



# FEED <sup>THE</sup> FUTURE

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



## EDUCATION AND RESEARCH IN AGRICULTURE (ERA)

*Community-engaged learning and research for economic growth*



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**Agriculture in Senegal is changing, with the support of innovations from Feed the Future and other initiatives. Senegal's agricultural education, training, research, and extension system must also change in order to provide relevant, high-quality, leadership and expertise for these agricultural innovations.**

# Education and Research in Agriculture (ERA)

## Objective

Develop human and institutional capacity in Agricultural Education, Training, and Research

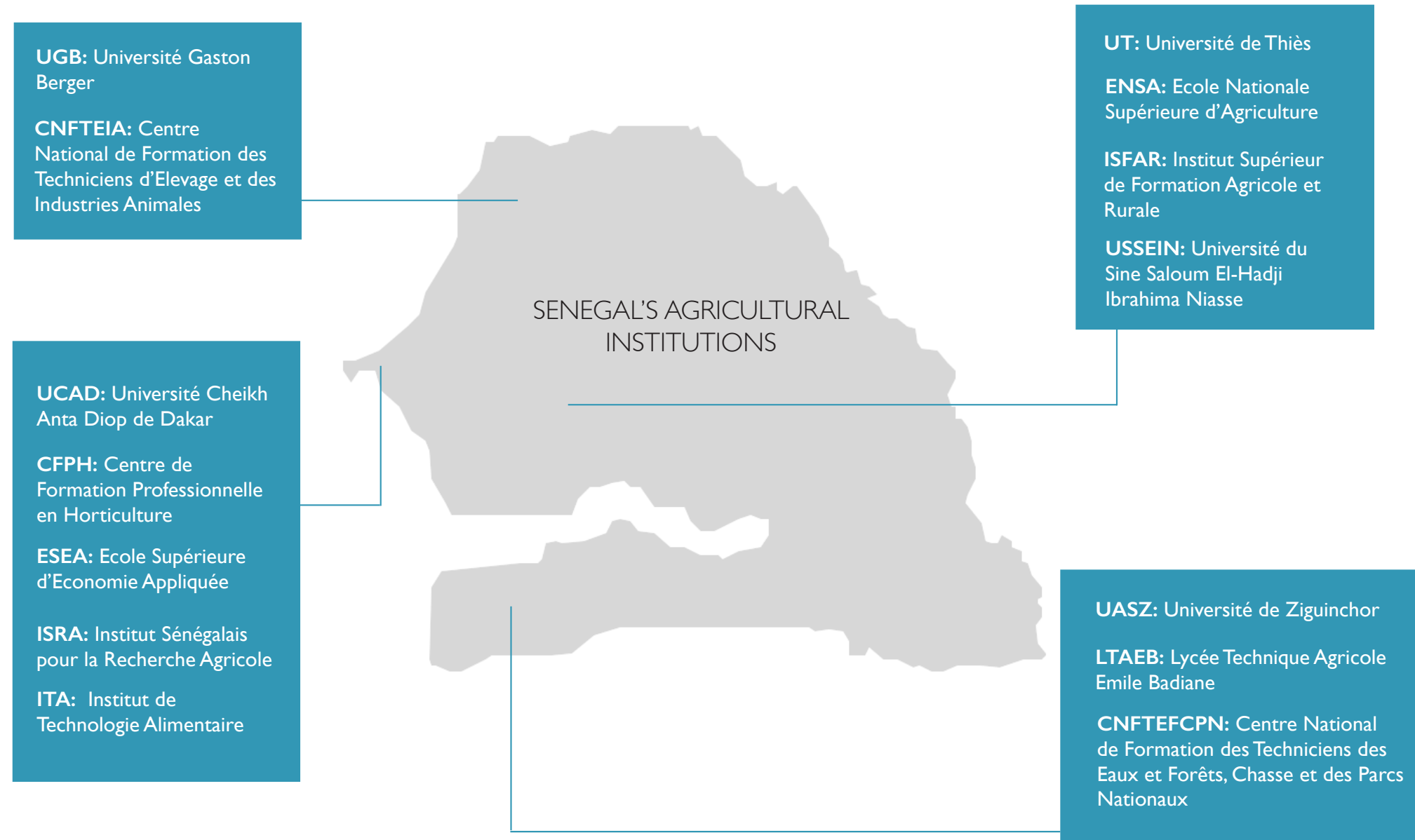
## Components

- Strengthening Agricultural Education and Training
- Strengthening Applied Research and Outreach
- Strengthening Project Management and Policy Support





ERA focuses on building and fostering stronger linkages between Senegal's agricultural institutions, community partners and agricultural producers in support of sustained agricultural development and economic growth.



# Agricultural centers of excellence

USAID/ERA works with Senegalese Agricultural Education, Training and Research (AETR) institutions throughout the country to accomplish its Feed the Future goals and objectives. The AETR partner institutions span six ministries in Senegal, including the Ministry of Higher Education and Research, which provides oversight for project activities.

Our partners are situated throughout the country. UGB and CNFTEIA are in the region of St. Louis, along the north-western coast; Dakar and Thiès play host to the majority of our programs in the western zone. Dakar is home to UCAD, CFPH, ESEA, ISRA, ITA, and FNRAA while UT, ENSA, and ISFAR are located in the region of Thiès. The south-western riverlands of the Casamance contain the last three schools in our partnership: UASZ, LTAEB, and CNFTEFCPN.

In addition to Virginia Tech, four other United States consortium members contribute to the success of the project, including Michigan State University, the University of Connecticut, Tuskegee University, and Purdue University.





# Shared national objectives




Similarly, with the organization of exchange visits to the United States and various African countries, and with the introduction of community outreach and service learning into the teaching practices of our institutions, ERA marked a vital turning point in strengthening the link between training, research, the private sector, and rural Senegal.

I would like to express my complete satisfaction vis-à-vis this project which, in addition to providing support in capacity building, logistics, and scientific and technical equipment, also and above all provided institutional support that has marked and transformed the universities, training centers, and agricultural research institutes of our country.

On behalf of the Government of Senegal, I express my thanks to the United States of America for its continued support in Senegal. I would like also to offer my sincere gratitude to the project's implementation team, headed by Virginia Tech, and to all of ERA's partners for their significant contribution to the achievement of our shared objectives.

The USAID/ERA project, through the consistent support it gives to agricultural research and training in Senegal, plays a very important role in the implementation of the Government of Senegal's policy in this area.

Indeed, thanks to the contributions of ERA, the number of students, and especially female students, enrolled in degree programs related to the agricultural sector has increased; new degree programs and institutes have been established; and teachers and researchers have gained experience and learned new skills.

 **Dr. Mary Teuw Niane**  
Minister of Higher Learning, Research and Innovation  
Republic of Senegal



# University reform law reinforces student learning & community development

In 2015, Senegal's Assemblée Nationale unanimously adopted a new law, n°2005°02/2015, which provides for new missions and better governance for universities. A key component of the university reform law—community service—calls for universities to commit to a higher level of engagement with the community outside of the formal classroom.

The law envisions agricultural education, training, and research institutions (AETRs) as key drivers of community development and economic growth in Senegal.

The changing role of universities in Senegal has been greatly influenced by ERA's efforts to promote three missions of American agricultural universities—teaching, research, and outreach. As part of study tours sponsored by ERA, high ranking officials from the Ministry of Higher Education and other higher education

professionals visited land-grant universities in the United States to gain knowledge about the land-grant model as well as community-university linkage and experiential learning. Recognizing the value of outreach as a university mission in the US, the government of Senegal formalized community service into the broader higher education reform law n°2005°02/2015.

ERA also inspired other components of the new law, including a mandate that half of a university's administrative board comprises members of the private sector. Furthermore, the promotion of career services is now part of every university's responsibility. The ERA project has played a major role in promoting vocational guidance services in agricultural training institutions.



**A key component of the university reform law—*service à la communauté*—calls for universities to commit to a higher level of engagement with the community.**





EDUCATION





## Promoting high-quality education through enhanced pedagogy and training

Senegal's agricultural development lies in the hands of the country's young and promising minds. In order to ensure that Senegal's future agriculturists and entrepreneurs are well prepared to meet the country's agricultural needs, ERA has implemented comprehensive measures that strengthen the human capacity of teachers, students and communities as well as the capacity of Agricultural, Education and Training institutions.

ERA has instituted programs at three different levels: institutions, professors and researchers, and students, to reduce performance gaps in the education and training component. The main

capacity building activities focused on:

- **syllabus creation** and use
- participatory **development of curriculum** to better align agricultural education offerings with the agricultural labor market
- **assessment of student learning**
- **e-learning**
- **experiential learning**
- teaching for **entrepreneurship and business planning**, and other pedagogical innovations



### Syllabi Development

Since 2011, ERA has supported the syllabus development process by building the capacity of more than 500 teachers-researchers and trainers in Senegal's agricultural training and research institutions. Monitoring the process has shown that syllabus development is well integrated into teaching activities.





### Tracer Studies

ERA has coached and supported five institutions on ways to develop and complete tracer studies that assess the quality of training based on the students' employment outcomes. Each of the five institutions applied the tools and methods of training through the implementation of a pilot study, the results of which were shared at the national level.



### Experiential learning

To strengthen institutional capacity to develop and implement experiential learning tools and opportunities, ERA organized a training on experiential learning. Four institutions are testing this approach through field activities with their students and local communities. Building upon the pilot test using silage as a case example, a team of ISFAR faculty began integrating new applied learning activities based on pasture management into their courses.



## Aligning agricultural curricula with workforce needs



Although Africa's booming youth population provides employers with a vast field of potential employees, many employers often find that graduates lack the skills necessary to complete the job. To help close the gap between student competencies and employer needs, ERA has worked closely with faculty to link course content with market demand.

In 2014, ERA project initiated the implementation of a program called “the public-private partnership for the development of training programs in the seed sector”. One of the objectives of this program was the integration of certain aspects of the seed value chain into the educational programs of Senegal's

agricultural training and research institutions. To achieve this goal, various activities have been carried out, including the curriculum development process in Seed Science and Technology with the participation of agricultural training and research institutions and public and private sector actors. This work culminated in 2015 in the definition of two Bachelor and Master degree programs in Seed Science and Technology.

In addition, the project supported curriculum development and revision activities in different institutions (UASZ, UCAD, UAM).



## Distance learning program facilitates access to training

The use of new technologies has led to the development of distance learning in Institutions. ERA contributed to the equipment of partner institutions in information and e-learning materials and **facilitated the creation of the national distance learning network in Senegal (RAFADIS)**. The main objective of RAFADIS is to set up a common policy in the use of ICTs for education and training in Senegal.

ERA also organized a workshop to organize an online course on integrated pest management (IPM) in Senegal —marking the first time that an IPM course will be offered in Senegal. The e-learning course tests a new model for sharing the development and implementation of online courses across multiple institutions (UCAD, UGB, ISRA, DPV, UASZ).





APPLIED RESEARCH AND OUTREACH



# 4-H Positive Youth Development

The number of youth in Africa ages 15-24 is expected to more than double by 2055. The youth bulge presents a valuable opportunity to equip younger generations with the tools needed to enrich their personal growth and to contribute to the continent's economic growth.

Thanks to the foresight of ERA, youth are discovering their own paths to sustainable development and exploring their full potential through the 4-H Positive Youth Development Program. Like its name indicates, 4-H (Head, Hands, Heart, and Health) is an outreach program that encourages youth development, youth entrepreneurship, and agricultural education in social and economic life.

## **Empowering youth through practical, applied experiences**

Originating from the land-grant universities and cooperative extension models in the US, 4-H promotes the active participation of universities and agricultural training centers in developing a new generation of agriculturists. Since 1902, 4-H has encouraged youth around the world to become actively involved in their communities.

In March 2015, the 4-H program took root in Senegal with the establishment of three pilot clubs in Toubacouta, south of the capital of Dakar—marking the first time a 4-H club has been established in francophone Africa. Throughout Senegal, 4-H is providing the optimal platform for youth ages 5-18 to stay engaged with their communities through experiential learning, participatory







research and ongoing service activities. Through this program, participants not only acquire but also discover new competences and life skills focused on their personal development; improve ways to make good decisions; manage resources wisely; work effectively with others; and to communicate effectively.

### Forging sustainable partnerships among youth, communities and institutional partners

The program is equally beneficial to agricultural institutions seeking to implement Senegal's new community service requirements. Employing a comprehensive approach, 4-H links partner institutions and their pedagogical expertise with local youth who seek valuable knowledge and experience in agriculture.

Following the establishment of the pilot clubs, ERA worked diligently to scale up trainings for prospective club leaders and partners. An additional 75 individuals (e.g., faculty members, practitioners, teachers, Peace Corps volunteers, students and representatives from local youth agencies) were trained to support 4-H Senegal clubs through a master train-the-trainer program involving three U.S. experts from Virginia Cooperative Extension service, plus local grassroots leaders and partners such as the Synapse Center.

Today, the 4-H Senegal program continues to empower Senegal's youth through a wide network of institutional, community and agricultural resources. Since the launch of the pilot clubs, demand for the program has skyrocketed with 4-H clubs as far south as



- 2015 4-H launched in Senegal
- 600 4-H members through 2017
- 100 Trained 4-H Leaders

Ziguinchor near the Guinea-Bissau border, to points north, including Saint-Louis. Nearly 40 clubs exist throughout Senegal with approximately 600 members.





#### Facilitating trainings for women entrepreneurs

Women entrepreneurs share best practices in transforming millet, one of the main staple crops in Senegal, during a training in Dakar. More than 10,000 women have been impacted by the trainings that ERA has facilitated throughout Senegal.





## Public-private partnerships link university expertise with women's economic empowerment groups

Thousands of women entrepreneurs in Senegal are breaking through social, economic and educational barriers thanks to the innovative public-private partnerships fostered by the USAID/Education and Research in Agriculture (ERA) project. ERA has joined together university expertise with women's economic empowerment groups throughout Senegal in value-added processing of local fruits and cereals.

From 2014 to 2017, ERA facilitated MOU between platforms of women-owned producer and processor enterprises and universities, including: the Platform of Organizations of Agribusiness Professionals of Senegal (POPAS) and the University Cheikh Anta Diop, the Agro-Food Actors Platform of Casamance (PAAC) and the Assane Seck University of Ziguinchor, the Agro-Food Actors Platform of the Saint-Louis Region (PAAR / SL) and the Gaston

Berger University. Initially, 12 POPAS companies, 18 PAAC companies and 17 PAAR/SL companies were selected to participate in this partnership. Exchanges between entrepreneurs and university researchers made it possible to assess the needs and weaknesses of each company.

As a result of scaled-up trainings and peer-to-peer exchanges facilitated by ERA, nearly 10,000 entrepreneurs have directly or indirectly benefited from the program today. Furthermore, about 101 products have been certified for commercialization and scaled up as a result of the technical assistance offered by ERA that has improved both the quality and safety of value-added food products in numerous sites across Senegal.

### Building up the capacity of existing platforms

Prior to the collaboration with ERA, women entrepreneurs in Senegal transformed locally-grown foods (fruits and cereals) and marketed their products through women's groups that promoted entrepreneurship, or *Groupements d'Interet Economique* (GIES). However, these businesses often lacked the technical capacity to produce high-quality products that met food safety norms as well as the management capacity to maximize commercial profits. To address these needs, ERA is providing for value-added food processing that maximizes

the technical and management capacity of the entrepreneurs through innovative partnerships with agricultural institutions.

### Advancing technical and safety trainings improve food quality

ERA has put in place specialized trainings for the women-owned agro-businesses that optimize the quality and safety of the end product throughout the food process. To this end, more than 5,000 women have been trained through a series of disseminations of these formations in different parts of Senegal. Thanks to the expertise of the university professors, trainings were organized for the members of the platforms on the following subjects:





Quality and HACCP system  
Nutrition and nutritional value  
Product Hygiene and traceability  
Marketing and commercialization  
Bar code, packaging and nutritional tables  
Short-term technical training in consumer taste testing

### **Hazard Analysis & Critical Control Points (HACCP)**

Faculty members from UCAD have also performed diagnostics and quality improvement on the agro-food, women-owned businesses, which resulted in noticeable changes in these businesses. Subsequently, POPAS businesses have benefited from more efficient and safe processing for many products.

### **Interns from universities reinforce effectiveness of trainings in processing units**

As a complement to the technical trainings held by UCAD faculty, interns have been placed in GIES of the different platforms to provide follow-up support to the businesses. With the recent implementation of service à la communauté—the country’s new law that requires universities to adopt outreach as part of their missions—the placement of interns provides a mutual benefit for students who



seek to apply their skills in the community and for entrepreneurs who would like to grow their businesses.

### **Technical guides, fact sheets promote knowledge sharing, sustainability**

ERA has incorporated innovative educational measures to ensure that value-added food processing goes beyond the production, processing and sale of food. Through the aid of university researchers, ERA has provided support for the publications that enhance knowledge sharing within the agro-business community.

### **Marketing matters**

In a country where the use of digital technologies has exploded, agro-businesses have also taken advantage of trainings on online marketing. About 100 stakeholders have been trained on the Mlouma software, a platform for exchanges between commercial actors in the agricultural sector; as well as Sooretul, an online platform for selling value-added food processed products. Participants have also received training on the use of social media, another digital tool for increasing the visibility of their products.

Each year, platform members showcase their products at the Foire Internationale de l'Agriculture et des Ressources Animales (FIARA), where they sold their processed food products.

### **Promoting gender integration, democratic knowledge sharing**

Women entrepreneurs and higher-level institutions have typically existed in separate domains, as cultural norms often shut women out of the education, training and research system. Refusing to accept the status quo, the President of POPAS (Plateforme des Organisations Professionnelles de l'Agroalimentaire du Sénégal), Nafy Diagne Gueye has spearheaded efforts to give women entrepreneurs a more influential voice in the application of agricultural theory.

### **Scaling up and branching out**

As a testament of the success and effectiveness of the POPAS-UCAD partnership, ERA has scaled up its efforts to join university expertise with women’s economic empowerment groups in value-added food processing.

It is in this context that the trainings delivered by academics have been disseminated in all other regions of Senegal including Kaolack, Fatick, Thies, Saint-Louis, etc. In addition to the platforms that have been created in the South, such as the Ziguinchor Producers’ Cooperative (COPAZ), a new entity named the Senegalese Agro-Food Actors Framework (CAAS) has been created to bring together all of these platforms to give greater representativeness in the agro-food sector.





# Madame Nafy Gueye

A visionary, entrepreneur & leader

When Nafy Gueye takes a seat at the table, she knows that her seat was not usually reserved for women. The fellow guests at the table—university researchers and development partners—had typically discussed agricultural research without the input of women entrepreneurs, les transformatrices, who specialize in the value-added processing of local cereals

and fruits. Thanks to the assistance of ERA and Nafy, women entrepreneurs are now boldly leading the way on the path to economic growth and food security.

In the northeastern area of Dakar in Guédiawaye, Nafy greets her customers each day with an endearing smile. While the sale of her products, such as bissap powder, couscous and cereal, provide a source of personal satisfaction, Nafy takes great joy in the fact that she and thousands of other women

entrepreneurs in value-added food processing are helping to ensure food security for Senegal that will in turn position the country for sustained economic growth.

“There is the grand economy, and then, there is the little market that is created by the population, the community. These small businesses help to generate money for food, for education, and for healthcare,” explained Nafy.

“As an entrepreneur, I give jobs to the people,” added Nafy. “When my business and other businesses employ people, we are working together to contribute to economic development in Senegal.”

Nafy, who currently serves as the president

of POPAS, Plateforme des Organisations Professionnelles de l’Agroalimentaire du Sénégal, has worked with ERA since 2011 to train women entrepreneurs in GIEs. While the food processing GIEs existed prior to ERA, product quality varied and some groups were not managed well. Through the scaling-up process, led by Nafy, more than 1,000 women near Dakar have been trained through the POPAS network. In addition, through

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the recently established platforms in Saint Louis and Ziguinchor, over 3000 women have been trained.

Nafy began collaborating with ERA following a study tour with public and private sector representatives to Virginia Tech University to learn about how food producers and universities collaborate. “After the visit, we said why can’t we do the same thing?” exclaimed Nafy. “POPAS and

the Université Cheikh Anta Diop de Dakar later came together to sign an MOU.

“The university experts bring their knowledge, and we give them our practical knowledge,” added Nafy. The institutional partners also see the partnerships as ‘win-win.’ Universities and research institutes contribute to women’s empowerment and economic development, while simultaneously enriching their own educational and research agendas.

She acknowledges that the lines of communication were not always open between universities and communities. “We had a sense of fear because the university is on a higher level. Prior to ERA, I thought how was I going to work with the university, but that is in the past now.”

Nafy has a BTS in Community Animation. She has spent much of her life advocating for others and sharing her skills in organizational management and entrepreneurship. Beginning in the late 1980s, she was very active in socio-economic programs for women and youth. Afterwards, Nafy continued teaching in public elementary schools 10 years, before beginning her work with local NGOs.

When she is not working in her own GIE, Nafy continues to assist ERA with GIE trainings. In addition, the Government of Senegal has invited her to discuss a plan for sharing the expertise and best practices of women entrepreneurs outside of the formal classroom.



# ERA: Lasting results in Agriculture



> 10,000

Women entrepreneurs impacted by trainings in food security

Students using improved and standardized syllabi



20,304

Food products approved for commercialization



101

1,735

Farmers and others who have applied new and improved technologies or management practices

Producers trained in agricultural productivity

> 5,000

Students participating in private sector internships

87



AETR members trained in administration, finance or monitoring and evaluation

120

Syllabi developed  
1,143

Scholarships awarded to Senegalese students to study in the US and in Senegal as part of the *Bourses d'Excellence* flagship initiative

155



AETR professors trained in syllabus development/curriculum design

832



ERA supports applied research via Collaborative Research and Outreach Partnerships (CROPs) that were funded as three-year sub-awards to a lead Senegalese institution.

## Nutrition-led & conservation agriculture (Mung Bean)

The short-cycle legume provides a protein-rich food before millet and other grains are harvested, serving as a vital nutritional bridge until cereals are harvested. In 2015, USAID-ERA and USAID/YAAJEENDE, in collaboration with the Commun Microbiology laboratory (LCM, IRD/ISRA/UCAD) introduced the mung bean as an alternative cover crop with the goal of improving soil fertility management, while addressing nutritional needs during off-season periods.



### Results:

- More than 150 test plots in Bakel, Matam and Kaolack during the cropping season
- In 2017 rainy season, about 95 producers from Kaolack, Bakel and Matam were involved in running the new Mung-bean campaign
- A doctoral thesis is running in collaboration with Virginia Tech and ISRA to test new varieties of mung bean (more than 600 varieties)

## Production and processing of sweet corn in Senegal: Sterilized canned corn manufacturing

Sweet corn is a counter-season crop and local demand is usually met by imported sweet corn. The Government of Senegal has identified sweet corn as a promising niche that has the potential to meet domestic demand and stimulate local economic growth. The project improves food security and creates a promising market cultivation of sweet corn in favorable agro-ecological zones and the production of canned sweet corn.

**Participating partners:** ITA, CFPH, and UCAD

### Results:

- Identification of sweet corn varieties (Infinity, Daaneex, and Yosenite)
- Development of processes for making canned sweet corn
- Testing of commercialization and marketing of sweet corn in the CityDia supermarkets, a Senegalese grocery chain.





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

ENSA uses available genetic resources to develop millet varieties adapted to low rainfall. Project partners focus 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.

**Participating partners:** ENSA, ANCAR Niayes, and ISRA/CERAAS

### Results:

- Production and sale of certified SOSAT seeds by the GIE Jambar (Méouane)
- Two graduates from the Master's program at Virginia Tech University
- Millet production guide, technical fact sheet, posters and publications



## Improving rain-fed rice productivity in Casamance

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, which led to a critical food deficit in 2007. ISRA, in collaboration with other partners, are working together to improve rain-fed rice productivity.



### Results:

- 30 women trained in rice parboiling
- 15.7 tons of improved rice were produced on 5,991 hectares covering 12 production sites
- 390 farmers, including 252 women, trained on improving rice production techniques
- Two tillage methods (ridging, no ridging) were tested, with ridging found to be more efficient



## Sustainable improvement of cereal productivity in salty soils

Each year, Senegal loses thousands of hectares of agricultural land due to soil salinization, a problem highlighted by President Macky Sall during the formal annual opening of the Academy of Science and Technology of Senegal. To help decrease land degradation, this research project tests techniques for restoring and conserving degraded soils, combined with several salt-resistant millet and rice varieties.

**Participating partners:** UT, ISFAR, ANCAR, ISRA, ITA, Green Sénégal

### Results:

- More than 300 producers (including 198 women) as well as 15 technicians trained
- One PhD student and three Master's students conducted research on this subject
- ERA is supporting the finalization of a document on the issue of salinization of soil in Senegal, at the request of the President of the Republic
- ERA supports the creation of an Inter-institutional Laboratory of Studies and Research on Salty Soils in Senegal (ILSRS)

## Promoting local rice in the Senegal River Valley and Delta

Senegal is heavily dependent on rice imports. However, local production covers only 20-30% of demand, as local rice is far from competitive compared to imported rice. Yet, rice represents 16% of food expenditures in rural areas and 11% in urban areas. To strengthen the rice production system in the Senegal River Valley and Delta region, this project has developed activities to increase the productivity and quality of local rice and to promote its marketing and consumption.

**Participating Partners:** UGB, ITA, ISRA/BAME, ISRA FLEUVE, SAED, DRDR Saint-Louis, Matam, CIRIZ PODOR, FEPRODES and Women's groups (Dagana, Podor, Matam delegations)

### Results:

- Training of producers in seed multiplication, certification and entrepreneurship
- Evaluation of capabilities, equipment and constraints of small-scale rice processing units
- Evaluation of consumer preferences and market study of local rice



**IF YOU WISH TO MOVE MOUNTAINS  
TOMORROW,  
YOU START BY LIFTING STONES  
TODAY**

~ AFRICAN PROVERB

In nearly every project, ERA has integrated the **participation of women and youth**, such as the: implementation of 4-H; experiential learning for female and male university students; and the strong role of women in the GIE groups comprising POPAS and the other women's food processing platforms. ERA has also worked with the government of Senegal to complete a gender assessment with the *Ministère de l'Environnement et du Développement Durable*.

In order to continue to effectively address food security and economic growth challenges, women and youth must be involved in the discourse and decision-making related to the economic future of Senegal. Throughout the project, our partners have also recognized the value in empowering Senegal's women and youth. Thanks to the assistance of ERA, Senegal is now one step closer to achieving inclusive and sustained economic growth.





# FEED THE FUTURE

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

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