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**UNIVERSITY OF
CAPE COAST**

USAID/UCC FISHERIES AND COASTAL MANAGEMENT CAPACITY BUILDING SUPPORT PROJECT

YEAR THREE 1ST QUARTER REPORT

1ST OCTOBER – 31ST DECEMBER, 2016
DEPARTMENT OF FISHERIES AND AQUATIC SCIENCES
UNIVERSITY OF CAPE COAST

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LIST OF ABBREVIATIONS

ANCORS	Australian National Centre for Ocean Resources and Security
ATL FM	Atlantic Radio Station
CBFMG	Community Based Fisheries Management Group
CCM	Centre for Coastal Management
CSLP	Coastal Sustainable Landscapes Project
CAADP	Comprehensive Africa Agriculture Development Program
CDCS	Country Development Cooperation Strategy
DFAS	Department of Fisheries and Aquatic Sciences
FAO	Food and Agriculture Organization
FishCoMGhana	Fisheries and Coastal Management Database of Ghana
FtF	Feed the Future
FCM	Fisheries and Coastal Management
GIS	Geographic Information Systems
GSSP	Ghana Strategy Support Program
GoG	Government of Ghana
ICZM	Integrated Coastal Zone Management
IUU	Illegal Unreported Undocumented
KNUST	Kwame Nkrumah University of Science and Technology
METASIP	Medium Term Agricultural Sector Investment Plan
MDG	Millennium Development Goal
MOFAD	Ministry of Fisheries and Aquaculture Development
MoU	Memorandum of Understanding
MEAS	Modernizing Extension and Advisory Service
METSS	Monitoring, Evaluation and Technical Support Services
RUFORUM	The Regional Universities Forum for Capacity Building in Agriculture
UAV	Unmanned Aerial Vehicle
UDS	University for Development Studies
UCC	University of Cape Coast
UG	University of Ghana
USG	United States Government
WARFP	World Bank West Africa Regional Fisheries Program

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Contact Information:

USAID/UCC Fisheries and Coastal Management Capacity Building Support Project
Department of Fisheries and Aquatic Sciences (DFAS), School of Biological Sciences,
College of Agriculture and Natural Sciences, University of Cape Coast.

UCC Representatives:

Prof. Joseph Ghartey Ampiah
Vice-Chancellor
University of Cape Coast
Tel: +233 (0) 332132378/32050
Email: vc@ucc.edu.gh

Dr. Denis Worlanyo Aheto
Project Manager
USAID/UCC Fisheries and Coastal
Management Capacity Building Support
Project, Department of Fisheries and
Aquatic Sciences
Tel: +233 (0) 242910056
Email: daheto@ucc.edu.gh

USAID Administrative Contacts:

Kelvin Sharp
Director
Economic Growth Office, USAID/Ghana
American Embassy, 24 Fourth Circular
Rd.
Tel: +233 (0) 302741132
Email: ksharp@usaid.gov

Justice O. Odoi
Activity Manager (AM)
Economic Growth Office, USAID/Ghana
American Embassy, 24 Fourth Circular
Rd.
Accra-Ghana
Tel: +233 (0) 302741828
Email: jodoi@usaid.gov

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Cover Photo: Administrator Gina McCarthy of the US EPA addressing the public on the theme, “Opportunity and innovation: How the US is leading global efforts to respond to climate change” during her visit to the USAI/UCC Fisheries Project.

Photo credit: Department of Fisheries and Aquatic Sciences – UCC

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EXECUTIVE SUMMARY

The Fisheries and Coastal Management Capacity Building Support Project was awarded by the United States Agency for International Development (USAID) to the Department of Fisheries and Aquatic Sciences (DFAS) of the University of Cape Coast (UCC) on the 24th October 2014. This document reports on activities undertaken between the periods 1st October- 31st December, 2016. It provides updates on progress made or otherwise in relation to first quarter activities as outlined in the third annual work plan. Key targets met include the completion of the fisheries governance, policy and research dialogues, strengthening community-based groups and promotion of supplementary livelihoods in coastal communities' were major components. The period also succeeded in conducting the Organizational Capacity Needs Assessment for DFAS and the CCM to identify areas for capacity strengthening and improvements needed on that front. Collaboration among sister projects notably the Sustainable Fisheries Management Project (SFMP) and the Sustainable Coastal Landscapes Project (CSLP) were strengthened to identify areas and opportunities for collaboration, building synergies and share lessons learned across projects through a co-creation, coordination and collaboration meetings. The project collaborated with ACDI/VOCA to strengthen its supplementary livelihood initiatives and hosted a volunteer who played the role of an advisor to provide technical guidance on snail farming and bee-keeping as supplementary livelihoods in project's intervention areas. Among others, the Fisheries and Aquaculture Association was registered and modalities for establishing a West African Journal on Fisheries and Aquaculture were developed under the project for implementation by the Centre for Coastal Management.

1.0 INTRODUCTION

1.1 Ghana's Marine Fisheries Sector

Ghana has valuable marine fisheries resources that contribute nearly 5% to annual national gross domestic product (GDP). The sector indirectly supports the livelihoods of some 2.2 million people or 10% of the Ghanaian population. Unfortunately, the economic fortunes from the fisheries have reduced due to low investment in fisheries management while at the same time value addition to the commodity has not been given the required attention. Illegal fishing is pervasive and there are too many vessels catching a few fish leading to cost overruns i.e. cost of fishing exceeds the amount of income that is being generated, at least compared to some ten years back. As a result, the individuals and communities reliant on fishing are getting poorer. Indeed, the industry presently provides little prospect for improving the welfare of fisher folks with ramifications for the national economy as a whole.



Figure 1: Artisanal fishermen at a typical predominantly rocky beach in Ghana

The decline in fish production and reduction in economic gains are so grave that improving the management of the sector in Ghana to be able to realize the full potential of the industry will however take some time. This will require careful management practices which will ensure that impacts on individuals and communities are properly addressed. Based on international experience, it will take 20 or more years to effect such a change. Therefore, a long-term commitment to rebuilding Ghana's marine fish stocks and increase production through effective fisheries management strategies and adoption of responsible fishing practices are crucial. To achieve these goals, a well-planned intervention to revitalize Ghana's fisheries sector is required which is expected to contribute to the Ghana Poverty Reduction Strategy.

The Fisheries and Coastal Management Capacity Building Support Project was born out of this concern. It aims at promoting sustainable marine fisheries management in Ghana through capacity building of students, professionals and fishing communities using effective partnerships across public and private institutions locally and internationally. In respect of this, the United States Agency for International Development (USAID) committed US\$5.5 million, sub-obligated through a multi-year partnership program with the University of Cape

Coast's Department of Fisheries and Aquatic Sciences as lead implementers over a five-year period(2014-2019). The project contributes to the Government of Ghana's national fisheries policies and coastal development objectives, and USAID's Feed the Future Initiative.

1.2 Feed-the-Future Initiative of the United States Government

The Feed-the-Future Initiative (FTF) was launched in 2010 by the United States government and the Obama Administration to address global hunger and food insecurity. According to the National Institute of Food and Agriculture, it is "the U.S. government's global food security initiative. In 2009 President Barack Obama committed US\$3.5 billion over a 3-year period to a global initiative with the intent of combating hunger and poverty. In May 2010, the United States Department of State launched and developed the Feed-the-Future Initiative. The Initiative is coordinated primarily by the U.S. Agency for International Development (USAID). According to USAID FTF website, "Recent studies suggest that every 1 percent increase in agricultural income per capita reduces the number of people living in extreme poverty by between 0.6 and 1.8 percent." No other investment has that return. FTF is funding initiatives in fisheries and coastal management in view of the fact that the capacity of most developing nations to utilize their coastal and marine assets, while sustainably protecting them from degradation to ensure long-term fish food production is lacking.



More so, Ghana is faced with growing challenges in managing the country's coastal and marine resources, such as the dramatic decline of fish stocks and the degradation of coastal resources. The overexploitation of fisheries at artisanal and industrial scales using unsustainable fishing methods, and the pollution of coastal ecosystems, are further concerns. Coastal ecosystems, especially estuaries, lagoons and their associated wetlands, are becoming increasingly impacted by activities within their catchment areas, with deforestation, intensive agriculture, damming and irrigation all changing the nature of material fluxes (water, sediment, nutrients and pesticides). It is apparent that Ghana's marine and coastal resources are being lost or damaged in ways that are diminishing biodiversity. This is attributed to many factors, including deficiency in monitoring and enforcement of regulations, lack of education, training, research, data gathering and analysis, and low government investments in capacity building for effective management. The lack of adequate human resource capacity, good governance and well-functioning regulatory systems impede natural resource management in Ghana.

1.3 The USAID Fisheries and Coastal Management Capacity Building Support Project

The Fisheries and Coastal Management Capacity Building Support Project operates on a partnership agreement signed on 24th October, 2014 between the United States Agency for International Development (USAID) and the University of Cape Coast (UCC). The project adds value to the work of the Department of Fisheries and Aquatic Sciences (DFAS) of the University in terms of administrative, technical and financial assistance. USAID's total contribution to this Project is up to the tune of US\$5,500,000, which 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 programmed under the US Government's Feed the Future 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 US\$ 5.5 million award by USAID to the University of Cape Coast is aimed at contributing towards addressing capacity deficiency in fisheries and coastal management to a large extent. The USAID Fisheries and Coastal Management Capacity Support Project was modelled to respond to the issues raised in the SWOT Analysis. It aims at resourcing the Department to be able to train personnel for fisheries and coastal management, and strengthen the Centre for Coastal Management to be fully operational. It will also build stronger and more integrated information support systems to manage and streamline existing and new data on fisheries and coastal issues to underpin future evidence-based policy formulation to help inform development strategy decisions at all levels. Therefore, the project activities contribute to USAID's development strategy for Ghana as outlined in its Country Development Cooperation Strategy (CDCS), directly in support of the Development Objective Two: Sustainable and Broadly Shared Economic Growth. It is expected that by the end of the project, capacity building for sustainable marine fisheries management in Ghana can be quantitatively proven and demonstrable management outcomes for the country's coastal-marine space and resources will be evident.

These achievements will come on the back of a strengthened local scientific capacity in specific areas of emphasis such as quality and relevant educational programs, practical research, extension and advisory services that will support the management of Ghana's fisheries and coastal resources to enhance the country's social and economic development. One of the key objectives to deliver this vision is to build sustainable partnerships 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 enabled targeted collaborations with relevant partners including the Ministry of Fisheries and

Aquaculture Development (MoFAD) and the Fisheries Commission of Ghana, 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.

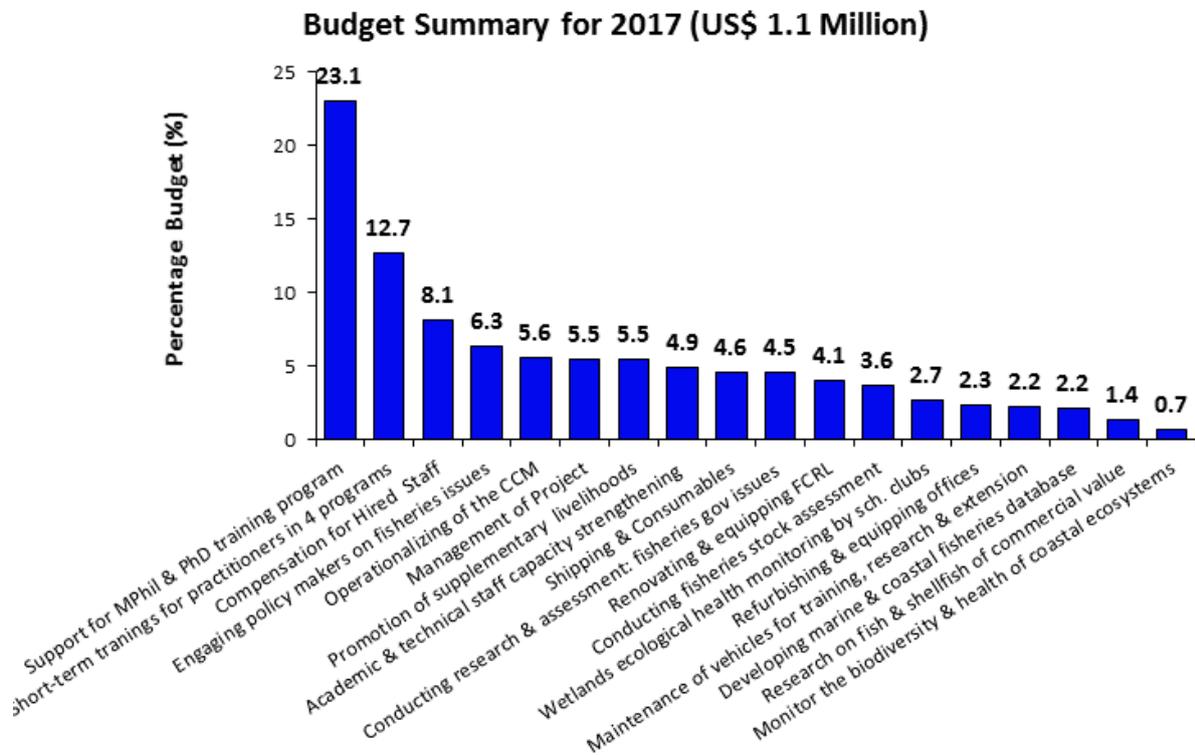


Figure 2: Overview of Year 3 Project Budget (US\$ 1.1 million)

An add-on effect of this project will be the upgrade of skills of academic and technical staff in the use of new technologies and scientific equipment, refurbishment of the fisheries and coastal research laboratory, library and offices of academic staff, acquisition of vehicles for field research, extension and the procurement of equipment for the creation of fisheries and coastal management database working with other international data sources and host centres.

These improvements coupled with the award of student scholarships will facilitate the training of 10 PhD, 20 masters and 150 undergraduate students. The package also includes financing of short courses on climate change adaptation, fisheries and coastal management for other relevant professionals over the course of five years. The short courses will be run under the ambit of the Centre for Coastal Management (CCM) as part of its operationalization. The project will also support the implementation of its strategic plan, develop business plans for the Centre, enhance roundtable policy dialogues, and undertake critical research with the help of its newly refurbished Fisheries and Coastal Research Laboratory within DFAS.

In addition, the project will generate research results to fill key knowledge gaps on a needs basis that would help strengthen the further development and implementation of Ghana's Fisheries and Aquaculture Sector Development Plan. It is expected that implementation issues, such as prioritizing, sequencing, and phasing in of policy reforms will feature

prominently; and will embark on community outreach and extension 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.

Through this grant, formal partnerships (Memorandum of Understanding) have been strengthened or established with reputable local and international institutions as follows:

- I. ECOWAS Coastal & Marine Resources Management Centre, University of Ghana
- II. Coastal Resources Centre - University of Rhode Island, USA
- III. Australian National Centre for Ocean Resources and Security, University of Wollongong, Australia
- IV. Florida Gulf Coast University, USA
- V. Ministry of Fisheries and Aquaculture Development, Ghana.

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 ocean making the Department of Fisheries and Aquatic Sciences (DFAS) one of the leading institutions in the area of Fisheries and Marine Sciences in Ghana. Indeed, the Department since its inception in 2002 has the vision to become unique and an innovative partner in advancing healthy aquatic ecosystems for sustained provision of goods and services, in collaboration with public and private institutions, both local and international.



Figure 3: Some DFAS students and technicians at an exhibition during the world fisheries day, 2016

This vision is beginning to see the light of the day through the USAID multi-year funding to the tune of US\$ 5.5 million. Through this grant, the capacity of the Department to deliver this vision is enhanced through the provision of adequate logistics and teaching infrastructure, increasing student numbers largely due to new knowledge about the capacity of the Department, possible job opportunities, enhanced sensitization about the Department and deepening relationships with related institutions. With this project coming on board, a lot of issues have been largely addressed. The USAID funds has enabled the Centre for Coastal Management effectively take off its operations and received formal institutional recognition.

The Department and the Centre now have a state-of-the-art laboratory with relevant and modern laboratory and field equipment which allow hands-on practical based training of students. The Department 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.

With the USAID grant, several opportunities exist for DFAS students. For instance:

Funding for undergraduate project work in the final year is guaranteed under the multi-year USAID/UCC Fisheries and Coastal Management Capacity Building Support Project (2014-2019).

Students could benefit from the J-TERM Student Exchange Program with the University of Rhode Island in the United States of America.

Graduate and Post-graduate studies - The Department offers MPhil and PhD programs in the fields of Integrated Coastal Zone Management, Aquaculture, Fisheries Science, and Oceanography and Limnology. This presents our undergraduate students with future academic prospects.

Staff and students also benefit from interactive teaching and learning alongside with field visits and real-time laboratory exposure for practical experience. It is anticipated that the graduates could engage in research work in Institutions (including Council for Scientific and Industrial Research-Water Research Institute (CSIR-WRI), Ministries (Fisheries and Aquaculture Development; Environment, Science and Technology; Agriculture), Environmental sector, Financial institutions, Oil and Gas industry, NGOs (local and international), Managers of Aquaculture Facilities, Navy, Academia, or become Entrepreneurs among others. The Department strives to communicate with its students and stakeholders through staff blogs, Departmental websites and social interactive platforms such as Facebook. For further information, please see:

<https://dfas.ucc.edu.gh/>

1.5 Monitoring and Evaluation (M&E)

Monitoring and evaluation is an important component of planning and implementation of all activities of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project. As such, monitoring and evaluation of project activities in the quarter under review started with the development of the Project Year 3 Workplan taking into account lessons learned from project participation in the Monitoring and Evaluation and Results-Based Management Training organized by AfricaLead in June 2016 at Koforidua in the Eastern Region. In the development of the project Year 3 Workplan, the project M&E team ensured that project activities were designed in ways that they could be measured using the project's selected list of indicators. The M&E team also made sure that the activities were also crafted to achieve results as described by the project Results Framework. This approach was used to ensure that project activities were carried out and monitored in a manner to achieve measurable results.

The project M&E team monitored all project activities planned for the first quarter 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 M&E team also fulfilled their obligation of entering all FY 2016 project results into the online FTFMS and the USAID AIDtracker+ database as well as all data reporting responsibilities to METSS. The M&E team also accompanied a livelihoods consultant who was assigned by ACDI/VOCA to work for the project as a volunteer to introduce the consultant to the field and inspect all livelihood activities being implemented by the project in four selected coastal communities in the Western and Central Region. Inspection of snail farms and bee hives being currently undertaken by community members as supplementary livelihoods in the communities indicated that activities were on course but had rather taken place on a slow pace which needed improvements in Year 3. The Core Management Team supervised and made sure that all Year 2 project activities carried forward to Year 3 were duly completed in the first quarter in order to provide an opportunity for a full concentration on Year 3 activities which were being implemented alongside.

The project M&E team participated in a co-creation, coordination and collaboration meeting for Implementing Partners of the USAID/Ghana Fisheries and Coastal Management Program which consists of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project, the Sustainable Fisheries Management Project and the Sustainable Coastal Landscapes Project. The meeting was organized by USAID and hosted by the Coastal Sustainable Landscapes Project in Takoradi. The purpose for the meeting was for the 3 projects to identify areas and opportunities for collaboration and synergies and share lessons learned across projects. The M&E team also benefitted from presentations by USAID on reporting project outcomes, performance monitoring principles, establishing baselines and setting targets for performance indicators. Information and knowledge acquired by the M&E

team are being used to improve upon the project M&E system and incorporated into project reporting requirements of USAID.

During the quarter under review, AfricaLead spent one week in Cape Coast to conduct an Organizational Capacity Needs Assessment for DFAS and the CCM to identify areas for capacity strengthening and enhancement. During that week, AfricaLead also took the opportunity to do a follow-up on the M&E and Results-Based Management training which was organized in June 2016. The M&E team prepared for and hosted the team from AfricaLead to review progress that the project has made towards setting up the project's M&E system and provided the needed coaching to the M&E team to ensure the project implements a sound M&E working system. During the M&E and Results-Based Management training, the project M&E team agreed to strengthen the existing project M&E system and develop and implement an M&E system for DFAS dwelling on lessons learned from the training topic "Setting up an M&E System" as the Plan of Action after the training. This formed the basis of the discussions held between the team from AfricaLead and the project M&E team. The AfricaLead team assessed how well the project M&E team has done with the plan of actions agreed upon, the challenges faced in the implementation and what AfricaLead can do to assist get over these challenges in order to have a sound M&E system in place not only for the USAID support project but also for DFAS and if possible the School of Biological Sciences of the University of Cape Coast which DFAS is part. The AfricaLead team was impressed with the progress made so far by the project M&E team towards improving the M&E system and further recommended the following that:

- The project Results Framework be reviewed to include and describe all project activities
- An operational M&E system be developed for DFAS and not the School of Biological Sciences
- All project Reference Documents must be printed in hard copies and stored in the Project M&E database
- Data collection plans be developed for all project indicators
- Update the M&E Plan developed for DFAS during the M&E and Results-Based Management training that took place in June 2016
- The project PMP be reviewed to include suggestions made by the AfricaLead Team particularly in the Introduction and Project Background sections, etc.

2.0 PROGRAM COMPONENTS, MANAGEMENT AND ACTIVITIES IN THE FIRST QUARTER OF YEAR THREE

2.1 Activities Completed in the First Quarter

Key Activities Completed within the First Quarter:

- The project wrapped up Year 2 activities with the completion of fisheries governance, policy and research dialogue, strengthening community-based groups and promotion of supplementary livelihoods in coastal communities' components

- AfricaLead conducted an Organizational Capacity Needs Assessment for DFAS and the CCM to identify areas for capacity strengthening and enhancement needed for the successful implementation of project activities and to carry out the mission of both DFAS and the CCM. AfricaLead also assessed the project M&E system
- Project management participated in a co-creation, coordination and collaboration meeting for Implementing Partners of the USAID/Ghana Fisheries and Coastal Management Program which consists of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project, the Sustainable Fisheries Management Project and the Sustainable Coastal Landscapes Project to identify areas and opportunities for collaboration and synergies and share lessons learned across projects. USAID reminded the IPs of their M&E and project reporting responsibilities
- ACDI/VOCA provided the project with a livelihoods consultant who worked as a Volunteer and an Advisor to provide technical assistance on snail farming and bee-keeping as supplementary livelihoods in coastal communities



Figure 4: ACDI/VOCA provided the project with a livelihoods consultant who worked as a Volunteer and an Advisor to provide technical assistance on snail farming and bee-keeping as supplementary livelihoods in coastal communities

- Project management collaborated with management of the Sustainable Fisheries Management Project to develop approaches for undertaking the Leadership for Fisheries Management Course in Year 3
- The project hosted a delegation from URI made up of the Associate Dean for Academic Affairs of the College of Environment and Life Sciences, Representatives from the Department of Natural Resources Science and the Department of Fisheries, Aquaculture and Veterinary Sciences to discuss Academic Exchange Programs and the award of joint degrees
- The project organized a National Stakeholder Conference on fisheries and coastal management research dialogue in Accra to deliberate on issues of fisheries and coastal management concern in Ghana to inform policy formulation



Figure 5: Some deans from the University of Rhode Island

- Project management organized a joint meeting with the Sustainable Coastal Landscapes Project, Friends of the Nation and Hen Mpoano to discuss issues pertaining to the community wetlands monitoring program with schools, progress made to date and the possibility of integrating UCC students into the program
- The project organized a short course on climate change adaptation and mitigation in coastal areas for middle-level professionals working on coastal economies and environments to understand the causes and effects of climate change in coastal communities, analyse the threats to assets and communities and to discuss adaptation and mitigation strategies that are being promoted in different districts and how these could be enhanced
- The project tested the 5-day training manual on fisheries management that was developed in Year 2 in collaboration with the University of Energy and Natural Resources' Department of Fisheries and Aquatic Resources to train professionals in the fishing industry, business and those working in administration and policy to gain first-hand technical knowledge and tools to support community fisheries management programs



Figure 6: The project tested the 5-day training manual on fisheries management that was developed

- The Administrator of the United States Environmental Protection Agency visited the project to discuss potential areas for collaboration particularly in the area of climate change and its impacts, paid a courtesy call on the Vice-Chancellor of the University of Cape Coast and participated in a roundtable discussion about climate change impacts on public health at the University of Cape Coast



Figure 7: Administrator of US EPA, Ms Gina McCarthy visits the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project and delivers a talk on how the USA is playing a leading role in addressing climate change

- Renovation, refurbishing and equipping the last batch of 3 offices for DFAS academic staff started after challenges involving contractual issues were finally resolved
- USAID approved project management request to fund 6 additional Postgraduate students to undertake PhD studies at DFAS which will be funded through budget for CCM training and research activities with external Technical Assistants

3.0 PROJECT OUTPUT1.1: IMPROVED INFRASTRUCTURE

3.1 Activity 1.1.1: Renovating and Equipping Fisheries and Coastal Research Laboratory

Renovation works at the fisheries and coastal research laboratory has been completed with the installation of equipment and laboratory certification procedures still ongoing. The shipping containers with the laboratory equipment have been transported from the central stores of the University of Cape Coast to their final destination where they will be kept. Space has been provided close to the College of Agriculture and Natural Sciences by authorities of the School of Biological Sciences for the purpose of keeping the shipping containers. Arrangements have been initiated with approval from the Directorate of Physical Development and Estate Management to develop the space and use the shipping containers as

storage rooms and office space for Laboratory Technicians of DFAS and GIS hub for CCM after the removal of the equipment. In relation to this, the appropriate documentation is currently being compiled (i.e. approval letter from the university, environmental compliance requirements, university approved shed construction plans) to be submitted to USAID for approval.

Some of the equipment have now been taken out of the shipping containers and sent to the laboratory ready to be installed. Those that do not require any installations are currently being used for teaching and research purposes by staff and students of DFAS which has enhanced research and teaching capabilities of the Department.



Figure 8: Some laboratory equipment installed

Enquiries regarding procedures involved in the installation of equipment and certification of the laboratory were made with the Ghana Standards Authority in Accra and other related agencies in this reporting quarter. Based on knowledge and information gathered from the enquiries, the Ghana Standards Authority has been identified as the most competent agency to undertake the installation of equipment and assist DFAS in the certification of the fisheries and coastal research laboratory. In view of that, project management has developed Terms of Reference for the Ghana Standards Authority that will guide the Authority to carry out work and will soon enter into work contract with it. The contract is being developed with the purpose of facilitating the installation of laboratory equipment at the fisheries and coastal research laboratory to meet the standards for an ISO certification. Expected outputs from the Authority will include the following:

1. Provide consultation on the needs of ISO criteria and requirement for the certification of an ISO compliant academic research laboratory
 2. Assess the intended purpose and functionalities of the fisheries and coastal research laboratory and recommend the appropriate ISO standards to apply to for certification
 3. Supply DFAS with a gas chromatographic unit
 4. Provide services for the installation, testing, calibration, training of technical staff on key equipment including:
 - Atomic absorption spectrophotometer and accessories (including gas supply system with a compressor and gas cylinders, graphite furnace system and flame autosampler)
 - High performance fume hood (ESCO 4' Frontier Acela) and accessories
 - Gas chromatograph and accessories
 - UV/Visible Spectrophotometer
 - Laboratory safety devices (including smoke detectors, fire extinguisher and blankets)
 - Other ancillary laboratory equipment and facilities (including water distillation system, autoclave system, incubator, centrifuge, laboratory freezers, oven and furnace)
 5. Facilitate the development of a management system for quality, administrative and technical operations (including maintenance schedule) of the fisheries and coastal research laboratory
 6. Facilitate in choosing an accreditation body and acquisition of an ISO certification for the fisheries and coastal research laboratory
 7. Provide routine maintenance services for the fisheries and coastal research laboratory.
- Project management will work expeditiously in the coming quarter to fast-track contractual agreements with the Ghana Standards Authority to conduct this activity to ensure that all equipment is installed and the fisheries and coastal research laboratory is ISO certified to fulfill all requirements and enhance DFAS's teaching and cutting-edge research capabilities. A detailed laboratory management plan is being prepared as part of the Department's Strategic and Business Plan that will look at the possibility of running the laboratory as an internally generated income venture for DFAS.

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

In order to strengthen the needed capacity of DFAS to carry out their mandate in terms of adequate infrastructure, eight (8) DFAS offices were earmarked for refurbishment under the USAID project. Five (5) of them have so far been completed, 2 in the first year and 3 in the second year which were also completed within the last quarter. The planned schedule for the refurbishment of offices has been disrupted for some reasons including lapses in University procurement, contracting and payment processes and lately due to the demise of the building contractor in the last quarter. This resulted in further delays in completing the 3 offices which were refurbished in the last quarter. However, the construction company and University authorities found an amicable solution to the challenges encountered and they both came to

an agreement to make all outstanding payments to the contractor and developed a new schedule for completing refurbishment works on the rest of the 3 offices. In the last quarter, project management advised occupants of those 3 remaining offices to pack out which they did before the end of the Christmas break and refurbishment work immediate started on them which is scheduled to be completed within the coming quarter. Hopefully by the end of the next quarter, all offices will have been completely refurbished and both academic and technical staff of DFAS can work comfortably from their offices to enhance their teaching and research obligations.



Figure 9: Renovated offices of some DFAS academic staff

The procurement process by the University to acquire books and subscribe to journals for the ICZM library at DFAS is still outstanding. The University librarian is working with the Procurement Section of the University to source for the books for the library but the process has still not come to fruition despite several attempts by project management to remind the librarian and the Procurement Section about the urgency of the matter. Invoices for procurement were once forwarded by the librarian to project management for consideration but management upon considering the invoices submitted took a decision not to approve the award of contracts because management was of the view that prices quoted were too high. The matter was brought to the Project Management Board who has advised that DFAS or the School of Biological Sciences can procure the books in bits by themselves on condition that the amount involved in a single procurement does not go above a certain value, which is in line with University procurement policy. This issue is still being discussed at management level to come to a conclusion on the matter.

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

All the vehicles which were planned to be bought under the project have all been already acquired. No more vehicles will be bought until the end of the project. Project management must now ensure that the vehicles are duly maintained to support educational, training, research and extension activities, the purpose for which they were bought. Maintenance of project vehicles is the primary responsibility of the project driver under the overall guidance of the Project Manager. In the last quarter, all project vehicles operated according to schedule without any major challenges. Project management in collaboration with the project driver ensured that all road worthy certificates and insurance policy for all the vehicles were still valid. All the vehicles were regularly serviced in accordance with servicing plans in Cape Coast for the Toyota vehicles and with Mechanical Lloyd in Takoradi for the Ford vehicle. The Ford vehicle had an accidentally broken glass window which needed to be fixed and replaced at Mechanical Lloyd. Fortunately, the insurance company for the Ford (State Insurance Company) assessed the damage caused and appropriately paid for the cost of fixing and replacing the broken glass window.



Mechanical Lloyd in Takoradi was contacted afterwards for the repairs who in turn contacted their office in Accra to enquire about the availability of the glass window which they did not have in stock at the time so needed to import. The latest information was that the glass window has been successfully imported into Ghana available now in Accra and will be sent to Takoradi for it to be fixed on the project vehicle. Project management is waiting to be informed on its arrival in Takoradi so that the project driver can send the vehicle to Takoradi for repairs.

4.0 PROJECT OUTPUT 1.2 INCREASED TECHNICAL AND SCIENTIFIC KNOWLEDGE

4.1 Activity 1.2.1: Academic and Technical Staff Capacity Strengthening

To provide a firm foundation to support trainings and outreach programs in subsequent years, a capacity needs assessment was conducted for staff of DFAS and CCM by the USAID-funded AfricaLead program. Findings from the assessment will be integrated into the design and development of project activities in subsequent years. It is expected that this will strengthen the capacity of academic and technical staff for effective fisheries and coastal management planning, training, research, and extension work.



Figure 10: Capacity needs assessment was conducted for staff of DFAS and CCM by AfricaLead

To further strengthen the capacity of academic staff, 4 members have been scheduled to participate in a study tour to the Australian National Centre for Ocean Resources and Security (ANCORS) at the University of Wollongong in early July this year. While at ANCORS, the participants of the study tour will receive education and training on ocean law, maritime regulation and enforcement, maritime security, natural marine resource management and also receive marine policy development advice. Learning from past experiences in organizing study tours as part of project activities, preparations for travel to Australia need to start way in advance to avoid any unforeseen circumstances which have the potential to delay the conduct of the study tour. In view of that planning for the activity started in the last quarter with initial enquiries made with the Capacity Development Leader at ANCORS in Australia who has provided a favourable response to host the 4 participants at ANCORS. Planning will continue in this quarter to make sure that the study tour is conducted as specified in the project Year 3 workplan.

Two members of academic staff of DFAS also attended a Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) Biennial Conference and 5th African Higher Education Week in South Africa to present some key findings of the project in the Ghanaian fisheries sector over the past two years to the audience. The Regional Universities Forum for Capacity Building in Agriculture RUFORUM's is a network made up of over fifty African universities with a mandate to oversee graduate training and networks of specialization in agriculture and allied subjects in the countries and universities where it works.



This was intended to market the project on an international platform and give more visibility to the project worldwide. The purpose of this travel was to use a highly international platform to showcase the capacity building collaboration between the USAID/Ghana (as a donor organisation) with UCC (as a public institution in Ghana) in the area of fisheries and coastal resource management and explore opportunities in collaborating with other partner institutions in Africa. The UCC team prepared and presented a poster that described the USAID/UCC project as a capacity building partnership program designed to strengthen the knowledge, skills, and relationships to enable organizations, groups, and individuals to reach their set goals in fisheries and coastal resource management and governance in Ghana which includes strengthening institutional systems, processes, and rules of engagement. The poster highlighted requirements for developing the foundation for effective partnerships and identified the role of higher education and research institutions in national development.

The capacity of two academic members has been further enhanced through participation in the RUFORUM conference particularly on issues pertaining to and how partnerships and innovations to strengthen higher education in Africa. The visit has also resulted in establishing links with two sister universities in Cape Town, South Africa which will be of great benefit to DFAS and CCM moving forward in the areas of students' supervision and examination, use of some institutional facilities, joint proposal writing and skills development in grantsmanship and research. The conference participants will continue to dialogue with contacts to deepen the relationship established and also to contact the Sustainability Institute of the Stellenbosch University, South Africa to explore possibility of collaboration with CCM.

4.2 Activity 1.2.2: Operationalization of the Centre for Coastal Management

With the appointment of a Director to the Centre for Coastal Management in August last year, the last quarter saw a remarkable improvement towards operationalization of the Centre for Coastal Management with respect to organization and the implementation of the Centre's activities. The Centre has become more organized as an independent entity from DFAS having project Research Assistants assigned with clearly defined roles and responsibilities to assist in the Centre's operations. Roles and responsibilities of the Centre under the project have also become more clearly defined.



Figure 11: Dr. Denis W. Aheto, Director - Centre for Coastal Management, UCC

The Centre effectively supervised all Year 2 activities which were carried over to Year 3 and made sure they were fully completed and also developed a new strategy and approach for the implementation of all Year 3 activities. Under the new approach, the Centre is going to play a more active role in the implementation of all its activities particularly those that are carried out in collaboration with external Technical Assistants. CCM will still continue to engage the services of external Technical Assistants in Year 3 but the

Technical Assistants will now act more as Facilitators who will be playing a facilitating role in the implementation of project activities and the

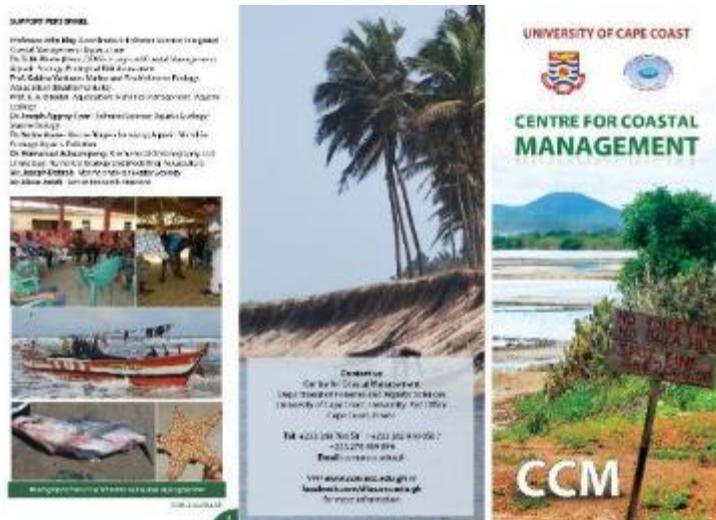
CCM will now play a more active role in the organization providing official, administrative, financial, logistics, material and other resource support unlike in Year 2 where the external Technical Assistants organized all of these on their own with little or no involvement of the Centre. This will enhance more efficiency in the system and ensure that project activities are implemented in an effective and timely manner to achieve intended results. This approach will apply to activities of the Centre such as the training in Integrated Coastal Management, Fisheries Management, GIS and Climate Change as well as Research in Fisheries Governance and Policy Dialogue issues.



Figure 12: Centre for Coastal Management Office located in the Faculty of Education Lecture Theatre (FELT) Complex, University of Cape Coast

The Centre intends to host a Coastal Management Specialist from Belgium in Year 3 preferably in March 2017 during the second quarter to draft a Strategic Plan for DFAS and to train staff of CCM and DFAS on project proposal writing, grantsmanship and project management and assist to identify funding sources over a two-week period. It is intended that the training will position DFAS and CCM to coordinate funding and engage in effective

resource mobilization (such as infrastructure, logistics, and personnel) to access grants nationally and internationally. Planning and preparation for the coming of the Coastal Management Specialist started in the last quarter with the Project Manager opening up communications with him to decide on his availability and the exact dates for his intended stay in Ghana.



The Coastal Management Specialist communicated and indicated that he is quite flexible with his time in early 2017 but would suggest 20th February – 3rd March 2017 and thinks that other moments are also possible. Draft Terms of Reference (TOR) for the assignment are currently being developed by project management for consideration by the Coastal Management Specialist after which cost implications including

flight and accommodation issues as well as next steps will be discussed.

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

The USAID/UCC Fisheries and Coastal Management Capacity Building Support Project was originally designed to train 10 PhD and 20 MPhil students in DFAS programmes in Fisheries Science, Integrated Coastal Management, Oceanography and Limnology or Aquaculture. These students would be fully funded under the project’s scholarship program. Five (5) PhD and 10 MPhil students were admitted in the 2015/2016 academic year while 5 PhD and 5 MPhil students were admitted in the 2016/2017 academic year through a competitive selection process. The last batch of 5 MPhil students will be admitted to begin their studies in the 2017/2018 academic year who will be able to complete their studies in time before end of project in September 2019. Postgraduate students who were admitted in 2016/2017 satisfied all admission, School of Graduate Studies, project, DFAS and University of Cape Coast requirements in the last quarter and have successfully started their study programs. All students have been assigned with their Academic Advisors, have submitted their research proposals describing their research themes and topics and are currently working with their advisors to fine-tune their proposals. MPhil students who are undertaking coursework attended lectures in the last quarter and are currently writing their end of semester examinations. This brings the total number of Postgraduate students who are currently studying with scholarship under the project to 25.

Postgraduate Scholarship Awards

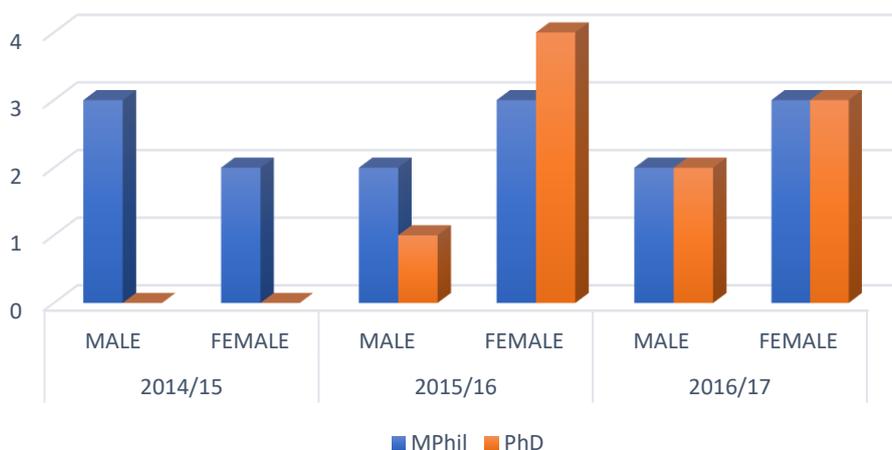


Figure 13: Sixty percent (60%) of the 25 postgraduate students on full scholarship under the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project at DFAS are females

Discussions about PhD students spending some time at the University of Rhode Island (URI) to conduct their studies were also further advanced in the last quarter between delegates from URI and UCC officials. It has been concluded through the discussions that the first batch of 5 PhD students will enrol into a 6-month (1 semester) research program at URI in Year 3 which is scheduled to begin in August this year. The possibility of PhD students undertaking dual degree program was also discussed between the leadership of URI and UCC in the last quarter when delegates from the College of Environment and Life Sciences of URI paid a working visit to the UCC. This visit was a follow up to previous exchange visits of high level officials of both universities in early 2016 to strengthen their partnership as spelt out in the MOU and begin negotiations of specific terms for further collaboration and exchange of faculty and students.

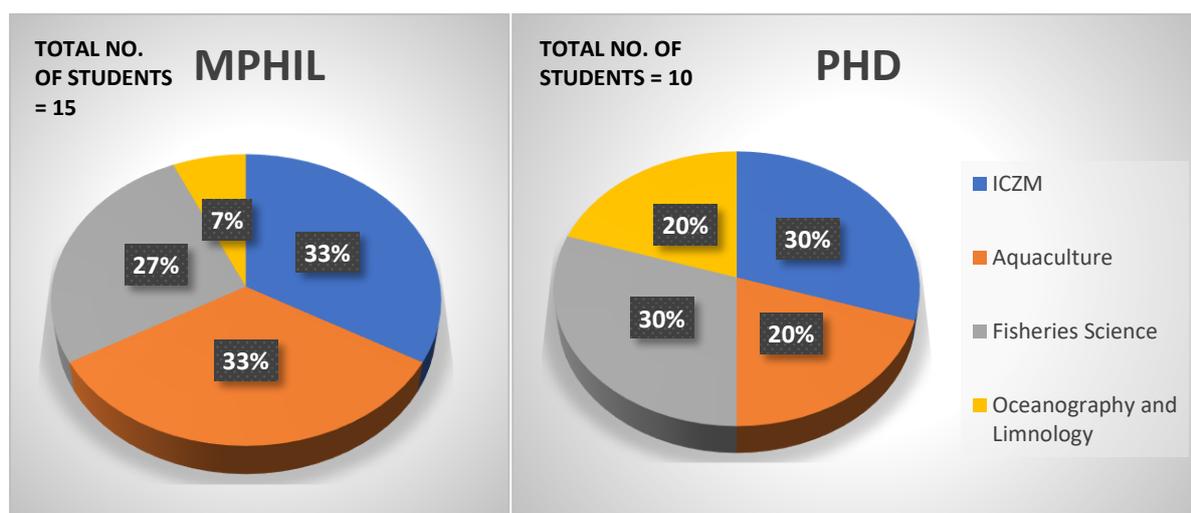


Figure 14: 15 MPhil and 10 PhD students are currently admitted into various programmes on full scholarship from the Project

During the development of the project Year 3 workplan, the project made a proposal to USAID for approval to support additional 6 PhD students on part scholarships to cover fees for various programmes of study within DFAS without a need for additional funding from USAID. It was indicated to USAID that funding for these additional students will come from the budget for research that are to be carried out by external Technical Assistants to the project as part of activities of the CCM. This approach is intended to use PhD students to conduct part of the research that is being outsourced to the short-term Technical Assistants to support capacity development of younger faculty and students, while the Technical Assistants would be used as mentors to supervise these research topics in collaboration with academic staff of DFAS. This strategy will train the next generation of scientists needed to promote sustainable management of fisheries and coastal resources at no extra cost to the project. Following the approval from USAID, 6 additional PhD students were admitted in the last quarter who are currently finalizing all the needed requirements to begin their studies.



Figure 15: Postgraduate students admitted on full scholarships to the University of Cape Coast under the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project

4.4 Activity 1.2.4: Undergraduate Research Grants

The USAID/UCC Fisheries and Coastal Management Capacity Building Support Project provides small grants to final year undergraduate students of DFAS to assist them financially to carry out field research for their dissertation. About 30 and 7 DFAS undergraduate students benefitted from such grants in 2015 and 2016 respectively. From past experience, project management has noticed that the amounts budgeted for in the project workplans to support final year undergraduate research outweigh the number of DFAS undergraduate students who make it to the final year. In planning for Year 3 therefore, project management took a decision to fund final year undergraduate students from the Departments of Fisheries of other sister Universities in Ghana that the project collaborates with in the implementation of project activities from the undergraduate research grants budget on competitive basis.



Four (4) Fisheries Departments were identified to benefit from the grants; Department of Fisheries and Watershed Management, Kwame Nkrumah University of Science and Technology (KNUST), Department of Marine and Fisheries Science, University of Ghana (UG), Department of Fisheries and Water Resources, University of Energy and Natural Resources (UENR) and Department of Fisheries and Aquatic Resources Management, University for

Development Studies (UDS). A total of 20 field research grants (5 per institution) worth US\$500 per student will be awarded to students from the above Universities this year in addition to 9 current undergraduate students of DFAS to support their final year small research projects.



Figure 16: DFAS Undergraduate and postgraduate students at the 2016 World Fisheries Day celebration in Cape Coast

A Memorandum of Understanding (MoU) that covers terms and conditions of the support was developed in the last quarter and is yet to be signed between DFAS and the other sister Universities. The purpose of the MoU is to strengthen the collaboration between DFAS and the sister Universities through the award of undergraduate field research grants by the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project implemented by DFAS to final year undergraduate students of the sister Universities to undertake research for their final year projects. Terms and conditions of the award comprise the following:

1. A total number of five (5) final year undergraduate students will be selected by DMFS-UG on a competitive basis to receive the award.
2. Each student will receive financial support to the tune of five-hundred United States Dollars (USD 500.00) to carry out research for their final year project work.
3. The grant (USD 500.00) shall be used strictly to cover research activities such as cost of travel to the field, phone calls, internet usage, printing, photocopying and binding and not any other unrelated activities.
4. Research work conducted by the students shall be within the framework of activities of the USAID/UCC Fisheries and Coastal Management Capacity Building Support Project being implemented by DFAS-UCC.
5. The Recipient provides monthly progress reports on their research activities to DFAS-UCC in consultation with their Academic Advisors.
6. The Recipient provides a copy of the dissertation arising from the research work to DFAS-UCC for their records.
7. The Recipient understands that funds for the award is provided by the United States Agency for International Development (USAID) and needs to be acknowledged as such in the final dissertation resulting from the research.
8. This MOU shall become effective upon signature by the authorized officials from DFAS-UCC and DMFS-UG and will remain in effect until modified or terminated by any one of the partners by mutual consent.

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

5.1 Activity 2.1.1: Conducting Fisheries Stock Assessment

To address the major challenge of declining fish catches in Ghana, the long-term conservation and sustainability of exploited fish stocks should be a priority. This requires the best and up to date information about the stocks through fisheries stock assessment research. In Year 2, the project conducted a fish stock assessment research with the primary objective to provide information on some selected commercially important marine fish stocks in Ghanaian coastal waters to facilitate sustainability and conservation of the stocks. The



Figure 17: Sepia officinalis (Cuttlefish), an important food-fish is one of the demersal stocks being assessed

assessments were concentrated at 6 designated fish landing ports along the entire coast of Ghana, namely, Elmina, Sekondi, Half Assini, Apam, Tema and Keta for data on selected fish stocks.

Data was collected on daily catch (kg) per canoe, semi-industrial and industrial boats, size distribution, maturity stages;

length-weight relationships from beach seine and offshore catches, salinity and surface temperatures of water for monitoring upwelling indices. Length-based assessment methods were used to estimate growth and mortality characteristics, exploitation rates and size at first capture of cuttlefish *Sepia officinalis*, shrimp species, Carangidae (e.g. *Caranx hippos*, *C. chrysos*, *Trachurus spp.* and *Decapterus spp.*) and Sparidae (*Pagellus spp.*, *Dentex spp.*, and *Pagrus spp.*). In addition, the data obtained covered various aspects of the biology of the targeted species including, the length-weight relations, sex-ratios, condition factor, food and feeding habits, sexual maturity, spawning and fecundity. Otoliths of fish specimens were removed for analysis to establish age structure of the stocks.

Preliminary analysis of the data collected indicated decline in the stocks possibly due to increased fishing effort. To have a more concrete data requires an all-year round sampling which prompted project management to approve a request from the project fish stock assessment Technical Assistant to undertake the research for an additional 6 months' period into Year 3. As a result, this activity was continued throughout last quarter and it is expected that the routine monthly fishery surveys and data collection will continue in the next quarter. The collection of monthly length-frequency data will be compiled after the end of the next quarter to allow application of the length-based FAO FISAT program to estimate growth and mortality parameters and the appropriate Surplus Production Model for Maximum Sustainable Yield (MSY) estimation respectively.

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

The component of Research and Assessment of Marine Fisheries Governance issues in the Western and Central regions is designed to focus on traditional governance structures or customary social arrangements, local governance and decentralization as well as collaborative/community rights based management and their legal dimensions. It is expected that an in-depth assessment of these issues and their proper understanding will provide the enabling conditions and pave the way for an effective management structure in the fishing industry at the community level. There are about 189 fish landing sites in the Western and Central regions, 93 in the Western and 96 in the Central region. Research and assessment of marine fisheries governance issues pertaining at 60 landing sites have been conducted to date in 7 coastal Districts in Western and Central regions. This was a Year 2 activity which was not fully completed by the end of the year so had to be concluded in the first quarter of Year 3. The first quarter of Year 3 was used to wrap up the research, validate the information collected and to prepare and submit a final report on all the issues identified through the research.

Results from the assessment indicate that traditional fisheries governance is closely linked with the customs and traditions of the various ethnic groups in a fishing locality, which vary from one landing beach to another depending on the ethnicity of the community. Even though some of the landing sites do not have recognized chief fishermen, traditionally, chief fishermen play a lead role in the governance system but their powers have declined over time.

The power of chief fishermen to govern the landing beaches generally erodes as one moves from the rural community, through the peri-urban communities to the urban areas. Furthermore, the power of the chief fishermen is affected by issues such as chieftaincy disputes and political affiliation. Women fishers are led by chief fish processors who traditionally fix fish prices at the landing beach and also serve as an arbitrator in settling disputes that arise among the female fish processors. The way this power is exercised varies markedly from landing beach to landing beach. The power of chief fish processors also erodes as one moves from the rural areas to the more urban fishing communities. Traditionally, the chief fish processor works with the chief fisherman but she is not a part of the governance structure of the landing beach.

A flow chart of the powers of leaders of coastal communities may be useful here

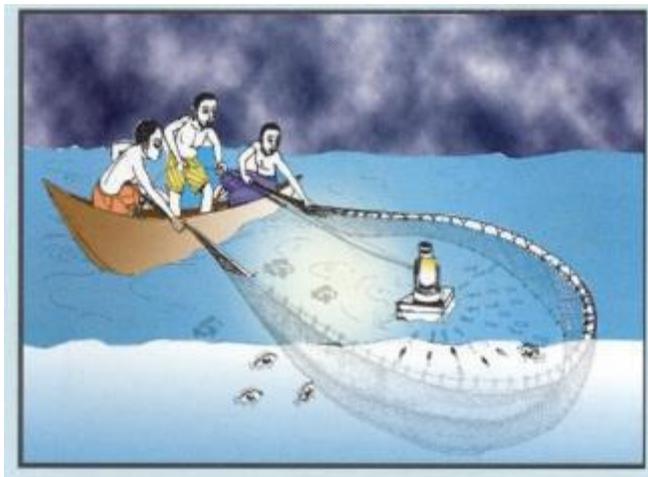


Figure 18: Light fishing aggregates fish of all sizes, which are captured by fishermen (Source: http://teca.fao.org/sites/default/files/technology_images/Mukene%20light%20fishing.jpg)

Fishing methods used in most of the landing beaches include light fishing, chemical fishing, bomb fishing and trawling in inshore waters. While majority of fishermen attest to the presence of illegal fishing methods, there is usually the blame game where one ethnic group accuses the other of engaging in the act. Prospects of adopting a management strategy that will lead to a sustainable exploitation of the resource is high among many fishermen but on condition that Government shows a lot more commitment at working to restore sanity in the fishing industry.

This could be achieved by first depoliticizing the issues in the fisheries, especially with respect to pre-mix fuel allocations and sales and also making alternative livelihood schemes available to the fishing communities. For instance, an effort at suspending light fishing for six



Figure 19: Ghana's coast is continuous with that of Ivory Coast; Ghanaian fishermen are compliant within Ivorian marine territory

months in the Nzema area of the Western region (Jomoro, Ellembele and Nzema East districts) by traditional authorities came into effect in May 2016. The rationale was to test the impact of light fishing on fish stocks. This gesture, according to respondents ought to have been supported by government and possibly extended to the rest of the country. There were reports of occasional breaches but the initiative appears to be yielding results.

Some Ghanaian fishermen spend up to six months in one year fishing in the Ivory Coast where they fully comply with the rules of engagement. Why

can't these fishers do the same in Ghana? Because the rules are strictly enforced in the Ivory Coast. Ghana should learn from the Ivorian experience. While fishermen hope for the recovery of fish stocks, majority do not want to take the initiative. The results showed that 60% of fishermen interviewed want to see IUU fishing banned, 40% support a ban on light fishing 80% want bomb fishing banned. Out of 240 fishermen, only 18 representing 7.5% were in support of a closed fishing season while 8 representing 3.3% supported the introduction of controlled access. In most instances, fishermen indicated that for as long as trawlers continued to fish for small pelagics in near shore waters, illegal fishing by canoe fishermen were likely to continue.

It was concluded through the research that there is a huge disconnect between the local government administration and traditional fisheries authorities as by-laws are either not applied or enforced to regulate fishing activities at the community level. Nevertheless, local government administration demonstrated their willingness and preparedness to partner with fishermen in controlling and regulating the fisheries and managing the environment. This effort managed to bring traditional fisheries authorities and local government together in respect of fisheries governance, management of the landing beaches, and provision of services by the local governments to keep the beaches clean. Achieving effective fisheries governance in the coastal fishing communities is possible but not until political influences in the fisheries especially in the areas of pre-mix fuel distribution and sales, and the transshipment of juvenile fishes are abandoned. Results from this study will be appropriately packaged and disseminated widely to reach policy makers as science and evidence-based inputs for marine fisheries policy formulation and advice in Ghana.



Figure 20: District Chief Executive (DCE) of Abura/Asebu/Kwamankese (AAK) District at Fisheries Governance Validation Meeting at Moree (June 2016)

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

It is a recognizable fact that production from Ghana's marine capture fisheries have decreased in the past few decades. One of the widely-proposed mechanisms by fisheries experts to address this challenge is the uptake and development of aquaculture. The



Figure 21: *Oreochromis niloticus* (Nile Tilapia) is a very important protein source for many Ghanaians

commonest fish cultured in Ghana is the Nile tilapia *Oreochromis niloticus*, a freshwater fish. The culture potential of many other species has received little or no attention. The project therefore plans to intensify scientific studies on the biology and culture of brackish water fish resources, mainly the black-chinned tilapia *Sarotherodon melanotheron* and the mangrove oyster *Crassostrea tulipa*, two resources which are endemic to coastal areas of the country. Part of the research are currently being conducted by MPhil and PhD Aquaculture and Fisheries Science students who are ably supervised by competent experts and

also through joint studies with colleagues from the Department of Fisheries of other sister universities.

Findings from the research on fish and shellfish aquaculture will inform the decision by project management to promote the aquaculture of viable species as an additional supplementary livelihoods activity in coastal communities. A research scientist has been engaged to identify brackish water bodies in the Central Region suitable for mass oyster spat production, and construction of tidal ponds for fish culture. An oyster demonstration farm and fish culture demonstration ponds will be established for training coastal inhabitants in oyster and fish rearing. This activity is expected to introduce an additional supplementary livelihood activity by the project with the aim of reducing effort on capture fisheries and promoting responsible fishing.



Figure 22: Oyster culture at Narkwa, in the Central Region of Ghana

5.4 Activity 2.1.4: Analysis of Value Chains of Fish Trade

This was initially designed as a student research activity but has been dormant in course of the project due to the fact that no DFAS student has so far expressed interest in taking up the activity for their research. However, one of the last batch of female PhD students who were admitted recently has taken up the challenge to carry out research in fish value chains for her PhD work and has already submitted her research proposal to her supervisors which has been accepted. The title of her PhD research proposal is “Value chain analysis of *Pseudotolithus species* towards food security in Ghana”. She describes that a value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production and delivery to final consumers and that fish value chain consists of input supply, harvesting, processing, marketing and consumers with support activities such as input needed, access to credit, technological development, storage facilities, etc.

She argues that *Pseudotolithus species* has been reported to be commercially important throughout the Atlantic coast of West Africa. Though much work has been done on various aspects of the biology and ecology of the fish such as the length-weight analysis, studies on food preference and food habits, there is almost no data on the commercial status of this important fish to portray a clear picture of the value chain of the species. It is against this background that she intends to research on the value chain of the species towards food security in Ghana which will focus on the economics and management of this fishery for this fish.

She concludes that this will serve as a baseline for management and decision making on the fishery for the fish. The study is expected to produce data on the value chain analysis of the sciaenids of which *Pseudotolithus species* is part to serve as a baseline on the factors that go into production (harvesting), processing, marketing, export and consumption. It is expected to establish the profit margins and revenue generated from its export. The study will address challenges along each step of the value chain, strengthen the policies governing the fishery and create opportunities for the actors and other stakeholders involved in the fishery. This research has the potential to generate useful information and knowledge on value chains of fish trade and will be supported by the project accordingly.

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

The intended objective of this activity is to promote the conservation and sustainable management of biodiversity which is critical for food security and poverty reduction. In Year 2, research was undertaken by the project in collaboration with researchers from the KNUST Institute of Renewable Natural Resources which provided baseline scientific information for assessing the status of coastal ecosystems involving the District Assembly and other stakeholders in advocating for bye-laws on their wise use. The work involved periodic assessment of fish species, benthic invertebrates, and mangrove communities in lagoons and estuaries to gather baseline scientific information for future monitoring in view of the ongoing offshore oil and gas exploration and production. Aquatic environmental conditions,

occurrence of algal blooms and invasive species were also investigated. A degraded lagoon at Half Assini in the Western Region was adopted for rehabilitation in the process.

Research on biodiversity and health of coastal ecosystems is currently being undertaken by PhD students of the DFAS which include developing ecological indices for monitoring pollution in estuaries and lagoons. These studies continued in the last quarter and the scope will be broadened in the next quarter to include new studies with focus on mangrove ecology, systematics and assessments of anthropogenic impacts.



Figure 23: Aerial photograph of the Awiane Lagoon currently being restored in the Jomoro District, captured with a drone

Planning for the ecological monitoring of the adopted lagoon in Half Assini started in the last quarter and activities will continue throughout FY2017 in order to acquire a more comprehensive baseline data on the lagoon and to support arguments for the removal of solid wastes from the lagoon. Solid wastes in and around the lagoon would be removed and deposited at an appropriate location to increase the depth and storage capacity, and decrease pollution in the lagoon. This work is scheduled for the next quarter at the height of the dry season (January –March 2017). Additionally, there will be a year-round monitoring of the health status of the lagoon after the removal of waste from the lagoon. In addition, the project will work with the community, the traditional authority and the Environmental Health Unit of District Assembly to develop a bye-law to protect the lagoon, to create a buffer zone around the lagoon and dialogue with the community on the location of sanitary sites and provide resources for solid waste collection by the District Assembly. This will ensure that the lagoon is kept in a healthy state that can continue to support the benefits that community people derive from it.

5.6 Activity 2.1.6: Developing Marine and Coastal Fisheries Database

Availability and access to quality and useful data is key in management decision making processes. One of the project's flagship activities is the development of a marine and coastal fisheries database that is intended to organize historical scientific data, new field observations and experimental results on the marine/coastal environment and fisheries in Ghana into a comprehensive database that can easily be accessed by researchers, students, marine and coastal environmental as well as fisheries managers in the country and elsewhere to support teaching and learning, research and management decision making. In Year 2, the project in collaboration with the Sustainable Fisheries Management Project (SFMP) organized a national dialogue on research needs for the management of marine/coastal fisheries and environment in Ghana. One of the outcomes from the dialogue was the development of concrete actions for pursuing the development of the marine and coastal fisheries database and data management. Ways to harmonize research and projects undertaken by different national institutions to enhance fisheries and coastal management was discussed. After that a database programmer was hired by the project to design the database which was completed and tested at the end of Year 2.



Figure 24: Logo of the marine and coastal fisheries database (fishcomghn.com)

In the last quarter, the project officially registered the domain name “FishCoM Ghana” referring to “Fisheries and Coastal Management” (<http://www.FishCoM Ghana/index.html>). After that a strategy for critical data collection, management and online distribution was outlined followed by actual collation and standardization of historical data, new marine/coastal research and fisheries data to populate the database. The database is currently being fed with available data and information to support the purpose for which it was conceptualized. Also in the last quarter, the project engaged in planning to organize a database workshop at the national level in Accra that will bring together potential collaborators for a national dialogue on sharing of scientific data and information and to develop modalities for the sharing of information as well as issues to deal with access to the database. Plans have been firmed to organize the workshop in late January in the second quarter of Year 3. This workshop will be used to officially launch “FishCom Ghana”. Collaborating partners will be signing Memorandum of Understanding (MoU) regarding the operation of the database in course of the workshop. The launch will involve representatives from all partner institutions including:

- Environmental Protection Agency of Ghana
- Ministry of Fisheries and Aquaculture Development & Fisheries Commission
- University of Energy and Natural Resources
- University of Ghana
- Kwame Nkrumah University of Science and Technology
- University for Development Studies

- Council for Scientific and Industrial Research
- University of Rhode Island
- United States Agency for International Development and
- Civil Society Representatives

6.0 PROJECT OUTPUT 2.2: COMMUNICATION, EXTENSION AND OUTREACH IMPROVED

6.1 Activity 2.2.1: Developing Material and Conducting Training on Integrated Coastal Zone Management (ICZM)

Humans have always had a close relationship with the coast for the provision of goods and services. In Ghana, coastal zones are of crucial importance for a majority of the population. In spite of the importance of the coastal zone, Ghana's coastal zone and resources currently face multiple challenges including resource degradation and ineffective management. This can largely be attributed to the lack of stakeholders' knowledge and understanding of the basic principles and skills to address the challenges in the coastal zone. Integrated Coastal Management (ICZM) is an important tool for sustainable management of the coastal environment and resource utilization. Training in Integrated Coastal Management is therefore a priority of the USAID/UCC Fisheries and Coastal Management Project Capacity Building Support Project. Delivering effective training in Integrated Coastal Management to build the required capacity for addressing the challenges in Ghana's coastal zone calls for the preparation of an appropriate curriculum and training materials that are of international standards.

In Year 2, the project developed a training curriculum and training manuals on ICZM and tested them in a 5-day training workshop that brought together training participants who are stakeholders in issues related to coastal resources management and planning including administrators at the district level in the Central Region. The training is targeted towards spatial planners, disaster managers, District, Municipal and Metropolitan Assemblies, environmental and fisheries officers, fishermen/fishmongers, and community-based fisheries and coastal management groups. An ICZM training manual with PowerPoint presentations, videos of interactions of the coastal zone and human activities and other materials including an instructor guide were developed for the testing. The project is rolling out the actual training program in Year 3 which is targeted towards stakeholders at the national level. Planning for the training program started in the last quarter with the identification of a training facilitator who will partner with the DFAS and CCM to successfully deliver the training. At the same time, Terms of Reference were developed for the training facilitator with roles and responsibilities to be carried out by DFAS and CCM clearly identified. Contract will be developed and signed between the facilitator and DFAS/CCM for work to begin in the ensuing quarter preferably beginning February 2017. This will contribute to assembling the enabling conditions required for the sustainable management of Ghana's coastal ecosystems and resources for the benefit of communities and future generations.

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

Sustainable management of fisheries in Ghana largely depends on sound scientific and technical knowledge and management capacity. Scientific and technical knowledge will inform and guide any management strategies to allow its sustainable exploitation based on a set of defined objectives. However, technical and management capacity is lacking in the fisheries sector in Ghana. To respond to this need, in Year 2, the project collaborated with other relevant governmental institutions or key fisheries experts from the sister universities in Ghana to develop a training curriculum and modules on fisheries management for short training courses targeting different stakeholder groups (fisheries extension offices, district assembly personnel, community leaders, fishermen and women groups). The primary objective is to promote sustainable fisheries management at the local level. The modules draw on strategies developed from the needs assessment of the community-based groups conducted in Year 1. It comprises of a 5-day training on fisheries management that is tailored to small-scale fisheries. It is intended to train professionals in the fishing industry, business and those working in administration and policy to gain first-hand technical knowledge and tools to support community fisheries management programs.



Figure 25: The project tested the 5-day training manual on fisheries management that was developed

This was tested in the last quarter using middle-level fisheries stakeholders including participants from the District Assemblies, Ministry of Fisheries and Aquaculture Development, the Fisheries Commission, NGOs and fishing communities. The training curriculum was finalized in the last quarter based on contributions received from the test training and inputs from DFAS academic staff. The actual training will be conducted in the second quarter of Year 2 preferably in March 2017. This activity will contribute to professional capacity development for sustainable fisheries management at different levels in Ghana.

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

One of the flagship training programs that have been developed by DFAS/CCM is the short course on Climate Change Adaptation and Mitigation in Coastal Areas which is a 5-day

intensive course for professionals working in coastal economies, environments and population/health. The course has been developed particularly for economic and physical planners as well as disaster management officials at the district level within Western and Central Region to understand the causes and effects of climate change in coastal communities and the role of human activity, identify and analyze threats to assets and communities and identify current actions being carried out in Ghana which contribute to future adaptation. The objective is to build the capacity of district planning officers and disaster management staff to incorporate climate change considerations into their district spatial planning and technical advisory services and to support disaster management efforts at the district level.

In the last quarter, the short course on climate change adaptation and mitigation in coastal areas was offered by DFAS/CCM in collaboration with a facilitator from the Kwame Nkrumah University of Science and Technology with people from relevant agencies who work across the coast of Ghana. This included the delivery of modules in training sessions in Cape Coast as well as field trip activities to the Western Region using a field guide for coaching participants. The field module complemented knowledge gained in the class by further giving participants the opportunity to discuss challenges, best practices in seafront development and impacts on fisheries livelihoods and discuss models for flood plain management at the community level for district engagement.

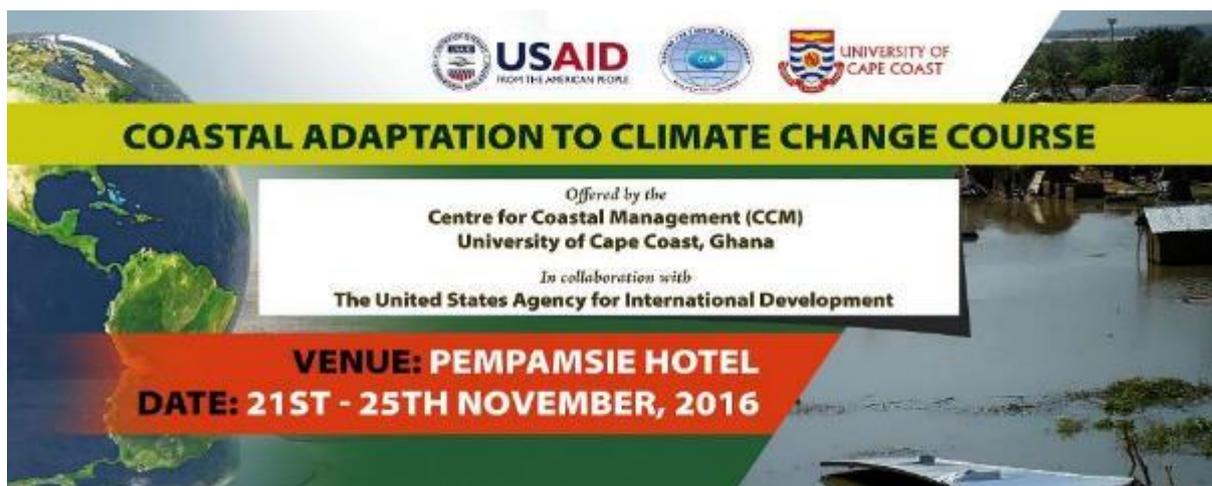


Figure 26: Banner used for the climate change training

Prior to delivery of the course, the course facilitator conducted a needs assessment for district and regional level planners, national disaster management organizations and other relevant personnel and also developed training workshop outline for presentations of courses and practical exercises. The course itself was delivered based on the documentation of best practices on climate change adaptation and mitigation strategies especially within the African sub-region. Altogether 18 participants were trained in the course, 12 males and 6 females. The course was evaluated by the trainees which indicated that 45% of the trainees rated the overall content as excellent, 35% thought it was very good while the remaining 15% thought it was good. The climate change adaptation and mitigation in coastal areas short course will be thought once again in the third quarter preferably in July 2017.



Figure 27: All participants were awarded certificates at the end of the training on coastal adaptation to climate change

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

There is the recognition that growing pressure from increasingly diverse human activities coupled with climate change impacts threaten the functional integrity of coastal ecosystems. Coastal flooding and shoreline erosion is increasingly impacting the lives of people, property and ecosystems in Ghana. Again, coastal forests, particularly mangroves, are consistently harvested for fuel wood and fish smoking without replanting or undertaking any systematic regeneration activities. These situations are exacerbated by the lack of baseline information that covers the coastal area, and a management plan to effectively deal with the challenges. This underscores the urgent need to design new approaches for managing coastal resources in sensitive tropical environments effectively. Geographic Information Systems (GIS) can play an important role in the management of these coastal resources. GIS represents a powerful tool to understand the dynamics of coastal processes.

In spite of the importance of GIS in fisheries and coastal management, the capacity to utilize GIS tools in the work of DFAS, CCM and other collaborating agencies is lacking. In responding to that need, a basic curricula and training manual in GIS was developed with the support of an external expert in collaboration with other institutions and tested on postgraduate students and lecturers of DFAS as training participants. Additional experts from UCC, KNUST and Forestry Commission were used as facilitators. Strengthening of GIS capacity for CCM, Development and Planning Officers within the coastal districts of Ghana is planned to continue in Year 3 with a goal of establishing GIS capacity of resource managers for spatial analysis, planning and management of coastal landscape resources on the basis of an advanced course. This activity started in the last quarter with the identification of a GIS expert to assist the CCM to undertake that activity. Project management started the development of Terms of Reference for the GIS expert and to fashion out exactly how the activity will be undertaken in terms of timelines, the needed logistics and sharing of tasks and responsibilities. The GIS expert will be required to undertake a needs assessment to

determine the viability and usefulness of GIS technologies to the districts and organize another training program that will target new stakeholders preferably Town and Country Planning and District level staff based on the modules developed in 2016. The GIS expert is also expected to develop and test an intermediate GIS course. This course will build on the "Introduction to GIS" course in 2016. Some intermediate GIS topics will be introduced through a combination of lectures, hands-on exercises, and individual projects.

During the period under review, training on the operation of unmanned aerial vehicles (UAV) for scientific analysis and coastal environmental planning was also undertaken. The training workshop was undertaken for staff and research assistants of the Centre for Coastal Management (CCM). The purpose of the training which was facilitated by the SFMP Project by Mr. Chris Damon of the Environmental Data Centre, URI was meant to build the capacity of the staff in all aspects of UAV operations. The training covered Ghanaian flight regulations, flight safety, UAV handling and flight control, mission planning and image acquisition and post-processing. At the end of the training, participants were qualified as Primary UAV Pilots and Field Spotters and could meet the minimum requirements necessary to fly the SFMP DJI Phantom 3 Professional UAV.



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

The project conducted a baseline study in Year 1 to provide the scope for continuous research and policy dialogues on fisheries and coastal management issues among its stakeholders. The results showed a general acceptance that, there are challenges in the management of the fisheries sector; there is a decline in the fish catch; and the sanitary state of the coastal environment is undesirable. Also, stakeholders are unanimous that change has to be from the bottom: instigated and implemented by fishermen and fishmongers and supported by their local district assemblies, traditional authorities and the police. That is, existing fisheries and environmental laws and regulations can be enforced by these local stakeholders in order to attain the national fisheries management objectives.



Following the findings from these dialogue series, the project implemented some of the findings from the policy and research dialogues for sustainable fisheries and coastal management in Ghana in Year 2 that was extended to the first quarter of Year 3 due to the fact that all planned activities could not be implemented as scheduled because of time constraints. To ensure continuous engagement with policy makers on fisheries and coastal management issues in Year 2 which was

extended in the first quarter of Year 3, a number of approaches were adopted to ensure a successful implementation of this program component including: a weekly radio programme to provide an effective extension service using local radio stations and to dialogue with community-based fisheries management groups and discuss fisheries and coastal management issues, Egyanom Afarifo on ATL FM keeps the people of Central region always informed about fisheries and coastal management issues; publications in national print media on salient issues keeps the nation abreast with fisheries and coastal issues; research briefs were prepared and distributed to stakeholders at appropriate fora. Staff of the Fisheries Commission and the Ministry of Fisheries and Aquaculture Development were actively engaged in program activities and a photo album of the issues is being distributed to stakeholders.

Meetings involving researchers with expertise in the fisheries and coastal environment were organized in the period which culminated in the birth of a Fisheries and Aquaculture Society of Ghana and the West African Journal of Fisheries and Aquaculture. The meetings involving scientists in fisheries and coastal environmental research is aimed at harnessing national expertise and resources to start to produce the much-needed scientific information to better manage the fisheries and coastal environment in Ghana.



Also, a national dialogue with non-governmental organizations and development planning officers of coastal districts of Western and Central Regions was held in the quarter under review to discuss fisheries and environmental issues of the districts. This was a talk-shop on fisheries and coastal environment which presented the Centre for Coastal Management the opportunity to establish the rapport with the MMDAs, NGOs/development partners and fisheries management stakeholders to establish rapport and market their research findings for research uptake. It was recommended, among others, that the Centre for Coastal Management works with the National Development Planning Commission to make fisheries and sanitation a priority in the Medium-Term Development Plans of coastal District Assemblies. Outcomes from the research and policy dialogue activities will be appropriately packaged and disseminated to reach policy makers as basis for fisheries and coastal management policy formulation, decision making and advice.

6.6 Activity 2.2.6: Building Institutional Partnerships and Collaboration

During the quarter under review, project activities were implemented to the largest extent possible in partnership and collaboration with relevant institutions particularly the USAID/Ghana, other USAID/Ghana supported projects like AfricaLead and ACDI/VOCA and other networks established since project inception. In the first quarter of Year 3, the project continued to work together with relevant institutions such as those mentioned above in processes towards development of the fisheries and coastal management database. The institutions involved were assigned different roles to play towards achieving intended objectives of that activity such as reviewing and discussing the Memorandum of Agreement drafted to guide the collaboration and getting clearance from the Legal Sections of the different institutions and their roles in collating and sharing data to feed the database. The project also actively collaborated with the sister universities in carrying out activities of the DFAS and the Centre for Coastal Management regarding the development of training manuals and conducting the training, conducting research on fisheries and coastal governance and management issues and engaging policy makers to discuss fisheries and coastal

governance and management issues. The project also collaborated with the sister universities in the co-supervision of students' research projects. Some other project activities such as wetlands ecological health monitoring were also implemented with Hen Mpoano, Friends of the Nation and the USAID/Ghana Coastal Sustainable Landscapes Project.



Figure 28: Representatives from ACDI/VOCA welcomed at DFAS, UCC

The project recognizes the need to continuously engage with the Ministry of Fisheries and Aquaculture Development since project activities are implemented in line with the vision and mission of the Ministry and therefore of the Government of Ghana as way of providing support to the Ministry to achieve its aim. Representatives from the Ministry were actively involved in the development of the project's training, research and outreach programs at different levels such as participating in and providing useful inputs into the testing of training modules based on their rich experience both in management and in the field. District Fisheries offices were the first point of contact when project activities were conducted in the field as a way of soliciting for their support and also for them to have a first-hand information about what the project is doing in the field. Informal discussions were also held with some members of the Ministry to identify their training needs and how the project can support.

The SFMP project still remains a key partner to the project and this was evident in the first quarter of FY2017. Both projects collaborated in number of activities including planning for the 2017 Leadership for Fisheries Management course, Ghana Industrial Trawlers Association-SFMP-UCC collaborative research on cuttlefish, equipping the fisheries and coastal research laboratory, support for 2 Research Assistants to assist in the work of the Centre for Coastal Management and providing support and training in the use and application of Unmanned Aerial Vehicle (UAV) in fisheries and coastal management. Through the SFMP, the project also further strengthened the existing collaboration with the URI and advanced planning and preparations towards exchange and dual and joint degree programs to be undertaken by students of both universities.

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

DFAS has developed a coastal zone wetlands educational curriculum made up of teacher's guide, students' manuals, visual presentations, outdoor classroom and field data monitoring sheets and test questions as well as competitive scorecards for monitoring wetlands' ecological health status, governance issues and threats to the wetlands which has been approved by the Ghana Education Service. The coastal zone wetlands educational curriculum is intended to educate senior and junior high school level and undergraduate university level students on the nature, types and importance of wetlands, the ecological conditions, biodiversity and anthropogenic threats to coastal wetland habitats, and the techniques for monitoring the ecological health of wetlands.



Figure 29: Quiz competition held for wetlands management clubs in Junior High Schools in the Western Region of Ghana

In Year 2, the project signed Memorandum of Understanding (MoU) for cooperation with *Hen Mpoano, Friends of the Nation* and the USAID/Ghana Coastal Sustainable Landscapes Project and trained teachers from some selected schools in the Western and Central Region to jointly implement this activity using students from the selected schools. In the last quarter, project management met with the collaborating partners to extend the MoU to also cover work in the first quarter of FY2017, discuss ways that UCC students could be integrated into the program and also report on progress made and achievements recorded to date. The MoUs were duly extended to work in the quarter under review and it was also agreed that UCC students could make use of the program for their practical work in the field.

Hen Mpoano reported that the program had successfully been carried out at Ampain JSS in the Ahanta District of the Western Region involving 100 students and 5 teachers and Ezulenuono SDA JSS in the Ellembele District of the Western Region involving 60 students and 5 teachers. Friends of the Nation also reported that they had done same at Anlo Beach JSS in the Shama District of the Western Region involving 20 students and 4 teachers and Gomoa Dago DA JSS in Central Region involving 20 students and 4 teachers. The Coastal Sustainable Landscapes Project had carried out work at Akwidaa SDA JSS in the Ahanta West District of the Western Region involving 40 students and 5 teachers and Yabiw JSS in the Shama District of the Western Region. All collaborating partners were encouraged to work closely together to ensure uniformity and the overall success in the implementation of the program.

6.8 Activity 2.2.8: Strengthening Community-based Groups

This is one of the Year 2 activities that were pushed to Year 3 to be completed. The USAID/UCC Fisheries and Coastal Management Capacity Building Support Project recognizes that strong and informed community-based groups are key to well-managed fish stocks and healthy coastal ecosystems. In view of that, community groups were supported in Year 2 to understand management structures, regulations, and by-laws and rules pertaining to the management of fisheries and coastal resources based on a needs assessment exercise that was conducted in Year 1 of the project. The objective was to strengthen the capacity of community-based groups to acquire the necessary skills in conflict resolution, advocacy, negotiation, and persuasive communication and behaviour change strategies to enhance coastal resources management.

Community-based groups were formed using a participatory process and strengthened in ways to be better positioned for fisheries management and to support development of coastal communities. After the formation of the groups, a community coastal resource management guide and manual were developed as training materials for the community-based groups. A validation workshop with representatives of key stakeholders in the fisheries sector such as the Fisheries Commission both at the regional and district levels met to review and validate the manual and guide to ensure that community level issues were adequately captured in the manual. The training materials were used to train all members of the community-based groups in each of the selected communities to equip them with basic skills in conflict resolution, advocacy, negotiation, resource mobilization, networking and persuasive communication for coastal resource management. After the training programs, all community-based groups developed action plans for their activities within the communities which included strategies for ensuring the compliance of bye-laws and regulations around effective management of the coastal resources, implementing activities that will ensure the safety and cleanliness of the shoreline and beaches, networking with external stakeholders such as the District Assemblies among others.

Through the strengthening process, community-based structures have been empowered to embark on awareness creation and sensitisation activities in the selected communities

targeted towards behaviour change to desist from polluting and abusing the coastal resources. For sustainability, behaviour change campaign in the communities are still ongoing. All community-based groups embark on outreaches in schools, churches and radio stations in the communities to sensitise community members on coastal resource management. In addition, tools (T-shirts, posters and flyers) with instructive messages have been designed and printed for all the groups to use as part of the sensitisation and awareness creation activities. As a result of these trainings and activities, the groups have developed action plans based on which they reach out to community members in their churches and schools to educate them and create awareness on the need to keep coastal environment clean. In Ankobra and Anlo Beach, the groups have linked up with the members of Zoil and Zoom Lion to conduct periodic clean up at the beach. Members have also taken up the responsibility to check on open defecation at the beaches in most of the communities.

Conscious efforts have been made to involve various stakeholders and collaborators within the activities of the project. The understanding is that, with a strong collaboration with existing structures mandated to oversee the management of resources in all communities including coastal communities, the District Assemblies and the Fisheries Commission are very key institutions that could support the sustainability of best practices and results achieve within the project. A consultative meeting was held to present the project to the major stakeholders in the fishing industry and to afford them the opportunity to make inputs into the implementation strategies of the project. The meeting was also to sensitize the District/Municipal Assembly staff, the Fisheries Commission and the Liaison Officers for the target communities on the purpose and expected results of the project and to solicit their involvement and support in the delivery of the activities planned in the communities.

It is recommended that the project must work more at collaborating with other projects and government institutions who have the mandate of managing the wider aspect of fish stock and their regulation. These linkages will help in getting the full picture to the community members, especially the fishermen who are willing to support the project when they know that the efforts go beyond the community. It was also suggested that as part of the larger fisheries management sector wide projects, the project should collaborate with other projects to put pressure on the District Assemblies to release funds for monitoring purpose and also to build the capacity of some of the existing staff. With regards to the capacity building and training of the community-based groups, the committees will need further support to make them achieve targets set in their action plans. Continues efforts must also be made to include women, youth and other excluded groups within the communities in the activities and leadership of the communities to ensure balanced and sustainable community development.

6.9 Activity 2.2.9: Promoting Supplementary Livelihoods in Coastal Communities

This is also one of the Year 2 activities that were pushed to Year 3 to be completed. In addition to strengthening community-based groups to provide effective governance at the community level in support of coastal resource management, their capacities were also built

to undertake supplementary livelihood activities in selected communities in the Western and Central regions of Ghana. The objective was to provide support for selected actors in the targeted coastal communities in snail rearing, bee-keeping and oyster farming to enhance community livelihoods. These activities were selected based on the needs assessments conducted by the project in Year 1. It is believed that with supplementary livelihood activities which provides a second or alternative stream of income for community members, the objective of sustainably managing coastal and fisheries resources will be improved. The oyster farming was expected to be a pilot project since it was the first of its kind to be cultivated in Ghana. Narkwa in the Central Region was selected for the pilot oyster farming and snail rearing, Anlo Beach in the Western Region for bee-keeping, Ankobra in the Western Region for snail rearing and Half Assini in the Western Region for bee-keeping and snail rearing.



Technical experts were identified to conduct training for the community-based groups in the selected supplementary livelihood activities. Community-Based Fisheries Management Groups (CBFMG) were also formed to support the implementation of the supplementary livelihood activities. The sites selected by the various communities in consultation with the trainers as suitable for the activities were confirmed as being available and ready for use by the project. Lease agreements were signed with the landlords to confirm the use of the land for the various activities in Ankobra and Half Assini. In Narkwa and Anlo Beach, the land identified by the community members were given for free by the owners who were also members of the CBFMGs. A local market survey was conducted to determine the suitability and profitability of the selected trades as a way of providing a second stream of income for communities to reduce the pressure on existing coastal resources. The survey was conducted on all 3 chosen supplementary livelihood activities in the Western and Central Regions. Findings from the market surveys supported the marketability and profitability of commercial production of snail rearing and bee products. It was observed that the value chain of bee-keeping was a potential that could be developed to generate additional income for beneficiaries and open up for the participation of many more people. Oyster was not well

known apart from the coastal communities which needed to be marketed more especially for commercial production. In view of that, there was a decision to discontinue activities in relation to the oyster farming and rather carried it forward as a research activity.



Demonstration farms and sites for snail farming and bee-keeping were set up in the selected communities to provide practical experience to the community people as a way of learning by doing after they were provided with theoretical training. The CBFMGs formed in the communities served as the management committee of the demonstration sites and leaders of the trainees. They received training in leadership and team/group management which enabled them to provide leadership to the group and to mobilise them for all activities in relation to the development and management of the demonstration sites. The idea of demonstration farms and sites was to provide training for members to set up their individual farms. The set ups for the demonstration farms were completed in the last quarter and it is recommended that the project provides ongoing support to the beneficiaries to set up their own farming systems and subsequently monitor the activities of the beneficiaries.



Figure 30: Oyster demonstration unit at Narkwa

Following the successful implementation of the activities in the pilot communities, such project interventions could be replicated in other coastal communities under the jurisdiction of the project. If the supplementary livelihoods program is implemented in an incremental manner, it will go a long way to reduce the current pressure on fish stocks and other coastal resources and ensure the sustainable use of those resources.

To ensure that the supplementary livelihoods program becomes a success, the project requested for an expert (Volunteer) in supplementary livelihoods from ACDI/VOCA who

spent a 2-week period to work for the project to improve on the program. The Volunteer reviewed all relevant project documents, conducted field visits and interviews with staff and community-based groups engaged in implementing the snail farming and bee-keeping programs to assess training successes, gaps and beneficiaries' level of acceptance to building a business around the supplementary livelihoods. The Volunteer presented an initial report in the form of debriefing project management after reviewing project documents, interviewing people and conducting field visits and recommended the following that:

- The project should focus more on snail farming and use the snail enterprise experience as a model for bee-keeping
- Snail farming should be developed as sustainable micro-enterprises
- There was the need to upgrade the snail demonstration farms, establish independent snail farms and for the project to design a support program for the snail farms; upgrade the free-range zones and upgrade the mini-paddocks
- Community people should transfer the skills and knowledge acquired from the demonstration farms to their own farms by frequently asking for inputs
- The snail demonstration farms be operationalized as training facilities, breeding stations and experimental test-beds
- Make it an event to mobilise the community to upgrade the snail farms as a group activity and provide hands-on training
- Find and buy healthy snails and use as breeding stocks in the demonstration farms that can successfully reproduce more snails for individual farms
- There should be a daily management checklist for the snail farms to count and record number of snails, remove dead snails, remove rotten food, add fresh food, fill water dish, sprinkle water to wet the substrate, remove invaders and change the substrate monthly.

All of these recommendations will be applied and enforced in the coming quarter to see a successful supplementary livelihoods program in Year 3.

APPENDICES

Appendix I. Registration details of the Fisheries and Aquaculture Society



CG076532016

C0007460767



The Companies Act, 1963, Act 179

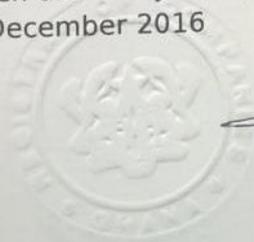
Certificate To Commence Business

I hereby certify that

FISHERIES AND AQUACULTURE SOCIETY OF GHANA

having complied with the provisions of Sections 27 and 28 of the Companies Act, 1963, Act 179 is entitled to commence business with effect from **22nd day of December 2016**

Given under my hand and official seal at Accra, this 22nd day of December 2016



A handwritten signature in black ink, appearing to read "J. M. A. O.", written over a horizontal line.

For: Registrar of Companies

APPENDIX II. West African Journal of Fisheries and Aquaculture

INSTRUCTION TO AUTHORS

1. Submission of manuscripts to West African Journal of Fisheries and Aquaculture

Manuscripts submitted to the journal should follow the guidelines set out below. All correspondence between editor and author is performed by e-mail, and paper copies are not required at all stages. A manuscript must be submitted electronically as email attachment directly to the Editor. The manuscript, including illustrations, tables, etc., must carefully consider the guidelines given below. Articles should be a minimum of 6,000 words and a maximum of 8,000 words. Contributions are received with the understanding that they are original, unpublished material and is not been submitted or being considered for publication elsewhere. All submissions be sent as email attachment to: editor@xxxxxxx.com

2. The title page

The title page should include:

- A concise and informative title
- The name(s) of the author(s)
- The affiliation(s) and address(es) of the author(s)
- The e-mail address and telephone number of the corresponding author

3. Abstract

Abstracts must contain adequate information to allow a sound review. It must describe in a succinct manner the purposes and results of the research so that the quality, originality, and comprehensiveness of the work can be evaluated by the reviewers. This section should contain a maximum of 250 words.

4. Text

The text should be double-spaced and organized under appropriate section headings. All headings should be placed on the left-hand side of the text. The pages in the manuscript must be numbered. All illustrations, tables, etc. should be inserted at the appropriate location in the text. Only three levels of headings are accepted in the text and do not number the headings. Avoid unnecessary formatting and codes. Avoid the automatic hyphenation function and do not hyphenate manually at line breaks. All measurements should be given in metric units. Acknowledgements may be made briefly just before the list of references.

5. Illustrations

Illustrations such as figures, diagrams, and photos should be ready for immediate use and included in a single numbered series. The format should be designed to occupy 1 or 2 columns i.e. 85 mm respectively 176 mm, alternatively 124 mm, - they must not exceed one page. Grades in the legend should be easy to distinguish. The font size of text in illustrations should not be larger than the manuscript text, say 8 pt is suitable for all illustrations. Folded

or detached illustrations or tables are not accepted. Photos should have a minimum resolution of 300 dpi and must not exceed one page. Accepted file formats for the photo: tiff, psd, bmp, jpeg.

6. Tables and Figures

- (a) All illustrations other than tables are to be numbered consecutively as Figures (e.g. graphs, drawing and photographs) using Arabic numerals.
- (b) Lines on line drawings should be thick enough to allow for reduction.
- (c) Any printed in colour will be at the discretion of the editors and or at the author's expense.
- (d) Tables should be numbered in separate sequence with Arabic numerals.
- (e) Figures and Tables should be constructed to be reducible to the published page width (16.8 cm) or to the column width (8 cm). All Figures and Tables are to be referred to in the text by their number.

7. Citations in text

Cited references in the text are to be cited in the text using the surname(s) of the author(s) followed by the year of publication of the work referred to, for example: Laar (2015), (Laar, 2015), (Laar & Duut, 2015) or for references to page (Laar, 2015: 15). In case of more than two authors use name of first author followed by "et al." (Laar et al., 2015). If several works are cited, they should be organized chronologically, starting with oldest work.

8. Reference list

ALL ARTICLES MUST be formatted following the APA Style. Please follow the guidelines below.

- 1. The items in the reference list should be presented alphabetically with the last name of the author, followed by the author's initials.
- 2. The last name should be followed by a comma and each initial must be followed by a full stop.
- 3. In the case of multiple authors, each author must be listed up to the seventh author (if applicable).
- 4. Where there are multiple authors, each author's name should be presented placing the surname first followed by the initials.
- 5. If there are more than seven authors, list up to the sixth author. After that insert followed by the very last author.
- 6. In the case of multiple authors, place an ampersand "&", not "and" between the penultimate and the last author.
- 7. After the name(s) of the author(s), you should state the year of publication enclosed in brackets, followed by a full stop. Example: Laar, J. K. (2015).
- 8. Each bibliographic entry must end with a full stop.
- 9. Where an entry flows into two or more lines, the second (and subsequent lines, if any) must be indented to create a hanging indentation.
- 10. Titles of books, journals, periodicals, theses, technical reports, or any major work that stands alone must be italicized.
- 11. Titles of journal articles, book chapters must not be italicized, underlined, or have quotation marks put around them.
- 12. Titles of all journals must be presented in full.

13. Each major word in the title of a journal must start with a capital letter.
14. In the case of titles of books, journal articles, book chapters in an edited book, Web pages, newspaper articles, only the first letter in the title should be capitalized, except if the title has a proper name. This means such titles must be written as if they are sentences.
15. If a publication has a subtitle separated from the main title by a dash or colon, the first word after the dash or colon must be capitalized.
16. Never use “et al.” as a way of presenting multiple authors of a publication in a reference list.
17. If a publication is an edited book, the names of the authors must be followed by (Ed.) if it is a single editor or (Eds.) if it has multiple editors.
18. Do not bold any part of an entry.
19. Where an author has multiple publications, you should present these chronologically starting with the oldest publication. In this case, each entry must start with the author’s name. Do not use a dash to represent the name of the author after the first item.
20. If an author has more than one publication in a particular year, distinguish between them using (a), (b), (c), etc. For example (2015a), (2015b), (2015c).
21. Use p. or pp. to indicate page numbers of a chapter in a book, but not the pages of a journal article.
22. All book entries should have the location and the publisher stated. There should always be a colon after the city of publication, followed by the publisher.
Example: Amsterdam: John Benjamins.
23. For books published in the USA, the city of publication must be followed by the two letter code of the state. Example: Bloomington, IN: Indiana University Press.

9. Specific Examples

a. Books

Give the name of the author (last name followed by a comma, then the initials), the year of publication in brackets followed by a full stop, the title, the city and publisher.

Single Author

Laar, J. K. (2015). *The Corrupt Politicians of Ghana*. London: Random House.

Multiple Authors

Laar, J. K., & Duut, V. W. (2015). *The Corrupt Politicians of Ghana*. London: Random House.

Edited Book

Laar, P. & Duut, V. W. (Eds.) (2015). *The Corrupt Politicians of Ghana*. London: Random House.

Book Chapter

When listing a chapter in a book, the editor(s) of the book should be presented by providing their initials followed by their last names, as in the example below:

Konjit L. & Dunwaak, T. (2012). A modest contribution of the development of Ghana. In Laar, P. & Duut, L. W. (Eds.). *The Corrupt Politicians of Ghana* (pp. 127-143). London: Random House.

b. Journal Article

When entering a journal article, include the author(s), year of publication, the title of the article (using a sentence format, with no quotation marks), title of the journal (capitalizing the first letter of each major word in the title), volume number, issue number (if the journal has an issue number it should be enclosed in brackets followed by a comma), and the page numbers.

Laar, P. & Duut, L. W. (2012). Spatial and temporal distribution of road accidents in Ghana. *Nimdze*, 34, 239-240.

Journal Article Accessed Online

Laar, J. K. & Duut, V. W. (2012). Spatial and temporal distribution of road accidents in Ghana. *Nimdze*, 34, 239-240. doi: 10.1057/dbm.2010.21

An Article Accessed from a Website

Laar, P. & Duut, L. W. (2012). Spatial and temporal distribution of road accidents in Ghana. Retrieved from <http://brian.weatherson.org/iemaem.pdf> (last accessed on 1st January, 2012)

Corporate Author

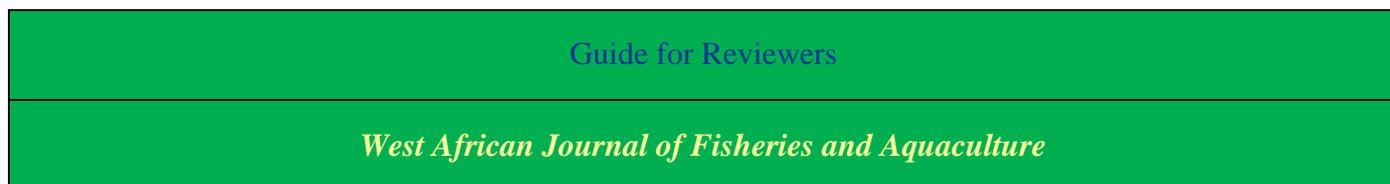
Ghana Statistical Service. (2002). *2000 Population and housing census: Summary report of final results*. Accra: Ghana Statistical Service.

10. Copyright

If the manuscript includes material formerly published elsewhere, written permission must be obtained from the author or source and submitted with the manuscript.

11. Proof

A first proof will be sent to the corresponding author, who should in particular, check numbers, proper names, tables, and mathematical expressions. Moreover, it is the responsibility of the contributors that calculations, references, names of places and of people as well as biological terms, etc. are correct. At this stage it is not possible to add further text, tables or illustrations to the paper. The editors may make minor changes in the text; greater ones, e.g. proposed by the referees, are made in cooperation with the contributor. Contributors will receive one complimentary copy each for free.



MANUSCRIPT EVALUATION FORM

Title of manuscript:	
Reviewer Name	

A. In making your evaluation, please take into account:

1. the paper's significance as a contribution to the field/discipline
2. the paper's overall strengths and weaknesses; and
3. the soundness of the paper's methodology, analysis, and structure.
4. the current developments (political, social, economic interests) in the field/discipline of fisheries and aquaculture

B. Generally, I recommend (thick where appropriate):

Unconditional Acceptance		the paper is publishable as is
Conditional Acceptance		the paper should be accepted only if the author successfully completes the minor changes in my comments
Significant Revisions		the paper needs moderate/major revisions before it could be considered publishable
Reject		the paper does not appear to have potential to be acceptable even if revised

C. In my opinion (5=excellent, 4=good, 3=average, 2=below average, 1=poor)

Section	Rank	Comment
Generally, the paper is:		
The topic is:		
The abstract is:		
Contribution to the literature:		
The methodology is:		
The literature review is:		
The writing style is:		
The reference is:		

D. Comments for the author (Will be passed on to authors)

You can write a report or use the table below showing comments per Section of Manuscript (write as much as needed. Table expands as you type).

<i>General comment:</i>	

List of Project Performance Indicators and FY 2017 First Quarter Results

No.	Indicator	Baseline	Annual target	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: Project Activity 2.1.1: Conducting Fisheries Stock Assessment provides data for this indicator. This activity is being carried out by an external Technical Assistant working in parallel with postgraduate students who are conducting research in fish stock assessment. This activity started in Year 2 which was extended to Year 3 upon a recommendation by the Technical Assistant to complete a one-year full cycle. The work is still ongoing which will be completed at the end of second quarter FY2017 after which data will be available for this indicator.</p>					
2	Fishing Mortality at MSY (F_{msy})	-	-	-	-
<p>Comments: Project Activity 2.1.1: Conducting Fisheries Stock Assessment provides data for this indicator. This activity is being carried out by an external Technical Assistant working in parallel with postgraduate students who are conducting research in fish stock assessment. This activity started in Year 2 which was extended to Year 3 upon a recommendation by the Technical Assistant to complete a one-year full cycle. The work is still ongoing which will be completed at the end of second quarter FY2017 after which data will be available for this indicator. This indicator will also be tracked from the SFMP project.</p>					
3	Biomass to produce MSY (B_{msy})	-	-	-	-

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
<p>Comments: Project Activity 2.1.1: Conducting Fisheries Stock Assessment provides data for this indicator. This activity is being carried out by an external Technical Assistant working in parallel with postgraduate students who are conducting research in fish stock assessment. This activity started in Year 2 which was extended to Year 3 upon a recommendation by the Technical Assistant to complete a one-year full cycle. The work is still ongoing which will be completed at the end of second quarter FY2017 after which data will be available for this indicator. This indicator will also be tracked from the SFMP project.</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 hectares	-	-
<p>Comments: The Half Assini lagoon and a wetland area measuring 6.9 hectares in total was identified to be put under improved natural resource management in collaboration with community members and the District Assembly in Year 2. Baseline conditions of the lagoon and wetland area were determined and concrete actions were put in place to be followed in Year 3. Work in Year 3 begins in the second quarter as detailed out in the Year 3 Workplan.</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 hectares	-	-

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
<p>Comments: The Half Assini lagoon and a wetland area measuring 6.9 hectares in total was identified to be put under improved natural resource management in collaboration with community members and the District Assembly in Year 2. Baseline conditions of the lagoon and wetland area were determined and concrete actions were put in place to be followed in Year 3. Work in Year 3 begins in the second quarter as detailed out in the Year 3 Workplan.</p>					
6	Number of training and capacity building activities conducted with USG assistance	0	10	0	Yes
<p>Comments: 10 training and capacity building activities have been targeted for FY 2017. None of them was planned to take place in the first quarter. The training and capacity building activities will start from the second quarter throughout quarter 3 and 4.</p>					
7	Number of people receiving USG supported training in natural resources management and/or biodiversity conservation	0	200	0	Yes
<p>Comments: Two-hundred (200) training participants have been targeted to benefit from natural resources management and/or biodiversity conservation training in FY 2017. None of those training activities were planned for the first quarter. They will begin from the second quarter throughout quarter 3 and 4.</p>					
8	Number of person hours of training in natural resources management and/or biodiversity conservation supported by USG assistance	0	3000	0	Yes

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
<p>Comments: No training in natural resource management and/or biodiversity conservation took place in the first quarter. Number of person hours of training will be counted and recorded after the trainings start from the second quarter.</p>					
9	Number of individuals who have received USG supported long-term agricultural sector productivity or food security training	0	28	100	Yes
<p>Comments: Twenty-eight (28) students altogether have been targeted to receive long-term training in FY 2017. During the last quarter, 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	50	0	Yes
<p>Comments: During the last quarter, no short-term agricultural sector productivity or food security training took place. Such training will be conducted beginning second quarter throughout quarter 3 and 4.</p>					

No.	Indicator	Baseline	Annual target	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	40	Yes
<p>Comments: Ten (10) community-based organizations have been 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.</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	8	0	Yes
<p>Comments: None of the organizations that received technical assistance in supplementary livelihood activities applied new technologies or management practices in this reporting period. Numbers will be counted and reported when Year 3 activities are fully implemented beginning second quarter.</p>					

No.	Indicator	Baseline	Annual target	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	40	Yes
<p>Comments: Two-hundred (200) members have been targeted to receive assistance in FY 2017. Eighty (80) members in total in the 4 Community-Based Fisheries Management Groups (CBFMGs) formed in the 8 selected fishing communities received technical assistance in supplementary livelihoods activities by the project in the first quarter of FY 2017.</p>					
14	Number of farmers and others who have applied new technologies or management practices as a result of USG assistance	0	150	0	Yes
<p>Comments: None of the members of the community-based groups who received technical assistance in supplementary livelihood activities applied new technologies or management practices in the quarter under review.</p>					
15	Number of rural households benefiting directly from USG interventions	0	200	40	Yes
<p>Comments: Eighty (80) rural households benefited directly from project interventions through supplementary livelihood support in the quarter under review.</p>					

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
16	Number of vulnerable households benefiting directly from USG interventions	0	50	80	Yes
<p>Comments: Forty (40) vulnerable households living in the flood prone areas close to the River Pra and the Ankobra River in the Western Region of Ghana benefitted directly from supplementary livelihoods support in the quarter under review.</p>					
17	Score, in percent, of combined key areas of organization capacity amongst USG direct and indirect local implementing partners	-	-	-	-
<p>Comments: An assessment was conducted close to the end of the quarter under review to determine key areas of organizational capacity of DFAS and CCM. Report on the assessment will provide data for this indicator.</p>					
18	Number of beneficiaries receiving improved infrastructure services due to USG assistance	0	120	61	Yes
<p>Comments: Seventy-four (74) people including 9 members of Academic Staff, 8 Research Assistants, 2 Project Support Staff, 5 Administrative Support Staff, 3 Technical Staff and 47 students in DFAS were beneficiaries of refurbished library, fisheries and coastal management laboratory, project vehicles and the premises of the Center for Coastal Management in this reporting quarter.</p>					

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
19	Number of new research collaborations established between USG-supported beneficiaries and other institutions	0	10	0	Yes
Comments: No new research collaborations were established in the first quarter of FY 2017.					
20	Number of scientific studies published or conference presentations given as a result of USG assistance for research programs	0	5	20	Yes
Comments: In this reporting period, 1 presentation was given during the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) Biennial Conference and 5th African Higher Education Week in South Africa.					
21	Number of dialogues and stakeholder consultations held on fisheries and coastal management	0	5	20	Yes
Comments: In the first quarter of FY 2017, the project organized 1 national stakeholder dialogue on fisheries and coastal management research in Accra to deliberate on issues of fisheries and coastal management concern in Ghana to inform policy formulation.					
22	Percentage of graduates from USG-supported tertiary education programs employed	0	5	0	No

No.	Indicator	Baseline	Annual target	Performance achieved in reporting period (%)	On target? Yes/No
Comments: No DFAS graduates were reported as employed in the first quarter of FY 2017.					
23	Number of CSOs and government agencies strengthened	0	10	0	Yes
Comments: No CSOs and government agencies were strengthened in the first quarter of FY 2017.					
24	Total number of direct beneficiaries	0	300		Yes
Comments: One-hundred and fourteen (114) people benefitted directly from project interventions in FY 2017.					