-stakeholders engagement, multicountry, multi-disciplinary teams, relevant to address the climate change issues.

The University of Dar es Salaam (UDSM) has over years involved in climate change training, research and outreach activities. To mention a few, UDSM has a fully-fledged climate change training programme as M.Sc. in Climate Change and Sustainable Development (CC & SD), and training programmes on impacts and adaptation studies: M.Sc. in Natural Resource Assessment and Management (NARAM); M.Sc. in Water Resources Engineering (WRE); Master of Integrated Water Resources Management (MIWRM); Master of Integrated Sanitation Management (MISM) and M.Sc. in Integrated Environmental Management (IEM). The UDSM is engaged on climate change research including climate downscaling studies; climate change vulnerability, impacts and adaptation studies. In addition, the University of Dar es Salaam has been running a number outreach programs and policy dialogues.

However, there are gaps which need to be bridged and the African Research Universities Alliance (ARUA) initiative founded in 2015 is timely. Accordingly, UDSM with its University Working Groups is subscribing to the thirteen (13) identified thematic areas by ARUA. The Climate Change Collaborative Working Group envisions contributing to informed decision towards enhancing climate change resilience and overall development in an integrated manner. Within this framework, the proposed research paradigm constitute of three key pillars: Research, Out-reach and capacity building, and Development for climate resilience and socio-economic transformation. The ultimate goal is to develop key policy messages in a more participatory way through multistakeholders engagement across levels and across sectors, with a gender consideration. This will also contribute to achieving the African Union vision through the Agenda 2063.

BUILDING RESILIENCE TO CLIMATE CHANGE AT COMMUNITY LEVEL IN AFRICA: LESSONS FROM ETHIOPIA

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Climate change and food security are two of the most pressing challenges in Ethiopia, and they cannot be tackled in isolation from each other. Agriculture and the communities that depend on it for livelihoods and food security are highly vulnerable to climate change impacts. Moreover, subsistence

and smallholder agricultural systems in Africa are under pressure from a number of interlocking stressors such as land degradation, fragmentation of landholding due to population pressure, overgrazing, deforestation, limited capacity to invest on the land, inadequate access to technology and markets and insufficient infrastructure. This recognition has motivated ongoing works to building the resilience of local communities to changes associated with climate and other changes to achieve food security, reduce land degradation, and improve water management, while reaping potential mitigation co-benefits. An ongoing research work on climate vulnerability and adaptation strategies in the Blue Nile recommended a five-step "community-by-agroecosystem-based" approach as resilience building framework at community level. The framework begins with the classification and analysis of major agro-ecosystems based on agroecology, soil, and farming systems followed by vulnerability assessment. In addition to this, the framework suggests that building climate resilience is possible through appropriate adaptation options with mitigation co-benefits with full consideration of local adaptive capacity and agro-ecosystems potentials. We concluded that building a climate resilient economy is about adapting effectively to climate change to minimize the potential damage and at the same time to maximize the potential benefits. The study recommends to adopt agro-ecosystem based "climate-smart landscape management", through establishing climate smart villages (CSV) to meet the goals of increasing agricultural productivity and smallholder farmer incomes while enabling adaptation and resilience to climate change and reducing emissions at community level. For small scale subsistence farmers, it's a way of doing agricultural development that uses resources efficiently and wisely, protects and conserves the environment, takes advantage of the best practices and technologies available, implements enlightened policies, increases market access, and reduces the high level of risk that smallholder farmers face.

Key words: adaptation, agroecosystem, climate change, climate smart villages, mitigation, vulnerability, resilience

FOOD SECURITY

CAN AFRICA MOVE BEYOND THE WATER-ENERGY-FOOD NEXUS TO ENSURE FOOD SOVEREIGNTY?

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Food and nutrition security requires well-managed inter-sectoral co-ordination, and an effective integration of existing policies and programmes in water, energy, agriculture, food, health, environmental protection and education, as well as in agrarian reform. A critical need in Africa is to establish the technical framework for innovation, education and to secure effective governance and control in the context of food security. A sustainable political correct transition towards a more environmental resilient food production system can therefore address economic growth, hunger, malnutrition and poverty and set the scene for a multi-disciplinary approach to food security for all. The global shift towards general well-being and food rights as well as fair trade, further requires a democratic reflection on food related governance and control. The evolving global debate around sustainable food security further renewed interest in Food Sovereignty. This debate expand the concept of agroecology and food system security. Food Sovereignty is a multifaceted socio / political ideology established to achieve an alternative approach to address sustainable food security. Agroecology on the other hand is endorsed for its sustainable methods in producing food to the benefit of communities and the environment. In this context local food production and consumption is prioritised. It gives a country the right to protect its local producers from cheap imports and to better control production for sustainable livelihoods. A paradigm shift from industrial agriculture to diversified agroecological systems is therefore emerging and a growing knowledge base in Africa can contribute to the changing face of global food systems and continental food security. With more effective regulatory frameworks, policies and technical capacity sustainable food systems can be achieved and can turn the tide against inequality, vulnerability and dependence. Water and Food security is therefore multifaceted and multidimensional challenges that cannot be attained through a single approach. The contribution that food sovereignty can make towards achieving food security provides a transitional paradigm,

rather than a developed set of principles, standards, regulations and controls. In this paper the link between food security and -sovereignty within the African continent will be discussed as part of the strategy to achieve the Sustainable Development goals.

SECURING THE GENETIC RESOURCE BASE OF UNDERUTILIZED PLANTS; THE BUILDING BLOCKS FOR CONSOLIDATING THE SUSTAINABLE DEVELOPMENT GOALS ON FOOD SECURITY IN NIGERIA.

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For a nation to attain sustainable food security, access to food should be made possible to all at all times. The Sustainable Development Goals (SDGs) incorporate the need to achieve food security and improved nutrition, promote sustainable agriculture, ending rural hunger, empowering small scale farmers especially women, ensuring healthy lifestyle by 2030. However, as the Nigerian population increases, the country's demand for food increases, while the ability to produce food diminishes because pressures from environmental challenges form of desertification, climate change and erosion. Even the resort to massive food importation have not even helped as many conventional crops have failed and these failures will continue to increase as environmental conditions change. The question remains how we can strengthen the resilience of the most affected to help them cope with this additional threat to food security. Having discovered a need to bridge the gap between environmentally mediated food insecurity and resilience, it is therefore necessary to look at alternatives to conventional food crops which have been long established in rural areas and have high indigenous knowledge for growing and adaptation to our changing climate. This paper hopes to provides insights on how securing the genetic resource base of underutilized plants can provide building blocks for consolidating the SDGs on food security in Nigeria. It also highlights a step to step solution to the various SDGs which focuses on Food Security. In concluding, the paper will support increase domestic food levels through the production of health food from theses underutilized plants at fair prices thus making them readily available for the rural poor to fight food insecurity.

Key Words: genetic resource base, underutilized plants, SDGs, Food Security, Climate Change, Sustainability

ENHANCING AFRICAN REGIONAL FOOD SECURITY THROUGH ARUA: THE CONTRIBUTION OF THE UNIVERSITY OF DAR-ES-SALAAM

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Food security has continued to be a high priority issue on the development agenda in developing countries. Although substantial progress has been made still problems exist along the value chain that need to be addressed before African countries can be food secure. Particularly the region is facing low agricultural productivity, processing, value addition and marketing. Tanzania as many other countries in the region, has taken different initiatives to tackle the problem, the most recent being KILIMO KWANZA (Agriculture First). Despite that, the growth of agricultural sector has remained low and about thirty percent of the country's population is food insecure. The major setback has been the non-holistic and non-integrative approaches that have excluded some of the key players such as universities, business community, and some government entities. Having this in mind, the University of Dar es Salaam (UDSM) has been addressing food security issues in different ways including postgraduate training and carrying out collaborative research in various themes namely; agriculture, environment and climate change; crop and livestock production; diseases and pests management, processing and value addition; fisheries and aquaculture as well as beekeeping and pollination services. UDSM has also re-established[2] a college of Agricultural Sciences

[2] Initially UDSM had Sokoine University of Agriculture as one of its faculties but this became a fully-fledged University in 1984.

and Fisheries Technology as a way of collating all initiatives on food security. In addition, the university is in the process of establishing a Food Security Center of Excellence for providing a platform of commercializing research findings through engaging entrepreneurs, be a repository for food security information, facilitating patenting/intellectual property rights, innovations, technology development/adoptions and coordination of research. UDSM is anticipating both contributing to and benefit from ARUA in the following areas: (i) gap –filling in technological and knowledge advances; (ii) availing a rich pool for post-graduate and post-doctoral students; and participation in big regional research programs which can attract high caliber personnel, facilities and funding. These areas are critical for addressing food security problems and are inline both with UDSM Vision 2061 and the three ARUA main thrusts namely; improving training and support for PhD students, capacity building to enhance research management, and collaborative research.

OPPORTUNITIES FOR MULTIDISCIPLINARY RESEARCH TO ADDRESS FOOD AND NUTRITION SECURITY ISSUES IN SUB-SAHARAN AFRICA

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The world population is expected to increase from 6.9 billion in 2010 to 8.3 billion in 2030 and to 9.1 billion in 2050. By 2030, food demand is predicted to increase by 50% (70% by 2050). The main challenge facing the agricultural sector is not so much growing 70% more food in 40 years, but making 70% more food available on the plate. Furthermore, Sub-Saharan Africa has the highest prevalence of hunger worldwide, with one in four people being undernourished. Eradicating hunger, food insecurity and malnutrition (HFIM) is a major challenge of our times and is a millennium development goal. These are also objectives of the African Union's programmes and at the heart of FAO's efforts to ensure people have regular access to enough high-quality food leading resulting in active and healthy lives.

Food systems are complex and cannot be understood and addressed in mono-disciplinary approaches. Real-world solutions will require that some of the boundaries between disciplinary and programmatic fields be dismantled

and innovative ways will be required to facilitate the substantial changes that will be necessary at different levels of the food system. Taking into account the different components in the food supply chain and the clinical aspects of food and nutrition security, it is clear that food and nutrition security studies are complex and multidisciplinary by nature, with human livelihoods at the core.

Stellenbosch University and especially the Faculty of AgriSciences (but also the Faculty of Medicine and Heath Sciences and Natural Sciences) are active in research efforts in the food and nutrition security sphere. The Faculty of AgriSciences is well placed to contribute to multidisciplinary research in this field with expertise in 11 departments covering the entire food production chain. Collaboration with the Faculty of Medicine and Heath Sciences, specifically the Division of Human Nutrition, in the Food Security Initiative (FSI) and the first joint Faculty Masters programme (Masters in Food and Nutrition Security) reinforce the commitment to food and nutrition security research in multidisciplinary teams. This presentation will aim to highlight the areas and opportunities that exist for food and nutrition related research collaboration by showcasing some of the projects in which Stellenbosch University (and specifically the abovementioned Faculties) is currently involved.

IMPROVING THE PRODUCTIVITY OF A HIGHLY NUTRITIOUS BUT UNDERUTILIZED CEREAL CROP IN ETHIOPIA: THE CASE OF FINGER MILLET

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Finger millet is a staple cereal indigenous to eastern Africa. The crop is adapted to a wide range of environments and serves as a food security crop because of its high nutritional value and excellent storage qualities. Despite its importance, the productivity in Ethiopia is limited to 1.7 tons ha^{-1}, way below the potential yield of 4 – 5 tons ha^{-1}. Under the leadership of Bio-Innovate (www.Bioinnovate-Africa.org), a collaborative project on finger millet was

put together by a diverse team of scientists from the eastern African region and beyond. We assembled a total of 150 cultivated finger millet accessions with the aim of conserving and evaluating them for different stress responses and subsequently developing improved farmer-preferred varieties.

A genetic diversity analysis was conducted using 23 agro-morphological traits and 20 microsatellite markers. Cluster analysis for both qualitative and quantitative phenotypic traits indicated that finger millet accessions from neighbouring regions of Ethiopia and neighbouring African countries shared strong similarity. The Nj-based clustering grouped the accessions, into three major clusters and accessions collected from the same region did not group strictly together within a given major cluster or sub cluster. Likewise, analysis of population structure using STRUCTURE also distinguished the accessions in to three subpopulation (K= 3).

To identify adaptable, stable and high yielding finger millet genotypes with blast tolerance, a total of 30 advanced finger millet genotypes were evaluated against two standard checks (Gute and Taddesse) across four locations (Arsi Negele, Assosa, Bako and Gute) for three years. Various analysis and models revealed that Acc. 203544 was stable and high yielding (3.16 ton ha-1) with a yield advantage of 13.7% over the best standard check, Gute (2.78 ton ha-1), and thus registered and release with varietal name *"Addis01"* for wider environments. The results suggest the existence of a rich genetic diversity in Ethiopia that can be exploited to improve the productivity of this nutritious underutilized crop.

NON-COMMUNICABLE DISEASES

MATERNAL AND CHILD ORAL HEALTH OF HAUSA WOMEN: THE EFFECT OF PARITY AND SOCIO-BEHAVIOURAL FACTORS

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"A tooth for every child" is a common phrase in many societies. In fact, parity may be an important factor responsible for tooth loss. High parity (when a woman has given birth four or more times regardless of whether the child survived) adversely affects maternal and child morbidity and mortality. The relationship between parity and tooth loss is attributed to nutritional stress in the mother, a condition termed "maternal depletion syndrome" (MDS). The physical and energy demands of repeated pregnancy and lactation, in

combination with stresses of life at a basic subsistence level, are thought to produce MDS. Few studies have studied the association between parity and oral health in high parity women, or by using a study design that can adequately test the relationship. For these reasons we decided to investigate parity and maternal and child oral heath through a case-control study in a population where high parity is common. Our study site is the Hausa community in Nigeria's Kaduna district. The prevalence of tooth loss and dental caries is high among northern Nigerian women. Several studies attributed this to the diet and socioeconomic status of these women. Our project combines oral examination of mothers and their children with a questionnaire covering oral health knowledge, attitudes and behaviours. We will provide basic dental services and train mothers to establish a family routine of preventative oral health behaviours. Our team consists of female dentists and uses community-based networks to recruit the study participants

CANCER SURVEILLANCE AND EXPLORATION OF GENOMICS OF BREAST CANCER FOR OPTIMAL THERAPY AND CONTROL IN AFRICA

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Background: Cancer is an important cause of burden of disease in Africa. Information on cancer in Africa is scarce due to lack of platforms for routine data capture and limited cancer research. There is scarcity of knowledge on genetic determinants in Africa despite substantial evidence of diversity of predisposition and susceptibility genes across populations. Evidence indicates that African women develop breast cancer at a young age, often suffer more aggressive disease and the tumor profiles are frequently negative for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth receptor (HER2). Mutations of genes involved in DNA repair and tumor surveillance e.g. BRCA1 and BRCA2 and aberrant expression of proteins involved in endocrine stimulation of breast tissues e.g. HER, contributes to the risk of developing breast cancer.

Lack of knowledge of breast cancer risk genes, molecular subtypes and tumor heterogeneity in the absence of expertise and technology for screening and diagnosis hinders the delivery of the available options for targeted treatment and prevention. The current personalized, precision medicine for

breast cancer includes prophylactic mastectomy for patients with BRCA1 mutations, use of monoclonal antibody-based blockade for HER2-positive tumors and hormonal blockade for endocrine receptor positive (ER, PR and HER2) tumors. Better understanding of breast cancer genomics will strengthen screening of at-risk populations, improve diagnosis and facilitate delivery of targeted, personalized care, with less adverse effects and great impact on outcome and survival.

Objectives: We aim to develop a framework for improving cancer surveillance and control and characterize breast cancer genomics for delivery of optimal precision medicine in Africa. In order to achieve this, we plan to:-

1. Establish a regional population cancer registry as a platform for cancer surveillance and longitudinal outcome studies in Africa.
2. Determine hereditary breast cancer (e.g. BRCA1/2) through genotyping and mutational sequencing in African populations and at-risk families.
3. Analyze breast cancer tumor markers (e.g. ER, PR and HER2) and other proteins for guiding targeted therapy and prediction of treatment response, metastasis and outcome in African populations.

Methods: Hospital-based, treatment annotated cancer registry will be established for collection of epidemiological, clinical and histological data for all cancer types involving major hospitals and oncology centres in the participating countries. Data will be collected into electronic database using cancer registry software. From the registry we will select patients with breast cancer and hereditary breast cancer for further molecular and genetic studies. Dried blood spots (DBS) will be collected from patients with breast cancer and relatives of patients with familial breast cancers for BRCA1/2 genotyping using SNP detection assays and microarray technology. In addition, analysis of mutations will be performed through PCR-based sequencing techniques. Paraffin-embedded biopsy specimen will be collected for expression profiling of the existing tumour markers e.g. ER, PR and HER and other proteins using immunohistochemistry.

RESEARCH, INNOVATION AND EDUCATION TOWARDS MALARIA ELIMINATION

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The University of Pretoria's Faculty of Health Sciences is committed to increasing its research contribution to society and build on its unique identity in Africa. Research in the faculty covers a range of focus areas that reflect a diversity of research that contributes to health knowledge and interventions in South Africa, Africa and globally. A range of research expertise in non-communicable diseases can be found in the research entities. The **MRC Maternal and Infant Health Care Strategies Unit** develops health strategies at primary- and secondary-care levels to reduce mortality and morbidity rates in mothers and infants. The **Environmental Chemical Pollution and Health Research Unit** focus on new and emerging origins of compromised reproductive health, including endocrine cancers, especially those that might link to environmental chemical exposures. The **Institute for Cellular and Molecular Medicine** focus on stem cells, the neurosciences, and cancer genetics. Improving non-communicable disease detection and management within the primary health care context is the current focus of research in the **Diabetic Unit**. Smoking and smokeless tobacco use are growing in Africa and the faculty is involved not only in assessing associated diseases but also in critically developing and assessing the effect of various clinical- and population-based interventions. Cardiac disease is also getting attention and the **Sport, Exercise Medicine and Lifestyle Institute** focus on replacement of bad lifestyle habits with healthier ones.

The **University of Pretoria Institute for Sustainable Malaria Control** is an MRC Collaboration Centre for Malaria Research and a leader in the communicable disease area due to the trans-disciplinary approach and involvement in various African countries. Research include innovations like *material development and nanotechnology* for vector control and remote sensing for *climate change*. The aim of the Institute is to coordinate and promote collaborative research on safer and sustainable malaria control and management strategies, and to generate new knowledge and support new activities pertaining to malaria elimination in Africa through research, innovation and education

ADDRESSING CHRONIC NON-COMMUNICABLE DISEASE PREVENTION AND CARE IN AFRICA: A CRITICAL PSYCHOLOGY PERSPECTIVE

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Millions of Africans live with diabetes, hypertension, stroke, cancers and chronic mental health conditions. For each African living with a specific condition, at least two more are at risk. For example, the prevalence of diabetes in some countries ranges between 6% and 9%, and prevalence of impaired glucose tolerance, a marker for diabetes risk, ranges between 11% and 18%. It is estimated that African chronic non-communicable disease (NCD) prevalence, morbidity and mortality rates will rise faster than rates in Asia and Latin America over the coming decades. The long term and costly nature of NCDs has major implications for individuals, communities, health systems and governments.

In my presentation I aim to make a case for why the development of solutions to Africa's NCD burden can benefit from a psychological perspective. I begin by outlining a critical psychology framework that facilitates multi-level analysis – individual, interpersonal, group, structural – of social phenomena. Then, I draw on insights from a qualitative synthesis of studies conducted on beliefs, experiences and care of diabetes, hypertension and stroke in 8 African countries, as well as my collaborative work on diabetes in Ghana and among Ghanaian migrants in Europe, to highlight the complex multi-level context of chronic disease risk, experience and care. To focus on experience and care for instance, the research shows that Africans living with chronic conditions experience many disruptions. The disruptions are physical (medical complications), psychological (depression), material (impoverishment), social (stigma) and spiritual (struggles with faith and trust). These experiences have an impact on family life and resources, with primary caregivers bearing similar disruptions to their chronically ill relatives. Furthermore, the eclectic treatment and cure-seeking responses to chronic diseases underscore the importance of medical and religious pluralism to affected communities and the conceptual/technical limitations of formal health systems approaches to NCD control. These complex, multi-level dynamics are rooted in socio-psychological processes and require multifaceted solutions. To conclude, I consider conceptual (interdisciplinary models) and practical (community-based interventions) approaches for reducing chronic disease risk and improving the quality of long-term experience and care.

RECENT DEVELOPMENTS IN SOCIAL SCIENCE/HUMANITIES RESEARCH IN AFRICA

EMERGING RESEARCH AREAS IN THE SOCIAL SCIENCES

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Social sciences are a major category of academic disciplines whose subject areas of study relate to society and how individuals in the society relate to one another. In its broadest terms, social sciences include such academic disciplinary areas as economics, political science, human geography, demography, psychology, social work and sociology. In more broader terms subjects such as anthropology, archaeology, jurisprudence, history, and linguistics, are also sometimes broadly classified as social sciences. But as time has progressed, it is no longer fashionable or sustainable for the social sciences to stand alone.

Scientific advances and the ever increasing complexity of disciplinary interdependence require social sciences go beyond their traditional boundary areas to integrate with other sciences such as the life sciences and natural sciences, as well as drawing on improvements in genetics to understand social science phenomenon. For instance, biomarker measurements are increasingly becoming standard methods of scientific enquiry into human health and behavior. The point to emphasize is that more and more, it is becoming less common now for social science to stand alone – they tend to combine social methods with other disciplinary areas to study certain behavioral traits. For instance, social science approaches are increasingly being used to better understand climate science including air pollution, household energy and waste management.

The issue of inequality is an old topic, but has gained new research attention among social scientists during the past decade due to worldwide evidence of growing inequality. Spatial thinking has also become more embedded in social science research, and space is being introduced more explicitly and systematically. Social scientists are also studying the impacts of global economic shocks, demographic transformations, democracy and governance, as well as immigration and social policy.

The use of mobile technology in a lot of social science applications have become common and improved our understanding of certain aspects of our lives, such as survey data collection and have influenced such things as child development and have influenced the ways in which humans relate generally. Social science and climate science is an emerging area which is increasingly getting a lot of traction. But as more advances are made in data science, data simulation and more complex computer science applications are likely to drive the next frontiers of social science applications.

NOTIONS OF IDENTITY

IDENTITY, DIVERSITY AND CITIZENSHIP: THE FUTURE OF AFRICAN STATES

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Arguably, modernism's greatest contribution to the structuring of society is the theoretical construction of the modern state as a nation-state. The creation of nation-states out of diverse groups of nationalities which usually entailed the use of a combination of violent and non-violent methods was stridently pursued across Europe from the 17th century and became one of the goals of the colonization. Among the non-violent methods was the conceptualization of national citizenship identity which aimed at trumping all other identities including ethnic and religious identities and bringing diverse groups of people together as one. Throughout Africa, the project of nation-state building was externally driven by the colonialists and often with violence. The consolidation of the nation-states in post-colonial Africa relied heavily on constitutionalising national citizenship identity to overcome the challenges of identity crises arising from the existence of diverse ethnic and religious nationalities with a history of mutual suspicion. Most African states were still grappling with forging national identity when the idealism of the "the nation-state" and national identity by citizenship was shattered by the deconstructionism of post-modern ethos. Post-modernism urged the validation of sub-national identity and argued that it as *sine qua non* of national identity. Simultaneously, trends in globalization started to create new notions of identity with an emerging concept of supra-national citizenship. It was argued that it was possible for each citizen to inhabit

multiple "national" identities with little or no conflict and for diverse individuals with multiple identities to co-exist as one national identity. This paper explores how some recent developments are challenging that idea and demonstrates with lessons from across African countries how well individuals with diverse identities and groups of nationalities negotiate their multiple identities and the implications of these for forging national identity. It also draws lessons from the push-back against national identity as seen in the increasing clamour across the globe for the recognition of sub-nationalities as authentic and superior to state-based nationalities and their projection as valid for redefining citizenship and nationalism as well as the push-back against supra-national identity witnessed with Brexit and growing popular support for the reconfiguration of nationalism (premised on racial and sometimes religious identity) in the US and much of Europe. It examines the implications of these changing realities for the notions of identity and citizenship in African States reflecting on the adequacy of the constitutional frameworks of some African countries and the legal framework of African Union to respond to the emerging challenges.

ETHNO-CULTURAL CITIZENSHIP, OPACITIES AND THE SOFTNESS OF OFFICIAL DOCUMENTS IN THE JULIE WARD MURDER IN KENYA

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This research note reflects on the shifting indices of un/reliability of official documents; the opacities created by uncritical embrace of received knowledge about Africa/ns; and the logics of ethno-cultural citizenship in Kenya. Using my work on the 1988 murder of 28 year old British tourist, Julie Ann Ward, in the Maasai Mara Game Reserve in Kenya, I reflect on the various sets of stumbling blocks that undermined the family's quest for truth and justice in the murder, which remains unresolved. The research note makes a case for more measured embrace of the presumed legitimacy of official documents, in contexts where state institutions are open to manipulation. It also argues for a more attentive understanding of Africans' shifting self-conceptions as both ethno-cultural citizens of particular cultural communities; and as citizens of the modern state. In effect, it recommends a more serious engagement with Africans' fluid senses of their identities and the ethical protocols they deem themselves subject to, under different circumstances.

NEGOTIATING LOCAL IDENTITIES THROUGH CULTURAL PRODUCTIONS FOR INCLUSIVE GROWTH

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Cultural productions form basis for the construction of (local) identities. Meanwhile, in this era of globalization, local identities seem to bear transforming effects on how communities see themselves and see others alongside improving livelihoods. But, how can communities in Africa (with various and complex identities) make use of these identities for inclusive growth? A focus of this research group, therefore, will be ways through which local identities that are composed of multiple and inseparable aspects (i.e. gender, status etc.), can be understood at both macro and micro scale level of analysis, by which individuals in communities, households etc. create understandings of similarity and difference with one another. Particularly, cultural productions are envisaged as involved in these relations through everyday practice, and not simply as a symbolic marker of identity. Negotiations, therefore, focus upon the way in which literature, oral histories, creative arts, space, cultural landscapes, locally produced and mass produced goods play a role not only in understandings of gender, status and community identities but also ensuring that inclusive growth is a part of daily life cultural practices.

Our research group seeks to explore questions relating to changing, complex and fluid identities of local cultural productions against the contexts of inclusive growth. The ways in which identities are created and expressed in the daily lives will be investigated through multiple lenses including literature, history, language, archaeology, creative arts, gender etc. The interpretation of research data is anticipated to explore the notions of identities in ways unattainable without this inter-and intra-disciplinary focus. Historical documents that inform about notions of identity are available, but they tell almost nothing on how cultural productions (part of identities) can contribute to inclusive growth as per the Africa's Agenda 2063, 'The Africa We Want.' More problematic is the fact that these documents are mostly written from the perspective of European visitors, who were unable to understand the complex nature of identities during the colonial period.

Social histories focussing on 19th century Africa have been revealing about the complexes of African cultural identity, and hint that such complexes existed

prior to the 19th century. A multidisciplinary research group on notions of identity, therefore, can enlarge knowledge on how contributions of cultural productions in inclusive growth should be negotiated. The group also offers a unique perspective on the materiality of past, present and future identities (i.e. creation and negation of changing identities on a daily basis). The cultural productions are intimately tied to creating, projecting and mediating identities, and it is these processes which may be interpreted through, for example, oral history, music, literature, archaeology, gender studies etc. The group anticipates that a combination of skills and perspectives from literature, history, language, archaeology, creative arts, gender etc. will result in a deeper understanding of the pertinent issues including how cultural productions should be used for inclusive growth.

THE MULTIPLE DIMENSIONS OF IDENTITY

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Identity is what enables people to define themselves and what is important and not important for them. It is constituted by a wide range of elements that stretch into the past, persist in the present and projected into the future. It depends on a lot of subjective and apparently objective factors. Identity is a component of the individual's self-awareness. Such a self-awareness emanates from the individual's knowledge of being a member of a group/ entity and as such constitutes a sense of what and who the group is and where it belongs.

Identity is based on the act of defining oneself both individually and collectively. People define themselves in various ways. Individuals/ groups have a multiplicity of identities. Identity has to be understood not in a monolithic but as multidimensional into which a lot of factors are incorporated.

This paper will try to explore the different elements that go into the making of identity. Today, the recognition of different types of identity is important from the perspective of moral thinking and other perspectives. Sustainable peace, democracy and development could be guaranteed through a proper recognition of identity rather than denying it. Practical reason requires that the recognition of different types of identity can go a long way in addressing many social, political and other problems.

GOOD GOVERNANCE

GOOD GOVERNANCE AND ACCOUNTABILITY IN DEMOCRATIZING SUB-SAHARA STATES: COMPARATIVE STUDY OF NIGERIA AND GHANA

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The "third wave" of democratization has swept through the sub-Saharan African States, and with the recent deliverance of the last state under totalitarian rule, Gambia, into electoral and constitutional democracy, there can be no doubt about the commitment of ECOWAS member states within the sub-Saharan sub-region, including Nigeria and Ghana, to the idea of democracy as the key to development. However, the challenges of governance in the democratizing states compelled the development and injection of the concepts of good governance and accountability into the mix, as necessary ingredient and parameters for measuring democratic governance. Due to the different trajectory of democratization in African states, several performance indexes have been developed especially for these African states, particularly those of Afrobarometer and IIAG. Nigeria and Ghana offer unique results in the democratization processes that can be analyzed comparatively to critique the common wisdom of accepting democracy as the irreducible ingredient for the effective/efficient governance for the development of the African continent. From the 1992 and 1999 Constitutions of Ghana and Nigeria respectively, constitutional democracy have been instituted in these two commonwealth countries, with varying challenges, outcomes and progress, that can offer deducible lessons not only for the sub-region but the whole of the continent. One of the primary objectives of this work is to interrogate the basic concepts underpinning the democratization processes of these two countries with the view to identifying the dynamics and countervailing constitutional and legal forces that have shaped their experiences/progress, and if possible postulate some hypothesis for addressing the challenges of good governance and accountability in democratizing African states.

EXPLORING THE NEXT PHASE OF ANTI-CORRUPTION MECHANISMS IN SUB-SAHARAN AFRICA: A FOCUS ON CITIZEN ACTION AGAINST CORRUPTION

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Anti-corruption mechanisms have had a chequered history in Africa. Since the 'corruption eruption' of the 1990s, Africa has been the intense focus of the development community's anti-corruption studies, action and rhetoric; with the aim to improve governance and developmental outcomes in Africa. Despite the implementation of several measures to address corruption in areas of the public sector such as public finance, public administration and public procurement, there appears to have been little change in the perception of corruption in many countries in sub-Saharan Africa based on global corruption indices such as the Corruption Perception Index and the Bribe Payers Index.

This paper examines the underlying causes of the failures to adequately reduce government corruption in Africa, exploring the problems inherent in the manner in which corruption is characterised and addressed, the collective nature of corruption in countries with systemic corruption, and the limitations of current anti-corruption measures. The paper further explores the recent move towards citizen action against corruption to determine whether citizen action provides more promise in fighting corruption than government sponsored regulatory and non-regulatory measures.

POLITICAL ECONOMY OF GOVERNANCE IN AFRICA: PAST, PRESENT AND FUTURE

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In which ways and how African countries can acquire socio-economic and political development? In attempt to answer this question, African states adopted and practiced centralized political and economic systems in the first two post-colonial decades. In the face of dire economic problems in

the late 1970s and 1980s and changing global geopolitical setting which came with the collapse of the Soviet Union, African countries abandoned the centralized systems in favour of liberal political and economic systems. Institutionalization of liberalism has acquired the form of creation of 'good governance states' in the style and shape of western political systems. In fact, many African countries have established 'good institutions based in 'best practices' from western institutions. The 2016 Mo Ibrahim Index has indicated that 37 countries out of 54 have demonstrated increased performance in institutionalizing good governance. The establishment of 'good institutions' was expected to promote economic growth and development, social cohesion, security and equity. Yet, violence, corruption, the 'natural resource curse', deterioration of public services delivery, poverty and inequality are still prevalent in several African countries. Socio-economic and political chaos are abound in all corners of the continent. This project seeks to interrogate the form and content of the governance in Africa in the past, present and future of the continent.

POST-CONFLICT SOCIETIES

PEACE COUNSELLING IN POST-CONFLICT SOCIETIES

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This study examines the effect of peace counselling among dwellers of two oil-producing communities in Akwa Ibom state of Nigeria after a dreadful inter-communal clash. 126 youths participated in this study; 63 from each community (30 male and 33 female). Twenty participants were used as control (10 male and 10 female) in each community while the remaining 43 (20 male and 23 female) in each community, were exposed to peace counselling. Two hypotheses were tested and significant differences were recorded in both. Analysis of the pre-test and post-test scores of all the participants on the Peace Index Questionnaire (PIQ) showed that the participants in the treatment group reported significantly higher scores on the peace index than the control. Also the female participants had a significantly higher peace index scores than the male participants. The participants in the control group were also given peace counselling immediate after the post-test scores were obtained. After the completion of the study, peace counselling continued during the end-of-year Town-Hall meetings of the two communities.

PROMOTING A PAN-AFRICAN APPROACH TO THE STUDY OF AFRICAN SECURITY

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The study (and practice) of defence and security in Africa tends to be informed and shaped by dominant narratives emanating from the USA and Europe. As a consequence, critical examination of African security – its study, training and education, research, publications and policy advice relating to crisis resolution and management – is downplayed in favour of the quest for stability and recovery, often from a heavily-militarised and time-constrained perspective.

Wits is interested in establishing a partnership with ARUA members on the theme of 'security studies in Africa'. The project will undertake an audit of the status of security studies in Africa, its academic profile and research output, student and client profiles, sponsors, curricula, epistemological orientation, and role and impact on African security studies and practices. This will enable the project to pursue the creation of an epistemic community of African security scholars and practitioners with a focus on shared values, indigenous and appropriately-contextualised knowledge creation, teaching, and policy outreach/influence.

STATE BUILDING AND POST CONFLICT POLITICAL SETTLEMENT IN AFRICA: THE ETHIOPIAN EXPERIENCE

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The issue of state building is one of the central points that require careful thought in post conflict political settlements in African countries. Unlike in many other African countries, the central state formation in Ethiopia was initiated by national elites in the end of 19th century. However, ethnic domination of an elite group from one ethnic group and resource appropriation of the state from farmers became the main structural causes of

conflicts. This led the country into a civil war that fought against the military regime (1974-1991). After the down fall of the military regime in1991, the state was federated and this provided some structures for the ethnic groups to administer themselves participate in the federal institutions and share the national resources using some criteria set by the House of Federation (HOF). Though this political settlement came under a political environment that was dominated mainly by the victor of the civil war , it has brought a relative peaceful situation and economic development which has lifted millions of people from poverty.

However, after more than two decades of the federalization of the state, still there are several issues that challenge the state building process in the country. Interregional conflicts associated with regional border issues, perceptions of inequalities in wealth distribution from the federal government, perceptions of inequalities with regard that the ethnic groups play a role in the federal institutions, weak democratic participation of citizens and weakness of the state to provide good governance hinder the state building process. Hence, post conflict political settlement is not a static thing that happens at one time. It should evolve through negotiations of the political elite and public consultations along the socio economic development and political dynamics of the country.

URBANISATION AND HABITABLE CITIES

THE ROLE OF AFRICAN RESEARCH UNIVERSITIES IN AN URBANISING AFRICA

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In a region undergoing rapid urbanization, there is a profound need for African research institutions to play a role in both researching the phenomenon and its impacts, but also in guiding governments and agencies in their strategies to engage an increasingly urbanized continent. This presentation focuses on urbanization trends, current dynamics in urban policy in Africa in the light of the New Urban Agenda and SDGs, and the potential role of researchers in working towards the achievement of these goals. The specific focus of the presentation is the work of researchers at the African Centre for Cities, University of Cape Town and their partners in addressing urban food insecurity through urban research networks at the research and policy interface in Africa.

URBAN REGENERATION AS A TOOL FOR SUSTAINABLE HOUSING DELIVERY IN NIGERIA

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The housing deficit in Nigeria is put at between 15 and 17 million. This includes large number of people living in substandard and dehumanized buildings. Unguided urbanization process and uncontrolled rural urban migration in the last six decades has resulted in urban sprawl and slum development in Nigeria. About 70% of Metropolitan Lagos with an estimated total population of about 21 million was declared slum in 1992. Most of the buildings in these slums are structurally sound but lack basic infrastructure which can be provided at cheaper cost than new built. The study enumerates

several efforts made to increase the rate of housing supply in Nigeria. These approaches often focus on development of new housing units, housing estates and satellite towns with total disregard for housing improvement and slum regeneration. This study explains the concept of regeneration and the huge opportunities inherent in urban regeneration as a means of increasing the nation's housing stock drawing lessons from regeneration projects in the United Kingdom. Urban renewal projects carried out in Nigeria between 1980 and 2010 were appraised to establish the superiority of urban regeneration over urban renewal. The study acknowledges the limitation of total reliance on government for funding urban regeneration projects and recommends Public Private Partnership (PPP) as a sustainable means of financing urban regeneration.

TOWARDS SUSTAINABLE CITIES - A PAN AFRICAN RESEARCH COLLEGE

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Our framing of the key ideas to be explored around sustainable cities in Africa centres on the notion of 'going beyond adaptation', where practically and intellectually the barriers to addressing climate change and urban and environmental sustainability might be addressed through a network of sharing research by young and emerging African scholars and scientists working alongside their more experienced counterparts. This dynamic, envisioned at the heart of the proposed Pan African Research College on Sustainable Cities, asks how we might cope with a changed future. Africa's futures have for too long been constrained by the dual discourses and indeed effects of colonial modernity and globalized notions of development. These effects, as we argue, have indeed seen a process of deterioration in post independent African countries - all around us, everyday, we see underdevelopment, internal conflict and war, growing poverty, disease and inequality, the ravaging effects of environmental degradation and ultimately the realities of food scarcity and deepening drought. Taken together these are urgent and pressing concerns for academics working in this space, where we agree that we need to take extraordinary measures to 'go beyond' accords such as COP21 and other overarching orders, where the agendas for the climate for adaption might best be taken forward by inter-city thinking and in this way enable scientific thought leadership in the sustainability arena. There is no doubt that the intellectual resources, located in cities are best positioned to lead such an initiative. Following UN Habitat's calls, we intend

to ask regionally specific and local questions about how to prepare for and support activities in cities in so-called emerging economies and developing countries to deal with climate change in our cities? We are intensely interested partnerships which explore models of good governance, responsibility, leadership and practical initiatives for local governments, communities and citizens.

This paper argues that the most effective way to achieve this is to establish a Pan African Research College on Sustainable Cities in partnership with four to five higher education and research institutions in some African countries, which have the capacity to supervise and grant PhDs and host Post-Doctoral fellows. The College will be a virtual one, built around joint workshops and structured forms of inter-institutional mobility for doctoral students and post-doctoral fellows.

CHANGING CITIES, CHANGING PUBLIC SPACES: RECONSIDERING THE ROLE OF PUBLIC SPACE IN THE DEVELOPMENT OF HABITABLE CITIES.

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As cities are changing, public spaces are also transforming. The decline of public space and the subsequent privatisation thereof have received significant attention in the literature. Many urban residents believe that public spaces have become unsafe and uncomfortable to use and consequently retreated into semi-privatised and privatised common open spaces. However, this is only part of the story. What is happening to the remaining public open spaces? Many spaces are changing in terms of their function and form to suit the particular needs of users. This raises a number of questions around the nature and use of public open space and the appropriateness of these changes within transforming African cities.

The aim of the paper is to investigate the changing nature and use of public space in the City of Tshwane (Pretoria) and its role in the development of more habitable cities. The paper will firstly, discuss the changing form and function of a number of public spaces, based on multiple case studies carried out across the country and interviews with urban designers. This will be followed by an interrogation of this transition or adaptation in the light of

existing social and economic challenges present in South African cities and its meaning for the development of more habitable cities in Africa. In doing so, the paper will argue that the transformation of public space in African cities should not always be viewed as problematic, but may also start to offer opportunities to not only be.

SIGNIFICANT RECENT ADVANCES IN SCIENTIFIC RESEARCH IN AFRICA

IMPACTING AFRICA'S DEVELOPMENT THROUGH STRENGTHENED RESEARCH ECOSYSTEMS: FUNDING OPPORTUNITIES FOR R&D FROM AESA

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Africa is increasingly recognising the importance of research and innovation in solving its health and developmental challenges. A number of countries are providing leadership based on their scientific outputs and ring fencing funding to support the STI sector. The African Union is providing leadership at a continental level through Agenda 2063 and the Science, Technology and Innovation Strategy for Africa 2024. There are also more coordinated efforts at national and continental level to ensure success in bridging the research capacity gaps including inadequate infrastructure, funding and skills. By profiling the Alliance for Accelerating Excellence in Science Africa (AESA) and the Coalition for Research and Innovation (CARI), this talk will showcase recent trends and developments in science and how:

- AESA is committing to increasing the number of world-class researchers and improving the places they work in to ensure they deliver the data that produces impact and can be used for policymaking.
- African organisations and international funders are coalescing to provide the collective voice to catalyse investment in research and innovation.

Science is being supported to provide solutions for countries to meet the Sustainable Development Goals targets.

MATERIALS DEVELOPMENT AND NANOTECHNOLOGY

EXPLOITING THE OPPORTUNITIES OF POLYMER NANOFIBERS AND NANOCOMPOSITE NANOFIBERS TO ADDRESS HEALTH AND ENVIRONMENTAL CHALLENGES

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The ability to process polymer materials into the nanofiber form has been known since the 1930's. Over the last two decades, however, there has been a renewed interest in the process of making polymer nanofibers using the electrospinning and other techniques as researchers and entrepreneurs alike realise the vast potential for the application of polymer nanofibers. The primary advantage of using polymer materials in the nanofiber form is the extremely high surface areas of these materials. This presents opportunities for the development of new materials and applications. The ability to obtain nanoscale fibers leads to the production of fiber mats with extremely high aspect ratios and this aspect lends itself to various applications including in filtration and water treatment applications, tissue scaffolds, drug delivery, wound dressing, protective clothing and composite reinforcement. This presentation will present and discuss some of the research done at Stellenbosch University on polymer nanofibers. It will highlight some of the successes as well as how some of the challenges with regards to the use of nanofibers are being addressed. Examples will be given of the production and use of functionalised nanofibers, nanofiber hydrogels and nanocomposite nanofibers with carbon nanomaterials such as multi-walled carbon nanotubes and graphene oxide nanosheets as well as magnetic nanoparticles.

INNOVATIONS IN ENGINEERING MATERIALS AND NANOTECHNOLOGY FOR NATIONAL DEVELOPMENT

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Innovative developments in engineering materials and nanotechnology are not just a critical area of research, but is also an area that holds immeasurable potential for a sustainable economic growth and national development. Currently, this goes well beyond traditional considerations of cements, alloys and plastics: new paradigm areas of technological growth include nanomaterials, smart materials, and nanostructured devices, that have potential impact on the environmental, energy/ electric power, biotechnology, communications, oil and gas, textiles, construction, electronics, transportation, mining, manufacturing and agricultural industries.

This presentation discusses some current innovation research areas such as nanostructured materials for energy generation, transmission and storage; porous ceramic materials; valorisation of solid waste. A general overview of research activities in the Department of Materials Science and Engineering, University of Ghana will be presented with the view of seeking research collaborations

ENERGY

What [Energy] Research when Society Plays Catch-up? Notes on Innovation, Technology Transfer and Indigenization

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It is well-known that many places in Africa lack access to modern forms of energy, particularly to electricity, but also to high-quality refined fuels. Where they are available, reliability and high cost limit usage. This has partly started to change recently, both through multi-national investment programmes at utility scale, and the diffusion of consumer-oriented photovoltaic lighting

and charging innovations. Principally, there is no lack of energy conversion technology to address backlogs, though there are still active research frontiers in energy storage and to some extent in photovoltaics, both requiring extensive financial and human resources.

What does this mean for energy researchers at African universities? Clearly, there is a need for social and business innovation and for meaningful technology transfer; technology research could, arguably, and with a few exceptions, be a fruitless endeavor. The theory of sustainability transitions offers some guidance. We have tested the utility of a technology innovation systems approach to initiating the indigenization of a technology that works elsewhere and have found it to be useful. Not only has it made a contribution to the emergence of a biogas industry in South Africa – it has also opened avenues for research and technology services linked to research laboratories.

VALOURISATION OF WASTES AND BIOMATERIALS INTO FOODS, CHEMICALS AND ENERGY THROUGH ALTERNATIVE PROCESSING APPROACHES

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With rapid population growth and decreased energy security, novel and disruptive technologies to valorise biomaterials, and municipal and other organic wastes are requisite to ensure a sustainable future of planet Earth and her second-largest continent – Africa. Several processing technologies are developed at Stellenbosch University, falling in four key domains *viz.* (i) biochemical conversion of biomass and organic wastes into fuels and chemicals, (ii) thermochemical processing of biomass and organic/ carbonaceous wastes, (iii) biorefineries for foods, fuels and chemicals from biomass and organic wastes, and (iv) bioprocess development with microbial

and enzymatic systems. These technologies are mostly evolved in an integrated manner following a biorefinery approach and address the whole value chain through techno-economic and value chain analysis. Several technologies will be showcased, with emphasis on waste (agricultural and municipal) valorisation to multiproduct streams. These technologies include fermentation of glucose and xylose from lignocellulose originating from sugarcane, sorghum and triticale, as well as sugars from paper sludge, municipal solid waste (MSW) and spent sulphite liquor to ethanol and lactic acid or conversely, thermochemical production of furfural from xylose, with methane production from processing residues. Pyrolysis applied to lignin results in production of various monomers, especially phenols, whereas enzymatic treatment of lignin is usually aimed at repolymerisation for production of vanillic and ferulic acids, among others. Pyrolysis technologies are also developed for conversion of MSW to solids (char), bio-oil and gas for the production of activated carbon, resins and antioxidants, and synfuel. Various processing technologies are also developed for production of prebiotics and protein from brewers' spent grains (BSG), Jerusalem artichoke and yellow peas, constituting high value products from novel crops. Given the vast potential that Africa has to offer, combined with the technologies and expertise available at Stellenbosch University, much potential exists for pan-African collaboration in biorefinery-based waste valorisation and agroprocessing.

Keywords: Biorefinery, bioprocessing, fermentation, pyrolysis, MSW, agricultural wastes, agroprocessing, waste valorisation.

WATER CONSERVATION

THE UTILITY OF GROUNDWATER RESOURCES FOR CLIMATE RESILIENT IRRIGATION IN THE NORTH OF GHANA - CHALLENGES AND OPPORTUNITIES

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Agriculture is the mainstay of most communities in northern Ghana and has largely been rain-fed over the years. Erratic rainfall patterns, attendant

climate change/variability have been a threat to the status quo and there is urgent need to diversify from rain-fed agriculture to an irrigation based one. Surface water dams have been proposed in the past to provide irrigation water for irrigation throughout the year. However, available climate models for the sub-region suggest rising temperatures and concomitant increases in evapotranspiration rates which may threaten surface water based systems. Moreover, high siltation rates resulting from improper land use practices render surface dams and dugouts unsustainable due to high costs of maintenance. Groundwater appears to be a much more resilient substitute to surface water dams in northern Ghana. In addition to the fact that the resource is relatively shielded from the unremitting impacts of high temperatures and low relative humidities, the groundwater reservoir is larger, and available almost everywhere with appropriate technology and science. Groundwater recharge studies conducted in parts of the White Volta Basin indicate significant promise. The future of the agricultural sector in northern Ghana hinges on the efficient and effective development of groundwater resources for continuous use in agriculture and industrial activities. The main challenge is the lack of adequate understanding of the regional hydrogeological conditions of the aquifers and their resilience to various levels of abstraction and climate change factors. The poor knowledge of the hydrogeology, due to low investments in hydrogeological and related research in the area over the years, has led to significant failure rates in drilling projects in northern Ghana. There is a huge potential for economic growth if sufficient investment is made to sufficiently define the hydrostratigraphy, model and quantity groundwater budgets and determine appropriate locations for siting commercial boreholes. A pilot study being carried out in the Nasia Basin so far suggests significant promise but further investigations are required to adequately define the hydrogeology and provide leads for enhanced success. Three main aquifer types are available: the saprolite, the saprock and the fractured bedrock with variable properties and potentials in space.

Keywords: Agriculture, Climate Change, Groundwater, Northern Ghana.

WATER CONSERVATION IN INDUSTRIAL PROCESSES: A TOOL FOR ENHANCING SUSTAINABLE ENVIRONMENTAL QUALITY IN LAGOS, NIGERIA

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The paper reviews the status of water conservation in industrial processes in Lagos State, Nigeria with the aim of abating environmental pollution through effective management of industrial wastewaters. Effort was also made to assess the current status of water pollution in the state with identification of it's causes and impacts on both humans, animals and plants. Data on water pollution from selected industries was analysed, while inferences on their impacts on environmental quality were assessed. Findings revealed that environmental pollution in Lagos is mainly caused by both municipal and industrial sources putting more than 16 million people at risk annually by increasing health costs and productivity losses (through higher-incidences of water-related diseases). Identified major polluters (industries) in Lagos metropolis include:-textile, food-processing, metallurgical and electroplating, pharmaceutical and chemical as well as paint. Major concerns of industrial wastewater pollution are high levels of biochemical oxygen demand (BOD), chemical oxygen demand (COD), pH, oil and grease, heavy metals, and elevated temperature. Impacts of water pollution on the environment from these industries depend on the nature and type of the industry and industrial processes each entails. The paper finally advocates for establishment of in-plant water conservation measures to effectively manage water supply, water use, effluent removal and treatment with each process unit being fitted with anti-pollution facility and adequate conservation measure. In order to enhance an effective industrial wastewater management for sustainable environmental quality in the state, the following are proposed as veritable tools for positive outcomes; establishment of in-house pollution abatement measures, in-plant water conservation measures, practice of cost reduction methods in process operation, water and wastewater monitoring as well as industrial plant monitoring.

Key Words: Industrial processes, water conservation, water treatment, plant process and monitoring.

COMPLEMENTARITIES BETWEEN DEVELOPMENT AND WATERSHED MANAGEMENT IN THE HIGHLANDS OF ETHIOPIA

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The Ethiopian Highlands forms the largest continuous area of its altitude in the Africa, with little of its surface falling below 1500 m while the summits reach heights of up to 4550 m. Ethiopia can be divided into highlands (39%) and lowlands (61%) using 1500-m elevation as a crude threshold.

Soil erosion is a major problem in the highlands of Ethiopia, with 1 to 2 million tons of soil lost each year. This has resulted in loss of top soils and land degradation with a third of the soils having a depth of less than 5 cm. The scale of the problem, is increasing due to the increase in deforestation, overgrazing, over cultivation, inappropriate farming practices, and increasing human population.

Ethiopia has a history of watershed management initiatives dating back to the 1970s. In order to extensively address the problem of natural resource degradation, conservation schemes were introduced, especially after the occurrence drought and famines in 1970s.

Starting from 1970s and onward, huge areas have been taken under soil and water conservation activities, and several thousand kilometers of stone wall terraces were constructed, millions of trees were planted to protect the soil from further degradation and to improve the vegetal cover.
These activities were funded by Food for work project of World Food Program with the objectives engaging affected communities in plantation and soil and water conservation activities in exchange for food grain and edible oil.

Previously, most water management practices aimed to solve single, localized problems without taking account of the wider impacts of such actions on the biophysical, economic and social elements of the larger watershed system. Watershed management was generally understood to be synonymous with technical interventions related to soil and water conservation.

The drawbacks in the implementation of this understanding was its poor involvement and participation of local people in the planning and implementation of the scheme, shortage of skillful man power, ill planned and ill-defined soil and water conservation policy, lack of commitments to address the problem, ignoring the interests of rural communities, theoretical Emphasis given on natural resources conservation, lack of scientific approach and lack of technical knowledge.

The reason behind the poor achievement previous attempts could be attributed to several reasons: The most glaring reasons is that fact that practitioners had different opinions of what constitutes watershed management. Agronomists are primarily interested in scaling out technologies, primarily those for soil and water conservation or environmental protection. Policy makers in water resource sector view watershed management means for enhancing environmental services and public goods emanating from upper watersheds for the society at large. Among conservationists, it is viewed as a framework for enabling trans-boundary natural resource management (NRM) in which livelihood concerns are often addressed only to the extent that they help to further conservation goals. Social scientists see watershed management as watershed as a framework for enhancing collective action and equity in natural resource access and governance, or livelihood problems that cannot be solved at the level of the farm or household. This has resulted in conflicting approaches and outcomes of watershed management. As a result, Watershed development and management programs in Ethiopia in the past did not yield satisfactory results in achieving the intended goals due to the lack of indigenous knowledge, top down approach, lack of institutional collaboration and lack of overarching objectives.

The current understanding of watershed management, which is based on the lessons from the past, implies that effective watershed management needs to be holistic and interdisciplinary. It has to consider natural as well as human resources, co-ordinate development needs and potentials and include mechanisms of conflict resolution.

The current understanding of watershed management considers that:-

1. It should be holistic and flexible. Watershed management needs to address identified problems in a holistic way and remain flexible to be able to respond to changes over time.

2. It should be People-centered and participatory. The degree to which people and civil society actively participate in conservation

and resource management is one of the most critical factors that determines the success or failure of the process.

3. It must involve negotiation and dialogue. Watershed management facilitates the multi-sectoral and multi-stakeholder negotiation processes by providing the necessary platform to examine the interests of the different parties from the overall watershed perspective. This results in the formulation of guidelines or plans for the maintenance of the watershed.

This abstract highlights the added value of moving beyond a focus on improving soil retention, increasing farm-level productivity or reversing environmental degradation to encompass landscape-level interactions for optimizing ecosystem goods and services and build on the synergies between economic developments and watershed management and proses to look into ways of using watersheds in common lands for income generation through production of livestock feed.

Ethiopia's longstanding commitment to harness the water in its river basins including the Blue Nile to exploit its vast hydro-power potential has given a renewed impetus and opportunities to realize the potentials of watershed management. The Ethiopian Renaissance Dam in particular has motivated people all over the country to effectively engage in watershed management with household income generating activities for equitable share of the benefits that will be accrued as a result of the economic development.

The potential synergies and complementarities among the various activities of the Climate Resilient Green Economy of Ethiopia (CRGE) is guided by formulation of effective implementation mechanisms. The climate-resilient green economic strategy demonstrates the commitment of Ethiopia to bypass the conventional approach to economic development and create a green economy where economic development goals are met in a sustainable way.

Well managed watershed is hoped to play a key role in the CRGE for improving the livelihoods of watershed community through access to fodder for their livestock, reducing the degradation of natural resources and socio economic conditions and encourage farmers to invest in long-term soil and water conservation activities, adopting intensive farming practices and to make sustainable use of watershed land.

Watershed planning and management program is now restructured in such a way that it is site-specific, embraces livelihoods, productivity and sustainability to varying socioeconomic condition and promote overall ecosystem resilience and sustainability. The community based participatory watershed management is considered as appropriate vehicle for improvement of living conditions of rural communities by implementing a number of green initiatives and switching to a new sustainable development model for rural economy. This demonstrates the shift in policy approaches from a sectoral focus, which can result in competing and counterproductive actions, to an integrated approach with policy coherence among the sectors that uses knowledge of the interlinkages to maximize gain, optimize trade-offs, and avoid negative impacts.

Improving crop and livestock production practices to improve food security and increase farmer's incomes is one of the four pillars of the CRGE. Watersheds, especially those not suitable for conventional agriculture can be used to produce livestock feeds for use by farmers in the community and for sale for people outside the watershed. This will created employment opportunities outside farming could help to reduce the pressure on natural resource and emerging landlessness.

Here we see the clear manifestation that economic development enhances watershed management which in turn galvanizes economic development. This can easily be considered as the complementarities between Watershed Management and Economic Development as in (Mary Tiffen, Michael Mortimore and Francis Gichuki, 1994, More people, less erosion) a view that challenges established orthodoxies.

THE WATER HUB: A CENTRE FOR NEW TECHNOLOGIES AND INNOVATION FOR TREATING URBAN WATER RUNOFF FLOWING FROM AN UNDERSERVICED SETTLEMENT IN SOUTH AFRICA

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Surface water that is drained from densely populated informal (slum) settlements in South Africa is polluting the receiving water bodies and compromising the ability to use this water for a variety of purposes including irrigation and drinking. Inadequate, poorly managed drainage is also a significant contributor to disease carrying vectors. Attempts to manage on-site conventional drainage infrastructure is often inappropriate because these systems often become blocked with solid waste and litter. This presentation describes new innovations in research and practices in treating contaminated surface water at an off-site treatment facility. The Water Hub is an ambitious new facility that uses a biomimetic approach to clean polluted water by using bioprocesses so that water can then be used for productive purposes. The earliest experiments involve a series of drying beds that have been converted into large biofiltration cells. Each of the six cells has a capacity of 60m^3 that are packed with different media (stone aggregate, peach pips and plants) to test the performance of each treatment cell in a scientific experiment. The quality of the effluent from each cell is measured by using electronic multi-probe sensors while the flow is captures with ultrasonic sensors that were developed by post-graduate students at the University of Cape Town. Two important scientific endeavours are being assessed in the early phases of this research project at the Water Hub: a determination of the required retention times; and optimum volume of water that can be treated to achieve a 'fit for purpose' requirement. The Water Hub is a research, innovation and demonstration site - the first of its kind in South Africa. The aim is to provide a centre of scientific knowledge and a hands-on experience for professionals and practitioners in learning how to improve water quality and the safe reuse water without the addition of chemicals. The Water Hub is a flagship project of the Future Water Institute at the University of Cape Town which aims to develop water science technologies and techniques, and to train a new generation of water scientists in sustainable water resource management.