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COASTAL RESOURCE MANAGEMENT and FISH CATCH MONITORING SYSTEM

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Abstract— This study designed and developed a Coastal Resource Management and Fish Catch Monitoring System for Northern Negros Aquatic Resources Management and Advisory Council (NNARMAC). It specifically examined the quality of the developed software based on McCall’s Software Quality Model. It also determined the level of system acceptability based on the required application functionality, provided a fast easy way to store raw fish catch data, and generated a report that shows statistics of fish catch data monthly and annually. The system is connected to the NNARMAC Website which enables the user to post updates and news about their Coastal Area. The research process from conducting a preliminary survey to initial design until the developed system underwent evaluations, reviews, and updates. Findings revealed that the developed system has passed all the criteria based on McCall’s software quality model. It is concluded that the system is highly acceptable by the end-users and provides a fast and easy way to monitor the fish catch data.

Keywords – Fish Catch Monitoring, Coastal Resource Management, CPUE (Catch per Unit Effort)

I. INTRODUCTION

Northern Negros Aquatic Resources Management and Advisory Council (NNARMAC) is an alliance of Eight (8) Local Government Units (LGUs) in the Northern portion of Negros Occidental. These LGUs agreed to ally with the common agenda of protecting, rehabilitating, and managing the coastal and fishery resources including inland waters, rivers, and creeks. The Eight (8) LGUs include San Carlos City, Municipality of Toboso, Municipality of Calatrava, Escalante City, Sagay City, Cadiz City, Municipality of Manapla, and Victorias City.

The NNARMAC’s problem is that they manually tabulate fish catch data in each LGU every month, which takes time because of the repetitive paper work involved in the tabulation and creation of reports. The government also required them to create a database for fish catch monitoring in order to automate report generation.

According to the European Commission (2011) “The Electronic recording and reporting system (ERS) for fisheries control is used to record, report, process, store, and send fisheries data (catch, landing, sales, and transshipment)”. It provides an Electronic Logbook which is operated by the owner of the fishing vessel. It includes monitoring the behaviour and fish catch of

the fishing vessels for control purposes. The record is then sent to the national authorities, which store the information in a secure database. The ERS has been deployed in the fishing vessels so that the master/owner can keep access to it while fishing. The researcher likely to align the developed system because it has a similarity with this existing ERS like recording, storing, and processing fish catch data, the difference, however; they include monitoring and controlling the fishing vessels used by the registered owner to the fisher's authorities of the Member State (ec.europa.eu).

Coastal Resource Management and Fish Catch Monitoring System for NNARMAC is a web-based system that helps NNARMAC in tabulating LGUs fish catch monitoring data like the name of barangay, date, fishing method/gear, name of the enumerator, name of the Fishing Vessel owner, number of hours, number of PAX, location, species, number of kilograms, and price. It helps gather and store fish catch monitoring data much faster and precisely. The user can add, edit, view, tabulate, the system also can print the analysis and report like number of kilos per month per barangay, number of fishing gears per barangay, list of species, the average catch per month per barangay, and the catch per unit effort (C.P.U.E). The system is connected to the NNARMAC Website which they can post updates and news in their coastal area. There is no existing system that had been implemented with the same features as the developed system in the Philippines.

II. GENERAL OBJECTIVES

This project aimed to develop a Coastal Resource Management and Fish Catch Monitoring System for NNARMAC. Specifically, this study aimed to:

1. provide a fast and easy way to tabulate the fish catch monitoring data every month;
2. generate the following reports:
 - a. Number of kilos per month per Barangay
 - b. Number of Fishing Gears per Barangay
 - c. List of Species catch per Month
 - d. Average Catch per Month per Barangay
 - e. Catch Per Unit Effort (C.P.U.E)
3. Determine the performance of the system based on Experts testing using McCall's Software Quality Model according to:
 - a. Correctness;
 - b. Reliability;
 - c. Efficiency;
 - d. Integrity;
 - e. Maintainability;
 - f. Flexibility;
 - g. Testability;
 - h. Portability;
 - i. Reusability;
 - j. Interoperability;
 - k. Usability;
4. Determine the level of the system's acceptability based on the User Acceptance testing tool (UATT);

III. MATERIALS AND METHODS

The researcher used the developmental method of research in this study.

The Developmental Method of Research has been defined as a systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet the criteria of internal consistency and effectiveness (eric.ed.gov).

To collect data, the researcher conducted interviews with the NNARMAC Director, NNARMAC Staff, and LGU Assigned Personnel is done to collect important data which is needed in the development of the project. The population of the study is the NNARMAC Director, NNARMAC Staff, LGU Assigned Personnel.

The researcher used purposive sampling since the total number of respondents is twelve (12).

Respondents	Number of Respondents
NNARMAC Director	1
NNARMAC Staff	3
LGU Assigned Personnel	8
Total Respondents	12

Table 1.0 Population of the study

Table 1.0 above shows the total number of respondents. The following are NNARMAC Director (1), NNARMAC Staff (2), and LGU Assigned Personnel (8 LGUs).

IV. SYSTEM DESIGN AND METHODOLOGY

This presents the system design and methodology which includes the requirements, analysis, and documentation on the different stages such as planning and analysis phase, development phase, design phase, testing plan, testing phase, implementation, and maintenance.

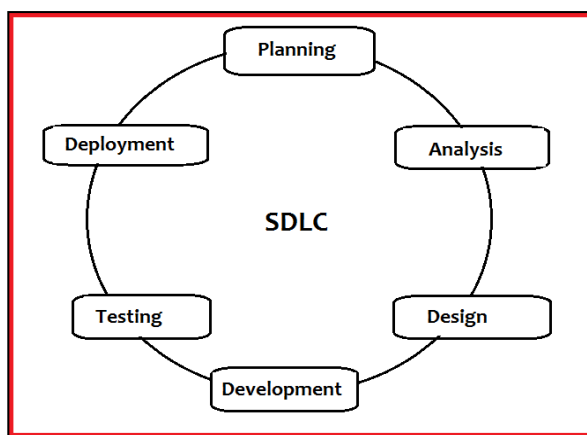


Figure 1 System Development Life Cycle (SDLC)

Figure 1 shows this study used System Development Life Cycle (SDLC). It is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application (www.searchsoftwarequality.target.com).

RAD Model was used for the Development for Coastal Resource Management and Fish Catch Monitoring System for NNARMAC.

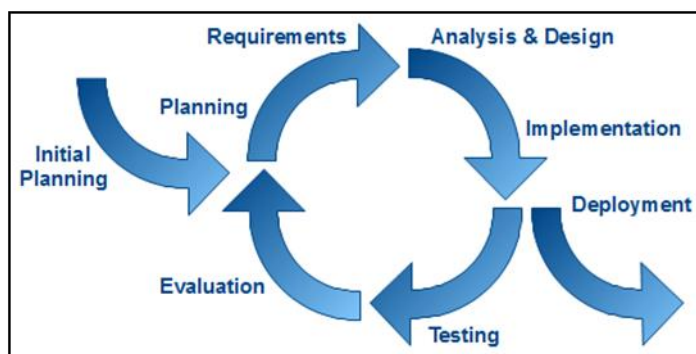


Figure 2 Rapid Application Development Model

Screen Design

The figures below illustrate the main layout of the system upon development.

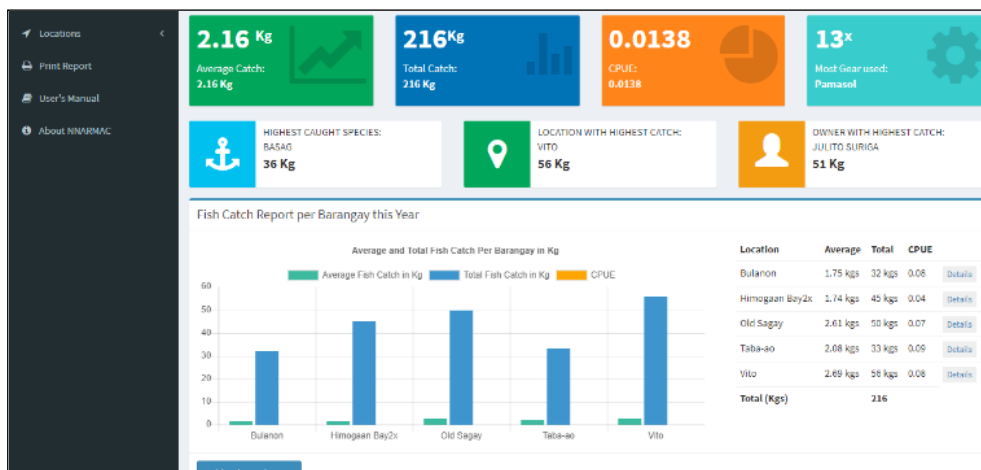


Figure 3. The dashboard contains the Fish Catch Report per Barangay’s graph and table. Users can view more details by selecting the “Details” button.

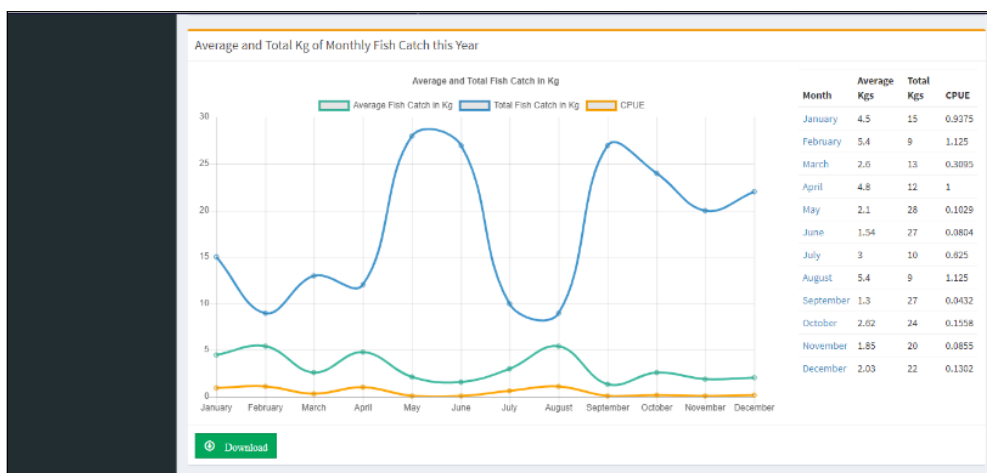


Figure 4. This graph displays the total and average kilograms of fish catch data, and the monthly CPUE of the current year.

V. RESULTS AND DISCUSSION

This chapter presents the generated data after series of tests and detailed evaluation of the system and provides the data analysis and interpretation of results:

Criteria	Grand Mean	Interpretation
of McCall’s Software Quality Model (Expert Testing)	4.37	Very Good
User Acceptance Testing	4.12	Good

Table 2. Results of McCall’s Software Quality Model use to test the developed system and the level of the System Acceptability based on User Acceptance testing.

Based on Table 2 the quality of the system based on the expert testing was rated Very Good with an overall Mean of Four-point Thirty-Seven (4.37). The level of the System Acceptability based on User Acceptance testing, the system’s overall rating was rated Good with a Mean of Four-point Twelve (4.12) indicating that the system has been accepted by the end-users.

VI. CONCLUSION

In the light of the findings of the study, the researcher concluded that the Coastal Resource Management and Fish Catch Monitoring System for NNARMAC is of a good quality system, highly accepted by end-users, secured, reliable, fast and easy to use, provides a fast and easy way in getting, storing, adding, and editing fish catch data as well as generating fish catch data reports selected by the user.

VII. RECOMMENDATIONS

Based on the findings and conclusions drawn, the following recommendations are put forward:

1. The NNARMAC will consider implementing the system to monitor fish catch data easily; however, it is needed to improve the technicalities of the system.
2. It is also recommended that a similar study may be conducted to assess further the effectiveness and usefulness of the developed system.

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