



COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH
SCIENCE AND TECHNOLOGY POLICY RESEARCH INSTITUTE
(CSIR-STEPRI)

Annual Report **2015**

CSIR-STEPRI
Annual Report 2015

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Council for Scientific and Industrial Research (CSIR)

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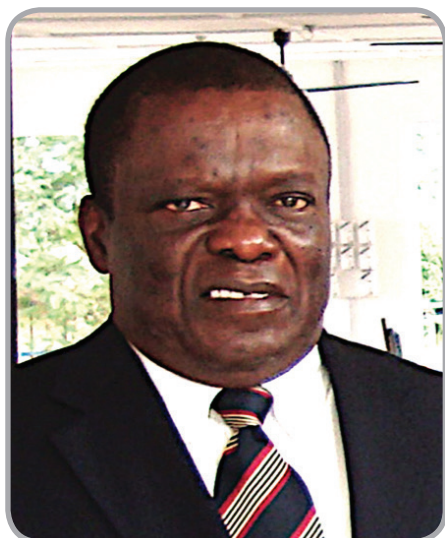
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LIST OF ABBREVIATIONS AND ACRONYMS

AGRA	-	Alliance for Green Revolution in Africa
ASTI	-	Agricultural Science and Technology Indicators
COTVET	-	Council for Technical and Vocational Education Training
CAAST-NET	-	Network for the Coordination and Advancement of Sub-Saharan Africa – EU Science and Technology Cooperation
DANIDA	-	Danish International Development Agency
DFID	-	Department for International Development
DRUSSA	-	Development Research Uptake in Sub Saharan Africa
EU FP7	-	European Union’s Seventh Framework Programme
FAO	-	Food and Agriculture Organisation
FASDEP	-	Food and Agriculture Sector Development Policy
ICT	-	Information Communication Technology
IDRC	-	International Development Research Centre
IFPRI	-	International Food Policy Research Institute
IFS	-	International Finance Services
IGF	-	Internally Generated Funds
MEST	-	Ministry of Environment Science and Technology
MOFA	-	Ministry of Food and Agriculture
MOF	-	Ministry of Finance
MOTI	-	Ministry of Trade and Industry
MWRWH	-	Ministry of Water Resources Works and Housing
NARS	-	National Agricultural Research System
NTNU	-	Norwegian Technical University
PACF	-	Pan African Competitiveness Forum
PORSPI	-	Policy Research and Strategic Planning Institute
PPP	-	Public Private Partnership
R&D	-	Research and Development
RWH	-	Rain Water Harvesting
S&T	-	Science and Technology
Sida	-	Swedish International Development Agency
SINTEF	-	Stiftelsen for Industriell og Teknisk Forskning
STEPRI	-	Science and Technology Policy Research Institute
STI	-	Science, Technology and Innovation
TTC	-	Technology Transfer Centre
TDTC	-	Technology Development and Transfer Center
UNDP	-	United Nations Development Programme



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

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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 thirty-seven (37) consisting of sixteen (16) senior members, eleven (11) senior staff and ten (10) junior staff. Senior members who constitute the core staff are a multidisciplinary staff with specialities in engineering, economics, sociology, agriculture and development studies.

CSIR-STEPRI has long maintained fruitful collaboration with international development partners and academic institutions including the World Bank, the Association of Commonwealth Universities (ACU), Food and Agriculture Organisation (FAO), International Development Research Centre (IDRC) of Canada, Department for International Development (DfID) of UK, the International

Food Policy Research Institute (IFPRI), Alliance for Green Revolution Africa (AGRA), Oxford University, United Nations University in Maastricht, The Netherlands and Washington State University in the US to carry out its primary mission of conducting research to provide knowledge-based information to contribute to the formulation and implementation of policies and programmes for socio-economic development.

In the reporting period, both old and new projects were implemented. Some of the new projects that were implemented included the Development of a National Strategy for the Implementation of "Empowering Novel Agribusiness-led Employment (ENABLE) for Youth in Agriculture", and the Socio-economic Impact of Broadband Using White Space in Sub-Saharan Africa among others. Other achievements of the Institute in 2015 were the participation in a Technology Fair that provided a platform

for CSIR, Ghana Atomic Energy Commission (GAEC), University of Ghana, Legon (UG), Ghana Technology University College (GTUC), and Kumasi Polytechnic researchers to showcase their research and technological innovations and a staff retreat at the Little Acre Hotel in Aburi to brainstorm on the way forward and to set strategic directions for STEPRI for the year 2016 and beyond. The retreat was chaired by Rev. Prof. S.K. Adjepong, the Chairman of the Institute's Management Board and Dr. Joel Sam, a member of the Board.

Donor inflows and Internally Generated Funds for 2015 were US\$516, 810.22 and GHC87, 736.25 respectively. As usual, the main source of income for the Institute was donor-funded projects. The challenge for running the Institute therefore, was the continued absence of government release for assets and operational expenditures.

Message from the Director of CSIR-STEPRI



Dr. George Owusu Essegbey,
Director of CSIR-STEPRI

We are happy to mark with the publication of the 2015 Annual Report, the end of another year and the beginning of another. We take stock of what went on before and what remains to be done.

We first acknowledge the progress we have made as an Institute with the implementation of various projects all of which were supported by donors. It made the Institute active and ensured delivery of the requisite outputs. The credit goes to all especially the untiring workers of the Institute in all categories – research, finance and administration. From the Chief Research Scientist to the Labourer, what STEPRI was able to achieve in the year reflects the efforts the members of staff put in. Likewise our Management Board and our sponsors deserve credit for the strides made in the year.

Their continued guidance and support made progress possible.

Nevertheless, there were challenges though some were to be expected. The year virtually marked the beginning of the transformation of the CSIR in order to position it as a more dynamic Research and Development organization, capable of contributing significantly to the industrialization of the country. In this regard the implementation of the CSIR-TDTC Project with STEPRI as the coordinating institute is notable. Building a strong bridge between the research system and the private sector is a critical initial step. Fortunately, the CSIR-TDTC Project implementation is very well on course and success is almost assured.

In the coming year 2016, there is need for a renewed commitment to dedication to work. STEPRI must still remain one of the shining stars among research institutes not only in the CSIR, but in Ghana and Africa. It is important for any member of staff of STEPRI to go anywhere with the chest out because when people know he or she is coming from STEPRI, respect is accorded automatically. It means that STEPRI must not just deliver on its obligations, it must deliver with utmost quality. This we can do if constantly we remain dedicated to work and we make every effort and take every opportunity to enhance excellence in our work.

STEPRI is unique and we must prove it unique.

1.0 Introduction

1.1 Background

The science and Technology Policy Research Institute is one of the institutes under the Council for Scientific and Industrial Research (CSIR). Its primary objective is to act as focal point to articulate policies and programmes on national Science and Technology (S&T) development. This objective is achieved by providing research support for formulating and implementing policies and programmes for the advancement and application of science and technology for national development.

The extensive research output of STEPRI over the years has made this institution a dependable partner in the acknowledgement and pursuit of Science, Technology and Innovation as a necessary tool for the social- economic development of the Ghanaian society.

Established in 1988 as Technology Transfer Center (TTC), the Institute was re-named Policy Research and Strategic Planning Institute (PORSPI) in 1992 and was assigned to the then Ministry of Industries, Science and Technology (MIST) for the purpose of providing direct technical support to the Ministry. The current name, the Science and Technology Policy Research Institute STEPRI was adopted two years later in 1994 when it was reintegrated into the institutional structure of the CSIR in 1994.

In accordance with the mandate of CSIR-STEPRI, research activities have specifically covered the agricultural, industrial and services sectors of the economy. The Institute has also been instrumental in stimulating public policy awareness for the advancement of national capacity in emerging technologies such as biotechnology, information and communication technology (ICT).

The success of CSIR-STEPRI's activities to a large extent rests on funds from its development partners who over the years have continued to support the Institute in research and human resource development. Notable among the Institute's development partners are United Nation Development Programme (UNDP), the Danish International Development Agency (DANIDA), the International Development Research Center (IDRC) of Canada, the Department for International Development (DfID) of the United Kingdom, the Netherland Government, the World Bank, the Norwegian Development Agency (NORAD), the International Food Policy Research Institute (IFPRI), Alliance for Green Revolution Africa (AGRA) , the Association of Commonwealth Universities, and the Swedish International Development Agency (Sida) among others.

The year 2015 showed a sustained support for STEPRI from some of its development partners and many of the Institute's core research programmes could have stagnated without this support. Research and Development (R&D) activities in the Institute during the year under review, received no funding from government.

Vision

The vision of CSIR-STEPRI is to be an internationally acclaimed Institute that facilitates the development, transfer, utilization and management of Science, Technology and Innovation (STI) in accordance with the specific needs and priorities of Ghana and Africa.

Mission and Mandate

CSIR-STEPRI's mission is to provide the research support necessary for the formulation and implementation of the relevant STI policies and programmes aimed at creating conducive conditions for effective use of science, technology and innovation for social and economic advancement. This mission transcends into the following five central programmes:

- Monitoring and assessment of S&T policies in all sectors of the economy;
- Assimilation and popularization of S&T;
- Facilitation and commercialization of technology innovation;
- Survey on S&T human resource development and management; and
- Evaluation of technology transfer and diffusion.

In providing support for the activities of the institute to carry out its mandate, the key development partners are the World Bank, the Association of Commonwealth Universities (ACU), the Swedish International Development Agency (Sida), the Food and Agriculture Organisation (FAO), International Development Research Centre (IDRC) of Canada, Department for International Development (DfID) of UK, the Netherlands Government, the Office of the New Partnership for Africa's Development (NEPAD), the Norwegian Development Agency (NORAD), the International Food Policy Research Institute (IFPRI), Alliance for Green Revolution Africa (AGRA), the Association of Commonwealth Universities, United Nations Development Programme (UNDP), among others. The Institute also collaborates strategically with international academic institutions such as Oxford University, Brunel University, Washington State University, among others. These strategic collaborations promotes greater synergies and knowledge sharing for better work outputs from the institute.

1.2 Technical Divisions

The organization of STEPRI is pivoted around four technical divisions namely: Agriculture, Medicine and Environment Division (AMED); Industry and Services Division (ISD); Commercialization and Information Division (CID); and Finance and Administration Division (FAD).

The sectoral coverage of each technical division is as follows:

a) Agriculture Medicine and Environment Division (AMED)

This division is tasked with the conduct of policy research in:

- i. Agriculture: Cash Crops, Food Crops, fisheries and urban agriculture.
- ii. Medicine: Orthodox and traditional medicine.
- iii. Environment: Waste management, control of Pollution and Environment degradation and natural resource conservation.

b) Industry and Service Division (ISD)

The division is responsible for policy research on:

- i. Industry: Manufacturing, Construction, Mining and Utilities.
- ii. Services: transportation, financial services, commerce, information and communications technology and tourism.

c) Commercialization and information division (CID)

This division is charged with the responsibility for:

- i. Promotion and Marketing of S&T innovation.
- ii. Consultancy and research outreach.
- iii. Documentation, dissemination of S&T information.
- iv. S&T popularization and
- v. Public relation.

d) Finance and Administration division (FAD)

This division is responsible for the important support services such as:

- i. Accounting
- ii. Personnel Administration
- iii. Estate Management
- 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 in 2015:

1. IFPRI-STEPRI: Agricultural Science and Technology Indicator Survey (ASTI)
2. Rain Water Harvesting (RWH) for Resilience to Climate Change Impact
3. The CSIR-Technology Development Transfer Centre (TDTC)
4. Development Research Uptake in Sub-Saharan Africa (DRUSSA)
5. Diffusion of Innovation in Low Income Countries-Extension
6. Multi-National Enterprises in Emerging Markets (MNEmerge)
7. Advancing Sub-Saharan Africa-European Union Cooperation in Research and Innovation for Global Challenges (CAAST-NET-Plus)
8. Development of a National Strategy for the Implementation of "Empowering Novel Agribusiness-led Employment (ENABLE) for Youth in Agriculture.
9. Revision of Ghana Herbal Pharmacopoeia
10. Socio-economic Impact of Broadband Using White Space in Sub-Saharan Africa

2.0 Summary Of Research Projects

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

Principal Investigator: Dr. George Essegbey

Research Team: Roland Asare

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

Duration: January 2015-March 2016

Introduction

Reliable information and data are important for the formulation of policies for effective performance of the agricultural sector. The International Food Policy Research Institute (IFPRI) in collaboration with the Science and Technology Policy Research Institute (CSIR-STEPRI) conduct studies to update agricultural research investments, human resource capacity and research focus themes in Ghana. The ASTI survey in Ghana and other 40 African countries collect primary data from government, higher education, nonprofit, and private agricultural R&D agencies.

The latest ASTI survey in Ghana started in January 2015 and data collection ended in December 2015. Data analysis is expected to be completed within the first quarter of 2016, which will be followed by the publication of the country factsheet. The factsheet is a summary of both qualitative and quantitative information and time series analysis of key indicators in agricultural R&D capacity in Ghana such as financial, human resources and research focus areas. ASTI's data and results have been an important source of information for policymakers, donor organization and other key stakeholders in making decision making in respect of agriculture R&D in Ghana. The data could be used to compare the performance of Ghana's Agricultural R&D activities with other countries in Africa.

The objectives of the project are:

- 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 policymaking;
- 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 Project Activities

- Desk study
- Qualitative survey
- Fine tuning of the standard survey questionnaire
- Data collection
- Computerization of returned questionnaires
- Uploading of individual survey responses to the ASTI Data Management Portal (DMP)

Conclusion

The preliminary results from the study showed an increase in public agricultural R&D spending during

the period 2012-2015. The bulk of the increase is attributable to the main agriculture R&D agencies namely: the Council for Scientific and Industrial Research (CSIR), Cocoa Research Institute of Ghana (CRIG) and the Biotechnology Nuclear Agriculture Research Institute (BNARI). The Universities in Ghana also made significant contribution Agricultural R&D spending or expenditure. Four main sources of funding agriculture were identified. Government agriculture R&D spending represents 84 percent, donor and development banks accounts for 10 percent whilst sale of goods and services as well as consultancy services accounted for six percent of agriculture R&D spending in Ghana.

The support from government mainly funds salary of research staff while donor and development banks support are the main sources of funding agriculture R&D research. The over dependence on donor funding for agriculture research is a challenge that needs to be addressed. There is the need therefore, for policies to support Research Institutes in Ghana to commercialize research outputs and findings. It is also important for the government to establish a national research fund for research activities in Ghana including agriculture. Considering the fact that 32 percent of the agriculture researchers in CSIR are PhD degree holders (source), a high premium should be placed on PhD level training and the mentorship of other categories of agriculture researchers to enhance the human resource capacity of agriculture researchers.

2.2 Rain Water Harvesting (RWH) for Resilience to Climate Change Impact on Water Availability in Ghana

Principal Investigator: Dr. George Essegbey

Research Team: Roland Asare, Masahudu Fuseini, Mavis Akuffobe, Portia Adade and Afua Sarpong Anane

Source of Funding: Nordic Development Fund

Duration: 30 months

Introduction

The reality of the impact of climate change has dawn on Ghana with its attendant effects such as rise in sea level, high intensity of rainfall, flooding and long periods of drought being experienced. More importantly climate change effect on the quality and quantity of freshwater in Ghana has resulted in the decline of portable water supply to households and institutions. There is an urgent need for an alternative source of water supply to meet the short fall in current water supply. To address this need SINTEF, a leading research institution in Norway in collaboration with the Water Research Institute (WRI) and Science and Technology Policy Research Institute (STEPRI) both of the Council for Scientific and Industrial Research (CSIR) initiated a research project dubbed "Rain Water Harvesting (RWH) resilience to climate change impact on water availability in Ghana. The project is a two-year project (2013-2015) and is financed by the Nordic Development fund (NDF) through the Nordic Climate Facility. The aims of the project are to:

- Increase resilience to climate change impact on water availability in Ghana;
- Facilitate business development in RWH technology;
- Improve urban livelihoods;
- Increase water availability in selected household and schools;
- Make affordable, appropriate and innovative RWH systems more available in Ghana; and
- Strengthen human and institutional capacities in RWH.

Research Project Activities

During the reporting period the project was able to accomplish the following activities:

- Organization of final training workshop for the RWH trainees during which certificates of participation and competence were issued to successful trainees.
- Formation of RWH business cluster out of the trainees for further RWH business development
- Registration of the RWH business cluster as a business entity at the Registrar General department.
- Organization of a Closing workshop where all the key stakeholders in the water sector were brought together and results from the project shared with them. Some of the stakeholders include Ministry of Water Resources Works and Housing (MWRWH), Community Water and Sanitation Agency (CWSA), Water Resources Commission (WRC), Ghana Real Estate Development Association (GREDA), National Development Planning Commission, the media etc.
- Engagement with the policy makers on how the findings from the project will feed into the National Rainwater Harvesting strategy.
- Completion of installation of the RWH systems in 20 households and one school.
- Socio-economic monitoring and interview of beneficiaries of the RWH systems
- Monitoring of quantity and quality of harvested water; and
- Promotion of the RWH technology in Ghana through National Level Learning Alliance Platform (NLLAP), a platform for stakeholders in the water sector.
- Publication of final project report. This report has been shared with stakeholders.

Conclusion

Quality test results from water samples of households installed with the RWH system, and the larger system from the pilot school showed that the quality of the water met the World Health Organisation (WHO) and Ghana Standard Authority (GSA) standard for potable water. Water from RWH has been recognized as improved water source by the WHO/UNICEF Joint Monitoring Programme on the Millennium Development Goals (MDGs) on water and sanitation. Therefore, the RWH system is capable of improving water availability and improvement of sanitation in the households. Promotion and adaption of the RWH technology in Ghana will not only increase household and institutional access to portable water supply but also reduce the reliance on Ghana Water Company Ltd (GWCL) as the main suppliers of portable water in Ghana. What is needed however, is a reduction in the cost of installing the RWH system. It is also important to feed the recommendations of the project into the National Rain Water Harvesting Policy and the updated National Building Code to make it mandatory for estate developers to include RWH systems in their designs.

2.3. CSIR-Technology Development and Transfer Centre

Principal Investigator: Dr. G.O.Essegbey

Research Team: Dr. Wilhelmina Quaye, Mr. Edward Decker, Mrs. Justina A. Onumah, EK Tetteh and Rankine Asabo

Source of Funding: World Bank, Danida and Government of Ghana

Duration: January 2014-June 2016 (30 months)

Introduction

The CSIR-Technology Development and Transfer Center is a market – oriented project under the component 2 of the Ghana Skills and Technology Development Project. The project seeks to bridge the gap between Ghana's research system and the private sector through the implementation of an improved technology development and transfer system. The overall goal of the CSIR-TDTC project is to ensure that research and development outputs or innovations address private sector needs and challenges and ultimately enhance productivity for socio-economic development of the Ghanaian Economy. The approaches used involves institutionalization of Competitive Grant Award Scheme for technology fine-tuning and subsequent transfer to the private sector, facilitating research-private sector partnerships through business seminars and creating interactive platforms for research -industry engagements. The project also focuses on institutional strengthening through capacity building of research scientists in technology marketing and development.

Project Objectives:

The project seeks to achieve the following objectives:

- Establish a private-sector oriented program based on institutional incentive schemes that encourage the providers to respond effectively to the technology demand from the private sector;
- Develop and implement a structured model for engaging the private sector in partnerships for technology development, appropriation and transfer;
- Develop capacity in technology transfer that enhances knowledge and skills of researchers and other relevant staff; and
- Create a system for intensive research-industry interaction.

Expected Beneficiaries: Research scientists and private sector partners

Project Activities in 2015

Project deliverables in 2015 included organization of technology fair, business seminars, research-industry interactive fora, training of grant awardees and partners, monitoring of grant awards and strengthening of sustainability systems with the existing CSIR commercialisation structures.

Organization of a Technology Fair

A Technology Fair was organized by all the COTVET - Ghana Skills and Technology Development Project component 2 awarded institutions on 31st March, 2015. The Technology Fair provided a platform for CSIR, Ghana Atomic Energy Commission (GAEC), University of Ghana, Legon (UG), Ghana Technology University College (GTUC), and Kumasi Polytechnic to showcase their research and technological innovations. Technologies developed by CSIR and the other project implementing institutions were displayed in different stands for public view. Generally, the Technology Fair was very successful with the active participation of entrepreneurs, stakeholders and other private sector players.

Awardee-Partner Interactions

A Grant Award Scheme was instituted under the project to give up to \$10,000 per research scientist to fine-tune technologies for transfer to the private sector. Two (2) interactive workshops were organized for the awardees and their respective private sector partners in Kumasi and Accra. The interactive workshops aimed at the following:

- Sensitizing awardees and their private sector partners on the project objectives, outputs and outcomes;
- Sensitizing awardees and their private sector partners on the expectations at the market place; and

- Offering a learning platform for the CSIR-TDTC technical team together with the awardees and their private sector partners to understand the project M&E indicators.

Research-Exporters Interaction

As part of the efforts to bridge the gap between research and industry, a business seminar was organized for selected CSIR-Researchers and Exporters including officials of the Ghana Export Promotion Authority (GEPA). The objective was to create a platform for interaction between researchers and exporters.

Presentations made at the forum threw more lights on alerts on exports from Ghana, challenges facing exporters particularly on yam, vegetables and palm Oil. The following researchable areas and training needs for exporters were identified for subsequent actions by the researchers:

- Training in Aflatoxins;
- Training in traceability of Sudan IV in Palm Oil;
- Proposal development on yam and pineapple; and
- Training in safe use of agro-chemicals.

From the interactive discussions there was the need to investigate why the pineapple industry was collapsing. It was also realized that information flow from the GEPA officials to the exporters as well as traceability systems need to be strengthened.



Photo: Researcher – Exporter Interactions at a CSIR-TDTC workshop

Technology Profile Document

A publication on 165 marketable technologies developed by the CSIR Institutes has been produced and widely distributed to stakeholders including the private sector (e.g. AGI), researchers, the ministries and development partners.

Monitoring and Evaluation of Competitive Grant Scheme

The CSIR-TDTC funded 18 projects in seven (7) CSIR Institutes under its Competitive Award Scheme. Grant Awards ranging between Cedi equivalent of \$5,000-\$ 10,000 have been awarded per researcher

specifically for technology transfer to the private sector. A Monitoring team from the CSIR-TDTC visited participating CSIR-Institutes from 5th to 23rd September, 2015 to track progress, check compliance and identify achievements.

A total of 17 out of the 18 CSIR-TDTC projects were monitored. Most of the research-industry partnerships had not started generating income except for the pozzomix and mushroom clusters. From the monitoring report, twelve (12) projects out of the seventeen (17) CSIR-TDTC approved projects monitored were rated good and four (4) projects rated below Average. Only one (1) project was rated poor.



Photo: Meat in the solar dryer for trials by CSIR-TDTC Awardee



Photo: Meat in the solar dryer for trials by CSIR-TDTC Awardee

Two Review Workshops were held during the reporting period to share the findings from Monitoring and Evaluation (M&E) of grant award activities. A Review Workshop was held for awardees in Accra on 26th October, 2015. A similar Review Workshop was organized on Thursday, 5th November 2015 at the CSIR-BRRI Training Centre, Kumasi for awardees in Kumasi and Tamale. The following were some suggestions made at the review meeting for reaching out to the private sector:

- Organize Open Days;
- Media Outreach (Radio & TV, Print Media);
- Consciously identify the entrepreneurs/private sector collaborators;
- Involve the private sector in our activities – private sector on management boards, but agenda of management boards are geared towards administrative issues;
- Scientists should be proactive on some topical issues; Sudan red in palm oil; and
- Every research institute should forecast societal problems.

Research-Industry (AGI) interactions

A research-industry interaction was organised on 8th December, 2015 at the CSIR-STEPRI Auditorium in Accra. This created opportunities for researchers and industry players to advance useful exchanges that enhance understanding of the technological needs among local industries, how best to harness and exploit local research technologies for business solutions and encourage research and innovation in areas of relevance for industry and private sector growth. The forum hosted Directors of CSIR institutes and/or their representatives, awardees, entrepreneurs from the Association of Ghana Industries (AGI) and EDAIF. Some recommendations made in respect of facilitating research-industry partnerships included, strengthening partnership between CSIR and AGI by creating a desk that coordinates the needs of the two; the need for some kind of policy intervention to ensure that technologies developed by CSIR are used by industry, especially for public funded projects, and if it exists, it should be enforced.



Photo: Participants at Research-Industry Interactions in Accra

Consultative Meeting with CSIR- Commercialization & Information Division

As part of the stakeholder's engagements, the technical team of the CSIR-Technology Development and Transfer Centre held a meeting with the Management of the CSIR- Corporate Commercialization and Information Directorate (CCID) and the CSIR Plus Ltd at CSIR- STEPRI Conference room on Monday, 17th August, 2015. The meeting was intended to discuss areas for collaboration leading to strengthening of sustainability mechanisms and systems for the CSIR-TDTC operations. Publication on the developed technologies by the CSIR and its usefulness for promotional activities was discussed. The business potentials of some of the profiled technologies were also discussed.

Conclusion

In conclusion, the implementation of the project is on track and important achievements have been made. Project implementation activities for 2016 will focus on monitoring of the technology transfer package to awardees, capacity building of researchers in Technology Marketing, Proposal writing skills, Business Development, and Intellectual Property Rights (IPR). Integration of TDTC into CSIR as done with CSIR Plus - strengthening of sustainability systems and synergies with the existing commercialisation activities, liaising with marketing officers of the various institutes and building their capacities in development of business plans.

2.4. Development Research Uptake in Sub-Saharan Africa (DRUSSA)

Principal Investigator: Dr. G.O.Essegbey

Research Team: Dr Wilhelmina Quaye, Dr Richard Ampadu and Mrs. Justina A. Onumah.

Source of Funding: DfID.

Duration: October 2013-October 2016 (3 Years)

Introduction

The project seeks to raise the level of discussion around research evidence at senior ministry levels, equip technical staff with practical skills and support senior civil servants as they begin to encourage a culture of evidence-informed approaches to policy making and policy implementation. The collaborating institutions are: Institute of Statistical, Social and Economic Research (ISSER) of University of Ghana, Uganda National Council for Science and Technology (UNCST) and the Economic Policy Research Centre (EPRC) at Makerere University and the Association of Commonwealth Universities (ACU).

Selected ministries under DRUSSA in Ghana are: Ministry of Food and Agriculture (MoFA), Ministry of Finance (MOF) and the Ministry of Trade and Industry (MOTI). DRUSSA project has three main components including, policy symposia for senior officials on 'key debates; professional development courses on 'handling science and evidence' for junior and mid-level policy advisors and; an early career policy fellowship scheme.

Project Objective: The goal is to improve the accessibility and utilisation of locally relevant research evidence to inform Sub-Saharan and global development policy and practice.

Expected Beneficiaries: Government, policy makers, academia and researchers

Activities in 2015

Policy Symposia

A series of 12 policy symposia have been conducted so far in collaboration with the three participating ministries. Four (4) Policy Symposia have been organized per each of the participating ministries. Policy Symposia organized in 2015 are detailed below:

Third MOTI Policy Symposium: Current Monetary Policies and their Implications for Doing Business in Ghana on 28th April, 2015 at the CSIR-STEPRI auditorium in Accra

Research evidence from the presentations indicated that an upward adjustments in monetary policy rate leads to substantial adjustments in lending rates. This ultimately causes the growth rate of sectoral and sub-sectoral output to decline. Additionally, the implications for exchange rate volatility translate itself into high lending rates, increased costs of importing raw materials and high import tariffs. These scenarios impair the growth and development of SMEs and sometimes forcing them out of business.

Key issues emerging from the discussions included:

- Policy makers should target and reduce the size of the pass-through effects of the policy rate to market rate by dealing with asymmetric information challenges;
- The MOTI should help SMEs to manage exchange rate effects;
- Research evidence on perceived risk is needed and hence the academics should take this up; and
- There is the need to deepen the implementation of SMEs promotion related policies.



Photo: Participants from the Third MOTI Policy Symposium

Fourth MOTI Policy Symposium: Determinants of Ghana's Bilateral Trade Flows-20th August 2015

Over 60 participants including 28 females were drawn from institutions including MOTI, MOF, National Board for Small Scale Industries (NBSSI), Ghana Investment Promotion Council (GIPC), Ghana Export Promotion Authority (GEPA) and the Universities. Research evidence presented show that GDP and population of trading partners, Ghana's GDP; trading partner's openness to trade and common official language had positive impact on Ghana's exports. Distance expectedly had a negative impact on the direction of Ghana's exports. The implications of the research

results are that: (1) strengthening of regional trade agreements could be beneficial since trade costs will be reduced significantly; and (2) inflation should be stabilized so that nominal depreciation could improve the competitiveness of Ghana's exports in the world market.

**Third MOFA Policy Symposium: Status and Impact of Ghana's Fertilizer Subsidy Programme"-
19th March 2015 at the Ghana Hockey Association conference room**

The Policy Symposium created a platform for dialogue among all stakeholders in the fertilizer supply and demand chain including, Farmer Based Organisations (FBOs), individual farmers, academia, research institutions, fertilizer supplying companies, Development Partner (DPs) and donors, the ministries, etc. Over 60 people attended the program with approximately 25% female participation. It was evident from the presentations that fertilizer subsidy increases fertilizer use and application rate by farmers and this contributed to crop yields. However, fertilizer subsidy did not alleviate market failures completely. The Ghana fertilizer subsidy programme was challenged by the absence of a comprehensive data base of farmers and this impacted negatively on the efficiency of the distribution mechanism. Monitoring of the programme was a challenge and there were delays in getting fertilizer from the regional offices as well as incidences of smuggling of fertilizer to neighboring countries. Some key recommendations made include the following:

- Establishment of comprehensive farmer data base – This will facilitate beneficiary targeting to ensure access to inputs by the rural poor;
- Critical look at the nutrient status of soils in Ghana and also adopt other means of improving soil fertility. Other complementary options are needed;
- The inefficiencies in the fertilizer distribution mechanism such as delays at the port, high handling charges and smuggling should be corrected using e-tracking system; and
- An in-depth economic analysis of the impact of fertilizer subsidy is needed from academia and researchers.



Photo: Participants at the Third MOFA Policy Symposium under DRUSSA Project

Fourth MOFA Policy Symposium: “Effect of importation of poultry and rice on the Ghanaian Economy”- 23 September 2015.

Participants were drawn from Ministry of Food and Agriculture (MoFA), Ministry of Finance (MOF) and Ministry of Trade and Industry (MOTI). Others include rice farmer, representatives of Ghana National Association of Poultry Farmers (GNAPF), Technical Adviser from USAID/APSP Project and other stakeholders. It was evident that the importation of rice and poultry has price, revenue and trade effects. With population growth rate of $>2\%$ in Ghana, demand for variety of foods including rice and poultry meat will increase. Importation of rice and poultry cannot be stopped but policy makers need to enforce non-tariff and tariff barriers. It was recommended that inward looking policies should be intensified to increase local production of rice and poultry, promote dietary diversification and consumer education on quality and health implications of locally produced foods.



Photo: Participants at the fourth STEPRI and MOFA Policy Symposium

Second MOF Policy Symposium: The Energy (Power) Crises in Ghana and its impacts on Economic Activities-April, 2015 at the CSIR-STERPI auditorium in Accra.

A total of 31 participants including 8 females attended. Presentations pointed out the costs incurred by businesses as a result of the crises and the reality of the need for solution as soon as possible. Production lost by micro-scale industries as a result of the power crisis was estimated at approximately 2.1 million US dollars a day and about 670.1 million US dollars per year, translating to 2% of national output. Considering the fact that energy (electricity) is the major driver of business growth and productivity, both presenters suggested that government in collaboration with the private sector should as a matter of necessity do their best to invest in the energy sector.

Some recommendations captured during the presentations and discussions include the need to:

- Consider the possibility of funding the power sector from the proceeds of oil production;
- Reduce distributional losses and improve operational efficiency performance; and
- Ensure improved quality and information sharing about power outages.



Photo: Registration for the Second MOF Policy Symposium in progress

Third MOF Policy Symposium: Impact of Exchange Rate Volatility on Macro-economic Stability in Ghana

While the current exchange rate has received much attention in the public and media frontlines, far less attention has been directed at examining the trend and history of exchange rate in Ghana over years. This policy symposium explored three key issues including the evolution of exchange rate, exchange rate volatility on macroeconomic stability and why the misalignment of the exchange rate matters to the Ghanaian economy. These issues have been identified as key in discussing a country's relative level of economic health.



Photo: Participants at the third MOF Policy Symposium

Fourth MOF Policy Symposium: "Cost-Benefit Analysis of the Petroleum Price Deregulation in Ghana" 9th December 2015

The aim of this symposium was to create an opportunity for stakeholders to understand the costs and benefits of the deregulation policy of the Ghana Petroleum industry which was relevant for effective monitoring and evaluation of the policy. The presentation indicated that the deregulation has a number of benefits including, increasing competitiveness of the Oil Marketing Companies, hence bringing price down for consumers; minimization of the incentives for smuggling of products to neighbouring countries – averting losses of products and revenue; More transparent and predictable business climate; improved liquidity situation of BDCs, among others. According to the presenter, the cost (s) associated with petroleum price deregulation are largely social in nature since cost recovery pricing leads to removal of subsidies and usually impacts negatively on the poor and socially vulnerable. Discussions on the theme presentation showed that the full pass-through of decreases in price of the petroleum products in the world market had not been fully realized since gains were used to defray huge GoG accumulated debts from the subsidized regime. It was largely recommended that the structure of the economy should be looked at carefully for the country to benefit from good policies.



Photo: Participants at the fourth MOF Policy Symposium

Policy Briefs

Eight (8) policy briefs were developed from the proceedings of the policy symposia and distributed to the Chief Directors of the respective ministries which included:

1. Decentralization of MOFA: Implications for sustainable agriculture productivity;
2. Effect of poultry and rice importation on the Ghanaian economy;
3. Understanding genetically modified organisms in Ghana;
4. Status and impact of Ghana's fertilizer subsidy programme;
5. Potential impact of the common external tariff and economic partnership agreement;
6. Gender in trade and industry: needs and challenges of women entrepreneurs in Ghana;
7. Determinants of Ghana's bilateral trade flows; and
8. Current monetary policies and their implications for doing business in Ghana.

Early Career Fellowship

The project has recruited and placed five (5) policy fellows in MOFA and MOTI. The first cohort of Policy Fellowship programme commenced in January 2015 with Dr Goerge Adu from KNUST placed at MOTI full time for six (6) months. Dr Akwasi Mensah-Bonsu was placed at MOFA part-time for 12 Months. The second cohort of Policy Fellowship programme commenced in September 2015 with Dr James Peprah (University of Cape Coast) and Prof Daniel Ofori (University of Ghana Business School) placed at MOTI. Dr (Mrs) Rose Omari (CSIR-STEPRI) was placed at MOFA-WIAD. All the second cohort candidates opted for part-time policy fellowship engagements.

The fellows worked on various tasks identified by and with the ministries in the course of their fellowship. Some policy briefs were developed as well as capacity building on data analysis for junior policy staff by some these fellows. Dr George Adu however completed his tenure of 6-month full-time with the ministry. All the other fellows are however at post pursuing their objectives.

Conclusion

The project implementation process has been very successful with active participation from the partnering Ministries. In 2016, the following activities will be rolled up in an effort to bring the project to a close:

- Organisation of Policy Symposium in collaboration with participating ministries;
- Monitoring of Policy Fellows; and
- Organisation of Project Management Meeting and Impact Assessment.

2.5. Diffusion of Innovation in Low Income Countries-Extension

Principal Investigators: Dr. George .O. Essegbey and Prof. Xiaolan Fu

Research team: Dr. Giacomo Zanello, Dr. Jun Hou, Ms. Mavis Akuffobe and Mrs. Portia Adade Williams

Source of Funding: ESRC/DFID

Duration: 6 months

Introduction

The development process in Low Income Countries (LICs) can be supported by tapping existing knowledge and know-how. The transfer, adoption and adaptation of knowledge to LICs hence constitute an important issue for economic growth and global development. The Diffusion of Innovation in Low Income Countries (DILIC) project which involves a team of investigators and advisors from various universities and international organisations in Europe and Africa was designed to investigate the determinants of and transmission channels for the dissemination of innovations in firms under severe institutional and resource constraints. CSIR-STEPRI collaborated with Oxford University of the United Kingdom to implement the project. The project officially ended in 2014. However, in 2015 a proposal for the extension of the project to cover multinational enterprises was approved.

The objectives of the project are:

- To understand the barriers to innovation and diffusion in LICs at the firm level;
- To identify useful industrial and relevant policies to overcome the barriers under institutional, resource and affordability constraints.

Project Activities in 2015

MNEs and Innovation in Ghana Survey

The MNEs and Innovation in Ghana Survey is a follow up national survey on innovation activities and knowledge transfer. It is a joint application and output of two research projects: 'The Diffusion of Innovation in Low-income Countries (DILIC) and the Multi-National Enterprises in Emerging Markets (MNEmerge); ' The survey seeks for information relating to innovation activities and the role of multinational enterprises (MNEs) subsidiaries in knowledge transfer, during the three-year period 2012 to 2014. The aim of the survey is to understand the sources and diffusion of innovation in Ghana.

In line with the MNEs and Innovation in Ghana Survey, a four – day training workshop was organized to train enumerators for the survey. The four - day training workshop held from 30th November, 2015 to 3rd December, 2015 at CSIR-STEPRI was jointly organized by Science and Technology Policy Research Institute (STEPRI) and Oxford University. Ten enumerators, most of whom were degree holders with data collection experience were selected and trained to collect data from the field. The purpose of the training was to impart skills, concepts of the survey and the use of the Personal Digital Assistant (PDA) for data entry.

The survey begun in December 2015 and is expected to cover 500 purposively selected micro, small, medium and large manufacturing firms in Ghana. The data include information on inputs and outputs for innovation at different levels of novelty; sources and channels of international, intra-Africa and intra-country transfer; training required to assimilate and level of adaptation needed; current resources for innovation including labour force skills and technological capacities; and constraints to innovation activities at the firm level.

Engaging the academia in the Diffusion of Innovation in Low Income Countries (DILIC) Project in Ghana

The project team engaged the academia by circulating the project activities on the website of both public and private universities and research institutions in Ghana. This interaction with these institutions is still ongoing.

Dissemination of DILIC Survey results

The DILIC team disseminated the results of a survey carried out under the Diffusion of Innovation in Low Income Countries Project (DILIC) to various stakeholders including academia, researchers, and policy makers among others.

Conclusion

The data collected will shed light on the critical role of innovation in the development of firms in low-income countries and on how innovations spread. The data collection was still ongoing at the time of reporting and hence results from the data collection and analysis will be available later in 2016. The DILIC study is likely to make important contribution to the knowledge on how innovations emerge and how they diffuse as well as the extent to which diffusion is made possible and effective in the developing country context.

2.6. Multi-National Enterprises in Emerging Markets (MNEmerge)

Principal Investigators: Dr. G.O.Essegbey and Dr. Godfred Frempong

Research Team: Ms. Mavis Akuffobe, Mrs. Justina A. Onumah, Mrs. Portia Adade Williams, and Dr. Rose Omari

Source of Funding: European Union, under the 7th Framework Programme

Duration: 3 years (2014-2016)

Introduction

MNEmerge is a collaborative research project funded by the European Union's Seventh Framework Programme for research; technological development and demonstration under grant agreement no 612889. Its aim is to provide a comprehensive framework for understanding the impact of multinational enterprises (MNEs) on United Nations Millennium Development Goals (MDGs) in developing countries using case studies, quantitative data as well as policy analysis. The issues studied in this project are varied but there is a common thread uniting all of its sub-themes, they all relate to how MNEs manage their activities in one of the following areas: FDI, business functioning, technology and innovation strategies, corporate philanthropy or socially responsible investment. It is analysed in detail how these issues contribute to the attainment of poverty alleviation, food security, health security, environmental security and energy in developing countries.

Project Objectives

The project has four broad goals:

1. Development of a framework to analyse MNE impact towards socio-economic development,
2. Development of a model that describes the relationship between MNE, FDI and the economy,
3. Analyze of the role of public policies in supporting responsible business practices and the Millennium Development Goals, and
4. Provide case studies and quantitative analysis to support the methodological framework model on health, environment and energy.

The collaborating institutions under this project are the University of Technology, Finland; King's College London; Brunei University, UK; University of Oxford, UK; United Nations University, Maastricht, The Netherlands; Public Health Foundation of India; University of Turku, Finland; and CSIR- STEPRI, Ghana

Research Project Activities in 2015

During the year under review, the major activities conducted were:

Policy Case Study

Study was completed on 8 cases (two subsidiaries, two NGOs, two policy institutions, a supplier and a distributor). The deliverables were policy case report, narratives and general information about Ghana (Demographic indicators, GDP growth rates, sectoral performance, Human Development Index, Global competitiveness indicators, social indicators, etc.).

Study on Management Practices

Ghana (CSIR-STEPRI) collaborated with Oxford to conduct the study on 'Diffusion of Managerial Knowledge in Ghana'. Four sectors (ICT, Construction, Pharmaceutical and Textiles & Garments) were involved. One Chinese and one western firm was selected under each sector making a total of 8 firms for the study. 30 interviews were conducted in each firm. The 30 interviewees were made up of 10 management staff and 20 workers, in total about 240 interviews were expected to be conducted.

Study on Managerial Knowledge Transfer in Construction Sector

Ghana (CSIR-STEPRI) collaborated with Oxford to conduct study on 'Diffusion of Managerial Knowledge in Ghana'. The objectives of the study were to find out the adoption of managerial practices and the dynamics of localization strategies; the key channels; the determinants and obstacles to managerial knowledge transfer. Six construction firms were involved. Three Chinese and three western firms were selected. Twelve (12) interviews were conducted, two (2) interviews in each firm.



Photo: Opening of the MNEmerge Regional Workshop held in Accra, CSIR-STEPRI

Workshop on MNEs in Africa held in Ghana

As a part of the MNEmerge activities in Ghana, CSIR-STEPRI organised a regional stakeholder workshop to create awareness about the project, and to exchange views with various stakeholders on the contribution of MNEs to Ghana's socio-economic development, especially in the areas of employment generation and poverty reduction. The two-day workshop under the theme Multinational enterprises in Africa: Challenges and options for effective development took place at CSIR-STEPRI in Accra, Ghana on the 10th and 11th of August, 2015. The workshop had about 45 participants, including representatives from the government, business community, NGOs, research organisations and the media. The workshop included presentations on various themes, such as Ghana's experiences on attracting MNEs, experiences of MNEs on engagement with local firms in Ghana, the role of MNEs in the country's agricultural sector, and the impact of MNEs on local development and poverty reduction. Furthermore, group discussions were held on the role of African governments in enhancing MNEs' impacts on economies and on the effectiveness of MNEs in achieving the Millennium Development Goals (MDGs). In as much as participants attested to the great contribution MNEs are making towards the attainment of the MDGs, it was also recommended that further actions be to provide support mechanisms for SMEs, as well as to facilitate effective linkages between MNEs and SMEs.

Third MNEmerge project meeting

The third MNEmerge project meeting was organised in Oxford on the 15th and 16th of October, 2015. The meeting was hosted by the Technology and Management Centre for Development (TMCD) of the University of Oxford. In addition to the actual project meeting, the first Advisory Board meeting of the MNEmerge project was held on the 14th of October. Issues discussed included the project's current state, the next steps and other opportunities that could be explored.

Conclusion

The Conclusion drawn from the various studies conducted under the project revealed that the impact of MNEs on local development was basically seen in their Corporate Social Responsibilities. MNEs also impact on local development through local suppliers and distributors as it created new demands and new standards of quality improving their productions and providing ready market for their products

as well as creating employment. In relation to their contribution to the MDGs, the MNEs key activities were those related to eradicating poverty and hunger, gender equality and women empowerment, child mortality and maternal health care as well as environmental sustainability. Each of the two policy institutions interviewed had their targeted MDGs that policy is influencing but in the end, all the MDGs were targeted.

The study on managerial knowledge transfer also showed that the Chinese construction MNEs in Africa are less institutionalized; Low level of local content and limited foreign language skills and a wide cultural gap between Chinese and Africans. The study recommended the localisation to foster knowledge transfer.

2.7. 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: Mr. Masahudu Fuseini and Dr. Godfred Frempong

Source of Funding: European Union's Seventh framework Programme (FP7)

Duration: 4 Years (2013-2016)

Introduction

Participation of African researchers in the Framework Programme of the European Union has been low compared to Europeans researchers. One of the solutions identified to bridging the gap is the capacitating of National Contact Points (NCPs) to increase awareness and participation of African researchers. Another way of increasing participation is to offer advisory and support services for African researchers. Activities of the CAAST-Net Plus in the year under review centered much on Tasks 5.1 and 5.2 of Work Package 5, which targets support mechanisms intended to raise awareness and knowledge of the EC's research and innovation programmes to promote Africa-EU partnerships. Much of the activities focused primarily on creating awareness of opportunities in Horizon 2020 for African countries. STEPRI in collaboration with JYU, University of Finland, Foundation for Research and Technology Hellas (FORTH) Greece and a host of other supporting partners from other countries executed the tasks.

Project Objective

The general objective of Work Package 5 is to Strengthen Africa-EU research cooperation partnerships. The outcomes of task 5.2, which is to offer Country Focal Point Training to existing and new beneficiaries, is to contribute to the overarching objective of the Work Package 5 and to the CAAST-Net Plus in general.

Research Project Activities in 2015

Task 5.1 – Advisory and support mechanisms to African and European researchers;

Task 5.2 – Training of National Contact Points (NCP)

Most of the activities of 5.1 and 5.2 were dovetailed, and happened simultaneously.

Information Sessions and Training of NCPs

An Information Session on Horizon 2020 was organized at the University of Buea in Buea, Cameroon, from 4-6 May 2015. It was held in collaboration with the Central African Research and Innovation Management Association (CARIMA) as part of its Annual Conference. There were 45 attendees from eight participating countries namely Cameroon, Gabon, Chad, Equatorial Guinea, Congo Brazzaville, Malawi, Ethiopia and Burundi. A total of 15 universities were represented, including a representative from the Ministry of Scientific Research in Cameroon.

In the same month, another Horizon 2020 Information Session was organized alongside NCP training workshop at the Mensvic Grand Hotel in Accra, Ghana. It was from 28th -29th May 2015. A total 76 participants from seven countries were represented including Senegal, The Gambia, Nigeria, Cameroon, Ghana Burkina Faso and Togo. This event, organized in collaboration with 'INCONTACT 2020' was mainly focused on the West African region. Resource persons came from other organizations including Institut de Recherche pour le Deloppement (IRD) and Department of Science and Technology (DST).

Later in 2015, WP5 also organized Information Session and National Contact Points Training for East and Central African countries as well as for REC in Addis Ababa from 26th to 27th October 2015. The event was held at the African Union Building and had 20 participants attending.

High Level Policy Makers Dialogue

Ghana's Ministry of Environment, Science, Technology and Innovation (MESTI) in collaboration with UNESCO hosted a High Level Dialogue (HLD) for ministers, parliamentarians, permanent secretaries or chief directors and experts in STI with support from CSIR-STEPRI. It was held from 7th to 9th July 2015 at the La Palm Royal Beach Hotel in Accra. About 80 participants from about 20 countries including Nigeria, Senegal, Uganda, Tanzania, Cameroon, Zimbabwe, South Sudan, Ghana, and among others. The theme for the HLD was "Mobilizing STI for Sustainable Development of Africa".

Participation in DILIC Conference, London

There was also the Diffusion of Innovation in Low Income Countries (DILIC) Conference, which CAAST-Net Plus participated, represented by Dr. George Essegbey (CSIR-STEPRI) and Dr. Andy Cherry (ACU), the Project Coordinators. It was organized in London by Oxford University and DFID-ESRC with support from UNCTAD and UNIDO. The conference was held on 2nd November 2015 at the Overseas Development Institute (ODI) in London, UK. The conference was aimed at sharing knowledge on innovation in low-income countries and was supported by.

Conclusion

CSIR-STEPRI and other partners under the Work Package 5 have achieved all the set milestones and the team is looking forward to work more successfully in the coming years.

2.8. Development of a National Strategy for the Implementation of "Empowering Novel Agribusiness-led Employment (ENABLE) for Youth in Agriculture.

Principal Investigator: Dr. George Essegbey

Research Team: Dr. George Essegbey, Dr. Rose Omari

Source of Funding: Rural Enterprises Programme (REP)

Duration: October – November 2015

Introduction

The Empowering Novel AgriBusiness-Led Employment for Youth in African Agriculture (ENABLE Youth) Program is about youth and women employment creation through market-oriented farming and agribusiness in at least 20 Regional Member Countries (RMCs) of the African Development Bank Group. It focuses on college and university-educated youths and women at the higher level; and youth groups seeking greater impacts within their respective communities at the lower end. It also focuses on improved delivery of the Program objectives serving to better replicate and upscale successful

agribusiness incubation approaches over time. The Rural Enterprises Programme (REP) has been identified as an implementing agency for the ENABLE Youth Programme in Ghana. In line with this, REP engaged CSIR-STEPRI as the consultant to develop a strategy to implement the ENABLE Youth Programme in Ghana under the Rural Enterprises Programme (REP).

Project Objectives

The objectives were to propose a strategy to incorporate the relevant aspects of ENABLE Youth Programme in the implementation of post-medium-term review REP, and to determine the costs/cost-sharing arrangements between REP and ENABLE Youth Programme towards the implementation of the proposed strategy for consideration by the REP medium-term review team.

Research Project Activities

Activities carried out were desk research, interviews with a wide range of stakeholders of youth in agriculture programmes and the REP including the management of REP, members of staff in the municipal and district offices, clients of REP and beneficiaries. Field visits were made to Asuogyaman district REP offices and Rural Technology Facility (RTF) in Mankessim to appraise the facility and identify opportunities. Based on information gathered from these activities the strategy has been developed, presented at the REP medium-term review meeting, finalized and submitted.

Conclusion

This was an interesting piece of work that has contributed to strengthening the relationship that has existed over the years between CSIR-STEPRI and REP. CSIR-STEPRI looks forward to the successful implementation of the strategy and avenues for further collaborations.

2.9 Revision of Ghana Herbal Pharmacopoeia

Principal Investigator: Dr. George Owusu Essegbey

Research Team: Dr. Godfred Frempong, Dr. Kofi Annan, Mr. Peter Arhin, Mr. Stephen Awuni

Source of funding: WAHO

Duration: 2 years (2013-2015)

Introduction

CSIR-STEPRI with financial support from The West African Health Organization (WAHO) to revise the second edition of the Ghana Herbal Pharmacopoeia (GHP). The first edition of the Ghana Herbal Pharmacopoeia was published in 1992 and the second edition was published in 2007. After six years, there was the need to revise the second edition to ensure that the GHP continues to be a good reference for all actors in the traditional medicine industry. CSIR-STEPRI with financial support from the West African Health Organization (WAHO) published the third edition of the GHP. To ensure standardization of the GHP, CSIR-STEPRI engaged the Herbal Department of the Kwame Nkrumah University of Science and Technology (KNUST) and Traditional and Alternative Medicine Directorate (TAMD) of the Ministry of Health to provide technical input for the revision. The third edition has in addition features which are not found in the second edition. These include update of information on all monographs; additional monographs of herbal plants such as Moringa, Morinda, Hibiscus, Sorghum, Tetrapoleura and Spathodea; colour photographs of all herbal plant species and Thin Layer Chromatography (TLC) profiles of monographs as a means of standardization.

Status/Outcome of Project

The project was completed in 2015 and 600 copies of the third edition of the GHP have been printed. The new edition contains a total of 56 monographs of herbal plants in the country. The launching of the book took place at CSIR-STEPRI on 17th November 2015 and was attended by high level personalities including key stakeholders in the herbal medicine industry of Ghana. The book is now available on sale at STEPRI, the Secretariat of Ghana Federation of Traditional Medicine Practitioners Association (GHAFTRAM), the Herbal Department of KNUST and in selected bookshops in Ghana.

Conclusion

The TLCs of the various herbal plants are necessary for the identification in the laboratory and for certification and quality control purposes while the colour photos allow easy visual identification. The features the third edition of the GHP makes the book unique and useful to the regulatory, certification and educational institutions such as Ghana Food and Drugs Authority (GFDA), Centre for Scientific Research into Plant Medicine (CSRPM) and Kwame Nkrumah University of Science and Technology (KNUST). It is equally of great use for herbal practitioners in the country

2.10 Socio-economic Impact of Broadband Using White Space in Sub-Saharan Africa

Principal Investigator: Dr. Godfred Frempong

Research Team: Dr. Godfred Frempong

Source of funding: Microsoft/University of Southampton

Duration: 1 year

Introduction

There is a global agreement under the auspices of the International Telecommunications Union that migration from analogue to digital broadcasting is a global process involving a switch from analogue to digital broadcasting signals. Digital broadcasting offers better picture and sound quality. Migration from analogue to digital involves re-allocating frequencies and telecommunication equipment. Internet developers are developing mechanism to utilise analogue frequency to provide broadband internet services. One of such companies is Microsoft. Microsoft has a pilot programme to utilise free spectrum normally referred to as TV white Space in South Africa, Kenya and Ghana. In Ghana, it is being piloted at Koforidua Polytechnic and when successful will be extended to other places of the country. The technical implementation of the project is being undertaken by Spectrum Wireless under the name of Djungle. There is a monitoring and evaluation phase being undertaken by the School of Electronics and Computer Science, University of Southampton. The CSIR- STEPRI has been subcontract by the School of Electronics and Computer Science to carry out the data collection for the monitoring and evaluation activities.

Project Objectives

The objective of the study is to evaluate the social and economic impact of broadband internet and the deployment of broadband internet using TV White Space technology.

Research Project Activities

The project activity involves the conduct of ex-ante and ex-poste surveys involving three categories of stakeholders (i.e. students, lecturers and administrators). The survey covers issues such as access to internet facility at home, school and hostel, usage of the facility, expenditure and general contribution of internet to academic work. The first phase of the project has been completed and data has been

analysed and report prepared by the School of Electronics and Computer Science. The second phase will be undertaken in 2016. The second phase is basically an impact assessment and will cover the same people covered in the first phase.

Conclusion

The survey has yielded very interesting results and in some cases confirmed earlier studies conducted by CSIR-STEPRI. It was evident from the survey that the students of Koforidua Polytechnic are highly connected, smartphone ownership and personal computers (PCs) amongst the students is high. The importance attached to Internet access was very high and majority of students rely on mobile broadband to access the internet. The students were of the view that access to internet services was important for studies at the Polytechnics.

2.11 Retreat at Little Acre Hotel in Aburi

A one-day retreat was organized by the CSIR-STEPRI at the Little Acre Hotel, Aburi on the 21st December 2015. The purpose of the retreat was to take stock of the institute's activities in the year and strategize towards the coming years. Participants of the event were Board Members, Internal Management Committee Members, and Researchers.

Various presentations were made on the projects handled by the institute. Staff were encouraged to participate in courses to build their capacities. The Director reminded researchers to collaborate within and outside the institute to bring in more projects for the institute.

3.0 Finance

Below is the financial report of CSIR-STEPRI for the year ended 2015. It covers the three main sources of income namely, government subvention, donor funded projects and internally generated funds.

3.1 Government Subvention

Table 1. Presents the summary of CSIR-STEPRI's receipts for 2014 and 2015 on the various components of income of government subvention.

Table 1: Government Subvention – Budget and Receipts

Income- Government Subvention	2014		2015		2016
	Budget GH¢	Release GH¢	Budget GH¢	Release GH¢	Budget GH¢
Compensation for employees	1,609,936.83	1,965,974.33	1,667,473.00	1,644,148.81	2,175,563.76
Goods and Services	650,335.00	12,654.00	550,000.00	39,014.98	863,920
Assets	330,650.00	-	330,650.00	-	402,500
TOTAL	2,590,921.83	1,978,628.33	2,548,123.00	1,683,163.79	3,440,783.76

Compensation for Employees

The government continues to pay the salaries of all established staff. Out of the total subvention of One million Six Hundred and Eighty three thousand one hundred and Sixty three Ghana cedis, seventy nine Ghana pesewas (GH¢1,683,163.79) released, salaries represents 97.7% while Goods and Services accounted for 2.3%. As compared to the 2014 subvention released, there was a reduction in the 2015 subvention released by 15%. This was due to salary arrears resulting from the Single Spine salary adjustment paid in 2014. The institute also engaged two casual workers to support the security and the cleaners. Their total wage bill for the year which was met from internally generated funds was Thirteen thousand five hundred and thirty Ghana cedis (GH¢13,530.00).

Goods and Services

The amount received for this budget line for the year was Thirty Nine Thousand and fourteen Ghana cedis (GHC39, 014.00). As a result bills such as electricity accumulated and the institute is doing its best to pay off its indebtedness through the internally generated funds.

Assets

There was no release of funds for the purchase of assets in 2015. The Institute through its projects and internally generated funds however, acquired some assets at a total cost of GH¢216,194.21.

Below is the lists of assets acquired within 2015.

1. Furniture and Fittings	11,316.73
2. Plant and Equipment (Generator, etc.)	188,957.48
3. Office Equipment and Accessories	15,920.00
Total	216,194.21

3.2 Donor Funded Projects

In the year 2015, efforts were made to attract and implement projects. Donor funded projects in 2015 as shown in Table 2.

Table 2: Donor funded projects

Project Name	Funding Source	Income USD\$ 2015
Polytechnic Study Project	WTSBS	8,814.00
Rain water	Nordic Dev fund	28,957.72
ICGEB Workshop	ICGEB	25,867.08
AAU	AAU	10,000.00
ASTI 2	IFPRI	19,959.00
CAASTNET Plus		38,771.69
Innovation Platform		29,806.00
DRUSSA	DFID/ACU	105,104.23
FARA PARI	FARA	19,550.50
Mining Study		15,000.00
UNESCO Workshop	UNESCO	80,430.00
SAPPA		9,550.00
COTVET Project	World Bank	125,000.00
Total		516,810.22

Total funds received from donors for project activities in 2015 was US\$516,810.22 as against US\$916,529.89 in 2014, representing a reduction of 44%. The decrease in donor funding is due to the end of some projects which contributed significant amounts in 2014. Some of such projects are AGRA, US\$78,952.00, BOIS funded by REP, US\$331,993.00.

In addition, nearly 75% (US\$250,000.00) for the COTVET- TDTC project was received in 2014.

3.3 Internally Generated Fund

CSIR-STEPRI's internally generated funds are derived from sales of publications, hiring of auditorium, fax etc. Table 3 below presents the details of the internally generated funds.

Table 3: Internally Generated Funds

Items	2014 AMOUNT (GHC)	2015 AMOUNT (GHC)
Hiring of Auditorium facilities	19,937.23	52,926.00
Hiring of Projector		2,620.00
Sale of Publication	1,590.00	3,805.00
Support from project	59,374.00	60,967.27
Sale of obsolete items	5,102.00	
Total	87,950.23	129,7318.27
Total Expenditure	61,064.42	32,582.02
NET IGF	26,885.81	87,736.25

There was a significant increase in the Hiring of Auditorium by 165%, while sale of publications recorded a rise of 139%. Support from Projects increased slightly by 3%. Hence net internally generated funds (IGF) for 2015 was GHs87, 736.25, representing an increase of 226% over 2014. 15% of the IGF (GHS13, 160.44) was paid to Corporate CSIR and the rest was retained by the institute. The increase in the IGF in 2015 was mainly due to support from Projects, the revision of the auditorium rates and awareness of clients about the quality and affordability of the available facilities available.

3.4 Conclusion

The institute performed well in the year 2015 especially in the areas of internally generated funds and support from projects. However the daily operational costs which is funded by a dwindling Government subvention is a worry to the institute since the donor funds cannot be used for administrative expenses.

4.0 Administration

4.1 Management

The Management Board of STEPRI which is composed of seven (7) members and chaired by Rev. Prof. S.K. Adjepong, Principal of the Methodist University is the highest decision-making body of the Institute.

4.2 Staff Strength

As a result of the restructuring process taking place within the Council, the under listed persons were transferred and assigned to the divisions indicated against their names to STEPRI. The staff strength of the institute increased from 38 in 2014 to 51 in 2015 as a result of the transfer of 13 staff from the Head Office to the Institute. The details of the Institute's staff for the year under review was as follows:

Research Staff Category

Research Scientist	-	14
Non-Core Research Staff	-	3

Non Research Staff Category

Senior Staff	-	21
Junior Staff	-	13

4.3 Internship and National Service

On the above topic, the institute over the years has nurtured students to acquire on the job training to equip them with relevant skills required for future employments. Some of the students were posted to the Institute as national service personnel while others apply as interns. For the reporting period, the Institute had 8 interns and 16 service personnel from various tertiary institutions in the country. The Table below shows the names and institutions of the students.

Internship

No.	NAME	QUALIFICATION	INSTITUTION
1.	Redeem Agbedanu	Bachelor of Arts (Social Development and Administration)	University for Development Studies, Wa Campus
2.	Paul Adu Ntiful	Bachelor of Arts (Economics/Statistics)	University of Ghana
3.	Dinah Enyaaba Aggrey	HND (Bi-lingual Secretaryship)	Accra Polytechnic
4.	Linda Ama Peprah	Bachelor of Science (Pure Mathematics)	University for Development Studies
5.	Abednego Duo Duo Duah	Accountancy	Accra Polytechnic
6.	Asunka Barbara	Bachelor of Arts (Political Science)	University of Ghana
7.	Sarah Adjorkor Adjei	Bachelor of Arts (Psychology and Religions Studies)	University of Ghana
8.	Ebenezer Opoku-Oware	Bachelor of Science (Renewable Natural Resources)	Kwame Nkrumah University of Science and Technology
9.	Marcia Akua Bekoe	Ghana Institute of Management and Public Administration (GIMPA)	Ghana Institute of Management and Public Administration
10.	Melissa Nana Yaa Boateng	Bachelor of Science (Agriculture Science)	University of Ghana
11.	Kafui Kojo Kisiedu	Bachelor of Science (Agriculture Science)	University of Ghana
12.	Doris Pokuaa Mafu	Bachelor of Science (Administration)	University of Ghana
13.	Samuel Adjapong	Bachelor of Science (Business Administration)	Christian Service University College
14.	Isaac Odai Tetteh	Bachelor of Business Administration	University of Professional Studies
15.	Mahama Abdalla	Bachelor of Arts (Mathematics and Economics)	University of Ghana
16.	Ms. Portia Koranteng	Certificate in Visual Editing	National Film and Television Institute
17.	Selina Asare	Bachelor of Science in Administration (Accounting option)	
Masters Degree Holders			
18.	Winifred Arthur	Master of Philosophy (Foods Science and Post-Harvest Technology)	University of Ghana
19.	Abena Nyama Opoku	Master of Philosophy (Agricultural Economics)	University of Ghana
20.	George Tawiah	Master of Business Administration (Information Systems)	Greenford University, Ireland
21.	Ewuresi B. Asmah	MSc. (Environmental Monitoring and Management)	University of Nottingham (UK)

Post Doctorate Fellow

No.	NAME	QUALIFICATION	INSTITUTION
22.	Charity Osei AmponsahPaul	Agricultural Partnerships, Innovation Platforms Agricultural Economics	Wageningen University and Research Centre, The Netherlands
National Service			
1.	Obeng Priscilla Lynda	Bachelor of Arts In Communication Studies Bachelor of Arts (Geography and Rural Development)	Ghana Institute of Journalism
2.	Mohammed Abdul-Latif	Bachelor of Education - (Social Sciences)	Kwame Nkrumah University Of Science and Technology
3.	Asare Gifty Frimpomaa	Bachelor of Arts (Political Sciences)	University of Cape Coast
4.	Borketeyfio Portia	Bachelor of Arts (Economics/ Geography and Resource Development)	University of Ghana
5.	Adutwum Nanette Keeba	Geography and Resource Development)	University of Ghana
6.	Addo Emmanuel Tetteh	Bachelor of Arts (Development Communication)	University of Development Studies, WA
7.	Anim Kwaku Augustus	Bachelor of Arts Political Studies	Kwame Nkrumah University Of Science and Technology
8.	Atiemo Raymond Osae	Bachelor of Arts (Human Resource Management)	Ghana Telecom University

Foreign Researchers

The Institute hosted two foreign researchers from Oxford University, UK namely, Dr. June Hou and Dr. Serena Masino for three months (3). The purpose of their visit was to collaborate with researchers of the Institute on the MNEmerge project.

4.4 Temporary Staff

The institute temporarily employed two persons, a security man and a cleaner whose salaries were paid from the Institute's Internally Generated Fund (IGF).

4.5 Termination of Appointment

The appointments of two members of staff, namely: Mr. Godfred Angabe and Mr. Frank Dwamena were terminated for vacating their posts. This reduced the staff strength from 51 to 49 as at 31st December 2015.

4.6 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 areas of specialization. Every year, members of staff are given the opportunity to upgrade themselves. Currently three of the institute's staff are on study leave pursuing PhD programmes at various universities within and outside the country.

They are:

Mr. Gordon Akon Yamga	-	University of North Texas, USA
Mr. Paul Boadu	-	Imperial College, UK/KNUST
Mr. E. K. Tetteh	-	University of Cape Coast

4.7 Promotions

The under listed staff were promoted in 2015:

Mr. Joseph Noonoo, from Principal Works Superintendent to Chief Works Superintendent

Mr. David Sowah, from Senior Accounting Assistant to Principal Accounting Assistant

Ms. Rosemond Ocansey was upgraded from Receptionist to Senior Stores Superintendent

4.8 Publications and Scientific Meetings

The research staff produced a number of books, technical reports, conference papers and peer reviewed journals which are displayed in the institute's book case and the library. The details of the publications are given in Appendix 1. Appendix 11 shows the research staff participation in workshops, seminars and conferences at the national, regional and international levels. These activities have contributed significantly to staff capacity building knowledge generation and knowledge circulation.

APPENDIX 1: Institutional and Staff Publications

Refereed Journal Publications

1. Wilhelmina Quaye, George Owusu Essegbey, Edward Decker and Justina A. Onumah (2015) The Role of Science Technology and Innovation in Socio-economic Development of Ghana – Linking Research to the private sector at the CSIR-Technology Transfer and Development Centre (TDTC). *Journal of Advances in Science and Technology Research (JASTER)* 1(2): pp. 6-14
2. Wilhelmina Quaye, Richard Ampadu, Justina Onumah and Atsu Titiati (2015). Does the current land tenant arrangement in Ghana incentivise adoption of environmentally sustainable cocoa production practices? A case study of four selected cocoa growing districts in Ghana. *African Journal of Science, Technology, Innovation and Development*, 7(4):265-275
3. Quaye, W.; Okai, M. Dowuona, SN; and Dziedzoave (2015). Gender Dimensions of Decision Making on Production Assets and Challenges Facing Women in Making Decisions Regarding Production and Processing Activities. Accepted for publication in *Development in Practice* 26(1):77-90.
4. Johnson P-N.T, S. Nketia and W. Quaye (2015) Appraisal of Logistics Management Issues in the Agro-Food Industry Sector in Ghana. *Journal of Agricultural Science*; 7 (3): 164-178
5. Abdulsalam-Saghir, PB, Ben Bennett, W Quaye, Viet Phu Tu, LO Sanni and AM Martin (2015) Gender analysis of households' decision-making to reduce post-harvest losses of cassava in Ghana, Nigeria, and Vietnam, *Food Chain* 5(1-2), pp. 53–70
6. Roland Asare, Mavis Akuffobe, Wilhelmina Quaye and Kwasi Atta-Antwi (2015) "Characteristics of Micro, Small and Medium Enterprises in Ghana. Gender and Implications for Economic Growth" *African Journal of Science Technology Innovation and Development*, In Press, doi: 10 1080/20421338.2014.979651
Available from:<http://dx.doi.org/10 1080/20421338.2014.979651>
7. Akuffobe, M., Williams, P. A., Roland Asare & George Owusu Essegbey (2015). Implications of Agricultural Knowledge and Information Systems on Technology Development and Dissemination in Ghana: A Review. *International Journal for Agriculture Research and Innovation (IJARI)*, Volume 1, pp1–9.
8. Tetteh, E. K, Frempong, G. K., Obirih_Opareh, N. & Omari, R. (2015). Does Microcredit Create Employment For the Poor? The Case of the Microcredit Scheme of Upper Manya Krobo Rural Bank in Ghana. *Business and Economic Journal*, Volume 7, issue 190, pp. 1-9.
9. Ampadu-Ameyaw, R (2015) Gender and Small Business Growth Orientations: Theory, Evidence and Implications for Ghana's Small Business Sector, *British Journal of Economics, Management & Trade*, Vol.: 9, (1) pp. 1-16
10. Ampadu-Ameyaw R (2015), Understanding Farming Career Decision Influences: Experiences of Some Youth in Rural Manya Krobo, Ghana. *Journal of Scientific Research and Reports* 7 (7), pp 567-578
11. Ampadu-Ameyaw R and R. Aidoo (2015), Formalizing Informality for Increased Security: Customary Land Tenure Formalization in Ghana. *Asian Journal of Agricultural Economics and Sociology*, 5 (2), pp.76-87.

12. Ampadu-Ameyaw R. and R. Omari (2015), Small-Scale Rural Agro-processing Enterprise in Ghana: Status, Challenges and Livelihood Opportunities of Women. *Journal of Scientific Research and Reports* 6 (1) pp 61-72

13. Omari R. and Frempong G. (2015) Food safety concerns of fast food consumers in urban Ghana. *Appetite* 98, 49-54

14. Omari R., Ruivenkamp G. and Essegbey G. (2015) Responsible fast food consumption in urban Ghana: Predicting consumers' intention to adopt loyalty or exit strategy. *Food Studies* 5(2): 13-26

15. Haleegoah, J. Guido Ruivenkamp, George Essegbey, Godfred Frempong and Joost Jongerden (2015), "Street Vended Local Foods Systems Actors' Perspectives on Safety in Urban Ghana: The Case of Hausa Koko, Waakye and Ga Kenkey", *Advances in Applied Sociology*, 2015, 5, 134-145.

16. Avik, Basu, Sean Phipps, Rachel Long, George Essegbey & Niladri Basu (2015) "Identification of Response Options to Artisanal and Small-Scale Gold Mining in Ghana via the DELPHI Process", *International Journal of Environmental Research and Public Health*, 2015, 12, 11345-11363; doi:10.3390/ijerph120911345

Conference Papers

Roland Asare & George Owusu Essegbey (2015) "Funding of Agricultural Research and Development in Ghana: The Case of Council for Scientific and Industrial Research (CSIR)" presented at the International Research Initiatives Conference (IRIC 2015) Accra, Ghana. 11-12 November, 2015.

Omari R. (2015) Fast food and fast food restaurants as material objects: The socio-cultural meanings of consumption. A paper presented at the 2015 Annual General Meeting of the Research Staff Association of the Council for Scientific and Industrial Research held in Accra, Ghana on 30th October, 2015

Book Chapters

Essegbey, George, Nouhou Diaby and Almamy Konte (2015) "Chapter 18: West Africa", UNESCO Science Report: towards 2030, UNESCO, Paris. (ISBN 978-92-3-100129-1). pp. 470-497.

George Owusu Essegbey (2015) "The Role of Science, Technology and Innovation in National Development", in Nana Araba Apt (Ed.) *Positioning Ghana Challenges and Innovations*, Institut Francais de Recherche en Afrique, Ibadan pp. 333-359

Books

Quaye, W., Onumah, J.A., Decker, E. and Essegbey, G.O. (2015). *Profiles of Marketable Technologies Developed by CSIR-Ghana*. A Council for Scientific and Industrial Research-Technology Development and Transfer Centre (CSIR-TDTC) publication, ISBN 978-9988-1-9351-5

Technical Reports

Quaye W (2015) Scoping Study on gender responsive agricultural Services for rural poverty reduction: the case of Ghana

Quaye,W., Onumah, J.A., Ampadu-Ameyaw, R and Essegbey, G.O. (2015). *Proceedings from CSIR-STEPRI and MOFA Policy Symposium on the Status and impact of Ghana's fertilizer subsidy programme*

Quaye,W., Ampadu-Ameyaw, R and Essegbey, G.O. (2015). Proceedings from CSIR-STEPRI and MOTI Policy Symposium on Determinants of Ghana's bilateral trade flows

Quaye,W., Onumah, J.A., Ampadu-Ameyaw, R and Essegbey, G.O. (2015). Proceedings from CSIR-STEPRI and MOFA Policy Symposium Effect of poultry and rice importation on the Ghanaian economy"

Sigrid Damman, Herman Helness, Barnabas Amisigo, Roland Asare, Regina Banu, Kwadwo Asante, Mavis Akuffobe, Fred Logah, Portia Adade Williams, Thor Bjørkvoll, Kamal Azrague, Fred Amu-Mensah, Masahudu Fuseini (2015) "Final Report: RWH for resilience to climate change impact on water availability in Ghana" ISBN: 9788214059809, SINTEF-STEPRI, Trondheim, Norway.

Akuffobe M. and Williams A. P. (2015) Report on International Training Workshop Science, Technology and Innovation (STI) Policy Research and Method: Reinforcing National Capacity on STI Assessment held from 18th October – 6th November, 2015 in Beijing, P. R. China.

Akuffobe, M., Williams, A.P. and Frempong, G. A. (2015) Proceedings of the MNEmerge Regional Workshop held from 10th – 11th August, 2015 at CSIR-STEPRI, Accra-Ghana.

Frempong G.K., Essegbey G.O., Akuffobe M., Williams A. P. Onumah J.A. and Omari R. (2015). The Impact of FDI on Local Development and Poverty Reduction: Insight from 8 Case Studies.

Williams A. P, Fuseini M, Essegbey G. O. (2015). Report on Horizon 2020 Information Session and National Contact Point training workshop at Mensvic Grand Hotel, Accra-Ghana.

Damman S., Helness H., Amisigo B., Asare R., Banu R., Asante K., Akuffobe M., Logah F., Williams A.P., Bjørkvoll T., Azrague K., Amu M. F., Fuseini M. (2015). Final report: RWH for resilience to climate change impact on water availability in Ghana.

Williams A.P, Arthur W., Asare R., Damman S. & Akuffobe M. (2015). Report on Rain Water Harvesting Project Stakeholders Workshop held on 11th June 2015, under the theme "Up scaling RWH in Ghana: Challenges and Opportunities at CSIR - STEPRI.

Onumah J. A., Frempong G.K., Akuffobe M., Williams A.P. and Essegbey O.G. (2015), Ghana Policy Indicators: Guidelines for MNEs Operation in Ghana's Agricultural Sector.

Williams P. A. (2015). Report on "National Dissemination Workshop on Gender and Enterprise Development in Ghana" held on 18th August, 2015 at ISSER Conference Centre at University of Ghana, Legon.

Onumah, J.A., Quaye,W., Ampadu-Ameyaw, R and Essegbey, G.O. (2015). Proceedings from CSIR-STEPRI and MOTI Policy Symposium on Current monetary policies and their implications for doing business in Ghana

Onumah, J.A., Quaye,W., Ampadu-Ameyaw, R and Essegbey, G.O. (2015). Proceedings from CSIR-STEPRI and MOTI Policy Symposium on Determinants of Ghana's bilateral trade flows

Akuffobe M. and Williams A. P. (2015) Report on International Training Workshop Science, Technology and Innovation (STI) Policy Research and Method: Reinforcing National Capacity on STI Assessment held from 18th October – 6th November, 2015 in Beijing, P. R. China.

Akuffobe M., Williams, A.P. and Frempong, G. A. (2015) Proceedings of the MNEmerge Regional Workshop held from 10th – 11th August, 2015 at CSIR-STEPRI, Accra-Ghana.

Akuffobe M. (2015): MNEs and Innovation in Ghana Survey: Enumerators' Training Workshop report held from 30th November – 3rd December, 2015 at CSIR-STEPRI, Accra-Ghana.

Akuffobe M. and Ampadu A. R. (2015). Report on Circle Institutional Strengthening Programme (ISP) workshop held from 9th - 11th December, 2015 in Nairobi-Kenya.

Frempong G.K., Essegbey G.O., Akuffobe M. Williams A. P. Onumah J.A. and Omari R. (2015). The Impact of FDI on Local Development and Poverty Reduction: Insight from 8 Case Studies.

Damman S., Helness H., Amisigo B., Asare R., Banu R., Asante K., Akuffobe M., Logah F., Williams A.P., Bjørkvoll T., Azrague K., Amu M. F., Fuseini M. (2015). Final report: RWH for resilience to climate change impact on water availability in Ghana.

Williams A.P, Arthur W., Asare R., Damman S. & Akuffobe M. (2015). Report on Rain Water Harvesting Project Stakeholders Workshop under the theme "Up scaling RWH in Ghana: Challenges and Opportunities.

Onumah J. A., Frempong G.K., Akuffobe M., Williams A.P. and Essegbey O.G. (2015), Ghana Policy Indicators: Guidelines for MNEs Operation in Ghana's Agricultural Sector.

Akuffobe M. (2015). Report on Vital Signs Ghana Stakeholders workshop Held on 3rd September, 2015 at Erata Hotel, Accra, Ghana.

Akuffobe M, (2015) Report of Seminar on "Youth, Employment and Agriculture" held at University of Ghana, Legon on 22nd January, 2015

APPENDIX 11: Workshops, Seminars, Conferences and Mass Media

Dr. George Owusu Essegbey participated in the following:

Meeting on Climate Change, Agriculture and Food Security (CCAFS) Programme held in Dakar, Senegal from 14th – 17 January, 2015.

Inaugural event for the Circle Programme: A symposium for senior representatives to learn more about the program, in Nairobi, Kenya from 2nd – 4th February, 2015.

Series of meetings of the Development Research Uptake on Sub-Saharan Africa (DRUSSA) held in ACU Office, London, UK from 2nd – 3rd March, 2015.

EBAFOSC 2, a Conference on Re-imagining Africa Food Security now and into the future under a changing climate, Nairobi – Kenya from 27th July – 2nd August. 2015.

PH.D. Defense Committee for three candidates in Wageningen, Netherlands from 23rd August – 2nd September, 2015.

Diffusion of Innovation in Low Income Countries (DILIC) Conference in London, from 31st October – 4th November, 2015.

Meetings on Gambia Competitiveness Project (GCP), to conduct a study for the development of market-oriented Science and Technology Programme for the country, in Banjul, Gambia from 8th – 16th November, 2015.

Annual Review and Planning Meeting by CASCAID in Bamako, Mali from 23rd – 26th November, 2015.

Dr George O. Essegbey, Dr (Mrs) Wilhemina Quaye, Dr Richard Ampadu and Mrs Justina A. Onumah organised and participated in the following:

CSIR-STEPRI and MOFA Policy Symposium on the Status and impact of Ghana's fertilizer subsidy programme at the Ghana Hockey Association Conference Room, on 19th March, 2015

CSIR-STEPRI and MOFA Policy Symposium Effect of poultry and rice importation on the Ghanaian economy at CLOSSAG Conference Room, Accra, 23 September 2015

CSIR-STEPRI and MOTI Policy Symposium on Current monetary policies and their implications for doing business in Ghana at CSIR-STEPRI auditorium, on 29th April, 2015

CSIR-STEPRI and MOF Policy Symposium on The Energy (Power) Crisis in Ghana and its impact on Economic Activities at CSIR-STEPRI auditorium on 30th April, 2015

CSIR-STEPRI and MOTI Policy Symposium on Determinants of Ghana's bilateral trade flows at CSIR-STEPRI, on 20th August 2015

CSIR-STEPRI and MOF Policy Symposium on the Impact of Exchange Rate Volatility on Macroeconomic Stability in Ghana at CSIR-STEPRI auditorium, 29 September 2015

CSIR-STEPRI and MOF Policy Symposium: "Cost-Benefit Analysis of the Petroleum Price Deregulation in Ghana" on 9th December, 2015.

Dr George O. Essegbey, Dr (Mrs) Wilhemina Quaye, Mr. Masahudu Fuseini, Mrs Justina A. Onumah and Mrs. Portia A. Williams organized and participated in the following:

Ghana Science Association's "National Development through Scientific Innovation" seminar at CSIR – STEPRI on 25th February, 2015.

High Impact Presentation Skills" training workshop at La Palm Royal Beach Hotel, Accra on 22nd April, 2015.

Council for Scientific and Industrial Research CSIR- Institute for Scientific and Technological Information (INSTI) and Author AID Research Writing training workshop at CSIR INSTI from 19th–21st May, 2015.

Workshop on Horizon 2020 Information Session and National Contact Point training at Mensvic Grand Hotel, Accra-Ghana on 28th -29th, May, 2015

Rain Water Harvesting Project Stakeholders Workshop under the theme “Up scaling RWH in Ghana: Challenges and Opportunities at CSIR-STEPRI, Accra-Ghana on 11th June, 2015.

Food Research Institute and Author Aid proposal writing training workshop at CSIR INSTI from 28th–29th July, 2015

30th National Level Learning Alliance Platform (NLLAP) on “Water within your reach – upscaling roof rainwater harvesting for institutional and domestic water supply in Ghana at Erata Hotel, Accra on 30th, July, 2015.

National Dissemination Workshop on Gender and Enterprise Development in Ghana” at ISSER Conference Centre at University of Ghana, Legon on August 18th August, 2015:

Official Launch of Enhancing Development of Ghanaian Entrepreneurs (EDGE) Stakeholder Conference” at Accra International Conference Centre, Accra, Ghana, from 15th October, 2015

Council for Scientific and Industrial Research (CSIR) “In House Commercialization of Research Technologies” retreat on November 17th, 2015

Mrs. Portia A. Williams and Ms. Mavis Akuffobebe participated in the following workshop: International training workshop on “Science, Technology and Innovation (STI) Policy Research and Method: Reinforcing National Capacity on STI Assessment” in Beijing, P. R. China, on October 18th – November 6th, 2015.

Dr Wilhelmina Quaye and Mr Stephen Awuni participated the following: Regional TOT was organized by UNEP in collaboration with GIZ in Nairobi, Kenya from 27th-31st July, 2015.

Regional Training on Guide to Guide Step for Natural Capital Assessments was organized by the United Nations Environment Programme (UNEP), in collaboration with the German International Development (GIZ) on 11-13, November, 2015 in Ethiopia.

Mrs. Portia A. Williams, Mrs Justina A. Onumah and Ms. Mavis Akuffobebe participated in the following workshops

Climate Smart Agriculture and the implication for policy formulation” policy dialogue by the Ghana Environment and Climate Change Policy Action Node (GECCPAN) at CSIR-STEPRI, Accra-Ghana on 26th February, 2015.

Multinational Enterprises in Emerging Markets (MNEmerge)” regional workshop at CSIR-STEPRI, Accra-Ghana from 10th–11th, August, 2015.

Dr. Godfred Frempong participated in the following: Regional Review Meeting WSIS+ 10 and Beyond: Outcomes and Perspectives for Africa” in Addis Ababa, Ethiopia from 14th-16th April, 2015

3rd Multinational Enterprises in Emerging Economies (MNEmerge)’ Project Meeting held at the University of Oxford from 13th - 17th October, 2015.

PhD Defence of Mrs Rita Owusu - Amankwah at Wageningen University and Research from 23rd – 28th August, 2015.

41st Annual Conference of the European International Business Academy (EIBA), at the Pontificate Catholic University, Rio campus, Rio de Janeiro, Brazil from December 1st -3rd December, 2015.

Dr Wilhelmina Quaye participated in the following:

Second Meeting of international Expert Group on the Toolbox for operationalizing Green Economy Transition in Africa was held in Ethiopia from 2nd -4th February, 2015.

Mrs Justina A. Onumah participated in the following:

Third MNEmerge meeting at University of Oxford, Oxford-UK from 15th-17th October, 2015

Mr. Roland Asare participated in the following:

Horizon 2020 Information day and National Contact Points Training. Held at Mensvic Hotel Accra, 28th -29th May 2015.

Agricultural Science and Technology Indicator (ASTI) survey training workshop for National contact points. Held at Laico Lake Victoria Hotel Entebbe Uganda, 28th -29th January, 2015.

International Research Initiatives Conference 2015 (IRIC-2015) Held at Accra Institute of Technology in Accra, Ghana. 11th -12th November, 2015

Mr. Emmanuel Kodjo Tetteh participated in the following:

Sensitization Workshop on a Draft Agricultural Extension Guideline at CSIR-STEPRI in 12th May, 2015.

Alliance for Green Revolution in Africa (AGRA) Consultative Meeting with Animal Sub-Sector at CSIR-STEPRI on 7th July, 2015.

The “Multinational Enterprises in Emerging Markets (MNEmerge)” regional workshop at CSIR-STEPRI, Accra-Ghana; from 10th -11th August, 2015.

National Roving Seminar on making better use of Intellectual Property for Business Competitiveness and Development in Africa at Noguichi Institute of Medical Research Conference Hall, Accra from 12th -13th August 2015.

Sensitization Workshop on Ghana’s open Data Initiative the NITA Computer Laboratory, Ministry of Information, Accra on 22nd October, 2015.

Ms. Mavis Akuffobebe participated in the following:

Seminar on “Youth, Employment and Agriculture” held at University of Ghana, Legon on 22nd January, 2015.

Rain Water Harvesting Project Stakeholders Workshop under the theme “Up scaling RWH in Ghana: Challenges and Opportunities at CSIR-STEPRI, Accra-Ghana. 11th June 2015.

The CSIR-FRI/Author AID Proposal Writing Workshop organized at CSIR-INSTI, Accra, Ghana, July 2015

The African Women in Agricultural Research and Development (AWARD) Science Skills Course in Accra, Ghana from July 12-18, 2015.

Workshop on Risk Communication for GMOs organized by ICGEB; at Aburi, from 21st – 23rd September, 2015

The Vital Signs Ghana Stakeholders Workshop held at Erata Hotel, Accra, Ghana, 3rd September 2015

MNEs and Innovation in Ghana Survey Training Workshop for enumerators held from 30th November – 3rd December, 2015 at CSIR-STEPRI.

Circle Institutional Strengthening Programme (ISP) workshop held from 9th - 11th December, 2015 in Nairobi-Kenya.

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

Training of Trainers Workshop on Effective Use of the Resources of the WIPO Project on the Establishment of Technology and Innovation Support Centers (TISCs) held in Accra, Ghana from 24th – 26th February, 2015.

Training Workshop on Research Writing held at INSTI in Accra from 19th to 21st May, 2015

Consultative Workshop on Establishment of Innovation Platform for Aflatoxin Management in Ghana held at FARA in Accra on June 17, 2015.

Two-day High level Dialogue of Minister, legislators and experts on mobilizing STI for Post 2015 Sustainable Development Goals held in Accra from 7th – 8th July, 2015.

ReSAKSS Conference held in Addis Ababa, Ethiopia from 1st -3rd September, 2015

Masuhudu Fuseini participated in the following:

Opportunities in Horizon 2020 programme of the European Commission at the CARIMA Annual Conference, held at the University of Buea, Cameroun from 4th -6th May, 2015.

Work Package Five of the CAAST-Net Plus (Horizon 2020) at the Annual General Meeting of the CAAST-Net Plus, in South Africa from 10th– 11th May, 2015.

Central and West African Event on Horizon 2020 Information Session and National Contact Points Training at Mensvic Grand Hotel, Accra, Ghana from 28th-29th May, 2015.

UNESCO-Government of Ghana- STEPRI High-Level Dialogue of African Ministers and Legislators on Mobilising Science Technology and Innovation (STI) for Africa's Sustainable Development Post 2015 at La Palm Royal Beach Hotel, Accra, Ghana from the 7th - 8th July 2015

International Biosafety Workshop for ICGEB: Risk Communication for GMOs at the Little Acre Hotel, Aburi, Ghana, from 21st – 23rd September, 2015

Biosafety Training Workshop on Risk Communication for GMOs at Little Acre Hotel Accra, Ghana from 21st– 23rd September, 2015

Stephen Awuni participated in the following:

Stakeholder Workshop on Integrated Assessment of Water Sustainability, Infrastructural Inequality and Health in Small-scale Gold Mining Communities in Ghana at Mensvic Grand Hotel, Accra from 20th -21st April, 2015.

Round Table Workshop on Mining Communities Concerns in Promoting Responsible Mining in Ghana at Mensvic Grand Hotel, Accra on 12th May, 2015.

Programme for AUTHORAID/INASP/INSTI Training Workshop on Research Writing for CSIR Research Scientist and Technologists at CSIR-INSTI from 19th -21st May, 2015.

Horizon 2020 Information Session and National Contact Points Training. EU Framework for Research and Development at Mensvic Grand Hotel, Accra from 28th -29th May, 2015.

IFS-AAS Project on Developing an Enabling Scientific Equipment Policy in Africa. Consultative Meeting on Scientific Equipment Policy in Nairobi, Kenya from 20th -21st August 2015.

AWARDS AND FELLOWSHIPS

Mrs. Portia A. Williams won a one year fellowship under the Climate Impact Research Capacity Leadership Enhancement (CIRCLE) programme, at the University of Cape Town, South Africa.

Dr (Mrs) Rose Omari was placed as a Policy Fellow in the Ministry of Food and Agriculture under the DRUSSA project.

Policy Briefs

Dr. George O. Essegbey, Dr. Wilhemina Quaye, Dr. Richard Ampadu and Mrs. Justina A. Onumah developed the various policy briefs

1. Decentralization of MOFA: Implications for sustainable agriculture productivity;
2. Effect of poultry and rice importation on the Ghanaian economy;
3. Understanding genetically modified organisms in Ghana;
4. Status and impact of Ghana's fertilizer subsidy programme;
5. Potential impact of the common external tariff and economic partnership agreement;
6. Gender in trade and industry: needs and challenges of women entrepreneurs in Ghana;
7. Determinants of Ghana's bilateral trade flows; and
8. Current monetary policies and their implications for doing business in Ghana

APPENDIX III: List of Members of STEPRI Staff

A. Senior Members

Director and Deputy Director

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

Commercialization and Information Division (CID)

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

Agriculture, Medicine and Environment Division (AMED)

9. Dr. Richard Ampadu-Ameyaw, BSc. (Agric. Econs), M.Sc. (Agric. Econs.), PhD (Development Studies), Research Scientist, (Head)
10. Mr. Gordon Akon-Yamga, B.A. (Geography), MPhil. (Env. Sci), Research Scientist (Study leave)
11. Mr. Paul Boadu, B.A. (Hons) Economics, MPhil (Econs.), Research Scientist (Study leave)
12. Mr. Stephen Awuni, BSc. (Hons) Zoology, M.Phil. (Env. Sci), Research Scientist
13. Mrs. Justina A. Onumah, BSc. Agricultural Technology (Econs & Extension), MPhil (Agric. Econs), Research Scientist

Industry and Services Division (I&SD)

14. Dr. Mrs. Wilhemina Quaye, BSc. Agric. Econs, Mphil (Agric Econs), PhD (Rural Sociology), Principal Research Scientist (Head)
15. Dr. Mrs. Rose Omari, B.Sc (Biochemistry & Food Science), M. Phil. (Food Science), PhD (Food Policy) Research Scientist
16. Ms. Afua Bonsu Sarpong-Anane, Diploma in Human Resource Management (ICM), B.A (Economics and Sociology), Principal Technical Officer
17. Mr. Roland Asare, B.Sc. (Hons) Geology, M.Sc. Environmental Engineering, MBA (Finance), Research Scientist
18. Ms. Mavis Akuffobe, B.A. (Sociology/Law), M.Phil. (Sociology) Research Scientist
19. Mrs. Portia Adade-Williams, BSc. (Agric Econs), M.Sc. (Bus. Administration), Research Scientist
20. Mr. William Boadi, B.A (Hons) Graphic Design, Master of Arts (African Art), Senior Scientific Information Officer
21. Mr. Rankine Asabo, SSSCE, B.A (Psychology and Sociology), Principal Technical Officer Accounts
22. Mr. Oswald Nyimebaare, CA, MBA (Accounting Option), BSc. (Admin.), (Head of Finance)

B. Senior Staff**Accounting staff**

23. Mr. David A. Sowah, Certificate in Procurement and Material Management, GCE 'O' Level, GCE 'A' Level, Principal Accounting Assistant
24. Mrs. Catherine Dzitse, Institute of Chartered Accountants (I.C.A.) Ghana, Part I & II, Principal Accounting Assistant
25. Ms. Sabita A. Pilly Apreko, Higher National Diploma (Accountancy), BA (Accounting) Principal Accounting Assistant

26. Mr. Enoch Okutu, ABCE (Accounting), I.C.A. Part 1, BA (Accounting) Principal Accounting Assistant
27. Miss. Rosemond Ocansey, HND (Purchasing and Supply), BA (Logistics and Supply Chain Management), Senior Stores Superintendent
28. Mrs. Gifty Dzihloru, B.A (Accounting), C.A, Auditor

Administrative and General Services

29. Mr. Godfried Acquaaah-Arhin, GCE 'O' Level, GCE 'A' Level, Bachelor of Business Administration in Management, Principal Admin. Assistant
30. Ms. Mary Magdalene Masopeh, GCE 'O' Level, Diploma in Business Studies (Secretarial Option), Diploma in Management Studies, Chief Admin. Assistant
31. Ms. Gloria Boakye, Diploma in Business Studies (Secretarial Option), HND (Secretaryship & Management Studies), B. A (Management Studies), Principal Admin. Assistant
32. Ms. Selina Lawer-Angmler, GCE 'O' Level, Higher National Diploma (Secretaryship and Management Studies), Principal Admin. Assistant
33. Mr. Kwesi Aboagye, MSLC, Defensive Driving (STC), Transport Management (NVTI), Senior Transport Management Course, Senior Assistant Transport Officer
34. Mr. Robert Anneeh Atawosu, Middle School Certificate (MSLC), STC Defensive Driving Transport Management (STC), Traffic Supervisor
35. Mr. Joseph Kingsford Noonoo, MSCL, Junior Supervisory Management Level Certificate, Senior Supervisory Management Level Cert. (Electrical/Mechanical), Chief Works Superintendent
36. Mr. Paul Debrah, GCE 'O' Level, CSIR-In House Security Supervisors Cert. (Module 3) Security Officer.
37. Ms. Christiana Agyeiwaa, GCE 'O' level, Diploma in Management Studies, Principal Admin. Assistant
38. Mr. Daniel K. Setufe, MSCL, CSIR In-House Training for Camera, Editing and Sound, STC Transport Management, STC Defensive Driving, Assist. Transport Officer
39. Mr. Moses Adevu, SSSCE, Security Officer
40. Mr. Robert Okpoti, BECE, Certificate in Effective Security Techniques, Security Asst. Gd. I.

C. Junior Staff

41. Mr. Adorta Abanya, Security Assistant Grade II
42. Mr. Richmond Gasu, BECE, MSCL, Defensive Driving, License F, Driver. Gd. I
43. Ms. Vida N. Quaye, MSLC, Advance Customer Care, Front Desk Manageress
44. Mr. Sammy Akanfella, Snr. Labourer
45. Mr. Joseph K. Osei, BECE, Senior Headman
46. Mr. Jonas Atta Bainfaira, Supervisor Gd. I
47. Mr. Yaw Batholomew, Supervisor Gd. I
48. Mr. Mama Musah Kanjarga, Supervisor Gd. I
49. Mr. Samuel Gadasu, CSIR-In House Security Training Certificate (Module 1,2, & 3)