



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

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

Annual Report 2016

CSIR-STEPRI Annual Report 2016

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Council for Scientific and Industrial Research (CSIR)

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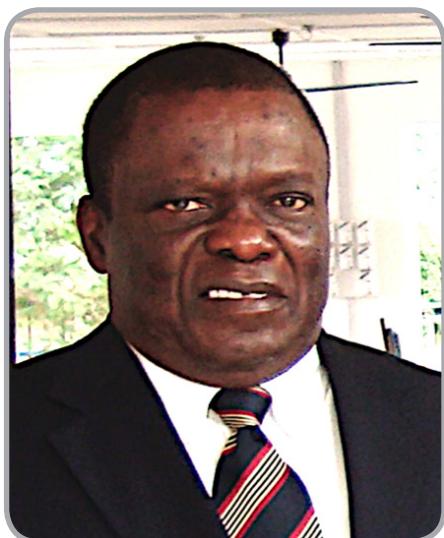
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LIST OF ABBREVIATIONS AND ACRONYMS

AAP	-	Annual Action Plans
ACU	-	Association of Commonwealth Universities
ADVANCE	-	Agricultural Development and Value Chain Enhancement
ASTI	-	Agricultural Science and Technology Indicators
AU-NEPAD	-	Africa Union- New Partnership for Africa's Development
BOT	-	Build Operate and Transfer
BRRRI	-	Building and Roads Research Institute
CIRCLE	-	Climate Impacts Research Capacity and Leadership Enhancement
CSIR	-	Council for Scientific and Industrial Research
CSOs	-	Civil Society Organisations
CSR	-	Corporate Social Responsibility
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
DILIC	-	Diffusion of Innovation in Low Income Countries
DRUSSA	-	Development Research Uptake in Sub Saharan Africa
EPA	-	Environmental Protection Agency
EU FP7	-	European Union's Seventh Framework Programme
FAO	-	Food and Agriculture Organisation
FASDEP	-	Food and Agriculture Sector Development Policy
FDI	-	Foreign Direct Investment
GHAFTRAM	-	Ghana Federation of Association of Traditional Herbal Medicine
GoG	-	Government of Ghana
IAR4D	-	Integrated Agriculture Research for Development
ICT	-	Information Communication Technology
IFPRI	-	International Food Policy Research Institute
IGF	-	Internally Generated Funds
ISSER	-	Institute of Statistical Social and Economic Research
KMA	-	Kumasi Metropolitan Assembly
LEKMA	-	Ledzokuku Krowor Municipal Assembly
MDGs	-	Millennium Development Goals
MESTI	-	Ministry of Environment Science Technology and Innovation
METASIP	-	Medium Term Agriculture Sector Investment Plan
MNEs	-	Multinational Enterprises
MoFA	-	Ministry of Food and Agriculture
MoF	-	Ministry of Finance
MoTI	-	Ministry of Trade and Industry
NCP	-	National Contact Point
NDPC	-	National Development Planning Commission
NGOs	-	Non Governmental Organisations
NSC	-	National Steering Committee
NORAD	-	Norwegian Agency for Development Cooperation
PARI	-	Programme Accompanying Research for Agriculture Innovation
PDAs	-	Personal Digital Assistant

PORSPI	-	Policy Research and Strategic Planning Institute
PPP	-	Public Private Partnership
R&D	-	Research and Development
RFI	-	Research Fairness Initiative
SARI	-	Savanna Agriculture Research Institute
SDGs	-	Sustainable Development Goals
S&T	-	Science and Technology
STEPRI	-	Science and Technology Policy Research Institute
STI	-	Science, Technology and Innovation
STIDEP	-	Science Technology and Innovation Development Programmes
STIPRO	-	Science Technology and Innovation Policy Research Organisation
STISA	-	Science Technology and Innovation Strategy for Africa
SWOT	-	Strengths Weaknesses Opportunities and Threats
TMA	-	Tema Metropolitan Assembly
TTC	-	Technology Transfer Centre
TDTC	-	Technology Development and Transfer Centre
USAID	-	United State Agency for International Development
UNEP	-	United Nations Environment Programme
WIAD	-	Women in Agriculture Development
WAAPP	-	West Africa Agriculture Productivity Programme
WEV	-	Women Extension Volunteer
WMD	-	Waste Management Department
ZEF	-	Centre for Development Research



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

CSIR-STEPRI MANAGEMENT BOARD

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Message from the Director of CSIR-STEPRI



Dr. George Owusu Essegbey,
Director of CSIR-STEPRI

In the year 2016, we pursued with great zest, our vision to be an internationally acclaimed Institute committed to facilitating the development, transfer, utilization and management of Science, Technology and Innovation (STI). Whilst the challenges were many, we still were able to chalk important successes.

The overriding challenge remain the burden of mobilizing resources to finance the operations of the Institute. To address this challenge, we strengthened our bonds with our partners – International Food Policy Research Institute (IFPRI), Forum for Agricultural Research in Africa (FARA), Association of Commonwealth Universities (ACU), the German Development Cooperation (GIZ) and others. Through these partnerships, there were resources to undertake a number of activities as elaborated in this annual report.

The diversity of our research activities illustrates the efforts CSIR-STEPRI is making to engage with the emerging issues in STI. For example, climate change has become an important domain of STI policy research. With the support of GIZ and in collaboration with the Environmental Protection Agency (EPA) an important project was initiated in the year. The continuation of the Agricultural Science and Technology Indicators (ASTI) Survey in partnership with IFPRI also underscores our efforts to contribute to the development and management of our scientific human resources, especially in Research and Development. The activities of the CSIR-Technology Transfer and Development Centre (CSIR-TDTC) carried out with funds from the World Bank, also illustrate the priority the Institute placed, and is placing, on the importance of building bridges between the CSIR and the private sector. In sum, innovation studies, business cluster development, technology transfer to industry, are all at the heart of the Institute's operations. The successful implementation of these projects is the evidence of our success in 2016.

I pay homage to my illustrious officers who contributed to

forging the new partnerships and who worked hard in sustaining the old partnerships. I have been the Director of CSIR-STEPRI and I can say without any hesitation that the greatest asset of the Institute is the totality of its human resources. I commend all and sundry who genuinely know they are part of the Institute's invaluable asset.

It is my hope that in the new year 2017, every one of the staff will serve more assiduously. Whatever the position of the employee, it is in commitment and sacrifice that work can be done, tasks accomplished and the outputs delivered to expectation. Let us all remember that no organization can be greater than the sum of its human resources. And no one employee can be greater than the employing organization. The more we contribute to making our organization great, the greater we will be individually.

Finally, I urge our stakeholders to look forward to growth and greater achievements in the coming year. We are most grateful to our partners for their support and solidarity. We can only say that, with them, we dare aspire to attain greater heights and our ultimate vision.

Executive Summary

The Science and Technology Policy Research Institute (STEPRI) of the Council for Scientific and Industrial Research (CSIR) is mandated to conduct Science, Technology and Innovation (STI) policy research, transfer and diffusion in all sectors of the economy of Ghana with particular emphasis on STI. The vision of STEPRI is to become an international institution that facilitates the development, transfer, utilization and management of Science, Technology and Innovation (STI) tailored to meet the specific needs of Ghana and Africa.

The staff strength of the institute stands at fifty-two (52) consisting of sixteen (16) senior members, three (3) senior members (Non-core), twenty-four (24) senior staff and nine (9) junior staff. The core staffs of the institute consisting of senior members have multidisciplinary specialties in agriculture, environment, sociology, development studies and among others.

The success of CSIR-STEPRI could not have been achieved without the collaboration with development partners and academic institutions including the World Bank, European Union (EU), Department for International Development (DfID) of UK, German International Development Cooperation (GIZ), United State Agency for International Development (USAID), the Association of Commonwealth Universities (ACU), the International Food Policy Research Institute (IFPRI), Oxford University, Forum for Agriculture Research in Africa (FARA), Microsoft and Environmental Protection Agency (EPA) Ghana 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 year 2016 both old and new projects were being executed. Old projects that run for more than a year continued and the new projects also started. Some of these include Green Economy (GE) projects mainly to conduct baseline survey on the status of GE in Ghana at the subnational level, Study of gender responsive agricultural extension delivery for improved agricultural productivity in Northern Ghana and Development research uptake in sub-Saharan Africa (DRUSSA), among others. Some achievements of the Institute in 2016 were the successful hosting of the International Innovation Conference at the La Palm Beach Hotel Accra which paved way for another hosting of GloBeLics 2018.

The well-attended conference gathered participants beyond Ghana, including Burkina Faso and Nigeria. Other achievements include a successful organisation of STEPRI staff retreat at the City Escape Hotel in Prampram 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 facilitated by Dr. Naaminong Karbo.

Donor inflows from foreign and local sources in 2016 were US\$675,521.41 and GHS¢ 1,230,029.55 respectively. Internally Generated Funds however accrued GHS¢335,742.10 within the same period. Inferring from the above figures indicate that the main source of income for the Institute was donor-funded projects. However, the continued absence of government release of funds for assets and operational expenditures is the main challenge in the running of the institute.

1.0 Introduction

1.1 Background

The science and Technology Policy Research Institute of the Council for Scientific and Industrial Research (CSIR) was established with the primary mission to conduct research to provide knowledge-based information to contribute to the formulation and implementation of policies and programmes for socio-economic development on the basis of Science, Technology and Innovation (STI). By this mandate, the institute acts as a focal point to articulate policies and programmes on national STI development.

Over the years, the research deliverables of the institute have contributed enormously in the pursuit of Science, Technology and Innovation which is the tool for the socioeconomic development of Ghana.

In 1988 the institute was established as Technology Transfer Center (TTC) with the mandate of addressing policy issues relating to transferring technology from developed to developing countries, as in the case of Ghana. The institute was re-named Policy Research and Strategic Planning Institute (PORSPI) in 1992 as the mandate got broadened to include other relevant research themes and was assigned to the then Ministry of Industries, Science and Technology (MIST) to provide technical support to the Ministry. The present-day name, the Science and Technology Policy Research Institute STEPRI was adopted in 1994 two years later when it was integrated into the institutional structure of the CSIR.

The research outputs of the institute cover the broad areas of agricultural, medicine, environment, industrial and services sectors of the economy. This is in line with the mandate of the Institute and has been very instrumental in stimulating public policy awareness for the advancement of national capacity in emerging technologies such as climate change adaptation and mitigation technologies, green economy, biotechnology, information and communication technology (ICT).

The achievements of the institute and its research works rests largely on donor funds from development partners who relentlessly provided support in research and capacity building of research staff of the institute. Some of the key donor partners we acknowledge are the Department for International Development (DfID) of the United Kingdom, the World Bank, European Commission (EC), United State Agency for International Development (USAID), Association of Commonwealth Universities (ACU), the International Food Policy Research Institute (IFPRI), German International Development Cooperation (GIZ), Forum for Agriculture Research in Africa (FARA) and Environmental Protection Agency (EPA) Ghana among others.

Without the support of the development partners, the Institute's core research programmes could have grounded, especially when activities of the year under review, received no funding from government. The institute do hope that this collaborations and support from its development partners will continue.

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

The mission of CSIR-STEPRI is to provide the research support necessary for the formulation and implementation of the relevant STI policies and programmes aimed at creating the environment for effective use of STI for socioeconomic development. This mission is classified into the following five thematic 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.

1.2 Technical Divisions

Based on its core mandate, the organization of STEPRI is divided into four technical divisions namely: Industry and Services Division (ISD); Agriculture, Medicine and Environment Division (AMED); 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 provides support services for the operationalization of the research activities of the other three divisions 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 2016:

1. IFPRI-STEPRI: Agricultural Science and Technology Indicator Survey (ASTI)
2. Multi-National Enterprises in Emerging Markets (MNEMERGE)
3. Diffusion of Innovation in Low Income Countries (DILIC)
4. CSIR-Technology Development and Transfer Centre (TDTC)
5. Development Research Uptake in Sub-Saharan Africa (DRUSSA)
6. Study of Gender Responsive Agricultural Extension Delivery for Improved Agricultural Productivity in Northern Ghana
7. Green Economy (GE) Projects
8. Advancing sub-Saharan Africa- EU Science and Technology Cooperation (CAAST-Net Plus)
9. National Science, Technology and Innovation (STI) Baseline Study
10. Programme Accompanying Research for Agriculture Innovation (PARI) Project
11. Capacity Development
 - a. AuthorAID Workshop: Applying principles of risk communication in research communication
 - b. Training workshop on current and emerging food safety issues

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 and Emmanuel K. Tetteh

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

Duration: January 2015-September 2016

Introduction

The Agricultural Science Technology and Indicator (ASTI) is an initiative of International Food Policy Research Institute (IFPRI) in collaboration with the Science and Technology Policy Research Institute (CSIR-STEPRI). This study seeks to gather data on agricultural research investments, human resource capacity and research focus themes to inform policy formulation for the agriculture research in Ghana. ASTI conducts primary surveys to collect data from government, higher education, nonprofit, and private agricultural R&D agencies.

Data collection ended in December 2015. In 2016, the main activities of the study were analysis of the collected data and the publication of the policy brief- the Fact Sheet after which highlights the key findings and trends on funding sources, spending levels and allocations, and human resource capacities, at the national level. ASTI's data and analysis constitute a powerful decision making resource for national and regional research managers, policymakers, donor organizations, partners, and other stakeholders.

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.

Conclusion

The results from the study showed a continuous increase in Public Agricultural R&D spending during the period 2012-2014 and this is mainly reflected across Universities, CSIR and Cocoa Research Institute of Ghana (CRIG). Government support to CSIR has remained strong, however this source of funding only covers staff salary with very small portion going into daily running of CSIR institutes. CSIR institutes therefore depend on donor funding for their research activities and there is the danger of research agenda being skewed away from national priorities.

Capital investments are totally inadequate at CSIR, as government disbursement of funds for this investment has ceased for some years now. High share of researchers in the old age brackets especially among the PhD degree holders is an area of serious concern at CSIR and higher educational institutions. The number of PhD-qualified researchers at CSIR is comparatively low though there was a slight increase compared with the previous study and given the level of specializations required across the institutes. Developing sound training and succession plans will be key to filling existing and anticipated staff gaps at CSIR.

2.2 Multi-National Enterprises in Emerging Markets (MNEmerge)

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

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

Duration: 3 years (2014-2016)

Introduction

The MNEmerge project 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 consortium that has been assembled for this project has been an active contributor to the multinationals research already before the project and it has extensive expertise on studying societal problems in emerging markets. The research during the project will combine the strengths of the partners and it will be carried out by an international, interdisciplinary team involving researchers from Finnish, British and Dutch institutes as well as Indian, Ghanaian and Brazilian organisations. 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: foreign direct investment (FDI), business functioning, technology and innovation strategies, corporate philanthropy or socially responsible investment. We analyze in detail how these issues can contribute to the attainment of poverty alleviation, food security, health security, environmental security and electrification in developing countries.

The objectives of the project

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 MDGs; 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

Work Done

During the year under review (2016), the major activities conducted were:

A. A national survey on innovation activities and management practices

A national survey on innovation activities and management practices was started in December, 2015 and ended in February, 2016. Enumerators were recruited and trained on the concepts of the study and the use of PDAs for the survey. The project research team monitored the field activities of the enumerators throughout the survey. A report of the survey findings has been written.

B. A Technical report on MNEs, Local Capacity Building and Development: Chinese and Western MNEs in Ghana

The report was submitted to the European Commission Seventh Framework Programme as part of the deliverables of the MNEmerge project. The report concerns the Ghana case study within the MNEmerge project.

The Ghana case study revealed that the amount of time and experience working in the MNEs, and the type of training received at the MNEs have had the most significant direct impact on a given workers' aspirations for future development. Some advanced management practices adopted in the MNEs, especially those of the intangible kind such as achievement recognition, and other non-monetary rewards, positive feedbacks, as well as skills enhancement increase the levels of aspiration of the local workers for future development. Management practices and activities that serve only to exploit workers' existing skills and capabilities may enhance the productivity of the workers but not their aspiration for future development.



A group picture of the participants at the opening ceremony of the Innovation Conference 2016

With regard to the diffusion of managerial knowledge between organisations, the case studies have shown that for both European and Chinese MNEs, much is still left to be achieved in terms of local outsourcing, partnership creation, and collaboration. The extent of local-foreign exchange between MNEs and local firms was found to be limited, although this depended on the sectors; with a clear improved performance in those instances where national policy took an active role in promoting the diffusion of knowledge. Such result highlights the crucial role of national planning in reaping the numerous potential benefits of FDI and operations of MNEs in Ghana.

C). Multinational Enterprises in Emerging Markets (MNEmerge) project's participation in Innovation Conference (IC Ghana 2016)

The Science and Technology Policy Research Institute of the Council for Scientific and Industrial Research (CSIR-STEPRI) in collaboration with AFRICALICS, GLOBELICS and its partners organised a two -day Innovation Conference under the theme, "Development Innovation – Putting the Pieces Together". The conference was organised with the aim of creating a network of innovation practitioners, including scholars in order to drive innovation research and practice in Ghana and West Africa as a whole. It also aimed at mobilising champions for innovation from policy institutions, the private sector, academia (research institutions, universities and polytechnics), international organisations and civil society organisations (CSO).

D). Participation in Innovation Conference (IC Ghana 2016)

The following were the conference's sub-themes:

1. Defining innovation practice in Africa – principles and fundamentals
2. The nexus of innovation and entrepreneurship
3. Challenges of innovation in developing economies and their antidotes
4. Promoting innovation in the key sectors of the economy – what to do and how to do it.

E). Plenary on the Role of Multinational Enterprises and Private Sector in Development Innovation
As part of the conference activities there was a special plenary on the Multinational Enterprises in Emerging Markets (MNEmerge) project being funded under the European Union funding framework. The Chairperson for this Plenary was Mr Kwesi Attah Antwi, the National Coordinator of the Rural Enterprise Programme, who also serves on the management board of CSIR-STEPRI. The theme for the session was: The role of Multinational Enterprises and Private Sector in Development Innovation. The session was aimed at sharing findings from the MNEmerge project and also to provide inputs in finalising the various work package reports. There were five presentations in all and these included the following:

1. A Framework Model on MNE's Impact on Global Development Challenges in Emerging Markets- Dr. Godfred Frempong, CSIR-STEPRI, Ghana.
2. The impact of multinationals on skills and aspirations: A comparative analysis of the subsidiaries in Ghana- Dr. Shaheen Akter, Technology Center for Development, Oxford University, UK.
3. Undertaking Innovation Activities among Firms in Ghana: Challenges and Opportunities- Mrs Portia Adade Williams, CSIR-STEPRI, Ghana.
4. Role of Policy in Capability Enhancement of Local Enterprises by Multinational Enterprises-by Mrs. Justina Onumah, CSIR-STEPRI, Ghana.
5. Operation of Multination Enterprises in Ghana: Experiences from Blue Skies Ghana- by Mr. Alistair Derby Djimatay, Blue Skies, Ghana.



Innovation Conference 2016

Conclusion

The Conclusion drawn from the various studies conducted under the project revealed that there is a quantifiable impact of Multinational Enterprises on Ghana's key sectors, and innovation is not a new thing in the country. Innovation was also seen to be undertaken by Medium and Small Scale Enterprises (MSEs). Few FDI has been witnessed in Ghana's agriculture and hence a call to all stakeholders to make the sector attractive to receive an appreciable level of investment to boost the sector since it still employs majority of the population.

2.3 Diffusion of Innovation in Low Income Countries (DILIC)

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

Supporting Researchers: Dr. Giacomo Zanella, Dr. Jun Hou, Ms. Mavis Akuffobea and Mrs. Portia Adade Williams

Source of Funding: ESRC/DFID

Collaborating Institution: Oxford University - United Kingdom

Duration: 3 Years

Introduction

In developing countries, technological innovation is decisive for industrialization and catch-up. However, technological innovation has been traditionally concentrated in a few developed countries, given the costs and risks involved in fomenting technological innovation. Foreign sources of technology account for a large part of productivity growth in most countries. The development process in Low Income Countries (LICs) therefore 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. Innovative capacity in LICs is, however, critical for the successful transfer and adaptation of knowledge. Yet several constraints and obstacles prevent firms from innovating. Addressing these constraints, to build functional innovation systems and enhance innovative capacity, is fundamental to socio-economic development in LICs.

Against this backdrop, 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.

The objectives of the project are:

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

Research Project Activities

• MNEs and innovation in Tanzania survey

Following the successful collaborations and outcomes of the 'The Diffusion of Innovation in Low-income Countries (DILIC)' and the "Multinational Enterprises in Emerging Markets (MNEmerge)" projects in Ghana, the project team decided to extend the studies to another African country for comparison purpose. Tanzania was selected for the comparative study and as result a DILIC/MNEmerge Survey is to be conducted in Tanzania. In connection with this a three-day (1st -4th February, 2016) training workshop was organised by the University of Oxford (UK) in collaboration with the Science and Technology Policy Research Institute (CSIR-STEPRI) and the Science, Technology and Innovation Policy Research Organisation (STIPRO) to train researchers in Tanzania on the DILIC/MNEmerge Survey.

The survey is the joint application and output of two research projects: MNEmerge and DILIC. The content of the survey is mainly on 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 was to understand the sources and diffusion of innovation in the private sector.

The training was facilitated by a team of Research Officers from Oxford University and Science and Technology Policy Research Institute (CSIR-STEPRI). The members of the training team were Dr. Jun Hou and Dr. Serena Masino of Oxford University and Ms. Mavis Akuffobe of



MNEs and innovation survey training session in Tanzania. Ms. Mavis Akuffobe (second from right) is the Resource Person.

STEPRI. The training-workshop was attended by five researchers from the Science, Technology and Innovation Policy Research Organisation (STIPRO). The five researchers were trained purposely for data collection and data management. These researchers were both degree and master's degree holders with data collection experience in order to ensure quality and consistency in the survey data.

Conclusion

The findings of the survey will shed light on the critical role of innovation in the development of firms in low-income countries and on how innovations spread. The DILIC study is expected 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.

2.4 CSIR-Technology Development and Transfer Centre (TDTC)

Principal Investigator: Dr. G.O.Esegbey

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

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

Duration: January 2014-June 2016 (30 months)

Introduction

The need to link research with the private sector for socio-economic development of the Ghanaian Economy is receiving attention from both Government and Development Partners. Establishing a linkage between research and industry ensures co-generation of knowledge and innovative technologies of high commercial value. It's against this backdrop that the CSIR-Technology Development and Transfer Centre (TDTC) was established under the component 2 of the Ghana Skills and Technology Development Programme funded by the World Bank, DANIDA and Government of Ghana (GoG). Among other things, the CSIR-TDTC aimed at developing a structured mechanism that facilitates effective transfer of CSIR technologies to the private sector. The project funding ended in 2016 but the CSIR-Technology Development and Transfer Centre (TDTC) remains functional under the corporate CSIR technology marketing and transfer system to consolidate the gains made even after the conventional project funding.

Project Objectives:

The project seeks to achieve the following objectives:

1. 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;
2. Develop and implement a structured model for engaging the private sector in partnerships for technology development, appropriation and transfer;
3. Develop capacity in technology transfer that enhances knowledge and skills of researchers and other relevant staff; and
4. Create a system for intensive research-industry interaction.

Expected Beneficiaries: Research scientists and private sector partners

Project Activities/deliverables

A. Project deliverables were included the following:

1. Technology Development & Transfer Centre (TDTC) established with functional website;
2. Capacity Needs Assessment Survey of CSIR Research Scientists conducted and findings formed the basis for the development of training modules;
3. Five (5) Capacity Building programs organised in Accra and Kumasi;
4. About 110 CSIR-Researchers including 38 female researchers trained in technology marketing, technology partnerships, proposal writing and Intellectual Property Rights;
5. Twenty-three (23) Competitive Grants awarded to researchers for technology transfer to the private sector;
6. Development of CSIR-R&D Strategic Plan which was validated by CSIR Institute Directors;
7. Research-Industry Interaction platforms in Accra and Kumasi established through organisation of Business Seminars;
8. Four (4) Business Development training organised for the private sector players;
9. Ten (10) Business plans and other communication materials developed and distributed;
10. Close to 170 CSIR marketable technologies profiled and published in a book;
11. Participation in 3 Technology Fairs;
12. Participation in international conferences and seminars; and
13. Monitoring activities conducted.

Specifically, the project deliverables in 2016 reporting period included the following:

1. Capacity building of researchers;
2. Organization of business development training for the private sector players;

3. Development of business plans for selected technologies;
4. Participation in technology fair and conferences;
5. Grant awards activities under additional funding; and
6. Monitoring of grant awards and strengthening of sustainability systems with the existing CSIR commercialisation structures.

B. Training in Technology Marketing and Intellectual Property Rights in Accra and Kumasi

A major challenge with the technology transfer drive by the CSIR has been the limited expertise in technology marketing and intellectual property rights among the CSIR-research staff. To overcome this challenge, the CSIR-Technology Development and Transfer Centre (TDTC) organized a two-day training workshop for selected researchers from the Accra-based CSIR Institutes (Animal Research, Water Research, Food Research, Industrial Research, Scientific and Technological Information) and the Soil Research Centre. The 2-day training workshop was held at CSIR-STEPRI Auditorium from 11th -12th July, 2016. The training workshop attracted a total of 55 participants, out of which 16 were females.

Another two-day training workshop on Technology Marketing and Intellectual Property was organised for CSIR-research staff in the Northern Zone including those in Kumasi. The 2-day training workshop was held at CSIR-BRRI Training centre in Kumasi from 30th- 31st August, 2016. The training workshop attracted a total of 33 participants, out of which 5 were females. Similar to that organised in Accra, the training in Kumasi aimed at enhancing knowledge and skills of the CSIR-Research Scientists and Marketing Officers in Technology Marketing and Intellectual Property Rights. Topics covered in the training compendium were similar to that organised in Accra.

The training aimed at enhancing knowledge and skills of the CSIR-Research Scientists and Marketing Officers in Technology Marketing and Intellectual Property Rights. Topics covered in the training compendium were:

1. Innovation Platform (IP) and Innovations in Ghana;
2. Case study on Commercializing Innovations: The key steps in setting up registered companies;
3. The basic legal issues in commercializing CSIR technologies;
4. Technology marketing – Principles and Practice;
5. Technology partnerships – The success factors;
6. Proposal writing in Technology Transfer;





Training in Technology Marketing and IP in session at CSIR-BRRI in Kumasi

Some activities that were undertaken on the project include the following:

A. Organisation of Business Development training

A one-day training workshop on Business Development Services was organized in Accra and Kumasi for CSIR-TDTC clients using technologies developed by CSIR for income generating purposes. This Training workshop was organized to enhance business performance and to improve on the competitiveness of entrepreneurs using the CSIR Technologies for bricks manufacturing and mushroom cultivation and marketing. A total of 45 people attended this training the training in Accra while the training organised in Kumasi was attracted a total of 45 participants.

The training content included the following:

1. Quality Assurance;
2. Record management;
3. Business Management;
4. Exploring new market opportunities
5. Credit Management; and
6. Costing and Pricing



Participants at the Business Development training in Kumasi

B. Training of the members of the Ghana Federation of Traditional Herbal Medicine Association (GHAFTRAM).

To ensure adequate training of the herbal practitioners on the Ghana Herbal Pharmacopoeia (GHP) and its applications, a one day training workshop was organized for Ghana Federation of Traditional Herbal Medicine Association (GHAFTRAM). This was to enable practitioners make good use of the scientific constituents of the pharmacopoeia so as to refine their production processes to enhance public safety and hygiene. It also afforded the opportunity for the practitioners to be introduced through demonstration, the High Rate Low Extraction Technology (HRLT) which practitioners could access to enhance their production processes. This will ensure a fully-bodied scientific approach that will ensure adequate innovation in the country.

The workshop was organized for over 60 GHAFTRAM Members, including the national executives of the association. Participants were taken through the features of the third (3rd) edition of the GHP. This was done using the monographs of the new additions to the GHP. Other presentations were made on the extractive plant and the pharmacopoeia project since its inception in 1992. The presentations included:

1. Presentation on the Ghana Herbal Pharmacopoeia Project
2. Presentation on the features and efficient use of the Ghana Herbal Pharmacopoeia
3. Presentation on the use of the high rate low temperature extraction technology (HRLT) in IIR (Including practical demonstration)



Training session for the members of GHAFTRAM

C. Development of Business Plans

Business Plans for ten (10) selected CSIR technologies were developed with the view to provide business cases to help would-be investors start-up businesses using the selected technologies. The key components of the Business Plan include value chain analysis, SWOT Analysis, marketing plan taking into consideration the competitive environment and the financial analysis as well as the financing options. The 10 selected technologies for which business plans have been developed for and distributed to the various CSIR-Institutes include:

1. Pozzomix Cement;
2. Drying of fruits using Gas Cabinet Dryer Sustainable;
3. On-Site Faecal Sludge Management (Biogas);
4. Improved Solar Drying of Meat;
5. Rain Water Harvesting;
6. High Rate Low Temperature (HRL) Extraction, Concentration and Purification of Bioactive Ingredients from Plant;
7. Mechanised Palm Nut Cracker and Kernel Separator;
8. Enhancing Oil Palm Mushroom;
9. Pelleted Feed Packages for Grasscutter Feeding; and
10. Improved "Akosombo Strain" of Nile Tilapia for Cage Culture.

D). Participation in Technology Fair

A technology fair was organized by Ministry of Science, Technology and Innovation (MESTI) and the Council for Technical Vocational Education Training (COTVET) at the Institute of Statistical, Social and Economic Research (ISSER) Conference Centre, University of Ghana, Legon. CSIR-TDTC participated in this three-day technology fair held from 14th -16th September, 2016. Among the products and research innovations exhibited by CSIR at the Fair were: Pozzomix Cement; Improved Solar Dying Technology, cereals/legume based convenience foods, root and tuber based convenience foods, processed fruits and improved crop varieties such as maize, rice, cowpea and groundnuts.



Some of the CSIR exhibits and a Researcher receiving a certificate from the Minister



Director of CSIR-Crops Research Institute explaining some technologies exhibited at the fair to participants

E. Monitoring Conducted In 2016

A monitoring and evaluation exercise was conducted to ascertain the benefits accruing to the adopters of the technologies transferred and the extent of success. The extent of implementation of three newly funded CSIR-TDTC projects was assessed in order to form the basis and justification for release of the next tranche of the fund. The results of the monitoring and evaluation of the old projects indicated that the adopters of the technologies had improved on their productivity and increased their value added price (profits) substantially. The increase in number of workers after adopting the technology was however, marginal.

With regards to the new projects, the ‘Palm Oil Quality Improvement in artisanal Mills in Ghana’ had performed creditably. The project had held workshops for oil palm processing operators and organized awareness creation for palm oil traders.

The Enhancing Drying of Fruits Using the Gas Cabinet Dryer for Small Scale Processors project had delays in the implementation. The construction of the drying chamber and drying racks with plywood battings and sieving materials were still under construction at the time of monitoring. The Scaling up Gas Cabinet Drying of Mangoes project in the Yilo Krobo District of the Eastern Region was yet to commence at the time of the monitoring visit.



A visit to the Fisher King Farms at Senchi near Akosombo



A visit to the Fisher King Farms at Senchi near Akosombo

F. Innovation Conference & Seminars

Ten (10) selected CSIR-TDTC Awardees were sponsored to present on their technology transfer experiences at the Innovation Conference organized by CSIR-STEPRI. The conference was organized by CSIR-STEPRI in collaboration with AfricaLics, GlobeLics and some Development Partners. The theme for the International Innovation Conference was "Development Innovation: Putting the Pieces Together". The two-day innovation conference was held on 27-28th September 2016 at the La Palm Royal Beach Hotel, Accra Ghana. The conference created opportunity for networking for the awardees and for publications on their technology transfer experiences in the proceedings of the conference.

Three (3) staff of CSIR-TDTC attended various conferences in Europe. Dr Wilhemina Quaye and Mr Edward Decker attended a 2-day seminar on Managing Intellectual Property and Access to Research Results in Berlin, held on 21st-22nd April 2016. The seminar was organised by European Academy for Taxes, Economics & Law in Berlin. The 2-Day Seminar offered a great opportunity for

knowledge exchanges, networking with experts in the IP management field and created the platform for brainstorming over challenges facing the industry.

Some Topics covered during the Seminar were:

1. IPR & Knowledge Exchange: What does Success look Like;
2. Assessing the value of and Potential of Intellectual Property;
3. Optimizing IP strategy and Creating commercially interesting innovations;
4. Case Study: Ownership of Intellectual Property;
5. Serious IP situations: Which Risks to Expect; and
6. IP Management and Dissemination Beyond Patents.

2.5 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 Development Research Uptake in Sub-Saharan Africa (DRUSSA) programme aimed at strengthening Research Uptake capacity and participation in the international development research system at 24 Sub-Saharan African universities across 12 countries. The work package 5 which was piloted in Ghana and Uganda focused on improving the accessibility and utilisation of locally relevant research evidence to inform Sub-Saharan Africa and global development policy and practice. DRUSSA Work Package 5 had three main components including (i) policy symposia for senior policy officials (ii) placement of academics from universities/research institutions in participating ministries as Policy Fellows (iii) professional development courses on handling science and research evidence for junior and mid-level policy advisors.

In Ghana, participating ministries in the DRUSSA programme were the Ministry of Finance (MOF), Ministry of Trade and Industry (MOTI) and Ministry of Food and Agriculture (MOFA). Ministry of Finance was later replaced with Ministry of Environment, Science and Technology and Innovations (MESTI) due to lack of commitment on the part of MOF to accept a policy fellow placement.

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

Project Activities/deliverables

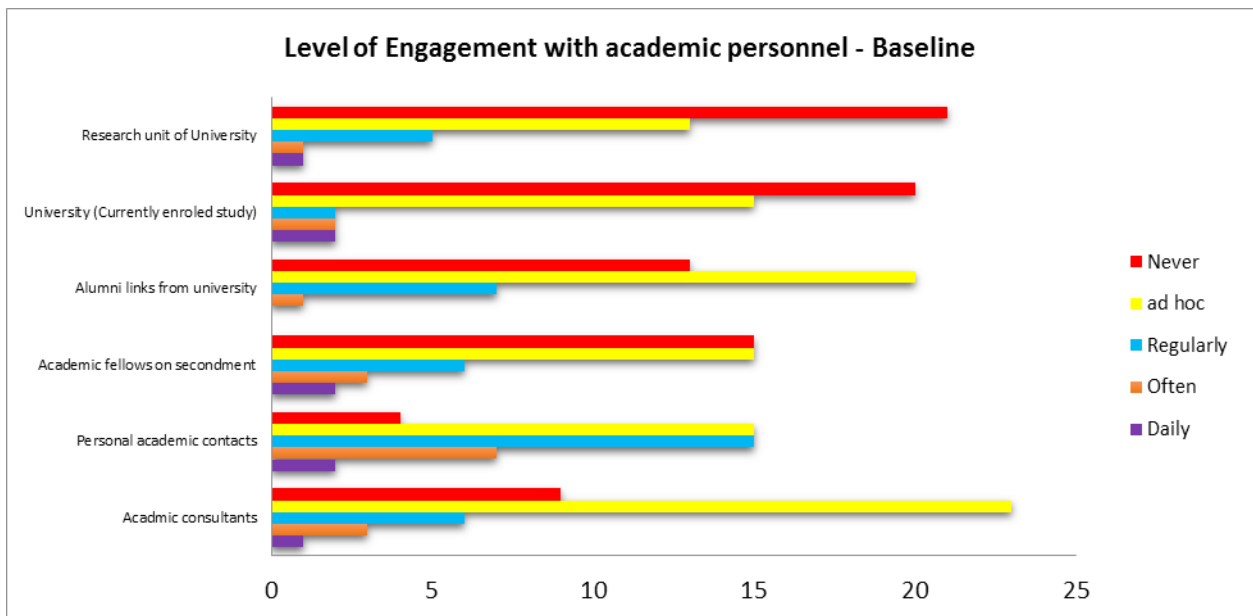
Project deliverables included the following:

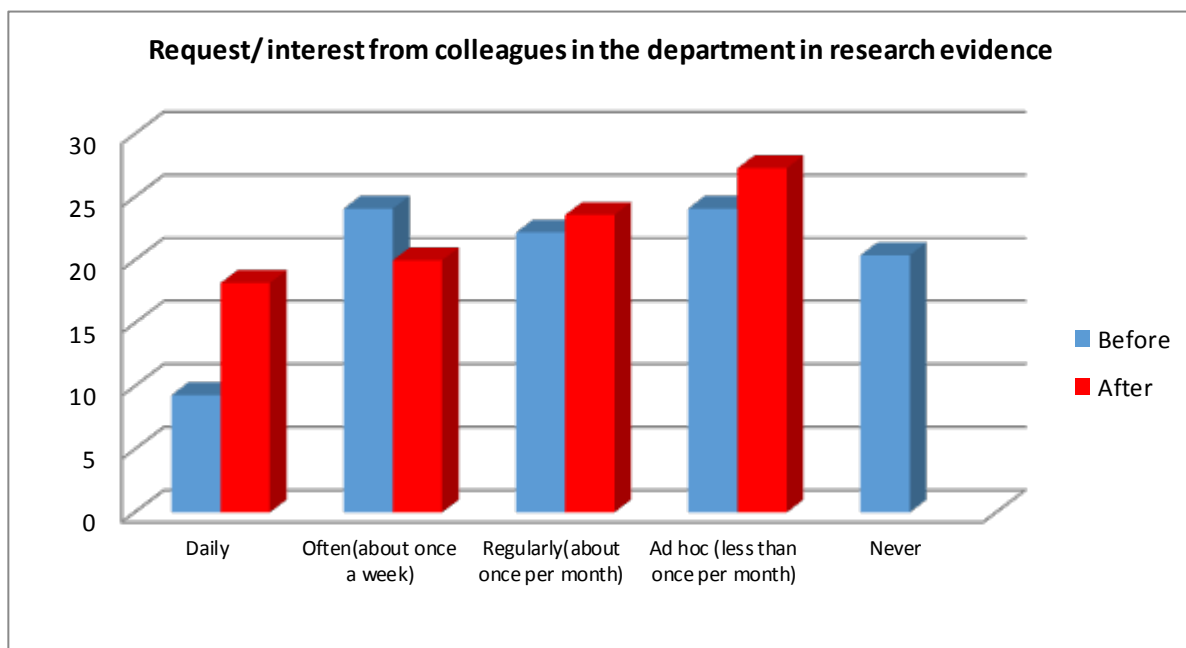
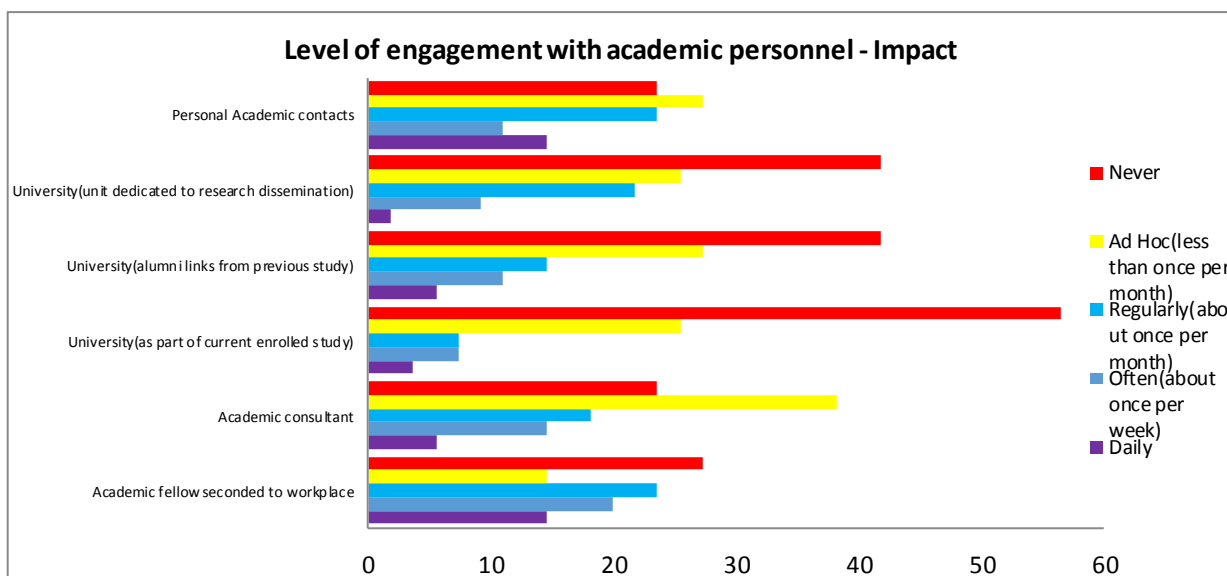
1. Signed Memorandum of Understanding (MoU) with the participating ministries including MOF, MOFA and MOTI to formalize their participation in the DRUSSA programme;
2. Conducted capacity needs assessment survey and organised validation workshops for all the three participating ministries;
3. Following up on the validation workshop, a day's planning session was held with each ministry to develop a purpose road map for the three main components and expected outputs of the DRUSSA project;
4. Distributed the Capacity Needs Assessment Report to Association of Commonwealth Universities (ACU), MOF, MOTI, MOFA and Institute of Statistical Social and Economic Research (ISSER);

5. Organized 15 policy symposia as planned for MOTI (5), MOFA (5), MOF (4) and MESTI (1) Proceedings for the policy symposia are available;
6. Developed, printed and distributed copies of policy briefs to MOTI and MOFA policy officials and other relevant stakeholders;
7. Organised screening of Policy Fellowship Applications for cohorts 1 and 2. Screening Reports available;
8. Developed and signed MOUs with Policy Fellows;
9. Coordinated placement of policy fellows at the participating ministries;
10. Developed concept note and organised policy symposium for Ministry of Education which was an addendum to the original DRUSSA programme; and
11. Facilitated DRUSSA assessment in Ghana by external consultant.

The project attempted to track some evidence of impact. At the Ministry of Food and Agriculture, Policy Fellow made input into the development of Medium Term Agriculture Sector Plan of MoFA 2014 -2017. He also developed proposal for the establishment Sub-district Agriculture Committee under the New Decentralized System. The proposal assesses the need and requirements for establishing district agriculture sub-committees. He reviewed researchers’ reports in five thematic areas on Strengthening Agricultural Policy Practice in Africa (SAPPA) and participated in the workshop where the reviews were presented. At the Ministry of Trade and Industry, there were contributions to policy documents review, capacity building program organized by one of the Policy Fellows on data types, data collection instruments and approaches to data analysis and inferences.

The graphs below show some improvement in the level of engagement with academic personnel particularly the policy fellows.





During the reporting year, three (3) policy symposia were organized and three (3) policy briefs developed on the following themes:

A. “Chemical Adulteration and its impact on vegetable production and marketing”

CSIR-STEPRI in collaboration with MoFA organised a half day Policy Symposium to provide the much needed platform for players in the Agricultural Production and Marketing Chain to share ideas and exchanges on the theme “Chemical Adulteration and its impact on vegetable production and marketing” under the Development Research Uptake in Sub-Saharan Africa (DRUSSA) Programme. There were two presentations (i) Chemical Adulteration in Agriculture: The Case Study of vegetables production in Ghana (ii) Chemical Adulteration and its Impact on Vegetable farming.



A section of participants at the MoFA policy symposium in Accra

Some recommendations emerged from the presentations during the policy symposium are listed below:

1. Communication of pesticide issues should be well articulated and made available to all relevant stakeholders;
2. Integrated Crop and Pest Management and improvement of vegetable seed system need policy attention;
3. Effective partnering of agricultural stakeholders and the Ministry of Health (MoH) to document hazards of pesticide adulteration on health of users;
4. The Environmental Protection Agency (EPA), and MoFA Plant Protection and Regulation Services Directorate (PPRSD) must train small scale agrochemical dealers, attendants, Customs and Immigration staff on basic agrochemical knowledge;
5. There should be a push for technical certification of commercial sprayers (spray gangs);
6. Creation of monitoring units at the local (district) level who will report (along existing MoFA lines) to Regional/National Quality Enforcement Offices;
7. EPA/PPRSD/Ghana Standards Authority/Ghana Customs Task Force with mandate for on-the-spot confiscation and destruction of adulterated or fake agrochemical should be equipped to pursue that mandate; and
8. Strict enforcement of periodic training and re-certification of agrochemical dealers.

B. Competition and Foreign Direct Investment in Ghana-Implications for Responsible Business.

A half day policy symposium was organized by the Council for Scientific and Industrial Research – Science and Technology Policy Research Institute (CSIR-STEPRI) in collaboration with the Ministry of Trade and Industry (MoTI) on Tuesday, 29th March, 2016 at the CSIR-STEPRI auditorium in Accra.

To address the broad theme, two presentations were delivered by two Policy Fellows at post at the MoTI under the DRUSSA programme. The first presentation was on the topic, “Is the Banking Industry Competitive? Implications for Cost of Credit” by Dr James Attah Peprah from the University of Cape Coast’s Economics Department. The presentation indicated that few banks are occupying the banking space in Ghana and there is the suspicion of anti-competition in the banking sector which is difficult to test. In terms of products, banks could be said to be operating competitively but same cannot be said of pricing, especially the cost of credit. However, it is presumed that the banks are colluding due to the leadership-followership relationship that has been observed over time.

The second presentation also focused on “The Impact of FDI Inflow on Domestic Firms’ Uptake of Corporate Social Responsibility (CSR) Activities: The moderating Effects of Host Institutions” which was delivered by Prof Daniel Ofori of the University of Ghana Business School. It was revealed that foreign firms are more involved in CSR activities compared to local firms. Also, most of the foreign firms’ CSR activities are strategic in and shared-value in nature and hence could be mutually beneficial for the community and the firm itself. However, local firms’ CSR activities were identified to be philanthropic in nature which creates no shared value and adds nothing to the firms’ productivity except for publicity. On the policy side, it also came to light that Ghana currently has no CSR policy and the Ministry in collaboration with the presenter have drafted a CSR policy which is yet to go to cabinet. It was suggested that developing countries’ governments can promote CSR activities in their economies by encouraging the inflow of foreign direct investment and retaining these foreign firms in their economies.



Participants from the Fifth MoTI Policy Symposium held at CSIR-STEPRI

C. ‘Policy Implementation in Ghana: The Case of STIDEP I and options for Enhancement’.

The Ministry of Environment, Science, Technology and Innovation (MESTI) and its collaborating Agencies has since 2009 developed a National STI policy with the aim of driving the development agenda of Ghana. To this end a document containing the priority programmes and strategic actions for implementing the National STI Policy was prepared spanning between 2011 and 2015. An initial assessment was carried out with the aim of determining the extent of implementation of the plan. This was done through in-depth interviews with key officials of the Ministry and some key agencies. The data was analysed qualitatively to determine the levels of implementation of the programmes and projects, constraints associated with the implementation, and the way forward. An attempt was made to present some theoretical frameworks in relation to the issues at stake that could possibly answer the challenges at hand. The presentation concluded on the most practical approach that could be adopted by the Ministry and perhaps the country.

Some recommendations emerging from this Policy Symposium were as follows:

1. Capacity building: Successful implementation of STIDEP-I will require building the capacity of key players;
2. Effective Coordination of Policy Implementation actions: There should be a strong collaboration between institutions connected to the implementation of similar projects. Also, the link between research and industry should be strengthened;
3. Early release and expansion of funding sources: Funds for implementation should be released timeously. Authorities should revisit the prescriptions of the STI Policy 5.1: the allocation of 1% of GDP to support S & T, and all other guidelines. There is the need for other alternative funding sources instead of government providing funds for the implementation of STIDEP-I;
4. The Need for a Focus: The number of programmes (17) and 84 projects is too much to be described as priority areas. There is the need to scale it down to create the needed focus; and
5. Relevant Structures should be in place and allowed to work independently: The Apex Body and all allied bodies should be put in place as independent entities to take care of all STI issues.

2.6 Study of Gender Responsive Agricultural Extension Delivery for Improved Agricultural Productivity in Northern Ghana

Principal Investigator: Dr Wilhelmina Quaye

Research Team: Masahudu Fuseini and Paul Boadu

Source of Funding: USAID/APSP

Duration: March 2016 - March 2017 (12 months)

Introduction

Gender inequality has become a major concern, an issue of importance and central to efforts in improving agricultural productivity. With women forming significant proportion of the agricultural labour force in Ghana and in Africa (50% agricultural labour force, (FAO 2011), they become the compelling target for support in terms of improving agricultural productivity. The case for enhancing women's productivity is made stronger against the background that several researchers including (Quaye et al., 2014) have observed wide gender gap crop productivity. The gender productivity gap is attributed to various factors including limited access to production assets and services such as land, technology and extension services. The agricultural extension system has been found to be less sensitive to women's interests, needs and challenges and does not seem to create adequate opportunities for women (MoFA/WAAPP, 2014).

To this end, this study attempts to examine the gender dimensions of some selected interventions in the three Northern Regions of Ghana. This study addresses productivity improvement under the Food Security and Emergency Preparedness in FASDEP II/METASIP II with the view to obtain evidence for policymaking. Two main case studies have been conducted including (i) Women Extension Volunteer (WEV) Approach and (ii) Agricultural Development and Value Chain Enhancement (ADVANCE) Program that mainstreamed gender in the implementation activities to reach more female farmers with extension delivery and other rural advisory services.

Project Objectives

This study was conducted with the overall goal of understanding gender responsive agricultural extension delivery for improved Agricultural Productivity in Northern Ghana. The specific objectives were to:

1. investigate how gender dynamics interact with the agricultural extension practices in the three Northern regions in Ghana;
2. gain an in-depth understanding of gender issues surrounding the adoption and adaptation of selected technologies;

3. investigate intra-household decision-making on access to production resources such as land, water and other inputs needed for the adoption and adaptation of the selected technologies; and
4. inform discussions and decisions on gender responsive strategies and practices for policy making.

Expected Beneficiaries: Smallholder Farmers particularly women and youth

Project Activities/deliverables

The study approach and methodology involved three clear phases: Phase 1 involved thorough literature review focusing on contextual gender analyses of agricultural communities in Northern Ghana including Northern, Upper East and Upper West Regions was done. The literature review was guided by the evaluation questions in order to capture the relevant literature in the specific themes and area of study. Phase 11 involved Case Studies of the Agricultural Development and Value Chain Enhancement (ADVANCE) and the Women Extension Volunteer (WEV) programs. Phase 111 involved qualitative and quantitative content analysis. A total sample of persons interviewed was 592 in selected communities in East Mamprusi, Garu Tempene and Wa East districts in Northern Ghana. In addition to one-on-one interviews, 18 focus group discussions were conducted in the surveyed districts.



Males Group interviews at Funsi and Tambaalug in Wa East and Garu Tempene Districts respectively



Group interview at Dagbiriboare and meeting with the MoFA District Director in East Mamprusi

Some of the key research findings indicated that culturally there are certain crops that are associated with certain gender groups across all the study districts. Males generally cultivated the maize crop and adopted related technologies while females farmed Soyabean and adopted soyabean related technologies. Two main reasons are provided for this situation. The first important reason is that culturally the man in male headed households is responsible for the food security needs of the entire family which is provided via the cultivation of maize crop (main staple crop). The second reason is that because the men are more economically endowed than the females, they are able to afford the relatively high cost of the technologies and inputs required in maize cultivation. Soyabean cultivation on the other hand is associated with females because its cultivation requires less expensive technologies and inputs.

Cultural discrimination against women in terms of access to land is observed by the small plots of land apportioned to them and in most cases in far infertile areas. The validation workshop confirmed this gender gap with respect to access to land.

Some value chain projects and NGOs reinforced the gender differentiated crop enterprises as stated in the preceding point without any serious efforts at implementing approaches and innovations aimed at significantly boosting productivity and reducing cost of technologies/ inputs which will break down the cultural and economic barriers hindering especially females in cultivating 'male' crops. The overall benefit from such development will be the empowerment of females socially and economically leading to improvement in family welfare.

The study findings indicate that general extension delivery services are biased against women evidenced by:

1. Men being given consideration first in extension and rural advisory services because of resource endowment – men had more access to land and had relatively bigger farms sizes than women;
2. Ability of men to access extension officers outside community in situations where there is no extension officer in the community because men have a considerable latitude in mobility than women due to cultural inhibitions on women; and
3. Some females access extension through men house heads because of socio-cultural inhibition on women engaging frequently with men who are not their spouses or family people.

From the above conclusions, the study recommendations for MoFA and its Development partners are: (1) strengthen capacity of women extension volunteers, (2) break gendered allocation of crop types through women empowerment programmes. This can be achieved through the use of advocacy groups at the local level (3) MoFA extension delivery system could use male champions to increase women access to extension and rural advisory services as well as access to production resources, (4) MoFA to use appropriate extension methodologies/tools to reach out to females and the youth; and (5) MoFA to collaborate with advocacy groups to tackle strict traditional gender roles and socio-cultural barriers limiting women access to productive resources.

2.7 GREEN ECONOMY PROJECT

Principal Investigator: Dr. G.O. Essegbey

Research Team: Dr. Wilhelmina Quaye, Stephen Awuni and Roland Asare

Source of Funding: UNEP/GIZ.

Duration: January 2015-December 2017 (3 Years)

Introduction

The United Nations Environment Programme (UNEP), in collaboration with the German International Development (GIZ) has developed a project entitled 'Operationalizing Green Economy Transition in Africa'. The project is to be implemented through a financial support from the Federal Government of Germany with UNEP taking the lead on the development of the Toolbox and the capacity building component and GIZ taking the lead on support for pilot application and development of a knowledge management platform. The pilot support on operationalizing Green Economy (GE) was focused on five countries that have a fairly advanced work done on GE at the national level. These were: Ethiopia, Ghana, Kenya, Mozambique and Rwanda. Collaborating institutions were MESTI, EPA (National Implementation Agency) and Technical Institutions comprising CSIR-STEPRI, Savanna Agriculture Research Institute (CSIR-SARI) and National Development Planning Commission (NDPC).

Objectives

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

Project Activities

A. National Training of Trainers in Ghana (Amasaman-Ga West)

A National Training workshop was organised by Environmental Protection Agency (EPA) at the Institute of Environmental Studies (IES-EPA) training school at Amasaman in Ga West Municipal. The 5-day training program started on 1st February and ended on the 5th February 2016. Participants were drawn from Ministry of Local Government, Ministry of Science, Technology and Innovations, EPA, participating planning units (TMA, Tolon and KMA), MoFA and the private sector players. Participants were taken through GE Toolkits, providing step-by-step guide from the foundational, sectoral and the implementation phases. Two STEPRI Staff (Wilhemina Quaye and Stephen Awuni) were among the technical team of trainers for the training program. They handled the Agriculture and Waste Sectors Greening with emphasis on Concepts and Approaches in the GE Toolkits from the Ghanaian perspective.

B. Baseline Studies of the participating planning units

A baseline survey was conducted in three planning units namely, Tolon District (Agriculture), Kumasi Metropolitan Assembly (Biomass Energy) and Tema Metropolitan Assembly (Waste Management). The objectives of the baseline survey were to:

1. Assess the state of the sub-national level on green economy, including priority development sectors, environmental, social and economic issues;
2. Assess the extent of households' involvement in the green economy transition by determining the household practices, environmental issues and practices to deal with environmental challenges; and
3. Assess the state of the private sector on green economy, including importance, structure and development of private sector, environmental, social and economic issues.

The baseline survey findings confirm that green economy issues have been mainstreamed in the planning processes at the national level but more work need to be done to heighten awareness on greening issues and to consciously integrate them in the district level development planning processes. Green Economy options have been identified in the selected districts to address sector specific and cross sector challenges. The findings cover the general economic activities in the selected planning units, on-going green economy interventions, environmental issues and potential areas for greening in the selected sectors as well as baseline status of selected green economy indicators.

The Tolon District is mainly agrarian and the people are highly dependent on the natural ecosystem for their livelihoods. About 63.4 percent of the sample interviewed depends on rivers/streams while 35.6

percent depend on dam for domestic water use. Firewood fuel and inefficient traditional cooking devices are predominantly used with its attendant smoke emission and health risk factors. Household income levels are less than 500GHS monthly. Yields of agricultural products are low. The level of inclusion in local planning process was high with 69% awareness level and 65% participation in the community development planning process among the sample interviewed. The agricultural sector is challenged by declining soil fertility, inadequate irrigation facilities, perennial flooding of farmlands, unfavorable weather conditions (drought) and perennial bush fires. To overcome these challenges GE options identified are (1) Sustainable agricultural intensification mixed crop - livestock farming system (2) Sustainable land management practices (3) Climate Smart Agriculture and (4) Conservation Agriculture. Some consideration should be given to aquaculture development for off-farm income generation and improved nutrition security particularly among women and the youth. Implementing these GE options will contribute to 5% annual increase in Agricultural outputs targeted by the Department of Agriculture in the Tolon District. At the household level, behavioral changes with respect to liquid and solid waste disposal and hygienic practices remain critical for reduced health and environmental risk exposures. Awareness level on green initiatives among respondents was very high (98.3%) as a result of intense NGOs interventions in the Northern region. However, green initiatives by NGOs were practically labeled as environmentally friendly and not green. The leadership of the Tolon District Assembly will have to proactively attract more NGOs operating along similar missions in greening into the district and effectively capture more green initiatives when reviewing the Annual Action Plans (AAPs).

In Tema Metropolitan Assembly, majority (92.5%) of the households surveyed dispose of waste through private sector operators, 1.9 percent of the respondents dispose of waste through recyclable waste material collectors while 0.9% used their waste in composting. The level of inclusion in the local planning process was low with 15% awareness level and 8% participation in the community development planning process among respondents. TMA generates about 500MT of solid waste and receives about 1207MT of solid waste per day (WMD TMA 2015). Main environmental problems identified at the household level were choked gutters and drainage systems (38% response), waste disposal (21.1% response), noise pollution (19.7% response), poor sanitation (18.3% responses) and indoor air pollution (2.8% responses). Greening options for the waste sector identified in TMA are (1) integrated waste management which will lead to waste minimization; resource efficiency, recycling, re-use (2) sensitization and education of the citizenry on integrated waste management as a shared responsibility leading to behavioral change among the people and (3) creating market for the business community through green initiatives. Private sector participation in waste management is on the ascendancy. The private sector service providers identified include Zoomlion Ghana Limited, Asadu Royal Waste Limited and J. Stanley Owusu Limited among others responsible for collection and disposal of solid waste on franchise basis.

One of the key developmental challenges in the Kumasi Metropolitan Assembly (KMA) is management of waste generated from the wood processing industries and the intense pressure on forest for wood fuels. About 14 percent of the sample interviewed used charcoal. The proposed GE options are (1) the use of biomass waste to energy resources such as pellets and briquettes and (2) promote the utilisation of improved and efficient cook stoves such as Eco-stove developed by Abellon (that use pellets) at institutional, commercial and household level. Some private sector players in the conversion of waste into energy products such as pellets and briquettes have been identified. Current quantity of biomass waste converted into pellets and briquettes are: Abellon - 25,000 MT per year; Esereso Carbon Products - 16 MT/day approx (about 4,000MT/year) and Sustainable Energy Solutions - 100 MT of wood off cuts into 30MT of kindling wood sticks per month. The GE project targets the conversion of 82,000MT of biomass into briquettes and Pellets in KMA per year. KMA has

signed MoU with Cinergex Solutions Limited, a Canadian firm, under a Build, Operate and Transfer (BOT) agreement for the construction of a waste-to-energy plant. The level of inclusion in KMA local planning process was low with 24% awareness level and 17% participation in the community development planning process among the sample interviewed.

2.8 Advancing sub-Saharan Africa- EU Science and Technology Cooperation (CAAST-Net Plus)

Principal Investigator: Dr. George Essegbey

Research Team: Mr. Masahudu Fuseini, Dr. Godfred Frempong

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

Duration: 4 Years (2013 – 2016)

Introduction

CAAST-Net Plus is a network of 25 partners from Europe and Africa that seeks to advance sub-Saharan Africa and European Union Cooperation in research and innovation for global challenges. Effectively, it was supposed to elapse by the end of December 2016 but had one more year extension without recourse to extra funding from the European Union (EU), in order to afford some partners, who have not yet finished their tasks, to complete.

Activities

Effectively, the CSIR-STEPRI has successfully executed the tasks assigned to it in both Work Packages 2 and 5 in relation to Africa-Europe STI cooperation on Climate Change for global challenges as well as to strengthen African-EU research cooperation partnerships.

Some of the tasks performed in the year under review include;

- Participating in the Research Fairness Initiative (RFI) programme in Kigali
- Attending a High-Level Policy Dialogue in Ethiopia
- Attending the Annual General Meeting in Athens
- Horizon 2020 Information Day and training of NCPs in Nigeria; and
- Collaborating with other institutions like GlobeLics to host an International Innovation Conference in Ghana

Conclusion

In the final lap of the project and so far, tasks assigned to the CSIR-STEPRI have been carried out successfully.

2.9 National Science, Technology and Innovation (STI) Baseline Study

Principal Investigators: Mr. E. K Tetteh and Dr. G. O. Essegbey

Research Team: Mr. Roland Asare and Ms. Adelaide Asante (MESTI)

Source of Funding: World Bank

Duration: 6 months

Introduction

Science, technology and innovation (STI) are increasingly being recognized as fundamental to achieving the sustainable development goals (SDGs). Several developed and developing countries, especially those in Asia and the Caribbean have drawn on STI to improve productivity, increased industrial competitiveness as well as overcoming environmental challenges. African countries have also recognized that understanding and use of STI is critical in responding to Africa's socio-economic development needs and challenges. Continental declarations such as the Lagos Plan of Action of 1980, the Kilimanjaro Declaration of 1987, the Khartoum Declaration of 1988, the Addis Ababa Declaration of 1998 and many

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

Ghana's efforts in harnessing the potentials of STI for socio-economic development connect invariably with the African recognition of the critical need for STI in national development. Since attaining independence in 1957, successive governments have established various processes for STI systems to drive national development. For instance, the establishment of the National Research Council in 1958 and the University of Science and Technology (now Kwame Nkrumah University of Science and Technology) in 1962 and other scientific institutions over the years, illustrate Ghana's commitment for harnessing STI potential for national development.

Ghana has formulated an STI policy since 2010. However, despite acknowledging the critical role of STI in her socio-economic development agenda as outlined in the STI policy, the country lacks a national database on STI activities. A national STI database is crucial for transformative development policies that can propel the achievement of the SDGs. For instance, STI policies based on evidence, improve efficiency and sustainable ways of satisfying human development needs. In addition, future STI studies, mid-term reviews, STI project completion reports and other ex-post STI evaluations will enable assessment of progress largely by comparing recent data with the information from a baseline data. Research studies can also refer to the baseline data to make decisions about STI development and use in Ghana. In line with this, the first national STI baseline survey was undertaken from December 2016 to March 2017.

Objectives

The main objective of the survey was to provide a national STI baseline data to form the basis for monitoring and evaluating STI activities and performance in Ghana. Among the specific objectives were to assess: the state of infrastructure in the national STI system; the quality of scientific research institutions; level of public and private sector investment in R&D; R&D human resource development and the level of protection of intellectual property.

Research Project Activities

A National Steering Committee (NSC) under the auspices of the Ministry of Environment, Science, Technology and Innovation (MESTI) with representations from key stakeholder institutions/organizations that have influence in the STI systems and policy formulation in Ghana was constituted to provide advisory inputs and to guide the planning and implementation of the survey.

The sampling frame included all Public and Private Higher Educational Institutions (Universities and Polytechnics), all Government institutions and organizations engaged in research activities and Private Universities offering STI related programmes. The sample was 38, consisting of 11 public universities, 10 technical universities and polytechnics, 5 public research institutes and 12 private universities. STI awareness creation information was also solicited from 22 media houses.

A survey instrument adapted from the already tested standard R&D and the Innovation questionnaires of AU-NEPAD which was developed with guidelines from the Frascati Manual was used. Additional questions were included to solicit information on R&D and innovation activities within the Ghanaian context. The role of the media in communicating STI related information was also assessed with a different questionnaire.

The sampling frame included all Public and Private Higher Educational Institutions (Universities and Polytechnics), all Government institutions and organizations engaged in research activities and Private Universities offering STI related programmes. The sample was 38, consisting of 11 public universities, 10 technical universities and polytechnics, 5 public research institutes and 12 private universities. STI awareness creation information was also solicited from 22 media houses.

Conclusion

The student enrolment in the tertiary educational institutions illustrates the progress Ghana has made in sustaining human resource development as a key facilitator in national development. Total student enrolment in tertiary institutions had increased from 2013 to 2015, however, Science student enrolments have decreased over the same period with female Science enrolment being more discouraging. Gender disparities tertiary education translates into professions including academia. Addressing this problem will require gender strategies which begin from the human resource development stages.

Several technologies were developed and transferred to the private sector. The majority of the adopted technologies were to increase agricultural productivity. R&D institutions in the country need to develop technologies /innovations for the other sectors of the Ghanaian economy. The Future technologies/ innovations must focus on the energy sector where Ghana is facing severe crises. Possible alternative energies for further research include renewable energy, wind energy, solar energy and biogas. R&D institutions are collaborating with the private sector for technology transfer. R&D industry linkage however, must be strengthened to drive demand-driven research. Donor funding of research activities is taking a centre stage in R&D institutions. The government must provide funding for research to drive socio-economic development.

2.10 Programme Accompanying Research for Agricultural Innovation (PARI)

Principal Investigator	:	Dr. George O. Essegbey
Research Team	:	Dr. Richard Ampadu-Ameyaw & Dr. Rose Omari
Source of Funding	:	German International Development Cooperation (GIZ)
Duration	:	4years

Introduction

The Program Accompanying Research in Innovation (PARI) is collaborative research and development project between CSIR-STEPRI and Forum for Agriculture Research in Africa (FARA). It is supported financially by GIZ and represented by the Centre for Development Research (ZEF). It aims at carrying out a series of research and development activities on Agricultural Innovations and innovation platforms in the country as a way of feeding the global populace or investors about the possible areas of investing in the country. It looks at the gaps and possible recommendations from the perspectives of the stakeholders. The framework of research and development adopted in this project is based on the Integrated Agriculture, Research for Development (IAR4D), developed by the FARA.

Objectives

- Carrying out an inventory and documentation of existing and functional promising technologies/ innovation in the country.
- Scoping of existing agricultural innovation platforms in Ghana.
- Assessing the state of national investment on agricultural innovation systems.
- Case studies of selected rice innovation platforms in Ghana

Achievements

Several reports based on the above objectives have already been written and published. Information gathered has already been shared with the general public (home and abroad) at different workshops

and fora. Some policy briefs are yet to be developed and circulated for a wider readership. Since it is a four (4) year project some activities on the rice value chain in selected districts of the Volta Region are being carried out.

Conclusion

This project identified several serious gaps within the Rice Value Chain in the Volta Region of Ghana. In addition, it has helped identified important areas of investment within the agricultural technology and innovation system of Ghana. The policy briefs that will be coming out of these reports will serve as an important material of decision making tools on agricultural research and innovation development in the country.

2.11 CAPACITY DEVELOPMENT

As part of CSIR-STEPRI's mandate to develop and manage STI human resource, and as part of the Institute's strategic objective of building capacity of staff and society in relevant competencies, a number of capacity development workshops were organized as follows:

A. AuthorAID Workshop: Applying principles of risk communication in research communication

Funding Source: INASP/AuthorAID

Team members: Dr. Rose Omari, Mr. Emmanuel Tetteh, Dr. Albert Allotey (CSIR-INSTI)

Introduction

Risk communication is an essential part of the risk analysis process. However, most risk analysis capacity building efforts have been focused around risk assessment and risk management with little attention to risk communication that is important to inform policy decision making. Many research organizations continue to face challenges in establishing or enhancing risk communication capacity particularly in dealing with risk involving food and water for both human and animal consumption.

Researchers or risk assessors produce various findings that must be communicated to various audiences. However, in most cases, the tendency will be to publish such research findings only in academic journals giving the impression that researchers are concealing risk-related information from other stakeholders. Nowadays, due to the free flow of information via the traditional and social media, information spreads quickly even to unintended audiences. This can create mistrust and loss of credibility in the researchers and can cause fear and panic among stakeholders.

To help enhance researchers' capacity to effectively communicate risk-related information to relevant stakeholders, a two-day training workshop was being organized on the topic "Applying Principles of Risk Communication in Research Communication".

Purpose and objectives

This workshop was meant to promote awareness and understanding about risk communication process as it relates to food, water, environment and health sectors and emphasise the role of researchers in strengthening the risk analysis process. The objectives of the workshop were as follows:

- To increase understanding on what is risk communication and why it is so important to establish risk communication capacity in research institutions
- To share knowledge and experience on good risk communication principles and practices, and key considerations for contextual adaptations
- To provide practical approaches and tools for developing/enhancing risk communication capacity particularly in food, water and environment sectors as well as in health promotion.

Application of knowledge and skills acquired from this workshop will facilitate dialogue and understanding among all interested stakeholders, and improve the overall effectiveness of the risk analysis process in research and academic institutions.

Approach and activities

In the space of two days, the workshop covered presentations and discussions in five main areas as follows:

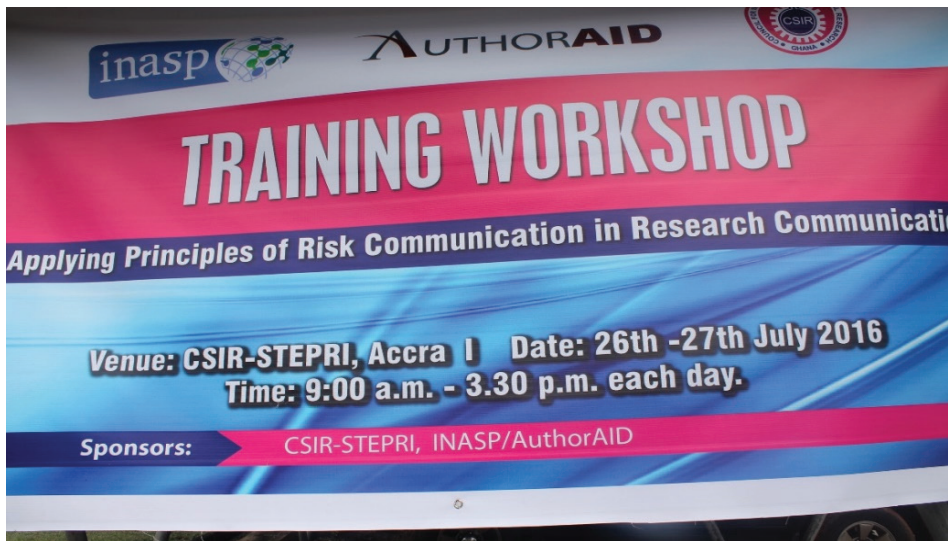
- Introducing risk analysis framework
- Introducing risk communication
- Principles of good risk communication
- Key factors to consider before communicating about risks
- Good practices of risk

The training materials featured real-life case studies from Ghana, Africa and other regions to illustrate principles and practices of effective risk communication as well as group exercises and role plays.

In total, the workshop was attended by 31 participants made up of 11 women and 20 men from different organization including the Secretariat of the Council for Scientific and Industrial Research (CSIR), CSIR-Animal Research Institute, CSIR-Institute of Scientific and Technological Information, CSIR-Science and Technology Policy Research Institute, CSIR-Water Research Institute, CSIR-Food Research Institute, and CSIR-Institute of Industrial Research. Other organizations were Food and Drug Authority, University of Ghana (Dept. Material Science & Engineering), Kwame Nkrumah University of Science and Technology (Dept. of chemistry), Ghana Atomic Energy Commission, Ghana Young Academy, and Ghana News Agency. The gender imbalance is largely due to the nature of the field of scientific and technological research in Ghana, which is largely male-dominated. The workshop was facilitated by Dr. Rose Omari (CSIR-STEPRI), Dr. Albert Allotey (CSIR-INSTI) and Mr. Emmanuel Tetteh (CSIR-STEPRI) with support from Jeff Cobbah (CSIR- STEPRI), Isaac Sowah (Intern), Marcia Bekoe (Intern) and other administrative staff.

The workshop was generally rated as useful. The table below shows a summary of online evaluation conducted by AuthorAID after the workshop:

Statement	Rating	% of participants
I had enough time to understand the new information	Completely agree	75%
The workshop was well organized	Completely agree	90%
The materials were useful	Completely agree	90%
The pre- and post-workshop tasks were clear	Completely agree	90%
There were many opportunities for practical work	Completely agree	75%
The workshop was tailored for my learning needs	Completely agree	80%
The facilitator(s) fostered a constructive and participative atmosphere	Completely agree	95%
The facilitator(s) formulated learning objectives for each session	Completely agree	85%
The facilitator(s) gave constructive feedback to participants	Completely agree	85%
The facilitator(s) ensured that everybody was able to understand the most important contents	Completely agree	75%



Group photograph at the training workshop



Presentation of certificates to participants at the workshop

B). Training workshop on current and emerging food safety issues

Funding Source: DFID under the DRUSSA Policy Fellowship Programme

Team members: Dr. Rose Omari

Introduction

Food safety is a major public health concern in Ghana and the world at large. In Ghana, the Women in Agricultural Development (WIAD) Directorate of Ministry of Food and Agriculture is mandated to empower farmers, processors and enterprises to produce safe and quality food products. To enhance their capacity, a two-day training workshop was organized by Dr. Rose Omari for WIAD staff on 16th and 17th March, 2016. The training was part of Dr. Omari's DRUSSA Fellowship's commitment to encourage the Ministry to use evidence-based data in policy formulation and programme implementation.

Purpose of training

The two-day training was meant to enable participants to understand the various hazards that compromise food safety, sources of the hazards, their health and economic effects and how they can be controlled along the food chain.

The two-day participatory training was attended by 15 WIAD staff from the Head office, Greater Accra Regional Office and LEKMA office. Topics covered include:

- Understanding food safety and its importance
- Food safety situation in Ghana: Evidence from EU Rapid Alert System for Food and Feed, Foodborne diseases outbreak, USDA Important Refusal Report and other studies conducted in Ghana
- Current and emerging food safety issues from the global perspective
- Maintaining food safety: International standards, guidelines, regulations & Codes of practices (GAP, GMP, GHP, GSP, HACCP)
- Key considerations in food safety risk communication
- Principles of food safety risk communication



Some participants at the food safety training workshop

2.12 Retreat at City Escape Hotel, Prampram

CSIR-STEPRI organized a one-day end of year retreat to take stock of the past year activities and strategies for the ensuing year and the future at large. It was the third consecutive retreat and the theme was dubbed "STEPRI 2017 and Beyond". The retreat was attended by the Board Chairman, Director, Deputy Director, a Facilitator, the Heads of Divisions and Researchers.

Participants attended the programme with high expectations including building team work, scouting for more projects, develop strategies for commercialization, visibility of the Institute and reflection on 2016 activities, which would serve as a lunch pad into 2017 and beyond and goal setting for better performance. Participants were made to identify gaps of the institute through SWOT analysis so those gaps could be mitigated and filled.

Presentations were made by the director, the deputy director, the board chairman and some research staff on some projects and the way forward. The director of STEPRI entreated all to stick to the core values of the institute (Teamwork, Hard work and Excellence) which has always defined the success of the institute.

Out of a total number of thirteen (13) Expectations made at the retreat, eight (8) were achieved, three (3) were attempted and two (2) were not achieved. This implied that 61.54% of the institute's expectations were achieved.



Participants at the 2016 Retreat at the City Escape Hotel at Prampram

3.0 Finance

3.1 Introduction

This report covers the financial transactions of CSIR-STEPRI for the period January to December 2016. The three main sources of income are from:

- Government subvention,
- Donor funded projects
- Internally generated funds.

3.2 Government subvention

Table 1 below presents the summary of budgetary releases for the 2015 and 2016 fiscal years on the various budget lines and estimates for 2017 fiscal year.

Table 1: Government Subvention – Budget and Receipts

Budget Line	2015		2016		2017
	Budget GH¢	Release GH¢	Budget GH¢	Release GH¢	Budget GH¢
Compensation for employees	1,667,473.00	1,644,148.81	2,175,563.76	1,926,565.23	2,243,117.86
Goods and Services	550,000.00	39,014.98	863,920	22,242.34	645,660.00
Assets	330,650.00	-	402,500	-	468,000.00
TOTAL	2,548,123.00	1,683,163.79	3,440,783.76	1,948,807.57	3,356,777.86

Compensation for Employees:

Out of the total subvention of One million Nine Hundred and Forty Eight thousand Eight hundred and Seven Ghana cedis, Fifty Seven Ghana pesewas (GH¢1,948,807.579) released, salaries represent 98.86% while Goods and Services accounted for 1.14%. As compared to the 2015 subvention released, this was an increase of 17%. This was due to salary arrears resulting from promotions and salary adjustments in 2016.

Goods and Services

There was no release of funds for 2016 budget submitted. As a result electricity bill accumulated to date is GH¢117,000.00 The institute is doing its best to pay off through the IGF .Government has however directed CSIR to submit all outstanding bills as at December 2013 to Ministry of Finance for payment to Electricity Company of Ghana. As a result a total of GHS¢43,000.00 outstanding bill was submitted.

Assets

There was no release of funds for the purchase of assets. This has been the case since 2010. The Institute through its projects and internally generated funds however managed and acquired assets at a total cost of GH¢167,197.75 as follows:

• Furniture, Fixtures and Fittings	-	55,764.91
• Office Equipment and Accessories	-	111,432.84
Total		167,197.75

3.3 Donor Funded Projects

Table 2: Donor funds inflow for the year 2016.

Project Name	Funding Source	Income USD\$ 2015	Income (GHS)
TV WHITE SPACE	MICROSOFT	11,478.00	
DRUSSA	ACU/DFID	260,804.65	
DILIC	UNIV.OF OXFORD	28,372.85	
PARI	FARA	43,520.00	
AUTHORAID	INASP	2,490.00	
ASTI	IFPRI	4,990.00	
CAASTNET PLUS WORKSHOP	CAASTNET PLUS	32,790.91	
INNOVATION CONFERENCE	VARIOUS	29,075.00	
MNEMERGE	EUROPEAN UNION	36,728.84	
FARA CONSULTANCY	FARA		5,985.00
GREEN ECONOMY I	GIZ		181,965.00
GREEN ECONOMY II	EPA		106,960.00
GENDER USAID	USAID/CHEMONICS		56,317.80
CSIR-TDTC	COTVET/WORLD BANK		878,801.75
GRAND TOTAL		675,521.41	1,230,029.55

Total funds received from foreign donors for project activities in 2016 was US\$675,521.41 as compared to US\$516,810.22 in 2015, representing an increase of 30.7%. The increase in fund inflow was due to the last tranche of funds from projects that ended in December 2016.

3.4 Internally Generated Fund

CSIR-STEPRI's internally generated funds are derived from sales of publications, hiring of auditorium, support from donor funded projects etc.

Table 3: The table below presents the internally generated funds results for the year 2016.

Table 3: Internally Generated Funds

Items	2016 AMOUNT (GHC)	2015 AMOUNT (GHC)
Hiring of Auditorium facilities	47,285.00	52,926.00
Hiring of Projector	1,930.00	2,620.00
Sale of Publication	16,855.00	3,805.00
Support from project	237,756.10	60,967.27
Miscellaneous (Car Rentals, photocopies etc)	1,568.00	
Consultancy Services	30,348.00	
Total	335,742.10	120,318.27
Total Expenditure	33,985.64	32,582.02
NET IGF	301,756.46	87,736.25

The Net Internally Generated Fund (IGF) for 2016 was GHS 301,756.46 which represents an increase of 243.94% over 2015 IGF. The increase in the IGF is mainly due to a significant increase in the Projects institutional support, and sale of publications. Fifteen percent (15%) of the net IGF was paid to Corporate CSIR and the 85% retained.

CONCLUSION

The Institute performed well in the year 2016 especially in the area of internally generated funds and support from projects and we hope to improve upon this in 2017.

4.0 Administration

4.1 Management

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

4.2 Staff Strength

The staff strength of the institute as at December 31, 2016 stood at 52. The details for the year under review were as follows:

Research Staff Category

Research Scientist	-	16
Non-Core Research Staff	-	3

Non Research Staff Category

Senior Staff	-	24
Junior Staff	-	9

4.3 Internship and National Service

As part of the Institute's corporate social responsibility, it has over the years 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 applied as interns. For the reporting period, the Institute had 13 interns and 16 service personnel from various tertiary institutions in the country respectively. Tables 1 and 2 below shows the details of internship and national service personnel posted to the Institute.

Table 1: Internship Personnel

No.	NAME	QUALIFICATION	INSTITUTION
1.	Anderson K. Ahwireng		
2.	Sebastian Cudjoe	BSc Information Technology Management	University of Professional Studies
3.	Doris Marfo	BSc Administration (Accounting)	University of Ghana
4.	Isaac N. A. Sowah	Bachelor of Business Administration	University of Professional Studies
5.	Ms. Marcia Bekoe	BSc. Human Resource Management	GIMPA
6.	Jeffrey Arhin	Bachelor of Business Administration	University of Professional Studies
7.	Akosua Obeng Bekoe	BSc Human Resource Management	Central University College
8.	Isaac Tetteh	Bachelor of Business Administration	University of Professional Studies
9.	Elizabeth Basoah	BA Social Science (Geography & Economics)	University of Cape Coast
10.	Ms. Celine Dery	BA Social Sciences (Economics)	University of Cape Coast
11.	Abadalla Mahama	BA (Economics and Mathematics)	University of Ghana
12.	Rosemond Tiwaa Afum	BA (Political Science and Information Studies)	University of Ghana
13.	Georgina Kufuor Koranteng	BSc (Agricultural Science)	University of Ghana
14.	Mary Owusu		

Table 2: National Service Personnel

No.	NAME	AREA OF SPECIALISATION	INSTITUTION
1.	Rozabel Asumadu	BA Economics/Geography & Resources Development	University of Ghana
2.	Justice K. Agbanyo	BA Economics	University of Ghana
3.	Wilson K. Awuah	BA Social Work & Sociology	University of Ghana
4.	Christolight O. Denkyi	BSc Psychology	University of Cape Coast
5.	Leticia E. Blewusi	BA Adult Education & Sociology	University of Ghana
6.	Richard Tetteh	BA Economics/Geography & Resources Development	University of Ghana
7.	Enoch Tetteh	BSc Mathematics	Kwame Nkrumah Univ. of Science & Technology
8.	Samuel E. Wedzi	BSc Mathematics	Kwame Nkrumah Univ. of Science & Technology
9.	Francis Neequaye	BA Information Studies & Political Science	University of Ghana
10.	Rosemary Baidoo	BA Geography & Resource Development/ Psychology	University of Ghana
11.	Johnny A. Okyere	HND Statistics	Accra Polytechnic
12.	Nana Ama Appah	BSc Psychology	University of Cape Coast
13.	Odame K. Osei	BA Geography/Resource Development & History	University of Ghana
14.	Syram Ahiabor	Post Dip. BSc Mathematics Education	University of Education
15.	Mavis Pappoe	HND Secretaryship/Management Studies	Accra Polytechnic
16.	Daniel A. Kwarteng	Advance Dip. Graphics & Website Designing	IPMC

4.4 Transfers

During the year under review, Dr. Adelaide Agyemang a Senior Research Scientist was transferred from CSIR-Crop Research Institute to CSIR-Science and Technology Policy Research Institute.

4.5 New Appointments

The institute employed three (3) persons, a Research Scientist and two (2) Senior Technologists.

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 five (5) of the institute's staff are on study leave pursuing PhD programmes at various universities within and outside the country. They are:

- | | | |
|-------------------------------|---|---|
| 1. Mr. Gordon Akon Yamga | - | University of North Texas, USA |
| 2. Mr. E. K. Tetteh | - | University of Cape Coast |
| 3. Mrs. Justina Onumah | - | ISSER-University of Ghana/ University of Bonn,
Germany |
| 4. Mavis Akuffobe | - | University of Ghana |
| 5. Mrs. Portia Adade Williams | - | University of Cape Town, South Africa |

4.7 Promotions

The under-listed staff were promoted in 2016:

1. Mr. Emmanuel K. Tetteh from Research Scientist to Senior Research Scientist
2. Ms. Gloria Boakye from Principal Administrative Assistant to Chief Administrative Assistant
3. Ms. Christian Agyeiwaa from Principal Administrative Assistant to Chief Administrative Assistant
4. Mr. Robert A. Atawosu from Traffic Supervisor to Assistant Transport Officer
5. Mr. Richmond Gasu from Driver Gd.I to Driver Inspector
6. Mr. Adorta Abanya from Security Assistant Gd.II to Security Assistant Gd.I
7. Mr. Robert O. Mensah from Security Assistant Gd.II to Security Assistant Gd.I

4.8 Compulsory Retirement

Mr. William Boadi, B.A (Hons) Graphic Design, Master of Arts (African Art), Senior Scientific Information Officer.

4.9 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. Asare, R. and Essegbey, G.O. (2016). Funding of agricultural research and development in Ghana: The Case of Council for Scientific and Industrial Research (CSIR). *Technology and Investment*, 7, 40-50. <http://dx.doi.org/10.4236/ti.2016.72006>
2. Omari R., Jongerden, J.P., Essegbey, G., Frempong, G., Ruivenkamp, G.T.P. (2016) The Role of Convenience in Fast Food Consumption in Urban Ghana. *Journal of Scientific Research & Reports* 11(4): 1-12
3. Osei-Amponsah, C., Sakyi-Dawson, O., Adjei-Nsiah, S., Adu-Acheampong, R., Essegbey, G. and Quarmin, W. (2016). Embedding research for innovation to meet societal needs in national research systems: experiences from Ghana. *Cahiers Agricultures* 2016-25, 65004. DOI:10.1051/cagri/2016047
4. Osei-Amponsah, C. and Leontine Visser (2016). Does actor perspective matter? A case study of designing intervention for small-scale palm oil production enterprises in Kwabebirem district of Ghana. *Sociology and Anthropology of Development Group, Wageningen University and Research Centre. Rural Sociology* 81(2), 2016, pp. 224–248
5. Tetteh E.K., Frempong G., Obirih-Opareh N., Omari R. (2016). Does microcredit create employment for the poor? The case of the Microcredit Scheme of Upper Manya Krobo Rural Bank. *Business & Economics Journal*, 7: 190. doi:10.4172/2151-219.1000190
6. Omari R. and Frempong G. (2016). Food safety concerns of fast food consumers in urban Ghana. *Appetite* 98 (2016) 49-54.
7. Asare, R., Sakyi, P. A., Fynn, O. F. & Osiakwan, G. M (2016). Assessment of Groundwater quality and its suitability for domestic and agricultural purposes in parts of the Central Region, Ghana. *West African Journal of Applied Ecology*, 24, 67-89.
8. Williams, P.A., Akuffo-bea, M., Onumah, J.A. and Essegbey, G.O. (2016), "Meeting productive capacity of agro-processors in Ghana: What are the drivers?" *International Journal of Development and Sustainability*, Vol. 5 No. 10, pp. 495-507.

Book Chapters

1. Essegbey, G.O. and Stephen Awuni (2016) "Chapter 5: Herbal Medicine in the Informal Sector of Ghana", in Erika Kraemer-Mbula and Sacha Wunsh-Vincent (Eds.) *The Informal Economy in Developing Nations – The Hidden Engine of Innovation?* Cambridge University Press, pp. 194 – 227.
2. Quaye, W., Ruivenkamp, G., Essegbey, G., Onumah, J.A. and Jongerden, J. (2016): Approaches to Promote the Inclusion of Smallholder Farmers as Suppliers of Large-Scale Institutional Food Purchase Programmes: A Case of the Ghana School Feeding Programme (GSFP) in Da Silva, C., Mpagalile, J., van Rooyen, J. & Rizzo, C. (Eds) "Enabling more inclusive and efficient food and agricultural systems in Africa" Rome, Italy, pp. 3-13. (ISBN 978-92-5-109498-3)
3. Sarpong-Anane, Afua B.(2014)."Globalization and indigenous conflict management: Experiences from Africa", in *Indigenous conflict management strategies*. Lexington Books, Plymouth,UK. (ISBN:9780739188040, 0739188046). pp. 75-83

Technical Reports

1. Quaye, W., Awuni, S., Abubakari M., Addo-Yobo., F and Rockson, G. (2016). Baseline Survey Report for 'Operationalizing Green Economy Transition in Africa: Status of Green Economy Initiatives in Tolon District, Tema and Kumasi Metropolitan Assemblies-Ghana. GIZ/UNEP Green Economy Transition Project Report, June 2016. 85pages
2. Ampadu-Ameyaw, R., Omari R., Essegbey G.O., and Dery, S. (2016). Status of Agricultural Innovations, Innovation Platforms, and Innovations Investment. 2015 PARI project country report: Republic of Ghana. Forum for Agricultural Research in Africa (FARA), Accra Ghana. 177pages. http://research4agrinnovation.org/wp-content/uploads/2017/01/Ghana_InnovationStudy.pdf
3. Onumah, J.A, Quaye, W., Ampadu-Ameyaw, R and G.O Essegbey (2016) Competition and Foreign Direct Investment in Ghana-Implications for Responsible Business'. Proceedings from Policy Symposium organised in Collaboration with Ministry of Trade and Industry (MOTI) at CSIR-STEPRI Conference Room,Accra. 28pages.
4. Ampadu-Ameyaw R, Quaye W, Onumah J.A and G O Essegbey (2016) 'Policy Implementation in Ghana: A Case of the Science, Technology and Innovation Development Programme (STIDEP) and Options for Enhancement'. Proceedings from Policy Symposium organised in Collaboration with Ministry of Environment Science, Technology and Innovation (MESTI) at CSIR-STEPRI Conference Room, Accra. 28pages.
5. Quaye W, Onumah J.A, Ampadu-Ameyaw R, and G O Essegbey (2016). "Chemical Adulteration and its Impact on Vegetable Production and Marketing in Ghana". Proceedings from Policy Symposium organised in Collaboration with Ministry of Food and Agriculture (MoFA) at CLOSSAG Conference Room in Accra. 25pages.
6. Essegbey, G.O, Ampadu-Ameyaw, R., Omari and W. Quaye (2016). Strengthening Agricultural Policy Practice in Africa (SAPPA), Ghana Consolidated Report prepared for Barefoot Education for Afrika Trust (BEAT). 166pages.
7. Sarpong-Anane, Afua B. and Essegbey, G.O (2016) Report on official visit to South Africa: Towards improving bilateral relations by the council for scientific and industrial research of Ghana with the council for scientific and industrial research of South Africa.
8. Quaye, W., Decker, E., Onumah, J.A and Asabo, R. (2016). CSIR- Technology Development and Transfer Centre 3rd Quarterly Report. 46pages.
9. Tetteh, E. K (2016) Monitoring and Evaluation Report of 17 CSIR-Technology Development and Transfer Centre Funded projects. 45pages.
- 10.Tetteh, E. K (2016) Productivity Analysis Report of 11 CSIR-Technology Development and Transfer Centre Funded projects. 35pages.
- 11.CSIR-STEPRI (2016). Business Plan for the Commercial Cultivation of Oil Palm Mushroom, Accra. 28 Pages.
- 12.CSIR-STEPRI (2016). Business Plan for the Promotion of Innovative Rainwater Harvesting Technology, Accra. 26 Pages.

13. CSIR-STEPRI (2016). Business Plan for the Promotion of the Mechanized Palm Nuts Cracker and Kernel-Shell Separator (MPCKSS) Technology, Accra. 28 Pages.

14. CSIR-STEPRI (2016). Business Plan for the Promotion of High Rate Low Temperature (HRLT) Extraction Plant, Accra. 31pages.

15. CSIR-STEPRI (2016) Business Plan for the Promotion of Commercial Distribution/Marketing of Pozzomix Cement. 25pages.

APPENDIX 11: Workshops, Seminars, Conferences and Mass Media

Dr. George Owusu Essegbey participated in the following:

1. Annual Review and Planning Meeting of the CCAFS Flagship 2 and Flagship 4 programs of ICRISAT held in Bamako from 1st - 4th February, 2016.
2. European Workshop on "Research Evaluation & Assessing Research Quality - Indicators* Impact* Integrity" on CSIR-TDTC Project implementation held at the European Academy for Taxes, Economics & Law in Berlin/Germany from 3rd - 4th March 2016.
3. Stakeholder Forum in Association with the Africa-EU High Level Policy Dialogue on Science, Technology and Innovation in Addis Ababa, Ethiopia from 5th – 6th April 2016.
4. Third Senior Officials Meeting of the EU-Africa High Level Policy Dialogue on STI held in Addis Ababa, Ethiopia from 13th – 14th April, 2016.
5. As Ghana's senior representative in a planning meeting of the project work package Leaders. CAAST-Net Plus Project at Brussels, Belgium from 18th - 20th May, 2016.
6. Annual Meeting of Boards of Governors of the African Development Bank Group held in Lusaka, Zambia from 23rd - 27 May, 2016.
7. Final Partner Review Meeting of the Development Research Uptake Programme in the United Kingdom from 7th – 8th July, 2016.
8. A Consortium Implementing CAAST-Net Plus Project Workshop in Kigali from 28th – 30th July, 2016.
9. ATPS Forum in Nairobi from 28th – 30th July, 2016
10. Conference of the Academy of Management (AOM) on "MNEs' Corporate Social Responsibility as Complementary to National Development" in Anaheim, California from 4th – 10th August.
11. 14th GLOBELICS International Conference 2016 held in Bandung, Indonesia from 12th – 14th October, 2016.
12. Annual General Meeting of CAAST-Net Plus in Athens from 19th to 21st October, 2016
13. Panel discussion at the AERC Conference on "Economic Opportunities for a better future Leveraging Agriculture, Innovation and Financial inclusion" in Nairobi, Kenya from 28th - 29th October, 2016.
14. Meeting on MNEmerge Project in Vienna, Austria from 23rd – 26th November. 2016
15. Workshop on MNEmerge in Vienna Austria from 2nd – 5th December, 2016
16. Panel Discussion in connection with launching of the book "The Informal Economy in Developing Nations: Hidden Engine of Innovation in Pretoria from 7 – 10 December, 2016.

Mrs. Mavis Akuffobe participated in the following:

1. 13th – 15th July 2016- Scenario-guided multi-level policy revision of the Ghana Livestock Policy Workshop held at Forest Hotel, Accra – Ghana.
2. 20th – 24th June 2016- Regional Training Course on Forest Certification for West and Central Africa held at Erata Hotel, Accra - Ghana.
3. 16th – 17th May 2016- Sustainable Agricultural Intensification Research and Learning in Africa Stakeholders Workshop held at CSIR-STEPRI, Accra-Ghana.
4. 1st – 4th February 2016- Co-organized Enumerators’ Training Workshop held at STIPRO - Dares Salaam-Tanzania. Organized and facilitated in the Enumerators’ Training Workshop for the MNEs and Innovation in Tanzania Survey.
5. 15th – 16th February 2016- CIRCLE Female Proposal Writing Workshop for the CIRCLE programme held at the African Academy of Sciences in Nairobi, Kenya.

Mrs. Portia A. Williams participated in the following:

1. 27th-28th September, 2016: Participated and presented at the Innovation Conference 2016 - Ghana held at La Palm Royal Beach Hotel, Accra-Ghana.
2. 22nd-25th August, 2016: Participated and presented at the 7th Ibadan Sustainable Development Summit at University of Ibadan, Ibadan-Nigeria.
3. 2nd - 5th August, 2016: Participated in ecological statistical analysis training on “Introduction to Statistical Modelling - A Data Based Approach” at Namibia University of Science and Technology, Windhoek-Namibia
4. 26th-27th July, 2016: Training workshop in “Applying principles of risk communication in research communication”. Held at CSIR-STEPRI, Accra, Ghana by AuthorAID and CSIR-STEPRI.
5. 11th -12th July, 2016: Training Workshop on Technology Marketing and Intellectual Property. Held at CSIR-STEPRI, Accra. Ghana by CSIR-TDTC.
6. 27th June – 1st July, 2016: Participated in a training workshop on “Using Climate Information for Adaptation and Policy Development” by Climate Systems Analysis Group (CSAG), Environmental and Geographical Sciences Department, University of Cape Town - South Africa
7. 4th -18th June, 2016: Participated in Brown International Advanced Research Institutes (BIARI) “Climate Change and Its Impacts: Connecting Local Variability and Knowledge in a Global System” at Watson Institute of International and Public Affairs, Brown University Providence, Rhode Island – USA
8. 21st to 23rd May, 2016: Participated in a retreat on writing by the Research Office of the University of Cape Town at Stellenbosch, South Africa.

9. 10th to 12th February, 2016: Participated in the induction workshop for Climate Impact Research Capacity and Leadership Enhancement (CIRCLE) Programme at African Academy of Sciences (AAS) Headquarters, in Nairobi- Kenya.

Dr Wilhelmina Quaye Participated in the following:

1. 21st – 22nd April 2016- International Seminar on Managing Intellectual Property and Access to Research Results; organised by European Academy of Sciences, Berlin
2. 9th September 2016- Training workshop for Women in STI 5, Kuala Lumpur, Malaysia

Mr Stephen Awuni participated the following:

1. 6th – 26th September 2016- Attended the third seminar on climate change and Green Low-Carbon Development sponsored by the Department of Climate Change, National Development and Reform Commission, organized by Academy of Macroeconomic Research of China.
2. 11th – 12th July 2016- Participated in Training workshop on Technology Marketing and Intellectual Property organized by CSIR-Technology Development and Transfer Centre (TDTC) at CSIR-STEPRI.

Mrs Justina A. Onumah participated in the following workshops:

1. 27th-28th Sept. 2016. Innovation Conference Ghana (IC Ghana, 2016), Accra, Ghana
2. 30th August - 2nd September, 2016. European Union (EU)-Africa Union (AU)-International Institute of Advanced System Analysis (IIASA) Evidence and Policy Event, Ispra, Italy
3. 11th -15th July, 2016 American Association for the Advancement of Science-The World Academy of Sciences (AAAS-TWAS) Course on Science and Diplomacy, Trieste, Italy
4. Policy Symposium on “Chemical Adulteration and Its Impact on Vegetable Production and Marketing” organized by CSIR-STEPRI and MOFA at the CLOSSAG CONFERENCE ROOM, Ministries, Accra, on 22nd March, 2016
5. Policy Symposium on the theme, “Competition and Foreign Direct Investment in Ghana-Implications for Responsible Business” organised by CSIR-STEPRI and MOTI on 29th March, 2016 at the CSIR-STEPRI auditorium, Accra
6. Policy Symposium on the theme, “Policy Implementation in Ghana: A Case of the Science, Technology and Innovation Development Programme (STIDEP) and Options for Enhancement”, organised by the CSIR-STEPRI and MESTI on 31stth May, 2016 CSIR-STEPRI Auditorium, Accra
7. Business Seminar organized by CSIR-STEPRI on the theme, “Improving Research-Private Sector Linkages in Ghana: The Business Perspectives” on 5th May, 2016 at the CSIR-BRRI Training Centre, Kumasi
8. Training workshop on Technology Marketing and Intellectual Property (IP) organised by CSIR-STEPRI on 11th – 12th July 2016 At The CSIR-STEPRI Auditorium, Accra

Dr. Godfred Frempong participated in the following:

Workshop on MNEmerge in Vienna Austria from 2nd – 5th December, 2016

Mr. Roland Asare participated in the following:

1. 20th – 21st - ASTI Technical Review Workshop: Held at Laico Lake Victoria Hotel, Entebbe, Uganda. Organised by IFPRI
2. 2nd-3rd November, 2016- Economic valuation of Ecosystem services training workshop: Held at CSIR-STEPRI, Accra, Ghana. Organised by WISE-UP to Climate project-Volta Basin (CSIR-WRI) and Basque Centre for Climate Change.
3. 26th -28th September, 2016- Innovation conference Ghana 2016: Held at La Palm Royal Beach Hotel, Accra, Ghana.
4. Training workshop in “Applying principles of risk communication in research communication”. Held at CSIR-STEPRI, Accra, Ghana. 26th-27th July, 2016. Organised by AuthorAID and CSIR-STEPRI.
5. Access to Global Online Research in Agriculture (AGORA) training workshop. Held at University of Ghana Accra, Ghana. 12th 13th July 2016. Organised by Information Training and Outreach Centre for Africa (ITOCA).
6. Training Workshop on Technology Marketing and Intellectual Property. Held at CSIR-STEPRI, Accra. Ghana. 11th -12th July, 2016. Organised by CSIR-TDTC.

Mr. Emmanuel Kodjo Tetteh participated in the following:

1. 1st – 2nd March 2016- TEEAL and AGORA Local Workshop at CSIR-INSTI, Accra.
2. 18th April 2016- Improving Research-Private Sector Linkages in Ghana. The Business Perspectives at CSIR-STEPRI, Accra.
3. 22nd June 2016- Enhancing Sustainable Development and Economic Growth through Research and Industry Partnership at CSIR-STEPRI, Accra.
4. 30th Nov – 2nd Dec 2016- Regional Meeting of Directors General of Scientific Research and Innovation to validate the 2015 Report on “ECOWAS Bibliometric Outlook” at Abidjan (Republic of Cote d’Ivoire).

Dr. Charity Amponsah participated in the following:

1. 17th to 18th November 2016- Attended and gave a presentation (as Ghana’s representative) at the Regional Workshop on Promoting Science and Technology Parks in the Region, organised by UNESCO-Abidjan office, at Les Residences Niable, Abidjan-Cote d’Ivoire
2. 27th to 28th September, 2016-Attended the Innovation Conference (IC Ghana 2016) and presented a paper on Institutional entrepreneurship for innovations in agricultural value chains: What more for project-based partnerships?, under the sub-theme, ‘the nexus of innovation and entrepreneurship, organised by CSIR-STEPRI, at La Palm Royal Beach Hotel, Accra-Ghana

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

1. Advocacy & Communication: Critical Requirements for Mitigating the Aflatoxin Challenge in Africa. A presentation at the 2nd PACA Platform Meeting, October 11 – 13, 2016, Entebbe, Uganda.
2. Ojijo, NKO, Mbabu, A., Mulongo G., Munyua H., Maru J., Omari R., Tagwireyi J. (2016). Perspectives on regional advocacy for taking biofortified crops to scale in Africa. A poster presented at the 7th African Nutrition Epidemiology Conference (ANEC VII), Marrakech, Morocco, October 2016
3. Influencing evidence-based policy and practice through process innovation: Experiences and lessons from DRUSSA Policy Fellowship Programme. A Presentation at the 2016 Innovation Conference, La Palm Royal Beach Hotel, Accra, Ghana, 27th -28th Sept, 2016.
4. Combating micronutrient deficiency through nutrition-sensitive agriculture: Implications for food and agricultural policy. A presentation at SAKSS Policy Dialogue, held in Accra, 11th August 2016.

Masuhudu Fuseini participated in the following:

1. 27th – 28th - September 2016- A Two-day International Innovation Conference 2016 on the theme: Development Innovation: Putting the Pieces Together at the La Palm Royal Beach Hotel, Accra, Ghana. Organizers include the Science and Technology Policy Research Institute of the Council for Scientific and Industrial Research (CSIR-STEPRI) in collaboration with CAAST-Net Plus, GlobeLics, AfricaLics, and other partners
2. 9th – 10th November 2016 - Two-Day Horizon 2020 Information Session in Lagos, Nigeria. Organized by the European Union Nigeria Office as part of the 2016 Business Summit

Dr. Richard Ampadu-Ameyaw participated in the following:

1. Planning Meeting of Ghana Soil Health Consortium in Kumasi from 18th – 19th January, 2016
2. Africa Rice Science week organized by AfricaRice held in Benin from 1st – 5th February, 2016
3. Lessons Learned Workshop organized by Ghana Soil Health Consortium held in Kumasi from 13th -14th February, 2016
4. Strategic Analysis and Knowledge System Capacity Building in Aburi on the 21st February 2016
5. Ghana Soil Health Consortium held in Kumasi from 25th -25th April 2016
6. Open Forum for Agriculture Biotechnology Annul Review and Planning Meeting organized by OFAB, held in Ethiopia from 8th -9th June 2016
7. Africa Agriculture Science Week ab FARA General Assembly organized by FARA, in Rwanda from 13th - 16th June, 2016
8. Final conference of the Research Project 'FoodSecure' (EC –FP7) organized by Center for Development Research (ZEF) held in Bonn from 11th- 12th October, 2016

9. Meeting of Coordination of Ghana Soil Health Consortium by GSHC in Kumasi from 24th – 27th October, 2016

10. CIRCLE Institute of Strategic Program: Closing Session for The African Academy of Science at Association of Commonwealth University from 1st – 3rd December, 2016

11. Annual Meeting of Program Accompanying Research Innovation organized by FARA from 8th-9th December 2016

AWARDS AND FELLOWSHIPS

Policy Briefs

1. Nienke Beitema, George Essegbey and Roland Asare (2016) "Agricultural R&D Indicators Factsheet Ghana" IFPRI, Washington. 4pages. Available online at www.asti.cgiar.org/ghana

2. Yeboah, E, Ampadu-Ameyaw, R, and Ansah-Amprofi F (2016) 'Prioritizing Integrated Soil Fertility Management for Increased Agricultural Productivity in Ghana'

Mass Media

1. Osei-Amponsah, C. (2016) Creating agricultural partnerships for efficient value chains: a task for all, The Daily Graphic, 29th February 2016, page 39



CSIR-STEPRI discussing the issue of chemical adulteration and its impact on vegetable production on VIASAT 1 TV morning show ahead of a policy symposium organised to sensitize the public on the issue.

APPENDIX III: List of Staff Members of CSIR-STEPRI

Directorate

Senior Members

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)

Senior Members

1. Mr. Emmanuel K. Tetteh, HND (Stats), B.Ed. (Pop. Studies), M.A (Demography) PhD Candidate, Senior Research Scientist/Head of CID
2. Mr. Masahudu Fuseini, B.A (Sociology), M.Sc. (Social Research), Research Scientist
3. Mr. Jeffet Ekow Cobbah, Bachelor of Fine Arts (Extension Communication/Theatre for Dev.), Master of Fine Arts (Extension Communication/Theatre for Dev.), Marketing Officer

Agriculture, Medicine and Environment Division (AMED)

Senior Members

1. Dr. Richard Ampadu-Ameyaw, BSc. (Agric. Econs), M.Sc. (Agric. Econs.), PhD (Development Studies), Senior Research Scientist/Head of AMED
2. Dr. (Mrs.) Charity Osei-Amponsah, BSc. (Agric.), MPhil. (Agric. Econs.), PhD. (Agric.), Research Scientist
3. Mr. Gordon Akon-Yamga, B.A. (Geography), MPhil. (Env. Sci), Research Scientist
4. Mr. Paul Boadu, B.A. (Hons) Economics, MPhil (Econs.), PhD Candidate, Research Scientist
5. Mr. Stephen Awuni, BSc. (Hons) Zoology, M.Phil. (Env. Sci), Research Scientist
6. Mrs. Justina A. Onumah, BSc. Agricultural Technology (Econs & Extension), MPhil (Agric. Econs), Research Scientist

Industry and Services Division (I&SD)

Senior Members

1. Dr. (Mrs.) Wilhemina Quaye, BSc. Agric. Econs, Mphil (Agric Econs), PhD (Rural Sociology), Principal Research Scientist/Head of ISD
2. Dr. (Mrs.) Adelaide Agyeman, BSc. (Computer Science), MSc. (Mathematics), PhD. (Statistics), Senior Research Scientist
3. Dr. (Mrs.) Rose Omari, B.Sc (Biochemistry & Food Science), M. Phil. (Food Science), PhD (Food Policy), Senior Research Scientist
4. Mr. Roland Asare, B.Sc. (Hons) Geology, M.Sc. Environmental Engineering, MBA (Finance), Research Scientist
5. Ms. Mavis Akuffobe, B.A. (Sociology/Law), M.Phil. (Sociology), Research Scientist
6. Mrs. Portia Adade Williams, BSc. (Agric. Econs.), M.Sc. (Bus. Administration), Research Scientist

Finance Division

Senior Members

1. Mr. Oswald Nyimebaare, BSc. (Admin.), MBA (Accounting Option), CA, Principal Accountant/Head of Finance
2. Mrs. Gifty Dzihlorunu, B.A (Accounting), C.A, Internal Auditor

Senior Staff

1. Mr. David A. Sowah, Certificate in Procurement and Material Management, GCE 'O' Level, GCE 'A' Level, Principal Accounting Assistant
2. Mrs. Catherine Dzitse, I.C.A.-Ghana (Part I & II), Principal Accounting Assistant
3. Ms. Sabita A. Pilly Apreko, HND (Accountancy), BA (Accounting), Principal Accounting Assistant
4. Mr. Enoch Okutu, ABCE (Accounting), I.C.A. (Part I), BA (Accounting), Principal Accounting Assistant
5. Miss. Rosemond Ocansey, HND (Purchasing and Supply), BA (Logistics and Supply Chain Management), Senior Stores Superintendent

Agriculture Medicine and Environment Division (AMED)**Senior Staff**

1. Maame D.A.A. Addo, BSc. (Agric.-post Harvest Tech.), MSc. (Sustainable International Agric.), Senior Technologist
2. Nana Y. Asafu-Adjaye, BSc. (Agric. Tech.-Economics & Extension), MPhil. (Agric. Econs), Senior Technologist

Industry and Services Division (I&SD)**Senior Staff**

1. Ms. Afua Bonsu Sarpong-Anane, ICM-Diploma, (Human Resource Management), B.A (Economics and Sociology), MPhil. (Sociology), Principal Technical Officer
2. Mr. Ransford Teng-Viel Karbo, BA. (Archaeology & political Science), MA. (development Studies), Senior Technologist
3. Mr. Rankine Asabo, SSSCE, B.A (Psychology and Sociology), Principal Technical Officer Commercialisation and Information Division (CID)

Senior Staff

1. Mr. George A.B. Dankwa, GCE 'O' Level, GCE 'A' Level, Diploma (Film and TV Sound Production), HND (Marketing), Chief Technical Officer
2. Mr. Fredrick Acheampong-Asiedu, GCE 'O' Level, Diploma in Film/Video Editor, currently pursuing, BA Fine Art in Editing, Chief Technical Officer
3. Mr. William Agbenyega Dorkordi, SSCE, Diploma in Librarianship, Snr. Library Assistant.

Administration and General Services Division**Senior Staff**

1. Mr. Godfried P.K. Acquah-Arhin, GCE 'O' Level, GCE 'A' Level, BBA (Management Option), MBA Candidate (Strategic Management), Chief Admin. Assistant/Ag. Head of Admin.)
2. Ms. Mary Magdalene Masopeh, GCE 'O' Level, DBS (Secretarial Option), Univ. Diploma (Management Studies), Chief Admin. Assistant
3. Ms. Gloria Boakye, DBS (Secretarial Option), HND (Secretaryship/Management Studies), B. A (Management Studies), Chief Admin. Assistant
4. Ms. Selina Lawer-Angmler, GCE 'O' Level, Higher National Diploma (Secretaryship and Management Studies), Chief Admin. Assistant
5. Ms. Christiana Agyeiwaa, GCE 'O' level, Diploma in Management Studies, Principal Admin. Assistant
6. Mr. Joseph Kingsford Noonoo, MSCL, Junior Supervisory Management Level Certificate, Senior Supervisory Management Level Cert. (Electrical/Mechanical), Chief Works Superintendent
7. Mr. Kwesi Aboagye, MSLC, Defensive Driving (STC), Transport Management (NVTI), Senior Transport Management Course, Senior Assistant Transport Officer

8. Mr. Daniel K. Setufe, MSCL, CSIR In-House Training for Camera, Editing and Sound, STC Transport Management, STC Defensive Driving, Assist. Transport Officer
9. Mr. Robert Anneeh Atawosu, Middle School Certificate (MSLC), STC Defensive Driving Transport Management (STC), Assistant Transport Officer
10. Mr. Paul Debrah, GCE 'O' Level, CSIR-In House Security Supervisors Cert. (Module 3) Senior Security Officer.
11. Mr. Moses Adevu, SSSCE, Security Officer

Junior Staff

1. Mr. Richmond Gasu, BECE, MSCL, Defensive Driving, License F, Driver Inspector
2. Mr. Samuel Gadasu, CSIR-In House Security Training Certificate (Module 1,2, & 3), Senior Security Assistant
3. Mr. Adorta Abanya, Security Assistant Gd. I
4. Mr. Robert Okpoti, BECE, Cert. (Effective Security Techniques), Security Asst. Gd. I.
5. Ms. Vida N. Quaye, MSLC., Advance Customer Care, Front Desk Manageress
6. Mr. Joseph K. Osei, BECE, Senior Headman
7. Mr. Yaw Batholomew, Supervisor Gd. I
8. Mr. Jonas Atta Bainfaira, Supervisor Gd. I
9. Mr. Sammy Akanfella, Supervisor Gd. II

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