



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Education and Research in Agriculture (ERA)

Cooperative Agreement No. 685-A-00-10-00194-00

Annual Report

Fiscal Year 2016

1 October 2015 – 30 September 2016

This publication was produced for review by the United States Agency for International Development. It was prepared by Virginia Polytechnic Institute and State University (Virginia Tech), Office of International Research, Education, and Development (OIREd).

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID) as part of Feed the Future, the U.S. Government's global hunger and food security initiative, under the terms of Contract No. AID-685-A-00-10-00194-00. The contents are the responsibility of Virginia Tech OIREd and do not necessarily reflect the views of USAID or the United States Government.

Project Management Unit

Mailing address: BP 24690 Ouakam
Street address: Rue 26 Ngor, Almadies
Dakar, Senegal
(221) 33 869 78 90

Home office

526 Prices Fork Road (0378)
Blacksburg, VA 24061 USA
www.oired.vt.edu
(1) 540-231-6338



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Management Entity Contacts

Thomas Archibald, *Chief of Party*
BP 24690 Ouakam
Dakar, Senegal
(+221) 33 869 75 21
tgarch@vt.edu

Van Crowder, *Executive Director*
Office of International Research, Education,
and Development
526 Prices Fork Road (0378)
Blacksburg, VA 24061 USA
(+001) 540 231 6338
vcrowder@vt.edu

Ministry of Higher Education and Research

Nouhou Diaby
nouhou.diaby@ucad.edu.sn

ANAQ-Sup

Abdou Lahate Cissé
abdou-lahate.cisse@anaqsup.sn

General Direction for Higher Education

Mamadou Sangharé
mamawacisse@yahoo.fr

Partner Institution Contacts in Senegal

CFPH
Mandoye NGOM
mandoyengom@yahoo.fr

CNFTEIA
Fatou Sarr
fatousarr1809@yahoo.fr

CNFTEFCPN
Moussa CISSE
cissemoussasn@yahoo.fr

ENSA (University of Thies)
Mamadou Thiam DIOP
mtdiop@univ-thies.sn

ISFAR (University of Bambey)
Birahim Fall
birahimfall@voila.fr

ISRA
Elhadji Traoré
elhadji.traore@isra.sn

ITA
Abdoulaye MBAYE
ablombaye@yahoo.com

LTAEB
Ibou DIEDHIOU
ibsoutou@gmail.com

UASZ
Daouda NGOM
ngom_daouda@yahoo.fr

UCAD
Kandioura NOBA
kandioura.noba@ucad.edu.sn

UGB
Amadou Bocar BAL
amadou-bocar.bal@ugb.edu.sn

USSEIN
Recteur Amadou Tidiane GUIRO
atguiro@gmail.com

CROP Contacts in Senegal

ENSA
Saliou NDIAYE
drsaliou@gmail.com

ISFAR
El Hadj FAYE
hadjfaye@yahoo.fr

ISRA/Djibelor
Siméon BASSENE
basseneisra@gmail.com

ITA
Nafissatou Diop NDIAYE
ndiop@ita.sn

UGB
Amadou Bocar BAL
amadou-bocar.bal@ugb.edu.sn

US University Partners

Purdue University
Jess Lowenberg-Deboar
lowenbej@purdue.edu

Tuskegee University
Ntam Baharanyi
baharany@mytu.tuskegee.edu

University of Connecticut
Boris Bravo-Ureta
boris.bravoureta@uconn.edu

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List of Abbreviations

AETR	Agricultural Education, Training and Research Institution
ANAQ-Sup	<i>Autorité Nationale d'Assurance Qualité de l'Enseignement Supérieur</i>
ANCAR	<i>Agence Nationale de Conseil Agricole et Rural</i>
APROVAL	<i>Association des Professionnels de l'Alimentation pour la Valorisation des Produits Locaux</i>
BAME	<i>Bureau d'Analyse Macro-économique</i>
CA	Conservation agriculture
CBSP	Community-based Service Provider
CFPH	<i>Centre de Formation Professionnelle en Horticulture</i>
CNFTEIA	<i>Centre National de Formation des Techniciens d'Elevage et des Industries Animales</i>
CNFTEFCPN	<i>Centre National de Formation des Techniciens des Eaux et Forêts, Chasse et des Parcs Nationaux</i>
CONGAD	<i>Conseil des ONG d'Appui au Développement</i>
CROP	Collaborative Research and Outreach Partnership
DRDR	<i>Direction Régional de Développement Rurale</i>
ENSA	<i>Ecole Nationale Supérieure d'Agriculture</i>
ERA	Education and Research in Agriculture
FEPRODES	<i>Fédération des Groupements et Association des Femmes Productrices de La Région de Saint Louis</i>
FIARA	<i>Foire internationale d'agriculture et de ressources animales</i>
FNRAA	<i>Fonds National de Recherche Agricole et Agro-Alimentaire</i>
FTF	Feed the Future (presidential food security initiative)
FTFMS	Feed the Future Monitoring System
FY	Fiscal year
GIE	<i>Groupement d'intérêt économique</i>
GRAAS	<i>Groupe de Réflexion sur l'Agriculture et l'Agro-alimentaire au Sénégal</i>
HACCP	Hazard Analysis and Critical Control Points
IPM	Integrated pest management
IRD	International Relief and Development
ISFAR	<i>Institut Supérieur de Formation Agricole et Rurale</i>
ISRA	<i>Institut Sénégalais pour la Recherche Agricole</i>
ITA	<i>Institut de Technologie Alimentaire</i>
LTAEB	<i>Lycée Technique Agricole Emile Badiane</i>
MEDD	<i>Ministère de l'Environnement et du Développement Durable</i>
MESR	<i>Ministère de l'Enseignement Supérieur et de la Recherche</i>
OIRED	Office of International Research, Education, and Development (Virginia Tech)

PMP	Performance Monitoring Plan
PMU	Project Management Unit (Dakar project office)
PPP	Public-Private Partnership
POPAS	<i>Plateforme des Organisations Professionnelles de l'Agroalimentaire du Sénégal</i>
Q1, Q2	1st quarter, 2 nd quarter, etc.
SAED	<i>Société Nationale d'Aménagement et d'Exploitation des Terres du Delta du Fleuve Sénégal et des Vallées du Fleuve et de la Falémé</i>
SNRER	<i>Réseau National pour l'Enseignement Supérieur et la Recherche du Sénégal</i>
TU	Tuskegee University
UASZ	<i>Université Assane Seck de Ziguinchor</i>
UC	University of Connecticut
UCAD	<i>Université Cheikh Anta Diop de Dakar</i>
UGB	<i>Université Gaston Berger</i>
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USSEIN	<i>Université du Sine Saloum El-Hadji Ibrahima Niasse (formerly USSK)</i>
USSK	<i>Université du Sine Saloum à Kaolack</i>
UT	<i>Université de Thies</i>
UVS	<i>Université Virtuelle Sénégalaise</i>
VT	Virginia Tech

Executive Summary

Agriculture in Senegal is changing, with the help of innovations from Feed the Future (FTF), USAID, and related initiatives. Senegal’s agricultural education, training, research, and extension system must also change in order to provide relevant knowledge-based innovations and to foster high-quality local leadership for these agricultural developments. To that end, ERA continues to develop human and institutional capacity in agricultural education, training, and research (AETR) institutions in order to help those institutions better serve the needs of the Senegalese public and private sectors, including farmers at all levels. In FY16, ERA entered a one-year extension, which is Year 6 of the project. Year 6 witnesses a number of successes and results, which have the potential to produce sustained impacts in the Senegalese AETE system.

In the domain of **Component 1, “Strengthening Agricultural Education and Training,”** the project facilitated capacity building workshops on syllabus creation, collaborative curriculum development, experiential learning, student assessment, e-learning, the common book, and other innovative pedagogical approaches. These workshops were led by local experts rather than international ones, which contributes to the potential sustainability of this work after ERA is gone. ERA also continued to support five AETR institutions in their systems evaluation-influenced tracer study, following up on the employment and educational outcomes of their graduates.

As pertains to **Component 2, “Strengthening Applied Research and Outreach,”** Senegalese AETR staff, students, and faculty members, with other partners continued ongoing multi-institutional, interdisciplinary applied research high-priority crops and issues, such as millet, rice, sweet corn, and instant flours; these projects continued their focus on discovering and sharing climate-smart technologies able to adapt to salty soils, an increasingly important constraint in Senegalese agriculture. The focus of these applied research projects has now evolved, following the natural progression through the project lifecycle, to a focus on extension and outreach to translate research results into community-level impacts.

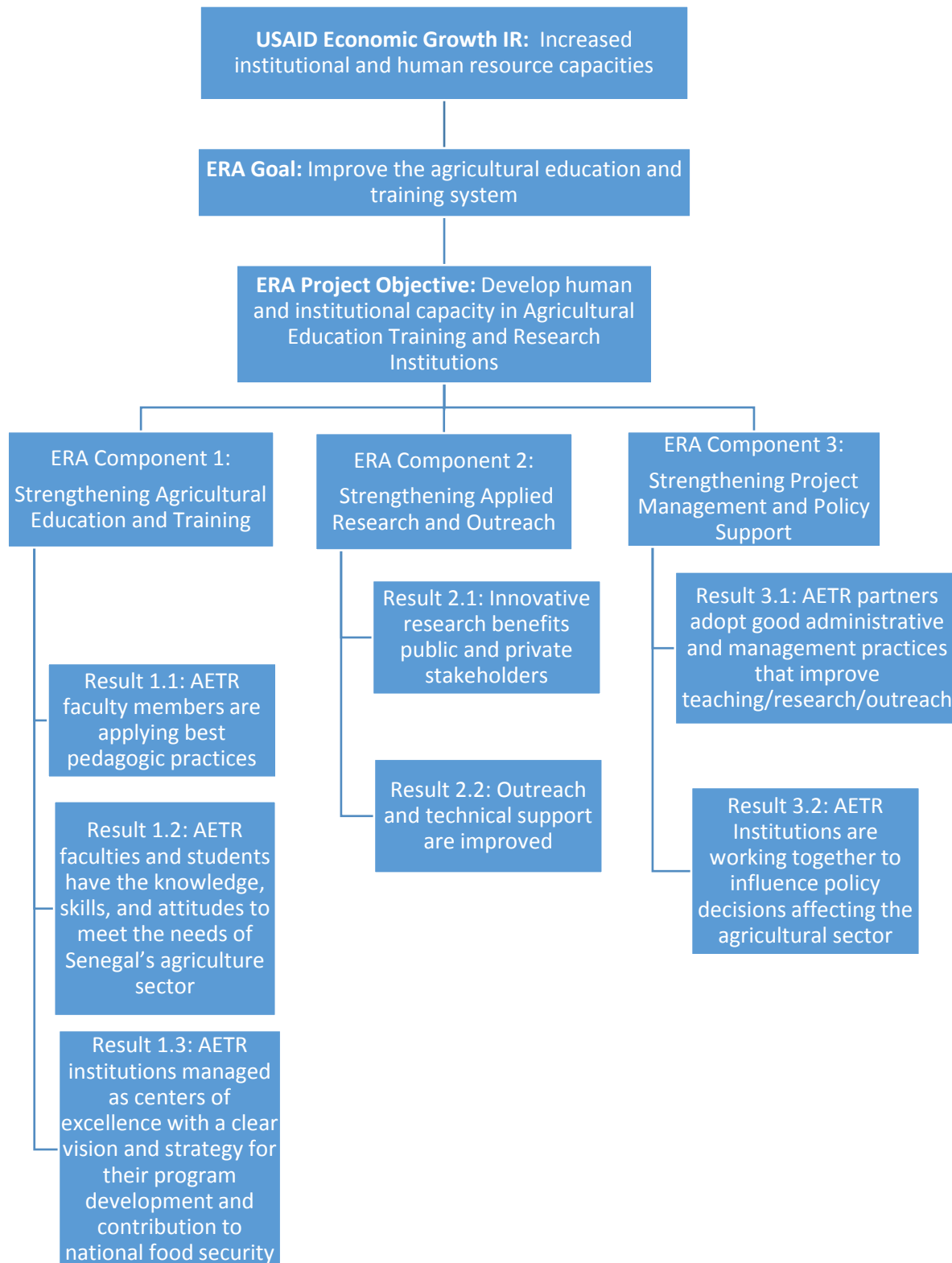
Regarding PPPs for agro-alimentary development, the UCAD and POPAS partnership continued to unite faculty members, interns, and women’s economic empowerment groups in a training and development partnership. In FY16, an extensive scaling-up process was implemented, designed to reach a large number of GIE members to disseminate the evidence-based approaches to local food processing that have been developed. In addition, new platforms were developed and strengthened in Ziguinchor and Bignona to scale up these activities and results still further.

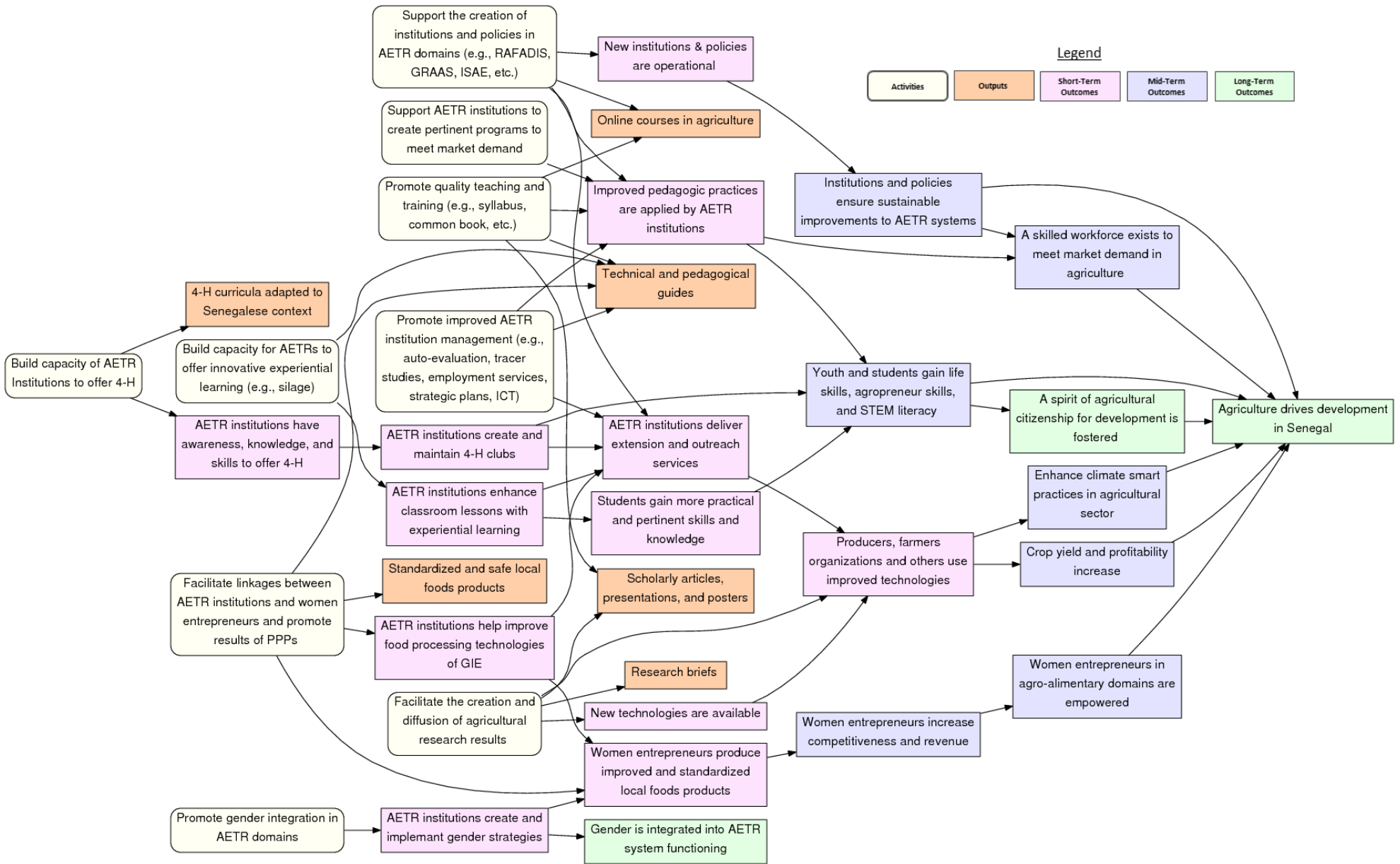
The 4-H Senegal Positive Youth Development (PYD) program in agriculture and entrepreneurship for sustainable community development continued to develop and be scaled up. The three pilot clubs in Toubacouta continue to improve their implementation of PYD, reaching over 100 youth, and receiving high praise from the local community. Through continued collaboration with 4-H experts from Virginia Cooperative Extension, as well as with Peace Corps and additional partners,

the program has now been scaled up to St. Louis, Ziguinchor, and Bignona, with hundreds of youth enrolled.

Finally, in the domain of **Component 3, “Strengthening Project Management and Policy Support,”** ERA continues to endeavor to help the Government of Senegal and AETR partners to operationalize the new law governing universities (*Loi n°18/2014*), which added outreach as a university mission (*service à la communauté*). In addition, ERA facilitated meetings leading to the creation of a national e-learning network, contributed to the creation of a new Institute for Agriculture and Entrepreneurship at UCAD, and finalized the gender assessment with the Ministry of Environment and Sustainable Development.

USAID/ERA Results Framework & Pathway Model





Component I: Strengthening Agricultural Education and Training

ERA targets three results under this component: (1) Improved teaching practices; (2) Increased knowledge, skills, and attitudes of students and faculty; and (3) Improved management of AETR institutions as centers of excellence.

Result 1.1: AETR faculty members are applying best pedagogic practices

Achievements

Syllabus Creation and Use

Workshops on syllabus development and use were held for over 200 teachers and researchers from UCAD, CFPH, ITA, and other AETRs, led using local expertise such as from within UT's and UCAD's Direction of Pedagogy and School of Education. Press coverage of one such workshop can be found [here](#). ERA then conducted monitoring and follow-up of syllabus activities at several AETRs (i.e., ENSA, ISFAR, UASZ, LTAEB, and CNFTEFCPN) to review the developed syllabi and to identify all the stakeholders who participated in the syllabus project. Key stakeholders were invited to participate in writing an article for publication in a peer-reviewed journal. About 288 syllabi were developed and used since 2012 by these AETRs. This result indicates that the development of syllabi is well integrated in AETRs system to strengthen student learning.

Common Book

This initiative is an innovative example of how AETRs can stimulate students' critical thinking and build a sense of community among them. This year the activity was scaled up to ISFAR, UASZ, CFPH, ENSA, and UCAD. Following the work done by each pedagogical committee to encourage discussion among students, animation sessions were organized in these institutions in the presence of the author who answered the students' questions, had a fruitful exchange with them and took into account the concerns raised by participants.

Experiential Learning

ERA continued to build institutions' capacity to offer innovative experiential learning activities, using the silage making process as a case example. The pedagogical processes developed and lessons learned can then be applied to any agricultural content area in future iterations. A train the trainers workshop was organized by ISFAR team involving partners from ENSA and ANCAR. The new silage chopper model was presented and tested with students and extension agents. Assessment of progress and scaling-up planning of silage and experiential learning activities were done with ISFAR team. Others training sessions will be organized for producers in three different areas.

e-learning

ERA organized a workshop for 23 professors, researchers, and a select few graduate students to develop an online course on integrated pest management (IPM) in Senegal. Such a course will satisfy an unmet need at Senegal's universities. The course will be offered within existing

programs in plant pathology, entomology, and weed science. The work groups also drafted syllabi for master's level IPM courses in each of those three disciplines. Also, the online course development processes and lessons learned can subsequently be applied to any agricultural content area in future iterations, thus increasing the number of online courses available in agricultural domains.

Assessment of Student Learning

A workshop was held for UGB teachers and researchers to build capacity around good practices in the assessment of student learning.

Teaching for Critical Thinking

To strengthen capacity of partners to improve their teaching methods and the quality of the students' learning, especially regarding the preparation for students to have the skills needed to adjust to and problem-solve in a changing agricultural labor market, a workshop facilitated by professor Rick D. Rudd from VT was organized on "Teaching for critical thinking." The workshop stimulated excellent discussion and partners requested follow-up capacity building on this topic.

Result 1.2: AETR faculties and students have the knowledge, skills, and attitudes to meet the needs of Senegal's agriculture sector

Achievements

Scholarships

Nineteen ERA Scholars have successfully earned their Master's degrees from U.S. Land Grants, with one (who has already returned to Senegal) scheduled to earn his degree soon. Many returned scholars have experienced career success, such as Diouma Faye, who completed her Master's at UConn and has been appointed as Chief of the "Production and Marketing" office at PRODAC, a 5-year agricultural program being implemented by the Senegalese Government. Three Scholars were able to leverage additional funding to return to the U.S. (not affiliated with ERA) to complete their PhDs (two at Virginia Tech and one at Purdue).

Curriculum Development

Related to the "Public-private Partnerships for the Development of Training Programs on the Seed Sector" initiative, partners made strides towards both implementing the curricula and sharing the processes and results of this collaborative curricular design activity. In addition, ERA was invited by UCAD to participate in the external validation workshop of the professional License in Ecological and Organic Agriculture that they developed with support from the NGO ENDA

Value Chain Exchange Visits

In support of efforts to connect ENSA's Master's in Value Chains to real-life FTF value chain case study examples, ERA organized exchange visit with COMFISH and Naatal Mbay oriented towards achievements in value chains (ENSA, ISFAR). For example, the focus of the visit with COMFISH was on collaborative management of fisheries resources through the use of effective tools and

management approaches. At the end of the visit, professors from ENSA and ISFAR were more willing to improve the contents of their teaching and to explore opportunities for new partnerships. This activity helped strengthen collaboration between ERA AETR partners and FTF projects and support the diffusion of FTF-generated knowledge.

Other Faculty Capacity Building

To strengthen capacity of some key partners who lead efforts to instill experiential, community-focused agroforestry pedagogy and training at UASZ, support was provided to faculty members to participate in national and international events related to food security: Drs. Daouda Ngom and Mohamed Charahabil participated in the third of three sessions comprising the Master training program on Cashew Value Chain Promotion organized by the African Cashew initiative. Upon their return, they offered a series of trainings in the community and made changes to their course design.

Result 1.3 AETR institutions managed as centers of excellence

Achievements

Student Employment Services & Entrepreneurship Support

In the area of tracer studies support, ERA facilitated meetings to monitor progress of the ongoing pilot program implemented by five AETRs (ISFAR, LTAEB, ENSA, UASZ, and UGB). The studies contain some elements that are standardized across the systems, and others that are particular to each institution, to allow for variation in the institutional contexts. There is variation in approaches and progress made across institutions, but progress is satisfactory overall. Relatedly, the Operational Guide designed to help AETRs develop student intern and career placement offices is complete and will begin being disseminated in FY17.

Self-Assessment & Accreditation

In the domain of self-evaluation by institutions in search of accreditation for their educational degree programs, ERA worked in partnership with ANAQ-Sup to formalize and disseminate the harmonized tools and methodologies of how to evaluate and assure the quality of agricultural higher education and training programs.

Material Support

ERA provided 6 collections of TEEAL (The Essential Electronic Agricultural Library) to partner institutions (UGB, ENSA, ISFAR, ITA, UASZ, and USSEIN) and supported the update of UCAD and ISRA's preexisting TEEAL collections. TEEAL is a full-text and searchable database of articles from more than 325 high-quality research journals in agriculture and the related sciences between 1993 and 2013. This software provided to institutions will allow students, professors and researchers to access to thousands of online peer-reviewed agricultural documents.

In addition, ERA provided 25 small GPS devices and a video projector to CNFTEFCPN to support their ability to successfully implement new curricula they have developed and to reduce the number of students who need to share devices during practical activities of GIS courses. This was needed in order to successfully operationalize part of the Center's pedagogical innovations.

Other Institutional Capacity Building

ERA facilitated workshops with university librarians on Invenio (a digital library management framework) software, plus the previously mentioned workshop for UGB teachers and researchers on good practices in the assessment of student learning. Both of these workshops will help improve the management of AETR institutions.

Constraints encountered and unresolved issues

Some activities, such as the completion of the tracer studies and scheduling of value chain study tours has taken longer to be fully implemented and to come to fruition than we had initially planned, for various reasons. Largely this is due to the difficulty of arranging multiple partners' schedules.

Component 2: Strengthening Applied Research and Outreach

ERA targets two results under this component: (1) Public and private stakeholders benefit from innovative research conducted by AETR institutions; and (2) Outreach and technical support are improved. One primary way in which ERA supports applied research is via Collaborative Research and Outreach Partnerships (CROPs) that were funded as three-year sub-awards to a lead Senegalese institution through a call for proposals requiring inter-institutional collaboration. Another way is to promote innovative ways to share knowledge and to encourage universities and other AETRs to do community-engaged work.

Result 2.1: Innovative research is benefiting public and private stakeholders

Achievements

Collaborative Research and Outreach Projects (CROPs)

Work continued on the five multi-institutional interdisciplinary innovation platforms, as well as on two related applied research platforms:

- Intensification and sustainable management of millet production in areas of Thies, Louga and Niore: Improving, expanding and strengthening the value chain of superior varieties (Lead: ENSA)
- Production and processing of sweet corn in Senegal (Lead: ITA)
- Sustainable improvement of cereal productivity in salty environments (Lead: ISFAR)
- Improving the productivity of rain-fed rice in Casamance (Lead: ISRA/Djibelor)
- Promotion of local rice in the valley and delta of the Senegal River (Lead: UGB)
- Fortified instant cereal-based products for the Senegalese market (Lead: ITA)
- Nutrition-Led & Conservation Agriculture (Mung Bean) (Lead: ERA)

Progress on the CROPs continued to be slower than expected. The projects will officially come to an end by June, at which time only targeted support will be offered to ensure that the results of the research platforms are translated into impacts. Updates on each of these projects is provided below:

Intensification and sustainable management of millet production in the areas of Thiès, Louga, and Nioro: Improvement, dissemination, and strengthening of the elite varieties' value chain.

ENSA leads this research activity. Millet is the basis of food security for many rural households in Senegal. ENSA is using locally available genetic resources to develop millet varieties adapted to low rainfall. Project partners ENSA, ANCAR, and CERAAS/ISRA are focusing on millet seed value chain reinforcement through identification of appropriate plant genetic resources, improvement of water stress tolerance in elite varieties, and dissemination of new varieties. The project works on three components of the millet value chain: seeds, production of the improved varieties, and primary processing. During this year, the main tasks and results were:

- *Seed production, primary processing of improved varieties, and farmer training (ANCAR).* ANCAR continued to train farmers at the beginning of the rainy season. A large amount of certified seed of SOSAT (an improved variety) was produced by the GIE Jambar at Meouane and sold to the farmers throughout the country. GIE Jambar, supported by ANCAR, organized field days across all its seed production sites and record yields were reached (2 - 2.5t/ha). Photos and a film on this field day are available.
- *Collection, characterization and conservation of genetic material (ENSA).* During this year, the project supported doctoral work by two students on this topic:
 - “Dynamic management of millet agro-biodiversity (*Pennisetum glaucum* L.) in Senegal: analysis of genetic diversity and sustainable management strategies germplasm grown in the Peanut Basin,” by Ms. Ndoye Khadidiatou Ndir, PhD Candidate from ENSA.
 - “What levers to reduce yield gap and to promote millet production and productivity in the Peanut Basin? From characterization of millet farming households’ performance to integrated cropping system modeling,” by Mr. Mountaga Diallo, PhD Candidate from UCAD.
- *Isolation of drought-resistant millet genomics.* This work, led by ISRA scientists, was supported by VT scientists via short term research at VT. The objective is the identification of pearl millet (*Pennisetum glaucum*) accessions tolerant to drought and study of the involved molecular mechanisms. This work is correlated with the completion of two Master’s theses on a new method of yield measurement and seed germination by an ERA-funded U.S. based Senegalese graduate students Ms. Fatou Tine and Ms. Mariam Dramé.
- *Publishing scientific papers and other knowledge translation products.* Some scientific papers (on drought resistance, yield measurement and seed germination, etc.) and knowledge translation materials (a guide on millet production, facts sheets, posters, etc.) are in the pipeline.

Production and processing of sweet corn in Senegal: Sterilized canned corn manufacturing. ITA leads this research activity. Sweet corn is a counter-season crop with production expanding in both the Niayes region and the Senegal River Valley. However, output is exported for canning while domestic demand is met by imported canned sweet corn. Therefore, in an example of value-added processing and closing an economic market loop, there is potential for processing locally-produced sweet corn to meet domestic demand and stimulate local economic growth. This research effort is a response to the desire of the Government of Senegal, which identified sweet corn as a promising niche with high potential through the Agriculture and Agro-Industry Cluster of the Accelerated Growth Strategy (SCA). Agronomic potential and physico-chemical properties of two sweet corn cultivars are being analyzed. The manufacturing process of canned sweet corn will be developed with suitable, accessible, and attractive packaging. The developed products will be submitted to market testing, and a technical and economic feasibility study will be conducted for the establishment of canned sweet corn manufacturing. During Year 6, the main tasks and results are:

- *Determination of agronomic and physico-chemical properties of five varieties of corn in the rainy and dry seasons.* The agronomic results (fertilization and seeding density trials) using the five varieties of sweet corn, obtained in the previous tests, have been confirmed this year at Ndiol, Sangalkam, and Nioro ISRA research stations. Work on identifying the biochemical properties of sweet corn was done by UCAD/ESP. The initial results of biochemical characterization showed that Infinity, Daaneex, and Yosenite varieties seem to be the most appropriate because of their highest total and reduced sugar contents coupled with low amounts of starch.
- *Development of process manufacturing of canned corn (ITA and UCAD/ESP).* ITA has worked to determine the best process for canning sweet corn, with studies conducted on corn cutting techniques, thermal variables, and microbiological analysis. As a result, the best processing technique was identified, nutritional analyses were conducted, a label was developed and the resulting product is now available in supermarkets.
- *Test marketing of canned sweet corn.* Led by ITA and its partners (FRUITAL Sarl and CityDia supermarket), this work consisted of the preparation for marketing canned sweet corn. The first market tests in the CityDia supermarket showed good interest among customers. The market testing work will continue in FY17 to complete and confirm the achieved results.
- *Elaborating facts sheets on sweet corn production and setting up modules to teach about sweet corn.* CFPH developed a data collection template and collected information using this template to contribute to creating draft of fact sheets. However, the fact sheets and training modules have yet to be completed.
- *Production of a documentary film about the cultivation and processing sweet corn in Senegal.* A documentary film about sweet corn has been developed and is available.

Sustainable improvement of cereal productivity in salty soils. ISFAR at the University of Thiès leads this research activity. Each year Senegal loses thousands of hectares of agricultural land due to soil salinization, a problem highlighted by President Macky Sall at the 2016 meeting of the Senegalese Academy of Science and Technology. This severe land degradation is caused by biophysical factors (e.g., surface saltwater infiltration and tidal movement, salt rising in the water table through capillary action, and the deposit of salt particles by wind) and also by human factors (e.g., deforestation and extensive farming). In many zones, soil salinization has increased steadily and represents more than 50% of available land, reducing the area for cereal cultivation. This research project has two objectives: (1) testing techniques for restoration/conservation of degraded land, and (2) improving production of millet and rice in these marginal environments. Personnel from the University of Thiès, ANCAR, ISRA, ITA, and Green Senegal are promoting a land use system which will reduce soil degradation while reducing production costs. The project is focused on a parallel set of mechanical and biological methods to manage salinization combined with several salt-resistant millet and rice varieties. This improvement of production conditions also makes it possible to increase women's access to land. Recent project tasks and results include:

- *Biomechanical management in salty soils for recovery.* Maintenance and repair of levees at Fadial and Ndof; Analysis of soil and groundwater at Fadial and Ndoff, nursery and reforestation monitoring.
- *Rice and millet trials to evaluate their performance.* Millet and rice at Fadial and Ndoff plots; IPM against the pests and pathogens; molecular and biochemical analysis and processing of grains of millet and rice; and extension of project results.
- *Testing of composted crop residues to condition soil.* Composting and fertilization tests with materials from peanut and filao.
- *Technology transfer through training modules designed for producers and technicians.* 15 technicians from ISRA, ISFAR and ANCAR and more than 300 producers (including 198 women) were trained.
- *Graduate research.* Nine Master's students concluded their thesis research on the topic.

Improving rain-fed rice productivity in Casamance. ISRA/Djibelor leads this activity. Rice occupies a choice place in the dietary habits of the populations of Casamance. However, rice growing in Casamance is primarily rain-fed, which explains its widely varying yields affected by annual rainfall and its vulnerability to climatic change. This dependence results in extreme fluctuations in production between good and bad years. This variability led to a critical food deficit of 20,000t in 2007. Personnel from ANCAR, UASZ, LTAEB, and ITA collaborate with ISRA to improve rain-fed rice productivity. The teams are identifying improved varieties adapted to four types of rice production environments. Activities include information dissemination and producer training to promote good practices. Tasks and the achieved results in this year, include:

- *Experiments in management of iron toxicity and salinity (ISRA, VT, UASZ).* Two tillage methods were tested (ridging and flat plowing), with ridging found to be more efficient.

Three amendments tested (charcoal, oyster shell, coal-shell oyster association); the charcoal is performing better

- *Participatory Varietal Selection (ISRA)*. In lowland ecologies, 4 Brazilian varieties, 12 other varieties (in advanced tests), and 34 varieties with potential resistance to iron toxicity were tested and adapted and productive varieties were identified. These varieties will be included in the later showcase trials. In mangrove ecosystems, 8 varieties which were tested last year were again tested in advanced trials this campaign, in order to identify the most well-adapted to this ecology.
- *Demonstration trials of improved varieties (ANCAR)*. The trials led by ANCAR this year consisted of a showcase of 8 improved varieties in farmers' fields (five sites), and a showcase of good management practices such as flat plowing, seedling planting in hole vs. online, and the System of Rice Intensification (SRI).
- *Training women rice processors in parboiling (UASZ, ITA)*. This involved the purchase and delivery of parboiling equipment; 30 women were trained on rice parboiling techniques.
- *Training farmers on good production practices (LTAEB, ANCAR)*. 390 farmers including 252 women have been trained on improved rice production techniques; 150 farmers including 87 women participated in internal exchange visits in the various rice production sites; and 15.7 tons of improved seed of all varieties of rice were produced on a total area of 5,991 ha covering 12 production sites.
- *Training of scholars (secondary and high education)*. This involved practical training for 12 students on rice production techniques, including student field trips to farms. In addition, two Master's and a License degree were supported.

Promoting local rice in the Senegal River Valley and Delta. UGB leads this research activity. Senegal depends upon on massive rice imports. Rice represents 16% of food expenditures in rural areas and 11% in urban. Currently, local production covers only 20 to 30% of demand. Considerable progress has been made in establishing viable rice production systems by Senegalese research and development institutions (SAED, ISRA, DRDR, Africa Rice and ANCAR). In contrast, the rice value chain faces challenges for the improvement of production, processing and marketing. Indeed for various reasons, local rice is far from competitive compared to imported rice. UGB and its partners ITA, ISRA (BAME and Matam), SAED, DRDR (St. Louis and Matam), CIRIZ Podor, and the women's grower federation FEPRODES are strengthening the rice production system in the Senegal River Valley and Delta region by increasing the productivity and quality of local rice and promoting its marketing and consumption. During this fiscal year, the activities of this project have continued as the last year:

- *Demonstrations*. Set up of demonstration plots of rice varieties under irrigated production.
- *Training*. Train producers in seed multiplication, certification, and entrepreneurship.
- *Processing unit evaluation*. Evaluate capabilities, equipment and constraints of small-scale rice processing units.

- *Value chain assessment.* Complete assessment of the rice value chain by ISRA and ITA.

Development and assessment of fortified instant cereal-based products for the Senegalese market. ITA leads research and extension on the development and evaluation of fortified instant cereal products. It is working on quantifying the micronutrient content of instant flour from local grains and promoting local production of fortified products. Products made from fortified millet flour and extracts of mango, papaya, ‘bouy’ (powdered baobab fruit), and carrot have been developed. This year, the activities were:

- *Development of several instant flours made from millet, maize and sorghum by extrusion.* Instant flours made from the following mixtures of primary ingredients have been developed and tested: (1) millet-groundnut-cowpea; (2) corn-peanut-cowpea; (3) sorghum-cowpea, groundnut; (4) millet enriched with extracts of mango and carrot powder; (5) millet enriched with Premix; and (6) millet enriched with extract of mango, carrot powder and bissap powder. These products were tested from the standpoint of nutrition, bioavailability, and consumer acceptability.
- *Modifications of the first cooker-extruder and producing a second extruder barrel more suited to our local cereals.* This second extruder-cooker was established at the Touba Darou Salam GIE site.
- *Extension work with women processors in Touba.* These processors were trained on processing techniques and management. This training had two phases:
 - Training of trainers at ITA: 8 trainers including 4 women and 4 men were trained by ITA technicians. The training session was organized in the form of lectures (on raw material preparation, hygiene and compliance, managing a good processing unit, and calculation methods for amounts of products), followed by practical work (preparation of products for extrusion, and extrusion-cooking and production of enriched flour) with a participatory approach.
 - Training the women processors (scaling up): Training of officials of more than 17 GIEs (Touba Darou Salam 1; Groupement Promotion Féminin 1; Groupement Promotion Féminin 3; Groupement Darou Salam 3; Touba Darou Salam 4; GIE Sant Yalla; GIE Takou LIGUEYE; Entreprise Mariama; Réseau des femmes de Touba; Groupement Sope Serigne Saliou Djanatou; GIE Sope Serigne Bara Guouye Mindi; Groupement Sope Mame Cheikh Ibrahima FALL Khaïra; Groupement Cœur de Kaolack; Commune de Sindia; Groupement des femmes de Fatick; Groupement des femmes de Bambey; Association Sope Serigne Bara) who will, in turn, train their members.
- *Support and supervision of students in License and Master Degrees*
 - Khodia Ndong, Mémoire Licence, Université Amadou Hampâté Ba
 - Ndeye Nombour Lô, Mémoire Licence, Université Amadou Hampâté Ba
 - Mohamed Ndiaye, Mémoire Licence, Université Amadou Hampâté Ba
 - Amadou Dieng, Mémoire Licence, Université Amadou Hampâté Ba

- Maty Diop, Mémoire Master 2, Université Cheikh Anta Diop De Dakar,
- Cheikh Ndiaye, Mémoire Master 2, ITA/ Purdue University.

Nutrition-Led & Conservation Agriculture (Mung Bean). An advisory group, formed via ERA collaboration between ENSA, ISFAR, ANCAR, and four farm communities in the Mbour region, identified local agricultural production problems. Central to resolving farmers’ production problems was soil fertility management. Conservation Agriculture (CA) practices include maintaining year-round ground cover; minimum soil disturbance, and diversified cropping. This research project focuses on the cover crop component—testing bean varieties (cowpeas and mung bean) that can both fix nitrogen in the soil and provide food and feed. Green chop silage, which is not considered a CA technique, is being tested among villagers as a means to store and enrich animal feed during the dry season.

If the recently-concluded on-farm field experiments of mung bean/millet intercropping show the expected benefits, ERA will work with Yaajeende to test the technology package at a larger scale. Mung bean is a short-cycle legume that offers a protein rich food before millet and other grains are harvested, providing a nutritional bridge until cereals are harvested. Mung bean inoculated with *Rhizobium* spp. bacteria fix nitrogen and improve the growth of intercropped millet. In an innovative linkage between a higher education research lab and the private sector that was catalyzed by ERA, UCAD has begun growing the needed inoculum in their laboratories to provide a local source.

As part of this work, ERA led meetings on mung bean research and development at Kaolack, Bakel, Matam. Work sessions and training lessons were organized with 15 farmers from Kaolack and Fatick, 7 ANCAR agents, and several interns from ENSA and LTAEB. As a follow-up, ANCAR agents will assist the farmers to inoculate and plant the seeds. The same work was done with farmers from Bakel and Matam.

Scientific Writing & Research Proposal Development

In addition, ERA facilitated a series of four workshops on development of research projects, scientific writing that reached over 100 teachers and researchers from UCAD, CFPH, ISRA and ITA (Dakar), UGB, CNFTEIA, DRDR, SAED, and FEPRODES (St. Louis), and UASZ and ISRA (Ziguinchor). In addition, focusing on the partners who received small sub-awards, ERA facilitated a separate workshop on scientific writing, publishing, and knowledge translation (e.g., via policy briefs) to promote dissemination of results from ERA’s collaborative research innovation platforms. Both sets of workshops used local expertise, part of ERA’s sustainability plan.

Result 2.2: Improved Outreach and Technical Support

Achievements

4-H Positive Youth Development

Following the two-week master training for 25 people including community leaders, faculty members from ENSA and ISFAR, ANCAR extension agents, and Peace's Corps volunteers that was facilitated in March of 2015, the three pilot clubs in the Toubacouta area have become well established and are functioning relatively well. ERA supported this development through the provision of small gardening materials for the three pilot clubs, collaborative planning for 4-H activities with Peace Corps, ENSA, ANCAR and ISFAR, and the posting of a 3rd Year Peace Corps volunteer to coordinate 4-H in Toubacouta. The clubs are engaged in gardening, tree-nursery activities, fund-raisers (e.g., through hosting traditional wrestling competitions), and various craft projects.

In FY16, ERA focused on the scaling up and implementation of the 4-H Senegal program in Ziguinchor and Saint-Louis, via a master train-the-trainer involving three U.S. experts from Virginia Cooperative Extension, plus new local grassroots leaders and new partners, such as Synapse Center. These trainings involved field visits to areas around each new town to scope out club sites and to identify local leaders who will subsequently be trained. In this phase, a total of 75 individuals (faculty members, practitioners, teachers, Peace Corps volunteers, students, and representatives from local youth agencies) took part of the training and initiation to 4-H (31 from St. Louis UGB; 30 from UASZ/LTAEB; and 14 from ISFAR with ANCAR/Kaolack and Thiès with community leaders and PC volunteers in Toubacouta.

These trainings, in the two new regions of St. Louis and Casamance, were followed up with visits, meetings, and trainings to help establish clubs and enroll youth in the areas around the new host institutions. There are now thirteen clubs with hundreds of youth enrolled. Next steps involve ensuring that the needed knowledge, skills, and structures are in place for the clubs to function well. Additionally, the previously trained trainers conducted their first peer-to-peer training, with ERA support. ERA also organized a coordination meeting between stakeholders from Peace Corps/Senegal, UCAD, Virginia 4-H, and ERA, with a focus on strategic planning for long-term sustainability and institutionalization of 4-H Senegal.

To support the scale-up phase of 4-H, ERA hired a 4-H Program Specialist. In recognition of its work to establish 4-H in Senegal, ERA won the Friend of 4-H Award at the Virginia 4-H Congress in the U.S.

Food Processing Partnerships

To continue the successful public-private partnership (PPP) work from FY15 in joining university expertise with women's economic empowerment groups in value-added processing of local cereals and fruits through the POPAS platform, ERA's main focus in this area in FY16 involved the facilitation of an extensive series of scaling-up workshops on training modules based on the local food products that were analyzed and formalized by UCAD food science faculty. Through co-facilitation between POPAS leadership, UCAD faculty, and UCAD interns these evidence-based

agro-alimentary processes for approved products were disseminated to the wide network of GIEs making up the POPAS platform. Products covered included arraw, thiacy parfume, couscous, couscous with gomme arabique, among others. Scaling-up sessions were held in Dakar, Rufisque, and other suburbs of Dakar.

In addition, as with 4-H, this activity scaled up to the north and south, with training workshops on the development and implementation of multi-institutional interdisciplinary public-private partnership platforms and revolving funds for women's GIEs working with value-added agro-alimentary products in St. Louis and Ziguinchor and producers' groups in Bignona. One important result was the creation of three new functioning platforms: *Plateforme des acteurs de l'Agro-alimentaire de la Casamance* (PAAC), *Coopérative des producteurs agricoles de la région de Ziguinchor* (COPAZ), and *Plateforme des acteurs de l'agro-alimentaire de la région de Saint-Louis* (PAAR/SL). News coverage of the launching of PAAR/SL can be found [here](#). Specific tasks and results related to this activity included the following:

HACCP Diagnosis. For 15 days in a row, a team composed of academic experts from the Food Science department at UCAD conducted site visits with microenterprise (GIE) food transformation units to analyze the food system dangers and critical control points during the manufacturing processes. This work was performed for units located in the region Casamance via the GIEs of Ziguinchor, Bignona, and Diouloulou. The whole manufacturing process of targeted products must be dissected, with data collection, sampling, and analysis carried out to guarantee the safety of the finished product. Following this evidence-based procedure, the risks of contamination will be limited for the 18 products chosen for university follow-up, which will enable the women to benefit from a comparative advantage relative to other products already on the market. This set of 18 PAAC products will join the 12 existing POPAS products already followed by UCAD for a better harmonization across the multiple platforms. These diagnoses by university experts also allows the women entrepreneurs, with the support of ERA, to obtain authorization for formal sale of their products (FRA).

Social Media and Online Presence for Better Promotion of Local Products. For the four platforms of processors and producers located between Saint-Louis, Dakar, Ziguinchor and Bignona (POPAS plus the three new platforms), the need was identified for these actors to better market their processed products. Almost 100 stakeholders have been trained on the Mlouma software, which is a platform for exchanges between commercial actors of the agricultural sector. In addition, participants received training on social media, allowing them to create accounts for better visibility of their products. The platform members also gained visibility through ERA's support for their participation at the *Foire Internationale de l'Agriculture et des Ressources Animales* (FIARA), where they had vendor tables to sell their food products.

Scaling Up of Products Monitored by UCAD & Experience-Sharing Workshops. A series of scale-up trainings and peer-to-peer exchanges have been carried out in the various networks and organizations composed of actors in the food industry. A caravan was organized to go to the different regions of Senegal (Dakar, Saint-Louis, Ziguinchor, Bignona, Thies, Kaolack, and Fatick) to expand and extend the benefits from the results of the new techniques and manufacturing processes of the products already validated by the. To date, more than 50 products out of the 56 monitored products have been scaled up and over 3000 women food processing entrepreneurs have benefited. This scale up will allow for wider shared packaging and labeling across the platform, which increases their market share.

Technical Evaluation and Capitalization Meeting. A meeting was organized with the trainers and food processors from POPAS, accompanied by the university experts, to focus on the production of technical guides and fact sheets about the products monitored by UCAD. This resulted in the development of 12 fact sheets, the contents of which have been approved by all the processors and validated by the university's experts to ensure that risks are limited to better control the manufacture of the products. These knowledge translation documents will be printed and a system of revolving management funds will be set up to enable these trainers to print the fact sheets for the other products monitored.

PAAR/SL Follow-Up & Fostering Civil Society Linkages. After facilitating the grouping of actors and producers into PAAR/SL for a better synergy of their shared actions, the members of the platform took ownership of the structure by partnering and collaborating with the various representatives of local government to promote better visibility of their actions in the region. All of these groups have already worked with other civil society structures to some extent, but never with the purposes of identifying synergies to enhance the organizational management of GIE platforms.

Non-degree training of agricultural professionals

In Year 6 thus far, most non-degree training of agricultural professionals has been associated with outreach through the CROPs and with additional applied research and outreach work, such as that on mung bean.

Constraints encountered and unresolved issues

As with Component 1, the largest constraint is the slowness with which many activities unfold. The CROP projects have been notoriously behind schedule, due in part to ERA inefficiencies and poor communication, in part due to lack of follow through by partners, and in part due to natural contextual issues such as rainfall.

Component 3: Management and Policy Support Strengthened

Component 3 supports development of a sustainable administrative and policy environment for human and institutional capital investments of AETR partners. Two key results are targeted in support of this effort: (1) Partner management and administrative systems are strengthened; and (2) Collaboration increases among AETR institutions in the development of policies that improve their contributions to the agricultural sector.

Result 3.1: Management and administration systems of targeted AETR partners strengthened

Achievements

Gender Mainstreaming in Agricultural Education

Working towards sustainability in the work to mainstream gender analysis in AETR functioning, ERA achieved finalization of the gender assessment with the *Ministère de l'Environnement et du Développement Durable*.

Self-Assessment and Accreditation

The harmonized methodology in the process quality assurance and institutional strategic planning for accreditation of agricultural curricula and programs continued to be used. Work in the first half of FY16 also progressed towards finalizing the guide and report for the harmonized methodology, which will subsequently make this approach available to other AETR systems elsewhere in francophone Africa.

Other Strengthening Through Partnerships and Events

ERA and its partners also participated in a number of events that promote strengthening of AETR management systems, such as the following:

- Participation in and presentation of the ERA model at the *Colloque international sur l'assurance qualité de l'enseignement supérieur en Afrique francophone: Bilan, bonnes pratiques et perspectives*.
- Participation in an international conference on funding of research organized by the National Academy of Science, Technology and Innovation of Senegal.
- Participation in the “*Forum de l'Emploi*” organized by UASZ, with the facilitation of a signing of a MoU between UASZ and the new platform GIEs involved in value-added processing of local foods. The forum was also used to announce the official launch of 4-H activities at Casamance. Press coverage of the event can be found [here](#).
- Participation in fora on employment and entrepreneurship at UT and at UCAD
- Facilitation of inter-institutional networking and awareness strengthening by supporting participation in the FIARA
- Facilitation of scientific exchange visit for Dr. Turekian, Science and Technology Advisor to the U.S. Secretary of State.

- Participation, as ERA and on behalf of VT, in the first meeting of international scientific partners of USSEIN (*Université du Sine Saloum El Hadj Ibrahima Niass*)
- Participation in ITA's round table on the theme: Investing in agricultural and food research: a challenge for the Senegalese private sector
- Participation in a workshop on the validation of literature reviews and finalization of research protocols of USAID/PAPA (*Programme d'Appui aux Politiques Agricoles*)
- Participation in USAID/AfricaLead workshop with UCAD's *Institut supérieur d'agriculture et entrepreneuriat*
- Participation in USAID/CINCERE launch, serving as advisory member of their steering committee, and sharing of project vehicles and contact info to facilitate their mission
- Participation, as a panel facilitator and discussant, by the DCOP and by two returned ERA Scholars, in a panel discussion on research on control of mango pests, part of the Mango Week event
- Participation in and presentation at the *Forum Africain de Recherche Agricole (FARA)* in Kigali, Rwanda
- Presentation on ERA and on importance of global investments in AET HICD at the Africa-USA Trade, Food Technology and Nutrition Conference
- Participation in the Senegalese Evaluation Network (SenEval) meeting and launch of the Youth Focused Evaluation Thematic Group
- Participation in a UNICEF roundtable with the Director of the Innocenti Research Institute, on ERA's role in evaluation and research on youth and children's issues in development

Result 3.2: AETR Institutions are working together to influence policy decisions affecting the agricultural sector

Achievements

RAFADIS

ERA supported and led its partners in the creation of this open network for exchange, synergy, and promotion of distance learning in higher education and training institutions. In July 2016, ERA facilitated the first meeting of RAFADIS (Réseau des Acteurs de la Formation à Distance du Sénégal). Professor Lamine Gueye, Recteur of Université de Bambey was designed as the first President of the group.

University Reform Law

ERA continues to assist the Government of Senegal in operationalizing law n°18/2014, providing new missions and governance for universities. Also, this year has seen the establishment of UCAD's *Institute Supérieur d'Agriculture et Entrepreneuriat* (ISAE), the creation of which was in part inspired by ERA. Placed as it is within the oldest and largest university in all of francophone West Africa, and in an era when university roles in sustainable agricultural and community

economic development are gaining attention, ISAE is well-placed to contribute to and influence policy decisions affecting the agricultural sector.

Constraints encountered and unresolved issues

TWGs, which ideally present the organizational structure by which gender and other work will continue without ERA investment, continue to languish. In part, this is likely due to the fact that many TWGs were established as parallel structures, sometime duplicating structures that were already place, and thus never gaining real buy-in. This was a concern raised in the mid-term evaluation and must still be addressed.

Also, the *Groupe de Réflexion sur l'Agriculture et l'Agro-alimentaire au Sénégal* (GRAAS) has been largely dormant this year, which is troubling because it occupies an important place in the plan for sustainability of ERA activities. In part, this inactivity is due to lack of availability of key actors, yet it is clear that ERA must make this more of a priority in the future. ERA is currently considering a way forward without GRAAS.

Operations and Administration

Some salient activities and other factors that pertain to the operation and administration of the ERA PMU include the following:

- **Change in COP.** Once again, ERA experienced a change in leadership in the PMU (as well as in the Home Office, OIRED). Larry Vaughan returned to the U.S. and was replaced by Tom Archibald.
- **Change in DAF.** The head finance and administrative staff person, Libasse Sylla, accepted a position elsewhere and was replaced first in an interim capacity and later in a full capacity, by Fatou Mbaye, who had served under Libasse. Then, Fatou Mbaye accepted a position elsewhere, too, and ERA was left without a DAF until the Cooperative Agreement was extended, which allowed us to hire a new DAF. These transitions may have led to a slowing of some activities, but generally the PMU continued to function as in the past.
- **Internal evaluative thinking and pathway modelling workshops conducted.** ERA conducted an internal retreat to develop a theory of change (pathway) model to support the project's learning agenda and eventual impact evaluation. This is part of a larger endeavor to instill a culture of evaluative thinking into ERA's everyday project management.
- **Photography training for drivers.** ERA drivers were trained in photography, to increase the quantity and quality of photos of ERA activities that are useable for communications materials. This is a lower cost way of obtaining usable photos, and also builds the capacity of PMU staff to contribute to their career advancement.

Communication & Knowledge Translation

Weekly activity summaries were sent regularly to USAID and project personnel. In addition to these regular communications, a video to highlight the experiences of the returning Scholars was

begun. Also, many events organized by the project were covered by national media (TV, newspapers, radio, online media), giving good visibility to the activities of the project.

ERA began creating a print overview of the project that will help tell the ERA story. ERA also began creating post-card like digital communication pieces that can be shared via social media. From a knowledge translation perspective, ERA staff, Scholars, and partners created a number of posters, presentations, and papers. These will be catalogued and archived in FY17; a few examples include:

- Archibald, T., Seck, Y. F., Guissé, B., & Mbaye, D. (2016). Women's leadership and economic empowerment are bolstered through partnerships with agricultural education and research institutions: Lessons from value chains in Senegal. In USAID (Ed.), *Learning from Feed the Future Programs about Gender Integration and Women's Empowerment: Compiled Case Submissions* (pp. 36-39). Retrieved from <https://agrilinks.org/library/cultivating-women%E2%80%99s-empowerment>
- Trail, P., Abaye, O., Thomason, W. E., Thompson, T. T., Gueye, F., Diedhiou, I., Diatta, M. B. & Faye, A. (2016). Evaluating Intercropping (Living Cover) and Mulching (Desiccated Cover) Practices for Increasing Millet Yields in Senegal. *Agronomy Journal*, 108(4), 1742-1752.
- Ndiaye, A., Bocoum, N. M., Moore, K., Ba, A., & Archibald, T. (under review). Innovation pédagogique dans les facultés et écoles agricoles Sénégalaises: Caractérisation et éléments de construction du « Common book » [Pedagogical Innovation in Senegalese Agricultural Colleges: Characterization and Elements of the “Common Book”]. *Journal of Higher Education in Africa*. (In French).
- Archibald, T. (2016, May). Complexity-Aware Monitoring and Evaluation: USAID's Education and Research in Agriculture Project in Senegal. Paper presented at the annual conference of the Eastern Evaluation Research Society, Galloway, NJ.
- Gichane, W., Anderson, J., Abaye, A. O., Gueye, F., & Archibald, T. (2016, February). An Exploration of Perceptions and Attitudes of Senegalese Professors Toward Learner-Centered Instructional Strategies in Agriculture Courses. Poster presented at the Conference on Higher Education Pedagogy, Blacksburg, VA.

Constraints encountered and unresolved issues

Constraints were mostly related to turnover at the COP and DAF position and to perennial inefficiencies in administrative functioning. There were some difficulties in operations of FOGs. A frequent issue for ERA is the slow administrative processing of payments and deliverables for FOGs. This continued in the first half of FY16, exacerbated in part by the transitions of COP and DAF. The FOGs, which in theory are good de facto mechanisms to build financial management capacity, will come to a close in the second half of this year, and any additional funds required by partners to translate their research results into impacts will be handled through On Behalf Of arrangements or other direct costs. More generally, reflections on constraints include the following:

- **Slowness by partners.** Conservative, protocol-based, bureaucratic ways of functioning slow things down at some of our partner institutions. And the more dynamic ones are genuinely busy with numerous initiatives. It is hard for them to follow-up on planned work, get products done, etc.
- **Slowness by ERA.** We are often just as slow, for example in terms of processing financial transactions (just like USAID can be slow on the financial side of things in relation to us) and in following-through on activities. Better planning, workflow management, and M&E could help address this, in part.
- **Slowness of institutional and cultural change.** Even when all is functioning well, creating new degree programs, helping to launch new programs, instilling new professional practices in an old profession—all of these institutional and cultural change processes can easily take years to take hold. In light of diffusion of innovation theory, organizational learning theory, etc., this might be more or less unavoidable.

Appendix I. Cross-Cutting USAID Thematic Areas

ERA is closely linked to USAID/Senegal's strategic objective of increased inclusive economic growth and the FTF goal of sustainably reducing global poverty and hunger in Senegal. The FTF initiative themes of improving farming systems, agri-businesses, community efforts, value chain productivity, and production system sustainability guide and inspire the work of ERA. In addition, as described in further detail below, ERA partners with other FTF projects to ensure that Senegalese agricultural education and research institutions are linked synergistically with USAID/Senegal's food security innovations. Part of this linkage is achieved by ensuring that ERA also contributes to broad cross-cutting themes such as the ones presented briefly below.

Science Technology and Innovation (STI)

Much of what ERA does is in support of STI. This fact was exemplified by the visit of Dr. Turekian, Science and Technology Advisor to the U.S. Secretary of State, with ERA and ERA partners. For instance, our applied research and outreach platforms use a competitive sub-award mechanism to foster inter-intuitional and multidisciplinary STI responses to the most pressing agronomic challenges facing Senegalese agriculture. Our PPP work to connect food processing GIE platforms with university researchers is a direct way of linking STI from university and research center campuses to local communities where that innovation can drive economic growth. Additionally, our 20 US and 114 local scholars are now more able to contribute to leading STI efforts in the future. In FY17, ERA will work even more closely with the Senegalese National Academy of Science and Technology to lead national efforts to use STI to address soil salinization, food processing technologies, nutrition-led agriculture, and more.

Gender

ERA completed a gender assessment with the *Ministère de l'Environnement et du Développement Durable*. Beyond that, gender received insufficient attention in FY16, although gender is at least tacitly included in almost all ERA activities (such as the implication of our partner AETR's Gender Cell's in the implementation of 4-H and the strong role of women in the GIE groups comprising POPAS and the other platforms). By increasing our personnel capacity in the area of 4-H Youth Development through the hire of a new Program Specialist, which would also have the effect of freeing up some time from our current youth and gender coordinator to focus more on gender.

Climate Change

ERA contributes to climate change adaptation and sustainable environmental management primarily by supporting applied research and extension on climate-smart crops and production techniques which are able to produce well in drought conditions and in salty soils. These technologies can contribute to efforts to more efficiently use crop land, and even to rehabilitate crop land lost to salinization. Salinization is understood to be an effect of climate changes, so reclaiming salty soils through management practices and adapted varieties is an important national climate adaptation priority in Senegal.

Feed the Future

ERA plays an important connector and knowledge translator role for USAID/Senegal's Feed the Future (FTF) activities. ERA increasingly contributes technological and systematic innovations and collaborative platforms that serve to complement other FTF activities such as the Senegal FTF Value Chain Activity (Naatal Mbay), the Senegal FTF Nutrition-led Agriculture Activity (Yaajeende), and the Senegal FTF Fisheries Activity (COMFISH). These activities are contributing to shaping the dynamic face of agriculture in Senegal and ERA is ensuring that the requisite social and technological aspects of the knowledge systems and the human and institutional capacity in agriculture are in place to multiply and scale up the results of those other FTF activities. Over the past 6 years, ERA has helped develop the human and institutional capacity in agricultural education, training, and research (AETR) institutions which are now better equipped to serve the needs of the Senegalese public and private sectors, including farmers at all levels. ERA has contributed to transformational and systemic change through increased AETR institutions' collaboration and outreach to the private sector, improved curriculum development, and positive youth development and entrepreneurship. We posit that ERA is a valuable activity in USAID/Senegal's Economic Growth portfolio, playing a pivotal role in helping the Economic Growth Office achieve its Development Objective of inclusive economic growth.

Microenterprise Development

ERA's largest contribution to microenterprise development occurs through our support for the PPP between POPAS and UCAD, and now in our support for similar arrangements in the areas of St. Louis and the Casamance. By the end of FY16 we reached roughly 3,000 small entrepreneurs (nearly 100% women) who, by virtue of the increased quality of their value-added local food products, should be in a position of competitive advantage over other local food processors. There is a need for ERA (along with other USAID partners such as Africa Lead) to follow-up this technical support with entrepreneurship skill building, revolving funds for purchasing of packaging, and other benefits of their economies of scale, such as bargaining power when purchasing primary materials and when seeking access to markets.

Youth

ERA's flagship efforts in youth are the 4-H Senegal Positive Youth Development (PYD) program, which aims to connect AETRs, grassroots leaders, Peace Corps volunteers, and other partners, to foster holistic development for young people (aged roughly between 8 and 25). Rooted in over 100 years of evidence-based experience in rural youth development in the U.S., augmented by 20 years of research-based knowledge on PYD, and with an emphasis on agriculture and entrepreneurship, this activity has the potential to offer both technical solutions and social solutions to the issues of youth un- and under-employment, a major national issue in Senegal. Three unique aspects to 4-H that set it apart from the myriad other youth-focused NGOs, projects, and government initiatives working in this space are: (1) its global connection to the strong network of 4-H based in

Washington, D.C (from which we are planning to seek official recognition); (2) its connection to Senegalese universities and other AETRs (thus providing otherwise untapped expertise to youth while simultaneously helping universities operationalize the call to provide service to the community); and (3) its focus on PYD, which is passed on premises such as: Youth are resources to be developed not problems to be solved; Youth voice, leadership, and participation are important; Problem-free is not fully prepared, etc. 4-H Senegal will capitalize on the rich research base in this area to offer a high quality youth development program that will be institutionalized in order to yield lasting impacts on Senegal's economic growth and development.

Appendix II. FY16 Performance Indicator Table

Indicator	Disaggregation		FY16 Targets	FY16 Actual	% of Target	Comments	
1.1.1. Number of AETR professors trained in syllabus development/ curriculum design			200	181	90.5%		
1.1.2. Number of syllabi developed by AETR institutions			120	127	106%		
1.1.3 Number of students in classrooms receiving course syllabi		Male	1400	2879	206%		
		Female	600	1280	256%		
		Total	1900	4159	219%		
1.2.1 Number of individuals who have received USG supported long-term agriculture sector productivity or food security training [FTF 4.5.2(6)]	Local scholars	Male	0	0	--		
		Female	0	0	--		
		Total	0	0	--		
	US scholars	Male	6	6	100%		
		Female	8	8	100%		
		Total	14	14	100%		
	New	Male	0	0	--		
		Female	0	0	--		
		Total	0	0	--		
	Continuing	Male	6	6	100%		
		Female	8	8	100%		
		Total	14	14	100%		
	Total			14	14	100%	
	1.2.2 Number of faculty members and students trained in:	Faculty members (distance and distributed learning, subject matter competencies, other)	Male	80	200	250%	
			Female	20	68	340%	
Total			100	268	268%		
Students (distance and distributed learning, career management, other)		Male	200	132	66%		
		Female	100	75	75%		
		Total	300	207	69%		
Total			400	475	119%		
1.2.3 Number of students participating in private sector internships			Male	60	0	0%	
			Female	30	0	0%	
	Total		90	0	0%		

Indicator	Disaggregation		FY16 Targets	FY16 Actual	% of Target	Comments
1.2.4 Number of AETR faculty members and students registered on InnovATE's online community of practice		UCAD	3	0	--	InnovATE changed platforms for their online community of practice, which disrupted ERA's attempts to get a critical mass of partners to use the system. This indicator will be removed for FY17.
		UGB	3	0	--	
		UASZ	10	0	--	
		UT	3	0	--	
		ENSA	3	0	--	
		ISFAR	3	0	--	
		ITA	3	0	--	
		ISRA	3	0	--	
		CFPH	1	0	--	
		CNFTEFCPN	1	0	--	
		CNFTEIA	1	0	--	
		LTAEB	5	0	--	
		Others	10	0	--	
		Total	49	0	--	
1.3.1 Number of public-private partnerships formed as a result of FTF assistance [FTF 4.5.2(12)]			6	2	33%	Some PPPs to be established with local governments around Dakar are ready to be signed but were postponed due to local official schedules.
1.3.2 Number of higher education partnerships between international institutions and host country higher education institutions that address regional, national, and local development needs			0	0	--	
1.3.3 Number of AETR institutions tracking the employment of graduates			5	5	100%	The systems are still being refined, but all 5 pilot AETRs are currently tracking employment of graduates.
1.3.4 Number of AETR institutions conducting self-assessments to improve institutional performance			2	0	0%	Activities leading to this result will be rekindled in FY17, starting with the strategic planning process at CFPH.
2.1.1 Number of new technologies or management practices under		Millet	17	18	106%	
		Maize	1	1	100%	
		Rice	5	7	140%	
		Climate change	2	0	0%	

Indicator	Disaggregation		FY16 Targets	FY16 Actual	% of Target	Comments
research as a result of USG assistance [FTF 4.5.2(39)-I]		Other aspects of Food security or economic growth	1	2	200%	
		Total	26	28	108%	
2.1.2 Number of new technologies or management under field testing as a result of USG assistance [FTF 4.5.2(39)-II]		Millet	1	1	100%	
		Maize	0	0	--	
		Rice	1	3	300%	
		Climate change	1	0	--	
		Other aspects of Food security or economic growth	2	0	--	
		Total	5	4	80%	
2.1.3. Number of new technologies or management practices made available for transfer as a result of USG assistance [FTF 4.5.2(39)-III]		Millet	1	1	100%	
		Maize	0	1	--	
		Rice	1	0	0%	
		Climate change	1	0	0%	
		Other aspects of food security or economic growth	0	0	--	
		Total	3	2	67%	
2.1.4. Number of farmers and others who have applied improved technologies or management practices as a result of USG assistance [FTF 4.5.2(5)]		Male	300	54	18%	We anecdotally have hundreds more farmers and others applying improved technology, but the M&E system failed to adequately track them. This lack will be corrected in FY17.
		Female	150	15	10%	
		Total	450	69	15%	
2.1.5 Number of private enterprises, producers organizations, water users assoc, women's groups, trade and business assoc and community-based organizations (CBOs) that applied improved technologies or		Private enterprises	3	0	0%	
		Producer organizations	15	0	0%	
		Water users	0	0	--	
		Women's groups	140	190	136%	
		Trade & business associations	4	3	75%	
		Community based organizations	0	0	--	

Indicator	Disaggregation		FY16 Targets	FY16 Actual	% of Target	Comments
management practices as a result of USG assistance [FTF 4.5.2(42)]		Total	162	193	119%	
		New	137	193	141%	
		Continuing	25	0	0%	
		Total	162	193	119%	
2.1.6 Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) receiving USG assistance [FTF 4.5.2(11)]		Private enterprises	0	13	--	
		Producer organizations	15	39	260%	
		Water users	0	0	--	
		Women's groups	140	239	171%	
		Trade & business associations	4	7	175%	
		Community-based organizations	0	2	--	
		Total	159	300	187%	
		New	137	282	206%	
		Continuing	22	18	82%	
		Total	159	300	187%	
2.2.1. Number of individuals who have received USG supported short-term agriculture sector productivity or food security training [FTF 4.5.2(7)]	Producers	Male	450	306	68%	
		Female	3800	2182	57%	
	People in government	Male	20	49	245%	
		Female	10	31	310%	
	People in private sector	Male	10	45	450%	
		Female	10	23	230%	
	People in civil society	Male	0	20	--	
		Female	0	37	--	
	Total	4300	2693	63%		
2.2.2. Number of partnerships developed to deliver training services to local farmers and the private sector			1	2	200%	
3.1.1 Number of AETR members trained in administration, finance or M&E			20	0	0%	
3.1.2 Number of AETR institutions completing performance contracts with their respective ministries			2	0	0%	

Indicator	Disaggregation		FY16 Targets	FY16 Actual	% of Target	Comments
as a result of FtF assistance						
3.2.1.Number of AETR stakeholder action plans for improving higher education policies for quality assurance			1	0	0%	
Communication plan available and updated			1	1	100%	
Number of communication updates			40	0	0%	
Number of newsletters			12	0	0%	
Number of weekly reports			45	21	47%	
Number of success stories			7	1	14%	
Number of highlight media coverage			12	9	75%	
Number of insertions in national newspapers			2	2	100%	
Number of video reports			3	1	33%	
Number of participations on fairs and exhibitions			1	1	100%	