Africa Research in Sustainable Intensification for the Next Generation - West Africa

Research in sustainable intensification of cereal-based farming systems in the Guinea-Sudan-Savanna of West Africa

2018 Research Year Work Plan - Ghana

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The Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.

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Partners and their responsibilities

Name	Acronym	Role/responsibility
Government Ministries/Entities		
Ministry of Food and Agriculture	MoFA	Scaling-out SI technologies and establishment of R4D platforms
Ghana Health Services	GHS	Household nutrition R4D with UDS and IITA
Women in Agriculture Development	WIAD	To improve lives and working conditions of rural households
National Academic/Research Institutions		
Animal Research Institute	ARI	R4D on livestock production (sheep and goats) with ILRI
Kwame Nkrumah University of Science and Technology	KNUST	Graduate student training and R4D on soil-water dynamics
Science and Technology Policy Research Institute	STEPRI	Policy and institutional research
University for Development Studies	UDS	R4D on livestock nutrition and human nutrition, Graduate student training
International Academic/Research Institutions		
International Food Policy Research Institute	IFPRI	Lead site selection, baseline survey and monitoring and evaluation
International Institute of Tropical Agriculture	IITA	Overall project coordination and R4D research on cereal-legumes
International Livestock Research Institute	ILRI	Lead R4D on ruminants in Ghana and natural resources governance in Mali
International Water Management Institute	IWMI	Lead R4D on water management
International Center for Tropical Agriculture	CIAT	Collaboration on soil-water-management
Wageningen University and Research, The Netherlands	WUR	R4D on farming systems characterization and graduate training

Summary

The Africa RISING West Africa (WA) project is being implemented by multi-disciplinary research teams and development partners from the public and private sectors in collaboration with farmers and community-based organizations in northern Ghana and southern Mali.

This document presents the work plans for the 2017 research year for Ghana. The work plans are mapped under the four Outcomes in the Phase 2 project log frame (See Table 1 below). Nine activity protocols are presented – four for Outcome 1; two each for Outcomes 2 and 3; and one for Outcome 4. The nutrition activities are integrated with the livestock and vegetable activities in protocol GH211-17 under Outcome 2 in response to the recommendation of the USAID-commissioned external evaluation team.

Gender mainstreaming, capacity building and knowledge exchange and dissemination are embedded in all activity protocols. Linkages between activities are presented in each activity protocol. Publication of research results and better communication among research teams within and across countries will be a major focus.

1. Background

Phase 1 (1 October 2012 - 30 September 2016) of the USAID-funded Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) project in West Africa (WA) was implemented in 25 intervention communities in northern Ghana and 9 villages in the Bougouni and Koutialia districts of the Sikasso Region in southern Mali under the *title 'Sustainable Intensification of Key Farming Systems in the Guinea-Sudano-Sahelian Zone of West Africa'*. Research activities under Phase 1 were organized around 3 research outputs (ROs), namely: 1) Situation analysis and program-wide synthesis (RO1); 2) Integrated Systems Improvement (RO2) and 3) Scaling and Delivery (RO3). Capacity building and gender were cross-cutting.

Phase 2 (1 October 2016 - 30 September 2021) of the WA project was launched in February 2017. The workplan is organized around 21 activities under 11 outputs to achieve four outcomes (Table 1). Implementation will be guided by achievements and lessons from Phase 1. There will, however, be a shift in approach from Research-for-Development (R-4-D) in Phase 1, to Research-in-Development (R-in-D) in Phase 2.

Technological packages and/or practices validated in Phase 1 (see Table 2) will be scaled out targeting agro-ecosystems and socio-economic circumstances defined by the sustainable intensification (SI) domains - productive, economic, social, human and environmental. Linkages will be established with research and development partners to undertake both generic and back-stopping research. The generic research aims at completing the loose ends of research on the SI innovations in Phase 2 plus any other emerging issues. The back-stopping research will address researchable issues emerging from the scaling-out of SI innovations with the development partners.

Phase 2 will also explore new research areas emerging from Phase 1 experiences and feedback by research and development partners, notably, using results from farming systems analyses and farm types to inform research targeting and technology dissemination; post-harvest management and value addition; nutrition-sensitive agriculture; labor-saving mechanization solutions for small-scale farmers; and climate-smart agriculture. The project will also develop the following research and development strategy documents: 1) a livestock strategy to increase the impact of livestock-related activities, especially those on small ruminants, poultry and pigs; and a nutrition strategy to harmonize nutrition-related activities with the crop and livestock activities, as well as with national nutrition approaches. It will engage in the purposeful inclusion of gender and youth concerns and develop more rigorous and quantitative approaches for measuring diffusion and early adoption of SI technologies.

This document presents the work plan for Ghana for the 2017 research year. The work plan for Mali for the same period is presented in a separate document.

Table 1: Outcomes, outputs and activities of the Africa RISING West Africa project Phase 2	
Outcome 1: Farmers and farming communities in the project area are practicing more productive, resilient, and profitable and sustainably intensified crop-livestock systems linked to markets.	
Output 1.1: Research products for more productive, intensive, diverse, profitable and resilient crop (cereals, legumes, and vegetables); livestock (sheep, goats, cattle, poultry and pigs) and integrated crop-livestock farming systems are identified and disseminated to farmers through development partners in the intervention communities.	Activity 1.1.1: Test a combination of climate-smart crop varieties and agronomic practices to increase and sustain food and feed production. Activity 1.1.2: Test and disseminate a combination of improved breeds, housing, feeding, health and breeding practices to intensify rearing of livestock (sheep, goat, pig, and poultry) for meat, egg and milk production.
Output 1.2: Integrated management practices and innovations to improve and sustain productivity and ecosystems services of the soil, land, water and vegetation resources are developed and disseminated with farmers and development partners in the intervention communities.	Activity 1.2.1: Test and disseminate land, soil and integrated land-soil technologies and practices to improve and sustain productivity and ecosystems services at the farm and landscape/watershed levels. Activity 1.2.2: Test and promote water management technologies and practices to increase water productivity in small-scale crop-livestock farming systems under rainfed and irrigated conditions.
Output 1.3: Labor-saving and gender-sensitive technologies in target areas to reduce drudgery while increasing labor efficiency in the production cycle delivered.	Activity 1.3.3: Demonstrate small scale maize shelling machines to smallholders and other stakeholders to reduce drudgery and labor requirements
Outcome 2: More farmers and farm families are adopting technologies and practices to improve nutrition, food and feed safety, post-harvest handling and value addition.	
Output 2.1: Improved technologies, innovations, practices and habits to increase production and consumption of safe diverse and more nutritious food for farm families, especially by women and children developed and disseminated in partnership with research and development partners.	Activity 2.1.1: Develop a nutrition strategy to harmonize the nutrition activities national nutrition approaches and link them to the crop and livestock activities Activity 2.1.2: Build capacity of farm families, especially women to produce and consume diverse and more nutritious food.
Output 2.2: Postharvest technologies and practices to provide options for the food, and feed sectors are tested and disseminated to farmers, through researchers, extension staff, and development partners.	
Outcome 3: Farmers and other value chain actors have greater and equitable access to production assets and markets (input and output) through enabling institutions and policies.	
Output 3.1: Improved policies and institutional arrangements to increase participation of farm families, especially women and youth in the output and input markets and decision-making are developed	Activity 3.1.1: Identify constraints to and opportunities for improving access to the output and input markets by women and youth in the target area.
Output 3.2: Options to increase access to production assets and increase participation in decision-making by women, youth and other vulnerable groups.	Activity 3.2.1: Identify constraints to, and opportunities for increasing women and youth access to production assets in the target area.
Outcome 4: Effective partnerships are built with farmers, local communities, and research and development partners in the private and public sectors to ensure delivery and uptake at scale of SI technologies, innovations and practices.	
Output 4.1: Alliances and effective partnerships developed between farmers,	Activity 4.1.1: Conduct cost-benefit and gender analysis coupled with other socio-economic analyses to identify and quantify

local communities, and research and development agents in the public and private sectors to enable the release, dissemination, and adoption of proven technologies and practices to scale.	adoption constraints and opportunities for different farmer contexts. Activity 4.1.2: Map and assess relevant stakeholders to establish dialogue for the exploration of mutual synergies for scaling delivery of validated technologies.
Output 4.2: Gender-sensitive decision support tools to assess technology-associated risks and opportunities are available for use by project partners.	Activity 4.2.1: Identify and communicate gender-sensitive decision support tools in the context of different farm typologies.
Output 4.3: A framework for monitoring and evaluating technology adoption, and technology-associated risk accessible to the project team and scaling partners	Activity 4.3.1: Monitor and modify the progress of technology adoption process towards scaling
Output 4.4: Knowledge sharing centers (physical structures) and learning alliances are developed within existing local and regional institutions	

Table 2: List of validated technologies ready for promotion through development partners in the Northern, Upper East and Upper West regions of Ghana

Broad category	Validated flagship technology
Introduction of new crops and varieties to overcome existing biotic and abiotic stresses and improve productivity per unit land area	New varieties – drought-tolerant maize, rice, aflatoxin resistant groundnut, sorghum hybrids, early-maturing cowpea, dual-purpose cowpea, short-duration soybean, medium soybean, high yielding and disease resistant varieties of vegetables (okra, roselle, tomato, eggplant and pepper)
Agronomic practices to improve grain and fodder yield per unit land area, and improve soil nitrogen	Cereal-legume intercropping Cereal-legume rotations Dual-purpose food legumes Cereal-vegetable intercropping
Integrated soil fertility management as a cost-effective approach to replenish soil fertility	Optimized N and P fertilizer rates Fertilizer micro-dozing Livestock corralling for manure/urine Cereal-legume rotations Cereal-legume intercropping
Improved livestock feeds and feeding, housing, health and breeding management packages	Sheep/goat flock feeding package Sheep/goat health package Housing and feeding for poultry Guinea fowl hatching and brooding management Stover quality improvement
Introduction of pre- and post-harvest technologies to reduce food waste and improve food safety	Storage – PICS bags, plastic drums Aflasafe application

2. Planned work

2018 Africa RISING West Africa Activity Protocol – Outcome 3: GH311-18				
Outcome 3: Farmers and other value chain actors have greater and equitable access to production assets and markets (input and output) through enabling institutions and policies				
a. Output 3.1	Improved policies and institutional arrangements to increase participation of farm families, especially women and youth in the output and input markets and decision-making are developed.			
b. Activity 3.1.1	Identify constraints to and opportunities for improving access to the output and input markets by women and youth in the target area.			
c. Sub-activity GH311-18	Assess institutions enabling or constraining access to output and input markets by farm households (particularly youth and women) in Africa RISING intervention Regions of Ghana			
d. Research team				
Name	Institution	Role		
Charity Osei-Amponsah	CSIR-STEPRI	Sub-Activity leader		
Adams Abdulai	CSIR-STEPRI	Research Assistant (Agric economics)		
Nana Yamoah Asafu-Adjaye	CSIR-STEPRI	Research Assistant		
Maame Dokuaa A. A. Addo	CSIR-STEPRI	Research Assistant		
Bekele Kotu	IITA	Support for research design and conceptualization		
e. Student(s)				
Name	Institute	Degree	Start	End
f. Location(s)	Purposively selected towns in specific districts of the Upper West, Upper East, and Northern regions			
g. Start	August 2018			
h. End	August 2019			
1. Justification				
Enabling institutional contexts enhance the effectiveness of up-scaling initiatives by projects. The Africa RISING project intends to promote the use of validated technologies generated from previous research activities, it is, therefore, important to first understand the institutional landscape to unravel issues that enable and/or constrain access to output and input markets. This will generate insights for designing tailor-made scaling-up/out models that would respond effectively to helping smallholders overcome constraining market institutions for better adoption of promoted SI technologies.				
2. Objectives				
Assess institutions that enable or constrain access to output and input markets by women and youth in Northern Ghana.				
3. Research questions				
3.1 What attitudes to learning, new knowledge, and innovations are prevalent among smallholders for the creating output and input markets, and what incentives are in place to encourage their use? 3.2 What input and output market opportunities exist for smallholders, and how efficient are the value chains surrounding the livestock and maize, cowpea markets in the three northern regions of Ghana?				
4. Procedures (survey methods, gender disaggregation, treatments, experimental design, sample size, etc.)				
Desk research, personal interviews, participatory rural appraisal, focus group discussion, validated with household surveys using semi-structured questionnaires. Data will be disaggregated based on youth, women and men.				
5. Data to be collected and uploaded		Responsibility/Institute		
5.1 Secondary and primary quantitative and qualitative data		CharityOsei-Amponash/CSIR-STEPRI		

6. Milestones		
Deliverables	Means of verification	Date
Data set on the institutional landscape for access to output and input markets collected	Interview guides; tape recorded and transcribed information, pictures and videos, quantitative data sets compiled	Jan. 2019
Report on preliminary analysis of data collected	Submitted report	Apr. 2019
Report on the complete analysis of data collected, including lessons and recommendations of approaches to creating enabling institutions for access to output and input markets submitted	Submitted report	Aug. 2019
Paper article and policy brief published in International Journal of Agricultural Sustainability or Sustainability	Journal article and policy brief publications	Jul. 2020

7. Sustainable intensification indicators	
7.1 Productivity	How enabling market institutions have affected Production yields/ at farm household levels
7.2 Environment	How input market institutions have affected ecological practices, crop-livestock integrated innovations/ at farm household levels
7.3 Economic	Input and output market participation, agricultural income/ at district and farm household levels
7.4 Social	Social cohesion- Participation in community activities; Level and reliability of social support/ community (town) and farm household levels
7.5 Human	Capacity to experiment and innovate- Number of farmers experimenting and using the validated technologies/ community (town) and farm household levels

8. How will scaling be achieved?
N/A
9. How are the activities in this protocol linked to those of others?
The activities in this protocol mainly focus on markets, institutions, policies and adoption of new SI technologies. These activities link directly to activities GH111-18 and GH112-18 which seek to generate new SI technologies and practices. The outlined activities will help to unravel insights on how access to input and output markets are achieved by women and youth.

8. How will scaling be achieved?	
Existing typologies (e.g. Signorelli, 2016) may serve to broadly test the validity of identified intra-household patterns per farm type. Knowledge about intra-household differences (and trade-offs) may sensitize/improve ongoing scaling efforts, minimizing intra-household trade-offs.	
9. How are the activities in this protocol linked to those of others?	
Linked to protocols GH111A-18.	

[1] Kuehne, G., Llewellyn, R., Pannell, D.J., Wilkinson, R., Dolling, P., Ouzman, J., Ewing, M. 2017. Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy Agricultural Systems 156 (2017) 115–125

2018 Africa RISING West Africa Activity Protocol- Outcome 4: GH412-18

Outcome 4: Effective partnerships are built with farmers, local communities, and research and development partners in the private and public sectors to ensure delivery and uptake at scale of SI technologies, innovations and practices.

a. Output 4.1	Understanding the social, economic, and institutional constraints to and opportunities for technology adoption from different farm typologies improved
b. Activity 4.1.2	Map and assess relevant stakeholders to establish a dialogue for the exploration of mutual synergies for scaling delivery of validated technologies
c. Sub-activity Gh412-18	Identify and assess delivery pathways to leverage and engage with existent initiatives including Government extension systems

d. Research team

Name	Institution	Role
Charity Osei-Amponsah	CSIR-STEPRI	Sub-activity leader
Adams Abdulai	CSIR-STEPRI	Research Assistant (Agric. economics)
Nana Yamoah Asafu-Adjaye	CSIR-STEPRI	Research Assistant
Maame Dokuaa A. A. Addo	CSIR-STEPRI	Research Assistant
Bekele Kotu	IITA	Support for research design and conceptualization

e. Student(s)

Name	Institute	Degree	Start	End

f. Location(s)	Upper West, Upper East, and Northern regions
g. Start	August 2018
h. End	August 2019

1. Justification

Lessons can be learned from existing initiatives, as well as tried and tested technology delivery pathways. The Africa RISING project intends to promote the use of validated technologies generated from previous research activities. It is, therefore, important to first understand the delivery pathways that are existing and how the project could engage with such initiatives for effective up-scaling approaches.

2. Objectives

Identify and assess delivery pathways of SI technologies to leverage and engage with existent initiatives on SI, including Government extension systems

3. Research questions

What organizational opportunities for SI delivery (extension and extension services; R&D; NGOs) exist and how effective are they in promoting SI practices and access to new knowledge and innovation by farmers? How can these be strengthened or taken advantage of in the implementation of other SI interventions?

4. Procedures (survey methods, gender disaggregation, treatments, experimental design, sample size, etc.)

Desk research, personal interviews, participatory rural appraisal, focus group discussion, validated with household surveys using semi-structured questionnaires.

5. Data to be collected and uploaded	Responsibility/Institute
5.1 Secondary and primary quantitative and qualitative data	Charity Osei-Amponsah/CSIR-STEPRI

6. Milestones

Deliverables	Means of verification	Date
Data set on existing SI initiatives and technology delivery pathways	Interview guides; tape recorded and transcribed information, pictures and videos, quantitative data sets compiled	Jan. 2019

Report on preliminary analysis of data collected	Report submitted	Apr. 2019
Report on the complete analysis of data collected	Report submitted	Aug. 2019
Paper article and policy brief published	Journal article and policy brief publications	Jul. 2020

7. Sustainable intensification indicators	
7.1 Environmental	Ecological practices, crop-livestock integrated innovations/ at farm household level
7.2 Economic	Profitability of agricultural activities related to increased dissemination and adoption of SI technologies at community level
7.3 Social	Social cohesion- types of interaction between proponents of SI technologies suppliers and users at community levels
7.4 Human	Capacity to experiment and innovate- number of farmers experimenting and using the validated technologies/ at farm household level

8. How will scaling be achieved?
N/A
9. How are the activities in this protocol linked to those of others?
The activities in this protocol mainly focus on markets, institutions, policies and adoption of new SI technologies. These activities link directly to GH111-18, GH112-18, GH113-18 and GH121-18, which seek to generate new SI technologies and practices. The proposed activities will help to unravel insights on how the generated technologies and practices are delivered and with what level adoption rate by farmers.

2018 Africa RISING West Africa Activity Protocol – Outcome GH421-18

Outcome 4: Effective partnerships are built with farmers, local communities, and research and development partners in the private and public sectors to ensure delivery and uptake at scale of SI technologies, innovations and practices.

a. Output 4.2	Gender-sensitive decision support tools to assess technology-associated risks and opportunities are available for use by project partners.
b. Activity 4.2.1	Identify and communicate gender-sensitive decision support tools in the context of different farm typologies.
c. Sub-activity: GH421-18	Dissemination of gender-sensitive technology assessment tools to project partners.

d. Research team

Name	Institution	Role
Gundula Fischer	IITA	Social scientist, gender expert

e. Student(s)

Name	Institute	Degree	Start	End

f. Location(s)	Ghana and Mali (as well as all other Africa RISING countries)
g. Start	October 2018
h. End	December 2018

1. Justification

In 2017 the Africa RISING gender team developed participatory tools for the gender-sensitive assessment of the interaction of agricultural technologies with a variety of social, economic and other factors. The three most important tools are activity profiles (focusing on shifts in labor time and burden), matrix scoring (exploring changes in all SI indicator domains) and linkage diagrams (as an open tool to capture farmers' views without predefined foci). These tools were included in a gender training manual and disseminated to project partners in four training sessions in Mali, Ghana, Tanzania and Malawi in 2017. The final version of the manual will be available on CGSpace in 2018.

2. Objectives		
2.1 To provide project partners with gender-sensitive technology assessment tools in the context of participatory farming systems and action research.		
3. Research questions		
4. Procedures (survey methods, gender disaggregation, treatments, experimental design, sample size, etc.)		
5. Data to be collected and uploaded		Responsibility/Institute
5.1 The "Gender Analysis in Agriculture" manual containing the tools will be uploaded to CGSpace accompanied by a blog on AR News to draw attention to it.		G. Fischer/IITA
6. Milestones		
Deliverables	Means of verification	Date
6.1. Manual uploaded	CGSpace	Dec. 2018
6.2. Blog	AR News	Dec. 2018