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UNIVERSITY OF CAPE COAST

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Cover Photo: Coastal profiling of Anomabo, a coastal community in the Central Region by participants of the Integrated Coastal Zone Management (ICZM) Short Course led by Prof. John Blay

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	6
1.0 INTRODUCTION.....	8
1.1 Ghana’s Marine Fisheries Sector	8
1.2 Feed-the-Future (FtF) Initiative of the United States Government	9
1.3 The Fisheries and Coastal Management Capacity Building Support Project.....	9
1.4 The Department of Fisheries and Aquatic Sciences of the University of Cape Coast	10
1.5 Monitoring and Evaluation (M&E).....	10
2.0 PROGRAM COMPONENTS, MANAGEMENT AND ACTIVITIES IN THE THIRD QUARTER OF YEAR TWO	11
2.1 Activities Completed in the Third Quarter	11
3.0 PROJECT OUTPUT 1.1: IMPROVED INFRASTRUCTURE.....	13
3.1 Activity 1.1.1: Renovating and Equipping Fisheries and Coastal Research Laboratory ...	13
3.2 Activity 1.1.2: Refurbishing and Equipping office/Lecture/Computer rooms and Library	13
3.3 Activity 1.1.3: Acquisition of Vehicles to Support Educational, Training, Research and Extension Activities.....	14
4.0 PROJECT OUTPUT 1.2 INCREASED TECHNICAL AND SCIENTIFIC KNOWLEDGE	14
4.1 Activity 1.2.1: Academic and Technical Staff Capacity Strengthening	14
4.2 Activity 1.2.2: Operationalization of the Centre for Coastal Management	14
4.4 Activity 1.2.4: Undergraduate Research Grants	22
5.0 PROJECT OUTPUT 2.1: INCREASED MARINE AND COASTAL RESEARCH AND RESOURCE ASSESSMENTS.....	22
5.1 Activity 2.1.1: Conducting Fisheries Stock Assessment	22
5.2 Activity 2.1.2: Conducting Research and Assessment on Marine Fisheries Governance Issues	22
5.3 Activity 2.1.3: Research on Fish and Shellfish of Commercial Value	23
5.4 Activity 2.1.4: Analysis of Value Chains of Fish Trade	24
5.5 Activity 2.1.5: Monitor the Biodiversity and Health of Coastal Ecosystems	24
5.6 Activity 2.1.6: Developing Marine and Coastal Fisheries Database.....	24
4.1 PROJECT OUTPUT 2.2: COMMUNICATION, EXTENSION AND OUTREACH IMPROVED	26
6.1 Activity 2.2.1: Developing Material and Conducting Training on Integrated Coastal Management	26
6.5 Activity 2.2.5: Engaging Policy Makers to Address Coastal and Fisheries Issues	31
6.6 Activity 2.2.6: Building Institutional Partnerships and Collaboration	33

6.7 Activity 2.2.7: Wetlands Ecological Health Monitoring Using School Clubs and Communities.....	33
6.8 Activity 2.2.8: Strengthening Community-based Groups	34
6.9 Activity 2.2.9: Promoting Supplementary Livelihoods in Coastal Communities.....	34

LIST OF FIGURES

Figure 1: Landing beach in Ghana's coast	8
Figure 6: Presentation on Cuttlefish research at DFAS/CCM	23
Figure 2: Participants and instructors of the ICZM Short Course in a group photograph, May 2017 ..	26
Figure 3: Participants of the ICZM Short Course practice coastal profiling.....	27
Figure 4: Climate Change Short Course by CCM, May 2017	28
Figure 5: Field experience on climate change issues during the Climate Change Short Course, May 2017	28
Figure 7: Participants at the GIS Short Course in April 2017.....	29
Figure 8: CCM receives iPad Mini tablet to help pilot UAV	30
Figure 9: Wetlands monitoring clubs measure physicochemical parameters of wetland ecosystems in the Western Region of Ghana	34

LIST OF TABLES

Table 1 Progress of students funded under the project	15
Table 2: List of Current USAID funded Postgraduate Students at the Department of Fisheries and Aquatic Sciences of the University of Cape Coast	20

EXECUTIVE SUMMARY

The third quarter witnessed key accomplishments. The USAID/Ghana Mission Director visited the Central Region and the University of Cape Coast to acquaint himself with activities of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project and to interact with members of staff and students of the Department of Fisheries and Aquatic Sciences (DFAS) and the Centre for Coastal Management (CCM). He also paid courtesy calls on the Vice-Chancellor of UCC and the Central Regional Minister to discuss issues of mutual interest and opportunities for development cooperation. In response to a call for proposal by the European Union (EU) Education, Audio-visual and Culture Executive Agency, the project successfully submitted a proposal for funding to the European Union as part of the Pan-African Program to train professionals in fisheries and aquaculture resources. Four (4) members of DFAS and CCM academic staff embarked on a study tour to the Australian National Centre for Ocean Resources and Security (ANCORS) at the University of Wollongong in Australia to build their capacity in Law of the Sea and Maritime Regulation and Enforcement. Also, five (5) members of DFAS Academic and Technical staff took part in a customized training program organized by the Maritime Safety and Security Department of the Regional Maritime University in Ghana to build their capacity to properly and safely man, operate and maintain the project research boat *RV Sadinella*. In this quarter DFAS selected the last batch of five (5) MPhil Applicants short-listed to receive funding by the project to undertake Masters Programs at DFAS beginning 2017/2018 academic year. Preparations and planning for the maiden Conference on Fisheries and Coastal Environment as part of the project activity on Engaging Policy Makers to Address Fisheries and Coastal Issues gained momentum in this quarter with the program's co-host, the USAID/Ghana Sustainable Fisheries Management Project (SFMP). Within the quarter, the project took delivery of an Unmanned Aerial Vehicle (UAV) acquired by the SFMP, registered it with the Ghana Civil Aviation Authority (GCAA), trained and acquired licenses for DFAS and CCM staff to operate the UAV for fisheries and coastal management research. The project organized three (3) short-courses in Climate Change Adaptation (CCA) in Coastal Communities, Integrated Coastal Management (ICM) and Intermediate Geographic Information Systems (GIS) to equip middle-level professionals of Government and Non-Governmental Agencies with the requisite skills needed for effective performance of their roles and responsibilities. Also, the activity fisheries stock assessment led by an external facilitator came to a close. A delegation of project officials paid a courtesy call on the new Minister of Fisheries and Aquaculture Development to introduce the USAID Fisheries and Coastal Management Capacity Building Project to her and explore potential areas for collaboration between the Ministry and the Project. It is noteworthy that the Project's fisheries governance and policy research facilitators made a presentation and submission on fisheries and coastal environmental sanitation: role of Metropolitan, Municipal and District Assemblies (MMDAs) to the National Development Planning Commission (NDPC) for inclusion in Medium-Term Development Plans. Over twenty (20) environmental journalists representing different media houses and representatives from the Ministry of Fisheries and Aquaculture Development (MoFAD) and the Ministry of Sanitation and Water Resources were trained in effective reportage of fisheries and coastal management issues. In is important to note that the project participated in an eight-member delegation from the University of Cape

(UCC) led by the Vice-Chancellor, Prof. Joseph Gharthey Ampiah to the United States of America (USA) to strengthen the relationship between UCC and some selected Universities in the US. The purpose of the meeting was to explore fruitful partnership opportunities for strengthening capacity building, research, student mobility, resource sharing, faculty exchanges among others. One hundred and twenty-five (125) community members were trained to engage in supplementary livelihood activities in selected communities where 25 of them were supported to set up their own farms. Finally, teachers from selected schools in the Central and Western Region were trained as trainer-of-trainers in wetlands ecological health monitoring to engage students in community wetlands conservation.

INTRODUCTION

1.1 Ghana's Marine Fisheries Sector

Ghana is well endowed with natural resources such as gold, timber, cocoa, diamond, bauxite, manganese and water resources such as fish. Ghana's fishing industry comprises resources from marine waters, inland or freshwater bodies and coastal lagoons. Marine fisheries in Ghana are important for employment, income generation, nutrition, and food security. The marine fisheries sector contributes 3-5% to the country's annual gross domestic product (GDP). In spite of the economic importance of the sector, production from marine capture fisheries has been declining since the mid-1990s, from almost 420, 000 tonnes to 202,000 tonnes in 2014, which indicates revenue losses in the sector. The economic benefits from the fisheries have reduced partly due to lack of effective fisheries management.

Ghana faces increasing challenges of managing its coastal and marine resources, especially marine fish stocks and the overharvesting of other coastal resources. The overexploitation of fish and the pollution of marine and coastal ecosystems are just some of the problems the country faces along its coastal zone. This has come about as a result of non-compliance with and ineffective monitoring and enforcement of fishing rules and regulations, lack of education, training, research, data gathering and analysis, and low government investments in capacity building for natural resource management in the country. Lack of adequate human resource capacity, good governance and well-functioning regulatory structures are a threat to natural resource management in Ghana.



Figure 1: Landing beach in Ghana's coast

Non-compliance, lack of effective monitoring and enforcement of fishing rules and regulations provide fertile grounds for illegal, unregulated and unreported (IUU) fishing. Available fisheries statistics data show that number of fishing vessels as well as fishers have increased beyond sustainable levels with corresponding decreases in fish catch, mainly due to open access nature of small-scale fisheries. Decreases in fish catch result in lower income levels of fishers, which in turn lead to increased levels of poverty particularly in coastal communities. There is a critical need to address the problem of decreasing fish catches, which can only be achieved through improved fisheries management if the Ghana Poverty Reduction Strategy is to be realized. Capacity building is an enabling condition for improved fisheries management. This is a justification for the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project, which has a primary aims of promoting sustainable marine fisheries management in Ghana through capacity building of students, professionals and fishing

communities, using effective partnerships across public and private institutions, both local and international. The project is sponsored by the United States Agency for International Development (USAID) through the Feed-the-Future (FtF) Initiative and it contributes to Government of Ghana's national fisheries policies and coastal development objectives.

1.2 Feed-the-Future (FtF) Initiative of the United States Government

Feed-the-Future (FtF) is a United States Government (USG) Initiative to address global hunger and food insecurity. In 2009, President Barack Obama of the United States committed US\$3.5 billion over a 3-year period to this global initiative, which was launched in 2010 with the aim of fighting hunger and poverty. FtF is coordinated primarily by the USAID based on the fact that every 1 per cent increase in agricultural income per capita reduces the number of people living in extreme poverty by between 0.6 and 1.8 per cent. No other investment has that return. FtF supports initiatives in fisheries and coastal management with funding in view of the fact that the capacity of most developing nations to utilize their coastal and marine resources, while sustainably protecting them from degradation to ensure long-term fish food production is lacking.

1.3 The Fisheries and Coastal Management Capacity Building Support Project

The Fisheries and Coastal Management Capacity Building Support Project is a partnership agreement between the USAID and the University of Cape Coast (UCC) which was signed on 24th October, 2014 and implemented by the Department of Fisheries and Aquatic Sciences ((DFAS) of UCC. The project provides DFAS with administrative, technical and financial assistance. USAID's total contribution to this Project is up to the tune of US\$5,500,000, which is sub-obligated on yearly increments to enable DFAS effectively coordinate capacity building at various 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 food security in Ghana as part of the USG FtF Initiative, and subject to the terms and conditions of the Agreement signed with the University of Cape Coast (PIL No.: 641-A18-FY14-IL#007).

The main purpose of the award is to contribute towards addressing capacity needs in fisheries and coastal management in Ghana. The project was modelled to respond to the issues raised in the SWOT Analysis. It aims at strengthening the institutional capacity of DFAS to train personnel for fisheries and coastal management, and support the Centre for Coastal Management (CCM) at UCC to become fully operationalized. The award also supports the restructuring of integrated data and information support systems for fisheries and coastal management, which serve as building blocks for evidence-based policy formulation and decision making at all levels. Project activities contribute to USAID's development strategy for Ghana as outlined in its Country Development Cooperation Strategy (CDCS), and also respond to USAID/Ghana Development Objective 2: Sustainable and Broadly Shared Economic Growth. Expected outcomes from the five-year project include the building of significant capacity for sustainable marine fisheries and coastal management in Ghana, and management outcomes become more evident.

Local scientific capacities are being strengthened in specific areas such as the provision of quality and relevant educational programs, practical research, extension and advisory services to support the management of Ghana's fisheries and coastal resources, which will enhance the country's social and economic development. Relevant partnerships are being built with institutions with shared research and training interests by creating a platform for regular interaction and dialogues with local and foreign universities, particularly with Centres, Institutes and Departments at the University of Rhode Island (URI). This project has also formed important collaborations with relevant government partners including the Ministry of Fisheries and Aquaculture Development (MoFAD), the Fisheries Commission of Ghana, as well as 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.

The capacities of academic and technical staff of DFAS and the CCM are continuously being strengthened to enhance the use of new technologies and scientific equipment, through the 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 fisheries and coastal management database working with other international data sources and host centres. These will facilitate the training of 10 PhD, 20 Masters and 150 Undergraduate students. The award also includes funding for short courses on climate change adaptation and mitigation in coastal communities, fisheries and coastal management and Geographic Information Systems (GIS) for targeted professionals over the course of five years, which are all facilitated by the Centre for Coastal Management (CCM) as part of its operationalization.

The project also supports the implementation of a DFAS Strategic Plan, development of a Business Plan for CCM, policy dialogues, and critical research with the help of the refurbished Fisheries and Coastal Research Laboratory. The project conducts research to generate data and information to fill key knowledge gaps that are required for a more effective implementation of Ghana's Fisheries and Aquaculture Sector Development Plan, and undertakes community outreach and extension programs to improve long-term national capacity on fisheries and coastal issues, train personnel in relevant government agencies, and strengthen their links to a network of researchers within national and international research organizations.

1.4 The Department of Fisheries and Aquatic Sciences of the University of Cape Coast

The University of Cape Coast (UCC) is located close to the Atlantic Ocean, which makes the Department of Fisheries and Aquatic Sciences (DFAS) of UCC one of the leading institutions in the area of Fisheries and Marine Sciences in Ghana. DFAS has a vision to become an internationally recognized partner in the conservation of healthy aquatic ecosystems for sustained provision of goods and services, in collaboration with public and private institutions. This vision has been facilitated by the initiation of the USAID funding support to DFAS. The capacity of DFAS has been strengthened with the provision of adequate logistics and teaching infrastructure, which has made DFAS more attractive to an increasing number of students wanting to undertake studies at the School of Biological Sciences, and enhanced opportunities for institutional collaboration. DFAS now has a state-of-the-art laboratory with relevant modern equipment, which supports hands-on practical based training of students. This presents DFAS students with future academic prospects. DFAS offers undergraduate (BSc) degree in Fisheries and Aquatic Sciences and postgraduate (MPhil and PhD) degrees that expose students to:

- Oceanography, Limnology and Aquatic Ecology
- Integrated Coastal Resource Management including Petroleum Ecology and Climate Change Studies
- Aquaculture, bridging gaps between demand and supply in the fishing industry and aquaculture entrepreneurship
- Fisheries Science including fisheries ecology and organismic interactions

1.5 Monitoring and Evaluation (M&E)

Monitoring and Evaluation (M&E) forms a critical component of planning and implementation of all activities of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project. During the quarter under review, the project M&E team monitored all project activities planned for the

third quarter, including those being implemented by external facilitators, and reported on the progress to the Core Management Team on regular basis in order to ensure that activities were implemented according to the timelines specified in the Year 3 workplan.

The project M&E system has so far been guided by the project Performance Monitoring Plan (PMP) that was developed at project inception in Year One. In course of implementation of project activities, it became necessary for the project PMP to be updated to accommodate lessons learned and changes encountered in course of time, and to improve upon the overall M&E system. The project PMP was updated in this quarter to reflect changes that had occurred as project activities progressed. The updated project PMP will be submitted to USAID for review and subsequent approval.

In late 2016, AfricaLead conducted an Organizational Capacity Assessment for DFAS and the CCM to identify strengths and weaknesses of both institutions and opportunities for capacity strengthening and enhancement. In this reporting quarter, AfricaLead organized a follow-up visit to DFAS and the CCM to assess progress made towards implementation of some of the recommendations made in the Organizational Capacity Assessment report. During this visit, AfricaLead also took the opportunity to have a meeting with the project M&E team to assess how the M&E team has implemented some of the recommendations made from participating in the AfricaLead training on Monitoring and Evaluation and Results-Based Management. After the meeting with the M&E team AfricaLead inspected the project M&E system in order to gather evidence that there is a functional project M&E system in place. It was gathered from proceedings of the meeting and inspection of the project M&E system that AfricaLead was convinced the M&E team has successfully implemented some of the recommendations but the M&E system still needed more improvements. Suggestions for improvements were made which were duly noted by the M&E team for future improvements.

One important lesson the M&E team learned from participating in the AfricaLead Monitoring and Evaluation Results-Based Management training was that, in setting up an M&E system, there is the need to assemble all project reference documents to form an important component of the M&E system. It was recommended in that training that the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project assembled all project reference documents and kept as part of the project M&E system. To implement that recommendation, Project Management assembled a team to conduct a thorough review of all project documents in order to have final versions of all the documents, and print copies to be kept as reference documents in the M&E system. The review exercise was completed in this reporting quarter and plans are underway for the documents to be printed.

2.0 PROGRAM COMPONENTS, MANAGEMENT AND ACTIVITIES IN THE THIRD QUARTER OF YEAR TWO

2.1 Activities Completed in the Third Quarter

Key Activities Completed within the Third Quarter:

- USAID/Ghana Mission Director visited the Central Region and the University of Cape Coast to acquaint himself with activities of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project and to interact with members of staff and students of the Department of Fisheries and Aquatic Sciences (DFAS) and the Centre for Coastal Management (CCM). He also paid courtesy calls on the Vice-

Chancellor of UCC and the Central Regional Minister to discuss issues of mutual interest and opportunities for development cooperation.

- In response to a call for proposal by the European Union (EU) Education, Audio-visual and Culture Executive Agency, the project successfully submitted a proposal for funding to the European Union as part of the Pan-African Program to train professionals in fisheries and aquaculture resources.
- Four (4) members of DFAS and CCM academic staff embarked on a study tour to the Australian National Centre for Ocean Resources and Security (ANCORS) at the University of Wollongong in Australia to build their capacity in Law of the Sea and Maritime Regulation and Enforcement.
- Five (5) members of DFAS Academic and Technical staff took part in a customized training program organized by the Maritime Safety and Security Department of the Regional Maritime University in Ghana to build their capacity to properly and safely man, operate and maintain the project research boat *RV Sadinella*.
- Interviews were conducted by DFAS and CCM Academic staff members to select the last batch of five (5) MPhil Applicants short-listed to receive funding by the project to undertake Masters Programs at DFAS beginning 2017/2018 academic year.
- Preparations and planning for the maiden Conference on Fisheries and Coastal Environment as part of the project activity on Engaging Policy Makers to Address Fisheries and Coastal Issues gained momentum in this quarter with the program's co-host, the USAID/Ghana Sustainable Fisheries Management Project (SFMP).
- The project took delivery of an Unmanned Aerial Vehicle (UAV) acquired by the SFMP, registered it with the Ghana Civil Aviation Authority (GCAA), trained and acquired licenses for DFAS and CCM staff to operate the UAV for fisheries and coastal management research.
- The project organized three (3) short-courses in Climate Change Adaptation (CCA) in Coastal Communities, Integrated Coastal Management (ICM) and Intermediate Geographic Information Systems (GIS) to equip middle-level professionals of Government and Non-Governmental Agencies with the requisite skills needed for effective performance of their roles and responsibilities.
- The activity on conduction fisheries stock assessment led by an external facilitator was completed.
- A delegation of project officials paid a courtesy call on the new Minister of Fisheries and Aquaculture Development to introduce the USAID Fisheries and Coastal Management Capacity Building Project to her and explore potential areas for collaboration between the Ministry and the Project.
- Project's fisheries governance and policy research facilitators made a presentation and submission on fisheries and coastal environmental sanitation: role of Metropolitan, Municipal and District Assemblies (MMDAs) to the National Development Planning Commission (NDPC) for inclusion in Medium-Term Development Plans.
- Over twenty (20) environmental journalists representing different media houses and representatives from the Ministry of Fisheries and Aquaculture Development (MoFAD)

and the Ministry of Sanitation and Water Resources were trained in effective reportage of fisheries and coastal management issues.

- The project participated in an eight-member delegation from the University of Cape (UCC) led by the Vice-Chancellor, Prof. Joseph Ghartey Ampiah to the United States of America (USA) to strengthen the relationship between UCC and some selected Universities in the US. The purpose of the meeting was to explore fruitful partnership opportunities for strengthening capacity building, research, student mobility, resource sharing, faculty exchanges among others.
- 125 community members were trained to engage in supplementary livelihood activities in selected communities where 25 of them were supported to set up their own farms.
- Teachers from selected schools in the Central and Western Region were trained as trainer-of-trainers in wetlands ecological health monitoring to engage students in community wetlands conservation

3.0 PROJECT OUTPUT 1.1: IMPROVED INFRASTRUCTURE

3.1 Activity 1.1.1: Renovating and Equipping Fisheries and Coastal Research

Laboratory

Physical development works and renovation of the fisheries and coastal research laboratory has been completed with some laboratory equipment installed and in use, but other equipment that require installation by a professional body are yet to be installed. Remaining laboratory equipment such as the Gas Chromatographic Unit (GCU) was procured in this quarter. A Business Plan that outlines strategies designed to run the Fisheries and Coastal Research Laboratory as a business to support internally generated funds by DFAS was also completed and submitted in this quarter. In spite of all these achievements, the laboratory itself is yet to gain ISO certification status. Initial attempts to get the Ghana Standards Authority to lead this process on behalf of DFAS was not successful due mainly to the request by the Ghana Standards Authority to charge very high fees for their services. The project hence identified a different service provider in this quarter to lead the process. It is therefore envisaged that contractual agreements will be reached for the remaining laboratory equipment to be installed and the laboratory also ISO certified for it to become fully operational in the coming quarter. Licensing procedures for the research boat continued in this quarter whilst the vessel was equipped with additional instruments and tested at sea.

3.2 Activity 1.1.2: Refurbishing and Equipping office/Lecture/Computer rooms and Library

Physical development work on refurbishing and equipping offices and the library has been fully completed. This means that eight (8) offices belonging to members of academic staff and technicians earmarked for refurbishment by the project have successfully been refurbished and equipped with office materials to enhance the work of academic and technical staff of DFAS. The Departmental library has also been well refurbished with all equipment supplied. Library books have been procured and academic journals have also been subscribed. Regular maintenance is needed to always keep offices, library books and all other equipment in good shape.

3.3 Activity 1.1.3: Acquisition of Vehicles to Support Educational, Training, Research and Extension Activities

The project has acquired all three (3) vehicles planned to be procured in course of the five-year life of project. Project management needs to ensure that the vehicles are well maintained and regularly serviced to support educational, training, research and extension activities.

4.0 PROJECT OUTPUT 1.2 INCREASED TECHNICAL AND SCIENTIFIC KNOWLEDGE

4.1 Activity 1.2.1: Academic and Technical Staff Capacity Strengthening

In this reporting period, three (3) members of DFAS academic staff and one (1) project staff who are more involved in the Integrated Coastal Management component of the project attended a capacity building training program on the Law of the Sea and Maritime Regulation and Enforcement at the Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong (UOW) in Australia. ANCORS offered a 50% discount on course fees due to the special relationship between ANCORS and DFAS. The participants who took part in this training program at ANCORS received education and training on law of the sea, maritime regulation and enforcement, maritime security, marine fisheries management and also received marine policy development advice. Training participants also learned from how ANCORS short courses are organized and are going to use the experience gained to improve on the short courses that are run by the CCM after taking part in the short courses at ANCORS. ANCORS and shared some experiences with training participants on how ANCORS operates in terms of strategies for organizing short courses, their overall management and administrative structure, funding and income generation mechanisms. These experiences will be applied to improve upon CCM short courses and how to run the short courses as a business.

In this quarter, five (5) members of DFAS staff also participated in a training course at the Maritime Safety and Security Department of the Regional Maritime University (RMU) in Accra to build their capacity especially for manning the research boat acquired for DFAS. This training was a requirement by the Ghana Maritime Authority for licensing the research boat for operations at sea and inland water bodies. Training participants were taken through short courses and training in basic maritime safety, security and survival. They received training in five ((5) mandatory courses for seafarers in Basic Fire Fighting, Personal Survival Techniques, Elementary First Aid, Personal Safety and Social Responsibility, and International Ship and Port Facility Security, as well as an additional course in Steering. The participants were issued with certificates of participation at the end of the 2-week program at the RMU.

4.2 Activity 1.2.2: Operationalization of the Centre for Coastal Management

In the quarter under review, operationalization of the Centre for Coastal Management (CCM) made some essential strides with respect to organization and hosting of four (4) short courses in Climate Change Adaptation and Mitigation in Coastal Communities, Integrated Coastal Management, Fisheries Management and Geographic Information Systems aimed at equipping middle-level government and non-governmental officials, and Civil Society Organization members with the skills they need to effectively tackle some of the management challenges confronting fisheries and the coast.

In addition to the running of short courses, CCM also facilitated extension and communication programs at the community and national levels, notably communication findings from fisheries governance and policy research to the Ministry of Fisheries and Aquaculture Development, Ministry of

Water Resources and Sanitation and the National Development Planning Commission to support Medium-Term Development Plans of Metropolitan, Municipal and District Assemblies.

4.3 Activity 1.2.3: Support for Postgraduate (MPhil & PhD) Training Program

Also in this reporting period, the last batch of MPhil students were awarded scholarships under the project to start programs of study in Fisheries Science, Integrated Coastal Zone Management, Oceanography and Limnology and Aquaculture beginning 2017/2018 academic year. Applicants were short-listed through a competitive selection process after which five (5) of them were finally given the award. The final interview results indicated that one (1) person was selected to read Integrated Coastal Zone Management, two (2) for Fisheries Science, one (1) for Aquaculture and one (1) for Oceanography and Limnology. The outcome of the selection process was communicated to the successful applicants and were encouraged to proceed with formal admission procedures at the University of Cape Coast and in DFAS since the award is conditional on acceptance/admission to the respective academic programmes at DFAS. Successful applicants have since gained admission to the University and are ready to start their respective programmes beginning this academic year, just on time to complete their studies before end of project.

Plans are also far advanced for the first batch of PhD students to travel to URI for a semester abroad. They are scheduled to travel to URI in September 2017 for a maximum stay of up to 6 months. A meeting is currently scheduled for a resource person from URI to discuss URI course registration processes, introduce them to URI and what to expect in the academic semester as well as travel information.

Table 1 Progress of students funded under the project

No.	Name	Activities Carried out in Year 3	Plans for Year 4
PHD Students			
1.	Alberta Jonah	Proposal development and Presentation	Monthly data collection of ecological and physic-chemical data from the 5 ecosystems fin the study area
		Reconnaissance visit to study site	Data Analysis
		Short courses in GIS, ICZM, Climate Change and Proposal Writing	Development of Questionnaires and interview schedules
		Stakeholder meeting for MPA's in Ghana	Ecosystem classification and Mapping of ecosystem services
		Literature review	Course work
		Participation in CCM Conference	
2.	Elizabeth Effah	Proposal development and presentation	Monthly data collection of ecological data from Ankobra
		Reconnaissance survey of study site	Data analysis
		Short courses in GIS, ICZM, Climate Change and Proposal Writing	Writing of thesis chapters

		Monthly data collection of ecological data from Ankobra	
		Participation in CCM Conference	
		Questionnaire Development	
3.	Isaac Osei	Proposal development and presentation	Data organization and analysis
		Preliminary studies of study site	Data collection: Physico chemical parameters and biological data Fouling experiment and bottom & suspension culture
		Data Collection and Literature search	Proximate and taste analysis
4.	Ebenezer Kpelly	Proposal Development	Sampling of fish from study area
		Review of Literature	Monthly sampling of fish
		Proximate analysis on undigested waste of fish	Data analysis
			Carrying out culture
5.	Fred Jonah	Proposal development and presentation	Field data survey
		Testing methodology (field and lab protocols) to improve proposal	Laboratory analysis including analysis for natural stable isotope abundance
		Training at GAEC on stable isotope ecology	
		Field data collection	
6.	Rhoda Lims Sakyi	Proposal development and presentation	Field sampling across all selected sampling sites for collection of water, healthy disease and moribund fish
		Aquaculture farm visits	Laboratory work on fish disease diagnosis
		Questionnaire administered	Review of literature to appropriately optimize lab protocol for write-up
		Course work at Molecular Biology and Biotechnology Department	
		Laboratory Analysis	
7.	Miriam Ameworwor	Proposal development and presentation	Field sampling
		Preliminary survey of study sites	Interviews with fishermen
		Two months of field sampling done	Laboratory analysis
		Laboratory analysis	Data analysis
		Interviews (40) fishermen on the bottom set gill net fishery	Thesis write-up
		Summer school on oceanography and applied nautical Science (RMU)	Trip to URI in August

8.	Lesley Ntim	Proposal development and presentation	Field data collection and analysis
		Coursework	Additional coursework
		Reconnaissance survey	Literature search
		Preparation of field Questionnaire	Thesis write-up
		Pre-testing of field instruments	
9.	Gertrude Aku Dali	Proposal development and presentation	Social survey
		Reconnaissance study carried out at both study sites (Kakum and Pra Mangrove forests) in January 2017.	Sediment collection and analyses
		Demarcation of study plots (10,000m ²) took place at each study site in February	Estuarine water quality analyses
		Data collection was started in March at both study sites	Litter production
		Mangrove species sampled in about 6,750 m ² and 1,800 m ² at Kakum and Pra Mangrove forests respectively	Patterns in environmental factors
		Soil sediment collection for macroinvertebrates sorting and identification, and for pH, salinity, nutrient and heavy metal analyses.	Determination of land use and cover
		Measurement of water quality along the banks of the estuary also started in June.	Data analyses & write-up
		Thirty (30) litter traps have been set at study site in May while litter measurements began in June	Trip to URI (USA)
10.	Jemima Etornam Kassah	Data collection: 2,028 freshly landed chub mackerel obtained from Sekondi, Tema, Elmina, Axim and Half-Assini 3 slabs of trawl bycatch obtained monthly from Elmina	Study trip to URI Thesis Write up Laboratory analysis of samples (ageing, histology and fecundity analysis) Progress report presentation Thesis Submission
		Laboratory analysis: Fish samples analysed for morphometric, fat weight index, stomach weight index, macroscopic staging and sexing of gonads	
11.	Rebecca Essamuah	Bimonthly sampling of water and testing for physico-chemical parameters such as DO, pH, Salinity, turbidity, nutrient analysis.	Continue field sampling

		Sampling of fish, avifauna, plankton and littoral vegetation in the catchment	Laboratory analysis
		Solid waste sampling	Visit to URI
		GIS training	
		Drone operation	
12.	L. A. Ahiah	Introduction and Literature review drafted	Trip to USA
		Methodology drafted	Sex reversal and growth performance test of F ₂ hybrids
		F ₁ was raised to sexual maturity	Seed production, fecundity and fertility evaluation of F ₁
		F ₁ were crossed to produce F ₂	Growth performance test of F ₂ for breeding value
		Growth performance test of F ₂ for breeding value evaluation on-going	Analyze collected data and writing thesis
		Sex reversal and growth performance test of different concentrations of 17 –Alpha MT –on-going	Prepare and submit draft thesis
		Growth performance test of F ₂ to evaluate selective breeding –on-going	Final editing and submission of Thesis
		Analyze collected data and writing thesis	Conference to disseminate research findings
13.	Michelle Clotey	Bimonthly sampling of fish (Canary dentex, Pink dentex, Blue-spotted seabream) from Tema, Sekondi and Elmina Total samples: 772 Canary dentex, 278 Pink dentex, 1401 Blue-spotted seabream	Investigate the type of hermaphroditism exhibited by the species
		Laboratory analyses of the fish samples for the lengths (standard, forked and total), body weights, gonad weights and stages, and sagittal otoliths of the seabreams	Conduct studies on the sagittal otoliths to help determine the ages of the species.
		Progress report presentation to Department students and faculty	Do more laboratory analyses to determine the fecundity of the seabreams
			Collect and analyze data on the relative abundance of the seabreams by weight of the fish landed from the relevant authorities
			Estimate the growth and mortality parameters of the species
			Take a semester’s course at the university of Rhode Island

14.	Margaret F. Dzakpasu	Data collection started in June 2016 and will end in August 2017. Samples are collected quarterly on some hydrographic factors, nutrients (nitrates and phosphates), heavy metals, sediment particle sizes, organic matter, and benthic macroinvertebrates.	Finish up with lab work: identification of macroinvertebrates, organic matter, etc.
		Progress reports on the preliminary results have been presented at departmental seminars.	Take a semester's course at the University of Rhode Island.
			Data analysis and write-up of thesis
			Submission of thesis
MPHIL STUDENTS			
1.	Mercy Johnson-Ashun	Proposal Presentation	
		Data collection	Oral defence/examinations
		Thesis writing and submission	
2.	Kezia Baidoo	Proposal Development and Presentation	Oral defence/examinations
		Monthly sampling and laboratory analysis for 6 months	
		Thesis write-up and submission by July 2017	
3.	Justina Annan	Coursework	Sampling
		Proposal development	Laboratory analysis
			Seminar presentation
			Write-up
4.	William Dogah	Course work	Sampling
		Proposal development	Laboratory analysis
			Seminar presentation
			Thesis Write-up
5.	Paulina Okpei	Coursework	Sampling
		Preliminary investigations	Laboratory analysis
		Proposal development	Seminar presentation
			Thesis Write-up
6.	Success Sowah	Coursework	Sampling
		Preliminary investigations	Laboratory analysis
		Proposal development	Seminar presentation
			Thesis Write-up

Table 2: List of Current USAID funded Postgraduate Students at the Department of Fisheries and Aquatic Sciences of the University of Cape Coast

No	Name of Student	Programme of Study	Level	Status	Start Date	Completion Date	Funding	Principal Supervisor	Co-Supervisor(s)
1	Divine Worlanyo HOTOR	Fisheries Science	MPhil	2nd Year	2015/2016	Sep 2017	Full	Prof. Joseph Aggrey-Fynn	Prof. John Blay
2	Jennifer ESHILLEY	ICZM	MPhil	2nd Year	2015/2016	Sep 2017	Full	Dr. Denis. W. Aheto	Dr. Noble K. Asare
3	Kezia BAIDOO	Fisheries Science	MPhil	2nd Year	2015/2016	Sep 2017	Full	Prof. John Blay	Dr. Noble K. Asare
4	Mercy JOHNSOM-ESHUN	Aquaculture	MPhil	2nd Year	2015/2016	Sep 2017	Full	Prof. Kobina Yankson	Dr. Emmanuel Acheampong
5	Simon Kyei GYIMAH	Aquaculture	MPhil	2nd Year	2015/2016	Sep 2017	Full	Prof. Edward A. Obodai	Dr. Emmanuel Acheampong
6	Lawrence Armah AHIAH	Aquaculture	PhD	2nd Year	2015/2016	Sep 2018	Full	Prof. John Blay	Prof. Kobina Yankson
7	Michelle N. Kordei CLOTTEY	Fisheries Science	PhD	2nd Year	2015/2016	Sep 2018	Full	Prof. Joseph Aggrey-Fynn	Prof. John Blay
8	Jemimah Etonam KASSAH	Fisheries Science	PhD	2nd Year	2015/2016	Sep 2018	Full	Prof. John Blay	Dr. Najih Lazar
9	Rebecca K ESSAMUAH	ICZM	PhD	2nd Year	2015/2016	Sep 2018	Full	Dr. Denis. W. Aheto	Dr. Emmanuel Acheampong
10	Margaret F. A. DZAKPASU	Oceanogr. & Limnol.	PhD	2nd Year	2015/2016	Sep 2018	Full	Prof. Kobina Yankson	Dr. Emmanuel Lamptey
11	Success Adjeley SOWAH	Oceanogr. & Limnol.	MPhil	1st Year	2016/2017	Sep 2018	Full	Prof. Kobina Yankson	Dr. Noble K. Asare
12	Paulina OKEH	Fisheries Science	MPhil	1st Year	2016/2017	Sep 2018	Full	Prof. Joseph Aggrey-Fynn	Dr. Isaac Okyere
13	William DOGAH	Aquaculture	MPhil	1st Year	2016/2017	Sep 2018	Full	Prof. Edward A. Obodai	Dr. George Darpaah
14	Nunana AGBEMEBISE	ICZM	MPhil	1st Year	2016/2017	Sep 2018	Full	Dr. Denis W. Aheto	Prof. John Blay
15	Justina Ekuwa ANNAN	ICZM	MPhil	1st Year	2016/2017	Sep 2018	Full	Dr. Denis W. Aheto	Prof. Edward A. Obodai
16	Fredrick Ekow JONAH	Oceanogr. & Limnol.	PhD	1st Year	2016/2017	Sep 2019	Full	Dr. Noble K. Asare	Dr. Emmanuel Acheampong
17	Miriam Y. AMEWORWOR	Fisheries Science	PhD	1st Year	2016/2017	Sep 2019	Full	Prof. John Blay	Prof. Joseph Aggrey-Fynn

18	Rhoda Lims Osae SAKYI	Aquaculture	PhD	1st Year	2016/2017	Sep 2019	Full	Prof. Kobina Yankson	Dr. Mike Osei-Tweneboa
19	Gertrude Lucky Aku DALI	ICZM	PhD	1st Year	2016/2017	Sep 2019	Full	Dr. Denis W. Aheto	Prof. John Blay
20	Lesley NTIM	ICZM	PhD	1st Year	2016/2017	Sep 2019	Full	Prof. John Blay	Dr. Denis W. Aheto
21	Elizabeth EFFAH	ICZM	PhD	1st Year	2016/2017	Sep 2019	Part	Dr. Denis Aheto	Dr. Emmanuel Acheampong
22	Sheila FYNN-KORSAH	Fisheries Science	PhD	1st Year	2016/2017	Sep 2019	Part	Prof. Joseph Aggrey-Fynn	Dr. Najih Lazar
23	Ebenezer Delali KPELLY	Fisheries Science	PhD	1st Year	2016/2017	Sep 2019	Part	Prof. John Blay	Prof. Joseph Aggrey-Fynn
24	Ramat Quaigrane DUKER	Oceanogr. & Limnol.	PhD	1st Year	2016/2017	Sep 2019	Part	Dr. Noble K. Asare	Prof. Edward A. Obodai
25	Isaac Kofi OSEI	Fisheries Science	PhD	1st Year	2016/2017	Sep 2019	Part	Prof. Kobina Yankson	Prof. Edward A. Obodai
26	Alberta JONAH	ICZM	PhD	1st Year	2016/2017	Sep 2019	Part	Dr. Denis W. Aheto	Dr. Isaac Okyere

4.4 Activity 1.2.4: Undergraduate Research Grants

The project provides small grants to final year undergraduate students of DFAS and other sister Universities to assist them financially to carry out field research for their dissertation as a way of strengthening the collaboration between the project and other Universities. A total of 20 field research grants (5 per institution) worth US\$500 per student were awarded to students from 4 public Universities in addition to 9 current undergraduate students of DFAS to support their final year small research projects. Prior to the disbursement of the funds, a Memorandum of Understanding (MoU) that covers terms and conditions of the support was developed and signed between DFAS and the other institutions to ensure its successful implementation. In the quarter under review, progress was closely monitored to ensure that the students successfully completed and submitted their dissertations.

5.0 PROJECT OUTPUT 2.1: INCREASED MARINE AND COASTAL RESEARCH AND RESOURCE ASSESSMENTS

5.1 Activity 2.1.1: Conducting Fisheries Stock Assessment

This activity is aimed at conducting research to provide data and information on some selected commercially important marine fish stocks in Ghanaian coastal waters to inform management decision making on the sustainability and conservation of the targeted stocks. This activity was facilitated by a fish stock assessment expert from the Department of Marine and Fisheries Science, University of Ghana which started in Year 2 and continued to Year 3 to have an all-year round data on the status of the selected stocks. The monthly stock assessment was completed in the last quarter, and a final report was submitted in this quarter. Monthly length-frequency data was compiled to estimate growth and mortality parameters and the estimation of Maximum Sustainable Yield (MSY).

Summary of findings from the assessment showed that annual catches for artisanal and semi-industrial vessels have gradually declined since the mid-1980s, which was largely attributed to increased fishing effort in terms of the number of canoes or semi-industrial vessels. Tuna catches however showed an increasing trend possibly due to the wider geographical reach, mostly beyond Ghana's fishery waters. The mean CPUE values were not uniform for the artisanal fisheries (ranged between 4.7 and 54.8 kg per canoe per day) which suggest that fish distribution is not uniform in the coastal waters. The estimated MSY for artisanal, semi-industrial and trawlers were 237,255 metric tons, 19,949 metric tons and 20,450 metric tons respectively, at an optimum fishing effort (F_{msy}) of 9,045 canoes, 1062 semi-industrial vessels and 103 trawlers respectively.

Comparison of annual fish catches since the mid-1980s with the estimated MSY values indicate that MSY has been surpassed for both artisanal and industrial fisheries sectors, which is a revelation of growth overfishing as shown by lower modal sizes of the landed fish species falling below the minimum permissible landing sizes of commercially important fish species. Fishing beyond MSY comes with negative implications both on the sustainability of stocks and livelihoods. This justifies the urgent need for the enforcement of fishing rules and regulations. It is concluded from the findings that the narrowly based management of single-species approach be replaced by the more broadly based management of ecosystems (or ecosystem-based management) that supports all marine species.

5.2 Activity 2.1.2: Conducting Research and Assessment on Marine Fisheries Governance Issues

For FY 2017 and therefore in this quarter, the activity on research and assessment on marine fisheries governance issues was combined with the activity on engaging policy makers to address coastal and fisheries issues, which means that most of the activities on research and assessment on marine fisheries governance issues have been reported as part of activities in section 6.5 of this report. Activities in this

quarter were centered on implementing the outcomes of research and policy dialogues conducted in Year 2 at the district, regional and national levels. They were focused on sets of principles and actions to guide activities at the various landing beaches and various government implementing levels as agreed upon nationally. The research focused largely on in-depth surveys and reviews of various social issues in the coastal fishing communities of Ghana. The areas of focus included the following: traditional governance or customary social arrangements, local governance and decentralization, and collaborative/community rights-based management and their legal dimensions, environment, sanitation, children, gender and tourism issues. Fifteen (15) landing beaches have been evaluated on governance issues so far in this quarter; in the Mfantseman and Ekumfi Districts in Central Region. Six landing beaches have also been evaluated in two districts of the Western Region; Shama District and Sekondi/Takoradi/Metropolitan Assembly (STMA).

Through this activity, it has been found out that there is a general perception by fisheries stakeholders that, illegal fishing practices coupled with ineffective governance systems particularly at the community level are mainly responsible for the decrease in fish catch and degradation of the coastal environment. However, this presents an opportunity for reform in the fisheries sector as there is the willingness and agreement by all stakeholders that change is needed, and the change has to occur from bottom-up rather than top-down, and supported by the District Assemblies and traditional authorities. This formed the basis for engaging policy makers at the national level through activities described in section 6.5.

5.3 Activity 2.1.3: Research on Fish and Shellfish of Commercial Value

With decrease in production of marine capture fisheries, aquaculture is perhaps an option that could be undertaken on a large scale to close the widening gap between fish supply and demand. However, there is inadequate scientific knowledge on the biology and culture potential of many fish species. This is an issue that must certainly be addressed if the potential of aquaculture is to be realized and promoted as a viable business. The project has identified the potential of Tilapia and shellfish aquaculture through research on fish and shellfish of commercial value and has therefore intensified scientific studies on the biology and culture of brackish water fish resources such as oysters to generate data and information needed to increase fish production from aquaculture.



Figure 2: Presentation on Cuttlefish research at DFAS/CCM

This activity involves collaborative research between students and academic staff at the Densu delta in Accra and elsewhere in the Central and Western Regions of Ghana. A PhD student is currently undertaking research on the topic; a study on the fishery, aspects of the biology and culture of the mangrove oyster *Crassostrea tulipa* population at Densu Estuary in Ghana under the supervision of senior academic advisors at DFAS who are experts in the field. A collaborative research is also ongoing between DFAS and SFMP in the Densu delta in the Greater Accra Region which is particularly looking at the role of women in oyster fisheries and how that could be enhanced for wealth creation. So far in this collaborative research, a conclusion has been drawn that oyster populations have huge potential to supplement livelihoods of coastal dwellers and therefore its culture must be promoted as a business that can contribute significantly to the incomes of fishers and local economies, and also reduce pressure on already depleted capture fisheries.

5.4 Activity 2.1.4: Analysis of Value Chains of Fish Trade

This activity is departmental driven involving students, research assistants and academic staff of the Department. Currently, there is a PhD student that is working on the topic: “Value chain analysis of *Pseudotolithus species* towards food security in Ghana”. She has proposed that *Pseudotolithus species* is known to be commercially important throughout the Atlantic coast of West Africa. There is some data and information on aspects of the biology and ecology of this fish, but very little is known and there is almost no data on the commercial status of this important fish, including value chain analysis of this species. This is the justification for her research. The study is expected to produce data and information on the value chain of *Pseudotolithus species* and will also address challenges along each step of the value chain which will be critical for management decision making.

5.5 Activity 2.1.5: Monitor the Biodiversity and Health of Coastal Ecosystems

In the quarter under review, a contract was signed between the project and the Department of Fisheries and Watershed Management of the Kwame Nkrumah University of Science and Technology to continue with research work that started in Year 2 in order to collect scientific data to have an all-year round data that will serve as baseline conditions for improved management of the lagoon in Half Assini. Some work was done in this quarter regarding monitoring the physicochemical and nutrient status of the lagoon. The research team reported that the sandbar between the sea and the *Awiane* lagoon has been breached allowing seawater to enter the lagoon at high tide. The wave-driven lagoon flushing has therefore changed the physicochemical dynamics of the lagoon, resulting in two distinct regimes at the two sampling sites. Salinity at the beach end of the lagoon has increased from freshwater to brackish but further assessment of fish stock is required to determine whether the changes in the physicochemical conditions has affected fish diversity. The sampling site farther away from the beach has, however, maintained typical freshwater conditions indicating that the effect of the influx of the seawater is only partial. Draining of water from the lagoon into the sea by gravity following the breaching of the sandbar has resulted in reduced water depth of the lagoon. A complete research cycle on the lagoon will provide baseline data and information that are critical for making management decisions on the conservation of the lagoon and protection of its biodiversity.

5.6 Activity 2.1.6: Developing Marine and Coastal Fisheries Database

The marine and coastal fisheries database team organized a workshop to plan moving that activity forward. The purpose of the workshop was to discuss issues related to the management

and further development of FishCoMGhana, the online platform for the management and distribution of Ghana's fisheries and coastal research data. A Geographic Information Systems (GIS) expert from the team that is facilitating the activity on developing material and conducting training on GIS participated in this workshop to provide technical assistance to support the development of the marine and coastal fisheries database moving forward. FishCoMGhana was launched by the project in January 2017 in Accra in collaboration with sister universities in Ghana and other relevant research institutions as well as USAID project partners.

Since the launch of the FishCoMGhana database, the project has mostly relied on the services of an external Information Technology (IT) specialist to build the website and the back-end of the database, which means that the IT specialist has been the one who manages the FishCoMGhana database, controls the publication of scientific literature, manages online communications between users of the FishCoMGhana database, and the scientists responsible for the data that is published as part of the database. In addition to the external IT specialist controlling the operations of the database, management of Geographic Information Systems (GIS) data related to Ghana's coastal environment and fisheries resources were not included in the FishCoMGhana database. This background information necessitated the organization of the workshop to train DFAS database team to take over the administrative responsibilities related to FishCoMGhana database which does not require specialized IT skills. The training focussed on defining and implementing rules regarding the system security of the FishCoMGhana database, and how to publish new content and communication with users of the database. Strategies for the management of maps and other GIS-based data on the FishCoMGhana database were also developed. The workshop was planned to answer the following questions

1. What are the important guidelines for ensuring an efficient and user-friendly management of GIS-based data online?
2. What (hardware) infrastructure will be needed for the management of GIS data as part of the FishCoMGhana database?
3. How can FishCoMGhana include different GIS applications, for example, to host numeric GIS data and images?
4. What criteria should be used to assess the quality of GIS data before it is accepted for publication on the FishCoMGhana database?
5. Given the limited DFAS staff time and GIS expertise, which of the available software will be appropriate for the management of GIS-based data on FishCoMGhana?

The external IT specialist provided information on the strengths and weaknesses of GIS application and links to free GIS. The workshop provided answers to these questions which have been documented to inform future project activities related to advancing the development of the marine and coastal fisheries database. The following activities have been planned in the near future:

- All papers/articles that will be downloaded from the FishCoMGhana database will be preceded with a fresh page containing a statement indicating the name of the database, and the date and time the paper/article is downloaded from database
- Maps and other GIS-based data will be effectively managed

- A gateway to the Ghana Fisheries and Aquatic Science Society journal will be included
- Training will be provided to enhance the editorial competency of FishCoMGhana managers
- FishCoMGhana will be publicized around the country and
- Members of FishCoMGhana editorial team will be provided with smart mobile phones to enable them edit and post materials on FishCoMGhana.

4.1 PROJECT OUTPUT 2.2: COMMUNICATION, EXTENSION AND OUTREACH IMPROVED

6.1 Activity 2.2.1: Developing Material and Conducting Training on Integrated Coastal Management

During the quarter under review, a facilitator was contracted to lead the training on Integrated Coastal Management, one of the short courses developed by the project and coordinated by the Centre for Coastal Management. This training course aims to train, in particular, middle-level professionals from marine and coastal-related governmental and non- governmental institutions at national and district levels in order to build their capacities and competencies to confront coastal management challenges in Ghana. The facilitator was contracted to publish training manuals developed for capacity building in Integrated Coastal Management (ICM) and conduct a five-day training course using the published training modules. He was also tasked to organize all communications on the training workshop, provide media communication covering, print and electronic outlets in coordination with CCM, and coordinate with CCM to identify participants for the course including acquisition of all relevant materials for the course.



Figure 3: Participants and instructors of the ICZM Short Course in a group photograph, May 2017

Eight (8) modules prepared for the training were successfully delivered, with active participation, interactions and discussions among participants as well as conducting fieldwork that covered issues presented. Module 1 covered Introduction to ICM, module 2 Coastal Ecosystems in Ghana, module 3 Opportunities, Uses and Concerns of the Coastal Zone, module 4 Types of Integration and the ICZM processes, module 5 Coastal Management Instruments,

module 6 Co-Management and Community-Based Management of Coastal Resources, module 7 Coastal Profile and module 8 Fieldwork with emphasis on Coastal Profiling and Coastal Environmental Health Assessment.



Figure 4: Participants of the ICZM Short Course practice coastal profiling

In all, thirteen (13) people participated in the ICM training course, seven (7) males and six (6) females. At the end of the training, participants were requested to assess the training from their individual points of view. For an overall assessment of the workshop 55% of participants rated their understanding and purpose of the workshop as excellent, 36% of participants rated their understanding and purpose of the workshop as very good and 9% rated it as good. This was interpreted to indicate that the training was important for the participants. Based on the overall assessment of the training, it can be concluded that the capacities of majority of participants have been improved by the training, which will improve on their work performance and efficiency.

6.2 Activity 2.2.2: Developing Material and Conducting Training on Fisheries Management

One of the project's short-term training courses that are facilitated by the Centre for Coastal Management is the course on Fisheries Management which also targets middle-level professionals to provide technical and management capacity needs for fisheries management in Ghana. The course comprises of 5 modules which are Module 1: Importance of fish to man, state of world and Ghana's fisheries, impacts of fishing on aquatic ecosystems and man, fish and aquatic resources of Ghana; Module 2: Fisheries management: the need, processes and data requirements; Module 3: Scope and approaches of fisheries management; Module 4: Fisheries management planning, fisheries regulations and institutions; and Module 5: Strategies for fisheries management. In FY 2017, the Fisheries Management short course was organized in the second quarter and documented in the second quarter report. A total of eleven (11) participants took part in this training programme, seven (7) males and four (4) females. This will be reported again in the FY 2017 Annual Report to USAID. Since only one Fisheries Management course was planned for FY 2017, there was no training on Fisheries Management in this reporting period. However another training course is scheduled to be conducted in FY 2018 which will be reported accordingly.

6.3 Activity 2.2.3: Developing Manuals and Updating Training Materials on Climate Change Adaptation and Mitigation

Climate change involves a complex of effects that collectively may dramatically modify the natural environment and have profound influence on our coasts and fisheries, most of which are likely to be judged as negative. For example, atmospheric and ocean temperature variability and the resultant shifts in ocean currents are likely to contribute to large-scale and catastrophic decreases in fisheries productivity. Governments and coastal communities therefore need to adopt strategies to enable them to cope with the impacts of climate change. However, the capacity for adaptation and mitigation to the impacts of climate change at different levels is lacking in Ghana. This necessitated the project to develop the short course on climate change adaptation and mitigation in coastal communities to train middle-level professionals who will contribute towards addressing the impacts of climate change particularly in coastal communities in Ghana.



Figure 5: Climate Change Short Course by CCM, May 2017



Figure 6: Field experience on climate change issues during the Climate Change Short Course, May 2017

The Climate Change short course is one of the flagship training programmes that are run on yearly basis by the project and coordinated by the Centre for Coastal Management. In this reporting quarter, the project's climate change working group finalised drafting the climate change short course training manual for publication and, with the support of an external facilitator, conducted the short course on climate change mitigation and adaptation in coastal

communities for seventeen (17) participants, eleven (11) males and six (6) females. The external facilitator was tasked to compile and publish the training manual on climate change, and build the capacity of district level planners and professionals working in coastal economies on climate change adaptation, organize all communications on the workshop and provide media communication covering print and electronic outlets in coordination with CCM, compile all materials including PowerPoint presentations of the modules, videos, charts and other relevant materials needed for classroom, laboratory and field exercises, coordinate with CCM to identify participants for the course including acquisition of all relevant materials for the course, and facilitate the training workshop.

6.4 Activity 2.2.4: Developing Material and Conducting Training on the use and Application of Geographical Information Systems (GIS)

In the quarter under review, the Centre for Coastal Management (CCM) organized an Intermediate short course in Geographic Information System (GIS) for District Planning Officers, staff and students of the University of Cape Coast, where eleven (11) participants, seven (7) males and four (4) females were trained. The Intermediate course is a follow on to the Introductory course designed and organized in the first quarter, and it provided participants with a comprehensive understanding of the theories, assumptions, and context of spatial analysis, which is so much relevant to the principles of coastal management. A GIS Intermediate training course manual was developed for the course by an external facilitator with the support of an expert reviewer with many years of experience as a lecturer, trainer and researcher at the University of Cape Coast Department of Geography and Regional Planning. In his review, he provided feedback on the scientific and technical value of the content of the manual, and also provided a constructive and informative critique of the manual.



Figure 7: Participants at the GIS Short Course in April 2017

PowerPoint presentations which provide theoretical notes for each of the modules were also prepared in addition to developing the training manual. The GIS course is divided into six (6) modules. Module 1 on Spatial Overlay and Geo-processing provides an introduction to spatial analysis and presents the concept of spatial data overlay and geo-processing. Module 2 On Spatial Query introduces the concepts of spatial queries and how it can be used to retrieve data from an existing database to answer geographic questions. Module 3 on Land Cover Classification and Land Use Analysis introduces the theoretical, applied and practical aspects

of digital remote sensing (satellite images) for land cover mapping. Module 4 on Surface Analysis introduces the concept of surface modeling using digital elevation model (DEM). Module 5 on Watershed Analysis provides an introduction to Watershed delineation. Module 6 on Change Management is geared toward deepening the understanding of the challenges, techniques, and the problems associated with initiating and implementing major change in an organization. The GIS training course external facilitator donated an iPad Mini2 and maps designed to show the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project intervention sites to the Centre for Coastal Management after the organization of the training program.



Figure 8: CCM receives iPad Mini tablet to help pilot UAV

The USAID/Ghana Sustainable Fisheries Management Project (SFMP) has supported the Centre for Coastal Management with an Unmanned Aerial vehicle (UAV) to facilitate coastal management research at the Centre. For the UAV to become operationalized, an official application for a permit to use the UAV was submitted to the Ghana Civil Aviation Authority (GCAA) and permission (flight permit) was granted to use the UAV after satisfying all application requirements including pilot tests and certification. The SFMP has also outlined a sustainability plan for the long-term maintenance of the UAV by the Centre for Coastal Management and also plans to conduct a 3-4 day training for staff of the Centre for Coastal Management and the Department of Geography and Regional Development to man the UAV. The SFMP intends bringing an external C-Astral instructor to come to Ghana to conduct hands-on training of the new UAV system. Preparations for the training started in this quarter and the actual training has been planned for the last week of September 2017 before end of FY 2017. During the training, the UAV will be set up at an appropriate place with permission sought from local land owners, and will be launched over several days. The training is planned to consist of some classroom work and lots of flying.

6.5 Activity 2.2.5: Engaging Policy Makers to Address Coastal and Fisheries Issues

The project's fisheries governance and policy research team and the Director of the Centre for Coastal Management (CCM) met with the Minister of Fisheries and Aquaculture Development at the premises of the Fisheries Commission to introduce the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project to her outfit, seek government's support and identify opportunities for collaboration between the project and the Ministry. An overview of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project, scope and current status, capacity building activities and cooperation with the Ministry was presented to the Minister. Also, IUU fishing issues, compliance and enforcement, fisheries governance issues which highlighted findings from a research perspective and gaps resulting from challenges with governance structures and the role of policymakers in policy reforms to ensure that fisheries and environmental issues are appropriately addressed were discussed.

In this quarter, the project's fisheries governance and policy research facilitators made a presentation on fisheries and coastal environmental sanitation: role of Metropolitan, Municipal and District Assemblies (MMDAs) to the National Development Planning Commission (NDPC). Following the presentation, the team put together a write-up on the subject, discussed and submitted the write-up to the NDPC for inclusion in a 4-year Medium Term Development Plan. This was a submission on fisheries governance and policy issues that going forward the project would wish are discussed and addressed at both the nationally and MMDAs level. The project team assured the NDPC of their willingness to have further discussions on the subject matter and any other issues bordering the project's areas of research that are of critical importance to national development. The project looks forward to further engagement with the NDPC on this issue, moving forward.

The write up introduced the issues that are currently posing challenges in Ghana's coastal zone as a background to the fact that marine and coastal resources and ecosystems are currently under threat from anthropogenic activities. The country's coastal zone, especially beaches, estuaries and lagoons have been degraded due to existing human pressures. Apart from the environmental challenges, the fisheries sector in Ghana also faces challenges with fisher/fishing vessel overcapacity, resulting in increased competition in fishing for limited stocks, declining productivity, economic inefficiency, and dwindling incomes. Some of the factors that have contributed to current challenges in the fisheries sector include overfishing, lack of effective management, open access nature of canoe fisheries, loss of critical habitats, coastal sand winning, exploitation of immature fish, and destructive fishing techniques such as the use of explosives (bomb fishing) and poisonous chemicals (chemical fishing) in fishing. Appropriate strategies that are required to address the issues identified and responsible agencies were proposed. Declining fish stocks, corrupt practices in the distribution and sale of pre-mix fuel, increasing incidence of illegal, unregulated and unreported fishing practices were some of the issues of fisheries management and governance concern identified to be addressed and the responsible agencies are the Ministry of Fisheries and Aquaculture Development, the Fisheries Commission, Ministry of Local Government and Rural Development, Ministry of Chieftaincy and Religious Affairs and the Ministry of Justice. Strategies include strengthening the role of traditional authority to enforce fisheries laws, re-defining the role of MMDAs to

include natural resources including fisheries management, stop illegal, unregulated and unreported fishing methods including trawling in near shore areas and trans-shipment of fish at sea, as well as effective management and control of the distribution and sale of pre-mix fuel. Issues were also identified regarding sanitation of the coastal environment such as the release of untreated sewage into coastal waters, dumping of domestic and industrial waste in coastal areas, sand mining/winning, and deforestation in coastal areas. Strategies to address these issues include government working to achieve the Sustainable Development Goals (SDGs) on environmental sanitation at the coastal towns through the MMDAs, providing public places of convenience along the beaches in all coastal communities, re-introducing ‘town council officers’ in all fishing communities to enforce sanitation rules and introducing award scheme for cleanest landing beaches at the district, regional and national levels as part of National Farmers Day programme. Some issues also had to do with providing alternative livelihoods to fishers as a way of reducing the pressure on overexploited fish stocks and increasing local incomes. Strategies include developing fish landing sites to improve activities along fish value chain, strengthening women organizations to support expansion of fish processing and marketing businesses, introducing and promoting aquaculture and encourage diversification of livelihood activities to include farming, aquaculture, apiculture, art and craft to supplement fishing. The last group of issues had to do with capacity building such as lack of staff with requisite technical skills and competences to manage coastal issues and lack of motivation to live and work in some coastal districts. The required strategy is to train students and other personnel based on assessment needs of the local communities to contribute knowledge for accelerated development of fishing communities.

As part of project management efforts to improve the communication of project activities to the wider public, the project identified that the capacity of Ghanaian environmental journalists to effectively capture and report fisheries and coastal environment issues was lacking. The project perceives that the ability of environmental journalists to effectively report and communicate fisheries and coastal environment issues will go a long way to inform people and cause behaviour change for improved fisheries and environmental management. In order to achieve this, the project organized a two-day training workshop aimed at building the capacity of journalist in environmental reporting to help advance this important course. Some selected media houses nominated and presented two people to participate in this program. This capacity building activity was fully sponsored by the project through activities of the Centre for Coastal Management (CCM). This training was organized in a practical fashion which involved visits to some selected fish landing beaches across the four coastal regions along Ghana’s coast that fulfilled the objectives of the exercise. At each landing beach, the training participants had about 2 hours to interact with fishing communities and make their reports.

It was mutually agreed that participants of the training produced materials for their respective media houses and promote adequate publicity of the findings of the project. Women in particular were encouraged to take part in this training programme. A female Senior Journalist with the Graphic Communication Group, who is an award winner in Environmental Journalism, took part in this training on effective reportage on coastal environment and fisheries issues in Ghana. Over twenty (20) environmental journalists representing different

media houses and representatives from the Ministry of Fisheries and Aquaculture Development (MoFAD) and the Ministry of Sanitation and Water Resources were involved in this exercise.

6.6 Activity 2.2.6: Building Institutional Partnerships and Collaboration

Perhaps the most important activity under building institutional partnerships and collaboration that occurred in the quarter under review is advancing the collaboration that exists between the University of Rhode Island (URI) and the University of Cape Coast (UCC). The two Universities met in a three-day series of events to discuss the issue of pursuing dual degree programs by both Universities when a high-level delegation from UCC led by the Vice-Chancellor visited Rhode Island. The first batch of UCC students who are potentially going to enrol in dual degree programs compiled and submitted their CVs to the Project Manager for discussion at URI for possible programs and potential Advisors before the delegation travelled to the US. Discussions in Rhode Island also covered the issue of UCC academic staff members having Adjunct Professor status at URI. If successful, that will allow about 3-4 UCC academic staff to obtain Adjunct Professor status at URI and they can serve to be on students examination committees for the institution of dual degree programs. This required an application in the form of a letter of interest specific to the UCC-URI dual degree program, and CVs with the list of publications of each interested applicant being submitted to the College of Environment and Life Sciences (CELS) at URI by interested DFAS Professors or Senior Lecturers. The Following are some highlights of the meetings which took place at URI between delegates from the UCC and URI relative to objectives:

- It was concluded that there are no barriers to finalizing the dual doctoral degree program between URI/CELS/BES and the UCC/DFAS doctoral programs, except that the concept note needed to be finalised for respective approvals from both institutions, and formalization through a Memorandum of Understanding (MOU). The first batch of students to benefit from in such a program potentially can occur in 2018.
- Some UCC PhD students are also going to visit URI for up to 6 months as part of their programs of study, which was also discussed in the meetings at URI beginning in Fall/2017 and running through Spring and Fall/ 2018 semesters. URI mentors or potential mentors were identified, and likely supplemental coursework for 4 UCC students scheduled to be at URI in the next academic school year (one additional student likely to wind up at Auburn for special needs rather than URI), as well as likely mentors for the Fall 2018 batch of 5 UCC students to be at URI in the Fall 2018 were concluded.
- Partnerships and collaborations outside of USAID/UCC project related activities such as those with other colleges including Pharmacy, Business and Engineering, and perhaps even beyond these in the future were also found to be emerging.

6.7 Activity 2.2.7: Wetlands Ecological Health Monitoring Using School Clubs and Communities

In this quarter, project management organized a meeting Friends of the Nation (FoN) and the USAID/Ghana Coastal Sustainable Landscapes Project (CSLP) to receive updates on the status of the wetlands ecological health monitoring using school clubs and communities and to discuss implementation issues of the second phase of the activity since it was a new school

term for the Junior High School students. The project hosted and trained teachers from the selected schools at UCC.

Some write-up is needed here as I don't have the current reports for this activity!



Figure 9: Wetlands monitoring clubs measure physicochemical parameters of wetland ecosystems in the Western Region of Ghana

6.8 Activity 2.2.8: Strengthening Community-based Groups

The objective of this activity is to facilitate the capacity strengthening of community-based groups to acquire the necessary skills needed to facilitate programs in coastal resources management. This is particularly to equip them with community-based fisheries management skills and to support development actions in their coastal communities. Strengthening of community-based groups continued in this quarter, which was facilitated by an external expert in community development and supplementary livelihoods. This activity was therefore combined with Activity 2.2.9: Promoting supplementary livelihoods in coastal communities. Achievements under this activity in the quarter are therefore reported as part of Activity 2.2.9 in the next section.

6.9 Activity 2.2.9: Promoting Supplementary Livelihoods in Coastal Communities

The objective of this activity is to provide capacity building support for people in selected fishing communities to effectively engage in snail rearing, bee-keeping and oyster farming to enhance community livelihoods, to provide alternative sources of income for community

members, and to reduce the level of dependence on fish resources in order to enhance the sustainable management of fisheries and other coastal resources in the selected communities. The capacity building activities were facilitated by the Departments of Entomology and Wildlife, and Conservation Biology of UCC while the community mobilization aspects were carried out by an external facilitator. In this quarter, community mobilization work, training of community members and field activity monitoring visits were conducted by the trainers from UCC and the community mobilization facilitator. The training focused on management and community leadership aimed towards the running of supplementary livelihoods demonstration sites in particular and their communities in general. In this quarter, 125 community members were trained in all four (4) selected communities and 25 community members were supported to set up their own farms. Demonstration farms in all four (4) communities were established (3 snail farms and 2 bee keeping sites) which are being managed by community members themselves. District Assembly members were also engaged in the training and monitoring of supplementary livelihood activities in the communities.

APPENDICES

List of Project Performance Indicators and FY 2017 Third Quarter Results

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
1	Quantities and/or sizes of fish landed by selected canoe fishermen in the Central and Western Regions of Ghana	-	-	-	-	-	-
<p>Comments: This is a custom indicator which measures and/or describes change in quantities and sizes of fish landed by fishermen in the Central and Western Regions of Ghana given by periodic fish stock assessments. Since it is difficult to set baselines, annual targets and performance achieved in a particular reporting period, results shown by this indicator could only be descriptive. Fish stock assessment conducted by the project indicated that quantities of fish landed by canoe fishermen have shown a gradual decline since the mid-1980s mainly due to increase in fishing effort in terms of number of canoes during the period, which is an indication of growth overfishing.</p>							
2	Fishing Mortality at MSY (F_{msy})	-	-	-	-	-	-
<p>Comments: This is a custom indicator of the USAID/Ghana Sustainable Fisheries Management Project (SFMP) which is only tracked by the USAID/UCC Fisheries and Coastal Management Capacity Building Project. In 2014, the SFMP estimated Fishing Mortality at MSY (F_{msy}) to be 0.74 which was higher than the preferred Fishing Mortality at MSY (F_{msy}) of 0.40. In FY 2017, the SFMP reported Fishing Mortality at MSY (F_{msy}) to be 0.30 which indicates an increase in fishing mortality and a severe decline in population size. Current fishing effort is well beyond the level of sustainability for the small pelagic stocks.</p>							
3	Biomass to produce MSY (B_{msy})	-	-	-	-	-	-

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
<p>Comments: This is also a custom indicator of the USAID/Ghana Sustainable Fisheries Management Project (SFMP) which is only tracked by the USAID/UCC Fisheries and Coastal Management Capacity Building Project. In 2014, the SFMP estimated Biomass to produce MSY (B_{msy}) to be 182,726 tonnes which was less than the preferred Biomass to produce MSY (B_{msy}) of 310,476 tonnes. In FY 2017, the SFMP reported Biomass to produce MSY (B_{msy}) as 30,000 tonnes. Current estimated biomass is much lower than those estimated in 2014. This suggests diminishing economic returns.</p>							
4	Number of hectares of biological significance and/or natural resources under improved natural resource management as a result of USG assistance	0	6.9	6.9	0	0	No
<p>Comments: In this quarter, the project continued to monitor the ecological conditions and assess the overall health status of the <i>Awiane</i> lagoon at Half Assini in the Western Region in order to acquire a more comprehensive baseline data on the lagoon with the objective to support decisions for the removal of solid wastes from the lagoon and also work with the community and their traditional authorities as well as the District Assembly to put the lagoon and its associated wetland area under improved management.</p>							
5	Number of hectares in areas of biological significance and/or natural resource showing improved biophysical conditions as a result of USG assistance	0	6.9	6.9	0	0	No
<p>Comments: In this quarter, the project continued to monitor the ecological conditions and assess the overall health status of the <i>Awiane</i> lagoon at Half Assini in the Western Region in order to acquire a more comprehensive baseline data on the lagoon with the objective to support decisions for the removal of solid wastes from the lagoon and also work with the community and their traditional authorities as well as the District Assembly to put the lagoon and its associated wetland area under improved management. Areas in hectares of the lagoon and wetlands showing improved biophysical conditions will be determined.</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
6	Number of training and capacity building activities conducted with USG assistance	0	40	10	5	50	Yes
<p>Comments: 10 training and capacity building activities were targeted for FY 2017. 5 (5) of them were conducted in this reporting period; Training in Intermediate GIS, Climate Change and Integrated Coastal Management. In addition, four (4) members of academic staff received capacity building support in the Law of the Sea and Maritime Regulation and Enforcement at the Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong, and five people (2 academic staff members, 2 technical staff members and 1 PhD student) also participated in a capacity building program on how to properly and safely man, operate and maintain the acquired boat <i>RV Sadinella</i>.</p>							
7	Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	0	250	200	125	63	Yes
<p>Comments: Two-hundred (200) training participants were targeted to benefit from natural resources management and/or biodiversity conservation training in FY 2017. None of those training activities have so far occurred in this reporting period. 125 community members were trained in all four (4) selected communities in this quarter.</p>							
8	Number of person hours of training in natural resources management and/or biodiversity conservation supported by USG assistance	0	15000	3000	3270	109	Yes
<p>Comments: 3000 hours of training in natural resources management and/or biodiversity conservation was the target for FY 2017. 2520 hours of training in natural resources management and/or biodiversity conservation was achieved representing 109 percent.</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
9	Number of individuals who have received USG supported long-term agricultural sector productivity or food security training	0	40	28	28	100	Yes
<p>Comments: Twenty-eight (28) students were targeted to receive long-term training in FY 2017. In the period under review, 11 PhD students (3 males, 8 females), and 17 MPhil students (7 males, 10 females) received USG supported long-term agricultural sector productivity or food security training, making a total of 28 individuals, 10 males and 18 females.</p>							
10	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	0	250	50	50	100	Yes
<p>Comments: Fifty (50) people (34 males and 16 females) received USG supported short-term agricultural sector productivity or food security training in this reporting period. Forty-one (41) people from relevant agencies (25 males and 16 females) received short-term training through short courses Intermediate GIS, Climate Change and Integrated Coastal Management organized by CCM and DFAS. Four (4) DFAS staff (all males) received short-term training in Law of the Sea and Maritime Regulation and Enforcement at ANCORS, University of Wollongong in Australia, five (5) DFAS staff (4 males, 1 female) received training on how to properly and safely man, operate and maintain a boat at the Regional Maritime University (RMU).</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
11	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	0	10	10	4	40	Yes
<p>Comments: Ten (10) community-based organizations were targeted to receive assistance in FY 2017. Four (4) of such organizations received technical assistance in supplementary livelihood activities (snail farming and bee-keeping) in 4 selected coastal communities in the Western and Central region of Ghana in this reporting period.</p>							
12	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	0	10	8	4	50	Yes
<p>Comments: Four (4) Community-Based Organizations that received technical assistance in supplementary livelihood activities applied new management practices in bee-keeping and snail farming in this reporting period. Numbers will be counted and reported when Year 3 activities are fully implemented in the coming quarters.</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
13	Number of members of producer organizations and community based organizations receiving USG assistance	0	200	200	125	63	Yes
<p>Comments: Two-hundred (200) members were targeted to receive assistance in FY 2017. One-hundred and twenty-five (125) members in total belonging to the 4 Community-Based Fisheries Management Groups (CBFMGs) formed in 4 selected fishing communities received technical assistance in supplementary livelihoods activities (snail farming and bee-keeping) by the project in the period under review.</p>							
14	Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	0	200	150	125	83	Yes
<p>Comments: One-hundred and twenty-five (125) members of the 4 Community-Based Fisheries Management Groups (CBFMGs) formed in 4 selected fishing communities applied new management practices in snail farming and bee-keeping in the quarter under review.</p>							
15	Number of rural households benefiting directly from USG interventions	0	200	150	125	83	Yes
<p>Comments: One-hundred and twenty-five (125) rural households benefited directly from project interventions through supplementary livelihood support in snail farming and bee-keeping in the period under review.</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
16	Score, in percent, of combined key areas of organization capacity amongst USG direct and indirect local implementing partners	-	95	-	80.13	80.13	Yes
<p>Comments: In the period under review, AfricaLead conducted an Organizational Capacity Assessment for DFAS and CCM. The assessment covered 8 major areas; 1) Governance 2) Administration 3) Human Resources 4) Financial Management 5) Organizational Management 6) Program Management 7) Network Capacities and 8) Policy Analysis and Advocacy and arrived at a total score of 80.13% as the combined key areas of organization capacity.</p>							
17	Number of beneficiaries receiving improved infrastructure services due to USG assistance	0	150	120	121	100.8	Yes
<p>Comments: One-hundred and twenty-one (121; 82 males and 39 females) people made up of 11 senior staff members, 6 Research Assistants, 5 Administrative staff, 8 Technical staff, 41 post-graduate students and 50 undergraduate students were beneficiaries of refurbished library, fisheries and coastal management laboratory, project vehicles and the premises of DFAS and the Center for Coastal Management in this reporting period.</p>							
18	Number of new research collaborations established between USG-supported beneficiaries and other institutions	0	10	10	3	30	Yes
<p>Comments: Ten (10) new research collaborations were targeted for FY 2017 but three (3) of them were established; two (2) between DFAS and SFMP on cuttlefish and shellfish research and one (1) between DFAS and the Monitoring for Environment and Security in Africa project, University of Ghana on Using Satellite Imagery for Mapping Fishing Areas of the Semi-Industrial Fisheries Sector in Ghana.</p>							

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
19	Number of scientific studies published or conference presentations given as a result of USG assistance for research programs	0	10	5	0	0	No
Comments: In this reporting period, no scientific study was published or any conferences attended.							
20	Number of dialogues and stakeholder consultations held on fisheries and coastal management	0	20	5	0	0	No
Comments: In the period under review, there were no major dialogues and stakeholder consultation events on fisheries and coastal management but there were several meetings held between the project and major stakeholders at different levels particularly in case of the project activity on Research, Governance and Policy on Fisheries and Coastal Management issues.							
21	Percentage of graduates from USG-supported tertiary education programs employed	0	50	5	0	0	No
Comments: No DFAS graduates were reported as employed in this reporting period. The first batch of MPhil students trained by the project have just graduated, which presents an opportunity for some of them to be employed either by the Centre for Coastal Management or DFAS or by other organizations.							
22	Number of CSOs and government agencies strengthened	0	25	10	24	200	Yes

No.	Indicator	Baseline	Life of Project (LOP) target	Annual target	Performance achieved in reporting period (actual)	Performance achieved in reporting period (%)	On target? Yes/No
<p>Comments: Representatives of the following 20 CSOs and government agencies were strengthened through their participation in the GIS, Climate Change and Integrated Coastal Management short courses in the period under review; Fisheries Commission, Wester Regional Coordinating Council, KEEA Municipal Assembly, Shama District Assembly, Ellebele District Assembly, Jomoro District Assembly and Gomoa West District Assembly, Ga West District Assembly, NADMO, SNV, LUSPA, Keta North District Assembly, CSLP, Hen Mpoano, Western Regional Coastal Foundation, Ministry of Gender, Children and Social Protection, Ministry of Tourism, Ministry of Works and Housing, NDPC and the National Service Scheme.</p>							
23	Total number of direct beneficiary	0	500	300	296	115	Yes
<p>Comments: Two-hundred and ninety-six (296) people benefitted directly in various ways as described above from project interventions in this quarter.</p>							