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SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

Fisheries Data Collection Workshop

August 22-23, 2016

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY | CRC COASTAL RESOURCES CENTER

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Cover photo: Coastal fishing port, Ghana. (Coastal Resources Center).

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ACRONYMS

ARTFISH	Approaches, Rules and Techniques for Fisheries statistical monitoring
ASSESS	USAID Analytical Support Services and Evaluations for Sustainable Systems
CRC	Coastal Resources Center at the Graduate School of Oceanography, University of Rhode Island
DBASE	A database software program created by Ashton-Tate
ETP	Endangered, Threatened, Protected species
FAO	Food and Agriculture Organization
FC	Fisheries Commission
FSSD	Fisheries Scientific Survey Division
ICCAT	The International Commission for the Conservation of Atlantic Tuna
KNUST	Kwame Nkruma University of Science and Technology
QA	Quality Assurance
QC	Quality Control
SFMP	Sustainable Fisheries Management Project
SOW	Scope of Work
UCC	University of Cape Coast
URI	University of Rhode Island
WARFP	West Africa Regional Fisheries Project

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INTRODUCTION

The workshop was organized between the SFMP team and the Ghana Fisheries Commision Fisheries Scientific Survey Division to evaluate the current data flow for catch and effort data being collected in the field and the data bases used to manage that data in the FSSD office. Current practice involves paper based survey techniques with data being hand entered into desktop data systems in the FSSD office in Tema. Data frequently takes 8 to 12 months to move from the canoe fishery landing site to the statistical survey effort at FSSD. Modern technology can be applied to this field survey technique that would improve the speed of information acquisition and management as well as the quality (QC and QA) of the resulting data. Multiple efforts are being explored by SFMP, WARFP and the FAO to move the Ghana Fisheries Commission toward electronic data collection and as such we found it important to bring the FC/FSSD group together to determine what the best direction would be for them.

The main purposes of the workshop were to:

1. Identify a collective vision and objectives of the improved fisheries data collection system.
2. Identify synergies with WARFP funded activities relative to the fisheries data collection system.
3. Discuss the ICT tools necessary to implement an efficient data collection program for monitoring the actions of the NFMP.
4. Design a pilot project using E-reporting (Tablets).
5. Outline a timeline for core activities from start-up to scale.

SESSION 1: MONDAY, AUGUST 22, 2016

Data flow from vessels to the FSSD

Discussion began on the current flow of data from fishing vessels to FSSD. The data is collected from four distinct fleets and customized per fleet with Tuna (pole and line, purse seines), Trawler, Semi-industrial (purse seine and trawl) and Canoe. The latter use five different gear types: purse seine, beach seine, hook and line, set gill net, and drift gill net, among others. Tuna fishing is restricted to pole and line as well as purse seines. Trawlers use a short-trawl while Semi-industrial and Canoe fishers employ a mix of all methods.

Sampling of the the catch by the artisanal fishing fleet of canoes is done at approximately 50 sampling sites out of more than 300 landing sites. By contrast, all of the vessels in the Semi-industrial fleet are sampled at 7 main landings sites that are harbors. Each of these larger vessels must complete and submit questionnaires to the FSSD

Data collected in each of Ghana's fisheries management regions is reviewed by zonal officers in charge of the enumerators. The information, on hand-written sheets is then sent to FSSD where it is collated and manually entered into various databases. ARTFISH (Approaches, Rules and Techniques for Fisheries statistical monitoring) is software created by the FAO (http://www.fao.org/fishery/topic/16081/en) to manage fisheries data collection. It is used by the FSSD for information collected from the canoe and semi-industrial fleets. The database for trawler data is programmed using DBASE. The International Commission for the Conservation of Atlantic Tuna (ICCAT) database is used for reporting information on tuna catches. Each of the programs has a set of routines for quality control and outputs. The ARTFISH software makes extrapolations based on a sampling frame defined by a national survey (frame survey) to estimate national landings by month, species, district and gear type.

Salinity and temperature are sampled several times a day from multiple coastal stations. The bottles containing the water samples are transferred to FSSD for analysis.

One of the problems from the field sampling of fish catches is poor species identification by the enumerators when less common species are caught. The problem cannot be addressed until information on the unknown fishes is collected from the field.

A vision for improved field data collection was discussed by the group. Recommendations for improvements include:

- Decentralized function for regional officers to enter the data directly from the regional offices.
- Involving local fishers and fish mongers to collect data. This discussion was involved and pros and cons of how to involve the fishers in this and how they could be paid to gather and provide this data did not reach consensus.
- Ongoing refresher training for enumerators is important as well as a strong recruitment and retention program is needed. Much discussion revolved around funding issues to keep enumerators engaged.
- Incentives to make the job of enumerator attractive enough to have people stay in the job and commit to collecting good data. Enumerators need to have enough knowledge about why they are collecting data and how it is to be used.

A discussion followed on the skill set and qualifications needed for field enumerators. The following qualifications and concerns were identified:

- Secondary school level education is sufficient, the enumerator does not have to be a graduate of a university.
- It is important to be from the local community.
- Most existing enumerators are Form 4 educated and look at the job as a stepping stone to another position, possibly with the Fisheries Commission.
- Zonal officers, who supervise enumerators, should become more involved. The officers currently get no in-service training on data collection and management.
- The Anomabo Fisheries College in the Central Region (not yet open) might play a role in training enumerators and zonal officers. FSSD Director Paul Bannerman is currently working with a UCC team on a curriculum.

Introduction to Tablet-based Data Collection

The discussion shifted to the potential role of tablet database methodology for collecting field information. Participants reviewed KoBoToolbox, an open source, free platform for creating data collection forms, managing and analyzing information along with the backend technology the platform employs. Among the benefits of a tablet-based data collection system, in the context of catch and effort data collection, is multilevel quality assurance not possible with paper forms. A demonstration of collecting questionnaire data was conducted using the KoBoToolbox project Chicken Survey 5. This led to a good discussion of the advantages of a tablet-based data collection system when compared to the current paper form based system. The Chicken Survey exercise showed participants how to create questions with multiple response scenarios. Methods for viewing submitted survey data were explained, along with formats available for downloading data from the cloud server.

The participants were then divided into four groups to work on developing their own survey questions on the KoBoToolbox platform. Each of the teams learned from the exercise and it was a valuable lesson for all engaged to see the possibilities of data collection using tablet tools.

SESSION 2: TUESDAY, AUGUST 23, 2016

Session 2 began with a recap of the previous day's material and discussed the significance of using a tablet to collect field data. The presenters explained how to build in compulsory questions and what that means in terms of flow of the survey tool. They also reviewed the use of data constraints and how the tablet makes such preliminary data review and QA possible.

Application to Catch and Effort information

Building on the basic foundation and experience in developing a tablet app provided in Session 1, the workshop moved on to cover how to use the tablet to do calculations on the fly. This was done using the example of collecting the total weight of a species caught along with the total value paid for that species. The tablet based system can be programmed to calculate a price/kg variable in real time. The group also reviewed the current data collection forms used by the Fisheries Commission and looked at what other data might be worthwhile collecting. Two groups were formed to create a small catch and effort tablet application using the two forms, A and B, as starting points. The teams worked with assistance from Bob Bowen, Richard Ansah, Brian Crawford and Opoku Oponcho. Report- outs and demonstrations from the two groups generated a variety of participant ideas regarding what additional data might easily be collected.

Discussion on the workflow with the tablets revealed the current way enumerators worked in the field. At present, enumerators travel from home to the landing site with a notebook (paper one) and do their survey filling in data into their notebook. When they return home, they fill in forms 1A and 1B in a more controlled environment. Questions came up about whether an enumerator would still bring their notebook to the site and then on returning home fill in the tablet as well as forms 1A and 1B? What would we need to do to use the tablet at the landing site directly? A strong conclusion was not reached. Staff thought that continuing to use the notebook in the field and filling in forms and tablet on return to home may be the best option. More discussion will be needed before the proposed workflow model is adapted.

Discussion of the two forms and the different data they collect led to the conclusion that a single tablet form may not work to capture both the landing site effort information as well as catch data that is canoe specific. An option to consider is using a tablet based form, submitted daily, containing site-specific information (census of gears), currently Form 1A, along with the date, landing center, stratum, remarks regarding the decision to fish or not fish and along with the effort by gear type and number of outboard motors. The landings data would be collected on a second form.

Ideas for additional site and canoe data, in addition to what is listed on forms 1A and 1B was brought up by both groups during the report out. Currently the detail form, 1B, collects landing site specifics as well as the number of canoes who fished that day. This information is used by fisheries statistics routines to determine fishing effort. It is also used to determine how many canoes to sample. The type of canoe and the gear type used on the canoe are collected. Both workshop breakout groups suggested adding additional variables including the length of the gear/net, the mesh size of the net, the netting material, and the horsepower of the outboard used by the canoe. Also, for hook and line gear, it would be valuable to collect the number of hooks used. These variables are easily added to the tablet form. One group suggested adding a free comment field for additional remarks to the form. This could be a place to enter endangered, threatened or protected (ETP) species notes. If the ETP entry is set up, it might be better done as a structured entry such as a drop down or multiple choice than as a free text field. However the need for a comment field was noted. The group did output a

tablet based form that is a direct copy of the paper-based form (it is attached here for reference).

Workflow Issues

The group discussed the workflow required for successfully deploying this rapid assessment tool using tablets. The data collected in the field will go to a data file in the cloud with web access. In KoBoToolbox this method defaults to store the data on a cloud server at Harvard University. The FSSD folks believe a better solution would be to have the data go in real time to a server at FSSD. This can be accomplished, as Richard Ansah explained, by installing the server system for the KoBoToolbox application on a server at FSSD. He previously did this for the Poultry Survey which KNUST staff set up for the USAID ASSESS project, also managed by the Coastal Resources Center. When data is stored on a local server, it will be in a true database and not a data file. As a result, access can be granted to FC Regional Directors to enable them to review and modify data for landing sites in their regions. This design consideration would need to be added into the scope of work (SOW) for deployment of a tablet-based data collection system.

Next Steps

- Decide upon database hosting, whether it should be cloud hosted or setup on a database server at FSSD. The workshop participants were in consensus to host at the FSSD but the decision is up to the FSSD Director.
- Decide upon adopting the KoBoToolbox platform or another methodology that would accomplish the same with the same benefits.
- Design a scope of work and terms of reference to engage a programming consultant to work with SFMP to develop the tablet application and backend database support.
- Write the data collecton forms App and create the database using a consulting group.
- Deploy the database, either with a cloud server or at the FSSD.
- Train FSSD staff, the enumerators, the Zonal officers and the Regional Directors in using the tablet-based data collection system.
- Train Regional Directors and FSSD staff in accessing data records in the data base system for QA and reporting.
- Deploy for testing and evaluation before full adoption.

Timeline

- The development of the scope of work, will begin first of October, 2016,with a goal of having an Request for Applications out for the first of November, 2016. This will necessitate decisions on hosting and development platform during October.
- The scope of work and terms of reference should be released November 1st 2016 so the SFMP can bring on a development team in November.
- By the second week of January, 2017, a training session will be conducted for enumerators, zonal officers and regional directors as well as data analysts. The focus of the training is the operation and maintenance of the system. A launch of field operations at 10 landing sites should occur by the second week of January, 2017.
- Evaluation of the operation will be scheduled for the end of March 2017, with any modifications or additional training to occur immediately afterwards.

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