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Science and Technology Policy
Research Institute
(CSIR-STEPRI)

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CSIR-STEPRI Annual Report 2017

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Compiled by:

Dr. Emmanuel Kodjo Tetteh
Ibrahim Kwame Asante

For any enquiries contact:

The Director
Science and Technology Policy Research Institute
CSIR-STEPRI
P.O. Box CT 519
Cantonments, Accra
Telephone: +233-21-773856/779401
Fax: +233-21-773068
E-mail: director@csir-stepri.org
Website: www.csir-stepri.org

Designed and Printed by:

Print Innovation
+233 267 771 670
+233 202 014893
www.print-innovation.com

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LIST OF ABBREVIATIONS AND ACRONYMS

ACU	Association of Commonwealth Universities
Africa RISING	Africa Research in Sustainable Intensification for the Next Generation
AGRA	Alliance for Green Revolution in Africa
AIC	Agricultural Innovation Centre
AMED	Agriculture, Medicine and Environment Division
AMCOST	African Ministerial Council on Science and Technology
AOSTI	African Observatory of Science, Technology and Innovation
ASTII	African Science, Technology and Innovation Indicator
AU	Africa Union
BioRAPP	Biotechnology and Biosafety Rapid Assessment and Policy Platform
BU	Brunel University
CABI	Centre for Agriculture and Bioscience International
CAVA	Cassava Adding Value for Africa
CAGD	Controller and Accountant General Department
CBMS	Community Based Monitoring Systems
CID	Commercialization and Information Division
CIRCLE	Climate Impact Research Capacity and Leadership Enhancement
CPA	Consolidated Plan of Action
CSA	Climate Smart Agriculture
CSIR	Council for Scientific and Industrial Research
CVF	Career Visiting Fellowship
COHRED	Council on Health Research for Development Association, Switzerland
DFID	Department for International Development
DMTDP	District Medium Term Development Plan
DST	Department of Science and Technology, South Africa
DOW	Description of Work
EC	European Commission
EPA	Environmental Protection Agency
EU	European Union
FAD	Finance and Administration Division
FAO	Food and Agriculture Organization
FARA	Forum for Agricultural Research in Africa
FAW	Fall Army Worm
FBO	Food Business Operator
FORTH	Foundation for Research and Technology Hellas, Greece
GE	Green Economy
GH-NLA	Ghana National Learning Alliance
GIZ	German International Development Cooperation
GLSS 6	Ghana Living Standards Survey 6
GMO	Genetically Modified Organism
IAR4D	Integrated Agricultural Research for Development
ICT	Information and Communications Technology
IDRC	International Development Research Centre of Canada
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGEIP	Integrated Green Economy Implementation Plan

IGF	Internally Generated Funds
IITA	International Institute of Tropical Agriculture
ILA	International Learning Alliance
IP	Intellectual Property
IRD	Institut de Recherche Pour le Développement, France
ISD	Industry and Service Division
KMA	Kumasi Metropolitan Assembly
MESTI	Ministry of Environment, Science, Technology and Innovation
MOFA	Ministry of Food and Agriculture
MOHEST	Ministry of Science and Technology, Kenya
MESCI	Ministério do Ensino Superior Ciência e Inovação, Cabo Verde (Ministry of Higher Education, Science and Innovation, Cape Verde)
NCP	National Contact Point
NDPC	National Development and Planning Commission
NGO	Non Governmental Organization
NIC	Newly Industrializing Countries
NOTAP	National Office for Technology Acquisition and Promotion, Nigeria
NCST	Ministry of Education, Science and Technology, Malawi
OM	Outcome Mapping
OU	Oxford University
PARI	Programme of Accompanying Research for Agricultural Innovations
PEP	Partnership for Economic Policy
PORSPI	Policy Research and Strategic Planning Institute
R & D	Research and Development
SAI	Sustainable Agricultural Intensification
SAIRA	Sustainable Agricultural Intensification Research and Learning in Africa
SARI	Savanna Agricultural Research Institute
SDG	Sustainable Development Goal
SEM	Structural Equation Model
SIDA	Swedish International Development Agency
S & T	Science and Technology
STEPRI	Science and Technology Policy Research Institute
STI	Science, Technology and Innovation
STISA	Science, Technology and Innovation Strategy of Africa
TMA	Tema Metropolitan Assembly
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNCST	Uganda National Council for Science and Technology, Uganda
WB	World Bank
WSU	Washington State University
WP 5	Working Package 5
WECARD / CORAF	West and Central African Council for Agricultural Research and Development



Rev. Prof. S.K. Adjepong
Chairman of CSIR-STEPRI Management Board

CSIR - STEPRI MANAGEMENT BOARD

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MESSAGE FROM THE DIRECTOR OF CSIR-STEPRI



Dr. George Owusu Essegbey
Director of CSIR-STEPRI

Amidst many challenges faced as an internationally acclaimed institution, CSIR-STEPRI was able to facilitate several projects with varying successes in the year 2017. The biggest among the many being the challenge of mobilizing financial resources to fund the Institute's operation.

The funding challenge is not going to go away anytime soon as the government's funding of operational activities have almost dried up completely. How CSIR-STEPRI is able to address this challenge will be fundamental to its future success. In 2017, we were able to strengthen our existing partnerships with other institutions both local and international, which resulted in many activities as reported in this annual report.

Our efforts to engage in emerging relevant research work of import to Science, Technology and Innovation (STI) is demonstrated, to a large extent, by the diversity of research activities as elaborated by this report.

Our researchers and members of the supporting staff have exhibited commendable tenacity to purpose and their commitment to the call of duty have been exemplary. I have always said that the key resource of CSIR-STEPRI is the human beings working in its diverse offices and divisions. Their commitment rooted in the core values of Teamwork, Hardwork and Excellence (THE) has always proved to be the pivot for success.

Early in 2018, I would be saying goodbye to the office of the Director of CSIR-STEPRI. In line with CSIR policy, I must step aside having served two terms of a total of ten years in this office. I have enjoyed my time immensely given the immense commitment of the staff. I therefore give gratitude firstly, to the almighty Lord for seeing us through and secondly, to my dedicated staff without whom none of these successes would have been chalked. It is however, humbling and an honour for me to pave way for another able person to assume the leadership role as the director of this noble Institute.

I believe that over the years, we have worked to forge a wonderful work culture that is worth sustaining in the coming years. It is my hope that all members of staff will re-dedicate themselves to the challenge of building on the present success and lifting the Institute higher. That, the in-coming Director working with the staff and the new Management Board will ensure that, CSIR-STEPRI grows from one level of success to the other.

In conclusion, we want to express our gratitude to all our partners both local and international for their confidence reposed in us, solidarity, support and loyalty as we continue to aspire to attain greater heights together.

My very best wishes for the coming years!

EXECUTIVE SUMMARY

The Science and Technology Policy Research Institute (STEPRI), one of the thirteen (13) Institutes under the Council for Scientific and Industrial Research (CSIR), is mandated to conduct Science, Technology and Innovation (STI) policy studies, technology evaluation, transfer and diffusion as well as fostering Science and Technology (S&T), human resource development and management. Its vision is to become an international institution that facilitates the development, transfer, utilization and management of Science, Technology and Innovation (STI) tailored to meet the specific needs of Ghana and Africa. The Institute has a staff strength of fifty-two (52) consisting of sixteen (16) Research Scientists, three (3) Non-Core Research Staff, four (4) Technologists, twenty (20) Senior Staff and nine (9) Junior Staff. Senior Members who constitute the Core Staff are a multi-disciplinary staff with specialities in engineering, economics, environmental science, environmental philosophy, sociology, development studies, agriculture, international business and project management.

In carrying out its mandate, CSIR-STEPRI collaborates strategically with international development partners and academic institutions such as the World Bank, the Association of Commonwealth Universities (ACU), the European Union (EU), Food and Agriculture Organisation (FAO), Department for International Development (DFID) of UK, Forum for Agricultural Research in Africa (FARA), the International Food Policy Research Institute (IFPRI), Alliance for Green Revolution in Africa (AGRA), Oxford University, United Nations University in Maastricht, The Government of The Netherlands and Washington State University in the US.

In the year under consideration, the Institute implemented a number of new and old

projects. Some of the new projects implemented include, Biotechnology and Biosafety Rapid Assessment and Policy Platform (BioRAPP), Does Addressing Gender Inequalities and Empowering Women Improve Development Programme Outcomes, Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) Project Phase II and the Climate Impact Research Capacity and Leadership Enhancement (CIRCLE) in Sub Saharan Africa Programme.

Donor inflows for 2017 amounted to US\$ 317,995.28 compared to US\$ 675,521.41 in 2016, representing a decrease of 53%. The decrease in donor fund inflow was because most of the donor funded projects ended in December 2016. An amount of GHC 98,187.65 was also received from donors in local currency to carry out project activities. An amount of GHC 262,728.69 was accrued as Internally Generated Funds (IGF). As usual, the main source of income for the Institute was donor-funded projects. There was no government release for assets and very little came in for goods and services. This continues to pose a big challenge for running the Institute.

1.0 INTRODUCTION

1.1 Background

Science and Technology Policy Research Institute (STEPRI) is one of the thirteen (13) research Institutes of the Council for Scientific and Industrial Research (CSIR). The institute was established through a United Nations Development Programme (UNDP) project in 1988 which aimed at addressing policy issues relating to transferring technology from developed to developing countries especially in Ghana. Its original name of Technology Transfer Centre (TTC) reflected the core mandate of the Institute at that time. However, that name was changed to Policy Research and Strategic Planning Institute (PORSPI) in 1992 as the mandate got broadened to include other relevant research themes. Two years later in 1994, the current name was adopted to underscore the diversifying nature of its programme activities.

The Vision

The vision of STEPRI is to become an international institution that facilitates the development, transfer, utilization and management of Science, Technology and Innovation (STI) tailored to meet the specific needs of Ghana and Africa.

Currently, CSIR-STEPRI has as its primary mission to conduct research to provide knowledge-based information to contribute to the formulation and implementation of policies and programmes for socio-economic development on the basis of Science, Technology and Innovation (STI). Over the years, CSIR-STEPRI has excelled in executing its mission and mandate by addressing the following five thematic programmes:

- Monitoring and assessment of STI-related policies in the Ghanaian economy.
- Popularization of Science, Technology and Innovation (STI).
- Commercialization, facilitation and diffusion of local technology and innovation.
- Development and management of STI human resource
- Adoption, assimilation and transfer of appropriate technology.

A number of development partners have been supporting CSIR-STEPRI in carrying out research in the above thematic areas. The Institute acknowledges with profound gratitude international development partners, notably, the International Development Research Centre (IDRC) of Canada, Department for International Development (DFID) of UK, the Government of The Netherlands, the World Bank, Swedish International Development Agency (SIDA), the Forum for Agricultural Research in Africa (FARA), the International Food Policy Research Institute (IFPRI), Alliance for Green Revolution in Africa (AGRA), the International Fund for Agricultural Development (IFAD) and United Nations Development Programme (UNDP), among others.

The Institute also collaborates strategically with international academic institutions including the Association of Commonwealth Universities (ACU), Oxford University, Brunel University, Washington State University and UNU-MERIT among others. These collaborations promote greater synergies and knowledge sharing for better work outputs from the Institute.

1.2 TECHNICAL DIVISION

Research activities in the Institute revolves around four technical divisions namely: Agriculture, Medicine and Environment Division (AMED); Industry and Service Division (ISD); Commercialization and Information Division (CID); and Finance and Administration Division (FAD). The activities of each division are as follows:

Commercialization and Information Division (CID)

This division is responsible for:

- i Promoting and marketing of S&T innovations;
- ii Consultancy and research outreach;
- iii Documentation and dissemination of S&T information;
- iv S&T popularization; and
- v Public relations.

Industry and Service Division (ISD)

Policy research in this division focuses on:

- i Industry: manufacturing, mining and utilities; and
- ii Services: transportation, financial services, commerce, information and communications technology (ICT), education and tourism.

Agriculture, Medicine and Environment Division (AMED)

This division conducts policy research in:

- i Agriculture: agricultural research and development systems, agricultural value chains, cash and food crops production, fisheries and urban agriculture;
- ii Medicine: orthodox and traditional medicine; and
- iii Environment: waste management, control of pollution and environmental degradation and natural resource conservation, climate change.

Finance and Administration Division (FAD)

This division provides support services such as:

- i Accounting;
- ii Personnel administration;
- iii Estate management; and
- iv Logistics.

1.3 RESEARCH PROGRAMMES

In line with CSIR-STEPRI's mandate, and through the support of development partners, the following research programmes and development activities were carried out during the year under review:

1. National Science, Technology and Innovation (STI) Baseline Study.
2. Does Addressing Gender Inequalities and Empowering Women Improve Development Programme Outcome Project under Partnership for Economic Policy (PEP).
3. Sustainable Agricultural Intensification Research and Learning in Africa (SAIRLA)
4. Operationalizing Green Economy Transition in Africa.
5. Programme of Accompanying Research for Agricultural Innovations (PARI).
6. Advancing Sub-Saharan Africa-European Union Cooperation in Research and Innovation for Global Challenges (CAAST-Net Plus).
7. IFPRI-STEPRI: Agricultural Science and Technology Indicator Survey (ASTI).
8. Biotechnology and Biosafety Rapid Assessment and Policy Platform (BioRAPP).
9. Addressing the "Missing Middle" in Multidimensional Poverty Reduction Programmes.
10. Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) Project Phase II.
11. Climate Impact Research Capacity and Leadership Enhancement in Sub Saharan Africa Programme (CIRCLE).

SUMMARY OF RESEARCH PROJECTS

2.1 National Science, Technology and Innovation (STI) Baseline Study.

Principal Investigator: *Dr. Emmanuel K. Tetteh*

Research Team: *Dr. George O. Essegbey, Roland Asare and Ms. Adelaide Asante (MESTI)*

Sponsors: *World Bank/Government of Ghana (GoG)*

Duration: *6 months*

Introduction

The fundamental role of Science, Technology and Innovation (STI) in socio-economic development is well illustrated in the advancement of the developed and Newly Industrializing Countries (NIC). In all sectors of the economy, STI provides the tools for economic transformation and national growth. The high levels attained by developed nations came through STI policies, strategies and programmes formulated and implemented over time. For instance, the ability of a country to innovate and industrialise largely depends on its scientific human resource capabilities, and arrangements that allow capable scientists to produce new technologies, products and new processes for national progress.

African nations have long acknowledged the role of STI in their development and have consistently emphasized the use of STI for national growth and wealth creation. Although the specified level of investment in Research and Development (R&D) and generally in STI has remained a mirage, African countries have in various ways made some efforts to bring STI to bear on their national development agenda. The Lagos Plan of Action of 1980 specifically enjoined African countries to invest one per cent of GDP in Research and Development (R&D) and to harness the transformative power of STI for socio-economic development (ATPS, 2002; Essegbey, 2015). Other continental declarations of intent on using STI for development include the Kilimanjaro Declaration of 1987, the Khartoum Declaration of 1988, and the Addis Ababa Declaration of 1998.

Still recognizing the benefits of STI, the African Ministerial Council on Science and Technology (AMCOST) in 2005 adopted Africa's Science and Technology Consolidated Plan of Action (CPA) as a framework that articulates Africa's vision for applying STI in all development efforts. The CPA also articulates the African Union (AU) agenda for harnessing STI to boost economic growth and to improve the lives of African people. Then again, the Addis Ababa Declaration on Science, Technology and Scientific Research for Development made at the African Union (AU) Summit in January 2007 echoed the need for African countries to commit investment to STI activities. The declaration went down to underscore the use of STI data to support evidence-based policy (IISD, 2007).

Yet another important evidence of the intentions of African countries to harness and apply STI in addressing the development challenges is the elaboration of the Science, Technology and Innovation Strategy for Africa (STISA-2024), which the Heads of States of Africa adopted in 2014. The mission of STISA-2024 is to accelerate Africa's transition to an innovation-led,

knowledge-based economy (African Union Commission, 2014). This strategy was intended to underpin the long-term people-centred AU Agenda 2063. STISA-2024 currently illustrates the African resolve to harness the unlimited potential of STI for national development everywhere on the continent. It is to be achieved by improving STI readiness in Africa in terms of infrastructure, professional and technical competence, entrepreneurial capacity, and implementing specific policies and programmes in STI that address societal needs in a holistic and sustainable way. After establishing the African Science, Technology and Innovation Indicator (ASTII) initiative, African countries have recognized the importance of STI indicators and have established the African Observatory of Science, Technology and Innovation (AOSTI) in Malabo to create an information system on STI indicators and promote the use of data and statistics in the Africa's policy cycle (AOSTI, 2014). The use of STI indicators, according to the AOSTI, will provide the means of assessing how development plans, policies and programmes are responding to Africa's socio-economic development needs and challenges.

Ghana has had an STI policy since 2010. However, despite the crucial role of STI in achieving sustainable socio-economic development, Ghana lacks a national STI system for monitoring and evaluating STI performance. Therefore, a national STI database to inform policy on STI activities in Ghana is critical for assessing, monitoring and evaluation of Ghana's STI systems. It was in this vein that a national STI baseline study was conducted in 2017.

Objectives

The main objective of the survey was to provide a national STI baseline data to form the basis for monitoring and evaluating STI activities and performance in Ghana. Among the specific objectives were to assess:

- The state of infrastructure in the national STI system;
- The quality of scientific research institutions and
- Level of public and private sector investment in R&D; R&D human resource development; and the level of protection of intellectual property (IP).

Project Activities

A national baseline survey committee was constituted to oversee the success of the survey. STI data was collected from a sample of 38 R&D institutions across the country. In addition, 22 media houses were interviewed on their contribution to STI awareness in the country.

Conclusion

The STI baseline survey is crucial for Ghana. Future STI studies, mid-term reviews, STI project completion reports and other ex-post STI evaluations will judge progress largely by comparing recent data with the information from the baseline survey report. Research studies can also refer to the report to make decisions about STI development and use in Ghana. The STI baseline study report will be beneficial to R&D institutions, policy makers, researchers and students.

See www.aosti.org

2.2 Does Addressing Gender Inequalities and Empowering Women Improve Development Programme Outcomes? Project under Partnership for Economic Policy (PEP)

Principal Investigator: *Dr. (Mrs.) Wilhelmina Quaye*
 Research Team: *Dr. Paul Boadu, Dr. (Mrs.) Adelaide Agyeman and Ms. Mavis Akuffo*
 Sponsors: *DFID and IDRC*
 Participating countries: *Togo, Botswana, Uganda, Kenya, Nicaragua, Burundi and Ethiopia*
 Duration: *24 months*

Introduction

The project seeks to use the Community Based Monitoring System (CBMS) developed under the Policy for Economic Partnership team in the Philippines to assess the effectiveness of intervention programs and collect local level information on Sustainable Development Goals (SDGs). The CBMS methodology is an institutionalized system for monitoring the various dimensions of poverty, develop a database useful for local governance and prioritization of interventions at the local level. The study will be conducted in selected communities in a planning unit in Atebubu-Amantin District where the Cassava Adding Value for Africa (CAVA) project has been implemented.

Poverty profiles and poverty maps for the study sites will be generated for planning and local policy development process. As part of the CBMS Methodological approach, a Sustainable Development Goals (SDGs) Report will be generated at the local level, thus localizing the SDGs for effective targeting of tailored interventions. The CBMS methodology helps in building local capacity in contextualized analysis and assists in local planning for innovative solutions and interventions.

Objectives

The objectives are:

- (i) Implement a community-based monitoring system (CBMS) to monitor the different dimensions of poverty;
- (ii) Investigate the effectiveness of intervention (the Case of CAVA Project) in addressing poverty reduction by gender;
- (iii) Investigate barriers to women empowerment in the study communities (using women participation in CAVA project and other interventions); and
- (iv) Recommend options for improving gender focused projects outcomes.

The project is relevant because it is beneficial to local planning officials and policy makers.

Activities Implemented:

The following key activities have been conducted so far under the Project:

- Development of Data Collection Matrix on poverty indicators for on-ward data collection programming;
- Development of Data Collection matrix for theme research questions;
- Development of Community Profile Questionnaire;
- Development of Data Collection Training Manual;

- Community-Based Monitoring System study visit by two (2) members of the project team. This was held in Manila, Philippines; November 20-24, 2017; and
- Development of CBMS Design Paper.

Conclusion

Data collection using the Community-Based Monitoring System will be conducted in 2018. Report on localizing the SDGs in Ghana: the case of Atebubu District will be generated from the study findings. Research papers on the theme "Does Addressing Gender Inequalities and Empowering Women Improve Development" will be developed and published.

2.3 Sustainable Agricultural Intensification Research and Learning in Africa (SAIRLA)

Principal Investigator: Dr. Victor Clottey

Research Team: Dr. George O. Essegbey, Dr. N. Karbo, Solomon Duah, Dr. (Mrs.) Wilhelmina Quaye and Ms. Mavis Akuffobe

Sponsors: DFID

Location: Ghana, Burkina Faso, Ethiopia, Malawi, Tanzania and Zambia

Collaborating Institution: Centre for Agriculture and Bioscience International (CABI)

Duration: 3 years

Introduction

Sustainable Agricultural Intensification Research and Learning in Africa (SAIRLA) is a five-year programme being implemented in Burkina Faso, Ethiopia, Ghana, Malawi, Tanzania and Zambia. SAIRLA seeks to facilitate multi-scale learning to understand different ways of achieving Sustainable Agricultural Intensification (SAI) and their developmental implications.

The programme functions through two processes, namely, a competitive research call for grants, and facilitation of a SAIRLA Learning Alliance between research organisations and other stakeholders. The Ghana National Learning Alliance (GH-NLA) seeks to improve the wellbeing of smallholder agricultural value chain actors, particularly women and youth through effective policies and investments in sustainable agricultural development.

Objectives

SAIRLA has four (4) key objectives including:

- (i) Facilitate co-generation of research evidence that addresses equitable access to Sustainable Agricultural Intensification (SAI) processes by smallholders particularly women and youth;
- (ii) Develop stakeholder engagement plan and facilitate Sustainable Agricultural Intensification (SAI) research evidence use by policy makers, investors and implementers in decision making processes;
- (iii) Jointly identify means of achieving effective implementation of policy and business strategies that improves the capacity of poorer smallholders, especially women and youth to achieve Sustainable Agricultural Intensification (SAI); and
- (iv) Network with local and external organisations to facilitate Sustainable Agricultural Intensification (SAI) knowledge management.

The project is relevant to smallholder agricultural value chain actors, particularly women and youth, policy makers, private sector investors and researchers.

Activities implemented during the period under review are listed below:

Outcome Mapping (OM) workshop

Outcome Mapping (OM) workshop was organized with project boundary partners at the CSIR-STEPRI Conference Room. A total of twenty three (23) project boundary partners drawn from academia, research, private sector, farmer based organisations and policy makers attended the OM workshop. The workshop sought to validate the desired outcome and collective actions for contributing to the achievement of the desired outcomes.

Four (4) main categories of boundary partners including private sector, policy, media and research groups were identified for the OM process.

Policy Symposium on 'Sustainable Agricultural Intensification (SAI): Policy implications for Agriculture Modernization in Ghana'.

A policy symposium was organized by Ghana National Learning Alliance on 24th March 2017 at CSIR-STEPRI. Primarily, the policy symposium sought to share research information and facilitate policy discourse on the theme: '*Sustainable Agricultural Intensification (SAI): Policy implications for Agriculture Modernization in Ghana*'. The policy symposium attracted participants from policy, research and academia, media, development partners, farmer organisations and the private sector. The theme presentation covered understanding of SAI, Climate Smart Agriculture (CSA) and Agricultural modernisation. Concrete examples of SAI related policies, programmes and projects in Ghana were shared. Stakeholders agreed to the fact that the effectiveness of SAI related policies, projects and programmes in Ghana need to be assessed. It was agreed that agricultural modernisation should incorporate both SAI technologies and the social aspects.

Policy symposium on excessive use of chemicals in the management of fall armyworm: Implications on Sustainable Agricultural Intensification in Ghana.

The Ghana National Learning Alliance under the Sustainable Agricultural Intensification Research and Learning in Africa (SAIRLA) program organized a policy symposium on the theme "Excessive Use of Chemicals in the Management of Fall Armyworm: Implications on Sustainable Agricultural Intensification in Ghana" with the aim of igniting the necessary experiential, technical and academic debates around it leading to the generation of appropriate policy actions for a more practical and sustainable approach to handling the Fall Armyworm (FAW) epidemic in Ghana. The symposium took place at the Science and Technology Policy Research Institute (CSIR-STEPRI).

It was concluded that the pest infestation is a tripod problem which affect the environment, economy and the social values. Therefore, the solution should also envisage the problem in the same manner. It came to the fore that the use of chemicals alone could not be the ultimate solution due to the possibility of pest resistance build up. Other approaches to the fall army worm needs to be researched further such as the biological control. Inputs from local farmers should be encouraged and brought on board as part of the integrated solutions to this plague. The need for collaboration among countries and sustainability of all efforts was emphasized at the policy symposium.

Capacity Needs Assessment Survey

The capacity and policy needs assessment survey was conducted in March - April 2017. A total sample of 50 boundary and strategic partners of GH-NLA were covered in the survey with the following key objectives:

- Characterize the demand for research evidence by the boundary and strategic partners of the GH-NLA;
- Assess the current level of access to SAI information and research evidence;
- Assess the level of utilisation of SAI information and research evidence among policy makers including private sector investors and policy practitioners;
- Investigate the extent to which researchers influence policy formulation, implementation and evaluation; and
- Recommend ways of improving the capacity of boundary and strategic partners of GH-NLA for effective use of SAI research evidence.

Validation Workshop

The validation workshop was organised to allow survey respondents and other relevant stakeholders to validate the capacity needs assessment report. The main objective of the validation workshop was to bring on board GH-NLA boundary and strategic partners to validate findings of the capacity needs assessment conducted in April 2017. The workshop was attended by research coordinators, policy makers, experts, academics, donors and practitioners from government and private institutions and organizations.

Conclusion

The Ghana National Learning Alliance (GH-NLA) was launched on 24th February, 2017. So far activities conducted include:

- i Organisation of Outcome Mapping workshop,
- ii Organisation of Policy Symposia,
- iii Capacity Needs Assessment Survey,
- iv Organisation of Validation Workshop and
- v International Learning Alliance (ILA) workshop organised in Accra.

These activities have resulted in social learning among various stakeholders.

2.4 Operationalizing Green Economy Transition in Africa

Principal Investigator: Dr. George O. Essegbey

Research Team: Dr. (Mrs.) Wilhelmina Quaye, Steven Awuni and Roland Asare

Sponsors: UNEP/GIZ.

Duration: 3 Years

Introduction

The United Nations Environment Programme (UNEP), in collaboration with the German International Development (GIZ) developed a project entitled 'Operationalizing Green Economy Transition in Africa'. The pilot phase of the project focused on five countries including Ethiopia, Ghana, Kenya, Mozambique and Rwanda. In Ghana, CSIR-STEPRI collaborated with EPA (National Implementation Agency), CSIR-SARI and NDPC to implement the Green Economy Project.

Objective

The overall objective of the project was to enable the participating African countries translate national Green Economy and climate resilience strategies into concrete development plans at the sub-national level.

Research Activity

The following activity was conducted: National Training of Trainers in Ghana (Amasaman, Ga West).

A National Training workshop was organised by Environmental Protection Agency (EPA) at the training school at Amasaman in Ga West Municipal. Participants were drawn from the Ministry of Local Government, Ministry of Environment, Science, Technology and Innovations (MESTI), Environmental Protection Agency (EPA), participating planning units (Tema Metropolitan Assembly - TMA, Tolon and Kumasi Metropolitan Assembly - KMA), GDPC and Ministry of Food and Agriculture (MOFA) and the private sector players. Participants were taken through GE Toolkits, providing step-by-step guide from the foundational, sectoral and the implementation phases. The 5-day training program started on 1st February and ended on the 5th February 2016.

- i Baseline Studies of the participating planning units. A baseline survey was conducted in three planning units namely, Tolon District (Agriculture), Kumasi Metropolitan Assembly (Biomass Energy) and Tema Metropolitan Assembly (Waste). Green Economy options were identified in the selected districts to address sector specific and cross sector challenges. General economic activities in the selected planning units, on-going green economy interventions, environmental issues and potential areas for greening in the selected sectors were established.
- ii Development of Green Economy (GE) step-by-step guide and orientation for some staff of NDPC. An adapted step-by-step guide was developed as a means of appropriating the GE training compendium to the Ghanaian situation.
- iii Training of district planning stakeholders in each participating planning unit and training of regional planning officers.
- iv Development of Replication Strategy drawing from the experiences and lessons from the pilot phase.

Major Findings

Extensive work has been done at the national level relating to Green Economy and building resilience to climate change effects. For example, development of Green Economy Scoping Study, National Climate Change Policy and Green Economy Training Manuals among others. However, the challenge is operationalizing green economy implementation plans at the subnational level, a gap this project sought to bridge. The adapted step-by-step guide developed under the current project details the processes involved in transitioning from brown business as usual development into a greener growth path in all the four key dimensions of development including the social, economic, human capital and sustainable environment.

There is a high level of convergence between the structure of the Integrated Green Economy Implementation Plan (IGEIP) and the District Medium Term Development Plan (DMTDP). The preparation of development plans at the sub-national level starts with the issuance of planning guidelines by National Development and Planning Commission (NDPC) to the MMDAs. Therefore, incorporating Green Economy issues in the NDPC guidelines will sharpen the focus and direction on district development priorities. This provides a good opportunity for using the Green Economy toolkit during the preparation of the next DMTDP.

Conclusion

The CSIR-STEPRI team provided expert inputs on the country specific context during the development of the Green Economy (GE) toolbox which was led by UNEP. The GE toolbox covers key assessments and methods as well as background knowledge necessary to plan and implement Integrated Green Economy Implementation Plan (IGEIP) at the district or local level. Drawing from the lessons and best practices under project implementation, the CSIR-STEPRI team now constitutes part of the critical number of trainers for GE application in Ghana.

2.5 Programme of Accompanying Research for Agricultural Innovations (PARI)

Principal Investigator: *Dr. George O. Essegbey*

Research Team: *Dr. Richard Ampadu-Ameyaw and Dr. (Mrs.) Rose Omari*

Funding Source: *German International Development Cooperation (GIZ)*

Duration: *1 year*

Introduction

The Forum for Agricultural Research in Africa (FARA), in partnership with the German Government represented by the Centre for Development Research (ZEF) of the University of Bonn under its 'One World, No Hunger' initiative, is implementing the "Programme of Accompanying Research for Agricultural Innovations (PARI)". PARI is taking cognisance of the successes of research and innovation initiatives in African agriculture and in consideration of the concept of integrated agricultural research for development (IAR4D) promoted by FARA, to build an independent accompanying research programme to support the scaling of agricultural innovations in Africa and thereby contribute to the development of the African agriculture sector.

The PARI will be implemented together with the Agricultural Innovation Centres (AICs) within the "One World, No-Hunger" initiative. The PARI is being implemented in 12 Pilot Africa countries that were preselected based on previous engagement of the countries in diverse German- supported initiatives. FARA coordinates the activities of PARI across the Africa continent. CSIR-STEPRI directly plays the role of Lead Implementing Institution for the PARI project in Ghana.

The PARI was initiated in 2014 and commenced its key activities in 2015. Deliverables produced in 2015 and 2016 include:

- A report on Factors Influencing Scaling-up of Agricultural Innovations: Lessons from Ghana.
- A report on Development and Analysis of the Rice Value Chain for the Hohoe and Jasikan Districts of the Volta Region, Ghana.
- Two functioning innovation platforms established in Hohoe and Jasikan Districts.
- Country dossier on the state of agriculture.
- An inventory and analysis of agricultural technologies and innovations developed, transferred and utilised over the last two decades.
- An inventory and analysis of agricultural innovation platforms established and being

operated in Ghana.

- A report on agriculture investment initiatives within the agriculture innovation system. In 2017, CSIR-STEPRI conducted two main studies 1) Consumption and Marketing study to assess the drivers of rice preferences in Ghana; 2) Success stories of engagement of policy makers in agricultural innovation processes in Ghana.

Objectives of the Study 1

To assess the drivers of rice preferences in Ghana to get better insights into factors that influence the sale, purchase, utilization and consumption of rice (local and imported) in Ghana Specific objectives were:

- To assess rice consumption patterns in the Greater-Accra and Hohoe districts of Ghana
- To identify motivational and inhibitory factors that influence rice purchase decisions
- To assess attitudes and beliefs about rice
- To identify perceived barriers that limit purchase and consumption of locally produced rice
- To identify the determinants of rice sales and marketing in both rice-producing and non-rice producing areas;
- To identify key issues for the development of an appropriate promotional and marketing strategy to stimulate the sale, purchasing, utilization and consumption of locally-produced rice in Ghana.

Objectives of Study 2

- Identify and document two brilliant success cases of engagement of policy-makers in agricultural innovation processes (that took place in the last 5 - 10 years) in each PARI country,
- Identify and document two brilliant failure cases of engagement of policy-makers in agricultural innovation processes (that took place in the last 5 - 10 years) in each PARI country, and,
- Draw and document lessons about key success and failure factors of engagement of policy makers in agricultural innovation processes.

Research Activities

The research activities were preceded by a training for CSIR-STEPRI PARI Team in Mobile Data Collection Training Using ODK and KOBO Toolbox followed by procurement of mobile phone tablets. This enabled the research team to programme the survey instruments on mobile phone tablets. Two main study 1) Rice consumption study and 2) Rice marketing study, involving both qualitative and quantitative methods were conducted in Accra and Hohoe. The study was also extended to other users of rice including caterers, matrons and rice processors.

The deliverables of this study are research reports and journal publications.

Other activities were:

- a) Identifying and selecting most significant agricultural innovations;
- b) Identifying and discussing with policy makers on their engagement in agricultural innovation processes;
- c) Determining key factors of success and failure of engagement of policy makers in agricultural innovation processes; and
- d) Documentation of the agricultural innovation processes and engagement of policy makers.

Conclusion

The PARI project has provided a good opportunity for researchers to interact with key actors including policy makers of the agricultural value chain to understand the production, post-production and marketing constraints. As the way forward, the recommendations from this study must be disseminated and implemented to eliminate the constraints and improve production, quality, marketing, utilization and consumption of locally produced rice and other commodities in Ghana.

2.6 Advancing Sub-Saharan Africa – European Union Cooperation in Research and Innovation for Global Challenges (CAAST-Net Plus)

Principal Investigator: *Dr. George O. Essegbey*
 Research Team: *Masahudu Fuseini and Dr. Godfred K. Frempong*
 Source of Funding: *European Union's Seventh framework Programme (FP7)*
 Duration: *4 Years*

Introduction

Research cooperation between Europe and Sub-Sahara Africa is seen as a driver to addressing global challenges between the two continents, especially for African countries to leverage on the benefits of the European Commission funding framework, H2020.

The project was supposed to have ended in December 2016 but was extended to the end of 2017 to give room for the completion of remaining unexecuted tasks. In the case of CSIR-STEPRI, the outstanding activity was in the Work Package 5 (WP5). The activities of the Work Package 5 are aimed at contributing to the strengthening of research cooperation between Europe and Africa, particularly in the area of addressing global challenges. To that end, the following tasks were earmarked to achieve the goal; training of country focal points, organizing brokerage events and disseminating information on the EC funding framework H2020 as well as analysing the level of relationships between the two continents.

These institutions played diverse roles to the realization of the objectives of the 'Work Package 5'; Task number, task title, task leaders and contributors.

a) Task 5.1: Advisory and support mechanisms to Africa European researchers.

Task leader : *University of Jyväskylä (JyU), Finland*
 Contributing partners : *CSIR-STEPRI, FORTH, IRD, UNCST, NOTAP, MOHEST, MHESRT, COHRED, NCST, MESCI*

b) Task 5.2: Country Focal Point Training

Task Leader : *CSIR-STEPRI*
 Contributing partners: *FORTH, UNCST*

c) Task 5.3: Monitoring and Analysis of bi-regional cooperation

Leader : *DST*
 Contributing partners: *CSIR-STEPRI, IRD*

Objective

The general objective of Work Package 5 is to strengthen Africa-EU research cooperation partnerships. The following were the purposes of the tasks:

Task 5.1 – Advisory and support mechanisms to African and European researchers to increase awareness of the EC funding framework and

Task 5.2 – Training of National Contact Points (NCP) of African countries for increased participation of African Researchers in the H2020 programme.

Activities in 2017

The last two of the training events of the CAAST-Net Plus were held in 2017 in Mauritius, and a regional one in Botswana for countries within the SADC.

The WP5 contributed to the penultimate and last CAAST-Net Plus magazines; July 2017 Issue 09 and December 2017 Issue 10 respectively. Content shared included; Building bi-regional partnerships for global challenges, and synthesis of experiences of participants of previous NCP trainings and Information sessions.

Conclusion

Activities of WP 5.1 and WP 5.2 in many cases ran concurrently, due to their commonalities.

Per the DOW, milestones of WP 5.1, 5.2 and 5.3 were achieved. Activities of 5.3 were achieved earlier. Effectively, the project has come to an end.

2.7 IFPRI-STEPRI: Agricultural Science and Technology Indicator Survey (ASTI).

Principal Investigator: *Dr. George O. Essegbey*

Research Team: *Roland Asare and Ms. Afua Bonsu Sarpong-Anane*

Source of Funding: *International Food Policy Research Institute (IFPRI), USA*

Duration: *May 2017 - June 2018*

Introduction

The Agricultural Science Technology and Indicator (ASTI) is an initiative of International Food Policy Research Institute (IFPRI) in collaboration with the Science and Technology Policy Research Institute (CSIR-STEPRI). ASTI is widely recognized as an authoritative source of information on the status and direction of agricultural research systems in developing countries.

Since its introduction, the study has been a regular activity and Ghana has actively participated in the survey since 2004. ASTI collect time series data on the funding, human resource capacity and outputs of agricultural research in low and middle income countries. The 2017 ASTI survey involved more than forty (40) countries in Africa.

Objectives

- To provide high-quality, up-to-date datasets on agricultural R&D;
- To conduct ongoing analysis of its agricultural R&D datasets;
- To communicate the results of its analysis to promote advocacy and support policy making;
- To build national and regional capacity for both data collection and data analysis;
- Provide up-to-date data and information on Agricultural R&D to enable policy makers make informed decision at the national level.

Research Activities

ASTI uses primary surveys to collect both qualitative and quantitative data from government, higher education, nonprofit, and private agricultural R&D agencies. Secondary data are obtained through desk research. The data are analysed to establish trends on agricultural R&D, policy briefs and country based agricultural expenditure fact sheets.

Conclusion

Findings of ASTI surveys inform policy formulation for agriculture research in Ghana. In addition, donor organizations and other key stakeholders rely on ASTI data in making decisions in respect of the agriculture sector in Ghana.

2.8 Biotechnology and Biosafety Rapid Assessment and Policy Platform (BioRAPP)

Principal Investigator: *Dr. George O. Essegbey*

Research Team: *Dr. Richard Ampadu-Ameyaw and Dr. Paul Boadu*

Source of Funding: *International Food Policy Research Institute (IFPRI)*

Duration: *1 year*

Introduction

The controversy about the need for acceptance of Genetically Modified Organisms (GMOs) in many countries of the world, including Ghana has to do with several factors and one of such is the benefit case. Currently arguments about the benefits of GMOs in the country are always drawn from elsewhere since the products and (therefore) the data do not exist in the country. In view of this, International Food Policy Research Institute (IFPRI) through the Program for Biosafety Systems is collaborating with CSIR-STEPRI in conducting an ex ante economic and environmental assessment study, as a way of gathering data on consumer perception of acceptance of the GMOs and their products in the country.

This study aims at gathering those relevant data as a first step in guiding research on evidenced based policy decisions on the acceptance of biotechnology and associated genetically modified organisms. This project is a technology focus, country focus with specific operational methodology aimed at solving the envisage challenge of GMOs releases or commercialization in Ghana as well as demonstrating the costs and benefits associated with adoption of improved technologies.

Objective

The main objective of this work is for CSIR-STEPRI to supervise the consultant to produce an ex-ante report on the assessment of the economic and environmental issues surrounding the new technology release onto the market.

Research Activities

An ex-ante economic and environmental assessment study was conducted. A simple and rapid method of data collection and analysis was adopted in this study. Secondary data and technology developers' data commonly referred to in this study as experts data were collected and appropriate assumptions were drawn to analyze the data using a newly developed tool by IFPRI, Washington called DREAM. It aims at evaluating based on an ex-ante activity data on benefits and costs essentially tied to the release of the technology and therefore its acceptance.

Conclusion

The study is still ongoing and therefore results cannot be communicated now. However, data has been collected and work on analyzing data is progressing steadily.

2.9 Addressing the “Missing Middle” in Multidimensional Poverty Reduction Programmes.

Principal Investigator: *Dr. (Mrs.) Adelaide Agyeman*
 Research Team Member: *Samelia Adu-Mintah*
 Source of Funding: *CSIR-STEPRI*
 Duration: *3 months*

Introduction

Widespread agreement that poverty is a multifaceted phenomenon, encompassing deprivations along multiple dimensions has been rife in the public and policy debate circles in recent times. Researchers argue that, the failure to address poverty and vulnerability in a sustainable manner may be directly related to the continued use of traditional, unidimensional approaches to defining, measuring and addressing poverty. Previous research has focused on poverty profiles without a clear understanding of poverty’s fundamental “causes” known as the “missing middle”.

Whiles the problem of the “missing middle” remains, there continues to be a gap between the causes of poverty identified in the poverty profile and the interventions put in place to address them. The overall goal of this study is to answer the important question of why people are poor by examining the factors that determine poverty and subsequently ascertain the complex relationships between the multiple dimensions of poverty. This we hope will provide an adequate linkage between poverty analysis and poverty reduction goals and activities which hitherto has been difficult to establish with poverty profiles and provide a useful feedback for policy review towards improved coherence.

Objectives:

- 1) Examine the relationships between four dimensions of poverty using a structural equation modeling method and
- 2) Identify the determinants of multi-dimensional poverty.
- 3) Provide recommendations for development of policies on poverty reduction

Research Activities

An analysis of the poverty profile of Ghana using Ghana Living Standards Survey 6 (GLSS6) was carried out. The survey covered a nationally representative sample of 18,000 households in 1,200 enumeration areas. Of the 18,000 households, data from 16,772 households were used. The full structural equation model (SEM) was used to examine the relationships between four dimensions of poverty and to identify the determinants of multidimensional poverty in Ghana. The four dimensions of poverty determined are namely, Economic Well-Being, Capability, Living Standards and Economic Inclusion.

Findings

The results reveal significant ($P < 0.001$) relationships among the poverty dimensions and finds the number of years spent schooling, per capita consumption, access to electricity and whether one is employed or not as significant determinants of multidimensional poverty in Ghana.

Conclusion and Policy Implications

Preliminary results indicate that the multidimensional approach offers a more comprehensive and more accurate picture of poverty. The policy implications are that, government should take human capital development seriously, create opportunities and an enabling environment in order to provide employment for the unemployed and provide access to basic services e.g, electricity in order to reduce poverty.

2.10 Africa Research In Sustainable Intensification For The Next Generation (Africa Rising) Project Phase II

Principal Investigator: *Dr. (Mrs.) Charity Osei-Amponsah*

Research Team: *Dr. George O. Essegbey, Dr. (Mrs.) Wilhemina Quaye, Ms. Afua Bonsu Sarpong-Anane, Nana Yamoah Asafu-Adjaye, Maame Dokuaa Akua Agyei Addo*

Funding source: *IITA through Feed the Future – USAID*

Duration: *June 2017 - March 2018*

Introduction

Research and development for agricultural productivity is grappling with the growing demand for food. The key challenge is how to increase food production to feed an ever growing, increasingly affluent and urbanised population, while at the same time decreasing the negative environmental impacts of agricultural expansion. Conventional intensification has been found not to be a viable solution, as it depletes environmental and social resources. Radical transformational measures are therefore needed in the agriculture sector. 'Sustainable intensification' as a potential approach to trigger the needed transformation, is now being widely promoted in farming systems.

This approach identifies farming and organisational practices that strengthen rural communities, improve smallholder livelihoods and employment, and reduce negative social and cultural impacts. It thus requires farmers to be able to implement and use better agricultural and management practices, to have access to and properly use the right agro-inputs, and have an enabling condition that provide access to capacity building, credit and output market opportunities.

Efforts have been made to disseminate proven sustainable intensification technologies, but adoption has been low and remained patchy. To address this, the International Institute of Tropical Agriculture (IITA) is implementing the second phase of Africa RISING project, funded by USAID, under Feed the Future initiative. The first phase of the project in Ghana, generated and validated sustainable intensification technologies such as: Climate-smart (high-yielding, early-maturing, drought and disease tolerant) crop varieties; Good agricultural practices to improve cereal-legume-vegetable cropping; Soil fertility and water management practices; Livestock feeding, housing, health-care and breeding management; Practices for reducing food waste and spoilage. In the second phase, the project seeks to provide pathways out of hunger and poverty for smallholder families through effective upscaling of the validated sustainable intensification technologies.

Objectives

CSIR-STEPRI is collaborating with FOSTERING (an NGO) under the broader component of 'Markets, Institutions, Policies and Adoption' of the Africa RISING project. The CSIR-STEPRI component of the project seeks to:

- Identify gaps sustainable intensification gaps in existing agricultural policies and programmes.
- Investigate the sustainable intensification practices and farming systems used by farming households, and diagnose the institutional conditions prevalent in agricultural input and output markets in Northern and Upper-West Regions of Ghana).
- Identify and map out strategic partners engage in agricultural development and agribusiness and investigate their potential for scaling-up the validated sustainable intensification technologies.

Expected Beneficiaries:

Agricultural research and development stakeholders (researchers, NGOs, FBOs, development partners, Ministry of Food and Agriculture, agribusiness companies)

Method of the study

The project's implementation period spans from June 2017 to March 2018. So far, key informant and personal interviews have been conducted at the national (meso) level for 23 persons involved in agriculture policy planning and programme coordination or implementation. Ten national agricultural-related policy documents (e.g. FASDEP 11, GSGDA 11, Climate Change Policy, Tree Crops Policy) have been profiled and reviewed based on the key themes of sustainable intensification, namely Genetic, Ecological and Socio-economics). Eight (8) on-going agricultural programmes have been reviewed. Twelve (12) agricultural organisations and/or projects (as stakeholders) were identified and content of their project activities have been reviewed to understand their interests in sustainable intensification issues and the extent of their influence to adopt and scale-up Africa RISING proven technologies and practices.

Interviews have also been conducted at the regional and district agricultural office levels to understand how sustainable intensification strategies outlined in national policies and programmes are incorporated into the development planning agendas at these levels. As well as draw insights on how well the sustainable intensification strategies are being implemented and with what challenges. A household survey involving 150 farming household (from 8 communities) was conducted in December 2017 in three districts of Northern Region (Savelugu, Tolon and Kumbungu); and two districts in the Upper West Region (Wa West and Nadowli). A knowledge sharing and validation workshop was held in February to disseminate the findings and seek stakeholders' views on sustainable intensification gaps in agricultural policies.

Main findings

Preliminary analysis of the data collected suggests that: 1) generally, agricultural policies tend to focus more on the genetic component of SI (e.g. higher yields, improved nutrition, resilience to climate change etc.). All the policies have gaps on socio-economic component of SI. For instance, clear strategies for input and output market access and provision of institutional arrangements for effective functioning of value chains are absent or not explicitly stated in the policy implementation action plans.

The reviewed agricultural programmes are mostly being implemented by development partners (through international organisations). Each programme addresses a specific component of SI depending on its core objectives. However, few have a tendency of formulating interventions that draw in bits and pieces of all three components of SI at the

same time. For example, an agriculture programme could be creating sustainable livelihoods and building human capital, introducing high yielding varieties and teaching farmers to practice conservation agriculture, but could be lacking in creating access to markets.

Analysis of the farm household data indicates that generally, some households are involved in sustainable intensification practices such as use of improved seed varieties, leaf stripping to feed animals, labour-saving equipment for women's processing, row planting and mixed cropping. However, the district agricultural extension units do not have the needed funding to improve and support the sustainability of these interventions.

Conclusion

The study shows that sustainable intensification is important to generate the needed transformation in farming systems in the study areas. There are however clear gaps and dysfunctions in the formulation and implementation of agricultural policies and programmes that have to be addressed.

The highlights below present further discussions on the use of a sustainable intensified approach for a modernised agriculture sector that can foster sustainable economic development in Ghana:

- Not much has been done in relation to mainstreaming sustainable intensification in agricultural policies in Ghana: The Ministry of Food and Agriculture should take this issue up and incorporate strategies of sustainable intensification in policy planning.
- There is a sustainable land management policy document, but there is a need to merge it with a strategic policy on sustainable intensification for agriculture.
- Ecological intensification is really missing in the core national agricultural frameworks (FAS DEP 11 and the Ghana Shared Growth Development Agenda documents), and there is the need to address this issue.
- Socio-economic and genetic intensification comes out clear in most of the policies, but the strategies should be effectively implemented at the district levels for farmers. This calls for government providing the necessary financial and human resources at the district agriculture office.

2.11 CLIMATE IMPACT RESEARCH CAPACITY AND LEADERSHIP ENHANCEMENT IN SUB-SAHARAN AFRICA PROGRAMME (CIRCLE)

Principal Investigator: *Dr. George O. Essegbey*
 Supporting Researchers: *Dr. Richard Ampadu-Ameyaw*
 Funding source: *DFID*
 Duration: *4 years*

Introduction

The Climate Impact Research Capacity and Leadership Enhancement in Sub-Saharan Africa Programme (CIRCLE) is an initiative of the Department for International Development (DFID) of the United Kingdom (UK) to develop the skills and research output of early career African researchers in the field of climate change and its local impacts on development.

The programme has three main objectives, namely to:

- strengthen research capacity in Sub-Saharan African research institutions to support early career researchers and develop a coordinated and strategic approach to climate change research;

- strengthen the capacity of African Researchers to undertake research on climate change and its local impacts development; and
- strengthen the capacity of the African Academy of Sciences to set and implement research programmes based on credibility commissioning and peer review processes.

Research Activities

As part of its Institutional Strengthening programme and especially the capacity building programme, CSIR-STEPRI nominated three candidates in all the three different cohorts for the Career Visiting Fellowship programme.

This training fellowship sought to provide a one year fellowship to support research proposals on the impact of climate change in Africa. Two STEPRI Research staff members benefited from this fellowship programme. One tendered in the fellowship at the University of Cape Town, South Africa and the other at the University of Dar es Salaam in Tanzania.

CSIR-STEPRI has also had the opportunity of becoming a home institution per the arrangement of the fellowships' CVF coming from STEPRI. The Institute has also benefited from trainings on institutional strengthening.

In 2017, CSIR-STEPRI has a grant from the programme to offer training to young and early career researchers within the CSIR. Two of such programmes were offered to a select group of newly recruited and young technologists from all CSIR institutes in Accra and the University of Ghana, Legon. Two research staff members of STEPRI participated in the champions training workshop held in Kenya.

Conclusion

The institutional strengthening programme of the project has provided two research staff of STEPRI the opportunity to enroll in PhD programmes. It has also enhanced journal paper publication skills of the research staff. It is hoped that the project will be given a second phase.

3.0 FINANCE

3.1 Introduction

This report covers the financial transactions of CSIR-STEPRI for the period January to December 2017.

There are three (3) main sources of income:

1. Government Subventions.
2. Donor funded projects.
3. Internally Generated Funds (IGF).

3.2 Releases Of Government Subvention

- Compensation for Employees (Personal Emoluments:)
Salaries are paid regularly by Controller and Accountant General Department (CAGD) to staff through their designated banks. In 2017 a total of GHC 2,583,344.07 was paid for Personal emoluments.
- Goods and Services - There had not been any receipts since 2015 to date though budgets had been submitted. Budget submitted for this budget line for 2018 was GHC 645,660.00.
Subvention for December 2017 total GHC 227,000 is yet to be paid by Controller and Accountant General Department. The long delay is due to the verification and validation by the Ministry of Finance and CAGD.
- Assets - No receipts, budget submitted was GHC 468,000.00.

Though nothing was received from government as has been the case since 2010, through projects support the institute was able to purchase some assets and build a Summer Hut at total cost of GHC 98,433.23 as follows:

Furniture, Fixtures and Fittings	18,327.25
Office Equipment and Accessories	35,227.66
Office (Summer Hut)	44,878.32
Total	98,433.23

Table 1 presents the summary of budgetary releases for the 2016 and 2017 fiscal years on the various budget lines and estimates for 2018 fiscal year.

Table 1: Government Subvention – Budget and Receipts

Budget Line	2016		2017		2018
	Budget	Release	Budget	Release	Budget
Compensation for Employees	2,175,563.76	1,926,565.23	2,243,117.86	2,583,344.00	3,100,012.00
Goods & Services	625,000.00	22,242.34	645,660.00		645,660.00
Assets	402,500.00	-	468,000.00		514,800.00
Total	3,203,063.76	1,948,807.57	3,356,777.86	2,583,344.00	4,260,472.00

3.3 Donor Funded Projects

Funds totalling \$317,995.28 were received from foreign donors for the below listed projects in 2017. Table 2.

Project Name	Funding Source	2017 Income (USD \$)	Income (GHC)
PARI/FARA	FARA	63,040.00	
BIORAP		53,705.00	
CAASTNET PLUS	CAASTNET PLUS	13,944.31	
FARA CONSULTANCY	FARA	47,990.00	
BIARI Project		8,000.00	
Wageningen University Project	Wageningen University	9,426.55	
Africa RISING	USAID	34,980.00	
ASTI Workshop	IFPRI	10,000.00	
CIRCLE Project		3,490.00	
ASTI	IFPRI	19,980.00	
LEAP AGRI		4,152.80	
PEP		9,890.00	
MNEmerge	European Union	39,397.42	
Gender (APSP)	USAID		24,136.20
SAIRLA Project	CABI		74,051.45
TOTAL		317,995.28	98,187.65

Total funds received from foreign donors for project activities in 2017 was US\$ 317,995.28 as compared to US\$ 675,521.41 in 2016, representing a decrease of 53%. The decrease in fund inflow was because most of the projects ended in December 2016.

Also GHS 98,187.65 was received from donors in local currency to carry out project activities.

3.4 Internally Generated Funds

CSIR-STEPRI's internally generated funds are derived from:

- hiring of auditorium,
- sales of publications,
- hiring of projector,
- support from projects
- consultancy
- and miscellaneous such as sale of obsolete items and car rentals.

Table 3.

Items	2018 Amount (GHC)	2017 Amount (GHC)	2016 Amount (GHC)
Hiring of Auditorium facilities	100,602.00	87,480.00	47,285.00
Hiring of Projector	9,028.00	7,850.00	1,930.00
Sale of Publication	10,160.00	8,835.00	16,855.00
Support from project	225,645.00	196,213.65	237,756.10
Miscellaneous (Car Rentals, photocopies etc.)	4,077.00	3,545.00	1,568.00
Consultancy Services	33,045.00	28,735.00	30,348.00
Total	382,557.00	332,658.65	335,742.10
Total Expenditure	89,619.00	77,929.65	33,985.64
NET IGF	292,938.00	262,728.69	301,756.46

Net IGF for 2017 was GHC 262,728.69 which represents a decrease of 12.93% over 2016 internally generated funds. The decrease in the IGF is mainly due to the completion of most projects in 2016. Hence, a reduction in the projects institutional support, and sale of publications. The 15% IGF to Head Office has been paid up to the third quarter.

The fourth quarter payment of GHC 13,715.79 is outstanding. Institutional support could not be taken for some two projects i.e PEP and BioRAPP project funds released due to the urgency to carry out project activities. Hence subsequent releases will attract institutional support in arrears.

3.5 Expenditures

- Power purchase: Monthly consumption of electricity cost the Institute GHC 12,000.00 and the generator alone consumes fuel costing GHC 3,000.00 a week if there is no power.
- Monthly consumption of fuel for the Institute's vehicles cost GHC 6,500.00

- Monthly water bill is GHC 860.00
- Monthly internet bills range between GHC 800 and GHC 1,000.00
- There exist an outstanding bill for the repair and maintenance of two Institute vehicles of GHC 17,030.00

3.6 Annual Financial Statements

The financial statements up to 2016 has been audited by both external auditors and internal auditors. The internal audit is yet to submit their report though the findings have been discussed. The audit of the 2017 final accounts by our external auditors, State Enterprise Audit Corporation is in progress and will be ready by the end of April 2018.

Conclusion

The Institute performed well in the year 2017 especially in the area of internally generated funds and support from projects and we hope to improve upon this in 2018.

4.0 ADMINISTRATION

4.1 Management

A new Management Board was yet to be reconstituted as at December 31, 2017 due to a change of government.

4.2 Staff Strength

The staff strength of the Institute as at December 31, 2017 stood at 52. The details for the year under review were as follows:

Research Staff Category

Research Scientist	-	16
Non-Core Research Staff	-	3
Technologist	-	4

Non Research Staff Category

Senior Staff	-	20
Junior Staff	-	9

New Appointments

Under the year of review, two (2) persons were employed to augment the staff strength. Table 4 gives details of the newly employed staff.

Table 4: New Appointments

No.	Name	Date of Appointment	Division assigned to	Designation
1.	Nana Yamoah Asafu-Adjaye	4th Jan. 2017	AMED	Senior Research Technologist
2.	Maame Dokuaa Akua Agyei Addo	4th Jan. 2017	AMED	Senior Research Technologist

4.3 Internship and National Service

As part of the Institute's Corporate Social Responsibility (CSR), it has over the years nurtured students to acquire on-the-job training to equip them with relevant skills required for future employments. Some students were posted to the Institute as national service personnel while others applied as interns. For the reposting period, the Institute had seven (7) interns and twelve (12) service persons from various tertiary institutions in the country. Table 5 below show the details of internship and national service personnel posted to the Institute.

Table 5.

No.	Name	Area of Specialisation/Qualification	Institution
1.	Osman Oscar Abbiw	Kumasi Technical University (KsTU)	HND Accountancy
2.	Ghanem Edward	University of Development Studies (UDS)	B. Com (Human Resource)
3.	Nyahe Alberta Elorm	Ghana Telecom University College (GTUC)	Diploma Information Technology
4.	Ampoe Kwesi Michael	University of Development Studies (UDS)	BSc Planning
5.	Aboe Vonette	University of Ghana (UG)	BA (Political Science & English)
6.	Acquaye Johnson	Accra Technical University (ATU)	HND Statistics
7.	Bawa Ibrahim	University of Cape Coast (UCC)	B. Com
8.	Labaran Tito	Kwame Nkrumah University of Science and Technology (KNUST)	BSc Agri. Business Management
9.	Yawson Doris Scott	Kwame Nkrumah University of Science and Technology (KNUST)	BSc Information Technology
10.	Owusu Mary	University of Cape Coast (UCC)	BSc (Mathematics and Economics)
11.	Armah Rufus Ashitey	University of Ghana (UG)	BSc. Geography and Political Science
12.	Enoch Okutu	Methodist University College Ghana (MUCG)	

Internship

No.	Name	Area of Specialisation/Qualification	Institution
1.	Margaret Kobiri Asenso	University of Ghana (UG)	BSc. Statistics and Mathematics
2.	Ebenezer Ntim	University of Professional Studies (UPSA)	Banking and Finance
3.	Elvis Dwamena	Kwame Nkrumah University of Science and Technology (KNUST)	BSc. Agriculture
4.	Thyra Djanie	Valley View University (VWV)	BSc. Development Studies
5.	Elizabeth Obodai Torshie	Accra Technical University (ATU)	Secretaryship and Management Studies
6.	Frederick Sefa Ofa	University of Ghana (UG)	BA (Political Science)
7.	Isaac Nii Adjetej Sowah	University of Professional Studies (UPS)	Bachelor of Business Administration

Upgrading

Two (3) employees, Nana Yamoah Asafu-Adjaye and Maame Dokuaa Akua Agyei Addo, both in the AMED and Ransford Teng-viel Karbo in the ISD were upgraded on 1st Sept. 2017 from Senior Research Technologist to Principal Research Technologist.

4.4 Staff Training

Training or capacity building is one of the motivational packages CSIR gives to its staff to help them improve upon their skills and acquire more knowledge in their area of specialization. Every year, members of staff are given the opportunity to upgrade themselves. In 2017, two of the Institute's Research staff: Dr. Emmanuel Kodjo Tetteh and Dr. Paul Boadu completed their PhD programmes. Five (5) other Research staff of the Institute are currently on study leave pursuing PhD programmes at various universities within and outside the country. They are:

Name	Institution
• Gordon Akon Yamga	University of North Texas, USA
• Mrs. Justina Onumah	ISSER – University of Ghana/University of Bonn, Germany
• Ms. Mavis Akuffobe	University of Ghana
• Mrs. Portia Adade Williams	University of Cape Town, South Africa
• Roland Asare	University of Ghana
• Stephen Awuni	University of Ghana

Promotions

On the above subject, the under listed staff were promoted effective January 2017:

No.	Name	From	To (New Designation)
1.	Dr. (Mrs.) Wilhemina Quaye	Principal Research Scientist	Chief Research Scientist
2.	Dr. (Mrs.) Adelaide Agyeman	Senior Research Scientist	Principal Research Scientist
3.	Godfried P. K. Acquaaah-Arhin	Principal Admin. Assistant	Chief Admin. Assistant
4.	Ms. Selina Lawer-Angler	Principal Admin. Assistant	Chief Admin. Assistant
5.	William Dorkordi	Senior Library Assistant	Principal Library Assistant
6.	Paul Debrah	Security Officer	Senior Security Officer

Contract Appointments

As a result of the small staff strength, the Institute had to employ three contract labourers/cleaners to hold the fort for the staff who proceeded on their annual leave for 2017.

Retirement

None of the staff proceeded on retirement during the period.

4.5 Office Renovation

Management of the Institute gave a facelift to the office building by:

- Changing dilapidated doors
- Renovating the kitchen
- Repairing leaked roofs, and
- Painting the office building

In addition to the renovation works, this a summer hut was constructed to serve as a meeting place for staff and visitors and also serve as a cafeteria.

Awards

Some members of staff were recognized for their hard work and dedicated service to the Institute. Their names were:

- Dr. (Mrs.) Wilhemina Quaye** - Best Research Scientist
Ms. Selina Lawer Angmler - Best Worker (Senior Staff Category)
Sammy Akanfella - Best Worker (Junior Staff Category)

4.6 Publications and Scientific Meetings

A number of books, technical reports, conference papers, and journals papers were produced by the research staff. These publications have been displayed in the Institute's book case with copies deposited in the library. The details are given in Appendix 1. Some of the research staff participated in workshops, seminars and conferences, held at the national, regional and international levels (see Appendix 11). These activities contribute to improving knowledge generation and knowledge circulation and capacity building. The Institute encouraged and supported its researchers to participate in these activities.

APPENDIX 1: Institutional and Staff publications

(Highlighted names are CSIR-STEPRI staff)

Journal Publications

1. **Essegbey, G.O.**, Owuraku Sakyi-Dawson, Dansou Kossou, Bara Ouologuem, Fiadiala Dembele, Richard Adu-Acheampong and Janice Jiggins (2017) "External influences on agro-enterprise innovation platforms in Benin, Ghana and Mali – Options for effective responses", *Cah. Agric.*, 26, 45011.
2. Owusu-Amankwah, R., Guido Ruivenkamp, **George O. Essegbey** and Godfred Frempong (2017) "The Nature, Extent and Effect of Diversification on Livelihoods of Farmers: A Case Study of Cocoa Farmers in Ghana", *International Journal of Agriculture Innovations and Research*, Volume 5, Issue 5, pp. 652 – 657.
3. **Quaye, W., Fuseini, M., Boadu, P and Asafu-Adjaye, N.Y.** (2017): Bridging the gender gap in agricultural development through gender responsive extension and rural advisory services delivery in Ghana, *Journal of Gender Studies*, DOI:10.1080/09589236.2017.14199-41
4. **Quaye, W., Onumah, J.A.** Tortoe, C., Akonor, P.T. and Buckman, E. (2017): Investigating the adoption of the root and tuber composite flour (RTCF) technology transferred among micro- and small-scale entrepreneurs (MSEs) in the bakery industry in Ghana, *African Journal of Science, Technology, Innovation and Development* DOI:10.1080/20421338.2017.1405545
5. **Quaye, W., Asafu-Adjaye, N.Y.**, Yeboah, A., Osei, C. and Agbedanu, E.E. (2017) Appraisal of the AgroTech Smart Extension Model in Ghana, Payment options and Challenges in ICT-enabled extension services delivery. *International Journal of Agricultural Education and Extension* 3(3): 072-084
6. Damman, S., Helness, H., Amisigo, B., **Asare R.**, Ama Banu R., Asante K.A., Bjørkvoll T., Azrague K., **Akuffobe M.**, Logah F., **Williams P. A.**, Amu Mensah F., **Fuseini M., Essegbey G.O.**, (2017). Sustainability and the Social Construction of Technology: The Case of Rain Water Harvesting as Source of Water Supply in Greater Accra. *European Journal of Sustainable Development*, 6 (4) 41-52
7. **Omari R.**, Ruivenkamp G.T.P., **Tetteh, E.K.** (2017) Consumers' trust in government institutions and their perception and concern about safety and healthiness of fast food. *Journal of Trust Research* 7 (2), 170-186
8. **Omari R.**, Quorantsen K.E., Omari P.K. (2017) Nutrition knowledge and food consumption practices and barriers in rural Ghana: The case of foods for preventing vitamin A and iron deficiencies. *Afr. J. Food Agric. Nutr. Dev* 17 (1), 11639-11656
9. **Omari R.** (2017) Mechanisms for Strengthening Evidence-Based Policy and Practice: A Review. In: M. F. Kebe C., Gueye A., Ndiaye A. (eds) *Innovation and Interdisciplinary*

Solutions for Underserved Areas. pp 156-161. InterSol 2017, CNRIA 2017. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 204. Springer, Cham.
DOI https://doi.org/10.1007/978-3-319-72965-7_15

10. **Agyeman, A.** and Nsowah-Nuamah, N.N.N. 2017. Estimating the Returns to Schooling: Restricted Maximum Likelihood Approach. *Statistika: Statistics and Economy Journal* 97(1):104-117.
11. Amponsah, S. H., Berchie, J. N., Manu-Aduening, J.A., Danquah, E. O., Osei Adu, J., **Agyeman, A.** and Bessah, E. 2017. Performance of an improved manual cassava harvesting tool as influenced by planting position and cassava variety. *African Journal of Agricultural Research* 12(5): 309-319.
12. **Osei-Amponsah, C.**, van Paassen, A. and Klerkx, L. (2018). Diagnosing institutional logics in partnerships and how they evolve through institutional bricolage: Insights from soybean and cassava value chains in Ghana. *NJAS-Wageningen Journal of Life Sciences*, 84:13-26, <https://doi.org/10.1016/j.njas.2017.10.005>
13. **Williams, P. A., Frempong, G. K., Akuffobe, M. and Onumah, J. A.** (2017). "Contributions of multinational enterprises to economic development in Ghana: A myth or reality?" *International Journal of Development and Sustainability*, 6:12 Pp. 2068-2081
14. **Williams, P.A.**, Crespo, O., Atkinson, C. J., and **Essegbey, G. O.** (2017) "Impact of climate variability on pineapple production in Ghana" *Agriculture & Food Security* 6:26 DOI10.1186/s40066-017-0104-x
15. **Williams, P.A.**, Crespo, O., **Essegbey, G.O.** (2017) "Economic implications of a changing climate on smallholder pineapple production in Ghana", *Journal of Economics and Sustainable Development*, Vol.8, No. 18, pp. 34 – 43.
16. Cazabon, D., Fobil, J.N., **Essegbey, G.O.** & Basu, N. (2017) "Structured Identification of Response Options to Address Environmental Health Risks at the Agbogbloshie Electronic Waste Site", *Integrated Environmental Assessment and Management*, Volume 13, Number 6, pp. 980 – 991.

Unedited Conference Papers

1. **Essegbey, G.O. and Onumah, J.A.** (2017). Science, Technology and Innovation Policy -Issues of Relevance and Impact for Africa in relation to the Sustainable Development Goals. A paper presented to the 2017 AFRICALICS Conference, 27th – 29th November, 2017, Oran, Algeria
2. **Onumah, J.A., Sarpong-Anane, A.B. Akuffobe, M., Williams, P.A and Essegbey, G.O.** (2017). The role of policy and multinational enterprises (MNEs) in Ghana's agricultural development: A Case of the rice industry. *Development Innovation, Putting the Pieces together*. In **Boadu, P., Quaye, W., Onumah J.A. and Essegbey, G.O.** (Eds). ISBN 978-9988-2-5383-7 pp. 184-200.

3. Williams, P. A., **Akuffobe, M., Onumah, J. A. and Asare, R.**, (2017). Performance of Innovation among Firms in Ghana: Challenges and Opportunities. Development Innovation, Putting the Pieces Together. In **Boadu, P., Quaye, W., Onumah J.A. and Essegbey, G.O.** (Eds). ISBN 978-9988-2-5383-7 pp. 302-313.
4. **Ransford Karbo & Roland Asare** (2017). Contribution of Renewable Energy to Socio-Economic Development of Communities in Ghana: Key Challenges and Policy Implications. Presented at the 3rd Ghana Renewable Energy Fair, International Conference Center, Accra. 11th October 2017.
5. **Osei-Amponsah, C.**, Klerkx, L., van Paassen, A., van Mierlo, B. and **Essegbey, G.O.** (2017). Institutional entrepreneurship for innovations in agricultural value chains: What more for project-based partnerships? In **Boadu, P., Quaye, W., Onumah, J., and Essegbey, G.O.** (Eds.), Development innovation-Putting the pieces together. (p. 71-85). Proceedings of the Innovation conference Ghana, Accra, 27th-28th September 2016, Print Innovation, Accra.
6. **Onumah, J.A., Quaye, W., Decker, E. and Essegbey, G.O.** (2017). Spreading the "Gospel" of Science, Technology and Innovation Research in Ghana: A Two-Case Experience of the CSIR-Science and Technology Policy Research Institute. The Global Network for Economics of Learning, Innovation, and Competence Building Systems (GLOBELICS) Conference on 11th-13th October, 2017, Athens, Greece.

Book chapters

Fu, X., **Essegbey, G.O., and Frempong, G.K.** (2017) "MNEs' and Capabilities Building in Ghana", in Pervez N. Ghauri, Xiaolan Fu and Juha Vaatanen (Eds.) Multinational Enterprises and Sustainable Development, International Business & Management Vol. 33, Emerald Publishing, Bingley, UK, pp.173-194.

Osei-Amponsah, C. (2016). Research and experimentation in support of artisanal palm oil production in Ghana, In Innovation Systems: Towards Effective Strategies in support of Smallholder Farmers. (Eds.). Francis, J., Mytelka, L., van Huis, A. and Röling, N. 2016. Technical Centre for Agricultural and Rural Cooperation (CTA) and Wageningen University (WUR)/Convergence of Sciences- Strengthening Innovation Systems (CoS-SIS), Wageningen.

Monographs, Handbooks, Pamphlets/Policy briefs (Edited

Osei-Amponsah, C., van Paassen, A., **Essegbey, G.O.**, and Bolfrey-Ark, G.(2017). Innovation Platform as a tool for agricultural development: Insights for research and extension, CSIR-STEPRI policy brief 2.

Osei-Amponsah, C., van Paassen, A. and **Essegbey, G.O.**, (2017). Creating public-private partnerships and innovation platforms for agricultural development: Insights for development partners, CSIR-STEPRI policy brief 1.

Technical Reports

1. Adofo, K., Baafi, E., Adu-Kwarteng, E., Quain, M. D., Amengor, N. E. Appiah Danquah, P., Bortey, H. M., Asamoah, E. A. Aubyn, A., Appiah-Kubi, D., Osei, Bonsu, P., Akom, M., Oppong, A., **Agyeman, A.**, Addo, A., Mochia, M., Sanda, U., Osei, K., Bolfrey-Arku, G., Boakye, S. G., Awoodzie, J. K., Asamoah Obeng, N., Okyere, F., Amoah-Owusu, A., Allotey, L. N. A., Akomeah, B. and Abrokwaah, L. A. (2017). Release of Sweet Potato Genotypes. Report submitted to the National Variety Release committee in support of the release of four sweet potato varieties in Ghana.
2. **Ampadu-Ameyaw R., Omari R., Essegbey G.O.** (2017) Factors Influencing Scaling-up of Agricultural Innovations: Lessons from Ghana. FARA Research Results 1 (4), 20.
3. **Ampadu-Ameyaw R., Omari R., Essegbey G.O.** (2017) Development and Analysis of the Rice Value Chain for the Hohoe and Jasikan Districts of the Volta Region, Ghana. FARA Research Results 1 (1), 48.
4. Julia Tagwireyi and **Omari R.** (2017). A situational analysis of regional investments, policies, legislation and advocacy efforts on food-based approaches to combating micronutrient deficiency in Sub-Saharan Africa: Focus on biofortification. FARA Research Report, 1(7).
5. Opoku M. and **Omari R.** (2017) Orange-fleshed sweet potato (OFSP) marketing plan. A report Submitted to the International Potato Center (CIP), Ghana.
6. **Omari R.** (2017) Building Nutritious Food Baskets Project (BNFB) Regional advocacy strategy 2017 and beyond. Forum for Agricultural Research in Africa, Accra, Ghana.
7. **Roland Asare, Wilhelmina Quaye, George Essegbey, Ransford Karbo and Asafu-Adjaye N.Y.** (2017). Assessment of Technology Transfer System in Ghana- CSIR Technology Development and Transfer Center.

APPENDIX II: Workshops, Seminars, Conferences and Mass Media

Dr. George Owusu Essegbey participated in the following:

- An international Workshop on “Industrial Innovation for inclusive Health Systems at United Kingdom from 6 – 7 February, 2017.
- Advisory and Strategy Meeting of the Agricultural Science and Technology Indicators (ASTI) at Washington, DC from 21 – 22 March, 2017.
- An Expert Group Meeting (EGM) on Science, Technology and Innovation at Headquarters, New York, - 15 – 18 May, 2017.
- Work visit to discuss opportunities for potential collaboration and have interaction at the Innovation Hub at University of Florida , 25 – 26 May, 2017.
- AFRICALICS Academy 2017 programme at Obafemi Awolowo University at Ile-Ife, Nigeria, 24 – 28 June 2017.
- A regional dialogue as IPBES National focal point at Addis Ababa, Ethiopia, 3-4 August, 2017.
- As Co- Project Coordinator at the World Conservation Monitoring Centre at Cambridge, (UN-WCMC) , UK, 5 – 8 September, 2017.
- Speaker on “Science, Technology and Innovation in economic growth and sustainable development”, at a High-level International forum organized by UNESCO and Ministry of Innovation, Science and Higher Education of the State of Guanajuato at Mexico, 11 - 13 Sept., 2017.
- The 15th GLOBELICS Intentional Conference at Athens Greece from 11 – 13 October, 2017.
- A workshop on a new framework for STI Policy Reviews by UNCTAD in Geneva, 9th November, 2017.
- Workshop on Science, Technology and Innovation for Sustainable Development Goals in his capacity as a member of the United Nations 10-Member Expert Group on STI or SDGs in Incheon, 29 November - 1 December, 2017 in Incheon, Republic of Korea.

Dr. (Mrs.) Wilhemina Quaye participated in the following:

- Partnership for Economic Policy (PEP) 2017 Annual Conference organised in Kenya Nairobi in June 8-14, 2017.
- Presented at a Conference on Implementation of the National Export Strategy in relation to One-District-One-Export Product organised by Ghana Export Promotion Authority at the Volta Serene Hotel, Ho on 20th June 2017.
- Evidence to Action: Towards and Evidence Based and Data-Informed Policy, Action and Practice in Africa Workshop hosted by ISSER, University of Ghana in Accra on 25-26th July 2017.
- Gender Responsive Agricultural Research and Development (GRARD) initiative workshop organized by African Women in Agricultural Research and Development (AWARD) in Arushia, Tanzania, 10-12 November, 2017.
- Community-Based Monitoring System Workshop organized by Partnership for Economic Policy (PEP). This was held in Manila, Philippines; November 20-24, 2017.

Dr. Emmanel Kodjo Tetteh participated in the following:

- Regional Meeting of Directors General of Scientific Research and Innovation to validate the 2015 Report on “ECOWAS Bibliometric Outlook” at Abidjan (Republic of Cote d’Ivoire). 12th - 19th February, 2017.
- Joint Science Granting Councils Initiative (SGCI) Meeting on STISA 2024 and the African Science, Technology and Innovation Indicators (ASTII) Initiative Continental Validation Workshop in Windhoek, Namibia. 21st -27th May, 2017.
- Workshop on the Design and Evaluation of Innovation Policies in African Countries at Abidjan, (Republic of Cote d’Ivoire). 10th -17th September, 2017.
- End of project (CIRCLE) workshop in Niarobi, Kenya from 10th -13th December, 2017.

Dr. (Mrs.) Rose Omari participated in the following:

- International Association for Food Protection Conference (IAFP 2017), 9th - 12th July 2017, Tampa Convention Center, Tampa, Florida, USA.
- Sustainable Food Systems for Healthy Diets and Improved Nutrition, Radisson Blu Hotel in Abidjan, Cote D’Ivoire, 16th - 17th November, 2017.
- Risk Assessment for Aflatoxin in weaning foods in Ghana, A Presentation at International Life Sciences Institute, Washington D.C. USA, 24th August 2017.
- Omari R., Turner P. and Narrod C. (2017) The role of advocacy in mitigating the Aflatoxin Gordon Research Conference: Mycotoxins & Phycotoxins: Stonehill College, Easton, MA, USA, 18th - 23rd June, 2017. Made a presentation on The role of advocacy in mitigating the Aflatoxin Challenge in Africa.
- Enhancing the effectiveness of aflatoxin awareness campaigns: Lessons from Rotary Club’s campaign in Benin, Ghana & Togo. A presentation at the Gordon Research Conference: Mycotoxins & Phycotoxins: Stonehill College, Easton, MA, USA, 18th -23th June, 2017.
- The EAI International Conference on Innovations and Interdisciplinary Solutions for Under served Areas, InterSol 2017, Dakar, Senegal, 11th -12th April, 2017. Made a presentation on Mechanisms for strengthening evidence-based policy and practice.

Mrs. Justina A. Onumah participated in the following:

- The Africa Network for Economics of Learning, Innovation, and Competence Building Systems (AFRICALICS) Conference, Oran, Greece. 27th - 29th November, 2017.
- The Global Network for Economics of Learning, Innovation, and Competence Building Systems (GLOBELICS) Conference. Athens, Greece. 11th - 13th October, 2017.
- Sustainable agriculture and rural transformation: meeting farmers’ needs in socio-ecological systems. Right Livelihood College (RLC), Bonn, Germany. 10th -15th July, 2017.

Ms. Mavis Akuffobebe participated in the following:

- Climate Impacts Research Capacity Leadership Enhancement (CIRCLE) induction workshop for the cohort 3 of the CIRCLE Visiting Fellows (CVFs) of the CIRCLE programme at the secretariat of the African Academy of Sciences in Nairobi, Kenya, 8th - 10th February, 2017.
- Training on Statistical Analysis with STATA from at University of Dar es Salaam, Tanzania, 16th - 18th February, 2017.
- A PhD Concept Note Presentation Seminar at the Centre for Climate Change Studies (CCCS) and Institute of Resource Assessment (IRA), University of Dar es Salaam, 23rd February, 2017.
- The Winter School 2017, a Capacity Building Training Course on “Using Climate Information for Adaptation and Policy Development” at the University of Cape Town, South Africa, 24th July - 28th July, 2017.

Dr. (Mrs.) Adeliade Agyeman participated in the following:

- Ghana's Data for Sustainable Development Roadmap Forum at Alisa Hotel, Accra from, 5th - 6th April, 2017.
- Expert Group Meeting on "Governing Science, Technology and Innovation to Achieve the Targets of the Sustainable Development Goals and the Aspirations of the African Union's Agenda 2063" at the United Nations Conference Centre Addis Ababa, Ethiopia from 2nd - 3rd August, 2017.

Roland Asare participated in the following:

- The 3rd Ghana Renewable Energy Fair on the theme: "Renewable Energy: An Engine for Distributed Wealth Creation" at the Accra International Conference Center from 10th -12th October, 2017.
- FAO/MOFA Workshop: Using Scenario-guided Recommendations in the Formulation of the New Livestock Policy at CSIR-STEPRI, Accra, 10th - 11th May, 2017.

Asafu-Adjaye Nana Yamoah participated in the following:

- Training on the Value Links Methodology developed by GIZ, Accra at CSIR-STEPRI, Accra, on the 24th–25th January, 2017.
- The Role of Sustainable Agricultural Intensification in Ghana's Agriculture Modernization. Policy Symposium, at CSIR-STEPRI, Accra, 24th March, 2017.
- FAO/MOFA Workshop: Using Scenario-guided Recommendations in the Formulation of the New Livestock Policy at CSIR-STEPRI, Accra, 10th - 11th May, 2017.
- Policy Symposium on the theme "Excessive Use of Chemicals in the Management of Fall Armyworm: Implications on Sustainable Agricultural Intensification in Ghana" organized by Center for Agriculture and Biosciences International (CABI), Sustainable Agricultural Intensification Research And Learning In Africa (SAIRLA) - Ghana National Learning Alliance (NLA), CSIR-STEPRI conference room, 30th August 2017.
- Agricultural Science And Technology Indicators (ASTI - led by IFPRI) Workshop - Enhancing the Use Of ASTI Data For Analysis And Policy Influencing Stakeholders Dissemination Workshop at CSIR-STEPRI, Accra, 31st August, 2017.
- Training Course in Mobile based Data collection using Open Data Kit (ODK) at CSIR-STEPRI, Accra, 30th October to 3rd November, 2017.
- Dissemination Workshop on Water and Weather Monitoring Services for Cocoa Farmers in Ghana. Organized by Farmerline at Coconut Grove Regency Hotel, Accra, 27th September, 2017.
- Sustainable Agricultural Intensification Research And Learning In Africa (SAIRLA) International Learning Alliance (ILA) Workshop at Oak Plaza Hotel, Accra, 17th–19th October, 2017.

Ransford Teng-viel Karbo participated in the following:

- The 3rd Ghana Renewable Energy Fair on the theme: "Renewable Energy: An Engine for Distributed Wealth Creation" at the Accra International Conference Center from 10th -12th October, 2017.
- FAO/MOFA Workshop: Using Scenario-guided Recommendations in the Formulation of the New Livestock Policy at CSIR-STEPRI, Accra, 10th - 11th May, 2017.
- Sustainable Agricultural Intensification Research And Learning In Africa (SAIRLA) International Learning Alliance (ILA) Workshop at Oak Plaza Hotel, Accra, 17th - 19th October, 2017.

Ms. Afua Bonsu Sarpong-Anane participated in the following:

- Training on Gender Mainstreaming in Research at CSIR-INSTI, Accra from 4th - 7th July, 2017.
- National Consultations on the Rolling-out the Science Agenda for Agriculture in Africa (S3A) to Ghana at CSIR-STEPRI from 11th - 14th July, 2017.
- Agricultural Science and Technology Indicators (ASTI - led by IFPRI) Workshop - Enhancing the Use of ASTI Data For Analysis and Policy Influencing Stakeholders Dissemination Workshop at CSIR-STEPRI, Accra on 31st August, 2017.
- Training on Mentoring and Coaching for Early Career Scientists and Technologists of CSIR at CSIR-WRI, Accra from 17th - 18th October, 2017.
- Innovations in Agriculture Biotechnology, Forum for Women in Science on at Centre for African Wetlands, University of Ghana, Legon on 2nd November, 2017.

Jeffet Ekow Cobbah participated as a facilitator at:

- Circle / Vitae / AAU Training on Mentoring and Career Development for Early Career Professionals Accra, Ghana, 13 - 17 October 2017.

Mrs. Portia Adade Williams participated in the following:

- Climate Impact Research Capacity and Leadership Enhancement (CIRCLE) Programme Cohort 2 post fellowship workshop for CIRCLE Visiting Fellows (CVFs) at the secretariat of the African Academy of Sciences (AAS) in Nairobi, Kenya, 8 - 10 February 2017.
- Training on "Starting the PhD journey" at University of Cape Town, South Africa, 3 May 2017.
- Training on "Agenda 2030, Poverty, Climate change and Sustainable Development" at Bergen Summer Research School, University of Bergen, Norway, 12 - 22 June 2017.
- Presented at the "Sao Paolo School of Advanced Science on Climate Change", University of Sao Paolo, Brazil, 3-15 July 2017.
- American Association for the Advancement of Science (AAAS) - The World Academy of Sciences (TWAS) course on Science and Diplomacy, ICTP Campus, Trieste, Italy, 21-25 August 2017.
- Sustainable Agricultural Intensification Research And Learning In Africa (SAIRLA) International Learning Alliance (ILA) Workshop at Oak Plaza Hotel, Accra, 17 - 19 October, 2017.

Dr. (Mrs.) Charity Osei-Amponsah participated in the following:

- A gender in agricultural research training organized by IITA at the Modern City Hotel in Tamale, Ghana, from 7th - 9th September, 2017.
- Presented a narrative on soybean cluster in northern Ghana during an Agri-food system innovation workshop organized by CSIRO, ISPC of CGIAR at ICRISAT Headquarters, Hyderabad, India, from 27th - 29th June, 2017.
- The Science Agenda implementation roll-out regional consultations for key national and regional stakeholders in Science, Technology and Innovations (STIs) production and dissemination. Organised by FARA on behalf of CORAF/WECARD and NAASRO at the FARA Secretariat in Roman ridge, Accra from 9th - 11th May, 2017.
- The Regional Consultative Workshop on the Zero Hunger Strategic Review organized by the John Agyekum-Kufuor Foundation at the Eastern Premier Hotel in Koforidua on 5th May, 2017.

Dr. Richard Ampadu-Ameyaw participated in the following:

- Stakeholders workshop on Initial Phase of Project: Tipping point of food security in socio-ecological Systems in West Africa from 27th November to 5th December, 2017.
- A working visit to India under the auspices of the council for research in International Economic Relations (ICRIER) and the Center for Development Research (ZEF) University of Bonn December 5th -15th 2017.
- Annual Agricultural Green Revolution 2017 in Cote d'ivoire to present a paper on Investment opportunities in Agricultural Innovation Value chain in Ghana. The case of Rice Value chain in the Volta Region of Ghana, on October, 2017.
- Annual review and planning meeting of the Open Forum on Agricultural Biotechnology (OFAB) in Kampala, Uganda from 24th - 30th September, 2017.
- End of project (CIRCLE) workshop in Nairobi, Kenya from 10th - 13th December, 2017.

Stephen Awuni participated in the following:

- The 3rd Ghana Renewable Energy Fair at the International Conference Center Accra on the 11th October, 2017.
- Agricultural Science and Technology Indicators (ASTI - led by IFPRI) Workshop. Enhancing the use of ASTI data for analysis and policy to influence stakeholders dissemination, Workshop at CSIR-STEPRI, Accra on the 31st of August 2017.
- National consultation on the rolling-out of the Science Agenda for Agriculture in Africa (S3A) to Ghana at CSIR-STEPRI from the 11th to the 14th of July, 2017.

AWARDS AND FELLOWSHIPS**Ms. Mavis Akuffobe**

Climate Impact Research Capacity Leadership Enhancement (CIRCLE) FELLOWSHIP
Department for International Development (DFID) AWARD : Received a DFID fellowship for training in climate change research.

Ghana Education Trust Fund (GETFund). Received sponsorship for a 4 - year PhD Programme in Sociology at the University of Ghana, Legon.

APPENDIX III: List of Members of STEPRI Staff**A. Senior Members**

1. Dr. George O. Essegbey, B.Sc. (Zoology), Post-Graduate Dip. (Communication Studies), M.A. (International Affairs), PhD (Development Studies), Chief Research Scientist, Director.
2. Dr. Godfred K. Frempong, B.A.(Sociology/Law), M.A. (Technology Policy), PhD (Sociology), Chief Research Scientist, Deputy Director.

Commercialization and Information Division (CID)

3. Dr. Emmanuel K. Tetteh, HND (Stats), B.Ed. (Pop. Studies), M.A (Demography) PhD (Geography), Senior Research Scientist, (Head of CID).
4. Masahudu Fuseini, B.A (Sociology), M.Sc. (Social Research), Research Scientist.
5. Jeffet Ekow Cobbah, Bachelor of Fine Arts (Extension Communication/Theatre for Dev.), Master of Fine Arts (Extension Communication/Theatre for Dev.), Marketing Officer.
6. Fredrick Acheampong-Asiedu, GCE 'O', Diploma in Film/Video Editor, Currently pursuing, BA Fine Art in Editing, Chief Technical Officer.
7. George A.B. Dankwa, GCE 'O' Level, GCE 'A' Level, Diploma (Film and TV Sound Production), HND (Marketing), Chief Technical Officer.
8. William Agbenyega Dorkordi, SSCE, Diploma in Librarianship, Prin. Library Asst.

Agriculture, Medicine and Environment Division (AMED)

9. Dr. R. Ampadu-Ameyaw, BSc. (Agric. Econs), M.Sc. (Agric. Econs.), PhD (Development Studies), Senior Research Scientist, (Head of AMED).
10. Dr. (Mrs.) Charity Osei Amponsah, BSc. (Agriculture), MPhil (Agricultural Economics) PhD (Agriculture), Research Scientist.
11. Gordon Akon-Yamga, B.A. (Geography), MPhil. (Env. Sci), Research Scientist (Study leave), PhD Candidate.
12. Dr. Paul Boadu, B.A. (Hons) Economics, MPhil (Economics.), PhD (Economics) Research Scientist.
13. Stephen Awuni, BSc. (Hons) Zoology, MPhil. (Env. Sci), Research Scientist, (PhD Candidate).
14. Mrs. Justina A. Onumah, BSc. Agricultural Technology (Econs & Extension), MPhil (Agric. Econs), Research Scientist, (PhD Candidate).
15. Maame Dokuaa Akua Agyei Addo BSc. Agriculture (Postharvest Technology), MSc (Sustainable International Agriculture), Principal Research Technologist.
16. Nana Yamoah Asafu-Adjaye, BSc. Agriculture Technology (Economics and Extension), MPhil (Agriculture Economics), Principal Research Technologist.

Industry and Service Division (ISD)

17. Dr. (Mrs.) Wilhemina Quaye, BSc. Agric. Econs, MPhil (Agric Econs), PhD (Rural Sociology), Chief Research Scientist (Head of ISD).
18. Dr. (Mrs.) Rose Omari, B.Sc (Biochemistry & Food Science), M. Phil. (Food Science), PhD (Food Policy), Senior Research Scientist.
19. Dr. (Mrs.) Adelaide Agyeman, BSc (Computer Science), MSc (Mathematics), PhD (Statistics), Principal Research Scientist.
20. Ms. Afua Bonsu Sarpong-Anane, Diploma in Human Resource Management (ICM), B.A Social Science (Economics and Sociology), MPhil (Sociology), Principal Research Technologist.
21. Roland Asare, B.Sc. (Hons) Geology, M.Sc. Environmental Engineering, MBA (Finance), Senior Research Scientist, (PhD Candidate).
22. Ms. Mavis Akuffobe, B.A. (Sociology/Law), M.Phil. (Sociology) Research Scientist, (PhD Candidate).
23. Mrs. Portia Adade Williams, BSc. (Agric Econs), M.Sc. (Bus. Administration), Research Scientist, (PhD candidate).
24. Rankine Asabo, SSSCE, BA (Psychology and Sociology), Principal Technical Officer.
25. Ransford Teng-viel Karbo, BA (Archaeology & Political Science), Master of Arts (Development Studies), Principal Research Technologist.

Accounts

26. Oswald Nyimebaare, BSc. (Accounting Option.), ICA, MBA (Accounting Option), (Head of Finance).

B. Senior Staff**Accounting staff**

27. David A. Sowah, Certificate in Procurement and Material Management, GCE 'O' Level, GCE 'A' Level, Principal Accounting Assistant.
28. Mrs. Catherine Dzitse, Institute of Chartered Accountants (I.C.A.) Ghana, Part I & II, Principal Accounting Assistant.
29. Ms. Sabita A. Pilly Apreko, Higher National Diploma (Accountancy), Principal Accounting Assistant.
30. Enoch Okutu, ABCE (Accounting), I.C.A. Part 1, BA (Accounting) Principal Accounting Assistant.
31. Ms. Rosemond Ocansey, HND (Purchasing and Supply), BA (Logistics and Supply Chain Management), Senior Stores Superintendent.
32. Mrs. Gifty Dzihloru, BA (Accounting), CA, Internal Auditor. Administrative and General Services
33. Godfried Acquah-Arhin, GCE 'O' Level, GCE 'A' Level, Bachelor of Business Administration in Management, MBA (Strategic Management) Chief Admin. Assistant.
34. Ms. Mary Magdalene Masopeh, GCE 'O' Level, Diploma in Business Studies (Secretarial Option), Diploma in Management Studies, Chief Admin. Assistant.
35. Ms. Gloria Boakye, Diploma in Business Studies (Secretarial Option), HND (Secretaryship & Management Studies), Bachelor of Management Studies, Chief Admin. Assistant.
36. Ms. Selina Lawer-Angmler, GCE 'O' Level, Higher National Diploma (Secretaryship and Management Studies), Chief Admin. Assistant.

37. Kwesi Aboagye, MSLC, Defensive Driving (STC), Transport Management (NVTI), Senior Transport Management Course (NVTI), Senior Assistant Transport Officer.
38. Robert Anneeh Atawosu, Middle School Certificate (MSLC), STC Defensive Driving, Transport Management (STC), Assistant Transport Officer.
39. Joseph Kingsford Noonoo, MSCL, Junior Supervisory Management Level Certificate, Senior Supervisory Management Level Cert. (Electrical/Mechanical), Chief Works Superintendent.
40. Paul Debrah, GCE 'O' Level, CSIR In-House Security Supervisors Cert. (Module 1,2,& 3) Senior Security Officer.
41. Ms. Christiana Agyeiwaa, GCE "O" level, Diploma in Management Studies, Chief Admin. Assistant.
42. Daniel K. Setufe, MSCL, Professional Driving License "A", CSIR In-House Training for Camera, Editing and Sound, STC Transport Management, STC Defensive Driving, Assist. Transport Officer.
43. Moses Adevu, SSSCE, Security Officer.

C. Junior Staff

44. Adorta Abanya, CSIR In-House Security Training Certificate (Module 1, 2 & 3) Assistant Grade I.
45. Richmond Gasu, BECE, MSCL, Defensive Driving, Licence F, Driver Inspector.
46. Ms. Vida N. Quaye, MSLC, Advance Customer Care Certificate, Front Desk Manageress.
47. Sammy Akanfella, Senior Headman.
48. Joseph K. Osei, BECE, Senior Headman.
49. Jonas Atta Bainfaira, Supervisor Gd. I.
50. Yaw Batholomew, Supervisor Gd. I.
51. Samuel Gadasu, CSIR In-House Security Training Certificate (Module 1,2, and 3).
52. Robert Okpoti, BECE, Certificate in Effective Security Techniques, Security Asst. Gd. I.

