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USAID/UCC FISHERIES AND COASTAL MANAGEMENT CAPACITY BUILDING SUPPORT PROJECT

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YEAR ONE

ANNUAL REPORT

24TH OCTOBER, 2014 – 30TH SEPTEMBER, 2015
DEPARTMENT OF FISHERIES AND AQUATIC SCIENCES
UNIVERSITY OF CAPE COAST

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Cover photo: Example of the result of activities of the sand winners and level of human traffic at the fish landing beach at Bortianor Beach, Ga South District of Greater Accra Region (Photo Credit: DFAS/UCC).

LIST OF ACRONYMS

AAS	Atomic Absorption Spectrophotometer
AM	Activity Manager
BUSAC	Business Sector Advocacy Challenge Fund
CANS	College of Agriculture and Natural Sciences
CBOs	Community Based Organizations
CCM	Centre for Coastal Management
CDCS	Country Development Cooperation Strategy
CRC	Coastal Resources Centre
CPUE	Catch Per Unit Effort
CSLP	Coastal Sustainable Landscapes Project
DFAS	Department of Fisheries and Aquatic Sciences
DPDEM	Directorate of Physical Development and Estate Management
EMMP	Environmental Monitoring and Mitigation Plan
EU	European Union
FoN	Friends of the Nation
FAO	Food and Agriculture Organization
FCWC	Fisheries Committee for the West Central Gulf of Guinea
FSSD	Fisheries Scientific Survey Division
FtF	Feed the Future
F2F	Farmer to Farmer Program
GDP	Gross Domestic Product
GIS	Geographic Information System
GoG	Government of Ghana
ICM	Integrated Coastal Management
IEC	Information, Education and Communication
IUU	Illegal, Unreported & Undocumented
MDG	Millennium Development Goal
M&E	Monitoring and Evaluation
MCS	Monitoring Control & surveillance
MoFAD	Ministry of Fisheries and Aquaculture Development
MoU	Memorandum of Understanding
MT	Metric Tonnes
METTSS	Monitoring, Evaluation and Technical Support Services
NDPC	National Development Planning Commission
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NHIL	National Health Insurance Levy
UAV	Unmanned Area Vehicle
UCC	University of Cape Coast
UG	University of Ghana

URI	University of Rhode Island
USAID	US Agency for International Development
USG	United States Government
PMT	Project Management Team
PPA	Public Procurement Authority
PMP	Performance Monitoring Plan
VAT	Value Added Tax
VMS	Vessel Monitoring System
VRPO	Vat Relief Purchase Order
WARFP	World Bank West Africa Regional Fisheries Program

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EXECUTIVE SUMMARY

The objective of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project is to provide a long-term institutional anchor for capacity building in Fisheries and Coastal Management at the University of Cape Coast in support of the Government of Ghana. This contribution to national development valued at US$ 5.5 million is fully financed by the United States Agency for International Development and will span a period of five-years (2014-2019). The Project was awarded on the 24th October, 2014 targeted at contributing to the overall USAID/Ghana's multi-year strategy of the US government's global hunger and food security initiative "Feed the Future". The central components focus on capacity building actions to improve governance of marine fisheries resources, support supplementary livelihoods and enhance nutritional status of households, at least provide more than half of the protein needs in the local Ghanaian diet. The project's activities will directly contribute to USAID's results framework targeting increased competitiveness of major food value chains in the country. It also feeds into USAID's development strategy for Ghana as outlined in its Country Development Cooperation Strategy (CDCS) and the Ghana's Sustainable and Broadly Shared Economic Growth agenda. The highlight of the first year was the launch of the project and commissioning of the newly refurbished Fisheries and Coastal Research Laboratory at the University of Cape Coast in June, 2015. Other key accomplishments include the hosting of coastal management specialist from the University of Rhode Island as part of operationalization of the Centre for Coastal Management (CCM). With the help of the university management, the Project Boards notably the Project Management Board (PMB) and the Centre for Coastal Management Board (CCMB) and the Project Management Team (PMT), the setup of acceptable reporting and financial accounting systems for USAID as well as appropriate program management and documentation procedure was established within UCC, DFAS and CCM in the first year. Also, catalyzed actions for policy dialogue/stakeholder consultations at district and national levels across all four coastal regions on the basis of the Fisheries Law Act 625 and its Regulations that was recently passed into law (LI 1968 of 2010) and the Fisheries Management Plan featured prominently. Memoranda of Understanding (MOU) were signed with the University of Rhode Island and the Florida Gulf Coast University as part of North-South Cooperation. The project initiated partnerships with ten (10) other public sector institutions involving universities and research agencies in Ghana. As a cardinal component of the capacity building program, five (5) PhD and ten (10) MPhil scholarships were competitively awarded to candidate for studies within DFAS. This figure represent 60% of total candidates admitted constituting females. The period was also used to engage in planning processes and recruitment of three (3) short-term technical experts from local and private sectors —to identify and prioritize strategies for addressing critical coastal zone and marine governance issues notably (i) climate change adaptation (ii) supplementary livelihoods and (iii) policy dialogue and sensitization. Finally, tendering and contracting process for the procurement of field and laboratory equipment for the newly refurbished Fisheries and Coastal Research Laboratory was concluded and awarded.

1.0 INTRODUCTION

The Fisheries and Coastal Management Capacity Building Support Project operates on a partnership agreement signed on 24th October, 2014 between the United States Agency for International Development (USAID) and the University of Cape Coast (UCC). The project adds value to the work of the Department of Fisheries and Aquatic Sciences (DFAS) of the University in terms of administrative, technical and financial assistance. USAID's total contribution to this Project is up to the tune of US$5,500,000, which will be sub-obligated on yearly increments to enable DFAS effectively coordinate capacity building at various institutional, community and individual levels for sustainable marine fisheries management in Ghana over a period of five years (2014-2019). The USAID award represents a strategic investment from the American people for the promotion of food security in Ghana programmed under the US Government's Feed the Future Initiative[1] and subject to the terms and conditions of the Agreement signed with the University of Cape Coast (PIL No.: 641-A18-FY14-IL#007). Therefore the project activities contributes to USAID's development strategy for Ghana as outlined in its Country Development Cooperation Strategy (CDCS), directly in support of the Development Objective Two: Sustainable and Broadly Shared Economic Growth[2].

Project Staff - Prof. Edward Obodai and Dr. Denis Aheto with Honourable Minister of Fisheries and Aquaculture Development (MoFAD), Chief Director, the Director and Heads of Divisions of the Fisheries Commission of Ghana.

It is expected that by the end of the project, capacity building for sustainable marine fisheries management in Ghana can be quantitatively proven and demonstrable management outcomes for the country's coastal-marine space including its coastal zone and resources will be evident. These achievements will come on the back of a trained and strengthened local scientific capacity in specific areas of emphasis such as fisheries science and coastal zone management in particular. These are aimed at enhancing quality and relevant educational programs in these areas, practical research, extension and advisory services that will support the management of Ghana's fisheries and coastal resources to promote the country's social and economic development. To achieve this goal, this project has enabled targeted collaborations with key partners including the Ministry of Fisheries and Aquaculture Development (MoFAD) and the Fisheries Commission of Ghana.

One of the key objectives to deliver on the vision of an improved sustainable management of Ghana's marine fisheries and coastal resources is to build a platform for regular interaction and dialogues with local and foreign universities, particularly with Centres,

[1] Is US Government-led initiative for food security in developing countries

[2] To obtain the full report, please visit http://www.usaid.gov/sites/default/files/documents/1860/Ghana_CDCS_fy2013-17.pdf

Institutes and Departments at the University of Rhode Island (URI).Others collaborations initiated within the first year programming include national libraries and research institutions with the idea to promote increased use of science and applied research for decision making, law enforcement, climate change adaptation and biodiversity conservation for poverty alleviation.

An add-on effect of this project will be the upgrade of skills of academic and technical staff in the use of new technologies and scientific equipment, refurbishment of the fisheries and coastal research laboratory, library and offices of academic staff, acquisition of vehicles for field research, extension and the procurement of equipment for the creation of marine and fisheries database working with other international data sources and host centres. These improvements coupled with award of student scholarships will facilitate the training of 10 PhD, 20 masters and 150 undergraduate students over a five-year horizon.

A cross section of DFAS students during an orientation program on the USAID/UCC Project

The package also includes financing of short courses on climate change adaptation, fisheries and coastal management for other relevant professionals over the course of five years. The short courses will be run under the ambit of the Centre for Coastal Management (CCM)[3] as part of its operationalization and institutionalization within the University of Cape Coast and beyond. The project will also support the implementation of its strategic plan, develop business plans for the Centre, enhance roundtable policy dialogues, and undertake critical research with the help of its newly refurbished Fisheries and Coastal Research Laboratory within DFAS.

On a broader perspective, it is noteworthy that Ghana's annual economic and social contributions of the fisheries sector to the country's Gross Domestic Product (GDP) cannot be underestimated. The marine fishery alone accounts for about 80% of the country's total annual fish production. In 2002 alone, Ghana's fish stocks were estimated to have contributed about 96 million dollars to the earnings of the non-traditional export sector, with annual revenues exceeding US$1 billion in some years. Fisheries accounts for about 11% of agricultural GDP with majority of the revenue directly supporting the livelihoods of 135,000 fishers in the marine capture fisheries sub-sector alone, and 27,000 women involved in fish processing and marketing. The vast majority (about 92%) of people in the marine fishery are artisanal fishers. However, there is a significant 'job multiplier effect' in the fisheries sector since for every fishing job, there are several other jobs that are

[3] CCM was established in December 2013 by the Academic Board of the University of Cape Coast.

created within the value chain including processing, distribution, marketing, selling of inputs and provision of services to the industry.

A typical beach scene – fish mongers and other practitioners await arrival of fishing vessels– Axim, Nzema East District

It is also estimated that the fisheries sector employs up to 20% of the national workforce. Thus, the contribution of the marine fisheries sector to household income in rural coastal districts is far-reaching. Despite these benefits, the sector unfortunately is fraught with many problems such that there is little or no profitability in the industry. Key among them includes the over-exploitation of existing marine fish stocks and weaknesses in institutional capacity to regulate the sector.

The problem is exacerbated by government subsidies that allow more people to participate in the fishery. Indeed, the amount of effort applied in Ghana's marine capture fisheries has increased significantly over the last 10 years and there is evidence that key fish stocks are being over-fished and seriously depleted with repercussions for coastal canoe-based fishery livelihoods. Also, instances of conflicts between artisanal, industrial and semi-industrial fishers have been recorded while regulations governing access and fishing methods are openly flouted.

These problems are compounded because coastal ecosystems which are "hot spots" of biodiversity are the most endangered ecosystems in Ghana. They are threatened by pollution, conversion to other land uses including agriculture, salt ponds among others. Consequently, the supply of goods and services from these natural systems change invariably for the worse due to the high levels of exploitation and habitat modification.

Women and children sifting through a catch for fish at Anlo

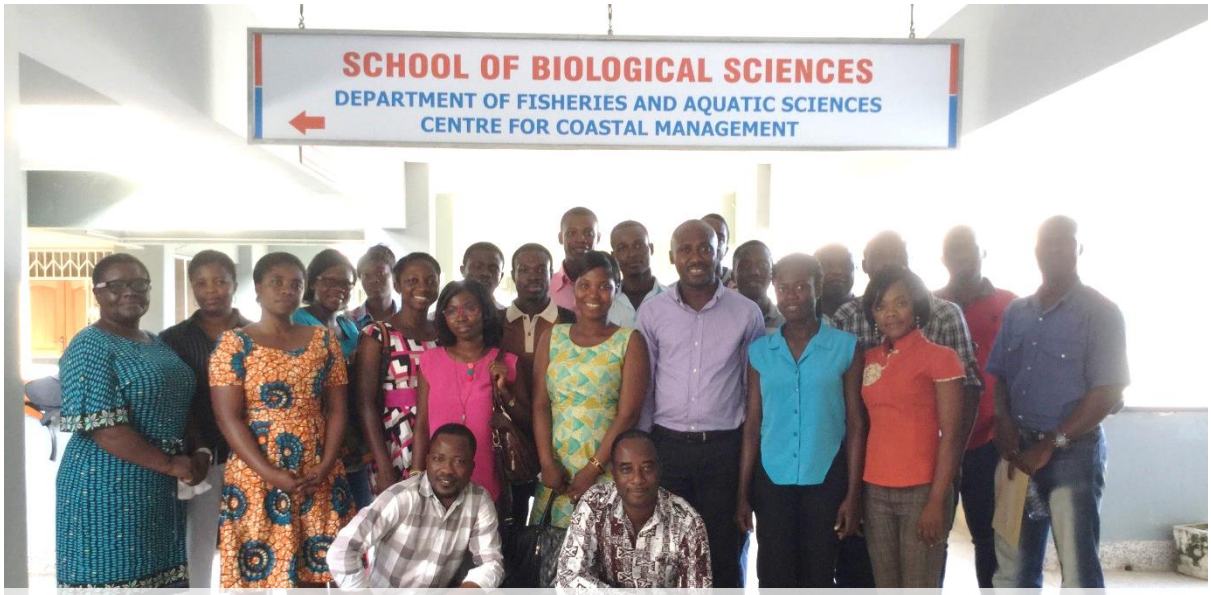
Through this grant, UCC/DFAS will be strengthened, and its value to students and stakeholders will be quantitatively demonstrated. The number of applications in the use of improved science and technology, as well as innovation in support of fisheries and marine conservation will be significantly enhanced both within the target areas and at the national level.

The objective of this report therefore is to outline activities that were undertaken and challenges encountered within the first year of implementation period- from 24th October, 2014 to 30th September, 2015. The rationale for this action is in line with Section 3d of the Project Implementation Letter (PIL No.: 641-A18-FY14-IL#007) that the Recipient will submit the ***annual report*** to the USAID Activity Manager.

Fishermen and fish mongers busy about their trade at Axim

The report must align with the activities detailed in the overall work plan and the Activity Description and must provide updates on progress in meeting the indicators detailed in the annual M&E plan. It stresses that recipient shall immediately notify USAID of developments that have a significant impact on the award-supported activities. ***Also, notification shall be given in the case of problems, delays, or adverse conditions which materially impair the ability to meet the objectives of the award.*** This notification will include a statement of the action taken or contemplated, and any assistance needed to resolve the situation.

The Department of Fisheries and Aquatic Sciences (DFAS) is one of seven Departments in the School of Biological Sciences. The Department offers programs leading to the award of a *B.Sc.* degree in Fisheries and Aquatic Sciences, as well as *M.Phil.* and *Ph.D*. degrees in Integrated Coastal Zone Management, Oceanography and Limnology, Fisheries Science and Aquaculture. DFAS empowers its students and stakeholders with the knowledge needed to ensure the protection and management of fisheries and coastal resources in the country. However, prior to the USAID support, the Department's capacity to deliver upon its mandate was hampered by a number of challenges.



HoD and some staff of DFAS in a group photograph with post graduate DFAS students

These include inadequate teaching and training materials and the lack of logistics making it difficult to retain qualified staff and attract students. In its efforts to support training, research and extension services in marine and coastal management, DFAS in 1997 considered the establishment of a Centre for Coastal Management (CCM) but this only became a reality in 2010 when the USAID/Ghana funded Integrated Coastal and Fisheries Governance Project supported the design and the development of a Strategic Plan for the Centre. Subsequently, CCM was approved by the University's Academic Board in December 2013 and aims to be a 'centre of excellence' and an innovative partner in marine and coastal resource science, training and applied management.

Through this grant, DFAS/UCC has taken a step forward. This report therefore recounts key events under the first year of project implementation as detailed in the annual work plan, highlighting the accomplishments made towards reaching the project goals. Emphasis relative to the challenges of implementation is made based on a self-assessment by the project management team and makes suggestions on adjustments that must be made in order to maximize effectiveness and efficiency of the project, have been discussed in another document (Please refer to the Second Year Work plan).

Key accomplishments in the first year have been discussed under the following broad activities:

i. Operationalization of the Centre for Coastal Management (CCM)
ii. Recruitment of Project Management and Technical Support Staff
iii. Development of Program Management Tools
iv. Postgraduate Scholarships and Undergraduate Grants Programs (MPhil, PhD & BSc)
v. Renovating and Equipping Fisheries and Coastal Research Laboratory
vi. Refurbishing and Equipping New Office/Lecture/Computer rooms and Library
vii. Acquisition of Vehicles to Support Educational, Training, Research and Extension
viii. Academic and Technical Staff Capacity Strengthening
ix. Developing Marine and Coastal Fisheries Database

x. Developing Manuals and Updating Training Materials on Climate Change Adaptation and Mitigation
xi. Building Institutional Partnerships and Collaboration
xii. Strengthening Community Based Groups and Alternative Livelihoods in Coastal Communities.

2.0 SUMMARY OF ACCOMPLISHMENTSIN YEAR ONE (1)

During the first year, programmatic actions completed include:

- Strengthened program management procedures of the Project Management Board (PMB) and the Project Management Team (PMT) both serving as a multidisciplinary institutional anchor for the Initiative.
- Catalyzed actions for policy dialogue/stakeholder consultations at district and national levels in all four coastal regions and targeted inputs into the Fisheries Law Act 625 and Regulations that was recently passed into law (LI 1968 of 2010)
- Hosting of coastal management specialist from the University of Rhode Island as part of operationalization of the Centre for Coastal Management
- Project launch and Commissioning of the Fisheries and Coastal Research Laboratory at the University of Cape Coast.

Pro-Vice-Chancellor Prof. Nelson Buah decorating Mr. Peter Trenchard, Former Director of the Economic Growth Office of USAID (left). Dr. Denis Aheto presenting a citation to Mr. Trenchard on behalf of the Department of Fisheries and Aquatic Sciences of the University of Cape Coast

- Memoranda of understanding (MOU) with University of Rhode Island and Florida Gulf Coast University signed, initiated partnerships with other universities (Ghana, Norway and UK) and collaboration with other 10 public sector universities and research institutions in Ghana.

Prof. John Hayes (Provost and Vice President of Academic Affairs) with Prof. John Blay (Coordinator of the Centre for Coastal Management, UCC) and Dr. Denis Aheto (Head of Department and Project Manager of the Project) during the visit to URI in January, 2015.

In contemplation of a relationship to be established for student and professional exchanges, DFAS represented by Dr. Denis Aheto signed a Memorandum of Understanding (MOU) with the Department of Biological Sciences of Florida Gulf Coast University (DBS-FGCU) represented by Prof. Phil Allman on the development of joint research activities and professional training programs within the context and objectives of fisheries and coastal conservation in Ghana

- Fifteen (15) scholarships awarded for PhD and MPhil studies within DFAS
- Conducted planning processes and recruitment of three (3) consultants from local and private sector —to identify and prioritize strategies for addressing critical coastal zone issues notably (i) climate change adaptation (ii) supplementary livelihoods and (iii) policy dialogue and sensitization.

Ms. Anita Takura co-facilitates the Climate Change Adaptation Course. Anita is an Environmental Scientist with expertise in Climate Change, Environmental management systems and natural resource management specializing in Environmental Change Management. With over ten years functional professional experience in Environment and natural resources management,

Dr. Benjamin Campion, a lecturer at the Kwame Nkrumah's University of Science and Technology (KNUST) Department of Fisheries and Aquatic Sciences is the lead collaborator on the Policy and Research Dialogues Activity.

Mrs. AbenaAcheampong was selected by the PMB to co-facilitate the Project's Community-based Livelihoods program and conduct Needs Assessment for Supplementary Livelihoods in eight (8) Communities in the Western and Central Regions of Ghana. Abena is the Country Director of World University Service-Canada. Abena has over 15 years practical experience working at different levels in both the community development, Education and the NGO sectors.

- The completion of tendering and contracting process for the procurement of equipment for the newly refurbished Fisheries and Coastal Research Laboratory.
- Acquisition of a 65 kVA generator set, computers and accessories.

In addition to the accomplishments outlined above, this annual report updates on progress in meeting the M&E indicators and point to some adverse conditions which limit the project to meet the objectives of the award in terms of timelines, providing notification on actions taken or contemplated, and any assistance needed to resolve the situation.

Coastal Management Specialist from URI

Fisheries and Coastal Research Laboratory

Installed 65 kVA generator

M&E session at Coconut Groove Hotel, Elmina

Memoranda of understanding (MOU) with Florida Gulf Coast University

Policy and Research Dialogues on Sustainable Fisheries and Coastal Management in Ghana

Table 1: List of Indicators for the Fisheries and Coastal Management Capacity Building Support Project: Indicator Numbers, Title of Indicators, Results and Narratives as at the end of Quarter 4, FY 2015

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
1	Prevalence of Poverty: Percent of people living on less than $1.25/day.	This is an impact level indicator which is determined through surveys periodically conducted by the USAID. Even though the project does not necessarily have to be responsible for reporting progress on this indicator, the project will do well to track it with the mission as and when information becomes available.
2	Per capita expenditures (as a proxy for income) of USG targeted beneficiaries.	No per capita expenditures of rural households to benefit from the interventions of the project were measured in this reporting period. Such measurements will be made after the identification of such households in the project focal areas in course of the 2nd year of the project.
3	Quantity and/or size of fish landed by selected canoe fishermen in Central and Western Region of Ghana.	To assess the health of marine and coastal fish stocks in Ghana's waters, it is important to monitor the quantities and sizes of commercially important fish species that are landed. To achieve this, students' research projects have been designed in ways for them to work directly with selected canoe fishermen in the Central and Western Region to measure the quantities and sizes of their catches. Baseline data is yet to be collected against which future measurements will be compared to determine changes in the fisheries.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
4	Number of hectares of biological significance and/or natural resources under improved natural resource management as a result of USG assistance	The project has identified and selected 8 communities in the Central and Western Regions of Ghana and has established good will with all stakeholders with respect to fisheries and coastal management in those communities. The project intends to designate critical areas of natural resource management concern in those communities as well as other coastal areas and put them under improved management. Such project activities will take place in the second year of the project.
5	Number of hectares in areas of biological significance and/or natural resource showing improved biophysical conditions as a result of USG assistance	Same as above such critical areas of biological significance will be identified and put under improved management during the actual implementation phase of the project beginning the second year.
6	Number of person hours of training in natural resources management and/or biodiversity conservation supported by USG assistance	No such trainings took place in the 4th Quarter of the first year of the project. Number of person hours of training in natural resources management and/or biodiversity conservation will be reported as and when these trainings take place in the implementation phase of the project.
7	Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	No such trainings took place in the 4th Quarter of the first year of the project. Number of people who will participate in training in natural resources management and/or biodiversity conservation will be reported as and when these trainings take place in the implementation phase of the project.
8	Score, in percent, of combined key areas of organization capacity amongst USG direct and indirect local implementing partners	The organizational capacities of direct and indirect local implementing partners of the project are yet to be determined with assistance from AfricaLead.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
9	Percentage of graduates from USG-supported tertiary education programs reporting themselves as employed by DFAS and other tertiary institutions	The project is only one year old and has therefore not churned out graduates who have been gainfully employed after their studies at the University as a result of the support they received from the project. However, the project will do well to establish contacts with DFAS graduates and monitor their progress as far as employment is concerned.
10	Number of tertiary institution faculty or teaching staff whose qualifications are strengthened through USG-supported tertiary education programs	So far into the project, 3 Academic staff members of DFAS have had the opportunity to strengthen their capacities by participating in a short training course in Climate Change Adaptation and Mitigation at the Coastal Resources Centre at URI in the US and 3 others also had the opportunity to participate in a short training course on Leadership for Fisheries Management which was organized by the sister project Sustainable Fisheries Management Project in Ghana. These training programs took place in the 4th Quarter of the project. Capacities rather than qualifications were strengthened in the process
11	Number of farmers and others who have applied new technologies or management practices as a result of USG assistance.	The project will establish a constituency of fishers and other coastal resource users in the Central and Western Regions of Ghana and will work with them to apply new technologies and adopt good management practices with regard to coastal resources use during the implementation phase of the project in the second year.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
12	Number of training and capacity building activities conducted with USG assistance	During Quarter 4 of FY 2015, the project conducted one training course on Climate Change Adaptation and Mitigation in Coastal Areas. It was a 5-day intensive course for specialists working on coastal economies, environments and population/health. The training course was specially designed for economic/physical planners and disaster management officials at the District and Regional levels in the Central and Western Regions of Ghana to equip them to understand the causes and effects of climate change in coastal communities. 27 participants, 26 males and 1 female, took part in the training. 3 members of academic staff of DFAS, all males, also participated in a 2-week capacity building program in Climate Change Adaptation in Coastal Communities at the Coastal Resources Centre of URI in the US. Their training will enhance curriculum development at DFAS.
13	Number of individuals who have received USG supported long-term agricultural sector productivity or food security training.	7 final year undergraduate students received field research grants to conduct research for their BSc dissertations and graduated during this reporting period. There are currently 54 undergraduate students, 14 Masters and 7 PhD students who are receiving various forms of support from the project.
14	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training.	In total, 30 (29 males and 1 female) individuals received short- term agricultural sector productivity or food security training on climate change during this reporting period.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
15	Number of beneficiaries receiving improved infrastructure services due to USG assistance	As at the end of the 3rd Quarter, 12 people (1 Professor, 1 Lecturer, 8 Research Assistants, Project Management Support and Project Monitoring and Evaluation Support Personnel) had received improved infrastructure by way of refurbished offices, furniture and other office equipment. Additional offices were refurbished for 4 other people (3 Administrative staff and Head of DFAS) in this reporting period. Altogether, there are a total of 75 students in DFAS who are also benefitting from the use of the refurbished library, the fisheries and coastal management research laboratory and the premises of the Centre for Coastal Management.
16	Number of vehicles bought with USG assistance.	The project is scheduled to acquire 3 vehicles in all; 1 4X4 cross-country, 1 4X4 pick-up and 1 bus. As at the end of the 3rd Quarter, only the 4X4 cross-country had been acquired. Information reaching the project indicates that the 4X4 pick-up which was purchased from the US has now been shipped to arrive in Ghana in the next Quarter. The bus is now at the Ghana Customs bonded warehouse in Accra awaiting the necessary documentation for clearing and subsequent release to the project.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
17	Number of public-private partnerships formed as a result of FTF assistance.	The project has so far signed MoUs with the University of Rhode Island in the US, Florida Gulf Coast University in the US and the Environmental Justice Foundation. There were no additional MOUs signed in this reporting period. Even though formal MOUs have not been signed many organizations, the project actively collaborates with relevant organizations like the Fisheries Commission and other USAID projects particularly in the Western.
18	Number of new research collaborations established between USG-supported beneficiaries and other institutions	The project is already engaged in research collaborations with the Sustainable Fisheries Management Project in particular. A PhD student of DFAS who is currently a member of staff of the Fisheries Commission intends to use his work aquaculture at the Fisheries Commission for research for his thesis. This also presents an opportunity for research collaborations between the project and the Fisheries Commission. More research collaborations will also be established with other institutions that will be part of the development of marine and coastal fisheries database.
19	Number of scientific studies published or conference presentations given as a result of USG assistance for research programs	No scientific studies were published nor conference presentations given during the 4th Quarter of the first year of the project.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
20	Number of private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) that applied new technologies or management practices as a result of USG assistance.	Such organizations were identified for strengthening and support during the 4th Quarter of the first year but actual interventions will be rolled out in the second year of the project.
21	Number of hectares under improved technologies or management practices as a result of USG assistance	Areas to be put under improved technologies or management practices will be determined together with relevant stakeholders in the second year.
22	Number of dialogues and stakeholder consultations held on fisheries and coastal management	8 community and 4 regional fisheries and coastal management policy and research dialogues and several stakeholder consultations on fisheries and coastal management were held during this reporting period.
23	Number of assessments conducted as a result of USG assistance.	No critical assessments were conducted during this reporting period. Fish stock assessments and assessments of critical coastal habitats in the Central and Western Regions are scheduled to take place in the second year of the project.
24	Number of food security private enterprises (for profit), producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) receiving USG assistance.	Such organizations were identified in the 4th Quarter. Different modes of assistance will be determined and rolled out beginning the second year of the project.

Indicator No.	Title of Indicators	Results and Narratives as at end of Quarter 4, FY 2015
25	Number of rural households benefiting directly from USG interventions.	Such households were identified through the assessment of community organizations during the 4th Quarter. Different programs will be rolled out in the second year of the project where rural households will be counted.
26	Number of vulnerable households benefiting directly from USG interventions	Such households were identified through the assessment of community organizations during the 4th Quarter. Different programs will be rolled out in the second year of the project where vulnerable households will be counted.
27	Number of members of producer organizations and community based organizations receiving USG assistance.	Such organizations were identified through the assessment of community organizations during the 4th Quarter. Different programs will be rolled out in the second year of the project where the number of members receiving assistance will be counted.
28	Number of CSOs and government agencies strengthened	9 organizations (NADMO, PDC, Hen Mpoano, Forestry Commission, EPA, KNUST, Town and Country Planning, MoFA, Environmental Justice Foundation) and 8 District Assemblies were strengthened through the Climate Change Adaptation and Mitigation short course the was organized by the project in the 4th Quarter.

3.0 WORK PLANNING WORKSHOP

With direct financing from USAID, AfricaLead[4] provided technical assistance and facilitation services to DFAS in support of the first year work planning process consistent with USAID requirements. Africa Lead is USAID's primary capacity building program in sub Saharan Africa (http://africaleadftf.org.s79942.gridserver.com/about-us/). The program works to help realize Feed the Future (FTF) and the African Union's Comprehensive Africa Agriculture Development Program (CAADP) goals of reduced hunger and poverty by building the capacity of champions, institutions and stakeholders to develop, lead and manage the structures needed for African-led agriculture transformation.

The workshop which took place in UCC from 10-12 November, 2014 was facilitated by Ms. Carla Denizard, Regional Director of AfricaLead and Dr. John Azu, an Institutional Development Specialist.

Work planning workshop at DFAS facilitated by USAID AfricaLead Program

Key Outcomes and Deliverables of the workshop include:

- UCC/DFAS staff familiarised themselves with USAID project mechanisms, including a review of relevant activity and organizational documents (program description, log frame etc.).
- Strategic issues of the project were highlighted for incorporation in the first year activity;
- Guidance on how the project may achieve its outputs were outlined in work sessions;
- Activity planning, programs coordination, environmental compliance and knowledge management were discussed.

Key Outcomes and Deliverables of the workshop:

- Enhanced institutional capacity and alignment for work plan development as per USAID Grantee Requirements- PIL
- A framework including schedules developed to help DFAS prepare subsequent year plans
- Prioritized first year activities
- Team staff roles and responsibilities outlined (lead and support)
- Programmatic and associated budget discussed for the entire activity life cycle
- Collaboration and alliances outlined
- Revised log frame and project targets set

The final work plan was submitted to the USAID on the 31December, 2014 for consideration and approval.

4.0 POST AWARD CONFERENCE

The primary objective of the two-day conference which took place from the 1-2 December, 2014 at the School of Biological Sciences and the School of Agriculture respectively, was to provide orientation to UCC/DFAS Project Staff on the project and provide information on the USAID Feed the Future project as a whole including in-depth guidelines on the programmatic, financial management and reporting components of the project. The need for a revised log frame and the rationale for meeting USAID gender, monitoring and evaluation as well as environmental compliance targets were emphasized. USAID was represented by

- Fenton Sands, Feed the Future Advisor
- Justice Odoi, Environmental Specialist
- Remy Puoru, Financial Analyst
- Abigail Awadey-Dunyo, Financial Analyst
- Abdulai Mahama, Gender Specialist

Academic and Administrative Staff of UCC in attendance:

- Department of Fisheries and Aquatic Sciences
- School of Biological Sciences
- College of Agriculture and Natural Sciences (College Accountant)
- Directorate of Finance
- Directorate of Internal Audit
- Directorate of Research, Innovation and Consultancy (DRIC)

Key Outcomes and Deliverables of the conference included:

- USAID's financial mechanisms and reporting requirements outlined
- Gender considerations discussed
- Environmental monitoring and mitigation requirements provided
- Monitoring and evaluation requirements including Feed the Future indicators discussed.

5.0 PROJECT MANAGEMENT BOARD AND OTHER PROGRAMMATIC ASPECTS

The Department of Fisheries and Aquatic Sciences is in the forefront of implementation of the project activities and overseen by a Project Management Board (PMB) established by the Vice-Chancellor (VC). The PMB is advisory but has fiduciary responsibility and include a Program Manager who is responsible for overall project implementation.

The PMB has the responsibility of approving project work plans and budget, and monitor activities on regular basis. The membership of the board is drawn from within the university and a proposed USAID representation (see Program Description). As part of its mandate, the Board held two meetings within the year under review at Pempamsie hotel in Cape Coast.

The primary objective of the meetings was to enable the Project Management Team to appraise the Board on activities of the project and progress made. It was also used as a platform to select collaborators to support project activities in the following areas:

- Environmental Monitoring and Mitigation Plan (EMMP)
- Gender Mainstreaming & Action Plan and Performance Monitoring Plan (M&E)
- Policy and Research Dialogues
- Climate Change Adaptation and other
- Project Management and Procurement issues

Other broad-based management activities the project participated in during the year under review included:

- Feed the Future Partners Meetings
- Meeting of the Board of the Centre for Coastal Management
- Departmental Meetings on the Project

Project Management Board (PMB) meeting at Pempamsie Hotel, Cape Coast

Feed the Future Partners meeting at Alisa Hotel, Accra

Departmental meetings at the CCM Library, University of Cape Coast

6.0 STAFF RECRUITMENT

The project is led by a core staff appointed by the Vice-Chancellor of the University of Cape Coast with a Project Manager in the person of Dr. Denis Worlanyo Aheto. The project also has a Monitoring and Evaluation Coordinator appointed in the person of Dr. Noble Asare of DFAS. Prof. John Blay was appointed as the first Coordinator of the Centre for Coastal Management (CCM) during the period under review. Additional staff were engaged into the Project Team namely Ms. Essinam Attipoe and Mr. Godfred Ameyaw Asiedu to provide Programme Management and Monitoring & Evaluation support as well as other administrative backstopping for project activities.

Project Support Staff – Ms. Esinam Attipoe (Extreme left) and Mr. Godfred Ameyaw (Extreme right)

Ms. Esinam Attipoe (as the Project Management and Technical Support) holds a BSc in Natural Resources Management from the Kwame Nkrumah University of Science and Technology and a MSc. in Environmental Governance from the Albert-Ludwig Universität, in Freiburg, Germany. She has five years of progressively relevant experience. She was Project Coordinator at the Hanns Seidel Foundation where she supervised the implementation of an environmental project between the Foundation and the Institute for Environment and Sanitation Studies, University of Ghana, Legon. She worked as a Community Liaison Officer at Vegpro Ghana Limited.

Mr. Godfred Ameyaw Asiedu (as the Project Monitoring and Evaluation Support) holds an MSc degree in Aquatic Ecology from the Centre for Tropical Marine Ecology, University of Bremen, Germany and a BSc degree in Zoology (fisheries major) from the University of Ghana, Legon. He has five years of experience in his field of expertise. Godfred has worked in various capacities as a Coastal Fisheries Advisor and Research, Monitoring and Evaluation Specialist with WorldFish and the Coastal Resources Centre respectively in Ghana on the Integrated Coastal and Fisheries Governance Project implemented by the Coastal Resources Centre of the University of Rhode Island, USA and supported by the United States Agency for International Development (USAID), Fisheries Research Officer with the Ministry of Fisheries and Aquaculture Development.

Engagement of Research Assistants:

During the period under review, six research assistants were appointed to the project by the university. Only short-listed applicants were screened through interviews for this engagement. Other key requirements for their appointment were as follows:

- All candidates possess at least a BSc. Degree in the relevant areas of the Department.

- Must have completed their national service
- Must have two letters of recommendation
- A letter of motivation

Also additional qualifications e.g. master's degree (MPhil category) or considerable working experience was considered as an advantage in the selection process. All the Research Assistants appointed have requisite backgrounds in fisheries science, aquaculture, wetland science, natural resource management drawn from across universities in Ghana.

While two of the Research Assistants i.e. Elizabeth Effah and ShielaFynn-Korsah are directly employed under the USAID Sustainable Fisheries Management Project (SFMP), DFAS/UCC is providing working/office and laboratory space for their work and playing a role in supervision. Generally, an appointment to a research assistantship position comes with a short-term contractual agreement spanning an initial period of two (2) years renewable yearly for up to five years subject to satisfactory work, conduct and availability of funds. They were primarily appointed to support field and laboratory research work and other related activities of the Department to take root in the second year of the project.

Orientation was organized for the Research Assistants at the School of Biological Sciences on 19th February, 2015. Dr. Denis Aheto, Project Manager and Mr. Isaac Nyieku (Division of Human Resource, UCC) were the main resource persons.

Orientation for the six (6) Research Assistants (RAs) employed under the Project. The RAs were selected based on competitive interviews and were drawn from University of Ghana, Kwame Nkrumah University of Science and Technology and the University of Cape Coast.

Some of the Research Assistants of the USAID/UCC Fisheries and Coastal Management Project

Participants were introduced to key Project documents and objectives. Other topics treated include work ethics and behaviour, social security contributions and general human resource issues.Also in attendance were Prof. John Blay, CCM Coordinator and Dr. Noble Asare, Projects M&E Coordinator. List of Names of successful candidates and qualifications:

- Evans Arizi – M.Phil. (Aquaculture), Department of Fisheries and Aquatic Sciences, University of Cape Coast
- Mr. Fredrick Ekow Jonah – M.Phil. (Aquatic Resources Mgt.), Department of Fisheries and Watershed Management, Kwame Nkrumah University of Science and Technology
- Mr. Richard Takyi -– M.Phil. (Fisheries Science), Department of Marine and Fisheries Sciences, University of Ghana
- Ms. Lesley Ntim– M.Phil. (Fisheries Science), Department of Marine and Fisheries Sciences, University of Ghana
- Mr. Ernest Obeng Chuku – B.Sc. (Fisheries and Aquatic Sciences), Department of Fisheries and Aquatic Sciences, University of Cape Coast.
- Mr. Richard Adade – B.Ed. (Social Sciences), Department of Arts and Social Sciences Education, University of Cape Coast.

USAID/SFMP Financed Research Assistants:

- Ms. Elizabeth Effah – M.Phil. Integrated Coastal Zone Mgt. (Thesis submitted for review), Department of Fisheries and Aquatic Sciences, University of Cape Coast
- Ms. Shiela Fynn-Korsah – M.Phil. Fisheries Science (Thesis submitted for review), Department of Fisheries and Aquatic Sciences, University of Cape Coast.

The interview panel was constituted by staff from the Department of Fisheries and Aquatic Sciences (DFAS), School of Biological Sciences and the Directorate of Human Resource. The composition of the interview panel is as attached.

7.0 PROGRAM MANAGEMENT TOOLS

7.1 Environmental Monitoring and Mitigation Plan (EMMP)

This Environmental Mitigation and Monitoring Plan (EMMP) will serve as reference guide for project staff under the Fisheries and Coastal Management Capacity Building Support Project. It determines the characteristics of tasks/activities implemented under the project and for managing their impacts. It simplifies the environmental due diligence process for the set of activities to be implemented, and will reduce the amount of paperwork and time involved in the process. The environmental management activities will be incorporated in Annual Work Plans and Performance Monitoring Plan. The EMMP will be updated annually in consultation with the USAID program manager. Future updates of the EMMP will be conducted concurrently with the Annual Work Plan and M&E plan. In relation to potential environmental impacts & recommended determinations, initial environmental examination of the project comes under the approved USAID-Ghana Feed the Future and the Development Objective 2 IEEs. Many of the activities under the project do not have direct

adverse environmental impacts, as they entail information, education, communication, training, research, community mobilization, planning, management, and outreach activities.

A **Categorical Exclusion** is therefore recommended for the implementation of such activities; that have no physical interventions and no direct effects on the environment. All are excluded per the following citations from Title 22 of the Code of Federal Regulations 216 (22 CFR 216), subparagraph 2(c) (2):

i. Activities involving education, training, technical assistance or training programs except to the extent such programs include activities directly affecting the environment (such as construction of facilities, etc.);
ii. Activities involving controlled experimentation exclusively for the purpose of research and field evaluation and carefully monitored;
iii. Activities involving analyses, studies, academic or research workshops and meetings;
iv. Activities involving document and information transfers;
v. Studies, projects or programs intended to develop the capability of recipient countries and organizations to engage in development planning.

However, if any topic associated with these activities is one that inherently affects the environment, then such training will include information on how to minimize and/or mitigate these impacts. An environmental screening process will be used as apt to confirm a Categorical Exclusion determination in the case of community and outreach activities.

Certain interventions under the project which will directly or indirectly impact the biophysical environment, and/or human health, or have the potential to do so are generally recommended for **Negative Determination with conditions** as per the approved Regulation 216 environmental documentation.

7.2 Project Management, Monitoring and Evaluation

The agreement clearly indicates that the Recipient will submit a separate monitoring and evaluation plan to the USAID Activity Manager within the first 60 days of an award (generally at the same time as an approved work plan) and before major activity implementation actions begin. Unfortunately this could not be achieved under the constraints at the time. Approval was therefore sought to have this activity submitted to USAID for review as part of second quarter report. Generally, the Monitoring and Evaluation (M&E) plan will support reporting on outcomes and impacts of the Recipient. The main objective of the M&E plan is to track progress during activity implementation, explain why certain trends occur, track constraints, and opportunities, and track roles of different stakeholders in the implementation, including the capacity to undertake their roles. Indeed, Monitoring and Evaluation (M&E) is a critical element of the overall management of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project (the "Project"). Recognized as such, the Project considers M&E as an important component of its program performance management.

In this reporting period, there was therefore the urgent need for the establishment of an M&E system that will ensure that good project data and information is generated, stored, used and communicated to USAID, project beneficiaries and fisheries and coastal management stakeholders like the Ministry of Fisheries and Aquaculture Development for

fisheries and coastal management policy decision making. As required by the USAID as a deliverable for the Project, The Department of Fisheries and Aquatic Sciences (DFAS) developed an M&E System and built the capacity of the Project Management Team in the handling and interpretation of the System with the support of services received from an M&E expert. DFAS therefore engaged the service of a consultant through a competitive bidding process.

The overall objective of the consultancy was to help establish an operational M&E plan and systems for the project with a specific purpose to provide the Project coordination with tools to effectively monitor project progress and achievement. The consultant was expected to lead the development of a project level M&E plan and to train selected DFAS and project staff in M&E techniques and skills to ensure that long-term capacity is established in the department to monitor activities. An initial M&E workshop involving the M&E consultant and project staff was held to share more knowledge on the project to facilitate the development of the M&E system. During this workshop, the Project's Results Framework was fine-tuned to reflect contributions to USAID/Ghana's Development/Strategic Objectives as well as contributions to Government of Ghana's Development framework (Figure 12). The M&E system is designed to involve all academic staff of DFAS, Centre for Coastal Management staff, Core Management Team, Project Research Assistants and other technical team members and relevant partners including government agencies involved in fisheries and coastal management in Ghana.

7.3 Performance Monitoring Plan (PMP)

After the initial workshop, a Performance Monitoring Plan (PMP) was developed in the form of a project document by the consultant and officially submitted to the Project through the Project Manager. The PMP features a basic design of a performance monitoring and evaluation system that will be used to monitor performance, progress, to evaluate project results and to deliver timely and accurate results to USAID. The PMP was prepared in accordance with all project documents taken into account specific activities and timelines as indicated in the original project document and with emphasis on gender mainstreaming issues. Over 30 USAID indicators and a few customized indicators were unanimously selected by the M&E consultant, DFAS and project staff to monitor and track project activities and performance and documented in the PMP not forgetting baselines and targets, data storage, management and reporting.

7.4 Monitoring and Evaluation Database

As part of the development of the M&E system, the M&E consultant was required to establish a data collection system and reporting procedures and to develop a database that will provide quick summary information on the project indicators. An online M&E database has been developed to capture and store all relevant project data and information that have been collected, are being collected and those that will be collected during the life span of the project. This is a restricted database system that permits only those with access to use it. The system is also designed in a way that provides full or partial access to its users. Currently, it is only the Project Manager, the M&E Coordinator and the Project M&E Support who have access to the database but other members of staff may be given access to the database as and when necessary.

The Project's Core Management Team have been given training on how to access and use the database which is currently being populated with project data and information which will also be available to be accessed by USAID Officials. In addition to the online database, a filing system has also been set up to cater for hard copies of all project documents.

7.5 Project M&E Meeting Sessions

Frequent meetings involving Project's Core Management team and academic staff of DFAS and chaired by the Project Manager were held during the second quarter to outline bi-weekly bulletins, discuss progress made on activities as described in the Year One workplan, what is going well, what is not going well and how these could be improved. In such meetings, challenges encountered with the implementation of project activities as well as opportunities were identified, discussed and addressed. These meetings also served as avenues for project activity team members to brief others on progress made as far as their activities are concerned and the resources needed to carry out further work.

7.6 Gender Integration and Action Plan

DFAS carried out a gender audit in accordance with Section G2 of the Agreement. The overall objective of the assignment was to ensure gender issues are mainstreamed in the implementation of the Fisheries and Coastal Management Capacity Building Support Project. The scope of work included identifying the gender-based constraints to equitable participation and access of men and women to programs and services, analysing strengths and opportunities for integrating gender into project activities and developing proposed guidelines for gender mainstreaming. The methodology combined techniques ranging from desk study, questionnaire administration, interviews and focus group discussions.
A day's meeting was also organised on 27th March, 2015 to validate the findings and to develop the gender mainstreaming action plan (Figure 13).SWOT analysis done with staff of the Department showed that although there was some level of gender awareness among staff and there existed good collaboration with UCC's Centre for Gender Research, Advocacy & Documentation (CEGRAD), the current strategic plan of the Department was gender blind. A key opportunity identified was to use the scholarship package as part of the USAID project as entry point to increasing gender parity ratios within the Department. The gender audit report has made recommendations in **four key areas** and summarized as follows:

a) Institutional Arrangement and Development:

The audit looked at six core areas as follows:

i. Human Resource Development and management
ii. Mainstreaming Gender in the curriculum
iii. Department and Support Programmes
iv. Student access and retention
v. Gender Violence and Sexual Harassment and
vi. Resource Mobilisation for Gender Equality.

The audit realized that most of the institutional arrangement policies and processes were gender insensitive and did not specifically address the different needs of men and women.
Other recommendations include the development of an affirmative action policy to ensure gender parity in teaching, research, administration and program implementation. It also proposes the review of the current strategic plan to make it more responsive to gender and inequalities challenges.

b) Program Development

The audit specifically reviewed the project proposal and project documents such as the logframe. This review focused on project design strategies as well as individual project outputs. The audit revealed that the stated project outputs did not fully address gender and inequality issues. This had the tendency to derail the entire project through a gender lens as there did not seem to be clarity in how women and marginalized groups were to be directly targeted, monitored and report upon.

Recommendations include a review of key project documents and ensure that future annual work plans take into consideration gender mainstreaming right from the initial stages. This includes the wording of actual project objectives, baseline methodologies and the performance measurement framework.

c) Project Performance Measurement, Monitoring and Evaluation

The PMF was reviewed looking at its monitoring indicators and proposed outcomes. It was noted that the PMF provides for sex disaggregated data as well as the space to conduct gender analyses of outcomes and outputs. However, the PMF needs to go further and show how this data and analyses will be used to influence decision making on the project specifically and in the area of Capacity Building generally.
It was recommended that the PMF should be used as a management tool and not only to collect data.

d) Gender analyses of implementing agencies

The audit revealed that the constitution of both the Project Management Board and the Project Implementing Team was male dominated. This may therefore affect the inclusion of gendered realities in project implementation. It was recommended that members of the implementing agencies require training on specific gender issues to ensure a genderised project. Also, the selection of a gender focal person and the development of a Gender Working Group as a sub group of the Implementing agencies will ensure that gender will continue to be on the agenda during activity design, implementation and monitoring.

8.0 YEAR ONE PRIORITY ACTIVTIES

ACTIVITY 1.1.1: RENOVATING AND EQUIPPING THE FISHERIES AND COASTAL RESEARCH LABORATORY

As part of the first year work plan activities, the existing laboratory for the Department of Fisheries and Aquatic Sciences (DFAS) was to be rehabilitated and refitted to receive equipment to facilitate educational, training and research activities. One of the key achievements within the year was the completion of renovation the works at the Fisheries and Coastal Laboratory, a key thrust for the training of students and promotion of research within DFAS. The specific activity involved purchasing, refitting and installations of state-of-the art facilities in order to provide a functional laboratory space that allow for the required scientific equipment to be fitted. Against this background, contracts were awarded by the university (Vice-Chancellor) in December 2014 to two refurbishment companies namely Melgrep Company Ltd. and Novobuild Company Ltd to initiate work on the laboratory and offices respectively. The selection utilized UCC procurement systems following national tendering procedures and standards.

By the end of the first year, the following outcomes were realized:

- Laboratory was designed and refurbished
- Procurement for relevant laboratory equipment initiated
- Functional laboratory is put in place developed
- Laboratory was commissioned by United States Agency for International Development and the Ministry of Fisheries and Aquaculture Development

Former and current state of the Fisheries and Coastal Research Laboratory at DFAS respectively

The award of contract and installation of a 60/66 KVA generator set was also completed within the year under review. However the extension of power to offices of academic staff and the DFAS general office is to be finalized due to technical problems emanating from the UCC development office and other procurement bottlenecks.

Opening of the Fisheries and Coastal Research Laboratory (From right to left: Hon. Minister of Fisheries and Aquaculture Development Ms. Sherry Ayittey, Omanhene of Cape Coast Traditional Area, Osabarima Kwasi Atta II, Former Director of Economic Growth Office, Mr. Peter Trenchard, Project Manager, Dr. Denis Aheto, Pro-Vice-Chancellor of UCC, Prof. Johnson Buah, Provost, College of Agriculture and Natural Sciences, Prof. Samuel Yeboah-Mensah & Chairman of project Management Board, Prof. Isaac Galyuon

Procurement processes for the acquisition of field and laboratory equipment (as well as chemicals) was finalised in the first year. This activity generally delayed due to challenges in getting a prospective supplier from oversees, sorting out clearance cost at the port and getting approval for sole sourcing (due to difficulties in getting a local supplier) from the Public Procurement Authority (PPA). An overseas supplier was eventually identified, quotations were received and the final approval from the Ghana Public Procurement Authority (PPA) for the award of contract was received. An official clearing agent of UCC was appointed in anticipation of the clearing of the goods by close of the year.

Fisheries and Coastal Research Laboratory and its Commissioning by Hon. Sherry Ayittey Minister for Fisheries and Aquaculture Development

The Minister for Fisheries and Aquaculture Development Hon. Sherry Ayittey commissioned the laboratory. Present at the ceremony were key dignitaries from USAID led by the Director of the Economic Growth Office of USAID/Ghana Mr. Peter Trenchard and the Omanhene of Cape Coast, Osabarima Kwasi Atta II, the Pro-Vice Chancellor and Registrar of the University in the persons of Prof. Nelson Buah and Registrar Mr. Kofi respectively.

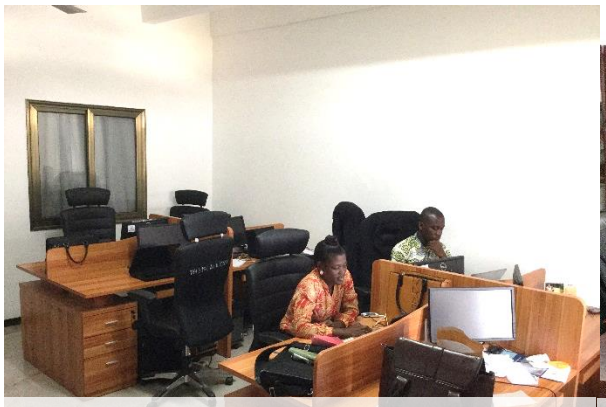
The commissioning ceremony was the highlight of the national launch of the project which took place on the 9th June, 2015. In his speech delivered five-minute open remarks at the

launch focused on the commitment and support of the U.S. Government to food security, especially fisheries, in Ghana. The Minister of Fisheries and Aquaculture Development, Hon. Sherry Ayittey, presented the keynote address on government's commitment to the fisheries sector and collaborations with USAID to improve the sector. Seven media houses (print, electronic) with nationwide impact were in attendance: GTV, TV3, UTV, Ghana News Agency, Daily Graphic, Radio Central and ATL FM were in attendance.

ACTIVITY 1.1.2: REFURBISHING AND EQUIPPING OFFICES OF ACADEMIC STAFF

During the period under review, refurbishment works involving the new CCM office space, Dept/CCM library complex and research assistants' office space was completed. In addition, DFAS took delivery of 37 desktop and 8 laptop computers (March 2015), relevant software for running project (Minitab and Statistica Softwares) have been received and installed. Additionally, furniture, curtains and fixtures for the three listed places renovated were procured and fixed.

Vice-Chancellor Prof. D.D. Kuupole (2nd from right) and Mr. Dadzie, Director of the Directorate of Physical Planning and Estate Management (extreme right) interacting with Project Management Team during renovation of CCM Library Space at DFAS



Office space for Research Assistants

Refurbished DFAS/CCM Library

Old storage area for laboratory chemicals

Refurbished storage for laboratory chemicals

All computers were delivered as expected. Delivery for all furniture for places currently under refurbishment was made one month ahead of time (in March 2015). The renovation of the General office and the Office of the Head of Department was also completed with this period.

Old Office of the Head of Department, DFAS

Refurbished Office of the Head of Department, DFAS

Refurbished DFAS General Office

This activity also involved refurbishing CCM office space and lecture room for postgraduate students located within FELT building and the CCM library. These facilities have been adequately upgraded to be able to facilitate educational, training and research activities.

The following are outputs to date:

- Office spaces, lecture and computer room furnished
- Library refitted

- Computers and accessories procured
- Procurement of softwares received and installed

ACTIVITY 1.1.3: ACQUISITION OF VEHICLES TO SUPPORT EDUCATIONAL, TRAINING, RESEARCH AND EXTENSION ACTIVITIES

During the period under review, three vehicles (4x4 pick-up, 30-seater bus, 4x4 cross-country) were expected by the end of April 2015. DFAS could only take delivery of only one (1), i.e. a 4x4 cross-country vehicle - Registration No. GT 7035 15- in March 2015 (Figure 18). Orders for the other two vehicles have been placed with suppliers but there have been delays due to procurement challenges.

4x4 cross-country vehicle - Registration No. GT 7035

The 30-seater bus is now expected within a month (awaiting a form T26 to be completed) whilst the 4x4 pick-up is expected at the end of the year (since it will be shipped from the USA).

Presently, exemption from customs duty for clearance of the bus and pick-up truck is presently being sought from government by the university.

ACTIVITY 1.2.1: ACADEMIC AND TECHNICAL STAFF CAPACITY STRENGTHENING

This activity is envisaged to be achieved through a series of collaborative actions between CRC/URI and DFAS/CCM to enable the latter in the long-term develop and be a position to provide quality and relevant educational programmes, research and technical advisory services that will support the management of fisheries and coastal resources on a sustainable basis for national development over five years (Oct. 2014-Sept. 2019). At a meeting in Accra on 17-18th November, 2014, consultative discussions were held between UCC/DFAS on one hand and CRC/URI on the other hand. As part of initial work planning for the first year partnership activities, the following Terms of Reference were outlined on mutually agreed terms:

I. CRC will support the training of students in critical areas needed for capacity strengthening in DFAS e.g. Coastal fisheries governance, maritime policy, etc.
    - Two (2) PhDs (five-year training in the US with field work to be undertaken in Ghana or facilitated through a split-site arrangement between DFAS/UCC and CRC/URI). Feasibility of this arrangement would be explored during a visit to URI by faculty of DFAS/UCC in January 2015.
    - 3-4 M. Phil. graduates exclusively in the US depending on availability of funds.

II. Set up of a GIS hub in the Central Region – modalities may include supporting CCM's proposed GIS unit with the following:
    - Opportunities for data sharing
    - Strengthening CCM with additional equipment e.g. servers, computers to support capacity building and extension services in GIS/ Remote sensing. The unit could be a source of income generation beyond the life time of the project
    - CRC provide support for the hiring one (1) GIS Research Assistant.

III. Fisheries baseline studies in the Pra and Ankobra estuaries
    - UCC will provide students or research assistants to conduct research over a period of one year including 8-month data collection
    - DFAS/UCC will provide two students/ research assistants to undertake the studies over a twelve (12) month period.
    - Provision of equipment to support fisheries research work e.g. microscopes, facilities for otolith studies, etc.

IV. Staff exchange program between URI/UCC
    - DFAS/UCC team to visit CRC/URI to initiate and advance partnership between the two institutions. The visit will also allow for discussions on administrative issues (MoUs, roles of departments, etc.) and gain insights into coastal management centres and programs in URI.
    - Since the institutional focus of UCC's intervention is on DFAS and CCM, we propose that SFMP/URI support the Project Manager and CCM Coordinator to undertake a visit to URI in December 2014.
    - SFMP/URI to support CCM with a coastal management specialist within the first year of the project with terms of reference as follows:
        - Support the review CCM's strategic plan
        - Assist with the planning of the Centre's outreach activities
        - Support the development of a business plan for the Centre and suggest approaches for attracting and coordinating grants
        - Propose and facilitate the establishment of collaboration with other Centres and institutions in the US

V. Joint hosting of Fisheries Leadership Short Course

- UCC hosted the SFMP/URI fisheries management course in July/Aug. 2015 for fisheries managers and other professionals from the Fisheries Commission and DFAS/CCM Staff.

Fisheries Leadership Course at University of Cape Coast, SFMP

VI. Fish stock assessment training:

Selected members of the DFAS mainly lecturers and postgraduate students[5] alike took part in a one-week intensive training program as participants/ trainees in fish stock assessment methods run and fully financed by the Sustainable Fisheries Management Project (SFMP). The main goal of the training was to strengthen the capacity of the Fisheries Commission and its partners in basic fish stock assessment techniques and prepare its professionals to take the next steps in stock assessment results and apply it to fisheries management.

Fish stock assessment synthesizes information on life history, fishery monitoring, and resource surveys, using mathematical models of population dynamics. Results from fish stock assessments are used to develop sound management measures. In terms of eligibility, the training is for individuals who are actively engaged in fisheries data collection, science and technology and fisheries management. Experience with statistics, fisheries sciences and computer programming is desired. The main goal of the training is to build capacity of professionals of the Fisheries Commission and other institutions in stock assessment and develop a strategy for professional development in advanced fish stock assessment in Ghana.

Fish stock assessment training run by the Sustainable Fisheries Management Project (SFMP)

Outcomes: The training program presented theoretical elements in fish population dynamics to guide participants in putting theory into practice in managing fisheries resources. The one-week program was under the tutelage of Mr. Najih Lazar, Senior Fisheries Advisor to the SFMP Project. The workshop provides instruction, demonstration,

[5] DFAS members included: Prof. John Blay, Dr. Joseph Aggrey-Fynn & Dr. Denis Aheto (Academic Staff) and Messrs. Isaac Okyere, Isaac Osei, Evans Arizi as well as Miss. Elizabeth Effah, and Miss. Shiela Fynn-Korsah

and exercises in fisheries stock assessment as applied to fishery resources. Working in teams, participants left the course with a wide range of assessment tools focused on data and information on small pelagic fisheries of Ghana.
It is expected that the practical exercises will feed information into fisheries management activities occurring as part of the Sustainable Fisheries Management Project and the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project. These activities are implemented with support of the USAID/Ghana. The training uses a range of methods including lectures, exercises, small group work, simulations and case studies to create a robust interactive and dynamic environment to learn new insights and skills in fish stock assessment. Specifically, at the end of the course, participants were able to:

- conduct single species assessment methods and understand data collection needs for different assessment methods
- familiarize with indicators and references points, both biological and economic, as tools in fisheries management, develop knowledge of fishery population and fishery processes by using simulation models to improve scientific advice for managers.

Dr. Joseph Aggrey-Fynn and Dr. Denis Aheto both academic staff of DFAS receiving Certificates at the Closing Ceremony of the Fish Stock Assessment Training funded by the USAID SFMP Project from Dr. Najih Lazar (Lead Trainer and Senior Fisheries Scientist of the USAID/ SFMP Project

VII. Visits by DFAS/UCC Officials to URI:

A visit from DFAS/University of Cape Coast specifically Dr. Denis Aheto, Head and Project Manager and Prof. John Blay, Coordinator, Centre for Coastal Management (CCM) to the University of Rhode Island (URI) from 3-9 January, 2014 was approved by USAID and University of Cape Coast. The invitation was at the instance of Dr. Brian Crawford, Chief of Party of the Sustainable Fisheries Management Project (SFMP) of the Coastal Resources Centre (CRC) at URI.

Specific details of implementation of some of these actions are captured under the next section since these activities seek to operationalize the Centre for Coastal Management.

From left CRC Director Dr. Anton Post, Dr. Denis Aheto of UCC, CRC's Chief of Party in Ghana Dr. Brian Crawford and Dr. John Blay at CRC earlier in January, 2015

Relative to this activity, three other DFAS senior members in the persons of Prof. Kobina Yankson, Dr. Noble Asare and Dr. Emmanuel Acheampong visited the Coastal Resources Centre (CRC) of University of Rhode Island (URI) from 7th to 18th September, 2015. DFAS used the opportunity of their visit to seek assistance in improving the content and delivery of its climate change adaptation services through three delivery mechanisms: undergraduate and graduate courses, professional workshops, and community extension activities. At the end of the visit at CRC/URI, the UCC faculty were able to produce course outlines (curriculum summaries) for two new courses to complement the already existing short course on climate change adaptation offered by DFAS/CCM to national level stakeholders. The focus was to develop the following:

- A 3 credit course –undergraduate level focused mainly on science with some management
- A 3 credit course – graduate level focused more on management issues and less on science.

Other activities during the visit covered:

- Study tours to other Rhode Island laboratories and institutions to learn new ways for researching and managing marine/coastal resources and systems. Institutions visited included the *National Oceanic and Atmospheric Administration (NOAA)* at Narragansett Bay, URI Marine Affairs Department, URI Graduate School of Oceanography, and URI Coastal Institute at Kingston.
- The team also presented a seminar to URI Marine Affairs Department on marine fisheries management, education and research in Ghana. The seminar was focused on the artisanal fishery and challenges in the sector. Graduate and undergraduate training programmes in fisheries and aquatic sciences at UCC were also presented. The thematic areas for research under the USAID/GHANA-UCC/DFAS fisheries and coastal management capacity building project were also presented. The overarching goal for these presentations was to highlight the opportunities for further research collaboration between UCC/DFAS and URI staff and students.

Prof. Kobina Yankson (extreme left) and Dr. Noble Asare (Extreme right) during the recent visit to CRC/URI with Course Trainer Mr. Glenn Ricci (right) and Dr. Don Robadue, SFMP Program Manager

Dr. Emmanuel Acheampong, DFAS/ CCM Academic Staff

- Brainstormed with selected URI faculty members on how to effectively manage marine/coastal fisheries and research data. The discussion was led by Mr. Christopher Damon of URI Coastal Institute. It was aimed at effective ways for designing a database to enhance research to support sustainable fisheries management which is one of the USAID/GHANA-UCC/DFAS project activities (see project output 2.1, activity 2.1.6).

ACTIVITY 1.2.2: OPERATIONALIZING THE CENTRE FOR COASTAL MANAGEMENT

The capacity of the University of Cape Coast to create knowledge across the country and build practical lessons for effective fisheries and coastal management practices will be substantially enhanced through the Centre for Coastal Management. This approach will also enhance the number of applications of improved science and extension in support of coastal and marine conservation and their sustainable use. The Centre for Coastal Management (CCM) was approved by the University's Division of Academic Affairs in December 2013. Presently the Centre is in a special relationship with the Department of Fisheries and Aquatic Sciences which is overseeing its operations[6].

[6]Letter from the Division of Academic Affairs, UCC dated 18 December 2013

Centre for Coastal Management housed within the Faculty of Education Lecture Theatre Complex, UCC

A major thrust of the work of the Centre within the first year was the hosting of a coastal management specialist in the person of Prof. Richard Burroughs of the Coastal Institute of the University of Rhode Island from May 9 – May 23, 2015. The purpose of his trip was to advance the objectives of the Fisheries and Coastal Management Capacity Building Support Project of the University of Cape Coast and the Sustainable Fisheries Management Project of the University of Rhode Island both concurrently supported by USAID. The specific terms of reference (TOR) for the visit to University of Cape Coast (UCC) are appended (see Appendix I) and the memorandum of understanding between UCC and the University of Rhode Island (URI) with the following as major outputs of his visit.

Indeed, part of the mandate of the coastal management specialist was to consider funding sources for the Centre to enable it expand on its operations beyond the scope of the USAID grant, identify other Centres in the US aside Coastal Resources Centre (CRC) and initiate discussions. Additionally, initiate the process for linking research conducted by the Centre for extension support for the civil society and engagement of government officials, support particularly promising students from UCC and mid-career professionals from the Fisheries Commission and provide graduate education at URI and deliver public lecture on Coastal Management.

<u>The following relate to key progress and recommendations made during the visit</u>:

(i) The Centre for Coastal Management Strategic Plan (TOR 1): The strategic plan discussed and initial round of comments provided (see Attachment C).
(ii) Business Plan and Attracting Grants (TOR 2, 3): A review of private foundations providing grants of over US $100,000 to Ghana was conducted and 26 organizations were identified. A logic behind establishing rate structures for sample analyses, social science data set collection, and mapping was provided
(iii) Collaboration with Centres in the US (TOR 4): UCC has memoranda of understanding (MOU) with Auburn, University of Delaware, and, in connection with this project, the University of Rhode Island (Attachment B).
(iv) Potential functions for the Centre that would serve these ends discussed. Expanded presentation of options for Centre provided in public talk.
(v) Research/Extension/Engagement (TOR 5): Sector-based management initiatives presented by topic area (ports, oil and gas, sanitation, and fisheries) and the role of

bridging organizations in connecting topical knowledge with individuals, civil society organizations, and government. For each of the topic areas the bridging organizations were identified to initiate further discussion about the role of the Centre at UCC. Students in the areas of stock assessment, coastal management, and sardinella biology have been selected and their files are being prepared for forwarding to URI.

(vi) USAID/ SFMP Student Scholarships (TOR 6): Memorandum of Understanding relative to student scholarships advanced. During the period, the PMB approved the nomination for an SFMP scholarship to pursue a 3-year PhD Degree in Fisheries Science at the Graduate School of Oceanography, URI. Mr. Evans Kwasi Arizi is a native of Jaway in the Jomoro District of the Western Region of Ghana. He attended Half-Assini Senior High School from 2001-2004. Subsequently, he gained admission into the University of Cape Coast where he obtained a Bachelor of Science Degree in Fisheries and Aquatic Sciences and a Master of Philosophy Degree in Aquaculture in 2009 and 2013, respectively. He did his national service at the Department of Fisheries and Aquatic Sciences (DFAS) as a Teaching Assistant and was subsequently employed in the Department as Principal Research Assistant. Evans has two scientific publications to his credit. Aside his key line of duty, Evans participates in academic and social debates and diligently contributes to ongoing research work in the Department. Evans has the ambition to become a Fisheries Scientist in Ghana. His grant is one among a series of capacity strengthening grants for DFAS/CCM to be drawn from the USAID/SFMP Project.

Dr. Emmanuel Acheampong (DFAS) welcoming guest to a lecture by Prof. Rick Burroughs of URI at the Academic Board Chamber, UCC

Prof. Samuel Yeboah-Mensah, Provost of the College of Agriculture and Natural Sciences (CANS)

Prof. Nelson Buah, Pro-Vice-Chancellor of UCC giving the welcome address at the lecture

Prof. John Blay, Coordinator of the Centre for Coastal Management introducing Prof. Rick Burroughs at the Lecture

Dr. Denis Aheto (left), Mr. Kofi Agbogah (middle) and Dr, Najih Lazar (Right), National Program Coordinator and Senior Fisheries Advisor of USAID SFMP Project respectively

In the same line of action, PMB approved the application of Miss. Ivy S. G. Akuoko to pursue an MA (Marine Policy). Ivy is also Ghanaian and from the Ashanti Region. She had her Senior High School Education in Kumasi Girls' Senior High School, Kumasi. In the year 2010, she gained admission to the University of Cape Coast (UCC) to pursue a Bachelor's degree in Biological Sciences and majored in Environmental Science. She holds certificates in Introduction to Environmental Law and Policy as well as Global Health from the University of North Carolina, USA and University of Copenhagen, Denmark respectively. Ivy is currently a Teaching Assistant at the Department of Environmental Science of the University of Cape Coast. Ivy has the ambition to become a university lecturer and an environmental advocate back home after her studies in the States.

<u>Recommendations:</u>

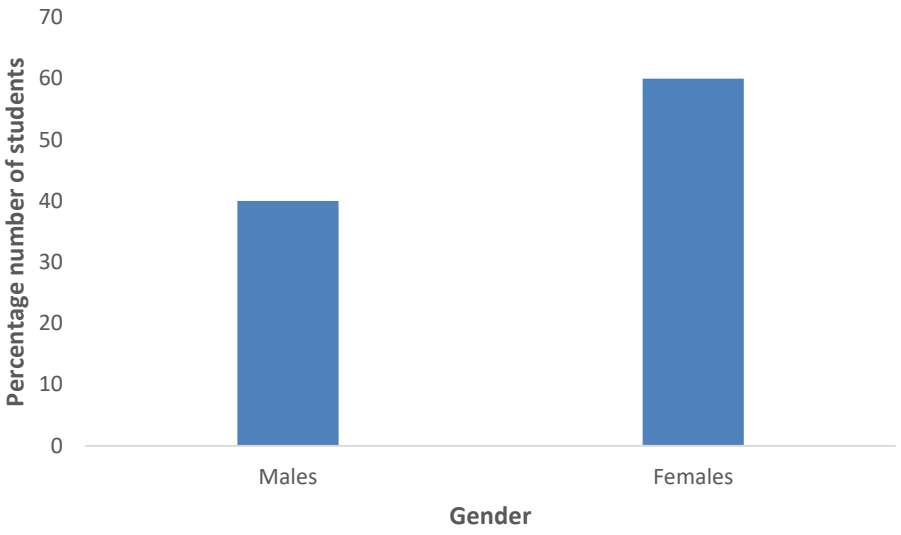
- The strategic plan should be viewed as a living document with revisions completed every two years during the life of the project. The plan and its evolution will become a record of the largest coastal management grant to a university in West

Africa and perhaps beyond. Through the plan readers should become familiar with the practical problems the Centre will consider and the means of linking multiple departments at the University to contribute to their resolution as well as the new technical capacities/services that the Centre will provide. The plan is also an opportunity to specify intentions with respect to interacting with the general public, officials, and civil society organizations. Centre leadership may consider public dissemination of the strategic plan, which would likely include figures and illustrations to capture the themes and the directions of the Centre. See US National Sea Grant plan or state Sea Grant plans as examples of content for public versions of strategic plans. To be effective the breadth of the Cape Coast plan will be much more targeted than these examples. Also consider communicating with the Coastal Resources Centre (CRC) at URI as they compete an update of their plan.

- Expand the analysis of potential funding organizations by creating a list of national donors (JICA, SIDA, CIDA, USAID, DANIDA, and others) and international organizations (WB, GEF, and others) with a history of funding coastal and fisheries projects. Complete analysis by checking websites and begin writing letters of inquiry in a year or two. When the new technical capabilities of the Centre become established create a rate sheet for the services available for faculty/students, government, and private sector. University support will be important as you negotiate with donors, and it may be considered in the forms of space, technical staff, and new faculty positions.
- Open correspondence with the University of Miami, University of Oregon, and Woods Hole Oceanographic Institution among others and over the first three years of the USAID funding establish at least one more MOU
- Use the current livelihoods project as well as other initiatives to develop and test extension and engagement strategies. Select among mechanisms presented in the talk those most appropriate for Ghana.
- Consider establishing a speaker series with one talk sponsored by the Centre each semester so that professors from Ghana and abroad, prominent officials, civil society leaders, and others with specific interests in the coast can address the University
- Complete the design of the selection process at the Fisheries Commission and process initial applicants.
- Establish the timing and review in future years to coincide with URI admission requirements – namely that applicant files should be complete by January for a start in September of the same year.

ACTIVITY 1.2.3: SUPPORT FOR POSTGRADUATE (MPHIL AND PHD) TRAINING PROGRAM

In relation to the scholarship program, DFAS prepared communications for both electronic and print media that announced available scholarships from the grant for the department. Daily Graphic and Ghanaian Times including UCC websites, DFAS Facebook pages were utilised for the dissemination of the opportunities. Subsequently, the Department formed committees to review the applications and selected candidates based on merit to receive the scholarship support to the University for the Award specifying the terms of the contract that includes the funding budget available for the studies including stipends, specific schedule and expected communications to come from the research.



Postgraduate students (PhD and MPhil) by gender

It is noteworthy to state here that, the DFAS since its inception in 2002 to date is 100% male-dominated in terms of its academic staff. The USAID capacity strengthening grant has provided an entry point for the design of a quota system for gender mainstreaming that will ensure that female researchers are recruited as part of its affirmative action policy. For gender parity among students, the quota system has instituted mentorship in favour of female admission up to about 60% of total student enrolment within the USAID/UCC Capacity Building Support Program.

The PhD study will cover a period of three (3) years while the MPhil will cover two years, beginning the 2015/16 academic year. The scholarships cover tuition, monthly stipends, and field research grants as well as other material and technical support.

The successful PhD candidates will spend 6 months at the University of Rhode Island in the United States to cover part of their studies. As part of the application process, all applicants are required to submit a research proposal on one of the following areas of thematic emphasis. In all, 14 PhD applications (7 males and 7 females) and 30 MPhil applications (18 males, 12 females) were received from across the country. The following were successful applicants following an interview.

Gender Composition of USAID funded Postgraduate Students scholarship awarded during the period are as follows:

Table 2: PhD Students funded under the USAID Grant at DFAS

No	Name	Gender	Previous Institution	DFAS Degree Program Pursued
PhD Scholarship awards (2015/16) Academic Year				
1	Margaret Fafa Dzakpasu	F	University of Cape Coast	Oceanography & Limnology
2	Jemimah Etornam Kassah	F	University of Ghana	Fisheries Science
3	Ahia Lawrence	M	University of Cape Coast	Aquaculture

No	Name	Gender	Previous Institution	DFAS Degree Program Pursued
	Armah			
4	Rebecca Kyerewa Essamuah	F	University of Ghana	Integrated Coastal Zone Management
5	Michelle N.K. Clottey	F	University of Ghana	Fisheries Science

Ms. Margaret Fafa Awushie Dzakpasu holds a Bachelor degree in Fisheries and Aquatic Sciences. Margaret also holds a Masters degree in Oceanography and Limnology. Her research interests include benthic ecology, seashore ecology and brackishwater ecology. She was onboard RV "Dr. Fridjof Nansen" to take samples for baseline studies of the coast of Ghana. She was part of a team that conducted an EIA on water bodies in Goldfields' mining concessions at Damang in the Western Region. She also served as a research assistant on the United State of America National Science Foundation International Research Experience for Undergraduates Program in UCC and the Fishing for Security Project in the Central and Western regions. She holds a certificate in "Remote sensing and satellite applications to marine and coastal environment" from the University of Ghana, Legon. Margaret is passionate about teaching and research and aspires to be an Aquatic Scientist.

Mr. Lawrence Armah Ahiah is a staff of the Fisheries Commission since 1998. Lawrence holds a BSc. (Hons) Biological Sciences degree from Kwame Nkrumah University of Science and Technology, Kumasi (1996) and a Master of Philosophy Degree (Aquaculture) from the University of Cape Coast (2008). After completion of his M. Phil. program he was transferred to the Upper West region of Ghana where he is currently the Regional Director.

Mrs. Jemimah Etornam Kassah on the 14th of December, 1984. She attend the University of Ghana where she studied for a Bachelor of Science degree in Oceanography and Fisheries, graduating in 2008. After National Service as a teaching assistant with her department, she worked for West Africa Aquatics after which she studied for a Master of Science degree in Sustainable Coastal Development at the Norwegian University of Science and Technology in Trondheim, Norway graduating in 2012. She returned to Ghana that same year and has since worked with Tropo Farms Ltd; the largest fish farm in West Africa as a senior supervisor, and African Connections Ghana Limited as a project coordinator. Jemimah will be found reading history books, writing, or watching a documentary during her leisure hours. She also loves to dance and cook new

dishes.

Ms. Michelle Naa Kordei Clottey, a fisheries scientist with special interest in aquaculture, is a Teaching Assistant at the University of Ghana, Legon, where she assists with teaching and research activities in the Department of Marine and Fisheries Sciences.
Michelle earned her MPhil Fisheries Science degree in 2014 and a BSc Oceanography and Fisheries degree in 2011 from the University of Ghana. She received full funding for her graduate research work from the Royal Society/ Leverhulme Africa project. She worked with the Institute for Environment and Sanitation Studies (IESS) as a national service personnel from 2011 to 2012, where she assisted graduate students with their laboratory work and the Research Fellows with both field and research works. She served in 2010 as an intern at the Aquaculture Research and Development Centre (ARDEC) and gained some exposure to aquaculture practices.

Rebecca Kyerewa Essamuah has a background training in Oceanography (BSc and MPhil) from the University of Ghana. Her research interest concentrates on water quality, pollution effects, management, sustainable exploitation, and restoration was fuelled by the huge pressure on aquatic systems and the observed rapid decline in the expected quality of aquatic ecosystems and the services they provide. Rebecca taught introductory courses in Oceanography at the Regional Maritime University (RMU) prior to being selected among the few privileged applicants to begin a PhD in a related field of Integrated Coastal Zone Management. Her proposed thesis has a working title – Development of a Decision Support System for the management of marine spaces in urban areas of Ghana.

Table 3: MPhil Students funded under the USAID Grant at DFAS

MPhil Scholarship Awards (2015/16) Academic Year				
1	Mercy Johnson-Ashun	F	University of Cape Coast	Fisheries Science
2	Jennifer Eshilley	F	Kwame Nkrumah University of Science & Technology	Integrated Coastal Zone Management
3	Divine Worlanyo Hotor	M	University of Cape Coast	Fisheries Science
4	Simon Kyei Gimah	M	University of Cape Coast	Aquaculture
5	Kezia Baidoo	F	University for	Fisheries Science

			Development Studies	
MPhil Scholarship Awards (2014/15) Academic Year				
1	Bright Asare	M	University of Cape Coast	Aquaculture
2	Pearl Sakyi-Djan	F	University of Cape Coast	Fisheries Science
3	Daniel Agyei	M	University of Cape Coast	Integrated Coastal Zone Management
4	Elsie Akushika Debrah	F	University of Cape Coast	Integrated Coastal Zone Management
15	PrInce Dela Tseku	M	University of Cape Coast	Aquaculture

Second year USAID funded MPhil Students of DFAS

The scholarships cover cost of accommodation, living expenses, course materials and other incidentals during the study period in the Department. Additionally, field research expenses will be borne by the project. Tuition fees will also be paid by the project directly to the university.

Other conditions of the award:

- Scholarships cannot be extended beyond the duration of the award and is subject to the availability of funds.
- The award may be terminated if the health condition of the awardee does not permit the continuation of the programme.
- The award will become void when proof of the awardee's academic achievements turns out to be unsatisfactory, according to university examinations regulations, and the academic assessment by the supervisor prohibits him/her from continuation of the study.

- The awardee is obliged to conduct a research in the project's thematic areas as outlined in the description document (USAID/PIL No.: 641-A18-FY14-IL#007) which are an integral and complementary part of the overall award.

ACTIVITY 1.2.4: UNDERGRADUATE RESEARCH GRANT

During the period seven (7) undergraduate student grant beneficiaries of the DFAS successfully completed/ passed their undergraduate dissertations. Each student had a grant award of US$ 500 to specifically support field research, covering transportation, collection of samples and printing costs. The research topics completed and assessed are as follows:

Table 3: Undergraduate Research Projects

No.	Name of Student	Title of Research Project	Supervisor
1	Jacqueline Allotey	Preliminary Assessment of IUU-*Saeko* fishing: The Case of Apam Fishing Community, Ghana	Dr. Denis W. Aheto
2	Lawrence Yaw Boateng Amankwa	Towards the mass culture of Marine Microalgae: The Development and testing of Cheap Culture Medium Based on an Agriculture-Grade Fertilizer	Dr. Emmanuel Acheampong
3	Prince Wiafe Gyimah	Assessment of Perspectives on *Saiko* Fishing among Artisanal and *Saiko* Fishers in Elmina	Dr. Denis W. Aheto
4	Success Adjeley Sowah	Towards the Development of Shellfish Culture in Ghana: Identification of Relevant Prey Items for the West African Mangrove Oyster (*Crassotrea tulipa*)	Dr. Emmanuel Acheampong
5	Isaac Gyetuah	Impacts of Pollution on the Ecological Health of the Fosu Lagoon: An Antrhopological Perspective	Dr. Noble Asare
6	Joseph Aditiba	Monitoring of Beach Seine Landings for Various Coastal Fish Species of Commercial Importance along Cape Coast Shores	Dr. Joseph Aggrey-Fynn
7	Emmanuel Sandy Amartey	Hydrographic Influence on the Utilization of Mangrove Ponds by Juvenile Fish Assemblages	Dr. Noble Asare

Five of the seven undergraduate recipients of research grants

The students have completed and currently undertaking their national service in relevant outfits including the university and the Fisheries Commission.

ACTIVITY 2.1.6: DEVELOPING MARINE AND COASTAL FISHERIES DATABASE

In order to provide technical direction as DFAS develops a work plan for Year 2 activities, DFAS hosted Chris Damon April 2015 during his visit on an SFMP assignment to discuss modalities for setting up the GIS and Environmental Data Hub. The vision is to develop an Environmental Data Centre, housed within the Centre for Coastal Management, which will be composed of a GIS unit of trained researchers and the underlying database(s) needed to organize and store environmental data. Indeed, CCM plans to embrace open data access with free exchange between universities, government agencies and NGOs, but there will likely be charges for commercial enterprises requesting data. A good portion of the discussion focused on the difference between what UCC is proposing with their Environmental Data Centre and the CR TCPD Central Planning Hub. While there will be cross-over in data usage, it was agreed that the 2 data centres are unique (both in data holdings and activity mandates) and will complement one another rather than compete against each other.

CCM also sees the need to support district planning activities and have proposed providing software/equipment/training to 1-2 districts in years 2-3 of their five year project.

<u>Outcomes:</u>

UCC is making good use of the time they have in Year 1 of their project to define both their vision and goals for the Center for Coastal Management and the Environmental Data Center. Mr. Damon however cautioned CCM to avoid too many activities that could limit its overall effectiveness. For example:

- district training and support are likely better handled by TCPD CR. DFAS/ CCM has limited capacity to train district planners with MapMaker/QGIS, and

developing this capacity will reduce their effectiveness at developing the much needed ESRI/ArcGIS capacity in-house, which is required to support their key role in the creation of new information and for scientific applications.

- The development of short, focused courses is also a worthwhile goal, but DFAS/CCM needs to be realistic in which aspects and capabilities they will be able to achieve in the next few years, recognizing that the URI Environmental Data Center as a model has taken three decades to attain its current capacity. Much work will need to be done building GIS staff capacity, procuring equipment/software, developing data and doing research.

It was highly recommended that UCC explore the opportunities offered through Esri's Conservation Grants Program (ECP) and begin the application process. It was noted that hardware/software/training are routinely provided to organizations that can demonstrate a need, and the potential exists to save a significant amount of money that would otherwise be allocated for software purchases and licensing. Though no financial resources for equipment support are available from the SFMP project, the SFMP could provide technical assistance with the ESRI ECP application and direction with GIS development. One of the slots for URI Master's degree training for UCC staff/faculty could also be allocated to a staffer to train up on GIS skills. During this trip, no specifics for SFMP GIS assistance were discussed so this would require further discussion to determine UCC needs.

Also during the period under review, the marine and coastal fisheries database (MCFD) team undertook the following activities:

- Began evaluating the strengths of potential partner institutions for collaboration on the development of the database. The evaluation is based on the questionnaire administered to the institution during the previous quarter of this year.
- Composed MoU to support its collaboration with the institutions. A draft of the MoU has been submitted to the legal office of University of Cape Coast for advice (see Appendix VII). The draft MoU will be sent to potential partners for input as soon as it is received. A copy is attached to this report for further perusal.

ACTIVITY 2.2.3: DEVELOPING MANUALS AND UPDATING TRAINING MATERIALS ON CLIMATE CHANGE ADAPTATION AND MITIGATION

Following up on two successful short courses on Climate Change Adaptation delivered to planners and disaster management officials from national and coastal district level stakeholders in 2011 and 2012, the Centre for Coastal Management (CCM) under the auspices of the Department of Fisheries and Aquatic Sciences of the University of Cape Coast (UCC) organized a five-day capacity-building workshop titled "Planning for Adaptation to Climate Change in Coastal Areas of Ghana" from 27-31 July, 2015. The workshop was organized at Pempamsie Hotel in Cape Coast.

Indeed, climate change is placing unprecedented demands on the environment of our earth, affecting our people and resources as seen with intermittent floods, severe drought, and increasing air and water temperatures. Activities, such as sand wining, fishery overexploitation, and infrastructural development in coastal areas are exacerbated by

climate change with serious implications on property, food security and livelihoods. New data that characterize the worldwide patterns and trends in climate change is available. Available data shows that the intensity of these stressors is likely to increase in the future. Unfortunately, national activities in Ghana do not give sufficient priority to climate change issues attributable to low human capacity to conceptualize integration of climate change issues in their work. The lack of funds to implement climate change related programmes is an additional factor.

Lecture session during the Climate Change Adaptation and Mitigation in Coastal Areas Course, 2015

The primary objective of this year's workshop was to deepen and enhance the understanding of the evolving and future impacts of climate change in Ghana as well as look into available methods for assessing physical and social vulnerability as well as possible adaptation options. Senior level representatives from four key national/ district institutions participated in this year's course, drawn largely from the Ministry of Local Government and Rural Development, Department of Town and Country Planning & the National Disaster management Organization. In addition, the Regional Directors of the Town & Country Planning Department and Regional Coordinating Directors in both the Central and Western Region were in attendance.

By the end of the workshop, participants were able to:

- explain the causes of climate change and the role of human activity
- identify and describe the effects of climate variability change in their community and
  appreciate how the effects of climate change are enhanced by human activity (i.e. sand mining, deforestation)
- identify and analyze the threats to assets and communities (non-climate and climate)
- recognize what actions are being taken in Ghana for future adaptation
- recall and discuss examples from Ghana, Africa and elsewhere on what other communities are doing to address climate change concerns
- link government interventions, policy and planning actions (i.e. spatial planning) at the various governmental levels
- suggest adaptive and mitigation actions that participants could promote in their field activities

- communicate (impart knowledge) climate change issues (causes and effects) to their peers and community at large
- apply basic methodology for climate change adaptation and mitigation that can be replicated in other areas
- address institutional needs and concerns for effectively integrating climate change considerations.

Participants of the Climate Change Adaptation and Mitigation in Coastal Areas Course, 2015 (Participants drawn from Coastal Districts of the Western and Central Regions and the national Development Planning Commission, etc. (Middle front roll: Prof. Johnson Boampong, Dean School of Biological Sciences, UCC)

The following are the course modules covered:

Module 1: Introduction to Coastal Ecosystems and the Influence of Climate Change – causes (human and effects, trends and projections; perceptions

- Acknowledge current coastal trends and issues
- Understand causes and effects (general) of climate change
- Communicate basic knowledge on cc and the coast
- Recall past trends and understand potential future projections (cc and coastal)

Module 2: Field exercise

- Apply knowledge acquired
- Apply tools/exercises to a real life situation
- Analyze vulnerabilities
- Suggest potential adaptation/mitigation actions

Module 3: Vulnerability of Coastal Districts

- Understand/identify the effects of climate change in their community and appreciate how the effects of climate change are enhanced by human activity (non-climate stressors i.e. sand mining, deforestation). Shama case study presentation can help to illustrate this.
- Identify and analyze the threats to their assets and communities (non-climate and climate)

- Identify their areas that are currently exposed (under threat/vulnerable) to different climate stressors (drought, SLR, floods)
- Identify impacts to different sectors
- Envision future threats (with scenario) and the implications for community
- Identify "adaptive capacity" of the community to adapt in the future (Resilience survey in fisheries communities (UCC/World fish) and focus groups in Western Region to look at governance capacity for resilience)

Module 4: Options to adapt

- Define the difference between climate mitigation and climate adaptation (which is sometimes referred to as hazard mitigation)
- Recall actions from other places
- Identify different actions (and examples) to mitigate and adapt within key sectors (fisheries, forest, water, infrastructure, health, ecosystem) for their place.
- Shama case is incorporating into their spatial planning planning.
- Evaluate/prioritize actions

Recommendations/ Way forward:

The course was designed to meet the professional needs of individuals and their respective participating institutions as well as provide a platform for constructive feedback to both the participants and trainers.

In the second year timeline of activities, follow-ups are expected with participating institutions with the aim to mainstreaming climate change adaptation efforts into the work of their institutions. We are hopeful that this programme will enable the development of hands-on training programmes and actual implementation in the field in the coming years on climate change for larger audience within and outside these organizations.

ACTIVITY 2.2.5: ENGAGING POLICY MAKERS TO ADDRESS COASTAL AND FISHERIES ISSUES

As part of this project, DFAS instituted a study to unearth the major issues confronting the poor performance of the Ghanaian fisheries industry and general degradation of the coastal environment. The study was couched around the theme: Developing tools for Sustainable Fisheries and Coastal Resources Management. The methodology employed involved having a dialogue with the fishermen and fish processers at the landing beaches along the coastal regions and validating the findings with interviews of identifiable groups such as chief fishermen, leaderships of fish processing associations, transport unions e.g., GPRTU leaderships, regional fisheries officers and the local district and municipal planning officers.

Planning for the Policy and Research Dialogues at DFAS with Dr. Benjamin Campion of the Department of Fisheries and Watershed Management, Kwame Nkrumah University of Science and Technology (KNUST)

In all, fisheries stakeholders from ten districts in the four coastal regions have been interacted with. The ideas expressed at the various levels were consolidated for each of the four regions by bringing representatives from the various landing beaches together to brainstorm to foster a common approach to dealing with the problems of fishing and beach cleanliness in their respective regions.

Major issues consistently coming up from all the meeting which were deemed to requiring urgent attention cantered around the following:

i. Fish stock depletion
ii. Methods of fishing
iii. Over licensing of foreign trawlers
iv. Operations of the trawlers in shallow waters
v. Pre-mix fuel distribution
vi. Non enforcement of the fisheries laws
vii. Interference in the fishing industry
viii. Over politicization of fisheries issues
ix. Empower the chief fishermen to carry out sanitation issues
x. Need to get the local administrations to support the local initiatives in keeping the beaches clean and
xi. The need for the police to be better educated on the offences in fishing.

In going forward, the USAID/UCC project's component on Research and Policy Dialogue in Fisheries and Coastal Environment seeks to synthesize the ideas gathered into *Research Tools* on fisheries and coastal zone management matters with participations of all the stakeholders and the managers of fisheries in the country. As a Government institution endowed with research capabilities in the fisheries sub-sector, the University looks to collaborating with MOFAD in forging alliance that will be fed with reliable data on which, we believe, the ministry can apply to influence policy on fisheries development in a pragmatic way to solving the ails of the fisheries industry in the country.

Fashioning these ideas at assemblage of representatives of all the fishing practitioners, local district and municipal authorities, researches, policy makers and the ministry of Fisheries and Aquaculture Development is the way to go and UCC seeks further collaboration and authorization from MOFAD to move forward.

Depletion of fish stocks in the marine environment is not peculiar to any one country, Ghana inclusive. What is most important is the knowledge of the causal effects and the willingness of the practitioners to recognize, accept and work towards resolving them. The study on Policy and Research dialogue seeks to, among others; engage the fisheries practitioners in dialogues at several levels on ways and means of addressing the issues militating against the fisheries and environmental degradation of Ghanaian beaches. The strategy adopted was to engage the individuals and groups along the fisheries value chain in idea-exchanges with the view to soliciting views on the issues and suggesting ways and means of resolving them at the local levels (District dialogues).

The dialogues were held in 10 Districts in the four coastal regions. Ideas from the District level dialogues were consolidated at Regional meetings with participation of representative from all the districts. The discussants, beside the fishermen and the fish mongers, comprised of the regional fisheries offices, local and municipal Directors of operations and planning officers, regional environmental protection agency officers and officers from the Fisheries Enforcement Units (FEU's). Contributing factors commonly agreed on as militating against development of the fisheries and contributing to environmental degradation and pollution at the district dialogues were validated at the regional levels. These were found to be cross-cutting but interestingly regional representatives attempted to shift the buck from their respective regions to other regions. The major issues are presented in Annexes 2 and 3.

Radio Discussion with Fishermen and Fish Processors at Obonu FM, Tema

Other challenges observed but of which the fisheries practitioners agreed were major issues for which they would not want to take responsibility were listed as follows: i. marine pollution by oil spills; ii. untreated sewage discharged into the near-shore areas, heavy siltation (pollution) emanating from riverine discharges, eutrophication (nutrient

enrichment), invasive species, persistent organic pollutants (POPs), heavy metals from mining activities and "saiko" fishing (by-catch from the industrial fleet.

Environmental filth is a common sight at all the landing beaches

To achieve the objectives of this activity, discussion were held with stakeholders in the districts and at landing beaches concerning the following:

1. Species of fish caught, catch trends and preferred species
2. Fishing methods
3. Storage of the catch at sea, the condition of the fish when landed, and suggested adaptations to storage challenges
4. Concerns about the fish stocks (species general)
5. Fisheries management issues
6. Impact of the following on fisheries development:
    a. Supply of premix fuel
    b. Number of fishing vessels and
    c. Regulations of fishing areas through licensing of vessels and Loss of coastal vegetation.

DISTRICT LEVEL OBSERVATIONS

I. JOMORO DISTRICT – HALF ASSINI

There were 208 canoes plying in 28 landing beaches in 2014 in the Jomoro District. The numbers have increased over the years and so have the numbers of fishermen also gone up. Major fish species landed here are burrito, barracuda, cassava fish, bumper, herrings and silverfish. The price of the fish is set through haggling and bargaining with the Konkohemaa (queen fishmonger) who relays the cost to prospective buyers.

Environmental and fisheries issues

There are underhand dealings in sale of premix fuel. Fuel purported to be sold by the local committee is first sold to non-fishing middlemen who then add their margins before selling to the fishermen. There is therefore frequent shortage resulting from hoarding of premix fuel and fishermen have to supplement with commercial fuels. There is also a strong political bias in the setup and operations of the Landing Beach Committee. These factor increase the cost of the fishing and consequently cost of fish at the landing beach; a cost which is amplified at the different levels along the value chain.

The Jomoro fishing folks boast of having once received a Presidential fiat for stopping illegalities. They have all reversed to light and chemical fishing with an argument that when they stop practising those illegal fishing methods, fishers from other districts and even regions come and harvest the stocks in their waters, due to the open access nature of fishing in the country. Furthermore, the activities of the trawlers in shallow waters go unchecked and any attempts to check them become unrewarding as informant in the FEUs allegedly relay information to warn the trawlers in advance even before they set out on operations.

II. ELLEMBELE DISTRICT – ESIAMA

About 25 canoes operate at the main landing beach at Esiama but none of these boats is registered. Some of the fishermen go out to sea overnight and others go and return within the day. The gear used here are Ali net, Tenga, Adadeboa (hook and line) and set nets. The distance travelled to the fishing grounds depends on the type of gear being used. Some fishermen go as far as Benin or Cote d'Ivoire to fish using the stars as a guide. Fishermen who travel farther from their base carry ice chests on board their vessel. The ice is produced and sold by women.

Environmental and fisheries issues

One of the major sources of conflicts encountered by the fishermen is crossing over of fishing nets belonging to different crew or fishing nets being swept over by trawlers. Net entanglement always ends up in disputes which, usually, get settled at sea but in extreme cases; they are settled by the chief fisherman when they return to land. The offending party is made to pay two thirds of the cost of damage.

At night, some trawl vessels switch off their lights and move into inshore areas to fish thus competing with artisanal fishers. In addition they pose a danger to canoes which sometimes run into the trawl vessels and also destroy gill nets set by canoe fishermen.
There is evidence that the beach area is being eroded steadily with sand mining taking place along the beaches.

III. NZEMA EAST DISTRICT – AXIM

The Fishery

Except on Tuesdays, fishing is practiced 24 hours daily all-year-round at Axim. A bumper harvest which was a common place in this community in the 1980s has since disappeared. Currently the number of canoes has increased to 4-5 folds over what prevailed in the 1980s. Fish landings have also systematically dwindled and the low fish catches has led to the use of various unapproved fishing methods, however destructive. These fishing methods include the use of light, chemicals, Calcium carbide and dynamites. Others include use of purse seine nets with smaller mesh sizes; including mosquito nets. The situation is further aggravated by the activities of trawlers in unapproved shallow waters capturing juvenile pelagic fishes and depleting stocks further. The major gears used are Ali, Poli and Watsa (APW) with watsa dominating. Set net, drift net, and hook and line are also variously used. Drift gill nets are used for skipjack tuna fishing in July/August. Purse seining is the dominant fishing method for the capture of round sardines and flat sardines in June – September.

Fishmonger associations exist in the area. They educate members about illegal fishing methods. Members of the association indicated that they would welcome equipment that tests fish caught using an illegal method so that they can boycott them. Sanitation is a major issue at the landing beaches in the area although the beaches are cleaned once every Tuesday. There is nonetheless a need to place trash bins at vantage points, construct public latrines and provide information vans to educate the population, and enforce the law. Sand used to be mined at the landing beaches but this activity has been relocated elsewhere because it has been overexploited. Waste management at the landing beaches used to be managed by the Zoomlion Company but this has stopped.

IV. SHAMA DISTRICT – SHAMA

During a fishing expedition that may last up to three days, the fishermen carry ice to store their catch. When the fish is landed at the beach, it is sold and the group field expenses are deducted and the profit is saved. At the end of a year or two, the profit is shared among the shareholders. On daily basis, every fisherman on the boat or canoe takes a share of the fish that can be taken home or sold. Fish of bad quality are bought at half price and processed into "*momon*i" (stink fish). Prior to salting the fish it is de-scaled and for some species the skin is removed. Removal of the skin makes it dry faster and prevents flies laying eggs underneath the skin. The processed fish is packed in a jute bag and stored in a cool dry place for up to two months before marketing. It may also be sold without being stored for any length of time.

Environmental and fisheries issues

Light fishing is practised in this area. The fishermen set off in the evening and return the next morning. Fishermen who use chemicals usually deliver the fish caught to their wives or the pre-financiers. Such fish is of bad quality; it is commonly smoked and sold in villages and the hinterland where the quality cannot be easily ascertained. Pre-mix fuel mismanaged issues are a common place in the Shama area. There are middle men who buy in bulk and sell at a higher price. Most of the time, the pre-mix fuel is in short supply. Because of the

shortage of fuel, many boats have relocated to Cote d'Ivoire where they go by the enforced rules and the regulations. To fish in Cote d'Ivoire waters, a fisherman must have a Ghana ID card, a Cote d'Ivoire ID card and an insurance cover for the vessel. The fish caught can either be sold in Cote d'Ivoire or sent to Ghana. Some fishermen stay about three to four months or up to one year in Cote d'Ivoire. The FEU in Ghana are reportedly corrupt and usually inform fishermen who do not comply with the fishery regulations ahead of time about their enforcement activities unlike the enforcement units in Cote d'Ivoire. Mangrove wood for fish smoking in Shama has reduced significantly because its harvest has ceased and fuel wood is now obtained from the hinterland.

V. KOMMENDA/EDNA/ EGUAFO/ABIREM (KEEA) DISTRICT - ELMINA

Environmental and fisheries issues

Light fishing, 'saiko" and "tainga" all unapproved fishing practices are done alongside the use of chemicals such as DDT, detergents, and bomb fishing. After several fruitless fishing trips fishermen are unable to pay off their debts and that compels them to use light. Fish caught using chemicals easily deteriorate. However, they are difficult to identify when in the fresh condition.

Premix fuel is available in the community but its sale and distribution is riddled with corruption. The wealthy boat owners buy the commodity in bulk and retail it to less endowed fishermen.
Fish starts to deteriorate when the fishermen stay too long at sea. When it is spoilt, it is processed into animal feed and the price for such fish is very low. Other forms of postharvest losses occur when dogs, cats or pigs tamper with unattended fish landed on the beach. Sand mining takes place in many locations along the beach. Although the police have been arresting culprits, the practice still continues especially at night.

Other key findings:

- In times of bumper harvest, there is services of money lenders are sought to finance fishing expeditions at very high rates.
- A glut leads to fish and revenue losses during period of bumper harvest.
- During lean periods fishermen stay longer at sea and often run out of ice leading to substantial fish loss through spoilage
- Most cold stores are not functioning properly either due to the high operational cost or frequent power outages.
- At low harvest fish may be bought from major landing beaches at Sekondi, Tema or from the neighbouring Cote d'Ivoire but losses may be incurred is revenue from transportation charges and exchange rates issues respectively.
- Light fishing is banned in Ivorian waters where the waters are more protected.
- Sizes of fishes caught in Ivorian waters are comparatively bigger.

VI. GOMOA WEST DISTRICT – APAM

The elements of the fisheries industry in Apam is more protected due to the perception that researchers gather information from them to give the fishing community bad publicity. Publications from some organizations on the ills of their operations are kept to justify their unwillingness to speak to researchers.
All the illegal fishing methods prevail in this District. The by-catch trade (Saiko) is very rife in this region to the extent that even on the normal non-fishing Tuesday, the beaches are just as busy as any other fishing day due to the 'saiko' trade.
While some fish mongers refuse to buy fish caught using light and other illegal fishing methods, others will buy such fish largely due to pre-finance arrangement made with the fishermen. The situation makes it difficult for the offending parties to be isolated. Notwithstanding, in Apam, fish caught using DDT is easily identified by the fish mongers and completely shunned. That fish usually appears reddish. Other key findings are that fish caught using chemicals deteriorate faster and loses are also incurred in terms of fish quality and quantity during smoking.
The elements of the illegal fishing are often hidden from the fish mongers who make conscious effort to dissuade their fishing folks from practising those fishing methods.

VII. GA SOUTH DISTRICT – BORTIANOR

There is high incidence of poverty within fishing communities. Therefore a major challenge is how to raise money to fund fishing expeditions. Women make contributions into a savings account. During the bumper season, the money is withdrawn and shared among the contributors. Loans are contracted by the associations. That way there is guaranteed retrieval of borrowed money. Soft loans have up to a maximum of 100 to 120% interest and are serviced in bits. The loans should reach the fishing communities before July at the beginning of the major fishing season.

Environmental and fisheries issues

A major concern of the fishermen is that the Ghana Government grants licenses to foreigners but fails to control them and rather local fishermen are chased out of the sea. It is also alleged that many of the so called foreign vessels are owned by Ghanaian middlemen. This encourages the illegalities in the fisheries sector in Ghana. Trawlers must be stopped from fishing in inshore areas. Because the trawlers fish in the zone of the artisanal fishermen, the artisanal fishermen have to increase their efficiency (such as the use of fish aggregating devices) and effort (many canoes and longer time at sea) to be able to survive.

The major illegal activity in the artisanal fisheries is light fishing. The fishermen in this community accuse Fantes for doing most of the illegal fishing like use of light and chemicals. In their opinion if light fishing is stopped all other illegal fishing activities will cease.
It should be possible for fishmongers not to buy fish caught by illegal means, and arrest any chief fisherman whose landing beach is used for illegalities. Currently when a catch or gear is seized, it is difficult to prove that the person used chemicals. So there are always conflicts among fishermen and also with the chief fisherman in trying to stop chemical fishing. The people here are in support of acquiring an instrument for testing fish for chemicals. Apart

from the landing beaches, these test kits should also be used at the market places so that the law is enforced everywhere.

Another effect of light fishing is that it removes the seasonality of fish catch. Therefore prices are affected and the fishermen who use legal and regular fishing methods run at a loss. There were complaints about operations of the FEUs which are accused of non-performance. Ordinary fisherman can stop illegal fishing while they are unable to stop such activities even in Tema from where their activities are coordinated.
It is the opinion of members of the community the municipal assemblies should help with cleaning the landing beaches.

VIII. NINGO/PRAMPRAM DISTRICT – PAMPRAM

The Fishery

Light fishing is the major problem in the area. This was banned in Lower Prampram landing beach about 10 years ago but other beaches are not enforcing it at their landing sites. So when a fisherman is arrested, it becomes a problem. Whilst light and chemical fishing are not practiced here, the women buy fish caught by this process. However, such fish is sold outside the community and not in Prampram market. The fish caught using chemicals deteriorates faster and has to be processed fast. According to the locals, Government has sold all our timber to foreigners while boat/canoe builders in Ghana buy wood from foreigners.
The challenges of the fisheries sector prevail because fishermen have been politicized. Politicians campaign and after they win, nothing is done about the problems of the fisheries sector. They fail to stop pair trawling and even instead are rather participating in this bad practice. The suggested solution is to arrest any chief fisherman who allows an illegality in their landing beaches, and also arrest people who patronise illegalities in the fisheries value chain. Another reaction was that it is impossible to reduce the number of canoes as a management measure because that would increase unemployment.

IX. KETA DISTRICT – KETA

The Fishery

In this area ali-poli-watsa, beach seine, winching nets (nifa nifa) are the main fishing gears. These are used to catch anchovies, herrings, round and flat sardines, horse mackerel, and tuna species. The use of monofilament net is the main fishing problem in the area. Stakeholders in this community suggest a ban on the importation of this gear and the consignments on sale seized and destroyed. The law should be enforced at the national level and at the local level the chief fisherman should be given legal backing to enforce fisheries regulations; fishermen, the police and judiciary should be educated on the fisheries law and more personnel from the FEU should be deployed to enforce the law.

They are of the view that there should not be a closed season or reduction of fleet because there is no alternative occupation for fishermen. Conflicts in the fishing sector include entanglement of nets belonging to different group of fishermen (company). In times of fish scarcity fish mongers quarrel among themselves especially during bargaining to buy fish that

has been landed by the fishermen. Some women pre-finance the fishing expedition but some of the men are not trustworthy and sometimes divert the fish to other fishmonger. In the markets, conflicts may arise from customer retention and loyalty. That is when a colleague fish monger tries to snatch another colleague's customer. Fishermen in this area believe that the fish usually migrate from the west to the east. At the time of this interaction they were of the view that the fish was being caught in the Western, Central and Greater Accra Regions with light and chemicals preventing the fish to reach the Volta Region.

On financial assistance they preferred it be provided in the form of fishing inputs for it to be paid for by instalment. Members of the fishmongers association do not patronize illegally caught fish. Some women own fishing vessels; others sponsor fishing expeditions.
The bulk of the fish landed in the area is smoked using the 'chorkor' smoker. During the bumper season, anchovies are dried. Mangrove wood is the most used energy source for smoking. This is followed by neem tree which is believed to give the smoked fish a better appearance and taste. Fish is mainly smoked or dried and stored. Smoked fish is stored in baskets lined with brown paper and stored in a cool dry room. In this state, it can last for three months.

Fish is bought and sold at the landing beach through haggling over prices which may result in profits or losses. Processed fish is mainly sold in Keta, Denu and in Togo.
The following suggestions were made for improving the fishing trade in the area.
Improvement in the quality of the wire mesh for the smoking racks. Cost of aluminium pans used to convey catch is too high and must be reduced.
There is need to provide training to fishermen and fishmongers in modern methods of fish processing and storage. Premix fuel distribution, sale and allocation should be made according to the number of registered boats at the landing beach and type of fishery practiced.
The price of pre-mix should also be reduced whenever that of other fuels goes down.
People in the area should be trained in mariculture to enable them take advantage of the vast saline Keta Lagoon to improve their livelihood The lagoon should be connected to the sea by breaching the sand bar to allow entry of marine fish to increase fish biodiversity and biomass.

X. SOUTH TONGU DISTRICT – ADINA

The Fishery

July-September is the major fishing season. The fish migrate from the west coast towards the east coast. However, because the fishermen at the western coast use light and chemical fishing the volume of fish reaching this area is reduced substantially. In their opinion, Government has failed to stop the light fishing practice for many reasons. For example, just seizing generators of offenders is not punitive enough; punishment should include seizure of the outboard motor of canoes that contravene the ban. Other challenges of fisher folk in the area are lack of money to purchase fish during bumper harvests and use of monofilament nets by some fishermen.
Fishermen and fish mongers in this community have associations formed to promote unity, welfare of members, train members in fish processing, and work towards the future development of the industry. Members can make withdrawals from a revolving fund

contributed by members. In times of good harvests, extra fish is bought by the association using the revolving fund.

Species landed are sardines, anchovies, horse mackerel, king fish, and cassava fish. Anchovies and round sardines form the dominant catch. Round sardines are most preferred because they are easier to process, look more attractive and can be preserved for longer periods.
About 70% of the fish landed here is smoked. The rest is dried or salted. All the small sized fishes are smoked. Mackerel is smoked and some are salted. The 'chorkor' smoker is the main fish smoking processing oven used. Mangrove wood is the energy source used but this is becoming scarce due to over-harvesting. Other forest woods are acquired from the forest zone to complement the mangrove woods. The smoked fish is packaged in cane baskets lined with brown paper and draped with a net. The fish is first packaged to make them airtight by covering the basket with large polythene sheets. The smoked fish are stored in special windowless rooms which doors are kept closed; the rooms are therefore permanently dark. The smoked fish can be stored in this way for 3-4 months. Major markets for selling the fish are Ho, Denu, and Togo.

Adina has a communal dump site around the lagoon. Sand mining in the area is prohibited. Sand for building construction is bought from inland areas.
There are no public latrines along the beach. Latrines therefore need to be built and a fine imposed on anyone caught defecating in the open.

Table 4: Study Areas in Four Coastal Regions of Ghana

Region	District	Main Landing beach
Western	Jomoro Ellembele Shama Nzima East	Half assini Esiama Shama Axim
Central	Kommenda/Edna/Eguafo/Abirem Gomoa West	Elmina Apam
Greater Accra	Ga South Ningo/Pampram	Bortianor Pampram
Volta	Keta South Tongu	Keta Adina

Table 5: Perceived causes of dwindling fisheries and environmental deterioration in Ghana

Region	Observed Major Contributing factor to fisheries depletion	Suggested solutions
ALL regions	overfishing, poor fisheries management, the open access nature of the resources, loss of critical habitats, coastal sand winning, exploitation of immature fish the use of destructive fishing techniques such as bomb fishing and fish poisoning.	Secure access privileges, community-designated fishing areas, zoning, national access agreements, Licenses and permits, and other forms of use rights or tenure.

	Weak governance Factors characterizing weak governance in the fisheries include corruption, inadequate management resources (physical, human, and financial), poor enforcement of regulations, illegal fishing, inability to trace the origin of catches, lack of stakeholder participation in decision-making, and user conflicts.	The inclusion of fishers in management decisions can strengthen governance structure Human behavioural change needed to reduce the need for extramural enforcement. A stronger, corruption-free institutional framework will allow for proper enforcement of laws.

Table 6: Environmental issues in Landing Beaches

Region	Observed major contributing factor to deteriorating conditions at landing beaches	Suggested solutions
ALL	Sand winning Defecation Dumping of domestic wastes Littering with polyethylene bags Siting of waste bins at or near landing sites Poor drainage Mining activities in inland area Oil pollution	Assembly must stop collecting revenue from people involved and enforce laws Community leaders must be empowered to deal with offenders Activities of illegal miners must be checked Polluting parties must be checked

ACTIVITY 2.2.6: BUILDING INSTITUTIONAL PARTNERSHIPS AND COLLABORATION

Ministry of Fisheries and Aquaculture Development (MoFAD): In April, 2015 Prof. Edward Obodai, and academic staff of DFAS and a former member of the Fisheries Commission of Ghana together in the company of Mr. Godfred Asiedu (M&E Support) and the Project Manager officially announced the USAID/UCC capacity building effort to Hon. Minister of Fisheries and Aquaculture Development Madam Sherry Ayittey in Accra. Also in attendance was Divisional heads of the Ministry. The idea of the visit was to solicit their inputs, coordinate efforts and to discuss both short- and long-term training opportunities DFAS/UCC could offer the Ministry under our USAID capacity building grant. Also in attendance was the Director of the Fisheries Commission, Mr. Samuel Quaatey and Mr. Paul Bannerman, Head of Fisheries Scientific Survey Division at Tema.

Outcome: It was concluded to undertake a capacity needs assessment of the Ministry to estimate how the project may support in critical areas of need relative to the short and long-term graduate courses at the University of Cape Coast.

University of Rhode Island (URI): Prof. Anton Post, Director of the Coastal Resources Centre, URI in the company of Dr. Brian Crawford, Chief of Party for the USAID/SFMP Project visited DFAS/CCM as part of arrangements towards implementing the purpose of the Memorandum of Understanding (MOU) between URI and UCC, which seeks to frame collaboration between the Coastal Resources Centre (CRC) and DFAS on the development of joint research activities, teaching and professional training programs within the context and objectives of their respective "Fisheries Projects" for Ghana. CRC is the lead institution on the USAID Sustainable Fisheries Management Project (SFMP) Initiative and it seeks to develop several activities together with faculty and students of the DFAS/UCC that will be mutually beneficial and also contribute to the wise use of natural resources, biodiversity conservation, food security, and livelihoods development particularly for the coastal communities of the Western and Central Regions. The MoU also further seeks to support training (Masters and PhD) for DFAS/CCM in critical areas of need.

University of Ghana - ECOWAS Coastal & Marine Resources Management Centre

DFAS/CCM finds it expedient to collaborate with the ECOWAS Coastal & Marine Resources Management Centre led by Dr. George Wiafe to monitor small fishing vessels in Ghana for fish stock assessment studies. In a meeting held in April, a cooperative research strategy for sampling catches of targeted species from vessels in selected coastal districts based on pilot surveys will be explored as part of postgraduate (M.Phil) within DFAS. The meeting attended by Messrs. Robert Buzzard and Justice Odoi both of USAID and Prof. John Blay and Dr. Denis Aheto were of the opinion that the program could provide mapping data from logs on vessel tracks to complement fish stock assessment research by students based on fish catch data. Collaborative research work is initiated and field work will begin in August 2015 with selected DFAS graduate students.

Florida Gulf-Coast University:

In contemplation of the relationship to be established for student and professional exchanges, DFAS represented by Dr. Denis Aheto signed a Memorandum of Understanding (MOU) with the Department of Biological Sciences of Florida Gulf Coast University (DBS-FGCU) represented by Prof. Phil Allman on the development of joint research activities and

professional training programs within the context and objectives of ongoing sea turtle conservation and research activities within DFAS in the Central Region of Ghana. It is anticipated that the collaboration will be mutually beneficial and will contribute to the enhanced protection of wildlife, appropriate use of natural resources, improvement of food security and economic development, and livelihood development for the coastal communities associated with the project. In respect of this modalities were initiated for four academic staff and two technicians to visit DBS-FGCU during the second year of the project as part of staff capacity strengthening for DFAS in the use of new scientific equipment and introduction to general wet lab procedures.

Netherlands Development Organization – SNV

As part of collaborative efforts with the USAID/SFMP Project, DFAS assisted with recruitment of ten (10) students as field staff for the Netherlands Development Organization in collecting information on fuel wood consumption in the four coastal regions in Ghana to help understand how the fuel wood supply chain operates. The aim of the project is to understand how the fuel wood supply chain functions, the individual beneficiaries and the main challenges encountered by the actors involved in the fuel wood chain business. This in the long term will transform the phase of the fuel wood business by placing it into a market oriented profitable and sustainable sector. The orientation program for the students took place at The Senior Common Room of the University of Cape Coast.

ACDI/VOCA in Ghana

During the period under review, DFAS hosted a visit from the USAID funded Farmer-to-Farmer Program (F2F) being implemented by ACDI/VOCA in Ghana led by Mrs. Mina Lassey, the Country Director. DFAS is seeking opportunities to enable the F2F Program feed its project activities with highly qualified professionals (volunteer consultants) with extensive experience in their fields of fisheries and coastal management to support the work of DFAS and CCM in critical areas of need mainly teaching and provision of extension services. In this arrangement, it is envisaged that the volunteers will be prepared to donate their time, talent and experience to transfer new skills and proven methods in the subjects of mutual interest.
In June 2015, DFAS submitted an application to ACDI/VOCA for consideration to obtain adequate volunteer technical assistance, technology transfer, training in the use of new laboratory equipment, provide hands on demonstrations and organizational capacity building in the second year of the project onwards.

Coastal Implementing Partners (IP)

During the quarter, DFAS participated in the May 2015 Implementing Partners meeting at Western Region Coastal Foundation's office at Anaji hosted by Mr. Matthew Armah (see full Coastal IPs, Appendix VIII). The objective of the IP meetings is to coordinate efforts and

avoid overlaps in the implementation of project activities funded by same or different donors. Therefore the Coastal IPs meeting is a Dialogue Platform that also seeks to

- **Provide Update by IPS:** Member organisations brief members about their various organisations and activities
- **Themes for meetings:** Members take turns to make presentations on the themes at meetings of the platform. Each presentation on a theme should respond to the following: (a) what are the dynamics/perspectives of the sector or topic (b) what is being done by different actors to make a difference (c) what has been achieved (d) interrogate our assumptions (e) what are the lessons? What are the communities of practice? Suggested themes are:
    i. Fishing industry
    ii. Mangroves
    iii. Economic development
    iv. Alternative livelihoods

Next step:

- A data base of IPs was proposed to be developed that will have profiles of members.

ACTIVITY 2.2.8: STRENGTHENING COMMUNITY-BASED GROUPS

A needs assessment of the capacity of community-based groups in 8 coastal communities in Western and Central regions for sustainable coastal resource management was undertaken in the last quarter of Year 1. The selected communities were Apam, Moree, Elmina, Narkwa in the Central Region, and Anlo Beach, Axim, Ankobra and Half Asini in the Western Region of Ghana. Following this assessment strategies for strengthening the capacity of the groups to realize their objectives have been developed drawing on best practices in other African countries. Results of the assessment and proposed strategies were discussed with the stakeholders in close-out workshops in each

The following needs were identified for the community and community-based groups:

Meeting with a cross section of women in Narkwa

- Relevant knowledge on role of community-based groups in the management of coastal resources
- Conflict and mediation and resolution skills
- Legal backing to enforce regulations on fisheries
- Supplementary livelihoods support
- Women empowerment to contribute to the management of coastal resources
- Clearly defined groups to manage key challenges in the community, e.g. sanitation, illegal fishing, conflicts, etc.
- Value chain development support for fisheries and other supplementary livelihood products
- Networking among neighbouring communities to address common socio-economic challenges

Some recommended actions to address the needs enumerated above are as follows:

- Develop an illustrative coastal resource management guide and training manual to support functions of community-based management groups
- Undertake regular training of groups and monitor effectiveness of management activities

- Conduct gender training sessions for fisheries groups and community leaders in the communities to enhance gender equality and capacity in the management of community resources including coastal resources.
- Work with existing community-based structures, and where necessary assist communities to form groups to oversee critical challenges

2.2.9 PROMOTING SUPPLEMENTARY LIVELIHOODS IN COASTAL COMMUNITIES

This activity was undertaken concurrently with that on strengthening of community-based groups. All communities were supportive of introduction of supplementary livelihoods because of dwindling incomes from the fishery. Low capital livelihoods as snail rearing, oyster culture and honey making were widely accepted and training of the communities in these ventures on the basis of community priority choices will commence in the first quarter of Year 2 of the project.

PLA Facilitator meeting with a women's group in Moree

Table 7: Selected supplementary livelihoods and community preference

Green = 1st choice Yellow = 2nd choice Red = 3rd choice

Community	Bee keeping	Oyster rearing	Snail farming	Others
Apam				
Narkwa				
Moree				
Elmina				
Anlo				Rabbit rearing, Poultry farming, Brick moulding and Grass cutter rearing
Axim				Mushroom and grasscutter
Ankobra				Pig farming, Poultry, and dress making
Half Asini				Tailoring, Dress making, Soap Making, Carpentry and Masonry

The details of these activities are specified in the Capacity Needs Assessment Report.