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TECHNOPOLICY AFRICA

The official newsletter of the African Technology Policy Studies Network (ATPS)

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ATPS AT



ATPS @ 25: Concept note and call for papers- Using STI as a means for achieving the SDGs

ATPS appoints new Board of Directors

EDITORIAL TEAM

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ATPS Vision:

To use Science, Technology and Innovation (STI) as a means for achieving sustainable development in Africa.

ATPS Mission:

To improve the quality of science, technology and innovation (STI) systems research, policy and practice by strengthening capacity for STI knowledge generation, dissemination, and use for sustainable development in Africa.

Overall Objective:

To build Africa's capabilities in science, technology and innovation for sustainable development.

ATPS Motto:

Building Africa's capabilities in science, technology and innovation policy research, policymaking and policy implementation for sustainable development.

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Chairman's message

ATPS, in line with the Phase VIII Strategic Plan (2017-2022), has shifted its focus from the usual programmatic approach to emphasize on a sectoral approach by identifying Africa's priorities for sustainable development. Based on this, the annual stakeholders' forum that convened in July 2016 identified four key sectoral areas including Agriculture, Food and nutrition; Energy; Climate change and environmental management; and Health innovations.

Under the Climate change and environmental management sector, ATPS continues with its work in building climate change resilient capacities at individual, institutional and systematic levels on the continent. We continue to further the impact of the project Developing an Innovation-led BioEconomy Strategy for Eastern Africa (BISEA), which is built on the premise that it is now high time for countries in the region to apply more systematically bio-based knowledge for economic transformations that will respond to local development needs.



**Prof. Crispus Kiamba,
Chair, ATPS Board of Directors**

On behalf of the board, I am pleased to welcome two new members to the Board of Directors. Professors Onwalu Peter and Ifejika are both experts in their respective fields of Science, Technology and Innovation.

We thus continue to forge ahead with the assessment of the overall performance of the Network as well as the quality of STI capacity development activities while providing strategic supervision and guidance to the ATPS Secretariat management.

Lastly, ATPS activities are well known within both scientific and academic communities in most of the countries in which we have our local chapters. However, we can, at best, claim moderate awareness and or recognition among government functionaries in these countries. Further still, the awareness of the activities and goals of ATPS within the private sector remains wanting in our representative countries. As such, we call upon all of you to support us in this endeavor as we seek for more partnerships that will help us promote the formulation of effective policies including those that drive and affect social and economic developments at national and regional levels.

Executive Director's message

Welcome to the second edition of the Technopolicy Africa 2019. This July Edition highlights significant events, challenges as well as achievements of the ATPS during the quarter. Generally, I am delighted to apprise that ATPS continues to soar higher in its mission to promote the generation, dissemination, mastery and use of Science Technology and Innovation (STI). In the course of the quarter, ATPS has been involved in several notable projects and activities; all of which have been highlighted in the newsletter.

Most notable is the ATPS staff retreat that took place from the 7th-9th May at the ATPS offices. The retreat's main aim was to look back at ATPS' successes, challenges faced along the way as well as charting the way forward in line with the current strategic plan. ATPS Staff were taken through team building by one of the founding members and premier Executive Director of ATPS, Professor Osita Ogbu.

Among the series of activities ATPS is engaged in this year is the Recirculate project: Driving Eco-Innovation in Africa: Capacity Building for a Safe Circular Water Economy. The project aims to support new partnership-based approaches to enable African researchers and research institutions to grow transformational impact (<https://atpsnet.org/projects/recirculate-driving-eco-innovation-in-africa-capacity-building-for-a-safe-circular-water-economy/>).



**Dr. Nicholas Ozor,
Executive Director,
ATPS**

It thus brings me joy to inform you that three of the ATPS staff who participated in the Knowledge Exchange & Engagement and Entrepreneurship & Innovation workshops that were held in Lilongwe, Malawi and Kitwe, Zambia respectively, managed to come up with proposals and secured residencies at the Lancaster University for a month. Read on to find out more details on the same.

I am also pleased to bring to your attention that ATPS has signed a Memorandum of Understanding (MOU) with the Africa Academy of Sciences (AAS) for the purposes of enhancing cooperation, interaction and knowledge sharing between the two organizations on Science, Technology and Innovation research, policy and practice in Africa. More details on the same are in the news section of this newsletter.

Most importantly, I am also happy to inform that the ATPS received a new grant from the Switzerland Development Cooperation (SDC) through the BioVision Africa Trust (BvAT) for the "Mainstreaming of Ecological Organic Agriculture Initiative (EOA-I) in the Agricultural Systems in Africa". The overall goal of the initiative is to contribute to mainstreaming of Ecological Organic Agriculture into national agricultural production systems by 2025 and to improve agricultural productivity, food security, access to markets and sustainable development in Africa. ATPS will implement activities under the Initiative worth about USD 684,000 for four years.

We thank all our donors and partners and continue to solicit for their support to enable ATPS improve the quality of STI policy research, policy making and implementation in Africa by building the capabilities of individuals and institutions to achieve sustainable development on the continent. Not to forget our continuous efforts towards the realization of our current Phase VIII Strategic Plan (2017-2022).



CONCEPT NOTE AND CALL FOR PAPERS FOR THE 2019 ATPS ANNUAL FORUM, CONFERENCE AND SILVER JUBILEE

**THEME: Using Science, Technology and Innovation (STI) as a means for achieving
the Sustainable Development Goals (SDGs) in Africa**

Hosted by:

**The African Technology
Policy Studies Network (ATPS) and Partners**

Partners so far:

- Government of Kenya
- Government of Nigeria
- AFREXIMBANK
- African Economic Research Consortium (AERC)
- African Academy of Sciences (AAS)
- Stockholm Environment Institute, Africa Centre (SEI-Africa)

30-31 October, 2019

Venue: Crowne Plaza Hotel Nairobi, Kenya

Contacts:

Executive Conference Organizing Committee (ECOC)
African Technology Policy Studies Network (ATPS)
8th Floor, The Chancery, Valley Road
P.O. Box 10081-00100, Nairobi, Kenya
Tel: +254-20-2714092/2714498/2723800
Fax: +254-20-2714028
Email: atpsconference2019@atpsnet.org
Website: <http://atpsnet.org>
Skype: [ATPS Network](#)



1.0 Background

The development of and attention to science and technology in Africa took center stage in the 1980s with African governments making commitments through their Heads of States to allocate at least 1% of their gross domestic products (GDPs) to research and development (R&D) as well as scientific and technological capabilities in what is popularly known as the Lagos Plan of Action for the economic development of Africa 1980-2000. This was against the background that Africa at that time was unable to point to any significant growth rate or satisfactory index of general well-being for almost two decades. Faced with this situation, and determined to undertake measures for the basic restructuring of the economic base of the continent, the African leaders resolved to adopt a far-reaching regional approach based primarily on collective self-reliance which included putting science and technology in the service of development by reinforcing the autonomous capacity of our countries in this field.

They noted that the role of science and technology in integrated rural development requires among other things the generation of financial resources and political will and courage on the part of policy and decision-makers to induce a profound change with far-reaching effects on the use of science and technology as the basis of socio-economic development. A well-developed science and technology base and its appropriate application will lead to developments in other sectors such as agriculture; transport and communications; industry, including agro-allied industries; health and sanitation; energy; education and manpower development; housing, urban development and environment among others. Countries were urged to develop appropriate policies and programmes that will utilize the power of science and technology to sustain growth and development. Among the early adopters in the development of science and technology policies since the Lagos Plan of Action were Ethiopia (1992), Tanzania (1996), Zambia (1996),

Botswana (1998), Nigeria (1998) and Ghana (2000). Other countries followed later.

One very remarkable outcome of the Plan of Action was the support and strengthening of regional and sub-regional science and technology organizations in Africa with a call to Member States and international agencies to provide resources to enable them attain full operational levels. It was during this period that two distinct networks emerged in Africa: the Eastern and Southern Africa Technology Policy Studies (EATPS) and the Western Africa Technology Policy Studies (WATPS). These networks promoted and advocated for the use of science and technology as a means for achieving socioeconomic development in the regions. They facilitated the development of most of the science and technology policies in most of the African countries earlier mentioned. However, in 1994, the EATPS and WATPS came together under one platform that led to the birth of the African Technology Policy Studies Network (ATPS) with its secretariat in Nairobi, Kenya under the East and Southern Africa Regional Office of the International Development Research Centre (IDRC).

The ATPS has since then grown in leaps and bounds. In 2001 ATPS became an autonomous international organization with diplomatic status in Kenya and working on transdisciplinary science, technology and innovation (STI) themes for African development.

Whilst retaining the STI focus, ATPS has moved towards a “knowledge for development” network of researchers, policymakers, private sector and civil society actors that promote the generation, dissemination, use and mastery of science, technology and innovation for Africa’s development, environmental sustainability and global inclusion. We implement our programs through members in National Chapters established in 30 countries (27 in Africa and 3 Diaspora Chapters in Australia, United States of America and the United Kingdom) with partnerships across the entire 54 African countries. The ATPS is unique in many ways: It is not only the premier STI institution in Africa; it is unique in the composition of its membership, institutional structures and implementation activities. Today ATPS is made up of over 1500 members spread across 51 countries in 5 continents. As the premier STI institution in Africa, it has successfully mainstreamed STI in African development policy dialogues and assisted many African countries to formulate STI policies as well as develop strategies for its implementation.



Our work is guided by the needs and aspirations of our stakeholders across Africa which we usually put together in consultation with these stakeholders as a Strategic Plan over five year periods. During the current ATPS Phase VIII Strategic Plan (2017-2022), we have identified four thematic and five programmatic priorities of action. The four thematic priorities are: Agriculture, food and nutrition; Energy; Climate change and environment; and Health innovations, while the five programmatic priorities include: STI policy research, policymaking and advocacy; Training, sensitization and capacity building; Youth and gender empowerment; Knowledge brokerage, management and commercialization; and Intra-Africa and global collaboration and partnerships. Details of these themes and programmes are available online at: https://atpsnet.org/wp-content/uploads/2017/12/ATPS-Phase-VIII-Strategic-Plan-2017-2022_Final.pdf.

These strategic priorities (thematic and programmatic) align very well with most of the development agenda in Africa including the Sustainable Development Goals (SDGs), the Africa's Agenda 2063, the African Development Bank (AfDB)'s Hi Five Priorities, and the national development agenda and visions in most of the African countries. We aim to seek for supports and collaborations from different institutions and organizations charged with the implementation of these development agenda especially in Africa. The ATPS has benefitted and continues to enjoy the support from many development partners, donors and governments at various levels in the achievement of our mandate.

2.0 ATPS Achievements so far

Since our establishment in 1994 as the premier STI policy research and policymaking network in Africa, the ATPS has continually impacted on Africa's STI development in many fronts.

Facilitated the development of STI policies of regional and national governments in Africa: Through series of policy research and advocacy actions, the ATPS has facilitated the development of STI policies and strategies in many African countries including Nigeria, Ghana, Kenya, Benin Republic, Lesotho, Uganda, Tanzania, Malawi, Ethiopia, Cameroon, Liberia, Swaziland, and Zimbabwe among many others. The ATPS made inputs to Consolidated Plan of Action (CPA) of the African Union that metamorphosed into the Science, Technology and Innovation Strategy (STISA 2024) for Africa. As an accredited institutional member of the African Union Commission (AUC) the ATPS provides inputs to the Specialized Technical Committee on Education, Science and Technology (STC-EST) of the AUC. The ATPS also developed the first ever *African Manifesto for Science, Technology and Innovation*¹ that provided a roadmap for attaining socio-economic development in African through investments in science, technology and innovation.

STI Policy research, capacity building and outreach: The ATPS has supported the conduct of policy research endeavours in over 30 countries in Africa in the areas of agriculture, energy, climate change and environment, health, intellectual property rights, entrepreneurship, etc. These research interventions have generated tremendous knowledge products for decision-making in Africa. The ATPS capacity building program has trained researchers, policymakers, private sector actors, the civil society, extension agents, farmers, the media and many more and enabled them to accomplish desired goals and objectives for sustainable development in Africa. We have commissioned and completed over 150 STI research projects; published over 500 research papers, policy briefs and reports including some global and regional reports; developed 4 training manuals on different areas of STI including STI policy manual, entrepreneurship training manual and Intellectual Property training manual; facilitated the development of STI policies in about 17 African countries; trained over 8000 different stakeholders of the ATPS; engaged over 5000 ATPS stakeholders in various events in Africa and beyond; conducted over 75 training workshops; signed over 30 MOUs; developed new project partnerships with other like-minded institutions across Africa and beyond; and launched 2 youth and gender programs - The Youth Innovation Challenge (Y I CAN) and Women Innovation Challenge (WE CAN) programs with 24 innovation challenge grants awarded among many others. Through one of our programmes, the

1 Available online at: http://www.atpsnet.org/Files/the_african_manifesto_for_st&i.pdf



University, Business and Research in Agricultural Innovation (UniBRAIN), we and our partners have facilitated the commercialization of over 110 technologies, created over 12,000 jobs and working with over 50,000 farmers, established 350 SMEs, supported over 280 new businesses across Africa and created linkages with over 20 incubators and mini-incubators across Africa.

Development of practical technologies to help the poor: ATPS in collaboration with the United States Department of Agriculture, Agriculture and Research Service (USDA-ARS) among other global partners developed an is out-scaling an award winning LandPKS mobile app technology that enable users instantly access climatic and soil information at any point given location and use the information generated to make informed decisions on their farm enterprises including production, processing, marketing and utilization. ATPS has won two awards, Wazo Prize and Tekeleza Prize for promoting the adoption and out-scaling of the technology in Kenya and continues to receive supports from development partners, donors and governments to out-scale the technology across Africa. Ranked as the Best Think Tank in Africa: For five consecutive years now, the ATPS has consistently been ranked by the Global Go To Think Tank Index Report as the best think tank in Africa (getting the highest number of rankings as well as ranking first in more categories). The 2018 Report released in February 2019 ranks the ATPS as the 1st Top Science and Technology Policy Think Tank in Africa and 10th globally. The ATPS also ranked tops in many other categories that were used to assess Think Tanks across the world. Notable among these categories where the ATPS ranked tops are: Best Think Tank Network; Best Managed Think Tank; Think Tank with the Most Innovative Policy Ideas/Proposals; Think Tank with the Most Significant Impact on Public Policy; Best Transdisciplinary Research Think Tank; Best Advocacy Campaign Think Tank; Think Tank with the Best Use of the Internet; and Think Tank with the Best institutional collaboration involving two or more Think Tanks among many others.

Details of the ranking can be found in the report at: https://repository.upenn.edu/cgi/viewcontent.cgi?article=1017&context=think_tanks

Positive Evaluation Assessments: The latest external evaluation assessment of core funding support to the ATPS by the Ministry of Foreign Affairs, the Netherlands scored the ATPS an “AAA Grade” on the average. The score was based on ATPS’s effectiveness, efficiency and value for money in all its activities and program implementation. Responses were received from ATPS stakeholders in Africa and globally. Our annual audits have shown positive financial responsibility and continuous ability of the ATPS to meet its financial obligations.

3.0 ATPS @ 25: Our Main goal

The main goal of the Annual Forum 2019 is to convene critical mass of STI stakeholders from Africa and beyond to further discuss how STI can be deployed more effectively to achieve most of the development agenda in Africa including the Sustainable Development Goals (SDGs), the Africa’s Agenda 2063, the African Development Bank (AfDB) Hi Five Priorities, and the national development agenda and visions in African countries. We shall use the opportunity to tell ATPS’s story as the premier STI organization and how far we have fared in our mandate of using science, technology and innovation as a means for achieving sustainable development in Africa. Most specifically, we hope to achieve the following during the event:

1. Present and discuss relevant and topical issues on how STI can be further deployed to more effectively achieve sustainable development in Africa
2. Tell ATPS’s story in championing STI development in Africa for 25 years
3. Relaunch the ATPS Phase VIII Strategic Plan 2017-2022
4. Provide opportunity for networking among STI stakeholders across the continent and beyond.
5. Present papers that address the main theme and subthemes of the conference
6. Celebrate and honour ATPS Legends and Champions

4.0 Conference subthemes and call for papers

Five inter-related priority subthemes have been identified to buttress the main goal of the Annual Forum, Conference and ATPS Silver Jubilee. Papers are therefore being invited from experts under the subthemes.



Sub-themes:

1. Science, technology and innovation priorities for Africa's development- This sub-theme focuses on how STI is driving Africa's development Agenda in the context of STISA 2024 and in achieving the SDGs on the continent. As the African Union has developed a long-term agenda 2063 for the continent, science, technology and innovation is playing a major role. The strategy aims to address the challenges that hinder development in critical sectors such as agriculture, energy, environment, health, infrastructure, mining, security and water using STI. What does Africa need to do to enhance the use of STI as a means for achieving the sustainable development goals? Has STI been mainstreamed enough in national development agendas in Africa in terms of investments, research and policy

2. The Fourth Industrial Revolution and Africa's Readiness- The fourth industrial revolution is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live and work. This year's (2019) World Economic Forum theme of Globalisation 4.0 addressed the fourth industrial revolution which is taking place globally at an unpredictable rate. Is Africa ready? How effective is the infrastructure in Africa to support these disruptive technologies that will enhance the fourth industrial revolution? Do African countries have enough capacity to exploit these emerging technologies? What needs to be done to support the use of these disruptive technologies in Africa?

3. Improving Africa's Intra-Africa Trade using science, technology and innovation- There are many reasons for the low intra-African trade including: weakness of physical and human infrastructure, small size of individual African country markets, residual tariffs and onerous non-tariff measures (NTM) on processed and semi-processed African products by both developed and emerging markets, export constraints and other pre-border barriers, absence of trade finance, institutional constraints on enterprise growth and inability to achieve scale, currency risk, corruption and rent-seeking clientelism, and civil disruption among many others. The abundance of interest, capital, opportunities, and promises in technology such as artificial intelligence (AI) reminds one of mobile technology just 10 years ago. Mobile money transfer technology took the continent by storm but this has not really translated to significant increases in intra-Africa trade due to the different levels of adoption of the technology in Africa as well as challenges in the development of the required infrastructure. Will technology/automation and AI do to African nations over the next decade what mobile technology did to them in the last one, fueling a dramatic rise in connectivity and unlocking significant gains in economic development? Like mobile technology and communication capabilities, will technology/automation and AI permit African nations to dramatically increase their research, development, and production capabilities? Will technology/automation and AI give African nations even more power to leapfrog the need for old-fashioned infrastructure and outdated strategies of industrialization? In essence, how can intra-Africa trade be realized using STI?

4. Funding science, technology and innovation priorities for Africa's development- African leaders have always committed to increasing funding for national, regional and continental programmes for science and technology and support the establishment of national and regional centres of excellence in science and technology. So far only a handful of the countries have implemented that. Funding for research in Africa is still very low hence very low emergence of new technologies and innovations. This has severely limited growth and development in Africa. How can African governments increase funding to STI? Has the private sector sufficiently contributed to funding research in Africa? Are the African universities and research organizations contributing enough in funding research in Africa? How can development partners significantly contribute to STI development in Africa?

5. Gender and inclusivity in science, technology and innovation- The persistent gender inequalities and exclusivity in Africa can be explained by lack of relevant policies, inadequate and improper curriculum content and strategies, poor didactic materials and negative culture and attitudes which discourage women from training and/or working as scientists, technologists or engineers and the youth from assuming high



positions of authority in the polity.

This theme focusses on identifying successful international best practices that should be learned, adapted and wisely implemented in Africa to encourage inclusivity and gender mainstreaming in STI.

The gender mainstreaming of science and technology policy formulation and review processes have not been sufficient enough to reflect the level of gender awareness that has been created and attitude changes made.

What actions need to be taken to ensure there is gender and inclusivity in STI? What data are required to inform decision making on gender inclusivity in STI?

i. Expected Outputs

- i) Published annual forum and conference proceedings;
- ii) A communiqué summarising key recommendations for African policymakers and development partners.
- iii) Two Policy Briefs

5.0 Expected Outcomes

- i) Increased and renewed recognition and deployment of STI as a means for achieving sustainable development in Africa by policymakers, science experts, private sector actors and civil society actors; and
- ii) Strengthened networks amongst STI actors in Africa.

6.0 Conference Methodology

The ATPS@25 Annual Forum will be a two-day event that will bring together stakeholders including network members, donors and financiers, beneficiaries and government officials from across Africa. The event will adopt participatory approaches to engage stakeholders in relevant discussions. For the main theme and sub-themes, there will be high level presentations by experts in the field and panel discussions on some of the sub-themes. In all, there will be enough time for stakeholder discussions and dialogue on the different subthemes. About 200 delegates are expected from across the 54 African countries and beyond during the Annual Forum, Conference and ATPS Silver Jubilee celebration. Delegates will be drawn from the academia and research institutions, policymakers and high-level government officials, organized private sector actors, informal sector, civil society actors, development partners, donors and financiers, and the Fourth estate among many others. Detailed programme of event will be published as we approach the dates of the event.

Key programme of events:

- Opening ceremony and key messages from donors, sponsors and partners
- A Masterclass on the theme: Using Science, Technology and Innovation as a means for Achieving the Sustainable Development Goals (SDGs) in Africa
- Plenary presentations on the selected sub-themes
- Relaunch of the ATPS Phase VIII Strategic Plan 2017-2022
- Celebration of ATPS champions and legends. All Foundation Members of the ATPS, past Executive Directors and Directors, Chairs of ATPS Board of Directors, Core Donors, etc. will receive honours awards.
- Exhibition of science, technology and innovation products and services from around Africa
- Press conference



6.1 Conference Exhibitions and Side Events

An exhibition area will be organized during the conference at the same venue. To showcase technologies and innovations, or institutions working in the subject area, exhibitors are requested to apply in advance to atpsconference2019@atpsnet.org. Spaces for the exhibition will be very limited and will be allocated on first-come first-served. Target Exhibitors will be on innovative science, technology and innovation products, prototypes, etc. produced as a result of research, good policies and practical applications of innovations and the institutions promoting such.

7.0 Conference Venue and Date:

Dates: 30 – 31 October 2019
Venue: The Crowne Hotel, Nairobi Kenya

7.1 Conference Delegates:

Delegates from all STI policy stakeholders (policymakers, researchers, private sector actors, and civil society) in the developing, emerging and developed countries with interest in STI capacity strengthening for sustainable development in Africa are welcome to attend the conference and workshops. Key policy making and policy implementation arms of Africa including the African Union Commission (AUC), Regional Economic Commissions (RECs); the United Nations Organizations/Agencies (UN); African national governments; researchers; private sector actors; civil society actors; and key development partners, philanthropies and donor agencies from developed, emerging and developing countries are particularly encouraged to attend.

8.0 Conference Registration Procedure:

All conference participants are required to register and at least one author per paper must attend. Online registration is open until 20 October 2019 at:

<http://atpsnet.org/2019atpsconferences/>

Conference registration conditions vary depending on the country of origin and the package selected.

The registration rates are as follows:

ATPS Registered members	\$50
Delegates from Africa and other developing countries	\$100
Delegates from developed countries	\$150
Post graduate students above 35 year old	\$50
Students/Youth Entrepreneurs between 18 – 35 years	Free
Institutional Exhibition fee	\$1000
Innovation/Technology Exhibitions	\$1000

ATPS and its partners plan to support the participation of pre-selected delegates including keynote and invited speakers and key policy stakeholders, ATPS Board members, Regional Council members; International Responsible STI Council members; National Chapter Coordinators/Focal points; Secretariat Staff; Program Regional and National Steering Committees members; AWFST Executives; AYFST Executives; Program Coordinators; Travel grant letters will be issued to qualifying delegates in advance.

All other delegates will be fully responsible for their participation including registration, travel, accommodation and subsistence costs during the conference period, etc. The ATPS and its partners are under no obligations to bear any responsibilities for unsupported delegates.



9.0 Submission Guidelines:

We particularly invite contributions to the conference that address the above theme and sub-themes from an interdisciplinary and trans-disciplinary approach.

i. Abstracts:

Abstracts of 350-500 words are invited from prospective conference participants. The abstracts should contain the title of the paper, name(s) of the author(s), contact information, 5 keywords and biographical notes about the author(s). Authors are also invited to indicate the conference sub-theme pertaining to their papers. All abstracts will be anonymously evaluated by the Conference Technical Committee on the basis of the following criteria: originality and creativity; clarity of content; contribution to the knowledge base/ evidence base; linkages with research, policy and practice; relevance and timeliness in terms of findings and conclusion. Abstracts will also be selected based on their relevance to one or more of the conference theme/subthemes. A book of selected abstracts will be published and made available during the conference. The deadline for the submission of abstracts is 12 September 2019. All submissions should be made to: atpsconference2019@atpsnet.org

ii. Full Paper submission:

Candidates whose abstracts are selected are expected to submit their full papers by 20 October 2019. The papers shall be evidence-based and can be theoretical, empirical or policy oriented, and can approach the issues from a range of disciplinary, but preferably trans-disciplinary perspectives. Papers submitted will be peer-reviewed for originality, technical and research contents, depth correctness, relevance to the conference themes, contribution to knowledge, readability, etc.

The full paper should be between 4000-6000 words, A4 word format, one column, font size: 12pt, Times New Roman, 1.5 spaces, margin width (2cm). Papers shall include the following: Title of the paper, Full name(s) of the author(s), contact details, Abstract (250words), 5 keywords. References shall be in APA format. All submissions should be made to: atpsconference2019@atpsnet.org

10.0 Conference Language:

The official languages of the conference are English and French. However, the submission of abstract and full papers must be in English. Simultaneous interpretation in the official languages during the Annual Forum and conference will be ensured.

11.0 Summary of Annual Forum and Conference Schedule:

Dates	Activities
12 August 2019	Announcement of the call for papers
12 September 2019	Deadline for submission of abstract
20 September 2019	Notification of Abstract Acceptance
20 October 2019	Deadline for the submission of full papers to be considered for publication
23 October 2019	Deadline for the submission of PowerPoint Presentation
30-31 October 2019	Annual Forum, Conference and Silver Jubilee Celebration

12.0 Our budget for the 2019 annual forum/ conference/ silver jubilee:

In order to effectively organize the ATPS@25 Annual Forum the organizing committee has drawn up a budget of about US\$500,000 to take care of the costs of participation of some of the stakeholders to the event. Self-sponsored delegates are highly encouraged. The cost of the event is made up of travel costs, accommodation costs, subsistence costs, conference costs, and cost of plaques and Silver Jubilee items among others.

To enable us meet these costs, we kindly request for supports and sponsorships from our multiple donors, partners and governments. As part of appreciating the supports that will be given, we will offer series of benefits in accordance to the level of supports or sponsorships received as enumerated in the table below:



Table 1: Categories of Sponsorship for

the ATPS Silver Jubilee Celebration

S/n	Types of Sponsorship	Amount (US\$)	Benefits
1	Platinum Sponsor	US\$ 100,000 and above	<input type="checkbox"/> Receive a Platinum award for supporting STI development in Africa <input type="checkbox"/> Make a pitch during the event <input type="checkbox"/> Have Logo in all ATPS@25 promotional materials for the event <input type="checkbox"/> Promote Organization in the widely read ATPS Technopolicy Newsletter for one year
2	Gold Sponsor	< US\$ 100,000-US\$ 50,000	<input type="checkbox"/> Receive a Gold award for supporting STI development in Africa <input type="checkbox"/> Make a pitch during the event <input type="checkbox"/> Have Logo in all ATPS@25 publication materials for the event <input type="checkbox"/> Promote Organization in the widely read ATPS Technopolicy Newsletter for six months
3	Silver Sponsor	< US\$ 50,000-US\$ 20,000	<input type="checkbox"/> Receive a Silver award for supporting STI development in Africa <input type="checkbox"/> Make a pitch during the event <input type="checkbox"/> Have Logo in all ATPS@25 promotional materials for the event <input type="checkbox"/> Promote Organization in the widely read ATPS Technopolicy Newsletter for three months
4	Bronze Sponsor	< US\$20,000-US\$10,000	<input type="checkbox"/> Receive a Bronze award for supporting STI development in Africa <input type="checkbox"/> Make a pitch during the event <input type="checkbox"/> Have Logo in all ATPS@25 promotional materials for the event <input type="checkbox"/> Promote Organization in the widely read ATPS Technopolicy Newsletter for one months
5	Exhibition Space	US\$1000-US\$5000	<input type="checkbox"/> Availability of an exhibition space during the event <input type="checkbox"/> Have Logo in all ATPS@25 promotional materials for the event

ATPS Accounts for the Silver Jubilee

Name & Address of Bank: Commercial Bank of Africa
 Upper Hill Branch, Mara/Ragati Road, P.O. Box 30437-00100, Nairobi, Kenya. Tel: 254-20-2884000

Bank Branch Code: 07000

Account Name: African Technology Policy Studies Network

Account Number: 6572770025

BIC/Sort/SWIFT Code: CBAFKENX

Currency of Account: US DOLLARS

For further information on sponsorship, please contact:
 Executive Director,
 African Technology Policy Studies Network (ATPS)
 8th Floor, Chancery Building, Valley Road;
 P.O. Box 10081-00100, Nairobi, Kenya
 Email: executivedirector@atpsnet.org
 Telephone: +254 (0) 20 2714092 (Landline); +254 (0) 713161928 (Mobile);
 Website: <https://atpsnet.org/>

ATPS appoints new Board of Directors

ATPS is proud to welcome two new members to the Board of Directors. Professors Azikiwe Peter and Chinwe Ifejika join the ATPS Board in their work of formulating and monitoring the implementation of policies and procedures designed to fulfill the network's objectives. They bring to the table expertise in their different fields in Science, Technology and innovation.



Professor Azikiwe Peter Onwalu

Professor Azikiwe Peter Onwalu works with African University of Science and Technology (AUST), Abuja, Nigeria where he serves as the Coordinator, Materials Science and Engineering Programme and Director, Academic Planning. He is also involved in the leadership of two World Bank assisted projects at AUST; Focal Point for Partnership for Skills in Applied Science and Engineering (PASET) and Co-Centre Leader, Pan African Materials Institute (PAMI), an Africa Centre of Excellence in Materials

He holds B.Eng. and M.Eng. Degrees in Agricultural Engineering from the University of Nigeria, Nsukka and a PhD degree in the same field from the Technical University of Nova Scotia, Halifax, Canada.

Prof. Onwalu has held different positions in the past including: Professor and Head, Agricultural Engineering Department, University of Nigeria, Nsukka; Director, Engineering Infrastructure, National Agency for Science and Engineering Infrastructure, NASENI, Abuja, Director General/CEO, Raw Materials Research and Development Council, RMRDC, Abuja (Federal Ministry of Science and Technology) and Visiting Professor, National Universities Commission, NUC, Abuja. Others include: Coordinator, Science Technology and Innovation (STI) thematic group of Nigeria's Vision 20-2020; Chairman, Committee of Directors of Research Institutes of Nigeria, CODRI and Chairman Nigerian Society of Engineers' Presidential Committee on Engineering Technology and Innovation. He was Editor-in-Chief Nigeria Journal of Agricultural Engineering and Technology. He is a Fellow of 12 professional bodies including: Nigeria Institute of Management, Nigeria Academy of Engineering and Nigeria Academy of Science.

Chinwe Ifejika Speranza is a Professor of Geography and Sustainable Development at the Institute of Geography, University of Bern, Switzerland. She heads the research unit Sustainable Land Management and Land Systems. Her research focuses on land management and land use, their interactions with biophysical processes, and how they shape the conditions of natural resources such as soil, water and vegetation, their interlinkages with livelihoods, food security, climate change and climate risks, and environmental governance. She teaches and supervises theses at PhD, Masters and Bachelor-levels. She serves in editorial and scientific advisory committees. She has field experience in sub-Saharan Africa, Sarawak-Malaysia, Bolivia and Switzerland.



Professor Chinwe Ifejika Speranza

ATPS signs MOU with AAS

The African Technology Policy Studies Network (ATPS) and African Academy of Sciences (AAS) signed a memorandum of understanding (MoU) on 13th May 2019 at the ATPS headquarters in Nairobi. This was as a result of a series of consultations between representatives of the organizations led by Prof. Nelson Torto, Executive Director AAS and Dr. Nicholas Ozor, Executive Director (ATPS).

During the signing ceremony, both teams reiterated the importance of partnerships with the aim of ensuring the development of the African countries through the use of Science Technology and Innovations (STI). The two organizations bring together a wealth of experience and knowledge in the field of STI and focus on common priority sectors of Environment and Climate change, Agriculture and Food security, Health and wellbeing and Energy. The two organizations agreed to work together to mutually further the goals of each of the organizations across the priority sectors identified by both parties.



ATPS/AAS Officials witness the MOU signing (From left): Ms. Christine Kuto, Dr. Isayvani Naicker, Prof. Nelson Torto, Dr. Nicholas Ozor, Mr. Alfred Nyambane and Ms. Ruth Oriama

AAS also specialize in promoting policy and practice through lobbying and advocacy activities, capacity building, knowledge brokerage and sensitization as well as generation and dissemination of knowledge outputs. Dr. Isayvani Naicker, the Director of Strategy and Partnerships (AAS), Ms Christine Kuto, Legal and Compliance Officer (AAS), Alfred Nyambane- Head of Research (ATPS), and Ms. Ruth Oriama Research Officer (ATPS), witnessed the signing of the MOU.

ATPS Staff Retreat

Team building can be described as the process of turning a group of individual contributing employees into a unified team. The process often includes creating instances and activities in which the employees use teamwork to achieve a goal. Teamwork is often a crucial part of a business, as it is often necessary for colleagues to work well together, trying their best in any circumstance. This means that people will try to cooperate, using their individual skills and providing constructive feedback, despite any personal conflict between individuals.

Teamwork is mandatory for result driven, high performance and a nurturing working environment. This calls for means and ways of growing and enhancing team work in every organization and one major way is having team members engage in theme based team building program. As such, ATPS has been organizing staff retreats on an annual basis. This year was no different. The ATPS staff retreat took place from 7th to 9th May. The team building session was pertinent in that it served to reminisce on past successes of the organizations as well as the challenges faced. This was towards the end goal of charting a way forward in line with the current Phase VIII Strategic Plan (2017-2022).

The retreat was held at the ATPS offices. Prof Osita Ogbu, the pioneer and former Executive Director availed himself for the retreat sessions as a moderator. The retreat sessions covered foundational principles of effectiveness, the main aim of which is to adopt a new concept of personal responsibility, teamwork, and openness of communication. The ATPS staff also learnt that good and effective work relationships are very important in organizational change. Handling conflicts, building supportive work relationships and communicating effectively all contribute to the formulation of and fostering team spirit and how every staff should align their goals with that of the organization. The staff and management alike also learnt the importance of observing the systems put in place that not only ensure good working environment, but also furthers ATPS mission and vision.



ATPS Staff members (From left): Mr. Philip Musembi, Ms. Violet Nyabaro, Ms. Nita Karume, Mr. Peter Chege, Mr. Alfred Nyambane, Ms. Nancy Wesonga, Prof. Osita Ogbu (Retreat Moderator), Ms. Ruth Oriama, Dr. Nicholas Ozor and (at the back) Mr. Mathew Imulia

Science, Technology and Innovation; is it the Answer to Food Security? A case of the Kenyan Agriculture Sector

By Violet Nyabaro

World population growth is projected to reach 9 billion people in the year 2050 (Rosegrant et al., 2014). With growth, humanity is faced with food insecurity and poor nutrition challenges accelerated by rapid widespread climate change and inadequate technological innovation. The importance and centrality of technology towards sustainable food production and ensuring food secure households in SSA is an aspect that requires attention from national, regional and global development goals.

Production trends of major cereals is worrying with per capita production of maize showing a decline from 129 kg in 1970 to 72 kg per capita in 2000 (Mohajan, 2014).

Further, the 'Economic Review of Agriculture, "Kenyan Report" 2008, notes that Kenya is falling behind in meeting its supply of cereals of 3.1 million tons compared to its production of 2.4 in maize, 280,000 tons vs. 120,000 in rice and 900,000 vs. 360,000 in wheat. A number of technological

innovations in agriculture that can be used to increase yields and address the

food security crisis in SSA have been identified.

For instance, Ozor and Urama (2013) describe the presence of and application of new and

existing agricultural technologies such as mechanical, biological and biochemical, biotechnology and nanotechnology and various indigenous technologies that are key to improving productivity. Some of the technologies include:

Mechanical technologies:

Agricultural production systems in Kenya majorly rely on human labor (50 %), animal draught power (20%) and motorized power (30%) (FAO, 2006).

There has been a documented increase in purchase of tractors for production in Kenya from an estimated 6422 in in the sixties to 12,844 tractors in the early 2,000 translating to about 1 tractor to 195 hectare. However, ownership of tractors is as low as 5%, which could be explained with high land fragmentation that has made use of machinery almost impossible (Bymolt and Zaal, 2015). Given the state of land and water resources in Kenya where 84 % of the land is ASAL, there are a varied number of innovative irrigation technologies that have been used for water collection and distribution for smallholder producers. According to Meinen-Dick, (2007) some of these technologies include: bucket irrigation that takes place in kitchen gardens to a large extent, gravity fed sprinkler and drip irrigation, treadle and pedal pumps, motorized pumps, wind-power and construction of small earthen dams which are predominant in water stress regions of Eastern Kenya.



Recent evidence from across the world point towards improved use of agricultural technology and increased innovations for increased yields. In Kenya, food and nutrition security is linked to the performance of the agricultural sector.

Biotechnology:

Biotechnology can be used to impact on food security in a number of ways such as: increase crop yields thus contribute to food production and availability, improve the economic and social status of smallholder producers through surpluses and finally, biotechnology can be used to produce nutritionally superior foods thus improve the food safety and food quality aspects of food security. In Kenya, biotechnology was introduced in use of tissues culture for various food crops such as bananas (Wambugu, 2001). Use of this technology leads to increase in maize yields by about 50 % compared to use of traditional maize varieties that have previously been used in the field trials (Thomson, 2007).

Nanotechnology in Kenya:

Nanotechnology is the science of using the smallest biological molecules for genetically engineering in different fields such as bio-medical sciences, telecommunication and agricultural production (Ozor and Urama, 2013).

In Kenya, the International Development Research Center (IDRC) in collaboration with the University of Nairobi has invested done research on the use of

nanotechnology in reducing post-harvest losses in horticultural crops (UNCTAD, 2017). According to a report by IDRC on 'Enhanced Preservation of Fruits

Using Nanotechnology (CIFSRF-PHASE II)' 2018, the Enhanced Freshness Formulation (EFF) that has hexanal as an active ingredient can be used as pre-harvest spray or post-harvest and has an ability to extend fruit shelf by 2-3 weeks under ambient storage conditions.

By delaying the ripening process, it is likely to increase farmer income by 15-20 % since smallholder producers can negotiate for better prices and exercise marketing timing for their produce (Subramanian et al., 2018).

Biological and biochemical technologies:

Seed type is one of the most important factors contributing to low crop productivity in Kenya. Prevalent in the agricultural sector is use of poor quality seeds which at times involves recycling of planting seeds from previous season and use low yielding seeds that are poorly suited to their agro ecological zones subsequently placing smallholder producers at a disadvantage in comparison with producers across the world who have access to pest and diseases resistant

seeds that are high yielding.

Policy recommendations

Technological Needs Assessment (TNA) has to be done before innovations are done. It is not enough for a technique to be technically sound, it must also be adapted to suit the specific conditions found on the ground by understanding why farmers do what they and ways to improve their practices.

Strong institutions and capacity building is lacking in light of science and technology innovation. Research institutions through government and private sector involvement need to be well equipped to encourage innovation of new technologies.

Increased investment in agriculture will go a long way in contributing towards food and nutrition adequacy. With decentralization county governments have been allocated significant responsibilities in agriculture. This should be utilized to ensure that agricultural areas in the grass roots get funding that is aimed at increasing productivity.

Climate smart agriculture: The Nigerian Experience

By Okpokiri Chibuzo

Dept. of Agribusiness and Management,
Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria

The high dependency of developing countries on agriculture cannot be overemphasized. It is believed that majority of the working population in most developing countries are directly or indirectly earning a living from agriculture.

It is expected that since majority of the working population are linked to agriculture, the sector will be characterized with top notch technology and robust development but that is not the case in most developing countries like Nigeria. Agriculture in most developing countries in Africa is still characterized with the use of crude implements, land fragmentation & tenure system, inadequate use of improved varieties, rain fed agriculture and agriculture dependent on the vagaries of weather conditions (climate change) amongst others. Climate change is the chief challenge among the aforementioned problems having a big impact on agricultural output. Although climate change is world over, the impact will be felt more by developing countries in Africa because of its geography, its sole dependence on agriculture and its generalized incapacity to cope and adapt to climate extremes. Climate change will make it more difficult to meet the key Sustainable Development Goal of ending hunger, achieving year-round food security, and ensuring sustainable food production systems by 2030.

Agriculture is a major source of greenhouse gas emissions and change in climate in developing countries.

Bush burning, excessive tillage, the use of inorganic fertilizers, deforestation, etc. are examples of ways agriculture contribute to the problem. In the attempt to address this problem, climate smart agriculture (CSA) concept was developed. It is believed that climate smart agriculture will address the complex issue of how to achieve sustainable agricultural growth for food security under climate change.

Agriculture is said climate smart when it achieves three main goals: these are (1) sustainably increasing agricultural productivity to support equitable increases in incomes, food security and development; (2) adapting and building resilience to climate change from the farm to national levels; and (3) developing opportunities to reduce GHG emissions from agriculture compared with past trends. It is pertinent to note that the tripartite objective of climate smart agriculture may not be met at once; importance of each objective differs across countries and situations. Developing countries, where agricultural growth and adaptation for food security and economic growth are a priority, and where poor farmers are the most affected by climate change can key into the first and

second objectives to practice climate smart agriculture (CSA).

Although many researchers believe that CSA is a not new agricultural system nor a set of practice, but is a new approach, that guide farmers to adopt the needed changes of agricultural systems, address food security and climate change.

Most farmers in Nigeria have unconsciously been practicing some CSA practices. The paper tries to create awareness of climate smart agricultural practices and also encourage farmers to key into these practices as they improve their product offerings.

Climate smart agricultural practices adopted by most farmers in Nigeria can be grouped into six (6) categories;

Conservative agriculture: This practice is concerned with the effective and efficient use of natural resources (soil, water, biological resources). This is achieved by encouraging farmers to practice crop rotation, permanent soil cover (cover crops) and reduce soil disturbance through direct seeding with reduced and zero tillage.

Organic Agriculture: Compost manure, mulching, oil palm tree residues, use of cover crops, crop rotation and planting of nitrogen fixing legumes that enrich the soil (nitrogen management) are common place in organic agricultural practice. Mixed farming is also practiced.

I. Integrated Crop Management

This practice tries to strike a balance between the use of inorganic practices like the use of herbicides, inorganic fertilizers, pesticides and inorganic practices in other to reduce environmental pollution and increase efficiency in input use in a way that avoids harm to the environment. Farmers use a combination of both organic and conventional production to boost their productivity.

II. Use of Adapted Crop and Animal Varieties:

Improved high yielding drought tolerant varieties of cereals, grain legumes, roots and tubers with tolerance to major disease and pests. In addition, use of improved animal breeds with increased output and tolerance to disease and pests are also practiced. They give yield increase often more than 100% over local varieties.

III. Indigenous Knowledge: To cope with the negative impacts of climate change, communities employ traditional/ local and indigenous knowledge based practices. This helps the farmers determine to either plant early or late. It also helps in detecting early or late rainfall with a high degree of certainty. In the Bauchi area of North central Nigeria, farmers estimate early or late commencement of rainy season by the height at which birds chose to nest on trees

Challenges of climate smart agriculture in Nigeria

I. Policy: Review of literature shows that few governmental policies are directed to climate smart agriculture. This is the biggest challenge to climate smart agriculture. A good governmental policy on the subject matter will help pave way for farmers to practice sustainable agriculture. It will also encourage collaborations with international communities, non-governmental organizations, private sector and other stakeholders in fostering a conducive environment for climate smart agriculture to thrive in the country.

II. Lack of awareness:

Most farmers in Nigeria have unconsciously been practicing some climate smart agriculture. There are few adverts and jingles on the print media and social medias sensitizing the public on CSA.

III. Agriculture extension, which serves as the most effective way of getting to farmers in the hinterlands are ill equipped and poorly funded. This have affected their services offering and reduced the awareness of CSA by rural farmers who need these awareness as they are the food hub of the country.

IV. Lack of financial resources:

Most farmers cite this problem as a major challenge to adaptation of CSA practice. The poor state of farmers' income leaves them no choice but to continue in their old practices. Adoption of CSA increases their cost of production.

Although, the Nigerian government have tried to make credit affordable and available to farmers; these funds do not get the real farmers. These farmers are discouraged and resort to doing their farm business as usual. In addition, CSA are generally more profitable in the long-term compared to conventional farming. This also discourages the farmers who want to see immediate return on investment.

V. Poor understanding of CSA concepts:

CSA is clearly knowledge-intensive and for it to be effectively implemented, well designed, inclusive, and innovative knowledge management systems are essential. Limited technical assistance constitute limiting factors to the adoption of CSA practices. Most farmers lack needed assistant to help foster their interest in CSA and the right model peculiar to their location, the right varieties to use and improve ways to carry improved farming. These discourages most people from venturing into CSA practice.

Recommendations

- Government should incorporate CSA in their agricultural policies. Although, most of the national policies have elements that support climate smart agriculture. Policy should be made with CSA as the main goal. This will encourage and improve adoption of all Climate Smart Agricultural practices especially those ones that were not highly adopted by farmers in the country.

- Efforts should be made by research institution to train extension staff properly about all the components of climate smart agricultural practices. Extension staff should in turn disseminate extensively accurate information on Climate Smart Agricultural practices to cover a larger proportion of farmers in the country.
 - Government should provide incentives and enabling policy environment towards adoption of good CSA practices. Access to credit will also enhance the capacity of farmers in procuring the necessary climate smart inputs.
 - Sensitization campaign and media jingles on the truth of climate change and the need to adopt climate smart practices towards reduction of adverse effect of climate change and improve food security should be strengthened.
- Climate change is here and not going anywhere. Its time African countries joined the rest of the world in the fight for the living against climate change. Winter is here.

African Technology Policy Studies Network (ATPS)

Africa Science Revival Week: ATPS Eswatini Chapter

By Professor Musa Dube

Eswatini (former Swaziland) National Chapter (ESNC) under the auspices of African Technology Policy Studies Network (ATPS) celebrated Africa Science Week Revival on 26 July 2019. The celebration was held at the University of Eswatini (UNESWA), Faculty of Agriculture, Luyengo Campus. During the celebration, a Seminar was organized. During the Seminar, Prof. C. Maphosa, Director of Institute of Distance Learning at UNESWA presented on the Prospects of harnessing Science, Technology and Innovation to use in E-Learning. The highlights of the Seminar included welcome remarks by Prof. A. M. Manyatsi, Acting Dean of the Faculty of Agriculture, Prof. Musa M. A. Dube, National Coordinator and the Prof. C. Maphosa as the main speaker on this special day.



Prof. A. M. Manyatsi

In his welcome remarks, Prof. Manyatsi commended ATPS Network for the initiative to start National Chapters to captain and coordinate the promotion of Science, Technology and Innovation (STI) in Africa. He stated that this initiative has steadily nurtured harnessing of STI which in turn has aided development. Prof. Manyatsi further commended the ESNC for organizing the Seminar and selection of such a prominent Scholar to give a Seminar. He concluded welcome remarks by further appreciating his association with ATPS Network since 1992.

Specifically, Prof. Manyatsi stated that the ATPS Network has made him grow; hence, today he is a Professor.

Following the welcome remarks, Prof. Musa M. A. Dube, National Coordinator made remarks on who is ATPS-SDC (ATPS ESNC) and the purpose for the Meeting. Prof. Dube further stated that the major focus of the Meeting was to continue to popularise ATPS-SDC and its endeavour to

promote harnessing of STI for aiding development in general.

Finally, he encouraged delegates (participants) to join ATPS-SDC (ATPS- ESNC).

Prof, Maphosa presented on the Prospects of harnessing Science, Technology and Innovation to use in E-Learning. The highlights of his presentation were that: i. Education is a human right not a privilege, ii. Sustainable goals 1-5 all prioritise the well-being of people for sustainable economic development; iii. SDG #4 being the major focus and target of 2030 agenda; iv. Focus of the African Union Agenda 2063 and v. Unpacking of E-Learning using STI. Details of each the five aspects of Prof. Maphosa can be read in his power point presentation posted by ATPS-Network.

He concluded his presentation by acknowledging that there are challenges in harnessing Technology for E-Learning;



Prof. Musa A Dube

African Technology Policy Studies Network (ATPS)

**Prof. C Maphosa**

Training of students and (ix) involvement of parents.

namely: capacity, policy/planning and cost of infrastructure.

He recommended that models for ICT integration in education and pre-requisites for effective implementation of E-Learning in Eswatini should be exploited. These included: (i) Clear/detailed/ implementable policy pronouncements, (ii) Internal availability in schools and higher education institutions (sound partnerships-government and private sector), (iii) Development and utilization of Learning Management Systems and appropriate applications, (iv) Availability of Computers, (v) Availability of hand held devices; smart phones, tablets and laptops, (vi) Conversion of learning materials into electronics/multi-media formats, use of OERs, (vii) Professional development of Teachers, (viii)

Evaluation of some Marine Seaweed as Food Supplements

By Maha Ahmed Mohamed Abdallah.

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Abstract

The chemical composition, essential trace elements and minerals of four indigenous seaweeds: brown (*Colpomenia Sinuosa*), red (*Hypnea musciformis*) and green (*Codium fragile* and *Caulerpa racemosa*) from Alexandria coast were investigated. In this study, the protein content varied from 18.5% to 42%. The highest value was found in *C. sinuosa*. Carbohydrate contents in the four species varied significantly and the values observed were negatively related with proteins. The four marine seaweeds contained relatively higher amounts of minerals (6538–23045 mg/100g; Na, K, Ca, Mg) and trace elements (20.57–144.5 mg/100g; Fe, Zn, Mn, Cu), than those reported for land vegetables as well as to other edible seaweeds. These seaweeds contain (3% - 61% carotenoid) more the quantity of any of the common vegetables. Brown and red seaweeds could be used as a food supplement to meet the recommended daily intake of some essential metals to improve the nutritive value in human diet

1. Introduction

Seaweeds are used for human and animal feed, as well as fertilizer, fungicides, herbicides. Phycocolloids (as Chlorophyta) are commonly used as food due to high contents of vitamins and minerals, Phaeophyta are typical suppliers of alginic acid. Rhodophyta are responsible to produce agar and carragenan (Chapman and Chapman, 1980; Nisizawa et al., 1987).

The nutritional properties of seaweeds are not completely known yet, and they are usually estimated from their chemical composition alone (Mabeau & Fleurence, 1992). Compared to land plants, the chemical composition of seaweeds has been poorly investigated and most of the available information only deals with traditional Japanese seaweeds (Nisizawa et al., 1987; Watanabe & Nisizawa, 1984). The chemical composition of seaweeds varies with species, habitats, maturity and environmental conditions (Ito & Hori, 1989). Consumption of seaweeds can increase the intake of dietary fiber and lower the occurrence of some chronic diseases (diabetes, obesity, heart diseases, cancers, etc.), which are associated with low fiber diets of the Western countries (Southgate, 1990). The different species consumed represent a great nutritional value as source of minerals, protein, carbohydrates and vitamins (Marinho-Soriano et al., 2006). Because of their low fat contents and their proteins and carbohydrates which cannot be entirely digested by human intestinal enzymes seaweeds contributed few calories to the diet (Lahaye and Kaeffer, 1997).

Asian cultures have traditionally employed marine seaweeds (macroalgae) as a natural source of food and medicines (FAO, 2002). Six million tons of fresh algae are now cultivated per year worldwide, amounting to around 90% of the commercial demand (FAO, 2002). Consumers in most developed countries are turning to more natural and nutritional products such as seaweed-based products, many of which have unrivalled healthy properties (Netten et al., 2000). It is now possible to find out a large variety of products derived from macro and microalgae throughout Egypt and a huge increase in consumption is expected in the next few years (Fayza et al. 1984, Zakaria, 2002, Abdallah, 2007 and 2008). In the context, the chemical composition (caroteniod, protein and carbohydrate), minerals (Na, K, Ca, Mg and P), essential trace elements (Zn, Cu, Mn and Fe) of four different seaweeds (*Colpomenia Sinuosa*, *Codium fragile*, *Caulerpa racemosa* and *Hypnea musciformis*) from Mediterranean coast of Egypt (Alexandria coast) was investigated. In order to provide more comprehensive nutrient information about them also to evaluate their use as a potential food ingredient and/or the toxicological point of view.

Keywords: Marine seaweeds; Chemical composition; Essential trace elements; Mineral.

2. Material and Methods

2.1. Sample collection and preparation

Four marine seaweeds: brown (*Colpomenia Sinuosa*), red (*Hypnea musciformis*) and green (*Caulerpa lentillifera* and *Codium frogile*) were collected bimonthly during 2009 - 2010 from the Abu Qir Bay along the Mediterranean Sea coast in the city of Alexandria, Egypt (31° 16' and 31° 21' N, 30° 5' and 30° 22' E.). In laboratory, the seaweeds were cleaned, washed with distilled water to remove epiphytes and encrusting material and then they were air-dried for three days then dried at 50°C for 48h. The dried samples were pulverized and passed through 1-mm mesh sieve. The milled seaweed samples were stored in plastic bags at room temperature for further analysis. All determinations were performed in triplicates.

2.2. Analytical measurements

The treated samples of around 1 g were weighed and placed in a Teflon reactor fitted to a stainless steel container. After addition of 1mL of ultrapure water (Milli-Q, Millipore) and 5mL of concentrated nitric acid (Merck, Supra pure), the reactor was set to 90 °C for 2 h. Small amount of HClO₄ and HNO₃ mixture (1:2) was added very slowly and heated to 120°C. After near dryness, the digested sample was transferred to a volumetric flask and made up to 25 mL with Milli-Q water.

The metals in the extracted samples were analyzed through atomic absorption spectrophotometer (Varian Techtron- Model 10 plus) following the procedures described by AOAC (1995). Total protein, carbohydrates and carotenoid contents were measured using 1g dry weight of each algal sample. Total protein content was estimated spectrophotometrically at 650 nm by the method described by Rauch (1981) and Hartree (1972). Total carbohydrates content were estimated according to Dubois et al. (1959). The results were expressed as mg/100g dry weight. All analytical protocols were included in a quality control system, which included analysis of certified reference materials, duplicated samples, procedural blanks and international inter laboratory exercises.

Chemical composition	<i>Caulerpa racemosa</i>	<i>Codium fragile</i>	<i>Hypnea musciformis</i>	<i>Colpomenia sinuosa</i>
Proteins	18070 – 42011 (30040±119.7) 30%	12650 – 24510 (18570±593.0) 18.5%	23002 – 48091 (35540±125.4) 35.5%	14901 – 33102 (42000±910.5) 42%
Carbohydrates	24638 – 48123 (36380±117.4) 36.4%	21190 – 34550 (27870±66.80) 27.8%	35122 – 48819 (41970±168.4) 42%	5757 – 8123 (6940±118.3) 6.94%
Carotenoid	44 – 69 (56±12.52) 56%	50 – 72 (61±11.1) 61%	1.2 – 4.8 (3±1.85) 3%	4.9 – 6.9 (5±1.81) 5%

Table 1. Chemical composition (range and mean ±SD) of studied seaweeds (mg/100g dry weight) and its %

2.3. Statistical Analysis

The results of the analysis are reported here as means were calculated with standard deviations. The standard deviations of pooled samples (seaweed) refer to the variability within different replicates.

3. Results and discussion

3.1. Minerals by atomic absorption spectrophotometry.

Mineral content has been shown to vary according to seaweed species, oceanic residence time, geographical place of harvest, wave exposure, seasonal, annual, environmental and physiological factors, type of processing and method of mineralization (Yoshi e et al., 1994). Minerals in the studied seaweeds that determined by atomic absorption spectroscopy (Table 1) showed that these seaweeds contained high amounts of the macrominerals (6538–23,045mg/100 g) and trace elements (20.5 – 144.5 mg/100 g) needed in human nutrition.

Mineral content in seaweeds was higher than the values reported for edible land plants (Indegaard & Minsaas, 1991; Ortega-Calvo et al., 1993). Macromineral contents of typical land vegetables (USDA, 2001), expressed for direct comparison as Na+K+Ca+Mg in mg/100 g dry weight, are: carrots 3276; onion 190; potato 6015; tomato 3429. Only the high macromineral value of spinach (9679) was comparable to that of seaweeds (Table 2). Most of the seaweeds showed Na/K ratios were below 3.0 in all the seaweeds studied (0.14–2.74), which is interesting from the point of view of nutrition, since the intake of sodium chloride and diets with a high Na/K ratio have been related to the incidence of hypertension. For instance, Na/K ratios in olives and sausages dried beef, cheese and cookies are 43.63, 4.89, 7.81, 17.55 and 7.97 respectively (Ortega-Calvo et al. 1993).

3.2. Essential trace elements

The level of selected essential trace elements (Cu+Zn+Fe+Mn) detected in *Hypnea musciformis*, *Colpomenia Sinuosa* and *Caulerpa lentillifera* was found higher (144.5, 113.8 and 59.45 mg/100g respectively) than that in previous reports on edible seaweeds *Undaria pinnatifida*, *Laminaria digitata* *Porphyra tenera*, *Fucus vesiculosus*, and *Chondrus crispus* reported from Spain (Kolb et al., 2004; Rupèrez, 2002), as well as higher than any of the land vegetables except spinach that showed the highest trace element content (50.7 mg/100 g, Table 2). Meanwhile lower than that measured in *Porphyra vietnamensis* (146.68 mg/100g) as well as in *Enteromorpha compressa* (199 mg/100g) by Subba Rao et al (2007) and Abdallah (2007).

The levels of essential trace elements detected (Table 1) also fit within the ranges observed in previous reports on seaweeds (Ortega-Calvo et al., 1993). Zn content (0.625–2.685 mg/100g, Table 1) in marine seaweeds was below the maximum amount allowed in macroalgae for human consumption in Japan and France (1.5–10 mg/100 g, respectively; Indegaard and Minsaas,1991). Algal products would supplement the daily intake of some trace elements for adults: Fe, 10–18 mg; Zn, 15 mg; Mn, 2.5–5 mg and Cu, 2–3 mg (Indegaard and Minsaas, 1991). Among all the 4 minerals analyzed Fe and Mn were found to be highest (18.51 – 131.45 mg/100 g) and (1.15 – 9.69 mg/100 g) respectively in all seaweeds.

3.3. Chemical composition

In (Dawczynski et al., 2007). In this study the protein content of the tested species were 30% to *C.racemosa*, 18.5% to *C. fragile*, 35.5% to *H. musciformis* and 42% to *C. sinuosa*. Generally, Dawes (1998) reported that, the members of Rhodophyta are characterized by greater protein content when compared to the Phaeophyta. But this rule is different in the current study where the results proved that the Phaeophyta contains the highest protein than that in Rhodophyta. In comparison with most species habitually consumed as food, *Hypnea musciformis*, *Colpomenia Sinuosa* and *Caulerpa lentillifera* contain greater levels of protein. Meanwhile, the mean of protein content (18.5 – 42%) recorded in the studied seaweeds was higher than the concentrations some red algae, the protein fraction can represent between 2.7% and 47.0% (dry weight) of the plant found in higher plants (Norziah and Ching, 2000).

The proximate protein contents of the four seaweed species and some edible vegetables show high values than that recorded in the vegetables i.e. (Tomato, Carrots, Red spinach, Broccoli had 1.4%,1.0%,2.8% and 4.1% protein content respectively). Changes in carbohydrate content were observed in the studied seaweeds throughout the study period (Table 3). The mean carbohydrate content for *Hypnea musciformis* (41970±168.4 mg/100g dry weight) was higher than for *Caulerpa racemosa* (36380±117.4mg/100g dry weight), *Codium fragile* (27870±66.80 mg/100g dry weight) and *Colpomenia sinuosa* (6940±118.3 mg/100g dry weight). In this study, inverse relationships between carbohydrates and proteins were shown, it may correspond to a pattern observed for several species that the proteins acted inversely (Rotem et al., 1986). Thus, the active period synthesis of carbohydrate is characterized by decrease in protein concentration in seaweed and vice versa.

3.4. Comparison between the different seaweeds

The relative abundance of minerals in *Hypnea musciformis* (Red seaweed) decrease in order: Ca>Na>K>Mg, *Caulerpa racemosa* (Green seaweed) decrease in order: K>Ca>Na>Mg and *Colpomenia sinuosa* (Brown seaweed) decrease in order: Ca>Na>Mg>K while *Codium fragile* (Green seaweed) decreased in the order: Na > K>Ca >Mg. Meanwhile, the relative abundance of essential trace elements in all studied seaweeds was decreased in the order: Fe < Mn < Zn <Cu this consecutive order agreed partially with results obtained from Spain by Rupérez (2002).

The highest levels of Fe and Zn were recorded in *H. musciformis* and *C. sinuosa* while highest levels of Ca, Mg and Na were recorded in *H. musciformis* and *C. racemosa*. The levels of trace elements detected in this study are fit within the ranges observed in previous reports on seaweeds (Mabeau & Fleurence, 1992; Ortega-Calvo et al., 1993; Rupérez, 2002). Meanwhile, the red seaweed (*H. musciformis*) reveals the highest contents of carbohydrates and nitrogen, while the highest contents of protein was reveal in brown seaweed (*C. sinuosa*). This study has shown an important mineral content in several edible marine seaweeds. Edible green, brown and red seaweeds could be used as a food supplement to help meet the recommended daily adult intakes of some minerals and trace elements.

Four different kinds of algae are complementary in terms of concentration of essential elements and mineral salts, protein and carbohydrates so it is difficult to say that one of them better than the other in terms of nutrition. In other word, the present study indicates the possibility of *H. musciformis*, *C. sinuosa* and *C. racemosa* to be a potentially good source of protein and essential elements and it could be used as a spice in food supplements to improve the nutritive value of the human diet. More study is necessary to evaluate the nutritional value of these seaweeds as food ingredients.

Innovation in Poultry farming: Arinifu Smart Brooder

Interview with Mr. George Chege

By Nita Karume

What was the motivation behind the inception of Arinifu Smart Brooder?



This solution was made to directly address a problem one of our founders faced as a chicken farmer. As a university student, he decided to team up with 2 friends to raise poultry thinking it was an easy task. Little did they know, what they had researched on the internet was very different from the actual task at hand. Having spent some uneasy nights, lost quite a number of chicks within the first few weeks and eventually losing a lot of money, they decided poultry rearing shouldn't be that difficult. Being Engineers, they decided to find a solution to their problem in case they kept more poultry in future. As fate would have it, rearing poultry while studying would be close to impossible but this did not deter them from finding a solution. After lots of research from local farmers with lots of experience, international scientific journals and input from American Industrial designers, the Smart Brooder was born. It was meant to be a device that was very easy to use and for people from all walks of life. To accomplish this, it meant a custom algorithm would need to be developed which formed the backbone of our program basically a culmination of all the research done. Remembering the chilly walks to be brooder

at 4am, GSM/SMS had to be incorporated to ensure peace of mind knowing one would be alerted in case of any faults. With lots of testing and prototyping, we finally have a product each and every poultry farmer needs in this 21st Century age of precision agriculture.

What are some of the challenges you have faced with reference to the establishment of the tech company?

We have encountered a challenge in lowering the cost of our units to allow reach to more farmers. This can only be achieved by mass production, which requires finances. We are also struggling with Sales and marketing staff, meaning the team is stretched doing sales thus slowing our core functions. We have to take time to educate farmers such technology exists and get them over their fear of unknown technology.

How does the digital smart brooder work?

Our vision is to enhance poultry farmer output by providing access to new, affordable and efficient technologies. We work with the farmers to understand the challenges they face then tap into technology for solutions. At the end of it, we want them to receive better returns and ultimately better standards of life. Brooding involves supplying chicks with supplemental heat. During the first weeks of a Chick's life, heat is more important than food. The chick seems anatomically complete at hatch, but it's thermoregulatory, gastro-intestinal and immune system needs further development/maturation.

The smart brooder is an environmental

control device, which ensures the conditions in the brooding space are kept within optimal levels, thus leading to better results.

It is composed of a few sensors either 3 or 5 (either 2 or 4 temperature sensors and 1 humidity sensor), which take readings throughout the brooding space and relay the data to a chip which is programmed to determine the age of the chicks and regulates the conditions in the brooding space accordingly since as chicks age, they feather and their environmental requirements change. Temperature is important for

of the chicks since they do not have the mechanism to maintain their internal survival temperature for their first few weeks. Humidity is important since it determines the rate of growth of bacteria within the coop. GSM is used to convey data to the farmer and one can expect a SMS if something goes wrong. We use Sms because of its wide network coverage across Africa and it works well with Feature or Smart Phones.



How have you ensured inclusivity in that the device is available to farmers irrespective of the size of their poultry farm? In essence, does a poultry farmer require up to a particular number of poultry for them to use the digital smart brooder?

We work with commercial poultry farmers' i.e those rearing chicken as a business. We have systems running from as little as 50 chicks with our largest farm being close 20,000 birds.

What is the current scope of the digital smart brooder (how many counties have you been able to reach)?

We are currently operating in Kenya and hoping to expand the rest of Africa in due course.

Poultry farming in Kenya has numerous challenges, from lack of information on proper management, inadequate funds to purchase feeds, to lack of access to core markets to sell their stock. What measures have you put in place to mitigate such issues especially in areas where poultry farming is widely practiced?

We talk to farmers in the field and have a very clear understanding of their biggest issues. We are currently working on our second innovation to handle some of the issues listed above.

How has KALRO influenced and or endorsed the digital smart brooder innovation as a means to improve poultry farming in Kenya?

Unfortunately, when we were starting of and tried to engage KARI, we felt like no one was keen on partnering with us and since then, have not engaged any organization again. 8. Poultry farming represents 30% of the agricultural 25% contribution to the GDP, a %age that is expected to increase. In your opinion, what are some of the factors that can improve poultry farming in Kenya? The only way to make poultry farming better and more competitive is by reducing the cost of feeds and ensuring the best feeds are available to farmers consistently. This will need a reduction in prices of raw materials and if farmers are pushed far enough, they will turn to making their own feed as some are already doing.

Poultry farming represents 30% of the agricultural 25% contribution to the GDP, a %age that is expected to increase. In your opinion, what are some of the factors that can improve poultry farming in Kenya?

The only way to make poultry farming better and more competitive is by reducing the cost of feeds and ensuring the best feeds are available to farmers consistently. This will need a reduction in prices of raw materials and if farmers are pushed far enough, they will turn to making their own feed as some are already doing.

The digital smart brooder is designed to make any brooder's atmosphere conducive for the growth of chicks. How does the unpredictable weather pattern affect this?

The brooder conditions should be kept at precise conditions for optimal performance. The Smart Brooder does this automatically. Therefore, regardless of atmospheric conditions changing outside, the brooder still needs to be maintained at certain conditions. The only changes are in the cost of heating since during extreme cold months, the heating cost rises, but in warm months, the cost reduces



Grants received by ATPS during the quarter

Mainstreaming Ecological Organic Agriculture Initiative (EOA-I) into the Agricultural Systems in Africa

Project Duration: 2019-2023

Grantor: Swiss Agency for Development and Cooperation (SDC)

Principal Investigator: Dr Nicholas Ozor

Contact Email: executivedirector@atpsnet.org

Grant Amount: USD 684,310

Development Goal

The EOA-I aims to transform and create sustainable food systems through promoting ecologically sound strategies and practices among diverse stakeholders in production, processing, marketing and policy making, to safeguard the environment, improve livelihoods, alleviate poverty and guarantee food security.

The overall goal of the initiative is to mainstream EOA into national agricultural production systems by 2025 in order to improve agricultural productivity, food security, access to markets and sustainable development in Africa.

Development of Implementation Index and, Monitoring and Tracking Tools for the Nationally Determined Contributions (NDCs) in Selected Eight Countries in Africa

Project Duration: 2019

Grantor: PanAfrican Alliance for Climate Justice (PACJA)

Principal Investigator: Dr Nicholas Ozor

Contact Email: executivedirector@atpsnet.org

Grant Amount: USD 43,528

Developmental Goal

This project seeks to enhance the African Civil Society Organizations' (CSOs') engagement in the climate governance discourse at national, regional and continental levels, enabling them to be at the centre-stage in the continent's acceleration on the transition to a low carbon, climate resilient, sustainable development through the effective implementation of Nationally Determined Contributions (NDCs).

Key Objectives

To develop the NDC Implementation Index:

To develop the Monitoring and Tracking tools to Support Index

Papers published by ATPS during the quarter

During this quarter, ATPS published the following documents:

Journal

1. Bertha V., B. Oyelaran-Oyeyinka, Nicholas Ozor, and M. Bolo (2019) Open Innovation and Innovation Intermediaries in Sub-Saharan Africa. *Sustainability*, 11(2), 392 (1-18); doi: 10.3390/su11020392. Available online at: <https://www.mdpi.com/2071-1050/11/2/392/html/>

Technopolicy Brief

1. Dr. Julius Mugwagwa, Dr. Geoffrey Banda, Dr. Nicholas Ozor, Dr. Maurice Bolo, Ms. Ruth Oriama (2019) New Approaches for Funding Research and Innovation in Africa *African Technopolicy Brief No. 49*

For more information please visit : <https://atpsnet.org/technopolicy-briefs/>

Research Paper

1. Dr. Julius Mugwagwa, Dr. Geoffrey Banda, Dr. Nicholas Ozor, Dr. Maurice Bolo, Ms. Ruth Oriama New Approaches for Funding Research and Innovation in Africa ATPS Research Paper No. 30

For more information please visit: <https://atpsnet.org/research-papers/>

2nd All Africa Postharvest Congress and Exhibition and Call for abstracts and papers September 17, 2019 to September 20, 2019

Postharvest Loss Reduction and Agro-processing: Drivers of Agricultural Transformation in Africa
Acknowledging the urgent need to address this global challenge, the University of Nairobi and a consortium of partners led by the Rockefeller Foundation, in conjunction with the World Food Preservation Center® LLC (WFPC) organized the 1st All Africa Postharvest Congress and Exhibition (AAPHCE) from 28th to 31st March 2017, in Nairobi, Kenya. The Congress, whose theme was 'Reducing Food Losses and Waste: Sustainable Solutions for Africa', sought to contribute to the continental and global agenda of reducing postharvest food loss and waste (FLW).

Guidelines for Abstract submission:

The abstract should be written in English language in MS word or rich text format and have a maximum of 300 words in Times New Roman font size 12. The abstract MUST have the following details:

- Concise title (maximum 15 words)
- Names of authors, their affiliation and mailing address and the corresponding author contacts
- The body of the abstract should contain clear objective(s), methodology, results, discussion and conclusion/recommendations
- Key words

The abstracts MUST be relevant to the congress theme and aligned to one or more of the five conference subthemes. Priority will be given to papers that demonstrate practical solutions (technologies, practices, strategies) to food loss and waste reduction.

The abstracts submission and registration can be made on the online platform at www.au.int. The abstracts can also be submitted as attachments to the congress E-mail address: Postharvest2019@africa-union.org with a copy to africa.postharvestcongress@gmail.com. We warmly welcome you to submit your abstracts and register before the deadline.

Publication of Congress Papers

Selected good articles from the Congress to be published in a Special issue of the African Journal of Science, Technology, Innovation and Development, following the normal peer-review process.

For more information please visit: <https://au.int/en/newsevents/20190917/2nd-all-africa-postharvest-congress-and-exhibition>

ONE WORLD AWARD 2020: Honoring the Visions and Activities of Persons and Organizations

Deadline: 30 September 2019

The natural health food producer Rapunzel Naturkost and IFOAM have launched the 'ONE WORLD AWARD 2020' (OWA) to honor the visions and activities of persons and organizations.

The award recognizes and promotes outstanding achievements within the context of the three areas of sustainability. It also recognizes people who demonstrate that globalization can indeed be more than the maximization of profits at the cost of the majority of the people around the world. Special attention in the selection process will be given to real innovation, role models and role potential that could be up-scaled and "globalized".

Objectives

To promote a globalization that is not oriented on profit maximization, but on the three pillars of sustainability: ecology, social aspects, economical welfare;

To recognize outstanding engagement and achievements in providing creative and highly effective solutions in the areas of environment protection and fair livelihoods;

To encourage more involvement for a loveable, liveable future and for peaceful community building.

Contributions and Achievements

The OWA jury selects five winners from the submitted nominations.

Eligibility Criteria

Nominations for the international ONE WORLD AWARD can be submitted from any country in the world. The OWA has no preferences with respect to certain geographical regions. The nomination procedure is very flexible and open, in order to allow for a wide variety of candidates. Nominations can be submitted either by individuals or by organizations.

For more information please visit: <https://www.one-world-award.com/>

DAAD Scholarship Programme for Developing Countries

DAAD Scholarships for Developing Countries have benefited hundreds of African students since inception. The scholarships are given each year to postgraduate students wishing to study for a master's or PhD degree. DAAD does not sponsor undergraduate studies in Africa. The DAAD scholarships can support students who want to study in their country (In Country Scholarships) or abroad.

Requirements

Bachelor degree first class honours or second class honours upper division
Age limit: 36 years.

DAAD Scholarships - Master in Germany

Are you an ambitious young professional with a good bachelor's degree not older than 6 years, or below the age of 36, with at least two years of professional experience and want to further your career? Mostly taught in English, the courses are in the fields of Economics, Engineering, Regional Planning, Agriculture, Health, Law and more.

DAAD Scholarship - PhD in Germany

Are you an ambitious young scholar with a master's degree (completed less than 6 years ago), would like to experience the German scientific world and earn a PhD from a German university? See the information below.

Special Call for Applications for DAAD Ph.D. Scholarships to Germany 2019/2020 for East Africans & Southern Africans

DAAD is offering Research Grants for Doctoral Candidates and Young Scientists and Academics for the academic year 2019/20 to pursue a Ph.D. in Germany. The scholarships are open to all fields of research.

DAAD offers eight scholarships to Kenyans and Kenyan residents with an excellent Master's degree.

Twenty additional scholarships for Kenyan University staff members are jointly offered by DAAD and the Government of Kenya (GoK). This programme is administered by the National Council for Science and Technology (NCST).

Also, in collaboration with the Government of the United Republic of Tanzania, twenty scholarships are on offer for staff members of Tanzanian public Universities. This programme is administered by the Tanzania Commission for Universities (TCU).

There is no age limit, but the Master's degree must not be older than six years at the time of application. Please be aware that some additional scholarships are available for residents of Eastern and Southern African countries holding an excellent Master's degree.

Application Deadlines: Different for each country.

For more information please visit: <https://www.daad.de/deutschland/stipendium/en/>

African Technology Policy Studies Network (ATPS)

Recirculate Entrepreneurship & Innovation capacity building workshop in Lusaka, Zambia



Ms. Nyabaro and Dr. Ozor with fellow delegates



Recirculate delegates



Recirculate Residence Attendees at Lancaster, UK

ATPS Staff Retreat



Dr. Ozor starting off a retreat with a presentation



Prof. Osita Ogbu, The retreat Moderator



ATPS Staff Members and Prof. Osita Ogbu (3rd right)

African Technology Policy Studies Network (ATPS)

ATPS/AAS MoU signing



Dr. Ozor with AAS Officials



Ms. Christine Kuto and Dr. Isayvani Naicker



Mr. Alfred Nyambane and Ms. Ruth Oriama

ATPS/AAS MoU signing



ATPS/AAS Staff look on as Dr. Ozor and Prof. Torto sign the papers



Dr. Ozor, Prof. Torto with signed copies of the MOU

African Technology Policy Studies Network (ATPS)

Southern Voices Network for Peacebuilding (SVNP) Conference in Abidjan, Cote d'Ivoire



SVNP Conference delegates



SVNP Members at the AfDB Headquarters in Abidjan

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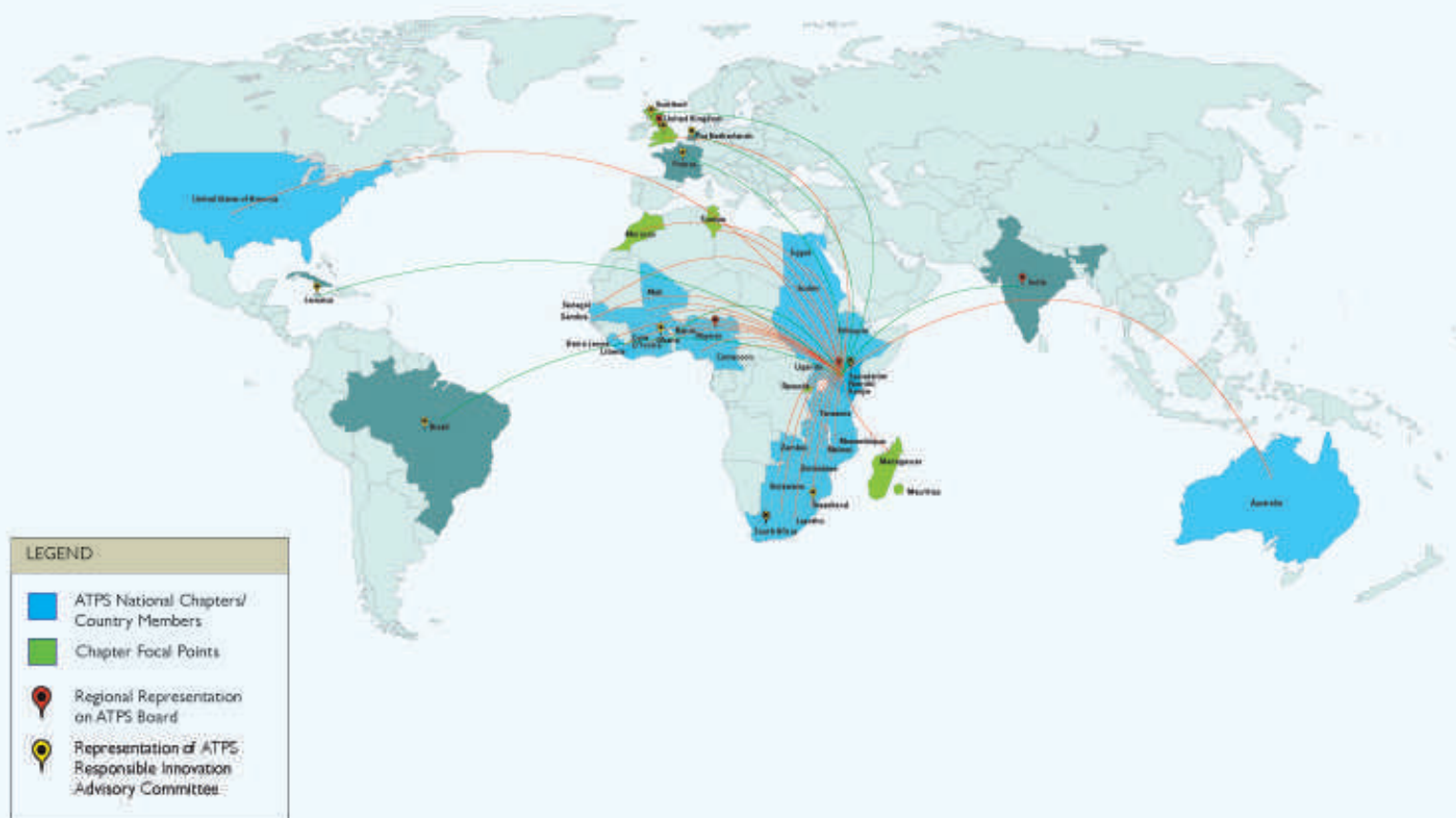
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ATPS National Chapters & Focal Points





**ATPS: Building Africa's Capabilities
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*25th
Anniversary*

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