



Africa RISING West Africa Project: Phase II Project Logframe



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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 regional 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 the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>



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1 Summary

The agriculture sector in West Africa which employs 68% of the total population and contributes about 30% of the Gross Domestic Product is dominated by rain-fed, smallholder, crop, livestock, and integrated crop-livestock/agro-pastoral farming systems. Total productivity of the farming systems is generally low due to several biophysical and socio-economic factors, including weak integration of the crop and livestock enterprises, low soil fertility, land degradation, low and variable rainfall, shortages of labour and trained manpower, high post-harvest losses, limited value addition, scarce use of mechanization, poor market access, lack of enabling institutions and policies, and poor adoption of improved technologies.

The Africa RISING West Africa (WA) Project is one of the three regional USAID-funded Africa Research in Sustainable Intensification for the Next Generation (Africa RISING) projects operating in Ghana and Mali under the title '*Sustainable Intensification of Key Farming Systems in the Guinea-Sudano-Sahelian Zone of West Africa*'. The project aims at providing pathways out of hunger and poverty for smallholder families through sustainably intensified farming systems that sufficiently improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base. It is managed by the International Institute of Tropical Agriculture, and implemented by multi-stakeholder research-for-development platforms comprising of international and national research and development partners from the public and private sectors, community-based organizations, farmers' interest groups, service providers and market actors.

In Phase I (2012-2016), participatory and multi-disciplinary research resulted in implementation of baseline studies and literature reviews that generated a critical mass of data and information that is available to guide prioritization, planning, and implementation of Phase II. Climate-smart (high-yielding, early-maturing, drought and disease tolerant) crop varieties; as well as good practices to improve cereal-legume-vegetable cropping; soil fertility and water management; livestock feeding, housing, health-care and breeding management; and reduction of food waste and spoilage were identified as issues to be addressed by the project. Results were communicated in different formats, but mainly in publications, reports, and success stories, and a few technologies were taken to pilot scale for uptake and adoption. Individual and institutional capacities for SI and integrated crop-livestock research were strengthened. Phase II proposes to build its continuity on the solid research partnership foundation but also on harmonized activities across countries along common research and development outcomes. The WA project will strengthen strategic partnerships with development institutions, and leverage on their entrepreneurial approach for success in taking technologies to scale.

1.1 Vision of success

The WA Project subscribes to the purpose and theory of change expressed in the umbrella document. The project will continue to generate research outputs that will support the farm-based households of smallholders to improve their livelihoods by increasing income and improving diets. Dependent on the livelihood strategy there will be different roles of farming, ranging from subsistence to enterprise-oriented agriculture. This implies a diversity of intensification pathways that utilize different packages of technologies and practices to realise sustainable intensification. Action research will be supported by extension material and rural development strategies that will be developed to stimulate technology and educational dissemination activities, and extended to about 92,000 households by the year

2021. These activities are designed to respond to the goals of smallholder households by accelerating adoption of technology breakthroughs that promote sustainable land management; increasing diversification of crop and livestock production to improve household diets in a manner that favourably affects the most vulnerable smallholders, particularly women and children; and increasing adoption of value addition to and the marketing of farm products as a means to improve incomes. Different sustainable production approaches are likely to be required within contrasting agro-ecological zones and socio-economic settings in what are otherwise similar smallholder systems and these will be addressed through typology characterization and targeting.

Building on current, and developing more functioning partnerships between research and development will be the basis for the envisaged success of Phase II of the WA Project. The Figure 3 shows numbers of beneficiary households that the WA Project is targeting directly through the research process and in partnership with development projects. The projections are increasing because of the current partnership with Africa RISING's Large-scale Diffusion of Technologies for Sorghum and Millet Systems (ARDT_SMS), and the Livestock Technology Scaling projects in Mali; and the ATT, N2 Africa, and Taking Cowpea and Groundnut to Scale projects in Ghana. In Phase II, the WA Project will continue to explore research and development partnership opportunities with the current development partners with whom the partnership extends beyond Africa RISING Phase I, as well as with several new partners. The new partners include: Camfed, CARE, Grameen ADRA, CRS in Ghana; and AKF and FASODJGUI in Mali. Exploration of new partnerships leads to the assumption of at least an annual 10-15% increase in beneficiary targets over the Phase II period. This partnership mechanism also ensures that the project activities have impact beyond the project life through continued promotion of the technologies by the partner organizations.

1.2 Moving from Phase I to Phase II

Phase II of Africa RISING in WA will be guided by achievements and lessons of WA Project Phase I, but also guided by the harmonisation with the Africa RISING projects in the Ethiopian Highlands and East and Southern Africa based on the approaches and principles outlined in the umbrella proposal. Research outputs are generated under seven broad strategies representing viable entry points for technological integration, being genetic integration involving introduction of new crops and varieties to overcome existing stresses; manipulation of crop ecologies to get more food and feed on limited land and maximise biological nitrogen fixation; integrated soil fertility management as a cost-effective approach to replenish soil fertility; introduction of land management technologies to reduce soil loss and enhance water productivity; improved livestock feeds and feeding, housing, health-care and breeding management; introduction of post-harvest approaches to reduce food waste and improve food safety; and introduction of nutrient rich food crops and nutrition sensitive agriculture practices and technologies for improved household nutrition. Details of the flagship technologies under these strategies are given in Table 3 in the [Africa RISING West Africa Phase 2 proposal](#). Bringing these technologies together in creative ways will begin to tip the scales in favour of sustainable farming. There will be need for integration of scientific evidence generated in Phase I into decision-guides and principles that can be taught and scaled out as simple rules of thumb and packages targeting agro-ecosystem and socio-economic circumstances, defined by the SI domains (productive, economic, social, human and environmental). It is the scientific information backing these packages that will form the basis for engaging development partners with whom we plan to conduct R-in-D and quickly scale up to beneficiary numbers that Africa RISING alone is unable to achieve.

We have also learned the importance of gathering feedback from the farmers and other stakeholders which allows for adaptation and iteration of activities during the research process. The WA Project will use R-in-D/Innovation Platforms as one major vehicle for this process, making them more effective, autonomous, and inclusive, especially of the private sector, for sustainability. They are meant for research priority setting, design, and dissemination. This approach will make it possible for research to package and complete the development of SI innovations and support their delivery and adoption in the region to achieve the planned outcomes.

Phase II will also explore new research areas emerging from Phase I experiences and feedback, 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; labour-saving mechanization solutions for small-scale farmers; focusing attention on climate-smart solutions and the effect of agricultural practices on ecosystems health. The project will also develop a livestock research strategy to increase the impact of livestock-related activities, especially those on small ruminants, poultry and pigs; develop a coherent capacity building strategy for different levels – farmers and researchers; develop a nutrition strategy to harmonize nutrition-related activities with the crop and livestock activities and with national nutrition approaches; engage in purposeful inclusion of gender and youth concerns and involvement in the SI process; and develop more rigorous and quantitative approaches for measuring diffusion and early adoption of SI technologies.

2 About the Africa RISING West Africa Project

The Africa RISING Project in West Africa (Africa RISING WA) shares the umbrella purpose of the Africa RISING Program aimed at creating 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 the natural resource base. This is guided by the unique characteristics of, and challenges and opportunities existing in the Africa RISING WA Project countries of Ghana (Figure 1) and Mali (Figure 2).

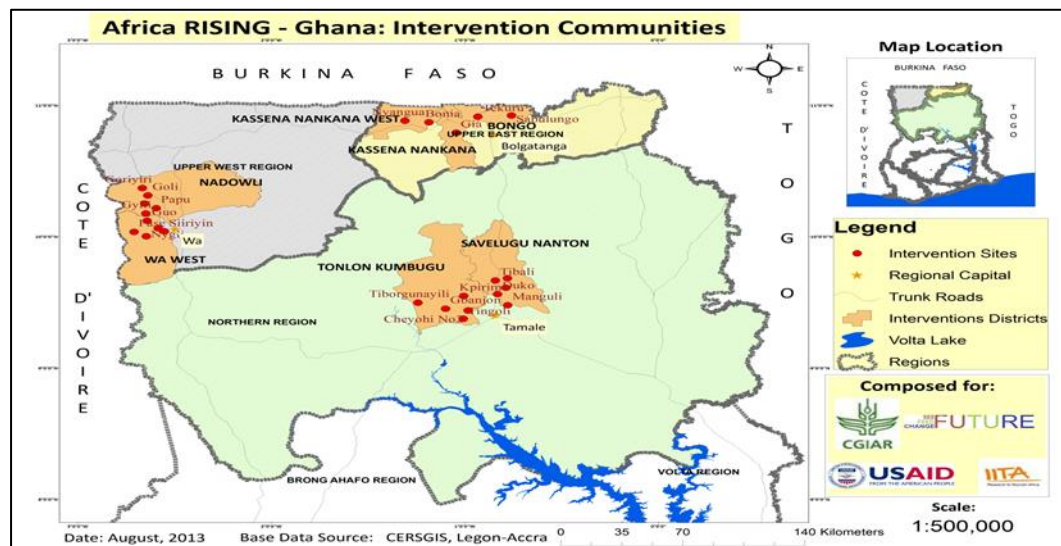


Figure 1: Africa RISING West Africa Project intervention communities in Ghana

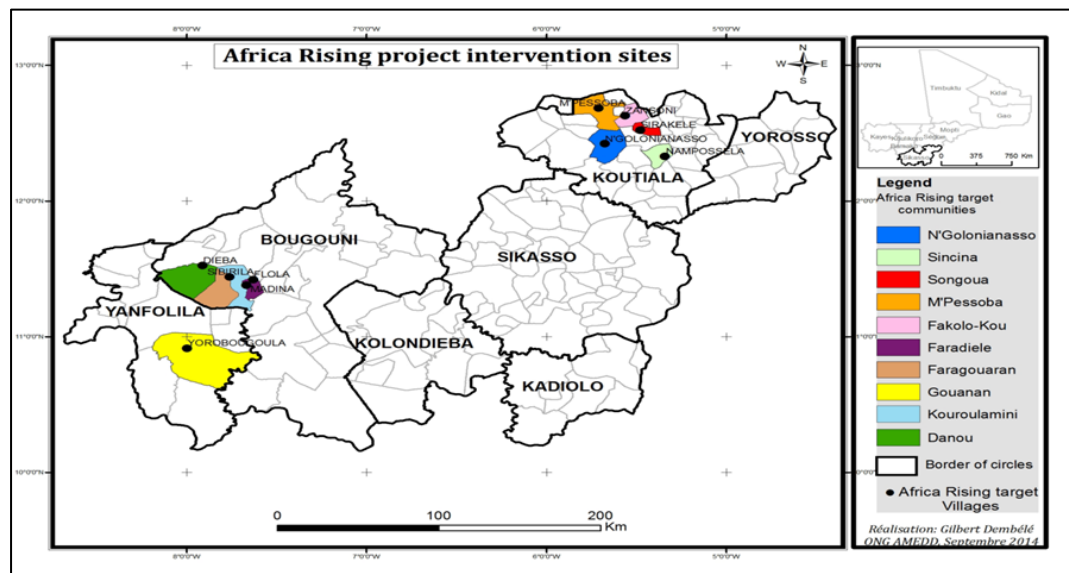


Figure 2: Africa RISING West Africa Project intervention communities in Mali

2.1 Characteristics of the project region

Phase I (2012-2016) of the Africa RISING Project in West Africa (Africa RISING WA) is being implemented in the Guinea and Sudano-Sahelian Zones in northern Ghana (Figure 1: Northern, Upper West, and Upper East Regions) and southern Mali (Figure 2: Sikasso Region). The area is characterized by a fast growing, relatively young population (>60% under 25 years) which is predicted to reach 574 million by 2050¹.

Agriculture characterized by rain-fed, small-scale crop, livestock, and integrated crop-livestock/agro-pastoral farming systems dominates the economy of the West Africa project region. The sector employs 68% of the population and contributes about 30% of the GDP, making it the most important source of livelihood for the rural poor who make up about 54% of the total population (Table 1).

The rapidly growing human and livestock population is driving agriculture towards greater intensification and putting pressure on the land, soil, water, and vegetation resources. Demand for food/feed has outstripped supply, resulting in widespread food insecurity, poverty, and natural resource degradation. The small-scale crop-livestock farmers need to adopt sustainable intensification (SI) technologies and practices to reverse the changes.

Table 1: Selected characteristics of the Africa RISING West Africa project countries

Country	Population (millions)	Population growth (%)	Rural population (% of total)	Agriculture (as % of GDP)	Agriculture labor force (%)	Cereal production (t/ha)	Global Hunger Index	Stunting (% kids <5years)
Ghana	26.8	2.4	47	22	56 (2015)	1.64	15.5	23
Mali	17.1	2.9	61	39	80 (2015)	1.58	29.6	28

Sources: IFPRI (<http://ifpri.publication/2015-global-hunger>); World Bank (<http://data.worldbank.org/indicator>)

2.2 Challenges and opportunities

Low productivity across all farming systems is the major challenge for the region's agriculture. Factors responsible for the low productivity include land degradation and low soil fertility; climate variability; high post-harvest losses and limited value addition; shortage of labor and limited use of mechanization; poor market access; absence of enabling institutions and policies; shortage of trained manpower; and poor adoption of improved technologies.

2.2.1 Low crop and livestock outputs

Most of the crop and livestock production in Ghana and Mali is characterized by low productivity and poor market orientation^{2,3}. Most farmers grow cereals, legumes, and vegetables for home consumption and cash. Crop yields are low, and there are several

¹ Kristjanson, P.M., Thornton, P.K., Kruska, R.L., Reid, R.S., Henninger, N., Williams, T.O., Tarawali, S.A., Niezen, J., Hiernaux, P. 2004. Mapping livestock systems and changes to 2050: Implications for West Africa. In: Sustainable crop-livestock production in West Africa, pp. 28-44

² Staatz, J., Kelly, V., Boughton, D., Dembele, N.N., Sohlberg, M., Berthe, A., Skidmore, M., Diarrah, C.O., Murekezi, A., Richardson, R., Simpson, B., Perakis, S., Diallo, A.S., Adjao, R., Sako, M., Me-Nsope, N., Coulibaly, J. 2011. Mali Agricultural Sector Assessment, 2011, Michigan State University Food Security Team, Department of Agricultural, Food and Resource Economics. USAID, Mali

³ SRID. 2013. Statistical Research and Information Directorate, Ministry of Food and Agriculture, report on pilot Ghana agricultural production survey (GAPS), Vol. 11 (Minor Cropping Season), April 2013

factors cited to explain the low yields, including lack of appropriate varieties, poor agronomic practices, and limited use of inputs, frequent drought, declining soil fertility, pests and diseases, and limited access to information. For example, a survey in Ghana showed that only 9% of farmers used certified seeds and the average yield of maize on farmers' fields was 1.7 t/ha compared with 6 t/ha on experimental stations⁴. An estimated 90-95% of seeds for Mali's traditional coarse grain come from informal farmer-to-farmer sources and village market exchanges⁵.

Livestock (cattle, sheep, goats, pigs, poultry) are reared for meat, milk, land preparation, transport, manure, and cash under extensive and semi-intensive management with limited housing, feed, shelter, health care, and breeding^{6;7;8}. Livestock production accounts for approximately 30% of Mali's agricultural GDP, and 80% of Mali's agricultural households own some form of ruminants - cattle, goats, sheep, or camels⁹. The major constraints on production are poor nutrition due to seasonal variation in the availability of quality feed and limited access to veterinary services, improved livestock breeds, quality feed and water^{10;11}. The poor husbandry practices result in high mortality rates and low productivity.

Improved SI innovations to increase productivity of the small-scale crop-livestock systems were developed during Phase I. The Africa RISING WA team has the opportunity in Phase II to scale-out the tested and validated innovations in collaboration with development partners and to conduct multi-disciplinary adaptive research to refine and adapt those which are yet to be validated. Research on extension of least-cost rations, markets to increase net profit, and dairy production to improve household nutrition and income will be explored.

2.2.2 Degraded land and low soil fertility

Environmental degradation is one of the key factors contributing to low productivity in WA. Soils in the region are inherently low in fertility, especially in contents of organic matter, nitrogen, and phosphorus^{12;13}. Fallow periods which were traditionally used to restore fertility have declined in length and are disappearing with cropping intensity and population growth. The crop and livestock enterprises are weakly integrated, preventing maximum use of the synergies derived from integrated crop-livestock production. Coupled with inadequate availability and use of organic and inorganic fertilizers, continuous cropping is leading to nutrient losses from farmlands¹⁴. During Phase II, the project team will undertake multi-disciplinary research on integrated crop-livestock production to improve nutrient cycling and nutrient use efficiency. Technical research and outreach on improved soil and water management will be strengthened.

⁴ SRID. 2011. Statistical Research and Information Directorate, Ministry of Food and Agriculture, Agriculture in Ghana, Facts and Figures, May 2011

⁵ Staatz et al., 2011 – footnote 2

⁶ Dei, H.K. (eds.) 2012. Sustainable intensification of crop-livestock systems in Ghana for increased farm productivity and food/nutrition security. Proceedings of a regional workshop, 27-28 August, Tamale, Ghana, 205 pages

⁷ Staatz et al., 2011 – footnote 2

⁸ SRID. 2013 – footnote 3

⁹ Staatz et al., 2011 – footnote 2

¹⁰ Staatz et al., 2011 – footnote 2

¹¹ SRID. 2013 – footnote 3

¹² SRID. 2011 – footnote 4

¹³ Staatz et al., 2011 – footnote 2

¹⁴ Vanlauwe, B., Kanampiu, F., Odhiambo, G., De Groote, H., Wadhams, L.I., Khan, Z.R. 2008. Integrated management of *Striga hermonthica*, stem borers, and declining soil fertility in Western Kenya. *Field Crop Research* 107:102-115

2.2.3 Climate variability

West African agriculture and food systems are climate dependant and recognized as one of the sectors most vulnerable to climate change¹⁵. Climate change is already leading to low and erratic rainfall and sporadic occurrences of droughts in the region which have consequences for crop and livestock production. For example, farmers in Ghana identified drought as the most important shock/event which may have a negative impact on their crop and livestock production¹⁶. During Phase I, limited water-related research was undertaken in the Upper East region of Ghana. There is an opportunity in Phase II to test and promote appropriate technologies for small-scale irrigation, water re-use, and water harvesting (e.g., waste/water recycling, rainwater harvesting), and watershed management. Another opportunity will be to formulate and test climate-smart agriculture packages based on some of the promising SI technologies from Phase I.

2.2.4 Post-harvest management, value addition and food safety challenges

Post-harvest losses are high because most farmers have limited knowledge on stored-grain management¹⁷. Storage is often done in homes using traditional silos and jute bags without routine fumigation or adequate protection from pests^{18 19}. Current farmer threshing and shelling practices are labor intensive and lead to breakage. Poor sorting and drying lead to pest and disease infestation and mycotoxin contamination. Lack of improved storage facilities for grain as well as the absence of improved technologies for proper storage management push farmers to sell their produce right after harvest when market prices are very low, hence reducing their farm incomes.

Also, adding value to crop and livestock products to improve quality and market value is limited at the household and community levels in the region^{20;21;22}. Where value addition is practiced (e.g., milk-processing), it is mostly done by women using traditional, outmoded, and time consuming methods which increase their workload and result in low-quality products with limited shelf-life. There was limited research on post-harvest and value addition in Phase I. There is need for project partners to pursue post-harvest and value addition research, including improvement of local storage and value addition methods in Phase II.

2.2.5 Labour shortage and mechanization issues

Throughout the region, cultivation of land is mainly by hand tools, with few farmers using animal draft implements in Ghana²³ and Mali²⁴. There is little use and/or adoption of small-scale machinery resulting in acute seasonal shortages and inefficient use of labour for farm operations. Continuing reliance on simple farm tools and manual labour accentuates the drudgery of farm work and discourages the youth from going into agriculture. The WA

¹⁵ Zougmore, R., Traoré, A., Mbodji, Y. (eds.). 2015. Overview of scientific, political and financial landscape of climate-smart agriculture in West Africa. Working Paper No. 18. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Pp 79

¹⁶ SRID. 2013 – footnote 3

¹⁷ Sugri, I., Osiru, M., Larbi, A., Hoeschle-Zeledon, I., Buah, S.S.J., Nutsugah, S.K., Asieku, Y., Lamini, S. 2015. Aflatoxin management in Ghana: Current prevalence and priority strategies in maize (*Zea mays* L.). *Journal of Stored Products and Post-Harvest Research* 6:48-55

¹⁸ Staatz et al., 2011 – footnote 2

¹⁹ SRID. 2013 – footnote 3

²⁰ Staatz et al., 2011 – footnote 2

²¹ Dei, H.K., Mohammed, S., Adarkwa, D.K. 2014b. Effect of partial replacement of maize with dry 'pito' mash on growth performance of guinea fowl and growing layer chickens. *Ghanaian Journal of Animal Science* 8:5125-130

²² SRID. 2013 – footnote 3

²³ SRID. 2013 – footnote 3

²⁴ Staatz et al., 2011 – footnote 2

project team has an opportunity to introduce, test, and adapt small-scale machinery to reduce drudgery and increase labor use efficiency.

2.2.6 Poor market access and absence of enabling policies and institutions

Limited access to the input and output markets by farmers, and the lack of enabling institutions and policies are major challenges to SI of the small-scale crop-livestock farming systems in the region. The link is weak between the small-scale farmers and the market actors (processors, traders, and consumers). Farmers have difficulties in getting access to market information, and there is little or no value addition at the farm and community levels to improve the market value of crop and livestock products. In Phase I, fodder markets were surveyed in Ghana, and market prices of agricultural commodities were monitored monthly in Mali. The Africa RISING WA research team has the opportunity in Phase I to conduct research on collective marketing, value addition, effective linking of various market actors, alternative marketing information channels, and market niches for underutilized crop and livestock products.

2.2.7 Limited manpower and capacity to innovate

Lack of trained manpower at all levels is a major constraint to increasing productivity of the farming systems in West Africa. For example, in Ghana the number of agricultural extension agents has dwindled, making it difficult to disseminate information on agricultural practices from the research station to the farm. In Mali, there is need to train more agricultural technicians (BSc) and scientists (MSc and PhD) to produce a new generation of agricultural scientists to replace the large cohort that is nearing retirement²⁵ (Staatz, 2011). About 24 graduate students were co-supervised by the scientists of the WA project during Phase I. The project team will train more graduate students in Phase II. In addition, short-term courses will be organized for early-career scientists and extension staff to build institutional and individual capacities for research on SI.

2.2.8 Low adoption of proven technologies

Adoption rates of SI technologies in West Africa are generally low. This has been attributed to several factors, including weak extension services, poor communication channels for scaling-up/out improved practices, and lack of enabling markets and institutions. The Africa RISING WA team plans to partner with key stakeholders in each country to adopt and adapt technology dissemination approaches that have the potential to take proven technologies to scale.

²⁵ Staatz et al., 2011 – footnote 2

3 Project vision of success

The rationale behind the vision of success for the second phase of Africa RISING WA is described in detail in the accompanying [umbrella proposal for the three projects](#).

Africa RISING WA Phase II vision of success is based on the premise that technology breakthroughs occurring through research can improve the lives of the smallholder farmers if they are fine tuned to more site-specific agricultural and socio-economic settings, and mechanisms are developed to put these technologies into farmer practice. Africa RISING WA research partners have, and will continue to develop proven SI technologies, and their operational approach with development partners (R-in-D) who have expertise in design and implementation of integrated community-based scaling will seek to meet impact targets as described below. These approaches were piloted during Phase I; research and development partners successfully worked together to assist farmers to access and better use farm inputs, cropping and livestock management technologies and practice for natural resources conservation. As a result, the beneficiary households at the end of the Africa RISING WA Phase I (2016) are about six times more than the original targets set for the research component (Figure 3).

The mandate for research partners was to identify and evaluate candidate technologies through participatory, on-farm approaches which, by their nature engages few farm households. During the latter part of Phase I, researchers realised that combining the the best performing interventions into information and technology packages and field testing them through networks of development projects would create an opportunities for identifying the the most effective interventions that would be mainstreamed into wider rural development programs, beyond Africa RISING WA zones of influence.

Partnerships were developed, initially with FtF supported development projects (see section 6.4 of the [Africa RISING West Africa Phase 2 Proposal](#)) whose visions of success required availability of informed productivity enhancing innovations for scaling-up and -out in the target communities. Both research and development projects are cognizant of the mutual benefits and synergies that would accrue from joint undertakings; Africa RISING generates these innovations as its outputs and development partners provide opportunities for learning through action research (R-inD) and scaling-up and -out of the research innovations. In Phase II, Africa RISING WA will continue to explore these opportunities with the current development partners with whom the partnership extends beyond Africa RISING Phase I, as well as new partners (including non-USAID supported) and thus increase the return to investment by USAID Feed the Future in the two countries' FtF zones of influence. The success of these partnerships form the basis for the proposed beneficiary targets given in Figure 3. It is expected that by the end of Phase II, Africa RISING WA will conduct research with about 12,000 households (up from about 4,000 now) and scale SI technologies and practices to 92,339 households through various development partners (up from about 24,000 now).

These totals were estimated based on the number of current and potential households directly involved in the project's research and development activities; and on the current and potential number of households that are exposed or will be exposed to the activities of Africa RISING WA and its development partners. Examples of existing development partnerships in Mali and Ghana are given under Section 6.4 of the [proposal document](#).

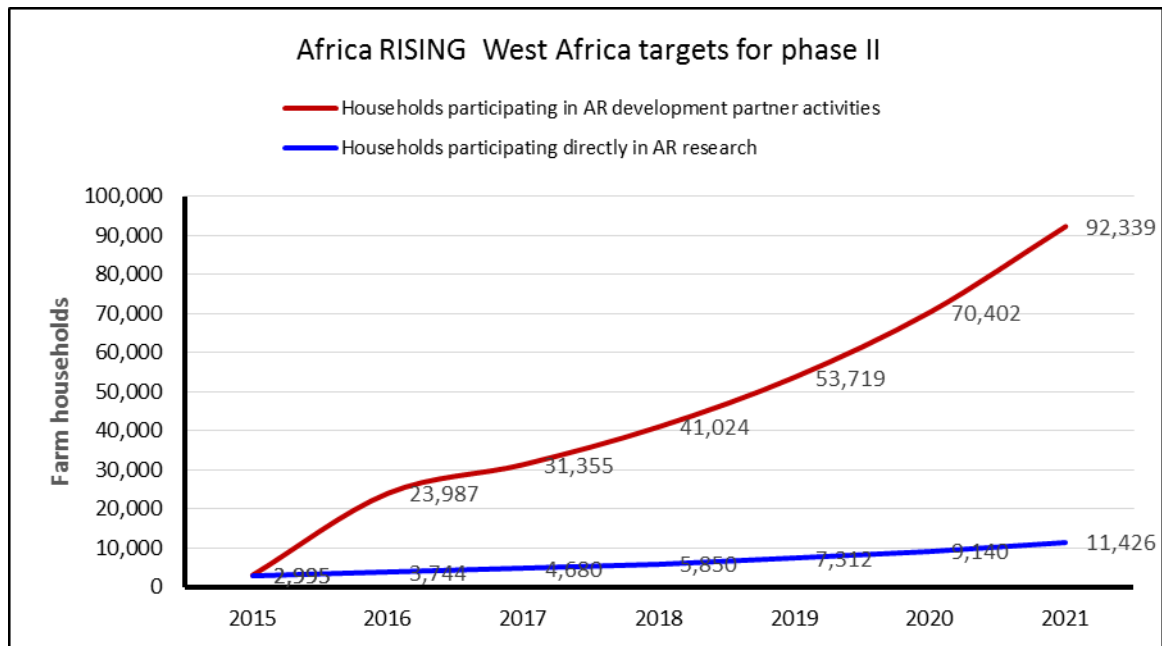


Figure 3: Target beneficiary household numbers for Africa RISING West Africa project, Phase II

4 Theory of change

A theory of change is a systematic assessment of what needs to happen in order for the desired outcomes of the program to occur. It is designed to explain how and why change happens, as well as the potential role of the work of the organizations involved in contributing to their vision of progress²⁶.

For Africa RISING, the adoption of research-derived innovations directed at the SI of smallholder agricultural production systems allows rural households to make more efficient use of the resources available to them. Consequently, they can produce more without compromising the needs of future generations. This increased production can translate into a range of livelihood outcomes through improved income flows, better household nutrition, and increased human capacity.

If the research conducted accounts for multiple sustainability domains (productive, economic, social, human and environmental), the long-term equity and viability resulting from the SI innovation, developed and promoted by the Africa RISING program, will be enhanced. A demand-driven approach based on long-term engagement with both research and development partners ensures that appropriate SI innovations will ultimately be scaled to receptive and informed beneficiary households.

Africa RISING will continue to follow a nested theory of change (ToC) adapted to more clearly support phase II of the program. At the top level in the ToC, two distinct types of research are identified with significantly different types of outcomes.

Methodological and diagnostic

Much of the research in this category seeks to reveal the nature of the target systems, and the constraints and opportunities characteristic of these systems. Other generic methodical and diagnostic (M&D) research seeks to understand more clearly and identify potential improvements in the SI processes. Direct SI impacts attributable to this type of research are not anticipated. Its outcomes are more facilitative and the research outputs delivered will help to ensure a more demand-driven²⁷ focus for the action-oriented research (see below). These outputs will also improve the relevance and targeting of the action-oriented research outputs, improving their adoptability and potential to generate impact. Much of the Africa RISING M&D research has been implemented during phase I, so phase II will not be replicating these broad diagnostic studies which were the focus of the first 18 months of the project. It is likely though that some of the research-in-development (R in D) partnerships at the core of phase II will require specific diagnoses of constraints and a stratification of intended beneficiaries to improve relevance and adoptability of promoted interventions.

Embedded in the M&D section of the theory of change, three major types of M&D research seeking to clarify different key issues relating to SI and the identification of appropriate SI trajectories are distinguished:

- **System diagnosis:** this research covers all aspects of the biophysical and social characterization of the target systems and communities for Africa RISING. It includes the

²⁶ From <http://www.geofunders.org>

²⁷ Demand-driven: caused or determined by demand from clients or consumers. For Africa RISING, this implies that: (i) demand must be formally identified to drive the program activities, hence the extensive phase I diagnostic activities; (ii) the priorities of any group, including clients and consumers, are not static so an awareness of how demand evolves is built into the program; and (iii) the composition of client groups evolves, necessitating regular demand monitoring.

identification of researchable constraints and opportunities, and a thematic research prioritization.

- **Trade-off analysis:** conducting systems diagnoses can identify potential solutions for constraint alleviation and promising SI trajectories; however, multiple stakeholders and multiple objectives within households mean that these are always subject to unintended consequences and trade-offs which may outweigh the benefits realised—and will clearly limit adoptability. Formal trade-off analyses allow for the rejection of options compromised by these externalities and/or identification of mitigating measures to strengthen promising interventions.
- **Typologies and equity:** diversity in target groups has two major consequences for SI-related innovations: i) one size does not fit all; most innovations are only adoptable by sub-groups within a target community; and ii) taking a portfolio of SI interventions as a whole, such as that developed by Africa RISING, must ensure equitable access so that all sub-groups have options which are appropriate for them. The use of household typologies, coupled with effective *ex-ante* impact assessment and well-targeted action-oriented research, helps to ensure these principles are met.

Action-oriented

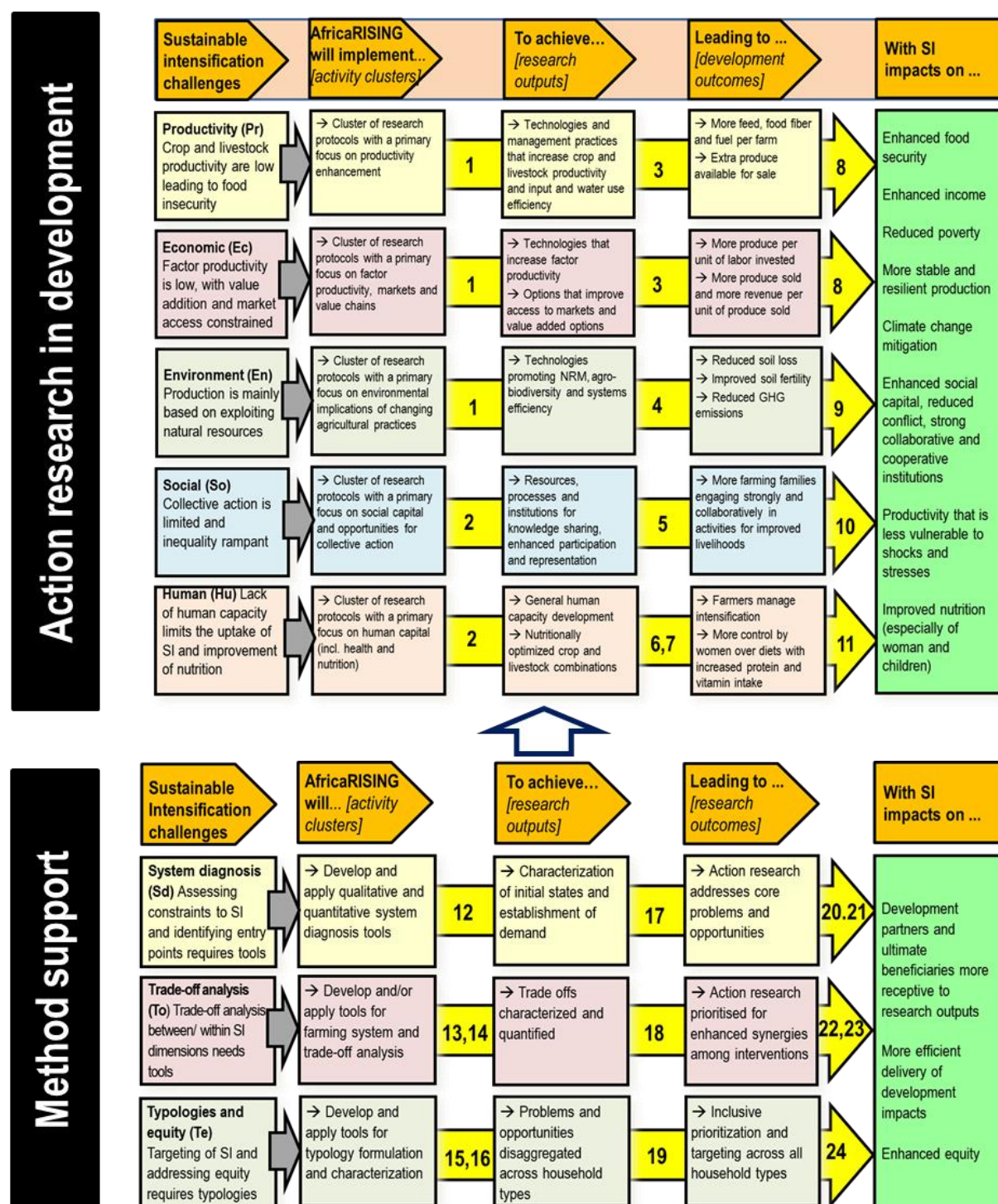
The phase I projects of Africa RISING all implemented broad-based action research—prioritized via the M&D research undertaken—to identify, test and validate interventions/innovations that promote SI and its benefits across multiple domains for stakeholders. This kind of research will continue, to varying degrees, across phase II projects, but will be augmented by action-oriented research specifically linked to development partnerships scaling Africa RISING and associated technologies (i.e. the outputs of phase I).

All Africa RISING action-oriented research is directly linked to developmental impacts in one or more of the five SI domains:

- **Productivity:** interventions targeting the productivity domain seek to promote directly the intensification part of SI with impacts on food security and income;
- **Economic:** research in the economic domain focuses on factor productivity and the value chain function with the ultimate aim of impacting on poverty levels and prevalence;
- **Environmental:** research in this domain needs to identify unintended environmental consequences of innovations promoting productivity and economic wellbeing (in particular), as well as landscape scale interventions to support SI. Targeted impacts include more stable and resilient production, and the mitigation of environmental damage.
- **Social:** the outcomes of research in this domain include strengthening of social capital, and identifying and supporting opportunities for collective action to impact beneficially on social cohesion; and
- **Human:** major elements of the human domain for Africa RISING are the health and nutrition outcomes generated along SI trajectories. These may be targeted both directly and indirectly on the general wellbeing and capacity of individual beneficiaries.

While Africa RISING research activities may primarily target one domain, all are likely to result in outcomes across several domains. This can be beneficial in strengthening adoptability, but also necessitates a clear vision of potential negative trade-offs.

Figure 4. Developmental impact of Africa RISING action-oriented research



Assumptions (A) and risks (R)

1. (A) Results of methodological and diagnostic analysis incorrect and/or not considered
2. (A) Adequate quantitative and qualitative databases for social analysis
3. (A) Availability of and access to inputs; functioning markets; technologies and management practices effectively disseminated and adopted
4. (A) Technologies and management practices effectively disseminated and adopted
5. (A) Functioning partnership platforms with adequate stakeholder representation
6. (A) Bio-fortified and diverse crops, plus combinations with livestock lead to increased nutrition; absence of external limiting factors (e.g. bad water, sanitary conditions)
7. (A) Presence of young women attending awareness raising activities; minimum level of women decision making power within a household
8. (A) Absence of other shocks affecting farmers; presence of enabling environment for adoption; level of excess production not distorting market prices
9. (A) Wider adoption of technologies across multiple farmers; farmers' awareness of absence of short-term benefits
10. (A) Social context promoting collective action
11. (A) Adequate and functioning WASH infrastructure
12. (R) Measurement errors, challenges in data collection
13. (R) Incomplete database to address analysis
14. (A) Adequacy of the models
15. (R) Inadequate databases for typologies formulation
16. (A) Typologies reflecting existing farm types
17. (R) Change in demand for technologies due to external factors
18. (R) Researchers embed the trade-off analysis into their research prioritization
19. (R) Missing testing and validation of model findings; errors in interpretation
20. (R) Research outputs and recommendations are attractive to ultimate beneficiaries
21. (A) Uncertainty in buy-in from development partners and ultimate beneficiaries
22. (A) Farmer awareness of risks associated to adoption of innovations
23. (R) Important farmer risk aversion
24. (A) Actual use of typologies by research teams

5 Logframe

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
Goal			
Reduce poverty, hunger and environmental degradation in the Guinea and Sudan savanna zones of West Africa	<ul style="list-style-type: none"> • % change in level (tons) of food production. • % change in income of farm families. • % change in number of people undernourished. • % change in number of adults with a low BMI (wasting or chronic energy deficiency). • Number of women reporting reduced drudgery. • % change in rate of degradation of natural resources (land, soil, water, and vegetation). • Number of hectares of degraded land returned to sustainable use. • % of children below 60 months having adequate nutrition and growth indicators (underweight, wasting, stunting, and overweight). • Quantities (in tons) of safe and nutritious food (by type) available. • % change in expenditure of farm households. • % change in sales of agricultural products by farm households. • Farmers' gross margin per hectare and per flock or herd. 	<ul style="list-style-type: none"> • National and regional statistics. • FAO database and publications. • Satellite images. • Empirical studies in the intervention areas 	<ul style="list-style-type: none"> • Political conditions and macro-economic environment remain stable. •

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
Purpose			
<p>Provide pathways out of hunger and poverty for smallholder families through sustainably intensified farming systems that sufficiently improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.</p>	<ul style="list-style-type: none"> • Number of adoptable technologies and practices for sustainable intensification (SI) widely used by farm families. • Number of farm families using technologies and practices for sustainable intensification (SI). • % change in household per capita food consumption and availability. • % of children under 24 months that received a minimum acceptable diet. • Number of farm families, especially women with access to home or community garden. • Number of women participating in decision making at household level. • % change in the production (tons) of agricultural produce. • % change in yields of resource-poor farmers using the technologies and practices. • Number of households adopting improved ISLWM, ISFM and IPM technologies and practices. • Number of stakeholders (by type) using climate information or implementing risk-reducing actions to improve resilience to climate change. • Number of researchers using nutrition research strategy as a guide. 	<ul style="list-style-type: none"> • NARES and IARC reports. • Program ex-post evaluation report by IFPRI. • Poverty monitoring surveys by local governments. • Satellite images. • Household expenditure surveys in project action sites by local government. • Agricultural and anthropometric statistics. • Adoption and impact studies. 	<ul style="list-style-type: none"> • Financial support to agricultural research and development maintained or increased. • Favourable government policies and services. • Enabling infra-structure will be provided by host countries. • Feed the Future priority countries and investments remain consistent with the project. • National policies and institutions in partner countries support SI and adoption of SI technologies. • Target areas remain conflict free. • Extreme events (e.g., fires, floods, droughts, diseases) do not impact target areas.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	<ul style="list-style-type: none"> • % change in dietary diversity score of smallholder farm households in the project intervention communities, especially women and children. • Number of households adopting improved nutrition, food safety and mycotoxin management technologies and practices. • Number of households adopting nutrition-sensitive agriculture. • Increased small-scale production of diverse plants and animal food, especially by women. • Number of households practicing positive nutrition health behaviors. • % Aflatoxin reduction at harvest through use of aflasafe in the field. • % change in efficiency on harvesting, drying, storage, processing and marketing of crops. • % change in postharvest losses in maize and cowpea in the intervention communities. • Number of women and youth accessing input and output markets and production assets. • Number of households adopting at least two improved post-harvest technologies and practices. • Improved storage and processing of diverse food. 		

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	<ul style="list-style-type: none"> • Vegetation cover and plant biodiversity at plot and farm level. • Soil moisture, erosion and carbon at the plot and farm levels. • Number of research and development institutions up taking SI technologies and practices. 		
Outcome 1: Farmers and farming communities in the project area are practicing more productive, resilient, 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.	<ul style="list-style-type: none"> • Number of crop, livestock and integrated crop-livestock (ICL) research products, technologies, and practices under research, under field testing or disseminated with farmers, researchers, extension staff, policy makers and development partners across the sustainable indicators (SI) domain (environment, production, economic, social and nutrition). • Number of rain-fed and irrigated climate-smart crop and livestock research products, technologies and practices identified and disseminated with farmers, researchers, extension staff and development partners. • Number of guidelines and training materials on crop, livestock and ICL developed and available to farmers, researchers, extension, policy makers and development partners. • Number of community-based, national, 	<ul style="list-style-type: none"> • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal papers. • National press and TV. • Training reports and students dissertation. • Smallholder farmer interviews. • Partnership agreements. • Policy briefs. • Adoption and impact studies. • Extension and NGO feedback. • Intervention community 	<ul style="list-style-type: none"> • Demand for research products developed by farmers and other partners. • Conditions for adoption of SI technologies and practices remain favourable. • Resources (human and financial) flow is maintained. • Market can absorb increased food and feed. • Smallholder farmers are willing to use validated options for more intensive, diversified, productive and resilient crop-livestock

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	<p>regional networks and partnerships established to exchange knowledge and information.</p> <ul style="list-style-type: none"> • Number of farmers, researchers, extension staff, policy makers, and development partners trained. • Number of on-farm demonstrations established. • Number of farmers' field days organized. • Number of project reports, workshop proceedings, journal papers, posters, policy briefs, leaflets and films produced, and radio and TV discussions organized per year. • Number of females and youth participating in project activities. • Number of infrastructure for supporting dissemination of technologies developed. • Number of infrastructure for supporting dissemination of technologies rehabilitated. • Number of farmers practicing crop, fodder and livestock production and variability at plot and farm level. 	visits.	production.
Output 1.2: Integrated management practices and innovations to improve and sustain	<ul style="list-style-type: none"> • Number of improved rain-fed and irrigated soil, land and water; and integrated soil, land and water management (ISLWM) research products, technologies and practices under research, under field testing or disseminated with farmers, researchers, 	<ul style="list-style-type: none"> • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal 	<ul style="list-style-type: none"> • Demand for research products by farmers, and development partners exists. • Smallholder crop-livestock farm families

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
<p>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.</p>	<p>extension staff, policy makers and development partners.</p> <ul style="list-style-type: none"> • Number of improved integrated pest management (IPM) research products, technologies and practices under research, under field testing or disseminated with farmers, researchers, extension staff, policy makers and development partners. • Number of ISLWM guidelines and training materials developed. • Number of IPM guidelines and training materials developed. • Number of community-based, national, regional networks and partnerships established to exchange knowledge and information on ISLWM, ISFM and IPM. • Number of participants trained in ISLWM (disaggregated by sex, farmers, research and extension staff, undergraduate and graduate [MSc and PhD] students). • Number of participants trained in IPM (disaggregated by sex farmers, research and extension staff, undergraduate and graduate [MSc and PhD] students). • Number of on-farm demonstrations established • Number of farmers' field days organized. • Number of project reports, workshop 	<p>papers.</p> <ul style="list-style-type: none"> • Training reports and students dissertation. • Smallholder farmer interviews. • Partnership agreements. • Policy briefs. Adoption and impact studies. • Extension and NGO feedback. • Intervention community visits. 	<p>are willing to use SI products, technologies and practices.</p> <ul style="list-style-type: none"> • Resource-flow (human and financial) is maintained. • Market can absorb increased production of crop (food and feed) and livestock (meat, milk and eggs) products.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	<p>proceedings, journal papers, posters, policy briefs, leaflets and films produced for dissemination.</p> <ul style="list-style-type: none"> • Number of radio and TV discussions organized per year. • Number of infrastructure for supporting dissemination of technologies/rehabilitated developed. • Number of promising land use management options identified and disseminated. • Number of land management practices identified and disseminated. • Number of hectares under improved land and water management each year. 		
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	<ul style="list-style-type: none"> • Number of women and vulnerable groups trained in behavioural change communication. • Number of nutrition and food safety research products, technologies and practices under research, under field testing or disseminated with farmers, researchers, extension staff, policy makers and development partners. • Number of community-based food demonstrations/fora organized. • Number of mothers/caretakers participating 	<ul style="list-style-type: none"> • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal papers. • Training reports and students dissertation. • Smallholder farmer interviews audio/video clips. 	<ul style="list-style-type: none"> • Demand for research products exists • Readiness of smallholder crop-livestock farm families to use improved nutrition, food safety and postharvest techniques and practices. • Adequate funding available for the activities throughout the project lifespan

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
<p>and children developed and disseminated in partnership with research and development partners in intervention areas in Northern Ghana and Southern Mali.</p>	<p>in community-based food demonstrations per country.</p> <ul style="list-style-type: none"> • Number of guidelines and training materials on nutrition, food safety and mycotoxin management developed and made available to farmers, researchers, extension staff, policy makers and development partners. • Number of community-based, national, regional networks and partnerships established to exchange knowledge and information on nutrition, food safety and mycotoxin management. • Number of farmers, research and extension staff, undergraduate and graduate (MSc and PhD) students trained in nutrition and food safety. • Number of project reports, workshop proceedings, journal papers, posters, policy briefs, leaflets and films produced. • Number of radio and TV discussions organized per year. • Proportion of household children under 2 year meeting minimum acceptable diet. • Percent of women of child bearing age meeting minimal diet diversity score. • Number of households benefiting from nutrition intervention per country. • Prevalence of stunting, wasting and 	<ul style="list-style-type: none"> • Partnership agreements. • Policy briefs. • Adoption and impact studies report. • Monitoring tours and surveys reports. • Extension and NGO feedback. • Intervention community visits field report. • 	<ul style="list-style-type: none"> • Aflasafe will be approved by the host government(s) of the project intervention country(ies) •

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	<p>underweight among children under 5 years.</p> <ul style="list-style-type: none"> • Proportion of children receiving complementary foods at 6 months. • Proportion of babes who initiated breastfeeding within 1 hour of birth. • Proportion of children receiving exclusive breast feeding at 6 months. • Proportion of children receiving breast feeding at 2 years. 		
<p>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.</p>	<ul style="list-style-type: none"> • Number of postharvest research products, technologies and practices under research, under field testing or disseminated with farmers, researchers, extension staff, policy makers and development partners. • Number of stakeholders that received disseminated technologies disaggregated by stakeholder and technology type. • Number of stakeholders (disaggregated by sex, farmers, research and extension staff, PhD students) trained in postharvest management. • Number of on-farm demonstrations on postharvest management organized. • Number of farmers participating in on-farm demonstrations on postharvest management. • Number of project reports, workshop proceedings, journal papers, posters, policy 	<ul style="list-style-type: none"> • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal papers. • Training reports and students dissertation. • Smallholder farmer interviews audio/video clips. • Policy briefs. • Adoption and impact studies reports. • Monitoring tours and surveys reports. • Extension and NGO feedback. 	<ul style="list-style-type: none"> • Demand for research products NARES and development partners by exists • Willingness and readiness of smallholder crop-livestock farm families to use improved postharvest techniques and practices. • Adequate funding available for the activities throughout the project lifespan. • Market can absorb increased production of food and feed.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
	briefs, leaflets and films produced, and radio and TV discussions organized per year. <ul style="list-style-type: none"> • Level of soil moisture at the plot and farm levels. • Type of erosion at the plot and farm levels. • Content of carbon at the plot and farm levels. 	<ul style="list-style-type: none"> • Intervention community visits field report. • 	
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: Enabling policies and institutional arrangements to increase participation of farm families, especially women and youth in the output and input markets and decision-making are advocated for implementation by national governments, policy makers and development partners.	<ul style="list-style-type: none"> • Number of women and youth participating in production and marketing decision decisions including access to production resources. • Number of policies and institutional arrangements advocated. • Number of published guidelines on market opportunities and niches for value-added crop and livestock products made available to NARES and policy makers. • Number of community-based producers' organizations established/strengthened for production, processing, and marketing. • Number of households clustered to viable chains by type of market orientation. • Number of livelihoods options supported and strengthened. 	<ul style="list-style-type: none"> • Sample household survey disaggregated by gender and age. • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal papers. • Training reports and students dissertation. • Policy briefs. • Adoption and impact studies. • Extension and NGO feedback. • Intervention community visits. 	<ul style="list-style-type: none"> • Cultural context on gender issues will not change within the project period. • Markets for crop and livestock products continue to grow and smallholders will participate in the market. • Political situation remain stables.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
		<ul style="list-style-type: none"> • Agricultural market and value chain reports. • Institutional and policy reports. 	
Output 3.2: Options to expand accessibility of production assets and increase participation in household decision-making by disaggregated groups by gender.	<ul style="list-style-type: none"> • Number of agricultural and nutritional enabling policies, regulations and administrative procedures recommended and communicated. • Number of individuals disadvantaged by age and sex with equitable access to productive resources through sensitization and training. 	<ul style="list-style-type: none"> • Sample household survey of disaggregated by sex and age. • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports, workshop proceedings and journal papers. • Training reports and students dissertation. • Policy briefs. • Adoption and impact studies. Extension and NGO feedback. • Reports on intervention community visits. • Studies on gender and vulnerable groups focusing on production resources and household decision-making 	<ul style="list-style-type: none"> • Household members are willing to attain equity in access and control over production resources. • Markets for crop and livestock products continue to grow and smallholders will participate in the market. • Political situation remains stable.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
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, 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 at scale.	<ul style="list-style-type: none"> • Number of constraints and opportunities (by type) documented for technology adoption by farm typologies. • Number and size of Farmer based organizations that Africa RISING is teaming up with as key partners, reaching out to different farm types (low, medium and high resource endowed). • Number of public-private partnerships (several entities: input dealers, development partners, FBOs) formed to scale out SI technologies and practices. • Number of effective multipliers (research and development institutions, farmer based organizations, champion farmers, etc.) scaling out SI technologies and practices. • 	<ul style="list-style-type: none"> • Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports; extension bulletins. • Smallholder farmer interviews (household surveys, Focus Group Discussions). • Monitoring tours and surveys. • Extension and NGO feedback (feedback to and from community). • Stakeholder analysis • Social network analysis diagram (number and strength of links around Africa RISING). • Memorandum of understandings with partners. 	<ul style="list-style-type: none"> • National policies and institutions support delivery and adoption and SI technologies and practices. • Local and regional institutions, including development actor are willing and ready to accept and utilize knowledge sharing centres and learning alliances. • Political conditions and macro-economic environment remain stable. • Project partners are self-motivated and committed.

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
<p>Output 4.2: Gender-sensitive decision support tools to assess technology-associated risks and opportunities are available for use by project partners.</p>	<ul style="list-style-type: none"> • Number of gender-sensitive decision support tools available for farmers to access technology-associated risks and opportunities developed, tested and launched. • Number of project partners who had access and used the tools. • 	<ul style="list-style-type: none"> • Tools explained on Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports. • Smallholder farmer interviews showing whether researchers used gender sensitive tools (feedback). • Monitoring tours and surveys reports. • Weighted scoring technique to assess gender components of Africa RISING technologies 	<ul style="list-style-type: none"> • Demand for gender-sensitive decision tool by project partners exists. • Willingness and readiness of project partners to use gender-sensitive decision tools.
<p>Output 4.3: An updated framework for monitoring technology adoption to be used by the project team and scaling partners available and accessible.</p>	<ul style="list-style-type: none"> • Number of project team members and scaling partners who use the framework developed by IFPRI to monitor technology adoption. • Number of reports received from project members and scaling partners. • Increased evidence for technology adoption over time. 	<ul style="list-style-type: none"> • The framework published on the Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports showing whether our partners are using the framework. • Annual FtF indicator reports showing increase in 	<ul style="list-style-type: none"> • National policies and institutions support delivery and adoption and SI technologies and practices. • Demand for gender-sensitive decision tool by project partners exists. • Willingness and readiness of project team members and scaling

Narrative	Objectively verifiable indicators	Sources and means of verification	Assumptions
		area under improved technologies number of farmers using new technologies.	partners to use the framework to monitor technology adoption.
Output 4.4: Knowledge sharing centres (physical structures) and learning alliances are developed within existing local and regional institutions.	<ul style="list-style-type: none"> • Number of knowledge sharing centres and learning-alliances developed within existing local and regional institutions. • Number of scaling-up and scaling-out capacity development activities undertaken. • Number of farmer meetings to ‘digest’ their knowledge (share and pick knowledge) • 	<ul style="list-style-type: none"> • Announcements of activities and workshops at the knowledge sharing centre through the Africa RISING website and databases (CKAN, CG Space, wiki). • NARES and IARC project reports. • Smallholder farmer interviews • Monitoring tours and surveys. • Extension and NGO feedback. • Attendance list of farmer meetings for knowledge sharing. 	<ul style="list-style-type: none"> • Providing centres: Local and regional institutions, including development actors’ willingness to accept, fund the centres and utilize knowledge sharing centres and learning alliances. • Receiving knowledge: There is an interested and motivated community of learning and practice.

END.