

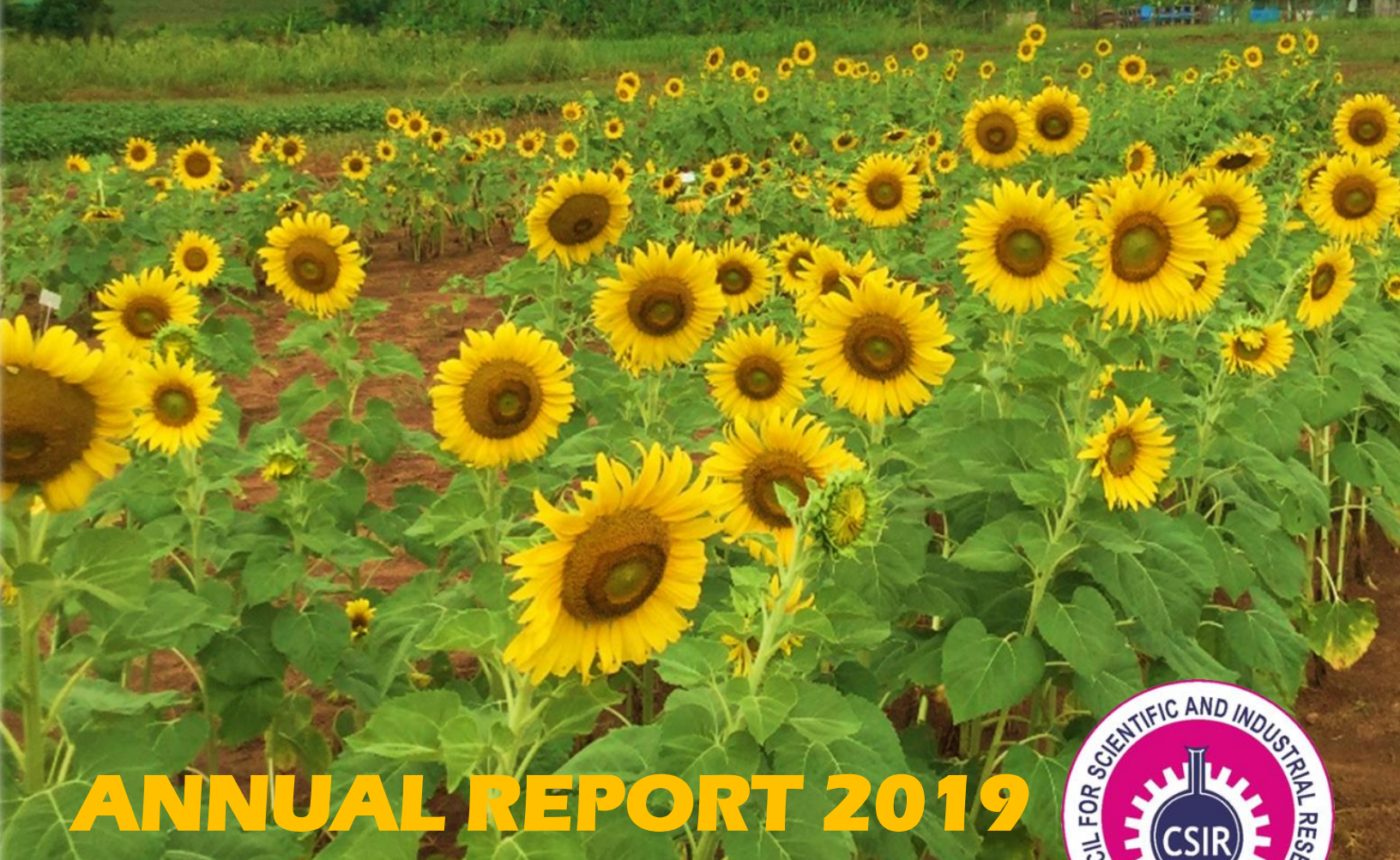
# ANNUAL REPORT 2019



## Crops Research Institute

*The leading agricultural research organization in Ghana.*

*A Centre of Excellence for agricultural research, innovation and capacity building for development.*



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A Centre of Excellence for agricultural research, innovation and capacity building for development.*



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# CSIR-CRI MANAGEMENT BOARD



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# ACRONYMS

AAIS	African Association of Insect Scientists
AATF	African Agricultural Technology Foundation
AFS	Aquaponics-based Food System
AGRA	Alliance for a Green Revolution Africa
AU	African Union
BMGF	Bill and Melinda Gates Foundation
BPA	Bui Power Authority
CABI	Centre for Agriculture and Bioscience International
CBSD	Cassava Black Streak Disease
CIAT	International Center for Tropical Agriculture
CORAF	West & Central African Council for Agricultural Research & Development
CRI	Crops Research Institute
CSIR	Council for Scientific and Industrial Research
DFID	Department for International Development
ECOWAS	Economic Community of West African States
ENVAC	Enhanced Nutrition and Value Chains
EU	European Union
FAW	Fall Army Worm
FFS	Farmer Field Schools
GDP	Gross Domestic Product
ICIPE	International Centre of Insect Physiology and Ecology
ICTA	Imperial College of Tropical Agriculture
IITA	International Institute of Tropical Agriculture
IPM	Integrated Pests Management
ISOFAR	International Society of Organic Agriculture Research
KAFACI	Korea Africa Food and Agriculture Cooperation Initiative
MAG	Modernizing Agriculture in Ghana
MDG	Millennium Development Goals
MWF	Mandela Washington Fellowship
NGO	Non-Governmental Organization
PABRA	Pan African Bean Research Alliance
PERD	Planting for Export and Rural Development
RELC	Research-Extension-Farmer Linkages-Committee
RSA	Research Staff Association
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
STMA	Stress Tolerant Maize for Africa
VAD	Vitamin "A" Deficiency
WAVE	West African Virus Epidemiology
WFP	World Food Programme
YALI	Young African Leaders Initiative

# FOREWORD

Dear friends,

Another year of agricultural research activities by the CSIR-Crops Research Institute has gone by and we are thrilled to present our annual overview of our 2019 activities to you. As a Centre of Excellence in agricultural research, we continue to engage in numerous research activities on our mandate crops as well as some other new and exciting research prospects that have been identified by the Institute. Whereas most of our research activities focused on our mandate crops such as cereals, legumes, horticultural crops, tropical fruits and vegetables, roots and tuber crops and industrial crops, scientists have also begun researching into other crops such as ginger, sugarcane, tiger nuts, sunflower among others.

Funding is a major component of all agricultural research activities and we are grateful to all our donors, sponsors and stakeholders for providing the needed financial support without which we would have nothing to report on.

Another major aspect of our success has always been the quality of our very qualified and dedicated human resource. Nonetheless, our staff continue to build their capacity by adding value to themselves.

We continue to invest in infrastructure as well as increasing commercialization activities in order to generate more internally generated funds to complement donor support.

We are eternally grateful to all those whose contribution, support and criticisms have brought us this far. Our heartfelt appreciation also goes to our very hardworking and committed staff for enduring the long hours in the offices and on the fields. Together we've made progress towards attaining our vision and we hope to continue working hard as we take advantage of every opportunity presented to us.



*Dr. Michael Abu Sakara Forster  
Board Chairman, CSIR-CRI*



*Prof. Moses Brandford Mochiah  
Director, CSIR-CRI*

# **ACKNOWLEDGEMENTS**

There aren't enough "thank yous" to say to all the people who have helped in various ways to bring the CSIR-Crops Research Institute where it is today. We are grateful to all our partners, donors and collaborators for their immense and continuous support throughout the years and especially in 2019. It is our hope that we will continue to work together for a long time in order to achieve all our different aspirations.

Our donors, partners and collaborators are such a huge pillar of our existence and in 2019, we received support from several of them. Our warmest appreciation goes out to partners such as the Modernizing Agriculture in Ghana (MAG), Solidaridad, the Alliance for a Green Revolution Africa (AGRA), the Bill/Melinda Gates Foundation (BMGF), KAFACI International, the International Institute of Tropical Agriculture (IITA), the International Center for Tropical Agriculture (CIAT), the Centre for Agriculture and Bioscience International (CABI), the World Food Programme (WFP), the African Union (AU), the European Union (EU) among many others.

The CSIR-Crops Research Institute is the largest of all 13 institutes under the Council for Scientific and Industrial Research (CSIR) and as such collaborates with all "sister" institutes under the CSIR as well as universities, non-governmental organisations (NGOs), civil society, farmers, ministries and other research institutions, all of whom we owe a great deal of indebtedness.

We appreciate the role our management board members; Nana Fobi Kropa III, Mr. Theophilus Owusu, Mrs Janet Gyimah Kessie, Mr. Emmanuel Brako, Alhaji Prof. Mohammed Moro Buri, and Prof. Moses B. Mochiah have all played in leading the Institute to the heights we have attained. We are especially indebted to our Board Chairman, Dr. Abu Sakara Forster for his leadership and absolute commitment in steering affairs of the Institute. There wasn't a single time we called on him that he wasn't ready and eager to help.

To all our scientists, technical and support staff, we say a big "ayekoo" for continuously working hard and putting in all those man hours every day. Here's to many more successful and fruitful years. God richly bless us all.



## **OUR PROFILE**

Established in 1964, the CSIR-Crops Research Institute (CSIR-CRI) is the largest of the thirteen (13) institutes of the Council for Scientific and Industrial Research (CSIR) of Ghana and is the foremost national science and technology organization in Ghana. The Institute provides innovative research and research-related services to the general public as well as other institutions.

The CSIR-CRI's mission is to develop and disseminate demand-driven technologies and build capacity for sustainable food and industrial crop productivity, with the vision to become a Centre of Excellence for agricultural research, innovation and capacity building for development.

The Institute's core mandate is to conduct research and develop improved varieties of food and industrial crops and their production technologies in order to enhance food security and reduce poverty. The relevant crops include: legumes (cowpea, soybean, groundnut, canning beans and bambara groundnut), cereals (maize and rice), roots and tubers (yam, cocoyam, cassava, taro and sweet potatoes), vegetables (pepper, garden eggs, tomato, onion, and leafy vegetables), tropical fruits (citrus, mango, avocado, cashew, pineapple, and pawpaw), and industrial crops (rubber and sugarcane).

With values such as Excellence, Fairness, Commitment, Transparency, Accountability and Teamwork at the heart of its operations, the Institute aims to

- develop and disseminate appropriate technologies that are demand driven and acceptable to end users.
- promote and strengthen strategic partnerships with relevant stakeholders to enhance the generation of solutions to challenges in agricultural research, technology development and transfer.
- improve institutional capability to undertake effective research and service delivery to enhance agricultural productivity.
- enhance research and technology delivery through efficient mobilization and management of funds

- improve the management and operating procedures and systems as a means of ensuring efficiency in research delivery.

In addition to its core mandate, the Institute also offers several services to various stakeholders. These include but are not limited to the production of breeder seeds for the National Seed Industry, the supply of healthy planting materials of citrus, avocado, mango, plantain and banana, the development of crop varieties for food and industrial uses, the establishment of farms (tree crop plantations), the integrated management of crop diseases and pests (including weeds), the production of extension materials and advise on the use of appropriate experimental designs for field studies.

## **EXECUTIVE SUMMARY**

The CSIR-CRI annual report for 2019 is a summary of most of its achievements within the calendar year. As is usually the case every year, the Institute chalked several successes in 2019 and it is our hope that this continues in forthcoming years.

The Institute started the year with the induction of a new Director into office after the former Director, Dr. Stella A. Ennin, successfully brought her tenure to an end. Consequently, Prof. Moses Brandford Mochiah, was inducted into office as the new Director in the first quarter of 2019. This ushered the Institute into a new dawn with high hopes and expectations.

Maize is a very key component of most Ghanaian meals. Having released numerous maize varieties over the years, the Institute recently released a number of pro-vitamin "A" maize varieties. These varieties have high levels of bio-available vitamin "A", the lack of which causes malnutrition, growth retardation and in some cases blindness. In 2019, the Institute introduced these varieties to various farming communities in the Ashanti region resulting in increased demand as well as very high adoption rates. More importantly, a number of first-cycle schools in these communities have accepted to include the vitamin "A" maize in their school feeding programmes.

With support from the Modernizing Agriculture in Ghana (MAG) project, a Canadian Government sponsored project, the Institute produced various quantities of planting materials for maize, soybean, rice, pepper and cassava. These are all expected to be planted to various acres of farmland.

Through its Research-Extension-Farmer Linkages-Committee (RELC) programme, the Institute identified the unavailability of premium quality planting materials of improved varieties of cassava as a major constraint to its production in the value chain. To resolve this, and produce clean planting materials of cassava, the Institute established a fifty-acre (20 hectares) seed multiplication field. The fields

have been planted to various varieties of cassava which will be made available to cassava seed growers and companies.

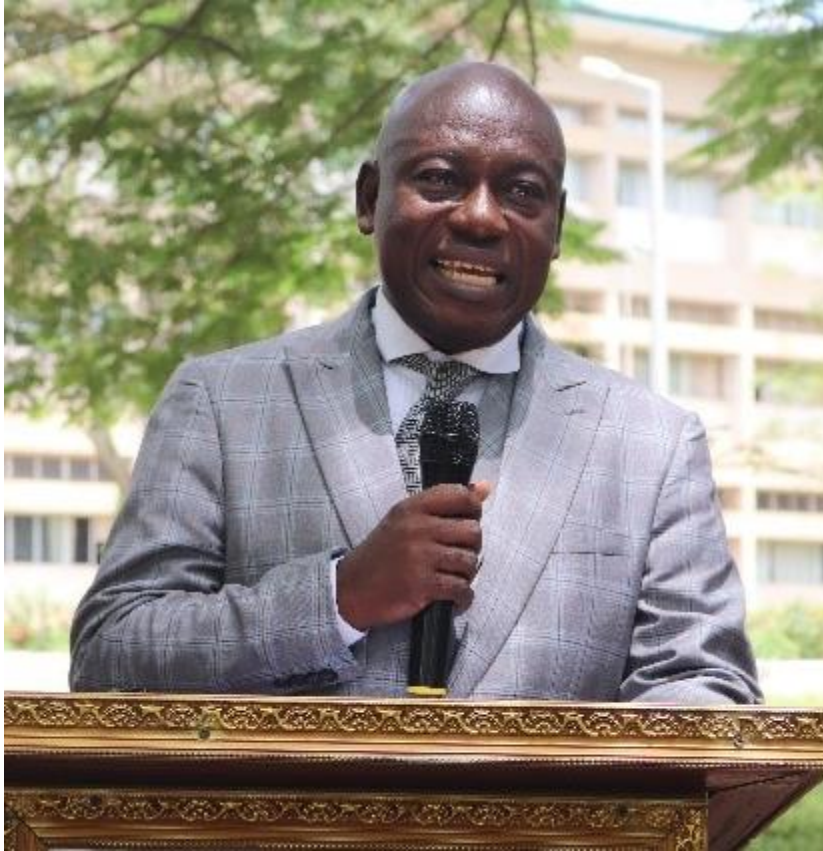
The fall army worm menace has not only caused devastating havoc to cereal production in Ghana but has also threatened food security as well. The use of synthetic pesticides has been the major response in tackling the situation with its accompanying side effects of environmental pollution. The Institute has, however, successfully introduced the “push-pull technology” to fight the menace. The technology offers multiple benefits and has been used in East and Southern Africa to deal with major stresses affecting agricultural production systems.

Staff of the Institute continue to receive numerous awards and recognitions from local and international agencies. In 2019, Dr. Shadrack Amponsah and Dr. Priscilla Ribeiro, research scientists of the Institute won the RUFORUM Young Scientists Award and the Best National Partner Presentation Award respectively. Additionally, a senior technical officer of the Institute, Ms. Elizabeth Norkor Nartey, became the third person from the Institute to win the enviable Mandela Washington Fellowship from the United States.

Staff attrition continues to be a major challenge the Institute faces. This has caused a major decline in staff strength from 605 persons in 2017 to a current figure of 542. However, the Institute was only cleared to recruit eleven persons in 2019.

The Institute continues to engage in various commercialization activities in order to generate funds internally. The production and onward sale of planting materials is the major component of the Institute’s commercialization activities.

As members of the scientific and academic community, staff of the Institute continue to make their research findings available to the public by regularly publishing in peer-reviewed journals. In 2019, the Institute recorded over one hundred publications. These comprise refereed journal papers, conference papers, manuals, production guides, books, book chapters, posters and technical reports.



## CSIR-Crops Research Institute Inducts New Director into Office



*Prof. Mochiah delivering his acceptance speech*

The CSIR-Crops Research Institute has inducted Professor Moses Brandford Mochiah, an entomologist and a Principal Research Scientist of the Institute into office as its new Director. The position of Director of the Institute became vacant after the immediate past Director, Prof. Stella Ama Ennin, the first female occupant of the office, successfully ended her tenure in March 2019. Prior to his appointment as the substantive Director, Prof. Mochiah was the Deputy Director of the Institute and also served as acting Director for a few months.

The new Director has pledged to provide effective leadership and also work hard towards attaining the Institute's objectives and targets.

"We will ensure that the Institute maintains its enviable position as the foremost agricultural Institute under corporate CSIR, by improving on our research outputs, facilities and incomes. We will strive to achieve the objectives and outputs set under the five (5) strategic thrusts of the Institute"



*Prof. Mochiah (left) being sworn into office by the Director-General of CSIR, Prof. Victor Agyeman*

Prof. Mochiah promised to work closely with the private sector in order to increase funding opportunities for the Institute's research activities and also enhance the Institute's image and competitiveness. He stressed the need for Government to fulfill its promise of allocating one percent (1%) of the nation's Gross Domestic Product (GDP) to research.

Additionally, he enumerated the numerous challenges that continue to face the Institute and promised to take necessary steps to address them. "While we strive to improve on our overall performances, we do not intend to lose sight of the myriad of challenges that confront us as an Institute. Currently, we face numerous challenges including, inadequate funding for research, limited capacity for commercialization, dwindling staff strength, inadequate laboratory and field equipment, deteriorating roads, land encroachment among others. Nevertheless, we are determined to adopt effective strategies to take advantage of available opportunities. We would also take pragmatic actions to deal with internal weaknesses which affect our general operations".

## *PROFILE*

**PROF. MOSES  
BRANDFORD  
MOCHIAH**

Prof. Moses Brandford Mochiah obtained his "Ordinary" and "Advanced" level certificates respectively from the Sunyani Secondary School and the Ghana Secondary Technical School between 1977 and 1984. He obtained a Diploma in Education from the University of Cape Coast, Ghana and currently holds a PhD in Entomology from the same university.

Since his appointment with the CSIR-Crops Research Institute in November, 2002, Prof. Mochiah has been involved in various research projects. His varied research interest spans from Integrated Pests Management (IPM), the ecology of insect pests and the development of integrated management strategies for pests of vegetables (cabbage, tomatoes, okra, pepper and eggplant) root and tuber crops (cassava and cocoyam), legumes (cowpea and groundnut) and CSIR-CRI mandated crops.

He is currently the coordinator and co-principal investigator for the ECOWAS Project on the Control of Mango Fruit Flies in Ghana. He has also served as the co-principal investigator for the Development and Delivery of Improved Production and Pest Management Packages to Peanut Farmers in Ghana.

As an entomologist, Prof. Moses Brandford Mochiah has been involved in the development and release of over twenty-five (25) crop varieties. He was part of the team that worked to release popular varieties such as "*Crops Akomapa*", "*Crops Ba*", "*CRI-Aziga*", "*CRI-AGRA SP09*", "*CRI-Kofi Annan*", "*CRI-Nkatie*", "*CRI-Semenhyia*" and "*CRI-Otuhia*".

Prof. Mochiah was also part of the Groundnut IPM programme that developed an eco-friendly strategy for the management of foliar diseases of groundnuts using local detergents. This technology has been adopted and being used by farmers in several districts of Ghana.

Prof. Mochiah has over one hundred (100) peer-reviewed publications such as refereed journal papers, edited research reports, conference papers abstracts, book chapters and poster presentations, all of which have been published in high impact international journals. He has travelled extensively, conducted research in both local and international research centres and participated in several national and international scientific conferences and workshops. He is also a fellow of the International Centre of Insect Physiology and Ecology (ICIPE) in Nairobi Kenya.

Prior to his appointment as the Director of the CSIR-Crops Research Institute, Prof. Mochiah served as the Deputy Director in 2019 and the Institute's Kwadaso station manager in 2018.

Prof. M.B. Mochiah has served on various committees within the Institute and has also been an examiner to several undergraduate and post-graduate students from different universities as well as the CSIR College of Science and Technology where he is a part-time lecturer. He has very good knowledge and experience in project management and writing of research proposals for funding.

He is a member of the African Association of Insect Scientists (AAIS), a member of the International Society of Organic Agriculture Research (ISO FAR), a member of African Regional Postgraduate Programme in Insect Science Scholars Association (ASA) and a member of the CSIR- Research Staff Association (RSA). He is currently a Principal Research Scientist and is married with three children.



# OUR CROP VARIETIES

## **CRI-Abebe**

110-115 days  
High Beta-carotene  
Yield: 6.3t/ha



## **CRI-Akomapa**

100-105 days  
Yield: 7.0 t/ha  
Tolerant to maize streak virus disease



## **CRI-Apraku**

80-85 days  
Yield: 5.5 t/ha  
Tolerant to multiple stresses



## **CRI-Nkomo**

100-105 days  
Yield: 6.5 t/ha  
Highly tolerant to maize streak virus disease



## **CRI-Nkwagye**

100-115 days  
Yield: 6.5 t/ha  
Pro-vitamin A



# Maize

CALL: 0244 213 204

# 2019 RESEARCH OUTPUTS

## 01 "Yabe", A Local Community in the Ashanti Region of Ghana Accepts Pro-Vitamin "A" Orange Maize

*Project Leader: Ewool, Manfred (PhD): Sponsor: Harvest Plus*

Vitamin "A" Deficiencies (VADs) are serious forms of malnutrition that retard growth, weaken the immune system and cause blindness in some cases. In many developing countries like Ghana,



*Community members of Yabe in the Atwima-Kwanwoma District*

VADs are important public health problems prevalent among women of child-bearing ages and children. Since maize is a major staple in Ghana, a feasible approach to minimize VAD is to develop and promote the production and utilization of maize varieties that have high levels of bio-available vitamin "A". The CSIR-Crops Research Institute, having developed and released such pro-vitamin "A" maize varieties organized an awareness creation programme with the objective of educating the community on the need to cultivate and utilize pro-vitamin "A".

"Yabe" is a community in the Atwima-Kwanwoma district in the Ashanti Region. A total of forty-eight (48) community members took part in the exercise. "Gakenkey", a popular Ghanaian delicacy was prepared from pro-vitamin "A" orange maize and offered to each participant to taste. Participants were then made to score

the delicacy using a likert scale of 1-5 (1=strongly like; 2=like; 3= moderately like; 4=dislike; 5=strongly dislike).

Interestingly, all 48 participants either “strongly liked” or “liked” the Ga-kenkey. They indicated that it was tasty, sticky without their usual cassava dough and had a sweet aroma. Community members expressed their desire to cultivate and utilize the pro-vitamin “A” orange maize.



*Community members taking the food test*

## **02** Vitamin “A” maize varieties to be introduced into Government’s School Feeding Programme

*Project Leader: Ewool, Manfred (PhD): Sponsor: Harvest Plus*

The Ghana School Feeding Programme has been implemented since 2005 in response to the first and second Millennium Development Goals (MDGs) on eradicating extreme poverty and hunger and achieving universal primary education. Over the period of implementation, the basic idea of the program has been to provide children in public primary schools and kindergartens with one hot nutritious meal, prepared from locally grown foodstuffs, on every school-going day.

The CSIR-Crops Research Institute has advanced plans to introduce its orange and yellow vitamin “A” maize varieties into the Government’s school feeding programme. This is to ensure that children eat locally produced nutritious meals that are also rich in micro- nutrients. The Institute under its Enhanced Nutrition and Value Chains (ENVAC) project, funded by the World Food Programme, has put

measures in place to ensure that more farmers embrace the cultivation of the new yellow and orange maize varieties in order to meet the demand of the programme.



*Vitamin "A" maize variety being introduced to members of a community*

A number of first-cycle schools in targeted communities have accepted to include the vitamin "A" maize in their school feeding programme. Consequently, the Institute has supplied 30 kilograms of orange maize to various communities to begin farm trials.

### **03 CSIR-Crops Research Institute Introduces Newly Released Rice Varieties to Farmers**

*Project Leader: Maxwell Darko Asante (PhD) Sponsor: African Union/European Union*

In 2017, the CSIR-Crops Research Institute developed and released six (6) new rice varieties namely *CRI-Mpuntuo*, *CRI-Dartey*, *CRI-Kantinka*, *CRI-Obofo*, *CRI-Emopa* and *CRI-Enapa* with funding from African Union and the European Union. These varieties have qualities such as early maturity, high yield, good grain quality, aroma and tolerance to diseases and pests encountered by rice farmers in the country.

These varieties, alongside good agricultural practices such as site selection, levelling, bunding/water control, nutrient management, weed, pest/disease control, irrigation, fertilizer application as well as harvesting were introduced to rice farmers across the country through farmer field schools (FFS), demonstrations and field days. FFS and demonstrations were organized at Asotwe, Adadietem, Bunso, Sokwai, Kadjebi, Hodzo, Aframso, Weta, and Botanga.



*CRI-Mpuntuo in the field*



*CRI-Kantinka in the field*



*Field day to introduce new rice varieties to farmers at Kadjebi*

Over four hundred (400) farmers and extension agents, comprising about two hundred and fifty males and one hundred and fifty females were directly introduced to the new varieties and good agricultural practices. Approximately, one thousand (1000) farmers were indirectly exposed to the new varieties and good agricultural practices. Farmers expressed their excitement about the varieties and generally accepted all the varieties with some preferences. Majority of farmers at Aframsso and Bunso preferred CRI-Enapa and CRI-Kantinka respectively.



*“CRI-Enapa” showing high yield under non-optimal conditions on a farmer’s field at Aframsso*



*Dr. Maxwell D. Asante (Rice Breeder, CSIR-CRI) discussing the characteristics of the new varieties with some extension staff during a field day at Ankaase*



*Demonstration field of the six varieties and good agricultural practice at Sokwai*

In the Volta region, *CRI-Enapa*, *CRI-Emopa*, *CRI-Mpuntuo* and *CRI-Dartey* were mostly preferred while *CRI-Kantinka* and *CRI-Dartey* were the most preferred varieties in Botanga.

*"Some of us are seed growers and we have been cultivating "AGRA" and "Jasmine" rice but with the introduction of "CRI Kantinka" and "CRI-Dartey", I have realized their high yield potential and that they can compete with "AGRA rice."*

#### **Farmer Testimonial 1**

Mr. Mohammed Issahaku Alhassan, Farmer, Botanga.

*"I started farming about three years ago but comparing the AGRA rice and the other rice varieties, I prefer "CRI-Dartey" because it has brighter and healthier grains"*

#### **Farmer Testimonial 2**

Mrs Salima Abdullai, Farmer, Botanga.

*"I prefer "CRI-Kantinka" to the other varieties due to its aroma content, high yielding potential and grain quality. Most rice consumers in the country prefer aromatic rice varieties and "CRI-Kantinka" is likely to compete with AGRA rice when introduced unto the market"*

#### **Farmer Testimonial 3**

Mr. Adam Mahama, Farmer, Aframso.

## **04 Common Bean: Ghana's Industrial and Nutritional Solution**

*Project Leader: James Yaw Asibuo (PhD) Sponsor: Pan African Bean Research Alliance (PABRA)*

The CSIR-Crops Research Institute is pushing for the adoption of common beans for industrial and nutritional value. Millions of farmers, many of them women, across the globe cultivate the crop for domestic consumption and commercial purposes. Lessons learnt from Ghana's neighbouring countries suggest that the crop can boost the country's Gross Domestic Product as well as address iron and zinc deficiency in diets. Over two billion people in developing countries suffer from malnutrition due to iron and zinc deficiency. Iron deficiency affects half of Africa's population by way of poor growth, impaired cognitive development and maternal mortality.



*A mixture of different types of common beans*

The Institute believes common beans could be an inexpensive solution to such nutritional challenges.

The crop has become a tradable commodity on both domestic and international markets. Demand in many African countries such as Ethiopia has risen and is hardly met by domestic production. To address this shortfall, common bean production needs to be increased by addressing the constraints and inefficiencies in cultivation along the value chain.

Consequently, the CSIR-Crops Research Institute has been involved in a project aimed at increasing production of common beans as well as reducing poverty among

smallholder farmers by evaluating common bean varieties from the International Centre for Tropical Agriculture.

Over the years, the Institute has received seeds from the Pan African Bean Research Alliance (PABRA), the Imperial College of Tropical Agriculture, (ICTA) and other partners for evaluation. This led to the development and release of four new common bean varieties in 2016. This has been followed by organization of demonstration fields with farmers across the country in order to market the crop successfully.

The expected increase in production will be achieved by targeting interventions along the bean value chain.



In West Africa in particular, improvement in productivity and capacities of smallholder farmers to meet diverse and changing domestic and foreign market requirements will be crucial. Initiatives will comprise access to climate-resilient good quality seeds that are high yielding, nutritious, and market-driven as well as complementary crop management practices in a gender-equitable manner.

The Institute is also exploring the use of granular fertilizers to increase productivity. Various experiments have been set up to investigate the effect of different fertilizers on the productivity of the crop. Initial results have been promising. Additionally, efforts are being made to involve processing companies to turn harvested beans into baked beans or pre-cooked beans in order to increase its value and expand marketing opportunities for farmers.

Finally, neighbouring countries such as Togo, Cote d'Ivoire and Benin are yet to release varieties of the crop-presenting a huge export potential for Ghana.

## **05 Establishment of a 20 hectare Cassava Planting Material Production Field**

*Project Leader: Allen Oppong (PhD) Sponsor: Alliance for a Green Revolution in Africa (AGRA)*

Cassava is a major staple and a principal root and tuber crop in Ghana. However, a major constraint to production in the value chain as identified by the Research-Extension-Farmer Linkages-Committee (RELC) is the unavailability of premium quality planting materials of improved varieties. It is therefore important that clean planting materials of high premium quality be made available for small scale and low-income farmers who would act as satellite farmers to produce raw materials to feed industry and the market. The availability of a ready and reliable source of certified clean premium quality planting materials of vegetatively propagated crops is critical in Ghana. Over the years, the CSIR-Crops Research Institute has developed and released improved varieties of cassava to serve as food, feed and fiber as well as other industrial purposes such as the production of starch and alcohol. Consequently, in order to produce breeder seeds (planting materials) of these improved varieties, the Institute has established a fifty-acre (20 hectares) seed

multiplication field in the Atebubu Amantin and the Techiman municipalities of the Bono region of Ghana with funding from the Alliance for a Green Revolution in Africa (AGRA).

The fields have been planted to various high-yielding cassava varieties such as "CRI-AGRA Bankye", "CRI-Dudzi", "CRI-Sikabankye", "CRI-Amansan", "CRI-Essam Bankye" and "CRI-Bankyehemaa".



*Cassava plants on multiplication field*

The Institute hopes to make these planting materials available to certified cassava seed growers and companies who require high-yielding disease-resistant cassava varieties for cultivation. This is also in support of the Government of Ghana's flagship Planting for Food and Jobs programme.

## **06 Modernizing Agriculture in Ghana (MAG)**

*Project Coordinator: Grace Bolfrey-Arku (PhD) Sponsor: Modernizing Agriculture in Ghana (MAG)*

The Modernizing Agriculture in Ghana (MAG) is a Canadian government sponsored project which supports four (4) major activities at the CSIR-Crops Research Institute. These comprise "Responding to Government's Planting for Food and Job (PFJ) programme", "Addressing Stakeholder Production Constraints", "Enhancing

Knowledge and Information Sharing through Integrated Agricultural Research for Development”, and Technical Backstopping for MoFA (Major Collaborator).



*The MAG Project*

The project is also expected to produce 2.5 tons of soybean seeds that can be planted to 150 acres (60 ha) of field to produce approximately 60 MT of certified seeds. The certified seeds could in turn be planted to 3,750 acres (1,500 ha) of land to produce approximately 3,000 MT of soybean grain. Various improved varieties of soybean such as “*CRI-Nangbaar*”, “*CRI-Anidaso*”, “*CRI-Toondana*” and “*CRI-Nangbaar*” are being used.

With support from MAG, the Institute has produced 1.82 tons of maize seeds. This includes various quantities of “*CRI-Dzifoo*”, “*CRI-Ahoodzin*”, “*CRI-Honampa*” and “*CRI-Abontem*” maize varieties.

Additionally, several quantities of rice seeds (“*CRI-Amankwatia*” and “*CRI-AgraRice*”), pepper seeds (“*CRI Shito Adope*”) as well as cassava planting materials (“*CRI-Amansan*”, “*CRI-Dudzɔ*”, “*CRI-AGRA*”, “*CRI-Bankyehemaa*”, “*CRI-Duade Kpakpa*”, “*Sika*”, “*Amansan*”, “*CRI-Abrabopa*” and “*CRI-Bediako*”) have been produced from the project. These are all expected to be planted to numerous acres of farmland.

## 07 Exploring the “Push-Pull” Technology to Fight Fall Army Worm in Ghana

Project Leader: *Stephen Yeboah (PhD)* Sponsor: *Alliance for Green Revolution of Africa (AGRA)*

Maize (*Zea mays*) is the most important staple crop for over 300 million people in sub-Saharan Africa and is cultivated on over 25 million hectares of farmland. The maize value-chain comprises farmers, traders, input producers and suppliers and several other middlemen.

The staple accounts for about 50% of total annual cereal production in Ghana. Despite the obvious significance of maize, its average productivity in Ghana is among the lowest in the world (1.2 - 1.8 t/ha). This worrying phenomenon has been worsened by the recent invasion and devastating impacts of the Fall Army Worm (FAW), *Spodoptera frugiperda*, on maize that seriously threatened cereal production and food security in Ghana. Emergency responses to tackle invasive FAW, has hitherto mainly based on the use of synthetic pesticides which have not only been relatively effective but have also burdened the scientific community with problems of environmental safety.



*The Fall Army Worm*

The CSIR-Crops Research Institute in its effort to resolve this problem has introduced the “push-pull technology” in the fight against the fall army worm menace. The “push-pull technology” is an innovative agro-ecological and climate-smart technology in which cereal crops are intercropped with desmodium

(which acts as a “push” crop to repel lepidopteran pests) and a border planting of Napier grass (*Pennisetum purpureum*) or *Brachiaria* (which acts as a ‘pull’ factor, to attract the pest. This has not only resulted in very minimal incidences of FAW on

maize crops but has also increased yields from these fields. The “push-pull” technology has proven to be a better non-pesticide approach to managing fall army worm infestation in maize.



*Desmodium spp.*



*Napier grass (Pennisetum purpureum)*

### *Prospect of the "push-pull" technology in Ghana*

Given the occurrence of multiple stresses such as pest damage, low soil fertility, drought and striga infestation affecting agricultural production systems in Ghana, the Institute recommends the upscaling and further dissemination of the multi-purpose “push-pull: technology. The technology offers multiple benefits and has been used in East and Southern Africa to deal with major stresses affecting agricultural production system such as poor soil fertility, reduction in striga infestation, and control of stem-borers.

## **08 Second Phase of the West African Virus Epidemiology (WAVE) For Root and Tuber Crops Project Launched in Libreville, Gabon**

*Project Leader: Allen Oppong (PhD) Sponsor: BMGF/DFID*

After the successful implementation of the first phase, the second phase (phase II) of the West African Virus Epidemiology (WAVE) for root and tuber crops project was successfully launched in the Gabonese capital of Libreville in 2019. The event was attended by seven (7) Gabonese government ministers, officials from the Bill and

Melinda Gates foundation (BMGF) and DFID from the UK (who are the main sponsors of the project).



*Launch of second phase of WAVE Project at Libreville, Gabon.*



*Panel discussion at launch of second phase of WAVE Project at Libreville, Gabon.*

Others were representatives from institutions such as the African Development Bank, Islamic Bank, AGRA, CORAF and several others including ten ambassadors from western countries accredited to Gabon.

The second phase of the project which is expected to end in 2023 is expected to build capacities of the participating countries to respond to threats posed by viral diseases of cassava and ensure food security in West and Central Africa.



*Some participants at the launch of second phase of WAVE Project at Libreville, Gabon.*

The first phase of the project resulted in a number of achievements such as

- The provision of laboratory equipment and consumables for virus indexing for the CSIR-Crops Research Institute (CSIR-CRI)
- Human resource development
- Provision of screen houses dedicated to viral research at the CSIR-CRI.
- Procurement of a cross country vehicle for viral disease survey and surveillance activities in the country
- Development of viral disease maps and development of viral disease epidemiological models predicting the potential spread of the Cassava Brown Streak Virus disease into West Africa.
- Development of a national CBSD response plan which has been endorsed by the Minister of Food and Agriculture.

## 09 “Quality Seed Yam” Demonstration Open Day

*Project Leader: Marian Dorcas Quain (PhD)*

*Sponsor: Yam Improvement for Incomes and Food Security in West Africa PHASE 2 (YIIFSWA-II)*

The production of yam, an important staple crop which provides food security, employment and incomes for smallholder producers in Ghana is seriously challenged by the limited availability of good quality seeds. Consequently, the country experiences a yield gap of about 67 percent despite being the leading exporter of yam in the world.

The CSIR-Crops Research Institute in collaboration with the International Institute of Tropical Agriculture (IITA) has developed novel technologies to produce high quality seed yam to boost yam production in Ghana. The technologies comprise high ratio propagation techniques (HRPT) such as adaptive minisett technique, tissue culture, temporary immersion bioreactor systems, aeroponics and hydroponics systems.

These have all been disseminated to seed producing companies to build their capacities in order to produce quality certified seed yam. As a way of promoting the technologies and attract private sector investment, an “Open Day” event was

organized by the Institute in November, 2020. The event which was aimed at showcasing the high ratio propagation techniques in quality seed yam production was witnessed by several guests and participants from both Ghana and Nigeria. Participants visited the various laboratories and fields to observe the technologies. An exhibition at which several posters and other publications developed was also mounted.



*Participants at the Open day*



*Participants in field*



*Group picture of all participants at the Open day*

The Yam Improvement for Income and Food Security in West Africa (YIFSWAA II) project's mission is to build demand creation, production systems and an enabling environment for improved varieties of seed yam.



The project hopes to achieve this by empowering smallholder ware yam producers with seeds of improved varieties for increased productivity resulting in increased income, developing functional and sustainable seed systems that deliver sufficient quantities of high-quality seeds of improved varieties to farmers, raising awareness of the economic impact of the yam sector and by empowering women to profitably participate in commercial seed yam value chains.

- Since its inception in 2013, the project has among other successes achieved the following:
- Establishment of an aeroponics, hydroponics, TIBS, and Plant Form systems.
- Training for staff of the CSIR-Crops Research Institute
- Plants raised using high ratio propagation techniques (HRPT),
- Solar-powered aeroponics system launched.
- Technical backstopping received by the CSIR-Savannah Agricultural Research Institute (SARI) to manage their aeroponics system.
- Indexing initiated using the molecular laboratory to ensure that the planting materials are clean.
- Installation of a RITA Bioreactor system which was procured during the West African Agriculture Productivity Programme (WAAPP)
- Acquisition of a system which produces more seedlings (about 4,800 seedlings) within a short time.
- Establishment of a solar powered (to ensure uninterrupted operation) drip irrigation system for field production all year round.
- Adoption of various technologies by several stakeholders.

## **10 Staff of The Bui Power Authority (BPA) Aquaculture Project Trained on Fish Stocking, Feeding and Pond Management.**

*Project Leader: Ing. Shadrack K. Amponsah (PhD) Sponsor: Bui Power Authority*

The CSIR Crops Research Institute has been promoting an aquaponics-based food production system (AFS) since 2016. The system which integrates crop production (especially the cultivation of vegetables and other common staple food crops),

poultry and small ruminant rearing with the rearing of fish in simple raised tanks, ensures an all year-round food production for enhanced income to the smallholder farmer.



*Trainees in the field during training*

In 2018, the Institute trained over six hundred (600) farmers, entrepreneurs and agriculturists in pond construction and management. This yielded over 40 adopters of the fish pond technology across the country. Additionally, the Institute constructed ten (10) fish ponds for the Bui Power Authority.



*Trainees inspecting a pond*



*Discussion by trainees during training*

Subsequently, the Institute was tasked to train field staff of the Authority's aquaculture project on fish stocking, feeding and pond management at Bui, in the Bono Region. Overall, six (6) technical staff of the Authority were successfully trained to construct, manage and maintain the fish ponds. They are expected to also train others eventually.



*Ten (10) fish ponds constructed for the Bui Power Authority*

# OUR CROP VARIETIES

## **CRI-Huogbelor**

*Yield potential: 13.14 t/ha  
Tolerant to Taro Leaf Blight Disease  
Maturity: 6-7 months*



## **CRI-Asempa**

*Yield potential: 25 t/ha, Tolerant  
to Taro Leaf Blight Disease  
Maturity: 8-12 months*



## **CRI-Agyenkwa**

*Yield potential: 12 t/ha, Tolerant  
to Taro Leaf Blight Disease  
Maturity: 8-12 months*



## **CRI-Yenanyawoa**

*Yield potential: 16 t/ha, Tolerant  
to Taro Leaf Blight Disease  
Maturity: 8-12 months*



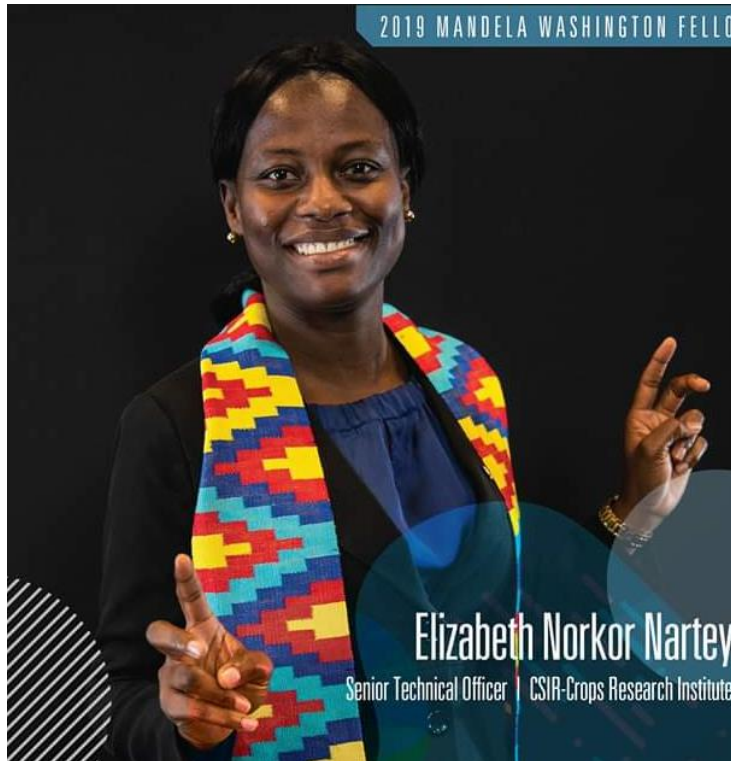
# Taro

CALL: 0244 213 204

# AWARDS

## 01 Miss Elizabeth Norkor Nartey Wins 2019 Mandela Washington Fellowship

*Project Leader: Elizabeth Norkor Nartey Sponsor: Young African Leaders Initiative (YALI)*



*Miss Elizabeth Naa Norkor Nartey  
2109 Mandela Washington Fellow*

After a very rigorous and competitive application process, Miss Elizabeth Naa Norkor Nartey, a Senior Technical Officer of the CSIR-Crops Research Institute, was successfully selected as one thirty-three (33) “2019 Mandela Washington” fellows from Ghana. In all, over 700 fellows (out of over 38,000 applicants) were successfully selected from Sub-Saharan Africa.

As part of the model, she took part in a six-week leadership training programme at the Texas Tech University in the United States of America (USA).

The Mandela Washington Fellowship (MWF) for Young African Leaders, begun in 2014, and has grown to become the flagship program of the Young African Leaders Initiative (YALI). The fellowship seeks to empower young people through academic coursework, leadership training, and networking by providing 700 outstanding young leaders from Sub-Saharan Africa with the opportunity to hone their skills at a U.S. college or university with support for professional development after they return home. Fellows must have established records of accomplishment in

promoting innovation and positive impact in their organizations, institutions, communities, and countries. Globally, there are over four thousand four hundred (4,400) MWF alumni from 49 different African countries.



*Miss Narthey delivering a speech at Texas Tech University*

*Miss Narthey with colleague 2019 Mandela Washington Fellows*

Miss Elizabeth Norkor Narthey is a Senior Technical Officer at CSIR-Crops Research Institute, where she assists the rice breeding team in the development and dissemination of new and elite improved varieties by providing technical assistance. In 2018, she assisted in the development and release of six new rice varieties. She also helps in training smallholder farmers on good agricultural practices in rice farming to help improve the yield and livelihood of farmers.

## **02 CSIR-CRI Scientist Wins 2019 Best National Partner Presentation Award**

*Project Leader: Priscilla Francisco Ribeiro (PhD); Sponsor: Bill & Melinda Gates Foundation (BMGF)*

Dr.(Mrs.) Priscilla Francisco Ribeiro, a Research Scientist with the CSIR-Crops Research Institute and the national coordinator for the Stress Tolerant Maize for Africa Ghana at the annual STMA project meeting held at the Cresta Golfview hotel in Lusaka, Zambia. The (STMA) project won the 2019 best partner presentation



*Dr. Priscilla Ribeiro  
receiving the award from  
Dr. B.M Prasanna,  
Director of CIMMYT  
Global maize programme*

award. She won the same award in 2018. Since 2016, Dr. Ribeiro has coordinated activities of the STMA project in Ghana. Under this project, she has also successfully released a maize variety, *CRI-Apraku*. The STMA project aims to develop improved multiple stress tolerant varieties that effectively address emerging and future production challenges.

### **03 Dr. Shadrack Amponsah of the CSIR-CRI Announced as One of Three Winners of the RUFORUM Young Scientists Award**

*Project Leader: Shadrack Kwadwo Amponsah (PhD):*

*Sponsor: Regional Universities Forum for Capacity Building in Agriculture (RUFORUM, BMGF)*

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) unveiled the Young Scientist Award Competition specifically to honour young and dynamic scientists who hold tremendous promise for scholarly achievement in Ghana. After extensive reviews by a team of technical experts in the specified fields, three (3) Young Scientist awardees from Ghana were competitively selected for various award categories. Dr. Shadrack Kwadwo Amponsah, an agricultural

engineer and research scientist of the CSIR-Crops Research Institute, was one of the awardees.



*Ing. Dr. Shadrack Kwadwo Amponsah receiving his award*

Established by African university vice chancellors in 2004, the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) is a consortium of 121 African universities operating in 38 countries on the continent with a vision to create “a vibrant agricultural sector linked to African universities which produce



high-performing graduates and high-quality research responsive to the demands of Africa’s farmers for innovations and able to generate sustainable livelihoods and national economic development”.

## 04 Dr. (Mrs) Evelyn Adu Kwarteng wins Outstanding Project Leader Award

*Project Leader: Evelyn Adu-Kwarteng (PhD): Sponsor: KAFACI*



*Dr.(Mrs.) Evelyn Adu-Kwarteng receiving her award*

At a project evaluation workshop on the project “Development and Application of Postharvest Handling Model for Horticultural Crops”, Dr. (Mrs) Adu-Kwarteng, a Senior Research Scientist of the CSIR-Crops Research Institute was adjudged the most outstanding Project Leader (PI) in the Postharvest Horticultural Research Program.

The three (3)-year project which is sponsored by the Korea Africa Food and Agriculture Cooperation Initiative (KAFACI) spans fifteen (15) African countries and aims at reducing post-harvest losses in horticulture to the barest minimum.

Dr. (Mrs.) Evelyn Adu-Kwarteng is a specialist in Post-Harvest Technology and is currently the head of the Biotechnology, Seed and Postharvest division of the CSIR-Crops Research Institute.



# OUR CROP VARIETIES

## **CRI-Agbeyeye**

*Pod Yield: 2.3 t/ha  
High Biomass  
Maturity: 90-95 days*



## **CRI-Dehvee**

*Pod Yield: 2.9 t/ha  
High Oil Content  
Maturity: 85-90 days*



## **CRI-Obolo**

*Pod Yield: 2.7 t/ha  
Confectionary Product  
Maturity: 105-110 days*



## **Groundnuts**

*CALL: 0244 213 204*

## **CRI-Oboshie**

*Pod Yield: 2.6 t/ha  
Moderate Pod Constriction  
Maturity: 105-110 days*



## **CRI-Yenvawoso**

*Pod Yield: 2.7 t/ha  
Slight Pod Constriction  
Maturity: 90 days*



## **MEDIA ENGAGEMENTS**

The media plays a very critical role in the Institute’s research activities by disseminating research results and technologies to the public and all stakeholders. The Institute therefore engages the media regularly by visiting radio and television stations as well as contributing to several newspaper publications. The Institute also has a regular “spot” on a number of local radio stations within the Kumasi metropolis. Scientists from the Institute regularly educate farmers and other stakeholders on good agronomic practices and improved technologies. In 2019, the Institute’s website and social media platforms also published a number of articles and stories to inform and engage the public on its activities.

TITLE OF PUBLICATION	MEDIA ORGANIZATION	DATE OF PUBLICATION
<b>South Korea gives \$55,000 to combat post-harvest losses in horticulture</b>	Ghanaian Times	12 <sup>th</sup> June, 2019
<b>CSIR-CRI develops new rice varieties</b>	Daily Graphic	21 <sup>st</sup> June, 2019
<b>CSIR-CRI develops 4 new beans varieties</b>	Ghanaian Times	23 <sup>rd</sup> November, 2019
<b>Inadequate opportunities for farmers</b>	Daily Graphic (Feature)	11 <sup>th</sup> December, 2019
<b>Sharing of CSIR-CRI technologies by scientists in farmers’ radio programme</b>	New Mercury Radio, 91.5 FM, Kumasi	2 <sup>nd</sup> May – 10 <sup>th</sup> October, 2019
<b>Live Interview with Director, CSIR-CRI</b>	Zuria 88.7 FM, Kumasi	23 <sup>rd</sup> December, 2019

*A summary of the Institute’s Media Engagements in 2019*

# CSIR develops digital platform for farmers

By Salomey Appiah Adjei

**T**HE Council for Scientific and Industrial Research (CSIR) has developed a digital platform that will enable farmers to easily access information on their product and services.

Known as the Agricultural Digital Hub platform, the application will be accessible on android mobile phones and tablets and will have all information about products and services of the CSIR that could help farmers enhance their work and increase their productivity.

The Deputy Director of CSIR, Prof. Paul Bosu, who made this

collaboration while enhancing agriculture in the country.

## The strategies

Prof. Bosu said research should aim at helping farmers to enhance their work to increase productivity and also make agriculture sustainable.

"Farmers have been doing their best over the years to feed the country and even beyond and the system where scientists will do the research and force on the throat of the farmers is what we want to address", he said.

## MIN READ



An application which will enable farmers to access information on the Council for Scientific and Industrial Research (CSIR)

challenges of the farmers and come up with appropriate innovations and technologies to increase their production based on a sustainable production system which maintains and/or increases soil fertility.

Through the committee, he noted that CSIR had produced and distributes over 25 metric tonnes of varieties of seed crops including maize, sorghum

*Newsprint report on the development of digital platform for farmers.*

# Inadequate opportunities for farmers

By Joshua Bediako Nsonn

**A**GRICULTURE accounts for about 30 per cent of Ghana's GDP and employs 67 per cent of the working population. Ghana has five agricultural regions.

The dominant agricultural sector in cocoa, of which Ghana is the second largest producer in the world after Cote d'Ivoire (together they account for 70 per cent of the world market share). Cocoa is cultivated in the western of the country. From the Ashanti plateau to the Volta basin, Ghana can produce up to 100,000 tonnes of beans during good harvests.

However, despite the massive contribution the sector is making to the development of the country, enough opportunities have not been created for stakeholders, particularly farmers.

## Statistics

Statistics indicate that by 2050, the world population will reach 9.6 billion, with 1.6 billion coming from Africa and about 1.5 billion from Ghana, up from the current 80 million.

The growing population and steadily increasing demands for modern farmers, in view of scientific and technological progress and need, emphasize the need to move towards food security, showing the need for which is currently estimated at more than 50 per cent of total potentials of a number of crops through: prohibiting deforestation; We need to be prudent and efficient in the use of resources at our disposal.

Recently, some local scholars have recommended, including longer term loans to allow for larger land holdings and irrigation.

Cooperatives and other non-profit private organizations in Ghanaian agriculture.

Some recent estimates suggest that we reach an 80 per cent of Ghana's arable land is underutilized, in part due to insecure property rights.

There is much change occurring in land tenure systems, under the impetus of new urban and market processes, and the government's new land policy and a land administration project that seeks to address land issues that exist in various parts of the country, particularly in some of the interventions that can address this challenge.

The general issue is that land is still a major constraint to agricultural productivity, both for small-scale farmers and for commercial operations. There is a need to speed up the pace of land reform here as a pre-agriculture policy approach. The land bank proposal, however, by the government, which is being used to some extent, is a compromise for small-scale farmers.

## Basic education

Basic education is critical for small-scale farmers who need to adopt new technologies, seeds and crops. While Ghana has made great strides in recent years in expanding gross enrolment in primary

schools, many rural schools have poor facilities (including teachers, per capita enrolment) in its own and some approach in the background of rural housing crisis. However, in the country, being provided through the internet learning approach to be implemented through the form of government support through programme such as the "E-learning for food and agriculture" (E-LFA) is a strategy that incorporates knowledge in making better use of land.

## Markets

Making markets work better for smallholder farmers will require a more active role in the state, agriculture and other business of government programs. These are challenges which are not addressed in the current policy and market reforms. There is need for a more active role in the need for improved interventions in related areas.

Despite past efforts, smallholder farmers still face many challenges, including limited access to credit, extension services, and market information. The government has a responsibility to support smallholder farmers through various interventions, including providing access to credit, extension services, and market information.

## State involvement

The government has a responsibility to support smallholder farmers through various interventions, including providing access to credit, extension services, and market information.

## Problems

Smallholder farmers face many challenges, including limited access to credit, extension services, and market information. The government has a responsibility to support smallholder farmers through various interventions, including providing access to credit, extension services, and market information.



*Newsprint report on inadequate opportunities for farmers.*

# OUR CROP VARIETIES

## **CRI-Adoye**

*Potential Yield: 1.3 t/ha  
Good canning quality  
Maturity: 60-65 days*



## **CRI-Ennepa**

*Potential Yield: 2.1 t/ha  
Good canning quality  
Maturity: 60-65 days*



## **CRI-Nsoroma**

*Potential Yield: 1.3 t/ha  
Tolerant to Diseases  
Maturity: 60-65 days*



## **CRI-Semanhya**

*Potential Yield: 1.9 t/ha  
High Iron/Zinc Content  
Maturity: 60-65 days*



## Common Beans

CALL: 0244 213 204

## **DONOR SUPPORT IN 2019**

With no research support from the Government of Ghana, the Institute continues to receive funding for all its research projects from both local and international funding agencies. In 2019, sponsors such as Solidaridad, the Centre for Agriculture and Bioscience International (CABI), the Alliance for a Green Revolution Africa (AGRA), the Bill/Melinda Gates Foundation (BMGF), KAFACI International, the International Institute of Tropical Agriculture (IITA), the International Center for Tropical Agriculture (CIAT), the African Agricultural Technology Foundation (AATF), KOPIA and the Modernizing Agriculture in Ghana (MAG) secretariat were the major donors to the Institute.

# OUR CROP VARIETIES

## **Crops-Zamzam**

*Yield potential: 3.0 t/ha  
High iron content  
Resistant/Tolerant to most cowpea pests  
Maturity: 64-67 days*



## **Crops-Agyenkwa**

*Yield Potential: 3.3 t/ha  
Tolerant to Cercospora leaf-spot disease  
Maturity: 62-64 days*



## **Crops-Hansadua**

*Yield potential: 3.5 t/ha  
Resistant/Tolerant to most-insect pests of cowpea  
Maturity: 65-67 days*



## **CRI-Nketewadε**

*Yield potential: 3.2 t/ha  
Tolerant to Cercospora leaf spot disease and-Antracnose  
Maturity: 62-65 days*



# Cowpeas

CALL: 0244 213 204

# COMMERCIALIZATION ACTIVITIES

The commercialization division of the Institute is charged with the responsibility of driving the commercial activities of the Institute to enhance its income generating capacity and improve the dissemination and transfer of its technologies. A major part of this involves the sale of improved varieties of planting materials/seeds from its orchards and plantations.

In 2019, the Institute produced planting materials for the Government of Ghana's Planting for Food and Jobs (PFJ) programme as well as the Planting for Export and Rural Development (PERD) programme which is targeting one million farmers to cultivate and average of one hectare of land each.



*Some commercialized commodities available at the Institute*

In total, the Institute initiated the production of 180,000 rubber seedlings as well as 150,000 cashew seedlings. Additionally, seven hundred (700) citrus and seven thousand (7,000) mango seedlings were produced for sale.

# OUR CROP VARIETIES

## **CRI-Kofi Annan**

*Yield potential: 19.2 t/ha  
Beta-carotene content: 28.46 (mg/ 100g) DW  
Tolerant to Sweetpotato weevil*



## **CRI-Vern Gracen**

*Yield potential: 22.4 t/ha  
Beta-carotene content:  
7.25 (mg/ 100g) DW  
Tolerant to Sweetpotato- weevil*



## **CRI-AGRA SP09**

*Yield potential: 26.4 t/ha  
Beta-carotene content:  
2.85 (mg/ 100g) DW  
Tolerant to Sweetpotato weevil*



## **CRI-AGRA SP 13**

*Yield potential: 39.2 t/ha  
Beta-carotene content: 11.38 (mg/ 100g) DW  
Tolerant to Sweetpotato weevil*



# Sweet-potato

CALL: 0244 213 204



# OUR CONSUMER ACCEPTED PRODUCTS



**100% Beans**



**50% Beans**



**80% Beans**

*Meat Substitutes made from CSIR-CRI Bean Varieties*



*Snack Products Prepared from Whole Beans*



*Highly Nutritious Tigenut-  
Flavoured Veggie Milk*



*Pre-cooked Beans (for salads, jollof etc)*

# HUMAN RESOURCE AND STAFF RECRUITMENT

A major challenge the CSIR-Crops Research Institute faces every year is staff attrition. The staff strength of the Institute has reduced from 605 in 2017, to 572 in 2018 and currently stands at 542. This decline is due to the huge numbers of staff who retire every year and the Institute's inability to recruit new staff due to the freeze on public sector employment by the Government of Ghana. After numerous appeals to the Government of Ghana, the Institute was cleared to recruit eleven (11) new staff in 2019. Consequently, two research scientists, five principal technologists, two technical officers, one marketing officer and one cash officer were employed. Staff of the Institute continue to seek higher education in order to improve on the delivery of our mandate. Consequently, six (6) senior members of the Institute earned various promotions in 2019.



*Dr. Ebenezer Obeng Bio  
Research Scientist*



*Mr. Samuel Azuug Ndebilla  
Marketing Officer*



*Dr. (Mrs) Mavis Badu-Brempong  
Research Scientist*



*Mr. Elvis Agyei Obeng  
Principal Technologist*



*Mrs Abigail Addo-Danso  
Principal Technologist*



*Mr. Jerry Fenteng Asamoah  
Principal Technologist*

***Newly Recruited Staff of the Institute***

# OUR PEOPLE



*Prof. Moses B. Mochiah*



*Prof (Mrs) Marian D. Quain  
Deputy Director*



*Dr. (Mrs.) Evelyn Adu-Kwarteng  
Head of Biotechnology,  
Seed & Postharvest*



*Mr. Beloved M. Dzomeku  
Head of Horticulture*



*Dr. Stephen Amoah  
Head of Legumes & Oilseeds*



*Dr. Paul Kofi Dartey  
Head of Cereals*



*Mr. Francis O. Amofah  
Head of Administration*



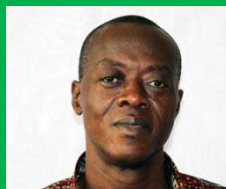
*Mr. Mohammed B. Braimah  
Head of Finance*



*Dr. (Mrs.) Patricia P. Acheampong  
Head of Resource &  
Crops Mgt./ Socioeconomics*



*Dr. Ernest Baafi  
Head of Roots and Tuber*



*Dr. Allen Oppong  
Head of Plant Health*



*Mr. Solomon K. Darkey  
Head of Scientific Support Services*



*Mr. Samuel Azuug, Head of Commercialization*

**Director, Deputy Director and Heads of Divisions of CSIR-CRI**

# OUR PEOPLE

## Director

Moses Brandford Mochiah

## Deputy Director

Marian Dorcas Quain

## Root & Tuber Crops Division

### Ernest Baafi (Head of Division)

Emmanuel Otoo

Kwadwo Adofo

Kwame Obeng Dankwa

Peter Appiah Danquah

Bright Boakye Peprah

Kwadwo Alhassan

Asamoah Obeng Nyarko

Joseph K. Awoodzie

Oswald Ohene Gyan

Nanaebo Blankson

Cynthia Oppong Darko

Habbibah Aggrey

Irene Dufie

Prince Opoku

Ebenezer Obeng-Bio

Job Owusu

## Cereals Division

### Paul Kofi A. Dartey (Head of Division)

Manfred B. Ewool

Elizabeth Norkor Nartey

Priscilla F. Ribeiro

Maxwell Darko Asante

C.K.A. Adaabre

Yameen Huss-Cole

Raphael K. Bam

Stephen O. Kunkumah

Eric Baffoe

Ebenezer Annan-Afful

William Lelabi Kota

Phyllis Aculey

Samuel Tandoh

Sober E. Boadu

Emmanuel Abugbila

Vida Amuzu

Isaac Owusu Konadu

Joseph K. Amponsah

## Legumes & Oil Seeds Division

### Stephen Amoah (Head of Division)

James Yaw Asibuo

Sylvester Addy

Victoria Larweh

Paul Manor

Maxwell Lamptey

Franklin B. Denkyira

Antwi-Bofah Henry

Felix Gakpleazi

Afua Gyaamah Gyima

## Horticulture Division

### Beloved M. Dzomeku (Head of Division)

Alberta Nsenkyire

Paul Mintah

Adama Haruna

Isaac Osei Bonsu

Michael Osei Kwabena

Jacinta Adoma Opoku

Benjamin Annor

Kwabena Asare Bediako

## Resource, Crop Management and Socio-Economics Division

### Patricia P. Acheampong (Head of Division)

Joseph Nketiah Berchie  
Patricia Oteng Darko  
Mavis Badu Brempong  
Shadrack K. Amponsah  
Stephen Yeboah  
Eric Owusu Danquah  
Kennedy Agyeman  
Erasmus Narteh Tetteh  
Felix Frimpong  
Mavis Numafa  
Michael T. Odamtten  
Aisha Karim  
John K. Fordjour  
Offei Micah Apraku  
Joyce A.S. Haleegoah  
Bright Owusu Asante  
Jonas Osei-Adu  
Natson Eyram Amengor  
Alexander Adu-Appiah  
Benedicta Nsiah Frimpong  
Lydia Brobbey  
Harriet Yeboah  
Mary Otiwaa O. Asante  
Monica Opoku  
Issac Kwame Frimpong  
Abigail Addo Danso  
Michael Fiifi Ampofo

## Commercialization Division

### Samuel A. Ndebilla (Head of Division)

John Fordjour  
Mark Anti  
Richard Peprah  
Ricmond Owusu Amankwah  
Theresa Boakye  
Cynthia Badoo  
Isaac Kusi  
Samuel Yankyera  
Augustine A Boakye  
Isaac Mensah  
Eric Donkor  
Thomas Acheampong  
Agnes Nti

## Plant Health Division

### Allen Oppong (Head of Division)

Kingsley Osei  
Haruna Braimah  
Adama Ibrahim  
Umar Sanda Issah  
W. Amoabeng Blankson  
Matilda Frimpong  
Godfried Ohene-Mensah  
Maxwell Kwodane  
Grace E.K. Bolfrey-Arku  
Stephen Arthur  
Kofi Frimpong Anin  
Joseph Adomako  
Atta Kwasi Aidoo Snr.  
Zippora Appiah-Kubi  
Yaw Danso  
Francis Ayueboteng  
Esther Agyemang Marfo  
Bismark Abugri  
Jerry Fenteng Asamoah

## Scientific Support Services Division

### Solomon K. Darkey (Head of Division)

Bernard Sakyiamah  
Lawrencia D. Acheampong  
Ruth Adu-Donyinah  
Solomon Gyasi Boakye  
Harriet A. Dwamena  
David Kow Amo  
William Aidoo  
Enock Osei Tutu  
Dora Aninakwa  
Sandra Baah Sakyi  
Linda Agyeman  
Esther Dwomoh  
Paulina Asieduaa  
Elvis Agyei Obeng

## Biotechnology/Seed Technology/Post Harvest Division

### Evelyn Adu-Kwarteng (Head of Division)

Ruth Prempeh  
Marian Dorcas Quain  
Michael A. Boateng  
Francis Amoako-Andoh  
John Kwadwo Addo  
Charles Afriyie Debrah  
Alimatu Sadia Osuman  
Harry Okyere  
Hillary Mireku Bortey  
Victor A. Amankwaah Henry  
Akrofi Doku  
David Appiah Kubi  
Linda A. Abrokwah  
Sylvia Kafui Artcher

Agnes Achiaa Aboagye  
Gertrude Osei-Diko  
Daniel K. Cudjoe  
Lily Naa Adoley Allotey  
Agnes Nimo Bosompem Monica Ode  
Adu-Gyamfi  
Joyce M. Gbarimaa  
Abigail Amoa-Owusu  
Mary Arthur  
Isaac Osei Tutu  
Belinda Akomeah  
Faustina Okyere  
Theodora A. Mensah  
Emmanuel Asamoah Adjei

## Administrative Division

### Francis Amofah (Head of Division)

Emmanuel Afriyie  
David Denu  
Joyce Larbi-Siaw  
Emmanuel Dadzie  
Martina Sikinya  
Joshua Atisu  
Christiana Nti  
Vera Fosua Yeboah  
James Konadu Bofo  
Cephas Nani  
Emmanuel Tetteh  
Richard Abongo  
Jackson O. Agyemang  
Emmanuel Amankwatia  
Yaw Kwodane  
Vida Antwi  
David Isaac Kpegah

Boye Opey  
Emmanuel Tetteh  
Asiedu Boateng  
Richard Aboagye Bekoe  
Paul Osei  
Johnson Ofori  
Emmanuel Bonige  
John Amoako  
Luke Opoku Amankwa  
Frank Appiah  
Paulina A. Sarkodie  
Michael Antifu  
Anthony Nimoh  
Elizabeth Nyarko  
Joseph Muah  
Lynda G.S. Nsafoah  
Mary Gyapong

## Accounts Division

**Baba Ibrahim Mohammed (Head of Division)**

Isaac Donkor

Maxwell Bright Owusu

Robert Adu-Gyamfi

John Amihere Mensah

Hayford Asiedu Boateng

Mawusi Lotsu

Thomas Konadu Yiadom

Martin Osei-Bonsu

Prince O. Agyeman

Anita Pokuaa Gyamfi

Olivia Opoku

Abraham Walden

Anthony Ofori

Isaac Osei Mensah

Peter Amoah

Emmanuel Manu

Daniel Tetteh

Fredrick Owusu

**Junior Staff and Others numbering - 292**

# 2019 SCIENTIFIC PUBLICATIONS

## PEER REVIEWED JOURNAL PAPERS

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- Acheampong, P. P., Amengor, N.E., Frimpong, B. N., Adu-Appiah, A., Haleegoah, J., Adogoba, D. and Nimo-Wiredu, A. (2019). Determinants of Adoption of Improved Sweetpotato Varieties in Ghana, *Ghana Journal of Agricultural Economics and Agribusiness* 2(1):65-85.
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## CONFERENCE PAPERS/CONFERENCE PAPER ABSTRACTS

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Acheampong, P. P., Amengor, N. A., Adu-Appiah, A., Nsiah-Frimpong, B., Haleegoah, J., Weridu, A. N. and Adogoba, D. (2019). Effects of Adoption of Improved Sweetpotato varieties on Yields and Incomes of Male and Female farmers. Invited paper presented at the 6th African Conference of Agricultural Economists, September 23-26, 2019, Abuja, Nigeria.

Agyemang K.O., Asante M.D., Oppong A, Asare-Bediako E. (2019). Marker-assisted breeding for resistance to the rice yellow mottle virus disease in Ghana. Abstract Submitted to the African Plant Breeders Association maiden conference in Accra, Ghana 23- 25<sup>th</sup> October 2019.

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Frimpong-Anin, K., Adama, I., Umar, S.I., Mochiah, M.B., Ohene-Mensah, G., Yeboah, S., Danso, Y., Ennin, S.A., Braimah, H., Agyekum, A. D., Opoku, P., Antwi, D. and Obeng, P. (2019). Integrated management of fall armyworm: Achievements of the CSIR-Crops Research Institute. Programme and abstracts, *2<sup>nd</sup> RSA Scientific Conference*, Ksoa, 22-25 October, 2019.

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Kusi , F., Sugri, I., Mukntaru, Z., Patrick, A., Lamini, S., Awuku, F.J., Laary, J., Ohene-Mensah, G., Agyare, Y.R. and Adogoba, D. (2019). Effects of Adoption of Improved Sweetpotato varieties on Yields and Incomes of Male and Female farmers. Invited paper presented at the 6th African Conference of Agricultural Economists, September 23-26, 2019, Abuja, Nigeria.

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- Yeboah, S., Oteng-Darko, P and Ribeiro, P.F. (2019). School Lunches - Reducing Malnutrition via Promoting Nutritious Pro-Vitamin "A" Maize in Ghana. 4<sup>th</sup> Federation of African Nutrition Societies (FANUS) conference. Kigali-Rwanda 26<sup>th</sup>-29<sup>th</sup> August 2019.
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