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Haiti Agricultural University Partnership:
Center for Mitigation, Adaptation, and Resilience to Climate-Change in Haiti (CEMARCH)

2023 WORK PLAN
October 1, 2022 to September 30, 2023

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ACTIVITY INFORMATION

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| Activity Start Date and End Date: | September 30,2021 to September 29, 2026 |
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| Cooperative Agreement Number: | #72052121LA00001 |
| Name of Subcontractors/ Sub-awardees: | <ol style="list-style-type: none"> 1. Quisqueya University – <i>Anchor University</i> 2. Faculté d’Agronomie et de Médecine Vétérinaire (FAMV) 3. Campus Henri Christophe de Limonade (UEH) (CHCL) 4. Université Chrétienne du Nord d’Haïti (UCNH) (NORD) 5. American University of the Caribbean (AUC) 6. University Notre Dame of Haiti (UNDH) |
| Major Counterpart Organizations | |
| Geographic Coverage | West, South and North departments of Haiti |
| Reporting Period: | October 1, 2022 to September 30, 2023 |

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II. ACRONYMS AND ABBREVIATIONS

| | |
|-----------|---|
| AEZ | Agro-Ecological Zone |
| AR4D | Agricultural Research for Development |
| ATP | Agriculture Technology Park |
| AUC | American University of the Caribbean (Les Cayes) |
| BFS/ARP | Bureau of Food Security / Agricultural Research and Policy |
| CE | Center of Excellence |
| CEMARCH | Center of Excellence on Mitigation, Adaptation, and Resilience to Climate-Change in Haiti |
| CHCL | Campus Henri Christophe de Limonade (UEH) (Cap Haitian) |
| COP | Community of Practice |
| CLA | Collaborating, Learning, and Adapting |
| CLAS | Collaborating, Learning, Adapting and Sharing |
| CRDD | Rural Sustainable Development Centre |
| CSA | Climate Smart Agriculture |
| ERF | Environmental Review Form |
| FAMV | Faculté d’Agronomie et de Médecine Vétérinaire (Port-au-Prince) |
| FTF | Feed the Future |
| FTFMS | Feed the Future Monitoring System |
| FY | Fiscal Year |
| GDP | Gross Domestic Product |
| GFSS | Global Food Security Strategy |
| HAU | Haitian Agriculture Universities |
| HG | Haiti Government |
| IEE | Initial Environmental Evaluation |
| IL | Feed the Future Innovation Lab |
| ILCI | Innovation Lab for Crop Improvement |
| IPM | Integrated Pest Management (IPM) |
| IR | Intermediate Result |
| ISFWM | Integrated Soil Fertility and Water Management |
| IRs | Intermediate Results |
| KSU | Kansas State University |
| M&E | Monitoring and Evaluation |
| MARNDR | Ministry of Agriculture, Natural Resources and Rural Development |
| MEL | Monitoring, Evaluation, and Learning |
| MELP | Monitoring, Evaluation, Learning, and Plan |
| MS | Masters of Science |
| NARS | National Agricultural Research Systems |
| MENFP | Haitian Ministry of National Education and Vocational Training |
| NGO | Non-Governmental Organizations |
| NORD/UCNH | Université Chrétienne du Nord d’Haïti (UCNH) (Cap Haitian) |
| PID | Priority Intervention Domains |
| PIRS | Performance Indicator Reference Sheet |
| PITT | Performance Indicator Tracking Table |
| PMP | Performance Management Plan |
| PPP | Public Private Partnerships |
| PPR | Performance Plan and Report |

| | |
|-------|--|
| RF | Results Framework |
| SDG | Sustainable Development Goals |
| SIIL | Sustainable Intensification Innovation Lab |
| SMIL | Sorghum and Millet Innovation Lab |
| SO | Strategic Objective |
| TA | Technical Assistance |
| T&I | Technology and Innovation |
| ToC | Theory of Change |
| ToT | Training of Trainers |
| UNDH | University Notre Dame of Haiti (Les Cayes) |
| UniQ | University Quisqueya (Port-au-Prince) |
| USAID | United States Agency for International Development |
| USG | United States Government |
| ZoI | Zone of Influence |

Project Description and Objectives

I.1 Project Description

Historically, agricultural research has been a key driver in improving agricultural productivity and improving food security. Identifying problems and solutions in-situ is critical because agricultural production is inherently tied to the land, the weather, and farmers. Decades ago, the Haitian people and the government prioritized agricultural training, research, and development to improve Haiti's agriculture, however, today, much of that investment has gone by the wayside due to the lack of investment, funding, and interest. One of the long-term investments that must be made to develop the agriculture sector is to strengthen the institutions to train agricultural professionals, at all levels, who have the capacity and capability to identify and solve the problems in the sector. In addition, agricultural development is key to addressing poverty and food insecurity in Haiti. Training farmers through development projects provides a short-term band-aid solution to increasing agricultural productivity and food security. Forming a cadre of professionals, from the field to the laboratories, is critical to building an agricultural production system to withstand the shocks and stresses. Kansas State University's (KSU), Feed the Future Innovation Lab for Sustainable Intensification (SIIL), is working in partnership with six Haitian universities to co-develop and establish the Center of Excellence on Mitigation, Adaptation, and Resilience to Climate-Change in Haiti (CEMARCH) by collaborating with USAID-Haiti and other relevant partners including Feed the Future Innovation Labs.

The opportunity:

By focusing on Haitian institutions, this center will provide greatly needed assistance to a consortium of universities, research institutions, governmental and non-governmental organizations (NGO) and the private sector to develop a network of mutual support and exchange programs. The proposal identifies an anchor university (University of Quisqueya) in Haiti to lead a consortium of Haitian Agricultural Universities (HAUs) and their associated research institutions to collectively address agricultural challenges such as climate mitigation, adaptation, resilience and producing nutritious and safe food, while sustaining natural resources (Climate Smart Agriculture, CSA). The proposed center (CEMARCH– Center for Mitigation, Adaptation, and Resilience to Climate-Change in Haiti) will primarily focus on building institutional and human capacity (through both short-term certifications and long-term degrees) so that Haiti is able to identify and seek solutions to its agricultural problems.

I.2 Theory of Change

IF local agricultural universities' institutional and human capacity is increased at all levels by way of partnerships, investments and collaboration among U.S. universities to better understand, monitor, share information /disseminate, and manage agricultural system; THEN resulting gains of forming a cadre of professionals, from the field to the laboratories, will help drive investments across the agricultural production system and overall food supply will be less constrained, leading to greater overall food availability and affordability as well as strengthening farmers' resilience to withstand climate shocks and stresses.

1.3 Activity Goal, Objectives, and Expected Results

Goal: The goal of this initiative and partnership is to create a center that will foster agricultural education, training, research, extension, link farmers with the private sector, and build human and institutional capacity in the public-sector through improved collaboration, communication and knowledge sharing to address agricultural problems, and food and nutritional security in Haiti.

This activity is implemented by Kansas State University (KSU) with the following set of partner local universities:

1. Quisqueya University (Port-au-Prince) – Anchor University
2. Faculté d’Agriculture et de Médecine Vétérinaire (Port-au-Prince) (FAMV)
3. Campus Henri Christophe de Limonade (UEH) (CHCL) (Cap Haitian)
4. Université Chrétienne du Nord d’Haïti (UCNH) (Cap Haitian)
5. American University of the Caribbean (Les Cayes) (AUC)
6. University Notre Dame of Haiti (Les Cayes) (UNDH)

The anchor university (AU) will lead the consortium and oversee the coordination of various activities to meet the goal, objectives, and outputs of the program. They will co-supervise the Chief of Party (COP), and will also supervise a financial staff person, an information systems office, an administrative assistant, and a project driver. They will also provide office space and other basic office functions (phone, internet, computer) for the CEMARCH project.

CEMARCH Objectives:

The overall objective of the Haiti Agricultural University Partnership (HAUP) is to build the institutional and human capacity in the agriculture sector to advance agriculture-led inclusive economic growth. Specially, the project will:

1. Increase institutional and human capacity and social capital of local universities to better meet the demands of the agricultural economy and workforce needs. This includes curriculum development, training opportunities for young Haitian professionals (long-term and short-term certifications) and capacity building opportunities for Haitian faculty with enhanced research, education, outreach, and leadership skills.
2. Strengthen the capacity of the six selected universities to provide research and extension services to farmers and the private sector that have the potential to generate revenue.
3. Create linkages between universities, research centers and producers to ensure that targeted smallholder farmers have access to adapted technologies to increase food security in the Resilience Focus Zones. This will be accomplished through the establishment of technology parks to showcase high-potential CSA technologies and strategies to sustainably intensify smallholder production systems.

1.4 Links Between Objectives to USAID's Strategy

This section describes the linkages between the activity's objectives, expected results, and its contribution to the USAID's Strategic Framework. This activity contributes to USAID Haiti 2020-2024 Strategic Framework Development Objective 2: More inclusive, locally driven economic growth and Social development advanced and the Intermediate Result (IR) 2.2: Economic Opportunities Expanded. This activity is also in line with the DO 1: Haiti is more resilient to shocks and stresses. USAID-Haiti supports a broad portfolio of agricultural activities and has invested more than \$300 million into the sector over the past ten years to increase productivity, introduce new technologies, improve market linkages, better manage resources, and engage the private sector. As a part of USAID-Haiti's new Strategic Framework, USAID will focus its interventions in two Resilience Focus Zones, one in the north and the other in the south of Haiti (HRASA). Therefore, CEMARCH will identify and seek collaboration with other USAID and donor funded activities in the sector. USAID-Haiti recently launched a \$27 million Haiti Resilience and Agriculture Sector Advancement activity and currently has a number of partnerships with the private sector and grants to Rural Sustainable Development Centres (CRDDs). Our potential collaboration with HRASA is described in Section 2.4 (Collaborations) of this document.

2. IMPLEMENTATION APPROACH, INTERVENTIONS, AND EXPECTED RESULTS

2.1 Implementation Approach

This work plan covers October 1st, 2022 to September 30, 2023, and outlines the activities for each project objective in that funding year.

This work plan incorporates the meetings, discussions, and activities that have been conducted with our Haitian Agricultural University partners to consider the dynamics around agriculture as well as the political and economic changes that have taken place in Haiti. These meetings served the purpose of developing the groundwork for a strong partnership between CEMARCH and the Haitian Agricultural University partners. In the Spring of 2022, two strengths, weaknesses, opportunities, and threats (SWOT) analyses were conducted, one in Les Cayes with two universities (American University of the Caribbean (AUC) and Notre Dame (UNDH), and the other with the remaining four universities (FAMV, University of Quisqueya, Universite Chretienne du Nord (UCNH) and CHCL-Limonade). While individual strengths, weaknesses, opportunities, and threats were outlined for each university, there were also some common themes. These common SWOT themes were (starts on the next page):

Table 1. SWOT Results from two meetings (one in LesCayes (south) and the other in Cap Haitian (north)) in which all six universities participated.

| Strengths | Weaknesses | Opportunities | Threats |
|---|--|--|---|
| Internal to each university | | External to each university | |
| <ul style="list-style-type: none"> • Dedicated faculty, with strong interest in CEMARCH. • Faculty are engaged and committed to teaching, and are open to new ways (ex: distance) of teaching. • Natural resources, especially land, are often available for ATP development. • In several cases, existing laboratory space is available for teaching and/or revenue generating facilities. | <ul style="list-style-type: none"> • Space is often unsecured, lacking needed equipment, and does not have water or electricity. • Key faculty may be missing in certain needed areas (animal sciences, for example). • Internet and library resources are poor or scant. • Students may have left due to Covid and/or unrest, so numbers are lower. | <ul style="list-style-type: none"> • Strong relationships with area growers or other agricultural organizations that could be improved and grown. • Novel crops or other ag technologies to be explored. | <ul style="list-style-type: none"> • Unrest in the country. • Lack of equipment, parts, and laboratory supplies. • Security and safety issues. |

From these meetings key priorities were outlined. These were:

- Installing and maintaining quality internet resources for on-line teaching and communication.
- Improvement in libraries, availability of journal articles and other research materials.
- Addition of supplies and equipment to existing laboratory rooms, both for research and teaching.
- Creating safe and reliable spaces for research projects, including fencing, water and housing.
- Identifying faculty to teach courses and advise students.
- Recruiting quality and diverse pools of students for BS and MS degrees.
- Development of short courses and training that meet the needs of farmers and others in the community, providing quality training and enhanced job skills.
- Prioritizing the research projects to be installed at the various types of agricultural technology parks.

The Role of CEMARCH in Project Implementation

In FY 2023, SILL Leadership will continue to meet with partners and develop Individual Development Plans. These meetings, and the documents created, will provide a way forward for formulating strategic direction for each objective in the plan. The following specific steps will be taken:

- The 2023 Workplan for the project will be created (this document).
- Five-year Individual Development Plans for each university will be developed (in October, 2022), plus budgets.
- Annual 2023 individual workplans for each university will be based upon these 5-year plans (in October, 2022), and will provide details for research, extension and curriculum planning.

CEMARCH staff will be involved in the implementation as follows. The Project Director will craft the first rough drafts of the Development Plans (both the 2023 workplan and the annual individual plans), and will then work with the Chief of Party (COP) and each university to finalize and provide details for the annual individual workplans. Given the current level of insecurity in Haiti it is likely that these meetings will occur via distance, with the COP traveling in-country as safety allows. The financial administration at SILL will be the lead for budget approval, with the financial staffer for CEMARCH (hired by the Anchor University) to begin in November, 2022.

Staffing Plan:

1. Project Director – Guertal – Will be the lead in document writing, with rough drafts created. Will then participate in all calls to complete the planning documents, and associated budgets. Will work with the COP, Anchor University leadership and partner universities to start recruitment for BS and MS degrees, and planning of ag technology parks.
2. COP – Pierre – Will be the first line of communication between the Anchor University and partner institutions. Via visits, WhatsApp or emails (varying with safety and need) the COP will identify details on budget items, exact timelines of activities, and planning of curriculum design. The COP (along with the Project Director) will start to plan field days and other meeting events for CEMARCH.
3. Anchor University – the University of Quisqueya will hire four additional positions which will work solely for CEMARCH. These are: 1) administrative assistant, 2) financial, 3) communications, and, 4) driver. These positions will be announced in October, 2022 and the staff will be hired by November, 2022. These individuals will be responsible for financial subcontracts for each university, press releases, hiring/management of farm managers, etc, transport of visitors or others associated with CEMARCH, and all other duties as outlined on the position descriptions. In addition to supervising these positions, the Anchor University (under the leadership of Pressoir) will be the main organizing university for CEMARCH, and will oversee general activities within the CEMARCH consortium.
4. Additional staffing support through SILL. The Sustainable Intensification Innovation Laboratory at Kansas State University is under the direction of a Director (Prasad) and an Associate Director (Middendorf), both of whom have supervisory control of CEMARCH. In addition to their leadership SILL has a financial manager who will serve as the approver

and creator of all contracts and subcontracts for the universities, through SIII. There is also a communications specialist who will work on press release, informational content and all other communications, making sure that material meets all the specifications found in the Branding and Marking guide. The financial and communications specialists will also work directly with the individuals serving in those positions within the Anchor University (once they are hired).

2.2 Interventions

As a key component of success, it will be important that CEMARCH is inclusive and supports all partner universities. Recognizing the varying budgets, capacities, infrastructure, and sizes of the partner institutions, the activities will be designed to ensure that all partners benefit equitably from USAID's assistance and SIII's guidance. During FY 2023, CEMARCH will establish an external advisory board (EAB) to provide voices and participation to all partners and ensure equity. This EAB will feature scientists or others with years of experience in Haiti, and their experiences will reflect work in the various regions of Haiti. They will also be selected so that diversity in gender, experience and ethnicity is well represented. This EAB will help partner institutions develop projects that will provide sustainability for each university.

CEMARCH will work with the universities in partnership with the COP and Project Director to ensure networking and collaboration. For example, the universities have all expressed an interest in forming a Haitian Crop and Soil Science Society, a scientific society for meetings, presentations, and the sharing of science. Such a group would help in research capacity building within CEMARCH, allowing students and faculty a means for research project presentations, collaboration, and professional development for faculty and graduate students. Haitian faculty have said they would like to see a first-ever meeting of a Haitian Crop and Soil Science Society in 2025. Interventions of the CEMARCH staff, COP and Anchor University leadership will help to make this happen, with planning starting in 2023.

Specific Interventions, by CEMARCH Objective:

CEMARCH Objective 1: Increase institutional and human capacity and social capital of local universities to better meet the demands of the agricultural economy and workforce needs. This includes curriculum development, training opportunities for young Haitian professionals (long-term and short-term certifications) and capacity building opportunities for Haitian faculty with enhanced research, education, outreach, and leadership skills.

Interventions:

1. Scholarships for bachelor's degree programs at the home institution.

Rationale: A key intent of CEMARCH is that agricultural education for Haitian will occur at Haitian universities, and be conducted largely by Haitians. Successful BS degree programs must have a program curriculum that is robust and rigorous, yet meets the demand for new science in areas such as data management, statistical analyses, or climate change modeling. CEMARCH does not intend to develop entirely new degree programs, nor large numbers of new classes. Rather, the strength of university partnerships will be used to provide live and distance-based education for BS students, across the universities.

What will be done: Prospective BS students will be recruited for both fall and spring enrollments, using a variety of recruitment techniques (high school visits, etc). Recruitment will be done with a careful eye towards gender, ethnic and life experience diversity. While it is correct that in Haiti most students start as a cohort in the Fall, with the current unrest we will explore January enrollments as well. In the 2023 year (Fall 2022 to Spring 2023) this will mean that enrollment will start in the Spring (January) of 2023. However, due to in country unrest at least three universities will have delayed starts for the Fall semester, and so students may be able to be enrolled in the fall semester. Currently, no start dates have been set at UCNH, AUC or Notre Dame.

Each university will attempt to enroll 10 new undergraduate students in the 2022-2023 academic year (budget is shown below). Students who are already enrolled may also benefit from scholarships through funded 5th year programs (ex: for internships or research projects). Additionally, funds allocated in this portion of the budget will be used to improve internet and distance teaching capabilities, improve library facilities, and renovate teaching laboratories. This will be key to a successful distance education program.

Budget: The total allocated for scholarships in FY 2023 is \$240,000. Budgets for state schools may be different than those for private universities, as state schools will not need to cover costs associated with student tuition. However, every student has a real tuition cost, and that is reflected in the budget provided below. If a state school does not need the tuition to pay the students those funds could be used for other educational costs. Below is an example budget. This is shown as a YEARLY amount

(2023), but it is the same in every year. In each year \$40,000 is allocated in the BS scholarship section of the budget.

2023 Budget for BS Scholarship Funds.

| | \$USD |
|---|-----------------|
| Tuition for ten students per year (50 BS students per university over the life of the project) | 20,000 |
| Internet improvement (a priority in Year 1) and/or laboratory/classroom improvements | 5,000 |
| Funding for 5 th year internships or projects (not provided via state funds) | 10,000 |
| Funding for teaching faculty – supplements for developing distance classes, short courses, or other curriculum material | 5,000 |
| TOTAL | \$40,000 |

Output (Indicators to Which this Intervention will Contribute):

EG.3.2-2: Number of individuals who have received USG supported degree-granting agricultural sector productivity or food security.

2. Draft curriculum for identified programs in agricultural and veterinary sciences.

Rationale: New courses are planned when they are needed to fulfil the needs of BS or MS students, and the course is not currently available. For example, universities in the south need a forage management course, as interest in animal production has increased greatly in that area. Other planned courses are needed to provide strong training in climate change and response to climate change. These courses are in geographical information systems (GIS) and soils and land use. Having these classes will produce graduates from Haitian universities with a rigorous and up-to-date background in newer or different areas of agricultural production. These planned courses are: 1) forages, 2) animal management and health, 3) GIS, 4) statistics and scientific methods, 5) soil taxonomy, and 6) soils and land use. In all, a total of 8 courses will be developed over the 5 years of the project. In 2023 three courses will be developed – an animal health course, a GIS class, and a soils and land use course. All courses will be taught over the life of the project. Since most courses that will be developed will be taught by a current faculty member it is likely that the courses will continue after this project ends. A few courses will be developed by new partners (for example, a soils and land use course), and in that case course content will be supplied to the partner university for their longer-term use. One such course (soil fertility) has been developed and will be used in 2023. The idea is that MS students completing degrees within the CEMARCH project could then take over teaching responsibilities, as various universities hire them into faculty roles.

Every university agrees that a 2023 first budgeted item will be improved internet so that developed classes can be offered via distance (see the Budget above, in BS degrees).

Budget: See #1, above.

Output (Indicators to Which this Intervention will Contribute):

Number of training/lecture series facilitated by CEMARCH for students and staff capacity building

3. New or expanded short-term programs focused on meeting the demands of the agriculture labor market at a suitable partner institution within Haiti or in the region.

Rationale: Short term training, certificates and other courses (not part of the BS degree programs) will be developed to provide education, information and training for Haitian citizens who seek new or additional training in areas of agricultural production or technology. These courses will enable young Haitians to develop career skills (ex: ag mechanic, laboratory technician), farmers to gain additional production information (new cropping systems, new crops, improved animal management, etc), or others to explore new business investments (ex: post-harvest processing and marketing).

The targeted audience varies with the type of program, the length of the program, and the intended outcome of the trainings. For shorter programs that do not have an 'official certification' (eg: required courses, a BS degree) the audience would be high school students that are not attending college, advanced high school students with an interest in these areas, farmers who are seeking additional information about methods to improve their productivity, and other citizens who have an interest in developing a new business, exploring a new crop or production practice, or other business enterprise. All students could be selected via an application process, with information about the courses spread throughout the region using common communication apps (WhatsApp, TikTok, Facebook, simple flyers at shops, etc.).

Many of the shorter courses or other trainings could be free (with development and instructor costs covered by the education budget, see Objective 1, above), or they could charge a minimal enrollment (which could then generate revenue). High school students could also receive a small scholarship, through funds in the research/extension part of the CEMARCH budget.

Over the 5 years of this project key areas have been identified for training opportunities. They are: 1) global information systems (GIS), 2) laboratory technician certification (to include soil, water, pest management), 3) agricultural mechanization (equipment), and, 4) composting methods. In addition to these courses in animal and crop post-harvest processing are planned, with a focus on dairy, rabbit, coffee, cacao, and root/tuber crops among others. It is anticipated that in 2023 each university will offer 2 short trainings/courses, which will be: 1) GIS, 2) composting, 3) basic rabbit or poultry production, 4) ag mechanization, 5) initial offerings in laboratory certificates,

and, 6) various crop management courses. In all 12 certificates/short courses will be offered in 2023, with some topics repeated or similar at the universities.

The laboratory technician certificate (#2, above) is a true certificate (the word 'certificate' implies a distinct approved course by the Haitian Education Ministry, with a given numbers of hours of instruction), and will be offered by AUC. Called the Agronomy Laboratory Certificate Program (CALT) the laboratory and analytical curriculum/teaching activities at AUC will be developed as 2 sequential, 3 credit, graduate level courses ideally to be offered over the course of a single academic year. after which successful students will earn a certificate as a Certified Agronomy Laboratory Technician (CALT). A post-BS Laboratory Certificate program in such skills will create a base of trained individuals that can support local educational and agricultural activities to both sustain the program and improve local agriculture. The year-long certificate program courses are needed because the operation, maintenance, and interpretation/application of the analyses to be offered at AUC need such trained professionals both at AUC and supporting local agricultural efforts at all levels of the for production agronomic chain.

Some of the trainings may only last a day or two (example – weed identification workshops, or personal protection equipment (PPE) training, while others may be taught at intervals over the period of a year (see the lab technician course, above). Many will also be taught via distance education (with developed exams, quizzes and live chats for quality), providing continuity through periods when universities may have to be closed. Course sustainability will be provided by the teaching faculty, most of whom are already at each university. Thus, short course development is not reliant on people hired as a part of this project, who would then leave once funding is over. Revenue will be generated as the courses will continue to be taught after the CEMARCH project has ended.

Budget: Funding for these trainings will come from the yearly allocation of \$112,878 (US) allocated to each university for the research and extension portions of CEMARCH. Additionally, in the budget for #1 (above) funds are allocated for faculty stipends, and those could cover faculty costs for course development.

Additionally, there is \$50,000 allocated yearly for university partners, and some of those funds could go towards partner costs, to help develop teaching materials. To be clear, that would be for the partner groups to decide, but training could be something they would specifically like to do. As an example, the milk producers might want to develop trainings specifically to show their producers how best to handle milk for improved food safety.

Last, a few of the short courses (especially the laboratory training modules, which will yield a Ministry certificate) could be revenue generating, through certification fees and/or a small enrollment fee for future students seeking a laboratory certificate.

Output (Indicators to Which this Intervention will Contribute):

1.4 Number of trainings/lecture series facilitated by CEMARCH for students and staff capacity building.

2.3 Number of facilities developed and/or improved for value-added services.

4. Scholarships for university graduates to obtain Master's degrees.

Rationale: Graduate degrees for Haitians, completed in Haiti, with the advising of Haitian faculty will be a key for the success and sustainability of this program. Moreover, every university should participate in this graduate program, either by hosting the MS itself or by providing course content, faculty advising, research space and/or graduate students.

It is critical that there are trained professionals to stay and work in Haiti in agricultural disciplines. Careers in government ministries, non-governmental associations (such as ag-based international missions), government relief agencies and agricultural technology companies need trained scientists, and one objective of this CEMARCH project is to supply those qualified graduates. The MS program will be a cooperative effort of all six universities, and will thus bring MS training to every university, representing every geographical and climate and crop zone in Haiti. For four universities their participation in MS degree programs in the agricultural sciences will be an entirely new undertaking.

This part of the CEMARCH initiative was planned so that only two schools would award graduate degrees: FAMV and Quisqueya. That plan has been somewhat affected by continued in-country safety issues, making it very challenging for students at other universities to travel to FAMV or Quisqueya safely. Quisqueya is moving much of their operation to the safety of Mirebalais, and they hope to train a total 15 graduate students at that location, with a first cohort arriving in January, 2023. The Mirebalais location also represents a sustainable solution as other organization are investing in the site, meaning that a long-term commitment has already been made. At this time we plan to start the MS program with 15 MS students at each university (FAMV and UniQ) in the Fall of 2023. This provides time to work out payment plans (stipends, tuition), university budgets, and obtain accreditation through the Haitian ministry of Education.

Development of the Curriculum and Courses for MS programs at FAMV and Quisqueya:

Quisqueya: An MS program with an emphasis on Crop and Soil Management, with appropriate coursework will be created. Using typical academic scheduling, an MS degree should comprise somewhere around 35 hours of classwork, with a total of 7 to 9 classes, plus credit for graduate student research. Classes could include (but does not have to be limited to): Statistics, Crop genetics, Weed Science, Experimental design, Soil chemistry, Soil fertility, Plant breeding and Crop production, Soil Erosion, Seminar and Research Presentations. Many of these courses will include specifics for Haitian agriculture, Tropical agriculture, and Farm Management of highly erosive soils

and conditions. No new courses are planned, and courses will represent the collaborative efforts of all six universities, provided via distance delivery.

Participants in the Quisqueya MS program will be BS graduates from Quisqueya and other Haitian universities, particularly our CEMARCH project partner universities, in appropriate fields.

FAMV: The FAMV MS degree will be in Agroecology, with coursework appropriate for this degree. First year coursework will be common core, with 8-12 courses of basics such as Genetics, Experimental Design and Research Methods. In the second year students will take 5 to 8 specialized courses, selecting from topics such as Soil Chemistry, Soil Fertility, Soil management and Erosion Control and Plant Breeding. Emphasis will be placed on tropical agriculture, focusing Haiti's specific crops, and the soils of the regions. A total of 45 course credits will be required for the MS degree.

It is important to note that the range of projects and training the graduate students will receive is highly flexible, and will vary widely with university, geographic region, and faculty advisor. Thus, one student could be studying crop breeding in rice, while another would study forages, and yet another would evaluate a cell phone app for soil taxonomy. This degree of variability amongst a single flexible MS program is very typical and the standard model at US universities, as well.

As newly established MS programs these will require accreditation from the appropriate Haitian ministry. Both Quisqueya and FAMV have experience in obtaining accreditation, and the COP for CEMARCH specializes in this area as well. Accreditation paperwork will be initiated in October 2022 so that all programs are approved and ready for the January, 2023 start date.

Budget: Qualified students will be recruited for available MS positions within this project, with attention paid to gender, societal and experience equity during selection. Over the life of the project each university will have a total of 5 MS scholarships to award (30 MS scholarships in total. These MS scholarships are available in Years 2, 3 and 4 of the project, and not in the first and last year.

Timing of enrollments could be an issue. However, our current plan to have 15 students at each university, starting in Fall, 2023.

- Start student enrollment in Fall, 2023. Allow students from each university to have the choice to either stay at the home university and conduct research, or move to FAMV or Mirebalais (Quisqueya). We anticipate students working from their 'home university' for a year, and then moving to join their cohort of 15 for a second year of study, especially if safety is improved.
- Each university would be billed the tuition costs for the students, and that would be paid to the university in which the student is enrolled for their MS degree (either FAMV or UniQ). This is shown in the budget, below.
- Stipends would be paid directly to the student, for their housing and living arrangements.

- Each university would have budget control over \$48,300 in funds for Years 3, 4 and 5 of the programs. These funds would be used by each university for research support, laboratory and library improvements, or other costs associated with the graduate program.

The intent is that each MS student selected from any university will complete their degree as an enrolled student at either FAMV or Quisqueya University. It should be noted that ‘enrolled’ does not necessarily mean physically at those universities, and students may choose to stay at their home school. We will strongly encourage that students move. However, those two universities will be the degree granting institutions. This means that courses should be available both on-line and live. Funding has been allocated in the budgets (see BS and MS) for course development as distance courses. This is critical to the success of this program, given current insecurities.

While the degree may be granted from Quisqueya or FAMV, the funding will go to the home university, who will then pay either Quisqueya or FAMV tuition and fees for each student. Stipends will be awarded to the student, for housing costs. Research projects can be conducted at the home institution, with these funds available for research support and support of faculty, as needed. Faculty support can include partial financial support for time spent advising graduate students. The MS budget (below) outlines these various costs. The Anchor University financial staff member will be responsible for billing each university for tuition, and then reimbursing the two MS-granting institutions.

Since a sizable investment is being made in internet and laboratory facilities (see the BS section, above) students in the MS program will be able to avail themselves of coursework at all the partner universities, taken via distance education. Similarly, funds allocated in the BS portion of the budget (see above) for laboratory improvements will also benefit graduate students, as they use those labs for sample analyses. Similar funds are also allocated in the MS budget (below).

It should also be noted that while each university will recruit and pay for their graduate students, all will be asked to pass a universal comprehensive exam. The exam is currently being prepared by the University Quisqueya and FAMV, but the other four universities will have the opportunity to review, comment and provide edits for the exam. The specific budget for the MS programs (see below) also notes that additional monies can be used from this section for improved laboratory or computer facilities.

Here is an example of the budgeting and payment process, for MS students. The budget shown below is for one year. The funding is available for Years 2, 3 and 4 of the work, with a total of \$72,220 available in each year for each university. Over the course of the project the goal is to have 30 students complete their MS degree. So, roughly, that is a cohort of 5 recruited graduate students from each university, or about 1 to 2 students per year, per university (the actual number used for the budget is 1.67 students per year/university).

Yearly MS Budgeted Items (years 2, 3 and 4 only) – this is all calculated on 1.6 students per year, per university. Thus, this applied to this 2023 workplan.

| Item | Cost (US\$) |
|---|-------------|
| Tuition (UniQ and FAMV) | \$13,360* |
| Stipend | \$10,560 |
| Materials and supplies for student research projects | \$20,000 |
| Funds for internet improvement, faculty stipends, books/journals, laboratory upgrades | \$28,300 |
| TOTAL | \$72,220 |

*this is calculated at 8,000/year for each student, with each university having funds for 1.6 students per year (to equal 5 students from each university in the 3 years).

Timeline: First graduate students should start in January, 2023.

Output (Indicators to Which this Intervention will Contribute):

1.2 EG.3.2-2: Number of individuals who have received USG supported degree-granting agricultural sector productivity or food security.

2.2 Number of scientific conferences hosted and/or co-hosted by CEMARCH. (This is for presentation of MS research)

CEMARCH Objective 2. Strengthen the capacity of the six selected universities to provide research and extension services to farmers and the private sector that have the potential to generate revenue.

This would include ATPs that would be producing product that could then be sold for revenue, as outlined in some sections below.

1. Establish and support laboratories that have the potential to generate revenue

Rationale: Sustainability is a key part of the CEMARCH initiative, and developing methods to ensure that projects and ag technology parks continue past the life of CEMARCH is crucial. Additionally, the projects should be revenue generating, becoming self-funding, to some degree. Projects outlined in this section are designed to be revenue generating.

Analytical laboratories offer an excellent opportunity for revenue generation, as such facilities can provide growers with key information about the productivity of their soils. Water tests can alert Haitians and others (such as NGOs) to potential issues with water quality, both for human health, and for potential effects on soil quality. Specialized testing services such as for forage quality or aflatoxin/endophytes can provide great benefits to animal and milk producers. All of these services can be revenue generating, as they are needed somewhat frequently, and growers often clearly see the benefits via reduced fertilizer use (because soil testing shows where applications are needed) or higher value crops/animals due to improved forage quality (knowing when to harvest, storage, etc).

Three universities plan to expand or create soil/water/forage testing laboratories (Notre Dame, AUC and CHCL). Not every university needs a functioning soil test lab, as that would likely create too many for Haiti. Notre Dame and AUC have rooms and some basic equipment, but funds will need to be allocated for materials and supplies to create a fully functioning lab (see below for examples). CHCL has an existing laboratory for soil and water testing, and has excellent equipment, including an atomic absorption analyzer (AA). As a part of CEMARCH this lab could be expanded to include some forage analysis (simple total N analysis apparatus can be created fairly cheaply) which would be of value to producers in the region. In 2023 all of these facilities will be updated and equipped as needed to start basic soil and water testing, and be used for certification and curriculum programs.

Specific Examples:

Notre Dame and AUC have excellent and spacious laboratories, and some materials for the development of a soil-testing laboratory are present. Present equipment includes scales, shakers and other sample processing basics. CHCL already has these resources. The labs have water and power, and basic furniture is there. The labs have glassware, mixers, and balances for weighing samples. Basic soil-test analyses could be conducted in a fairly rapid period of time, with the following equipment purchased through this project. These purchases would be upgrades to the labs, allowing them to conduct basic soil tests that would allow them function as a commercial soil-testing lab, with continued revenue generation.

- Soil pH meter – a higher quality unit is around \$1,000. Additional supplies would be the buffers needed for calibration. Soil extracts are done in water.
- Soil phosphorus, potassium, magnesium, and calcium – although the extract may vary with the soil type (easily determined and likely known by the Haitian soil scientists) the content of these nutrients can be determined via a fairly inexpensive colorimetric process.
- Soil carbon content can be determined using a newer colorimetric method (the Solvita method), a process that is being widely studied in the United States.

A basic soil test that would provide soil pH and extractable P, K, Ca, and Mg, plus soil carbon is thus fairly easily done, and providing such results to farmers, who would then see the benefits, could produce revenue. The benefits would be most realized by taking the results and calibrating them to proper lime and fertilizer recommendations, and then having extension staff work with the farmers for recommendations.

FAMV will have an English language laboratory, specifically designed to help those who work in agriculture gain skills in that area, with English proficiency. Although this is not directly linked to agriculture it is an excellent idea for the CEMARCH project, as English proficiency will be key for future Haitian MS graduates, and others learning via certificates or short-term learning. This is also a fairly safe project for a Year 2 endeavor, as much of this could be run as a distance program. This program could become revenue generating via others utilizing the service, paying small fees to improve their English skills.

Quisqueya will house a business incubator, from which revenue will be generated through licensing agents. The AgroUniQ CEMARCH Centre will be located in Mirebalais in the “Region Centre,” on the New AgroCampus Mirebalais. This Centre is part of their new Agro UniQ Campus. In 2023 the Centre will house the BS and MS programs. In future years the Centre will host space for the development of new tools, technologies and methods that will transform agriculture and the agri-food industries, and these will be a part of the certification program in ag mechanics.

Budget: Materials, supplies and small equipment to develop and improve the revenue generating laboratories will be funded through the allocated \$112,878 for research and extension.

Output (Indicators to Which this Intervention will Contribute):

2.3 Number of facilities developed and/or improved for value-added services.

2.4 Number of partner institutions providing services for revenue generations.

2. A research and extension program providing services to farmers and the private sector that has the potential to generate revenue.

Rationale: Revenue generation will be through the sale of seed, plants, plant products and animals (live or processed meat, milk, or eggs) created through research projects. Other products that will be sold include fish, honey, and nursery plants. One university (AUC) has a farm market under construction.

An example is provided for each university, and the examples below are included as 2023 projects:

AUC. Plant Protection Services. Modeled after US models in which plant protection specialists received certifications, this program will provide certificates and trainings in pesticide use for plant protection (Pesticide Application).

The AUC Plant Protection Laboratory will work with partner institutions, including the Ministère de l’Agriculture, des Ressources Naturelles et du Développement Rural (MARNDR), local NGOs and private enterprises to develop a network of well-trained professionals to provide services to farmers in crop diagnostics for pest and disease control. To be effective in providing Plant Protection Services to their client farmers, the Pesticide Application courses will train individuals on how to appropriately collect diseased plant samples and/or pest specimens which they can bring to the laboratory for identification. A fee will be charged for each sample diagnosed and identified. When necessary, specimens might be sent to partner laboratories for confirmation.

In addition to making money off the samples, revenue generation will come from the licensing and training portion of the project. Yearly updates and training will be needed for pesticide licensing, as materials change and updates for labeled use of new products is

always needed. Teaching the short courses will be a regular event, and licensing and registration fees will provide a small amount of revenue.

CHCL. Covered house installation and use for market gardens and floriculture. Three covered will be built (in Year 2) and these will be used for a series of research projects to study vegetable and flower production in greenhouse systems over the 5 years of the project. These are not greenhouses with lighting and/or cooling and are rather simple plastic covered structures that allow some temperature moderation and improved pest control. In 2023 projects will focus upon tomatoes, pepper, and cabbage, a selection of cool- and warm-season vegetables that are widely used in Haitian cooking. The research portion of the work will be growth media and production methods (ex: tomatoes - determinate versus indeterminate in rockwool production), and at least one project will be detailed enough (replication, specific growth media treatments) for use as an MS project.

FAMV. Aquaculture (fish farming). In 2023 fish tanks (typically 800 gallon or so sealed concrete raised structures, with water movement) will be constructed as a part of this project, with tank-reared tilapia as the study topic. This will depend on the availability of supplies and materials, but if they can be found in-country tank production of tilapia will be a research and extension study. Research will be conducted on the Tilapia species regarding feed, feed rations, and other management practices. Once research and data collection have been completed the fish will be sold with the intent to generate revenue.

A possible partner for developing the sales and revenue portion of the project will be Double Harvest, a mission-based group which has existed in Haiti since 1978. Located just outside of Croix des Bouquets, their 200 acre facility has greenhouses, horticultural production facilities, and tilapia production tanks. Double Harvest is about 1 hour from FAMV, and it could prove to be an excellent partnership, especially as they have experience with tank-raising tilapia. They have long engaged in the direct sale of live tilapia to residents in the area and can help devise best marketing and sales techniques for this project.

Notre Dame. Seed/Vegetative Propagation Production Facility. Notre Dame will establish a seed center at the agricultural technology park. This Center will focus on the production of seed from beans and peanuts, and on the production of vegetative plant parts from cassava, taro, and sweet potato. Materials sold from the plant side will first come from the leftover harvests from research projects.

Vegetative plant parts research will utilize collected germplasm from around the area, providing a standardized assessment of best selections of cassava, taro and sweet potato for quality and yield. In 2023 a total of three trials will be started, all variety trials with bean, sweet potato, and cassava. Additional taro and peanut trials will start in 2024 and subsequent years.

Revenue generation will come from selling quality seed and vegetative plant parts that have been properly harvested and stored (refrigeration may be needed for some vegetative parts). Prior to sale random selections of seed and plant parts will be tested for germination (using standard germ tests) and weed/noxious/off type seed amounts documented. This will allow the sale of quality planting stock with a known Pure Live Seed

content. Quality seed is very hard to find in Haiti, and thus this seed will be desired by growers. Additionally, all of these seed quality indices can be explained and taught to area farmers, providing a readily absorbed extension lesson for the project as well.

Finally, there are active sweet potato breeding programs in the United States, notably at Louisiana State University, North Carolina State University, and Tuskegee University. Various scientists work with both the orange-skinned and white-skinned types, which vary in nutritional quality. These universities offer potential partnerships for field testing of their cultivars, conducted as part of an MS project. Once best performing cultivars have been identified these could be sold to Haitian growers for revenue generation, and then they can be used by Haitian growers for their own slip (transplant) production. Selected organic-skinned varieties would also offer improved nutritional content (beta carotene).

UCNH. Breadfruit. Breadfruit (*Artocarpus altilis*) is tree of the mulberry family (Moraceae) and its large fruits that are a staple food of the South Pacific and other tropical areas. Breadfruit contains considerable amounts of starch and is seldom eaten raw. It may be roasted, baked, boiled, fried, or dried and ground into flour. In some areas, cloth is made from the fibrous inner bark, the wood is used for canoes and furniture, and glue and caulking material are obtained from the milky juice. In Haiti breadfruit is often grown because it produces a nutritious flour that has a long shelf life.

Research projects would focus on best management for the production of seedlings, followed by field work to demonstrate planting methods for the trees. Because these are all projects which rely upon on the production, planting, and growth of trees the 2023 work would be focused upon establishment and growth as research projects, with harvesting and post-harvest work for 2024 and later.

The production and sale of breadfruit seedlings would be used as a source of revenue, and seedling production would be a 2023 activity. For example, a mission in Haiti (Trees that Feed) is regularly looking for breadfruit seedlings to purchase, as they donate them to other missions and farmers for future food production. Having UCNH research best varieties and then produce those breadfruit seedlings would create a revenue stream.

This project also ties into extension activities as there is a plan to host workshops that show how to cook and work with breadfruit flour. Recipes will be provided, and cooking demonstrations conducted.

Quisqueya. Plant breeding and variety releases, seed production and sales. AgroUniQ is actively involved in plant breeding and variety release. An example of this is their work with the USAID Feed the Future Innovation Labs that are currently active in Haiti: Sorghum and Millet Innovation Lab (SMIL) at Kansas State University, and the Innovation Lab for Crop Improvement (ILCI) at Cornell University. Breeding efforts at UniQ have resulted in the release and farmer adoption of improved lines of sorghum, and current rice research will also lead to improved varieties.

In 2023, continued work in plant breeding conducted through the CEMARCH project will lead to continued variety releases, with accompanying revenue. This work will continue

with rice and sorghum, but projects in bean breeding will also be a part of this work. These will all be revenue generating releases, via seed sales. Semans UniQ is a company that will be selling seeds: this will include base seeds for multiplication by third party or commercial seeds (TBD). This company is an essential service to make sure that the varieties Quisqueya develops are widely available across the country.

Budget: Improvements to revenue generating laboratories or other activities will be made through the \$112,878 allocated to each university in each year for research and extension. Additionally, funds allocated for BS and MS research projects will produce products (animals, seed and plant products) sales of which will produce revenue.

Output (Indicators to Which this Intervention will Contribute):

2.3 Number of facilities developed and/or improved for value-added services.

CEMARCH Objective 3. Create linkages between universities, research centers and producers to ensure that targeted smallholder farmers have access to adapted technologies to increase food security in the Resilience Focus Zones. This will be accomplished through the establishment of technology parks to showcase high-potential CSA technologies and strategies to sustainably intensify smallholder production systems.

1. Applied research grants in collaboration with other local institutions or farmer's associations.

Rationale. In each year of the project \$50,000 is allocated for use by partner institutions, for research and extension activities. These monies are intended to assist in existing or new partnerships – providing sustainability with existing Haitian business and agricultural cooperatives.

At each university there are collaborations identified between a wide range of local growers' cooperatives (peanuts, coffee, cacao, dairy), many mission-based or non-governmental organizations, and the other universities. Allocated funds for the research grants to collaborating organizations can be roughly placed into four distinct areas: 1) plant variety trials to improve on widely grown crops (rice, corn) or increase use of others (ex: coffee, jatropha, breadfruit), 2) animal research that examines feed strategies, with a focus on fish, rabbit, dairy, beef cattle and poultry, 3) non-crop plants for erosion control and landscape stabilization, and, 4) soils work that seeks to classify soils of various regions of Haiti, and better understand their role in carbon and water systems.

Budget: \$50,000 in each year to be allocated via subcontract to identified organizations, by each university.

Output (Indicators to Which this Intervention will Contribute):

3.2 Number of farmers with access to improved technologies made available by NGO, private sector development, or through CEMARCH ATPs.

2. Collaborations with other NGOs, research entities and Sustainable Development and Research Centers (French acronym CRDDs).

Rationale: Ensuring that there is sustainability and continued growth of the CEMARCH programs requires that existing partnerships are further developed, and new partnerships created. Here are all the identified partners, to date, identified by the 6 universities. Please note that these partners were identified for the life of the CEMARCH project, and not exclusively for 2023.

AUC:

| Partner | Role | Specific Projects |
|--|---|---|
| Ministere de L'agriculture, des Ressources Naturelles et su Developpement Rural (MARNDR) | Haitian Government Ministry | Will assist with the Certificate in Plant Protection. |
| CIMMYT (Centro Internacional de Mejoramiento de Maiz y Trigo), | International Crop Production organization. | Will consult on corn projects, as needed. |
| CIAT (Centro Internacional de Agricultura Tropical), | International Crop Production organization. | Will consult on fruits, vegetables, coffee, and cacao projects, as needed. |
| AVSF (Agronomes et Vétérinaires Sans Frontières) | International animal health organization. | Will assist with creation of animal health courses and certificates. |
| CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement | International Crop Production organization. | Will assist with Plant Protection certificate, and in the development of courses. |

CHCL:

| Partners | Role | Specific Project/Task |
|---|-------------------------------------|--|
| Women's Association of Limonade for the Development of Agricultural Production and Handicrafts (AFLIDEPA) | Local farmers group. | Will work on the greenhouse and floriculture work. |
| Limonade Women's Association (RAFAVAL) | Local women's group. | Will work on the greenhouse and floriculture work. |
| Association of Limonade Milk Producers (APWOLIM). | Haitian milk producers cooperative. | Will work on the dairy studies. |

| Partners | Role | Specific Project/Task |
|---|---|--|
| Research and Action Group for the Integrated Development of the Haitian Rural Environment (GRADIMIRH) | Non-profit organization founded in August 2003. | Will work on the soil characterization studies, with an emphasis on soil carbon. |
| Agrisud international | Non-profit created in 1992 for the development of rural and peri-urban territories, through agro-ecology practices and participatory land use planning. | Soil characterization work, and land use studies. |

FAMV:

| Partners | Contact Information | Way of Participation |
|---|---|--|
| CRDD (Centre Rural de Développement Durable) of Bas-Boen | Mr. Kenel Cadet 509 37028847 | Research and Extension activities on maize and beans Pest control on banana Seed production Aflatoxin control |
| CRDD (Centre Rural de Développement Durable) of Montrouis | Jason Innovil 509 3848 6946 | Research and Extension activities on plantain and banana Water management |
| APV (Association des Paysans de Value) | Mr. Abner Septembre 509 4898 9494 509 3231 8871 | Mountain Agriculture; Soil conservation and Fruit Processing; Extension services |
| ANATRAF (Association Nationale des Transformateurs de Fruits) | Yvon Yacinthe Faustin 509 3660 6356 5093281 3007 | Fruit Processing; Extension services |
| AIPA (Association des Irrigants de la Plaine de l'Arcahaie) | Karl Moreau 509 3628 8892 | Irrigation and water management; Watershed management; Extension |
| PFI/PSI (Petits Frères et Petites Sœurs de l'Incarnation) | Fr. Francklin Armand 509 4222 3448 4806 076 lenkanasyon@yahoo.fr | Extension and Water Resource Management; Aquaculture; Fruit Processing; Soil Conservation; Extension |
| ORE (Organisation pour la Réhabilitation de l'Environnement) | Eliacin Magloire 509 3792 1718 | Plant Nursery; Seed Production; Soil Conservation |

Notre Dame:

| Partners | Role | Specific Project |
|-----------------|-------------|-------------------------|
|-----------------|-------------|-------------------------|

| | | |
|--|-------------------------------|--|
| University of Quisqueya | University Collaborator | Working on the soil taxonomy classification data set, with eventual link to a cell phone app |
| American Soybean Association | International Commodity Group | Support from the American Soybean Association on the carp/tilapia feeding project. |
| Departmental Directorates of the Ministry of Agriculture; Planning; Persons with Reduced Mobility; Women's Conditions; and the Chamber of Commerce and Industries and Professions. | Haitian Government Ministries | Will be used to help identify populations of people who might have an interest in BS degrees, short courses, or other training opportunities. |
| Organization for the Rehabilitation of the Environment (ORE) and Ferme Levy | NGOs | Used to advertise field days, grower meetings or other extension engagement activities, and as a source of ideas for research projects. |
| American University of the Caribbean (AUC) | University Collaborator | Collaboration on curricula and classes, especially in the area of animal-based agricultural, which is of great interest to Haitian farmers in the south. |
| CHCL-Limonade | University Collaborator | Partnership link for experiences and expertise for the soil testing laboratory. |

NORD (UCNH):

| Partner | Role | Specific Projects |
|---|--|---|
| Fondation pour la Protection de la Biodiversité Marine (FoProBim) | Tours with the short course. Assistance with the BS/MS newly developed Research Methods classes. | New courses on Scientific Experimentation and Research Methods. |
| Agroforsa | Assistance with business development. | Nursery and landscape center. |
| Fecanno | Cacao cooperative. | Assistance with the cacao research and extension projects. |
| Recacarno | Coffee cooperative | Assistance with the coffee research and extension projects. |

| | | |
|---|--|--|
| Nature Design Haiti | Producer of native plants for Haiti. | Nursery and landscape center. Also assistance with the breadfruit project. |
| Echo Cafe d'Haiti and Carice Coffee Milling | Haitian coffee roasting and cupping companies. | The coffee research and extension activities. |

Quisqueya:

| Name | Role | Function in this project |
|-------------------------|---|---|
| AZA | AZA and Acceso are both members of the HFSA (Haiti Food Security Alliance or the Local Food production Alliance as it is known in Creole). As such both organizations have a network of hundreds (AZA) or thousands (Acceso) of growers that they serve and purchase local commodities from (contract farming or contract purchasing). Both organizations are therefore going to be essential partners to our CEMARCH Center extension strategy | Works with common bean, sorghum, and maize. Assists with the agricultural technician degree and is a partner with farms in Corporant and Lacheteau. |
| Acceso | | Works with peanut (processing), common bean and fruit trees (tree nursery). |
| KORE | <p>Kore Mission: To ensure every member of the Haitian community has equal access to education, healthcare, & financial prosperity.</p> <p>To support the Haitian community by addressing educational barriers, healthcare accessibility, & economic sustainability through diverse partnerships.</p> | Poultry production and feeding trials. |
| Veterimed and Let Agogo | <p>Veterimed is a Haitian NGO that works to develop the local Haitian milk sector.</p> <p>Let Agogo is a dairy network</p> | Will work on dairy production, cows, and rabbit production demonstrations. |

| | | |
|--|--|--|
| | project, established in 1999 by leading Haitian animal health specialists. | |
|--|--|--|

Budget: \$50,000 in each year to be allocated via subcontract to identified organizations, by each university.

Output (Indicators to Which this Intervention will Contribute):

- 1.1 Number of institutions collaborated with HAUPs due to CEMARCH involvement.
3. Capacity building of Haitian faculty at all partner universities to build their research, education, outreach, and leadership skills.

Rationale. While it certainly differs from university to university, a brief review of the individual university workplans clearly demonstrates that every school has capability to grow as a research, extension, and teaching university. Funds allocated through this project will provide the means for that growth, and the planned projects will provide sustainability for the future once this funding is gone. In 2023 capacity building at each university as follows:

Specifically, SILL, in partnership with the universities and other collaborative partners will: 1) improve internet accessibility at each university, 2) use that internet to offer existing courses as distance offerings to the partner universities, creating improved course content without new classes or travel, 3) improve and equip proposed soil, water and forage testing facilities, 4) recruit BS and MS students, and start research projects, and, 5) begin the installation of research at newly developed ag technology parks. The Anchor University budgets are in place and staff have been hired. Thus, we can begin the process of creating individual development plans for each university, moving projects forward.

Not every university needs to have an agricultural technology park. For example, current insecurities at FAMV have led to develop some courses that have a significant extension component, and can also be developed using distance technologies, or taught in a safer location. For example, FAMV will offer a Water Management short course. The course will cover best methods for water conservation, both soil-based (cover crops, terraces, etc.) and farm-based (cisterns, etc.). There will also be discussion on irrigation, irrigation scheduling, and methods for evaluating the uniformity of installed irrigation systems. Since significant portions of this short course will be field based it can be taught in safer areas, with less danger to participants.

Other universities, such as AUC, have an existing agriculture park that can be upgraded to an agricultural technology park. Located directly on campus, the AUC site (which is established and fenced), will house animal production facilities, small scale plots

showcasing potential new varieties and cultivars of common Haitian produce, bee keeping demonstrations, and composting displays.

Quisqueya is in the process of building their agricultural technology park at Mirebalais, a safer area. The addition of the CEMARCH project would create additional capacity through the technology park, and additional research. The ability to build an agricultural technical park through CEMARCH would then allow additional funding from a wide variety of sources (private sector, national, international donor agencies, international foundations), as they would clearly demonstrate capacity of UniQ to perform research, and train graduate students. Their goal is to reach \$2 or 3 million USD/year in research and extension funding in the next five years.

Regardless of the type of ATP, it will be developed over the 5-year period of the CEMARCH initiative, with alterations and changes as needed. Such changes would vary with many factors, but could include: 1) educational needs of the local Haitian citizens, 2) research needs of MS students, 3) availability of supplies and planting stocks, or 4) requested research and/or extension needs of collaborative partners. Of course, changes may also be needed as security and safety issues change, and ATPs may need to be designed for easy flow between field and laboratory projects, and for the ready incorporation of distance and on-line activities, to ensure safety.

Budget: \$112,878 in each year for research and extension activities, for each university. Also note that overlap may occur via funds budgeted for BS/MS projects.

Output (Indicators to Which this Intervention will Contribute):

3.1 Number of established Agricultural Technology Parks.

3.3 Number of farmers with access to extension services through visits to and use of information supplied by the CEMARCH Agricultural Technology Parks (ATPs).

2.3 Expected Results

The CEMARCH activities will contribute to improved coordination of activities of USAID, USG, and other funding agencies in Haiti, reducing overlapping project implementation through a database of promising technologies. This will enhance the efficiency of implementation of these programs. The presence of the center will provide wider opportunities for networking among the partners, organizations, and donors for information exchange, data management and communication. Enhancing human resource capacity for research, education, extension, and advisory services will enhance innovation and leadership of scholars and agricultural professionals in Haiti. Additional impacts include the improved skills in research, grant writing, communication, knowledge sharing and strategic planning. The ATPs in various agro-hydro-ecological zones will be available to multiple audiences (farmers, extension agents, private industry, researchers, and policy makers) to better program and serve multiple stakeholders. The ATPs will accelerate the delivery, diffusion, and adoption of research outputs to end users. Over the life of CEMARCH, the center will deliver the following key outputs.

1. Increased coordination and linkages between partner agricultural universities in Haiti.
2. Enhanced institutional and human capacity to support linkages between universities, extensionists (public and private), private sector, and farmers in Haiti.
3. Trained graduate students (long-term, MS degrees, 30 students) and short-term certifications to meet the demands and needs of the agricultural work force/market.
4. Trained Haitian faculty with enhanced research, education, outreach, and leadership skills.
5. Individual university plans with a rationale, timeline, budgets, and a sustainability plan.
6. A database and fact sheets of promising CSA innovations in agricultural systems.
7. Showcased CSA technologies at technology parks in different agro-ecological zones.

2.4 Collaboration and Coordination

USAID-Haiti supports a broad portfolio of agricultural activities and has invested more than \$300 million into the sector over the past ten years to increase productivity, introduce new technologies, improve market linkages, better manage resources, and engage the private sector. As a part of USAID-Haiti's new Strategic Framework, USAID will focus its interventions in two Resilience Focus Zones, one in the north and the other in the south of Haiti. Therefore, CEMARCH will identify and seek collaboration with other USAID and donor funded activities in the sector. A key collaborator will be the Haiti Resilience and Agriculture Sector Advancement (HRASA). Through HRASA's numerous activities, the project aims to benefit more than 25,000 rural Haitian farmers, especially marginalized groups such as women and youth; promote private investment in the agriculture sector; expand livelihood opportunities and household assets; and strengthen community institutions to better manage essential resources. These activities directly link with the goal of CEMARCH – to create capacity for Haitian farmers and citizens through extension, ATPs and education. In 2023 we (CEMARCH and COP) will meet with the leads of HRASA, and develop a plan so that our education and extension events will be of direct benefit to HRASA, meeting research needs in the region. Once we understand the needs of HRASA it will be likely that MS projects can be planned to meet the needs of rural Haitian farmers. The emphasis of HRASA on marginalized groups will also be a benefit for CEMARCH, as it serves as a possible pool of candidates for BS scholarships and short-term learning opportunities for those not pursuing university education..

There are two Feed the Future Innovation Labs that are active in Haiti: Sorghum and Millet Innovation Lab (SMIL) at Kansas State University, and Innovation Lab for Crop Improvement (ILCI) at Cornell University. The ILCI began in FY2020, while the SMIL completes a tenth year of activity in 2023. Both Innovation Labs partner with Quisqueya University. The work of SMIL has brought new and commercial usefully sorghum and millet varieties to Haiti, and CEMARCH will use those varieties in demonstration and research studies at the agricultural technology parks. Quisqueya University is a partner in SMIL, and the developed plant genetics as a part of SMIL will likely be integrated into CEMARCH projects, ensuring continuity and sustainability of these crops. This will ensure that information about the improved varieties will continue to spread, generating revenue through sales of the improved seed.

The ILCI serves as a support system for national, regional, and international agricultural research institutions in target regions to identify, develop, pilot, and transfer tools, technologies, and methods for crop improvement. It is advancing plant breeding tools,

technologies and methods aimed at delivering staple crops that can increase yields, enhance nutrition, and show greater resistance to pests and diseases. The ILCL focuses on six key areas: priority setting, trait discovery, genomics, phenomics, breeding informatics and institutional capacity with emphasis on roots, tubers, bananas, legumes, sorghum, and millet. As with SMIL, improved genetics developed by ILCI will become a part of research at CEMARCH's ATPs.

The activities of ILCI and SMIL are now essentially 'mature' and they have a body of research results which can be combined and repackaged into extension materials for farmers and others interested in new production methods in a changing climate. The universities and CEMARCH should be able to take the research and output from ILCI and SMIL and produce resources (both written and biological) that will result in improved crop production for Haitian growers. This will be communicated via field days, short courses and extension materials.

CEMARCH will also potentially collaborate with the Water Resilience Research Center (WRRC) led by Auburn University (AL) which will be located at the State University of Haiti (CHCL-Limonade). A soil and water testing lab, which also was a collaboration between Auburn University and the Henry Christophe Campus of the State University of Haiti in Limonade already exists at CHCL, and this too was funded by USAID. The new water resilience center is a continued collaboration and will focus upon scientific research on water management. This new center will provide an excellent partnership with the CEMARCH project, as CEMARCH graduate students (especially those from CHCL) will work on projects related to water resources, such as irrigation, protection of water quality, or watershed evaluation. This is a direct link between two USAID projects, one of which does not have funding for graduate students, while the other (CEMARCH) does. Thus, research projects conducted by CEMARCH-attached graduate students can directly benefit the goals of the Water Resilience Research Center. Additionally, CEMARCH directors have already been approached by Auburn University staff associated with WRRC, seeking distance classes of value to all students who work with these two programs (WRRC and CEMARCH). Two classes have been developed (Soil Fertility, and Soil Erosion Control) and they are available as distance options, beginning in 2022 (Fall).

The new water resilience center is a continued collaboration and will focus upon scientific research of water. This new center could provide an excellent partnership with the CEMARCH project, as graduate students working within the Water Center could have their MS stipends funded through CEMARCH. Students will work on projects of direct benefit to the Water Center, and the lab will also be a part of certificate training for laboratory certificates. Additionally, developed distance courses can be used by students in both projects. The opportunity for graduate education, and possibly certificates in laboratory training, will provide learning and career opportunities in soil and water testing, and management of agricultural laboratory facilities. This will serve two functions for the community: 1) producing trained individuals with laboratory skills, and, 2) offering soil, water (and possibly forage) testing services for farmers and others in the region.

Additionally, plans are underway for a potential partnership with the American Soybean Association, through their World Initiative for Soy in Human Health. Using their collaboration with CESAIN in Cambodia (another SILL project) as a model, the idea is that the utility of short-

season soybean cultivars be examined for production for animal feed in Haiti, providing a local substitute for soybean meal that is currently shipped into the country. Two of our participating universities have expressed an interest in such a project, exploring Haitian-grown soybeans for use in both poultry and fish food. Under the USAID Climate Strategy, 'Systems Change' is a Strategic Objective. That Strategic Objective is: 'Fully addressing the climate crisis requires long-term, transformative changes....transforming food systems to be more resilient, less wasteful, and less environmentally destructive...transitioning economic systems to be less carbon-intensive- in ways that are comprehensive, equitable, and locally led.' This partnership, if successful, would be less Carbon intensive (locally grown legume) that would not require shipping, as is currently done with many animal feeds.

3. MONITORING, EVALUATION, & LEARNING PLAN

The monitoring, evaluation, and learning plan (MELP) is an essential part of this initiative. The ability to rapidly collect, review, analyze and communicate monitoring and evaluation information is important to boosting results. Successful implementation of Center for Mitigation, Adaptation, and Resilience to Climate-Change in Haiti (CEMARCH) will rely on ongoing monitoring and assessment of outcomes and performance in accordance with the objectives. The Chief of Party (CoP) will oversee all activities in collaboration with and support from the Sustainable Intensification Innovation Lab (SIIL) at Kansas State University (KSU). In addition, a detailed MELP (along with a logic model or results framework) was developed through a co-creation process with the Haiti Agricultural University Partners, and this was provided to the U.S. Agency for International Development (USAID). This MEL plan was approved by USAID. It will updated each year, as needed.

3.1 Collaborating, Learning, Adapting, and Sharing (CLAS)

CEMARCH will include in the implementation activities a collaborative, learning, adapting, and sharing (CLAS) agenda to ease feedback with strategic partners and key stakeholders at regular intervals to develop lessons learned. Examples of these features include:

- Initial annual learning meeting with strategic partners and key stakeholders on upscaling agricultural Technologies and Innovations in the various regions of Haiti.
- Initiating collaboration closely with KSU/SIIL to share lessons learned and use the results to make informed decisions for potential adoption; and
- Initiating collaboration with USAID-Haiti and other university partners in Haiti to share lessons learned and expand program reach where applicable.

This approach will be very beneficial for CEMARCH, given the emphasis of the center on collaboration, leveraging partnerships, improving human and institutional capacity, as well as showcasing innovative technologies ready for scaling up with emphasis on engaging the private sector. Some of the strategies that CEMARCH will incorporate in the day-to-day operation include:

- Facilitating collaboration internally and with external stakeholders:
 - Quarterly CEMARCH staff meetings will bring together all staff members to share lessons learned and to design strategies of adaptation. The CEMARCH management staff will also establish and utilize the Piestar Reporting Hub to collect monitoring data on research projects and scholars and to foster collaboration within research teams. Piestar (<https://www.piestar.com/>) is a

developed tool that allows logging, tracking and monitoring of data, and is designed for maintenance of Federal data. Most (but not all) USAID Innovation Labs use Piestar to follow and monitor data collection and maintenance.

- Externally, CEMARCH will develop extension materials outlining the technical protocols and innovations showcased in the ATPs. These materials will be made available for smallholder farmers, private sector, and NGO partners through the CEMARCH website and social media platforms.
- Sharing lessons learned, showcasing innovations, building capacity, and sharing progress performance:
 - The CEMARCH Chief of Party and staff will lead efforts to plan field days and other showcase events on at least an annual basis.
 - Annual reviews with the External Advisory Board and Research Committee to reflect on lessons learned from successes and challenges to assist CEMARCH in building on what works, under what circumstances, and why.
 - Biannual platform meetings will take place in 2023 and 2024 that engage Innovation Labs, other Feed the Future projects, and the private sector. These meetings will provide an opportunity for all funded researchers and students to showcase their results and progress.
- Incorporating new learning into strategic and programmatic adjustments in CEMARCH to inform funding allocations, project design, and project management:
 - Prior to composing semi-annual and annual performance reports, CEMARCH will conduct a programmatic review of its monthly reports and data collected in the Piestar Reporting Hub to identify key progress gaps and lessons learned. The conclusions of these reviews will be documented in CEMARCH’s semi-annual and annual performance reports and utilized to adjust funding allocations, project design, and project management.

The CEMARCH, in collaboration with Haiti partner universities, and SIIL, will implement the strategies outlined above as a means of: 1) communicating findings and data among partners and to stakeholders including USAID; 2) improving program management by reflecting on project results, monitoring and evaluation data and other inputs from special studies; and 3) incorporating feedback from the External Advisory Board, Research Committee, and other external stakeholders for future project implementation.

Key questions (Table 1) will help us to learn from our own experience, test assumptions, seek new explanations, make connections, and generate insights, through a set of these learning questions, and learning from day-to-day work experience.

Table 1. CEMARCH’s Learning Questions

| Areas of Concern | Suggested Learning Questions |
|--|---|
| Collaborating, Learning, Adapting and Sharing | |
| Collaborating | Is CEMARCH collaborating with the right partners? In the right way? How is CEMARCH collaborating internally and externally? Which relationships or networks need attention? |

| | |
|--|---|
| Learning | What processes and activities are in place to encourage learning? What sort of questions are we asking to fill knowledge gaps and make informed decisions? How is CEMARCH using and learning from our monitoring data and evaluations? How are we learning from program implementation? How is CEMARCH sharing what we have learned with stakeholders? |
| Adapting | What is CEMARCH doing to regularly reflect on our programs and the context in which we work? How are we using what we have learned from collaboration and learning activities to make decisions and adjustments? What processes and activities are in place to encourage adaptation? How can we further adapt in the face of continued country unrest? |
| Enabling Conditions | How does CEMARCH's organizational environment support our collaborating, learning, and adapting efforts? What changes in the organizational culture or processes would make the biggest difference? |
| Program Design | |
| Results (outcome and impact level) | Will planned targets be met? If targets are not going to be met, what are the reasons for that, and how do we impact change? Is the performance management system in place adequate to capture data on the achievement of results? |
| Outputs | Will planned outputs be able to be completed on schedule? Will the outputs lead to the achievement of the desired results as anticipated? |
| Inputs | Are inputs relevant and effective in producing the desired outputs? Are funding pipelines adequate to finance activities until new funds become available for obligation? |
| Indicators and Targets | Are the performance indicators appropriate for program needs? Will CEMARCH be able to attribute progress in the USAID indicators? Are the set targets realistic? If not, what targets are more appropriate? Do performance data meet quality standards for reporting? |
| Critical Assumptions Inherent in RF | How best is private sector engagement with the consortium? Does CEMARCH's approach facilitate private sector engagement? |
| Program Implementation | |
| Successes | Have additional resources been leveraged? Have program synergies been found with other donors, USAID, NGO, CRDD, governmental or private sector activities? |
| Partner Organizations/Perceptions | Are gender concerns being addressed, and are there new gender issues that need to be considered? |
| Lessons Learned | Have important lessons emerged during implementation that should be shared within the USAID-Haiti operating unit or Agency-wide? |

3.2 M&E Improvements

The CEMARCH performance monitoring system will be a continuous systematic data collection, processing/analysis, and reporting system on program implementation to inform management decisions, improve program implementation, facilitate review of performance indicator targets, and take corrective measures through a feedback mechanism with project Implementing Partners and potentially other partners.

3.3 Evaluation and Research Plan

In the table below is a list of planned assessments, surveys, and evaluations to be conducted within the 5 year period based on the approved MELP.

Table 2: Evaluation Plan Matrix - 2023

| Evaluation Plan Matrix | | | | |
|---|--|--|--|----------------------------------|
| Title | Research/assessment Type | Purpose of research/assessment | Intended use of research/assessment | Expected dates of implementation |
| With the guidance of the COP and PD, meet with every university to identify classroom teaching needs. 'Classroom teaching' is a general term to include both virtual and live teaching. | Assessment via virtual or live engagement, and document analyses. | To determine if there are: 1) adequate internet capabilities for distance teaching, 2) identified faculty for the proposed new classes, and 3) the needs for laboratories associated with the classes. | SIIL Leadership team, Anchor university, each university | October, 2022. |
| Evaluate potential risks (and factors to reduce that risk) for proposed agricultural technology parks. | Assessment via virtual or live engagement, and document analyses. | With increased security issues for every university, surveys and discussion are needed to pinpoint security issues with the technology parks, and to determine how best to prepare for these risks. This could include items which must be included in a budget, such as fencing, or security gates. | SIIL Leadership team, Anchor university, each university | November, 2022 |
| Determine pool of available MS candidates | Assessment via virtual or live engagement, and via student engagement and survey (oral). | Identify barriers and issues with recruitment of MS students. Determine flexibility in moving with current levels of unrest. Determine if sufficient faculty are on each campus for MS-level advising. | SIIL Leadership team, Anchor university, each university | November, 2022 |
| Farmer assessment of cropping systems services. | Assessment via virtual engagement, and potentially surveys (social media?). | Determine the limiting factors for area growers for adoption of new techniques, cultivars, or animals. Find out what most limits their abilities to increase their production. | SIIL Leadership team, Anchor university, each university | January, 2023. |
| Farmer assessment of animal-based production systems. | Assessment via virtual engagement, and potentially surveys (social media?). | Determine the limiting factors for animal-based production. Find out what most limits their abilities to increase their production or adopt more efficient animal management. | SIIL Leadership team, Anchor university, each university | April, 2023. |

3.4 Targets and Indicator Summary Table

Based on the expected impact, IRs, and Sub-IRs, and considering the activities to be implemented, a total of 14 Performance Indicators are outlined below to monitor and measure/evaluate project performance using the Performance Indicator Tracking Tool (PITT). Although 14 is large, this does include two required indicators, and these are over the 5 year period, additionally. Performance Indicator Reference Sheets (PIRS) are included in the MELP and are designed to facilitate tracking, data collection, and monitoring. For each indicator, the following information and guidelines are provided:

- Detailed indicator definition
- Expected Result, type, source, frequency, unit, PPR, disaggregation, baseline, and target data

Table 3: Targets and Indicator Summary Table - 2023

CEMARCH Indicators Summary Table (IST)

| Indicator | Result Measured by Indicator | Type of Indicator | Data Source | Frequency | Unit of Measure | PPR (Y/N) | Baseline | | Target | |
|---|--|------------------------|--|-------------------|-----------------|-----------|----------|-------|--------|-------|
| | | | | | | | Date | Value | Date | Value |
| 1.1 Number of institutions collaborated with HAUPs due to CEMARCH involvement | Improved collaboration between local institutions | Performance / Custom | Type of application: Memorandum of Understanding (MoU). Each university will have one. | Reported annually | Number | Y | 2022 | 6 | FY2026 | 6 |
| 1.2 Indicator EG.3.2-2 Number of individuals who received USG supported degree-granting ag sector or food security training | Improved degree-attainment for agricultural and technical students | Performance / Standard | Activity training records. | Reported annually | Number | Y | 2022 | 0 | FY2026 | 30 |

| Indicator | Result Measured by Indicator | Type of Indicator | Data Source | Frequency | Unit of Measure | PPR (Y/N) | Baseline | | Target | |
|---|---|------------------------|--|-------------------------------------|-----------------|-----------|----------|-------|--------|-------|
| | | | | | | | Date | Value | Date | Value |
| 1.3 Indicator EG.3.2 Number of individuals participating in USG food security short-term training programs | Improved knowledge around topics of food security | Performance / Standard | Enrollment numbers for each short course, training module, or other educational program (not to include academic coursework, which is counted above in 1.2). | Reported annually | Number | Y | 2022 | 0 | FY2026 | 1200 |
| 1.4 Number of trainings/lecture series facilitated by CEMARCH for students and staff capacity building | Improved technical knowledge for university members | Performance / Custom | Numbers of developed short courses, training modules, or other educational programs (not to include academic coursework, which is counted above in 1.2). | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 120 |
| 1.5 Indicator CBLD-9 Percent of USG-assisted organizations with improved performance | Improved organizational capacity | Performance / Standard | Implementing partners that have been allocated USG funding to work with local organizations to strengthen their organizational capacity for increased performance. | Reported annually | Percent | Y | 2022 | 0 | FY2026 | 100 |
| 2.1 HAUP projects with CEMARCH involvement that results in revenue generation. | Improved sustainability of the program through program-generated income | Performance / Custom | Type of application: Memorandum of Understanding (MoU). | Reported annually and semi-annually | Number | Y | 2022 | 0 | FY2026 | 30 |

| Indicator | Result Measured by Indicator | Type of Indicator | Data Source | Frequency | Unit of Measure | PPR (Y/N) | Baseline | | Target | |
|---|--|----------------------|---|--------------------|-----------------|-----------|----------|-------|--------|-------|
| | | | | | | | Date | Value | Date | Value |
| 2.2 Number of scientific conference hosted and/or co-hosted by CEMARCH | Improved capacity building and collaborations | Performance / Custom | Numbers of attendees at conferences, and overall numbers of conferences, data obtained from the organizers. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 10 |
| 2.3 Number of facilities developed and/or improved for value-added services (ex: soil test lab). | Improved means of production for farmers' agricultural products | Performance / Custom | Number of viable commercial entities, reported by the associated university, and supplemental information from CEMARCH/USAID. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 12 |
| 2.4 Number of partner institutions providing services for revenue generation, (e.g., Soils Testing Lab, improved plant genetics, marketing) | Improved specialization of knowledge between institutions and partnerships | Performance / Custom | The universities, their partners, and supplemental information from CEMARCH. | Reported quarterly | Number | Y | 2022 | 1 | FY2026 | 12 |
| 3.1 Number of established Agricultural Technology Parks (ATPs) | Improved access to agricultural extension knowledge for the region | Performance / Custom | Number of ATPs, as provided by the participating universities/CEMARCH. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 6 |

| Indicator | Result Measured by Indicator | Type of Indicator | Data Source | Frequency | Unit of Measure | PPR (Y/N) | Baseline | | Target | |
|---|--|----------------------|---|--------------------|-----------------|-----------|----------|-------|--------|-------|
| | | | | | | | Date | Value | Date | Value |
| 3.2 Number of farmers with access to improved technologies made available by an NGO, private sector development, or through CEMARCH ATPs | Improved accessibility to novel technologies for local farmers | Performance / Custom | Number of farmers utilizing a developed technology. This could include downloads, soil samples run/analyzed, or number of times a web site is accessed. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 5500 |
| 3.3 Number of farmers with access to extension services through visits to and use of information supplied by the CEMARCH Agricultural Technology Parks (ATPs) | Improved accessibility to research parks for local farmers | Performance / Custom | Number of farmers who utilize extension information from private extension services. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 5750 |
| 3.4 Number of extension materials produced by CEMARCH | Improved methods of disseminating information | Performance / Custom | Numbers of created publications, by type, and accompanying download/use statistics. | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 100 |
| 3.5 Number of entities conducting research and/or demonstrations in agricultural technology parks | Improved collaboration between local farming research institutions | Performance / Custom | Numbers of students, university faculty, extension personnel, others (private sector). | Reported quarterly | Number | Y | 2022 | 0 | FY2026 | 38 |

Annex 1b: CEMARCH Performance Indicator Tracking Table (PITT) with Targets and Indicators

| N | PERFORMANCE INDICATOR | Indicator Number (SPS#) | Indicator type | | | | | | | | | | | | | Progress Monitor | | |
|--|--|-------------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|------------------|----------|---------|
| | | | | Baseline (2021) | FY 2022 Target | FY 2022 Result | FY 2023 Target | FY 2023 Result | FY 2024 Target | FY 2024 Result | FY 2025 Target | FY 2025 Result | FY 2026 Target | FY 2026 Result | LOP | Status | Progress | Balance |
| Project Goal: To create a center that will foster agricultural education, training, research, extension, link farmers with the private sector, and build human and institutional capacity in the public-sector through improved collaboration, communication and knowledge sharing to address agricultural problems, food, and nutritional security in Haiti. | | | | | | | | | | | | | | | | | | |
| IR 1: Increase institutional and human capacity and social capital to better meet the demands of the agricultural economy and workforce needs. | | | | | | | | | | | | | | | | | | |
| 1.1 | Number of institutions collaborated with HAUPs due to CE MARCH involvement | Custom Indicator | Outcome | 0 | 6 | 6 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 6 | 100 | 0 |
| 1.2 | Number of individuals who have received USG supported degree-granting agricultural sector productivity or food security training | EG.3.2-2 | Output | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | | | |
| | Gender: Male | | | 0 | 0 | 0 | 10 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | | | | |
| | Gender: Female | | | 0 | 0 | 0 | 10 | 0 | 15 | 0 | 15 | 0 | 15 | 0 | | | | |
| | Duration: new | | | 0 | 0 | 0 | 20 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | | | | |
| | Duration: continuing | | | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 30 | 0 | 0 | 0 | | | | |
| 1.3 | Number of individuals participating in USG food security short-term training programs | EG.3.2 | Output | 0 | 0 | 0 | 240 | 0 | 300 | 0 | 300 | 0 | 360 | 0 | 1200 | | | - |
| Age 15-29 | Farmer/Producer: Male | | | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | | | | |
| | Farmer/Producer: Female | | | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | | | | |
| | People in Government: Male | | | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | | | | |
| | People in Government: Female | | | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | | | | |
| | People in Private Sector: Male | | | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | | | | |
| | People in Private Sector: Female | | | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | | | | |
| | People in Civil Society: Male | | | 0 | 0 | 0 | 35 | 0 | 45 | 0 | 45 | 0 | 51 | 0 | | | | |
| | People in Civil Society: Female | | | 0 | 0 | 0 | 35 | 0 | 45 | 0 | 45 | 0 | 51 | 0 | | | | |
| Age 30+ | Farmer/Producer: Male | | | 0 | 0 | 0 | 30 | 0 | 30 | 0 | 30 | 0 | 40 | 0 | | | | |
| | Farmer/Producer: Female | | | 0 | 0 | 0 | 30 | 0 | 30 | 0 | 30 | 0 | 40 | 0 | | | | |
| | People in Government: Male | | | 0 | 0 | 0 | 11 | 0 | 11 | 0 | 11 | 0 | 15 | 0 | | | | |
| | People in Government: Female | | | 0 | 0 | 0 | 11 | 0 | 11 | 0 | 11 | 0 | 15 | 0 | | | | |
| | People in Private Sector: Male | | | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | | | | |
| | People in Private Sector: Female | | | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 | | | | |

| N | PERFORMANCE INDICATOR | Indicator Number (SPS#) | Indicator type | | | | | | | | | | | | | Progress Monitor | | |
|---|---|-------------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|------------------|----------|---------|
| | | | | Baseline (2021) | FY 2022 Target | FY 2022 Result | FY 2023 Target | FY 2023 Result | FY 2024 Target | FY 2024 Result | FY 2025 Target | FY 2025 Result | FY 2026 Target | FY 2026 Result | LOP | Status | Progress | Balance |
| | People in Civil Society: Male | | | 0 | 0 | 0 | 25 | 0 | 40 | 0 | 40 | 0 | 50 | 0 | | | | |
| | People in Civil Society: Female | | | 0 | 0 | 0 | 25 | 0 | 40 | 0 | 40 | 0 | 50 | 0 | | | | |
| 1.4 | Number of trainings/lecture series facilitated by CEMARCH for students and staff capacity building | Custom Indicator | Output | 0 | 0 | 0 | 24 | 0 | 30 | 0 | 30 | 0 | 36 | 0 | 120 | | | |
| 1.5 | Percent of USG-assisted organizations with improved performance | CBLD-9 | Outcome | 0 | 30 | 0 | 50 | 0 | 60 | 0 | 100 | 0 | 100 | 0 | 100 | | | |
| IR 2: Develop revenue-generating services to provide to the region through coordinating and leveraging USAID, USG, and other donor activities. | | | | | | | | | | | | | | | | | | |
| 2.1 | Number of institutions collaborated with HAUPs due to CEMARCH involvement that results in revenue generation. | Custom Indicator | Outcome | 0 | 0 | 0 | 6 | 0 | 6 | 0 | 8 | 0 | 10 | 0 | 30 | | | |
| 2.2 | Number of scientific conferences hosted and/or co-hosted by CEMARCH. | Custom Indicator | Outcome | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 4 | 0 | 10 | | | |
| 2.3 | Number of facilities developed and/or improved for value-added services. | Custom Indicator | Output | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 0 | 4 | 0 | 12 | | | |
| 2.4 | Number of partner institutions providing services for revenue generation, (e.g., Soils Testing Lab, improved plant genetics, marketing) | Custom Indicator | Output | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 0 | 4 | 0 | 12 | | | |
| IR 3: Improve linkages between universities, extension specialists, private sector, and farmers by establishing Agricultural Technology Parks (ATP). | | | | | | | | | | | | | | | | | | |
| 3.1 | Number of established Agricultural Technology Parks (ATPs) | Custom Indicator | Output | 0 | 0 | 0 | 3 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | | | - |
| 3.2 | Number of farmers with access to improved technologies made available by an NGO, private sector development, or through the CEMARCH ATPs. | Custom Indicator | Output | 0 | 0 | 0 | 500 | 0 | 1000 | 0 | 1500 | 0 | 2000 | 0 | 5500 | | | |
| 3.3 | Number of farmers with access to extension services through visits to and use of information supplied by CEMARCH Agricultural Technology Parks (ATPs) | Custom Indicator | Output | 0 | 0 | 0 | 750 | 0 | 1500 | 0 | 1500 | 0 | 2000 | 0 | 5750 | | | - |
| 3.4 | Number of extension materials produced by CEMARCH | Custom Indicator | Output | 0 | 0 | 0 | 15 | 0 | 25 | 0 | 30 | 0 | 30 | 0 | 100 | | | |
| 3.5 | Number of entities conducting research and/or demonstrations in agricultural technology parks | Custom Indicator | Outcome | 0 | 0 | 0 | 6 | 0 | 8 | 0 | 12 | 0 | 12 | 0 | 38 | | | |

4. INTEGRATION OF CROSS-CUTTING ISSUES

4.1 Gender Equality, Female Empowerment and Youth Engagement

Within the framework of the CEMARCH, the anchor university, the COP and the Project Director will ensure implementation of the project adheres to the principles described in the Gender Integration and Social Inclusion Strategy. This means: (i) promote gender responsive access, adaptation, and adoption of technologies and/or innovations for improved agricultural productivity for resource poor farmers, particularly women and youth; (ii) promote the use of labor-saving technologies and/or innovations to reduce the time that women spend in farming activities; (iii) promote increased access to technologies and/or innovations such as Integrated Soil Fertility and Water Management, Integrated Pest Management (IPM), or hybrid seed varieties to women to increase agricultural productivity, as well as improving food and nutrition security, and improving family's welfare; (iv) ensure gender compliance in interventions, gender capacity building, and enhanced participation of women and youth in the design of the CEMARCH activities, implementation, monitoring and evaluation, and; (v) incorporate a gender lens to assure the active participation of women and hence, contribute to improving their socio-economic wellbeing. The process of mainstreaming gender in the CEMARCH identifies a combination of approaches as being keys to success:

- Building partnerships on gender equality in the CEMARCH: high level gender policy dialogue. This will include discussions within the partnerships between the universities and the collaborative partners (several of which universities have already identified as being women-led).
- Gender screening of the CEMARCH activities (gender-oriented activities). First gender screening activities will occur in the BS and MS student recruitment process to ensure equal representation.
- Ensuring that budgeted items (scholarship, resources for ag technology parks, funds for collaborative entities) are made equally available to vulnerable groups, and sections are made with close attention to gender.
- Targeting the vulnerable groups among the beneficiaries of the CEMARCH; and
- Participation and consultation of farmers organizations, women, and youth. Individual university work plans have identified collaborative organizations, and they represent an excellent group with diverse membership, life experiences and genders.

4.2 Sustainability Planning Actions

CEMARCH, the consortium of HAUs, and their associated research institutions would collectively address the agricultural challenges such as climate mitigation, adaptation, resilience, and producing nutritious and safe food while sustaining natural resources (Climate Smart Agriculture, CSA). By focusing on Haitian institutions, this center will provide greatly needed assistance to a consortium of universities, research institutions, governmental and non-governmental organizations (NGO) and the private sector to develop a network of mutual support and exchange programs. The proposed center (CEMARCH– Center for

Mitigation, Adaptation, and Resilience to Climate-Change in Haiti) will primarily focus on building institutional and human capacity (both short-term certifications and long-term degrees) so that Haiti is able to identify and seek the solutions to its agricultural problems in partnership with U.S. universities. Due to extensive experience, Kansas State University's (KSU), Feed the Future Innovation Lab for Sustainable Intensification (SIIL), will serve as the lead entity and work with the Haitian institutions to co-develop and establish the CEMARCH by collaborating with USAID-Haiti and other partners including Feed the Future Innovation Labs. In the co-creation process of the center SIIL utilized participatory approaches similar to the Collaborating, Learning, Adapting, and Sharing (CLAS) practices to gain insights from a variety of perspectives to develop a comprehensive understanding of the context, build trust and a shared sense of responsibility. This allowed us to create an enabling environment of inclusivity and respect to empower others to express their own perspective, understanding, and learning to generate effective solutions.

Each university will craft a 5-year plan, and part of that plan will include sustainability. Sustainability will focus on the maintenance and continuation of research and extension programs, and partnerships between universities for the BS and MS degrees. Such sustainability will have to be achieved within the current climate of Haiti, recognizing that universities will likely need to generate revenue and work within the existing faculty and staff (ie no new classes or lots of newly hired faculty). This means that sustainability plans should include curriculum, research and extension plans that generate revenue and use the resources at hand.

4.3 Environmental Compliance

Addressing environmental impact and sustainability issues is required in the design and implementation of USAID-funded program activities as prescribed by the United States Government's Foreign Assistance Act of 1961 (<http://www.usaid.gov/policy/ADS/200/>). The program will be subjected to an Initial Environmental Examination (IEE) (completed) and any sub-grant to HAU partners for the implementation of the activities will be tributary to a satisfactory Environmental Review Form (ERF). The PD has previous experience with writing IEEs, and will oversee and edit the Environmental Compliance documents, as needed.

4.4 Global Climate Change

Developing climate change agricultural mitigation, adaptation, and resilience technologies is the best holistic solution to increase food production and ensure improved household nutrition from existing farmland while minimizing the negative impact on the environment. It will be important to identify opportunities for improving farming systems that enhance overall productivity and nutrition for households and to identify adaptation and mitigation strategies to increase resilience of farming to changing climate. These new opportunities can provide employment to youth and women.

Individual university workplans have taken global climate change into their planning, and research and extension projects are focused on new crops for Haiti, research which evaluates regional water resources and their changes, and best methods for documentation of soil resources. In addition to research and extension there are also new classes planned that will address global climate change. In both university curriculum and short courses education has

been designed for GIS education, water resources planning, soil resource delineation, and cover crop/plant selections for carbon storage. Of particular emphases for climate change are the planned projects that will study carbon storage, water resources, and best methods for crop production in mountains environments.

4.5 Policy and Governance Support

The Haiti Government's (HG) Ministry of Agriculture, Natural Resources and Rural Development (MARNDR) prioritizes agriculture and natural resources management. However, at present, they do not have the available financial resources and institutional capacity to make significant change in these topics nor do they have the means to meet the Sustainable Development Goals (SDGs) particularly those related to zero hunger, poverty reduction, food security and climate action. Currently, Haiti is ranked 152 out of 157 countries towards meeting the SDGs. There is also high unemployment (~40% of population) including women (50%).

The overall Objective of the CEMARCH project is to provide capacity development for research, teaching and extension within the framework of Haitian universities. With partners and collaborators CEMARCH will work to build research technology parks, BS and MS educational opportunities, and extension that benefits Haitian for improved food, fuel and fiber in a changing climate. CEMARCH will do this with the support and knowledge of the various Ministries in Haiti, including Agriculture, Natural Resources and Rural Development (MARNDR), and National Education and Vocational Training (MENFP).

4.6 Local Capacity Development

Increasing agricultural productivity is key to the success of Haiti's economy and food security. With half of Haiti's food imported, developing the agriculture sector will be key to increasing income and purchasing power of smallholder farmers. For example, rice is the primary staple food in Haiti and around 80% of rice consumed in Haiti is imported. Haiti's dependence on food imports creates about 70% of the population chronically food insecure making it one of the most food insecure countries in the world. A key part of the CEMARCH consortium is to identify and conduct research in new crops, value added processing for existing crops, and improved methods for food animal production. Coupling this research with extension and teaching (degrees, short courses, certificates), all done in Haiti, will provide increased agricultural productivity and capacity development.

These expected outcomes – increased food production and developed new crops and methods of animal production - via CEMARCH and partners will directly impact local capacity development through Haitian Agricultural University partners. The local capacity activities include improving agricultural programs, updating curriculum, and supporting undergraduate and graduate degrees in agricultural to enhance institutional and human capacity to support linkages between universities, extensionists (public and private), private sector, and farmers in Haiti. For reporting, this will be done within the CBLD-9 indicator (see Table 3, 1.5 in this document).

4.7 Public Private Partnerships (PPP)

CEMARCH will work with SIIL, USAID/Haiti and other partners to identify potential opportunities for developing private sector alliances between government agencies and private investors. Objective 2 activities that focus on revenue-generating, stability and growth will necessitate collaboration with private sector for understanding of profitable services needed in regions of Haiti.

Individual workplans created by each university outline the wide ranges of collaborative partners for designed projects. Currently (for 2023) the collaborative partners are largely NGOs and mission-based partners with whom the universities have existing collaborative efforts. In 2023 CEMARCH will approach private sector partners (agricultural sales groups, seed companies, commercial processing facilities) to engage the private sector. First steps will be meetings and tours of CEMARCH facilities, as they are developed. Private sector involvement is critical sustainability as those companies can: 1) provide capital for expansion of successful projects, and, 2) hire BS and MS graduates, for employment in Haiti. Specific projects have been outlined for revenue generation, and these are also detailed in each university workplan. Revenue generation covers many topics, including seed/plant part sales,

4.8 Science, Technology, and Innovation Impacts

One of the long-term investments that must be made to develop the agriculture sector is to strengthen the institutions to train agricultural professionals, at all levels, who have the capacity and capability to identify and solve the problems in the sector. In addition, agricultural development is key to addressing poverty and food insecurity in Haiti. Thus, developing climate change agricultural mitigation, adaptation, and resilience technologies is the best holistic solution to increase food production and ensure improved household nutrition from existing farmland while minimizing the negative impact on the environment. It will be important to identify opportunities for improving farming systems that enhance overall productivity and nutrition for households and to identify adaptation and mitigation strategies to increase resilience of farming to changing climate. These new opportunities can provide employment to youth and women.

Science, technology and innovation are keys in the success of the CEMARCH project. Specific examples include: 1) calibration and use of existing or new soil and water testing labs, 2) inclusion of new varieties and their genetics in crop trials, 3) development of cell-phone based applications for soil, water and weather use in ag-based production, 4) use of alternative mechanization for soil and water protection, and more efficient crop production, and, 5) exploration of novel post-harvest technologies for safer food and greater profit. All of these innovations will be used in CEMARCH in a three-pronged strategy: 1) education/curriculum, 2) extension tools and teaching, and 3) research.

5. MAJOR UPCOMING EVENTS

Table 4: Major Events – major events is defined as an activity at which others will attend, participate or learn. 2023.

| Major Event | Brief description of purpose | Planned date(s) | As applicable, specify what kind of support may be required from USAID Haiti. |
|---|--|---------------------------------------|---|
| Visits to Cap Haitian, Les Cayes and Port-au-Prince (security permitting) to finalize all work objectives, as outlined in each 2023 workplan. | To agree to the extract projects in each university workplan and complete all details. | October, Nov or Dec, 2022. | None |
| First opening and tours of an agricultural technology park and/or laboratory facility. Most likely in the northern region. Other openings (in south and central regions as well) will occur in 2023 if safety allows. | Host a regional ‘kick off’ of the project and have interested parties attend. | March, 2023. Other dates if possible. | None |
| Host a planning meeting of the Haitian Crop and Soil Science Society, with initial graduate student presentations. | Start the conversation about national scientific crops/soils society and have an outlet for scientific presentations and discussions. Provide an outlet for Haitian MS students to give short scientific presentations. | November, 2023 | None |
| Host at least two certificate or field training programs at each university in 2023. | These should be ‘entry level’ activities designed to easily get programs going. For example, conversion of an existing class to distance options so that other universities can make use of the course. Curriculum development workshops and extension training workshops, taught by the COP or KSU staff would also fit here. | Completed by October, 2023. | None |

6. APPENDICES

6.1 Detailed Gantt Chart of Interventions

Table 5: Gantt Chart - 2023

| Activity by Objective | 2022/2023 | | | | | | | | | | | |
|---|-----------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept |
| Implementation Activities | | | | | | | | | | | | |
| Meet with each university to discuss and finalize 5 year workplans, and create their 2023 workplan. This also includes budget materials. | X | X | | | | | | | | | | |
| Submit Quarterly and Annual Reports | X | | | X | | | X | | | X | | |
| Hire administrative staff under Anchor University supervision | X | | | | | | | | | | | |
| Hire Farm Managers at each university. | | X | | | | | | | | | | |
| Objective 1: Increase institutional & human capacity and social capital to better meet the demands of the agricultural economy | | | | | | | | | | | | |
| Establish strategic plan to facilitate agricultural research and engagement activities | | | X | X | X | X | X | X | | | | |

| Activity by Objective | 2022/2023 | | | | | | | | | | | |
|--|-----------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept |
| Develop certificate courses, short-term learnings, and short courses. | | x | x | x | x | x | x | x | x | x | | |
| Provide technical expertise on research opportunities in the areas of CSA related to key value chains | x | x | x | x | x | x | x | x | x | x | x | x |
| Objective 2: Develop revenue-generating services to provide to regions in Haiti with donor partners | | | | | | | | | | | | |
| Establish a community of practices to connect with private sector business networks. | x | x | x | x | x | x | x | x | x | x | x | x |
| Facilitate research and extension activities between USAID-Haiti & other funding institutions | x | x | x | x | x | x | x | x | x | x | x | x |
| Network and link with int'l and nat'l partners engaged w/CSA education, research, & extension | x | x | x | x | x | x | x | x | x | x | x | x |
| Sustainability plan completed for each university. | x | | | | | | | | | | | x |
| Objective 3: Improve linkages between universities, extensionists, private sector, and farmers by establishing Ag. Technology Parks | | | | | | | | | | | | |

| Activity by Objective | 2022/2023 | | | | | | | | | | | |
|--|-----------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sept |
| Establish CMARCH ATPs to promote institutional change and innovation | x | x | x | x | x | x | x | x | x | x | x | x |
| Provide best practices for strengthening agricultural innovation to all stakeholders | x | x | x | x | x | x | x | x | x | x | x | x |
| Host regional field days or other extension event at each ag tech park or university activity. | | | x | x | | x | | x | | x | x | |

6.2 Budget – 2023, All in USD

| | October 1, 2022 - September 30, 2023 | | | |
|--|--------------------------------------|--------------|-----------------|-----------------|
| | Unit | No. of Units | Unit Cost (USD) | Year 2 Estimate |
| PERSONNEL | | | | |
| Program Director | Year | 0.65 | 123,600 | 80,340 |
| Program Coordinator | Year | 0.5 | 56,650 | 28,325 |
| Business Manager | Year | 0.5 | 61,800 | 30,900 |
| TOTAL PERSONNEL | | | | \$139,565 |
| FRINGE BENEFITS | | | | |
| Benefits - ME | Percent | 0.32 | 139,565 | 44,661 |
| TOTAL FRINGE BENEFITS | | | | \$44,661 |
| TRAVEL | | | | |
| International Travel | Total trips | 9 | 2,862 | 25,758 |
| International Travel - Ground Transportation | | 9 | 500 | 4,500 |
| TOTAL TRAVEL | | | | \$30,258 |
| SUPPLIES | | | | |
| Computers / Laptops | | | | 0 |
| Communication Materials | Each | 1 | 6,000 | 6,000 |
| TOTAL SUPPLIES | | | | \$6,000 |
| CONTRACTUAL | | | | |
| PROGRAM ACTIVITIES | | | | |
| General Program Activities | | | | |
| Reporting Systems and Online Tracking | Each | 1 | 10,000 | 10,000 |
| Others | Each | 1 | 19,500 | 19,500 |
| Advisory Board | Each | 1 | 15,000 | 15,000 |
| Training | | | | |
| Workshops and Training | | | | 70,500 |
| SUBTOTAL PROGRAM ACTIVITIES | | | | \$115,000 |
| CONSULTANTS | | | | |
| Participant Costs (Faculty Training) | | | | 150,000 |
| SUBTOTAL CONSULTANTS | | | | \$150,000 |
| SUBGRANTS | | | | |
| Lead Anchor University - Management | Each | 1 | 370,058 | 370,058 |
| Lead Anchor University - Research/Education | Each | 1 | 112,878 | 112,878 |
| Other Partner Universities | Each | 5 | 112,878 | 564,390 |
| Scholarships (Bachelors) | Each | 6 | 40,000 | 240,000 |
| NGOS/CRDD | Each | 6 | 50,000 | 300,000 |
| MS Student Scholarships and Support | Each | 30 | 14,444 | 433,333 |
| SUBTOTAL SUBGRANTS | | | | \$2,020,659 |
| TOTAL CONTRACTUAL | | | | \$2,285,659 |
| TOTAL CONSTRUCTION | | | | 0 |
| OTHER DIRECT COSTS | | | | |
| TOTAL OTHER COSTS | | | | 0 |
| DIRECT COSTS | | | | \$2,506,143 |
| INDIRECT COSTS | | | | |
| Management Entity | Indirect | 0.35 | 335,484 | 117,419 |
| TOTAL INDIRECT COSTS | | | | 117,419 |
| TOTAL COSTS | | | | \$2,623,562 |
| COST SHARE | | | | |
| Salaries | | | | 55,000 |
| Fringe | | | | 17,600 |
| IDC (Indirect Cost) | | | | 25,410 |
| College of Agriculture Commitment | | | | 60,000 |
| COST SHARE TOTAL | | | | \$158,010 |

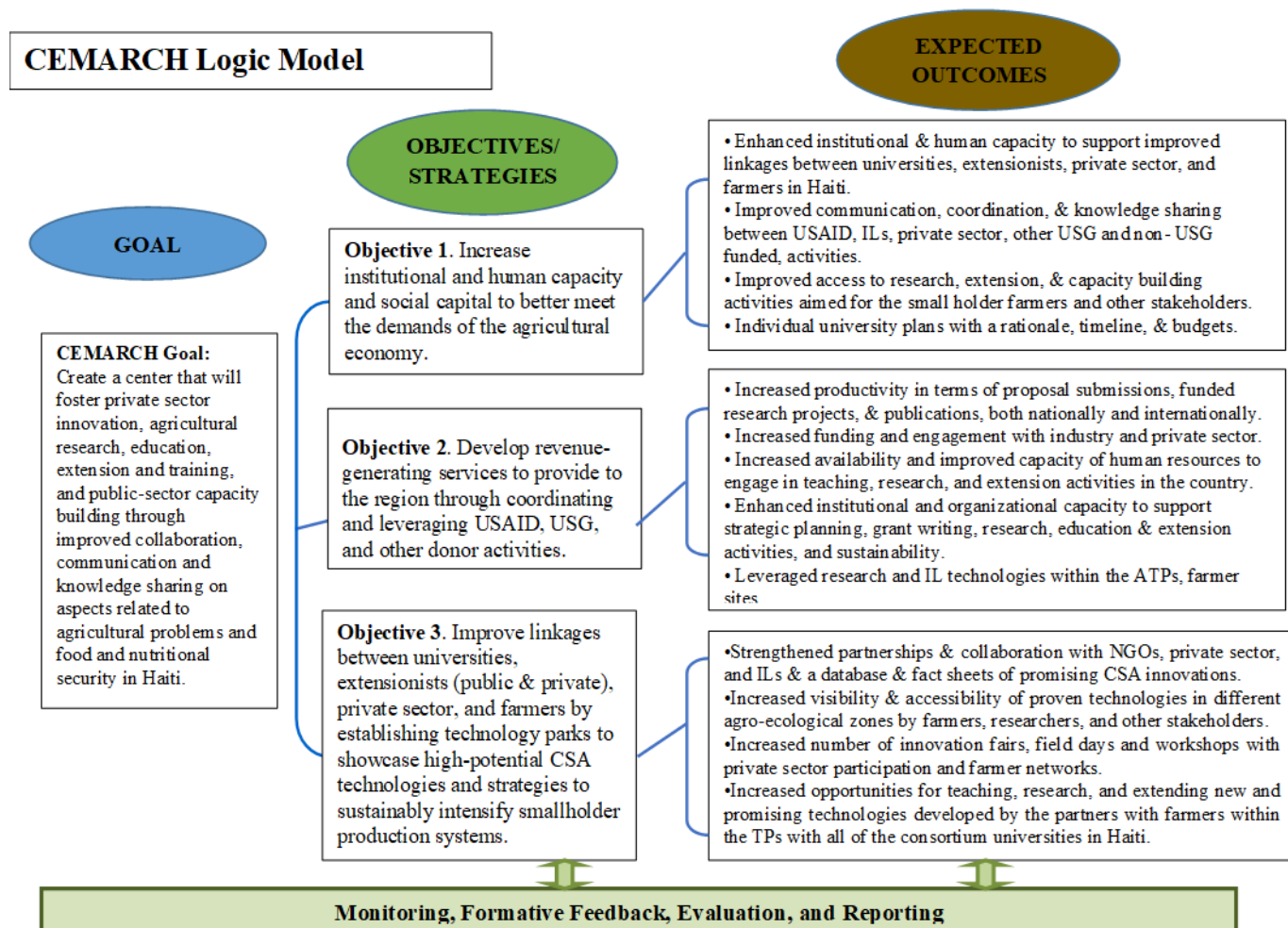
Percent of 2023 Budget, by Objective.

| Objective | Amount | Percent of Budget |
|--|---|-------------------|
| | USD | % of Direct Costs |
| Objective 1: <i>Increase institutional & human capacity and social capital to better meet the demands of the agricultural economy</i> | \$70,500 (workshops) + \$150,000 (faculty training) +240,000 (BS) + \$433,333 (MS) = \$893,833 | 35.7 |
| Objective 2: <i>Develop revenue-generating services to provide to regions in Haiti with donor partners</i> | [\$677,268 (res/ext) + \$300,000 (NGOS/CRDD subgrants)]/2 = \$488,634 | 19.5 |
| Objective 3: <i>Improve linkages between universities, extensionists, private sector, and farmers by establishing Ag. Technology Parks</i> | [\$677,268 (res/ext) + \$300,000 (NGOS/CRDD subgrants)]/2 = \$488,634 | 19.5 |
| Total percent budget that fits under an Objective | | 74.7 |
| Budget items not specifically under an Objective | | |
| KSU - Salaries + Fringe benefits | \$184,226 | 7.4 |
| Anchor university administration | \$370,058 | 14.8 |
| KSU – supplies, reporting, advisory board | \$50,500 | 2.0 |
| International travel | \$30,258 | 1.2 |
| Total percent of budget allocated to administration | | 25.4 |
| TOTAL DIRECT COSTS | \$2,506,143 | |

This is a rough estimation as some parts of the budget can overlap from line to line. For example, monies allocated to BS scholarships, MS graduate students and research/extension could all be used for internet support.

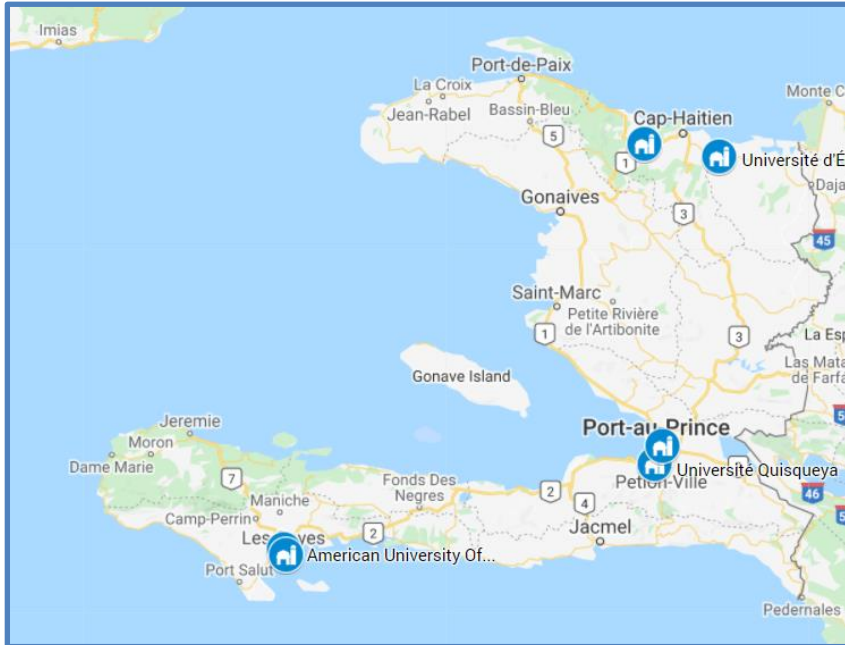
6.3 Theory of Change and/or Key Result Areas Diagram

Item 1. Detailed Illustration of Logic Model (CEMARCH)



6.4 Geographic coverage

Item 2. Haitian Agricultural Universities



Although there are several universities which focus on agricultural education, the initial set of partner institutions include the following:

1. Quisqueya Université (Central)
2. Faculté d'Agronomie et de Médecine Vétérinaire (Central)
3. Campus Henry Christophe de Limonade (North)
4. North Christian University (North)
5. American University of the Caribbean (South)
6. University Notre Dame of Haiti (South)

I. ANTICIPATED RISKS AND SHOCK RESPONSIVE PROGRAMMING

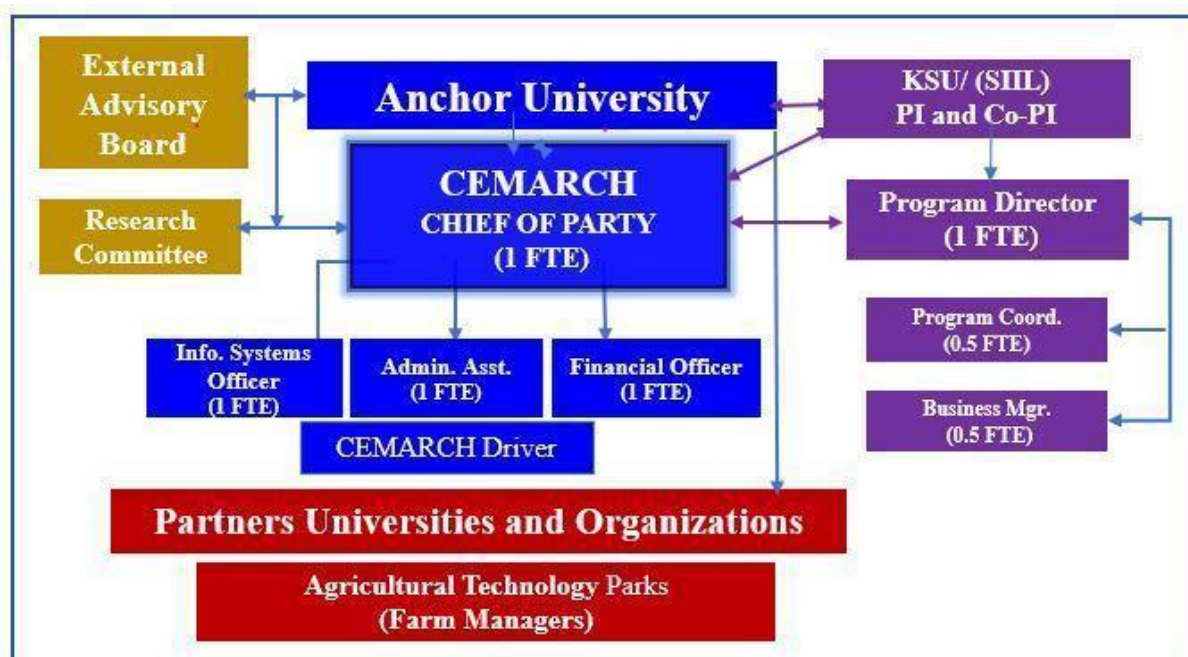
The project team is aware that risks in Haiti are increasing, and some areas previously thought of as relatively safe have become more problematic. For example, some universities in Cap-Haitien have delayed the start of Fall semester and may shorten the semester itself. Currently there is no fuel in Les Cayes. The CEMARCH team understands the risks, and will continue to work with the partners in the following ways: 1) distance communication as needed, via WhatsApp, Zoom, teams or other methods (the COP will create a WhatsApp listserv by the end of September, as that is the most immediate means of communication), 2) travel when safe, and use of safe locations (in the Sofital in Port-au-Prince, for example) for meetings as needed. If forced, meetings in the Dominican Republic could be an option, or in Florida – these will be a last resort, however, and 3) immediate budgeting and steps to make sure that internet access is as good as can be, with reliability. With a combination of Zoom communication, WhatsApp messaging, good internet for distance education, and a newly hired COP who is willing to travel we feel we can work around many safety issues.

If security becomes a continued issue then plans will be shifted for the project. For example, a first step is the installation of quality internet at each university. This could also include the purchase of and set-up of connected computers. This will allow distance education and remote connectivity for projects, allowing the BS and MS degrees to continue. Additionally, not every university may have an ATP, and collaborations at ATPs in safer areas (such as Mirebalais) may be needed. Such issues will require flexibility and constant evaluation.

II. ANTICIPATED STAFFING CHANGES

No staffing changes are anticipated in FY 2023. The primary anchor university (AU) will be identified in consultation with USAID-Haiti and key partners. The AU will lead the consortium and be in charge of the coordination of various activities. The SILL will work directly with the AU with a small administrative unit established to provide support for management, reporting, communications and outreach, and organization of events. The details of the administrative units are provided in the below organizational chart.

Anchor University (AU) Administration: The AU administration will primarily consist of leadership (e.g., Rectorate; Vice-Rectorate(s); Research and Innovation Council, International Programs Administrators). They will play the role of advisory and facilitation for successful implementation and establishment of the CEMARCH. They will help create linkages with the Government of Haiti for sustainability of the CEMARCH. The COP is hired, and all other Anchor University staff will be in place by November 1, 2022. Farm Managers will be hired for each university, and they will serve as liaisons between the COP, the universities and the ATPs.



III. PLANNED TECHNICAL ASSISTANCE (TA)

The Anchor University (AU) has been identified as Quisqueya University. The specific Scope of Work (and accompanying budget just for the Anchor University) for serving as the AU has been written, approved by KSU, and sent to UniQ for their signature. As of 9/30/22 the documents have been signed, and the COP is working. The SIIL will work directly with the AU with a small administrative unit established to provide support for management, reporting, communications and outreach, and organization of events. This administrative staff will be in place by November 1, 2022. The details of the administrative units are provided in the organizational chart (above). The AU will also be responsible for organizing a series of research conferences at partner institutions to share research findings and create a community of learning. These events will include professors, researchers, students, local and national government, and farmers. In addition to the yearly conferences, CEMARCH will provide opportunities for learning and adapting and will incorporate various types of short, focused studies and methods necessary to build capacity and facilitate rapid activity feedback to serve as compelling evidence for making in-course corrections. Satellite hubs could be established if there is a larger need identified by any specific institutions due to differences in agro-ecological conditions.

The PD on CEMARCH (Guertal) has 29 years of field crop expertise, with a background in experimental design, field research and data collection. Similarly, the head of the Anchor University (Pressoir) has years of experience in these areas. Other faculty, particularly at FAMV and AUC, are well trained in field and laboratory work, with agronomy, soil science and crop science PhDs from top international universities. Thus, we do not see a need for outside technical assistance in these areas. However, such assistance may be beneficial in the areas of post-harvest processing and/or animal production and processing. If needed, CEMARCH will work with each university to identify appropriate technical support.

IV. INTERNATIONAL TRAVEL PLAN

The SILL team will conduct an initial site visit to convene the various partners to establish the center and then reassess travel needs at a later date. SILL and all partners will take into consideration the serious security concerns in all engagements and activities and understand that the conditions are not anticipated to change in the near or medium-term.

| Name of traveler(s) | Purpose of international travel | Destination | Travel dates |
|---|--|---|---|
| Elizabeth Guertal | Final approval on individual workplans and budgets, discuss SOW – all details addressed | Port-au-Prince, Cap Haitien, and Les Cayes. Haiti | Feb, 2023 |
| Elizabeth Guertal Jan Middendorf P.V. Vara Prasad | Visits to universities participating in CEMARCH – finish workplans | Port-au-Prince, Cap Haitien, and Les Cayes. Haiti | March, 2023 |
| Elizabeth Guertal Jan Middendorf P.V. Vara Prasad | MEL meetings and training | Port-au-Prince, Cap Haitien, and Les Cayes. Haiti | March, 2023 |
| Elizabeth Guertal | Planning meeting for extension activities and field days. Tour MS students' projects and research sites. | Port-au-Prince, Cap Haitien, and Les Cayes. Haiti | April, 2023 |
| P.V. Vara Prasad Jan Middendorf Elizabeth Guertal | Regional field days/community events at each site. | Port-au-Prince, Cap Haitien, and Les Cayes. Haiti | June-August, 2023. Visit dates will vary with each university date. |