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SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)
Report On Training Course On Fish Stock Assessment Methods University Of Cape Coast

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THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY

CRC COASTAL RESOURCES CENTER

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Cover photo: Group picture of participants at the end of the one-week fish stock assessment training program

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SSG Advisors:	http://ssg-advisors.com/
Spatial Solutions:	http://www.spatialsolutions.co/id1.html

ACRONYMS

CRC	Coastal Resources Center
EDA	Ellembelle District Assembly
FoN	Friends of the Nation
GIS	Geographic Information System
NEMA	Nzema East Municipal Assembly
SFMP	Sustainable Fisheries Management Program
TCPD	Town and Country Planning Department
URI	University of Rhode Island
USA	United States of America
USAID	United States Agency for International Development

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INTRODUCTION

As part of the Sustainable Fisheries Management Project (SFMP) activities, Najih Lazar, Senior Fisheries Advisor of the project delivered the first fisheries stock assessment workshop for 19 participants representing the Fisheries Commission, Fisheries Scientific and Survey Division, Division of Water Resources, University of Cape Coast and local NGOs. This training is part of the capacity building programs of SFMP for the Ministry of Fisheries and Aquaculture Development (MOFAD), the Fisheries Commission and the University of Cape Coast.

This is one-week intensive training program in fish stock assessment methods for Ghanaians involved in fisheries assessment and management training program was intended to present theoretical elements in fish population dynamics and guide participants in putting theory into practice in managing fisheries resources. It was to provide instruction, demonstration, and exercises in fisheries stock assessment as applied to fishery resources. The main goal of the training was to strengthen the capacity of the Fisheries Commission and its partners in basic fish stock assessment techniques and prepare its professionals to take the next steps in stock assessment results and apply it to fisheries management.

Working in teams, participants obtained a wide range of assessment tools focused on data and information on small pelagic fisheries of Ghana. The training used a range of methods including lectures, exercises, small group work, simulations and case studies to create a robust interactive and dynamic environment to learn new insights and skills in fish stock assessment. At the end of the course, participants were able to conduct single species assessment methods and understand data collection needs for different assessment methods. Participants developed indicators and references points, both biological and economic, as tools in fisheries management, knowledge of fishery population and fishery processes by using simulation models to improve scientific advice for managers. Participants were able to run their own stock assessment model by end of the training, interpret data and made summaries for managers.

The format of the training was divided into three sessions for each topic; a lecture to introduce and explain the topic followed with questions and answers, then a group discussion and "help your peer" session where participants helped each other in an informal setting to clarify and discuss among themselves the issues and questions. The third session was the practical and hand-on exercise using excel spreadsheets. Participants were provided with data and were asked to analyze the data and fit the appropriate model. The instructor presented the solution step by step and allowed for group discussions.

A total of 19 participants attended the one-week training program.

SUMMARY OF PRESENTATIONS

The presentations were delivered by Najih Lazar of SFMP. A summary of the presentations are outlined with selected slides from the presentations.

Introduction to stock assessment and fisheries management
- Why manage fisheries?
  - General approaches to fisheries management (input/output controls)
  - Biological reference points
  - Contribution of fish stock assessment to appropriate fisheries management
  - Fisheries and research surveys
  - Effects of fishing on a population
  - Maximum sustainable yield

- o Fisheries management games

- Introduction to excel

  - o Worksheet basics
  - o Formatting a worksheet
  - o Working with data
  - o Plotting graphs
  - o Pivot table
  - o Solver
  - o Macros

- Biostatistics Review

  - o Functions
  - o Mean and variance
  - o Powers and logarithms
  - o Confidence limits
  - o Derivatives
  - o Regression analysis
  - o Integrals
  - o Transformations
  - o Matrix algebra

Figure 1 Najih Lazar delivering a training lecture to participants

- Fisheries surveys and sampling

  - o Background
    - Basic methodology and assumptions

- - - Abiotic: Trawl surveys
  - Biotic factors: Fish behavior
  - Organization of surveys
  - Check list (equipment and protocols)
  - Biomass estimated by the swept area method
  - Precision
  - Estimation of MSY (direct estimation)

- Fishing Gear Selectivity

  - Background
  - Trawl selectivity
  - Pot selectivity
  - Gillnet selectivity
  - Hook selectivity
  - Recruitment to the fishery (partial recruitment)
  - Application in population dynamics models

- Estimation of Growth Parameters

  - Models of growth by length, weight, and age
  - Von Bertalanffy growth equation
  - Ford-Walford plot
  - Gulland and Holt plot
  - Age composition from length frequencies
  - Computer based length-frequency analysis

- Fishing Mortality

  - Estimation of total mortality
  - Fishing mortality
  - Natural mortality

- Yield Per-Recruit Analysis: Dynamic Pool Models

  - Beverton and Holt yield per recruit
  - Relationship between yield and biomass
  - Spawning stock biomass per recruit
  - Ricker yield per recruit
  - Thompson and Bell yield per recruit

- Production Models: Biomass Dynamic Models

  - Simple models: Schaefer and Fox model
  - Non-linear models
  - Non equilibrium situations
  - Applications to data
  - Fitting procedures

- The Stock-Recruitment Relationship

  - Density dependent recruitment
  - Fitting stock-recruitment curves
  - Recruitment and the environment
  - Age-based cohort analysis
  - Cohort analysis

- o Virtual population analysis
- o Tuning indices
- o Length based cohort analysis
- o Overview of ELEFAN

GROUP PROJECT

The participants were divided into three groups and were provided with a simulated catch effort data for a collapsed fisheries case. The time series of 15 years lacked information in 3 consecutive years and were asked to find a statistical method to fill in the missing data and justify the methodology. Then the group were asked to select appropriate model, enter data and run the model. The results should include the status of the stock including fishing mortality trends, biomass trends, recruitment events and quantify the uncertainty of the model (%CV).

Each group were asked to summarize the results and present a succinct summary to the Minister of Fisheries in a 5 minute presentation then propose some fisheries management recommendations on the basis of these results. In addition, each group was asked to make research recommendations on how to improve future assessments.

Figure 2 The Minister and her Deputy'during the mock presentation

Figure 3 A participant delivering during the mock presentation.

GRADUATION

Figure 4 A participant being presented with a certificate

Figure 5 A participant being presented with a certificate

LIST OF PARTICIPANTS

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15	Alex Sabah
16	Bismark Akoto
17	Isaac Osei Kofi
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