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Analysis of catches data collection system at Fish Landing Base (PPI) of Dumai

Ratu Sari Mardiah[1,*], Sri Yenica Roza[1], Edy Miswar[2]

[1] *Department of Capture Fisheries, Marine and Fisheries Politechnic of Dumai, Dumai City, Riau Province 96127, Indonesia.*
[2] *Department of Fisheries Resources Utilization, Marine and Fisheries Faculty, Universitas Syiah Kuala, Darussalam-Banda Aceh.*

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ABSTRACT

Data collection system in Fish Landing Base of Dumai was traditionally. Data written manually using books and collected by agents. This fact illustrates the weakness of the catch data collection system that occours. The effect is low data accuracy and requires a longer time in reporting. Data collection system based on technology will facilitate the process and important to do. The purpose of this study was to design a data collection system for fish catches landed at Fish Landing Base of Dumai. The research was conducted in February-June 2020 in Dumai city. The method used observation, interviews and literature review. Data analysis is used the process of analyzing data, literature review, analysis of existing systems, analysis of new systems and system design using data flow diagrams (DFD), entity relationship diagrams (ERD) and HIPO. System design starts from input, output and database design. The data design inputted is fishermen data, fishing gear, fish production and price of day, fish distribution, customer data and data employees. The output data are reports of user data, fishing gear specifications, fish production and fish distribution. The database is structured and presented using a flow chart. A technology-based of catch data collection system designed to improve the efficiency of the presentation of the reports needed for agencies.

Introduction

Most of Dumai's fishery production is produced from marine fisheries. Total fish production in Dumai was recorded at 1.273 tonnes. The result of marine fishery amounted to 931 tonnes (73%) and 342 tonnes (26,89%) from aquaculture (BPS of Dumai, 2018). This means that marine fisheries activity in Dumai is very high. Marine fisheries came from fishing activities using different fishing gears, namely mini trawls, gillnets and set net semi-permanent (Zain, 2015; Pramesthy and Mardiah, 2019). It were included in traditional fishing gear. The method of operation tends to be easy, inexpensive and do not require a lot of the crew (Mardiah and Pramesthy, 2019). The distribution of its activities is well known in several areas of Dumai, namely Tangkahan Pelintung, Basilam Baru, Tangkahan Guntung, Kemeli Besar, Bangsal Aceh, Tanjung Palas and its center is at the Dumai Fish Landing Base of Dumai. This is commonly referred to as PPI Dumai.

One of the mandatory activities that must be carried out by PPI Dumai is collecting data of catches. The results of a survey that was conducted in October 2019, the author did not find any data collection by the port authorities. The agents are only recording the catch. Each agent only records manually the catch based on the type and weight per basket. The agent's notes serve as proof of payment of levies to PPI Dumai. As an impact, the production value of PPI Dumai cannot be described clearly and accurately.

Several relevant studies, namely conducted by Gabels *et al.* (2016) has designed a catch auction activity at the TPI in Situbondo Regency, East Java. The second study by Khaerudin *et al.* (2018) identified the types of fish caught by fishermen and landed at the TPI, Tungkal Hilir, West Tanjung Jabung Regency, Jambi Province, Kisworo *et al.* (2013) have identified data collection steps for

* Corresponding author.
Email address: ratu.sarimardiah2@gmail.com

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longline catch at PPI Bajomulyo I, Pati. The latest research conducted by Sari *et al.* (2017) related to design stages implementation of an information system for managing catches data and trading ice cubes at PPI Dumai. However, the research related to the catch data collection system at PPI Dumai has never been carried out. This study has the aim of designing a catch data collection system at PPI Dumai.

Materials and Methods

Location and time of research

The research was carried out in February-June 2020 at PPI Dumai, Dumai City. The research locations are more clearly presented in Figure 1. The materials used during the research were stationery, computer and camera. All of them are used for research data collection. The methods of data collection used observation, interview and literature study. Observations were made by observing the activity of the catch data collection process at PPI Dumai, the researcher interviewed 12 interviewees, namely 2 staff of Dumai Fisheries Office, 2 staff of PPI Dumai, 4 agents and 4 fishermen. Literature studies are obtained from journals, scientific websites and related reference books.

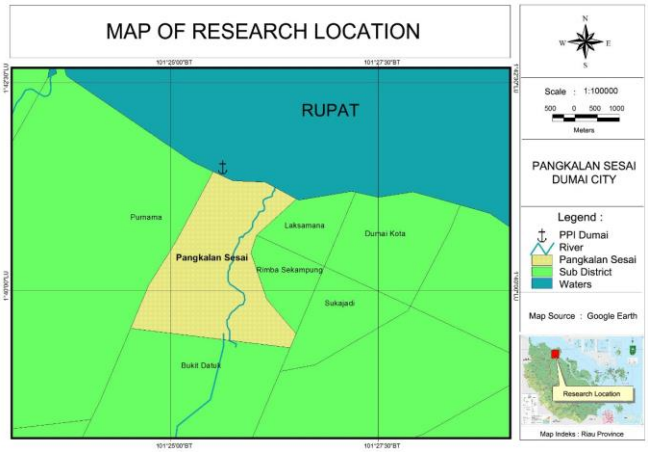

Figure 1. Location of PPI Dumai.

Data analysis

The data analysis is presented qualitatively. The process starts with data collection, literature review, analysis of existing systems, analysis of new systems and system modeling using data flow diagrams (DFD), entity relationship diagrams (ERD) and hierarchy of input process output (HIPO). System design starts from input, output until database design. The data design that is inputted is fishermen data, fishing gear, fish production and price per day, fish distribution, customer data and employee data. The output data are data reports of user, fishing gear specifications, fish production and fish distribution. The database is structured and presented using a flow chart.

Results

Fish behavior before stunning

The results of the research on the catches data collection system landed at PPI Dumai are presented in several diagrams. The first results are analysis of existing and new system. It was presented in Figure 2 and 3.

Information system design begins with process modeling. Process modeling in research uses a context diagram which will describe in general the process relationship that occurs between the user and the application. The context diagram presented in Figure 4.

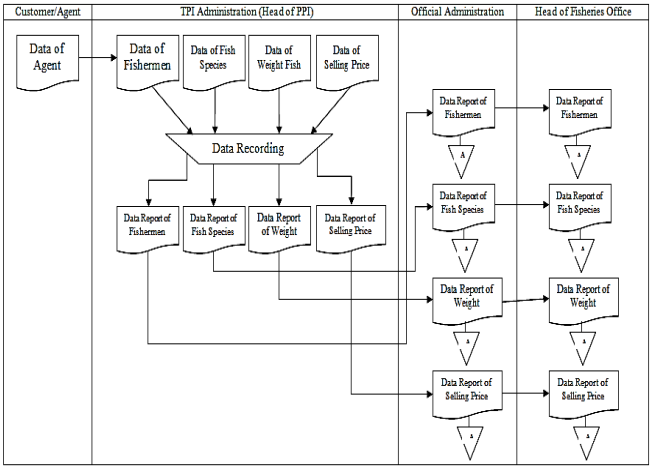

Figure 2. Analysis of existing system.

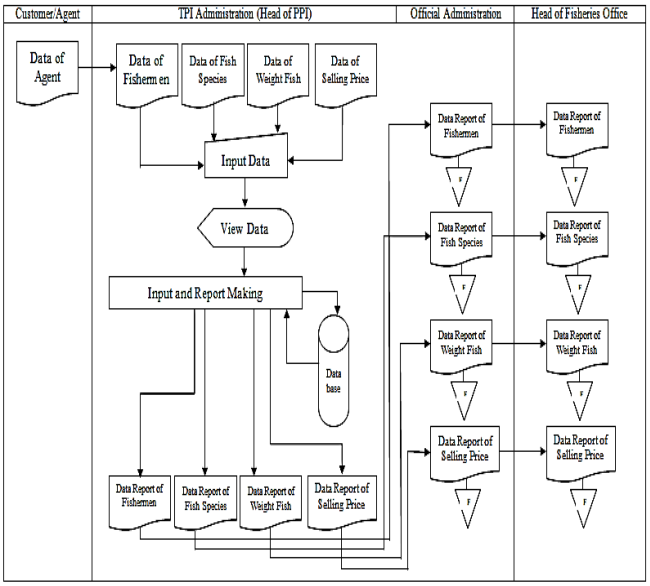

Figure 3. Location of PPI Dumai.

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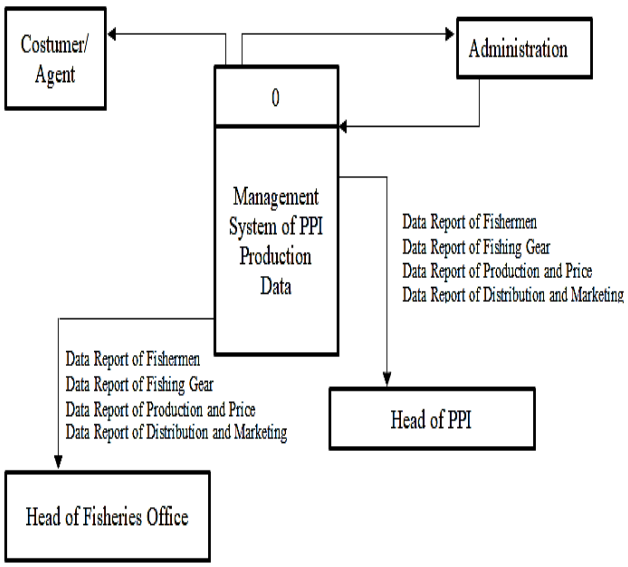

Figure 4. Context diagram.

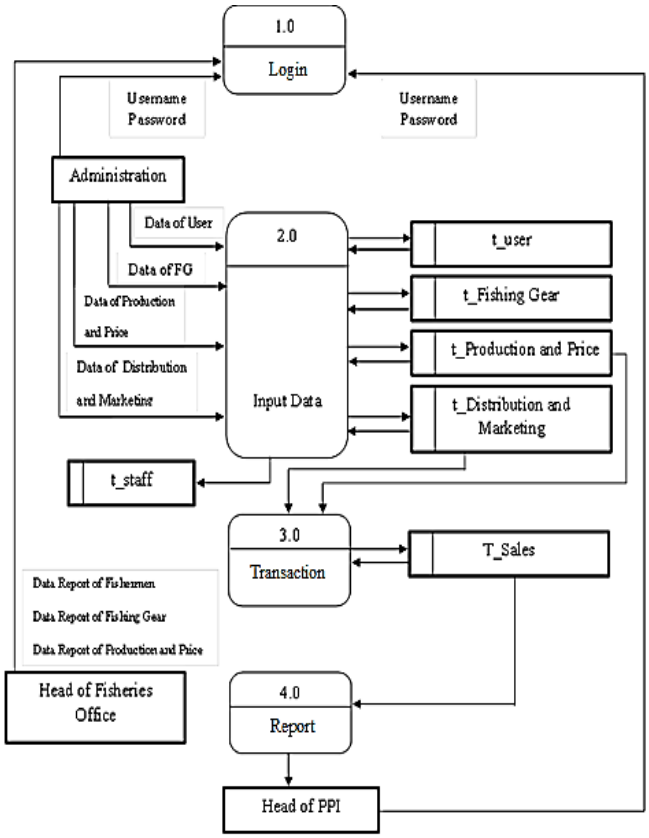

Figure 5. Zero level diagram.

The description of the fish catch data collection information system is described in more detail using a zero level diagram. The zero level diagram illustrates the table needed in designing a catch data collection information system. The detailing information system is described by zero level diagram and depicted by Figure 5. The database modeling used in the fishermen's catch data collection information system is the Entity Relationship Diagram (ERD) method and presented in Figure 6. The program structure in this study uses HIPO. HIPO stands for Input Process Output Hierarchy. The diagram of HIPO is attached in Figure 7.

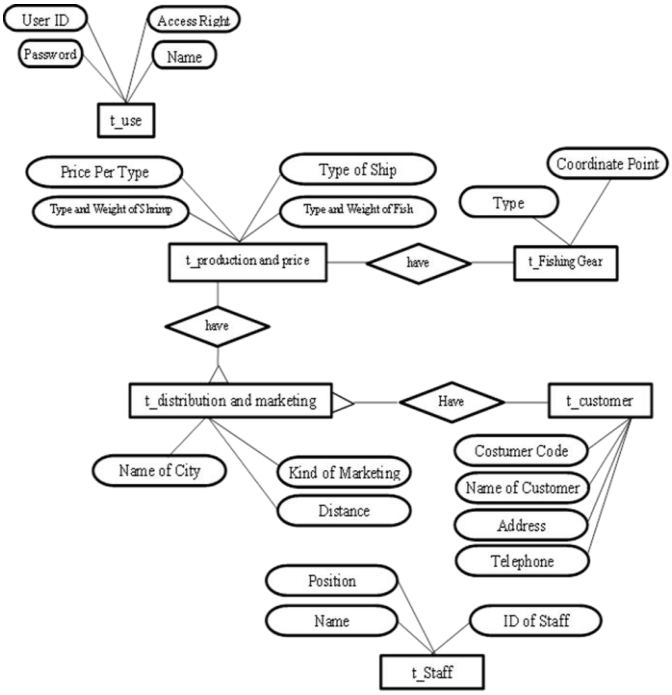

Figure 6. ERD Diagram of Fishery Production Database.

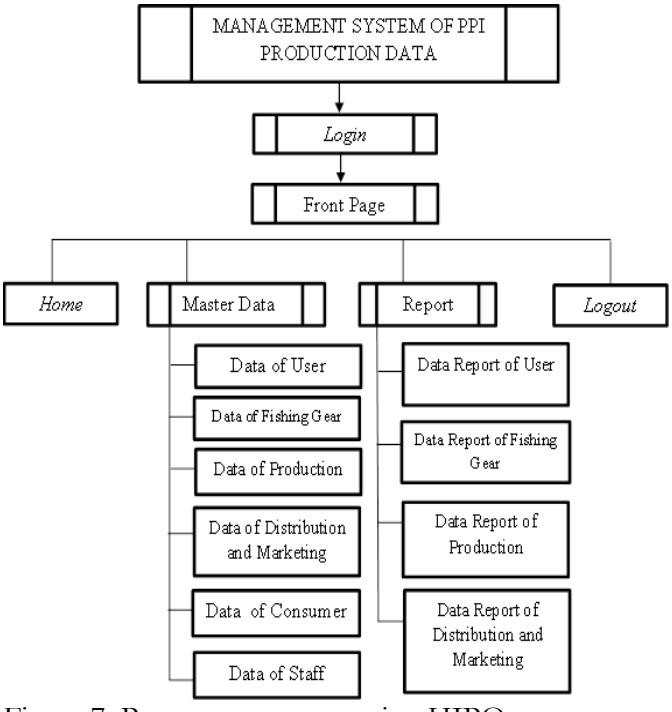

Figure 7. Program structure using HIPO.

Discussion

System analysis is an effort to observe the process of a collection interconnected components to form a single unit in integrating, operating, storing and distributing data (Sitohang, 2018). Data collection on fish catch is analyzed into two parts,

namely the analysis of the current system and the new information system.

The catch data collection system that is currently running (Figure 2) can be translated into several stages, namely:

- The agent provides data to the TPI Dumai administration;
- Administration records manually, namely data on fishermen, types of fish, weight of fish and selling price of fish per day;
- Catches data collection carried out every day and recapitulated every month;
- The reports are prepared every month, namely reports of fishermen data, types of fish, weight and selling price per day;
- All reports are submitted to the Head of PPI Dumai and the staff of the Dumai Fisheries Office;
- Reprocessed reports according to the form requested by BPS of Riau and checked by the Head of the Dumai Fisheries Office; and
- Archived.

The analysis of the new data collection information system based on Figure 3 can be interpreted as follows:

- Data of fishermen, types of fish, weight and selling price are inputted by the administration with computer (technology);
- When it has been inputted it will generate several reports, are data report of fishermen, types of fish, weight and selling price;
- Then the report is given to the head of PPI and the Head of the Dumai Fisheries Office and archived;
- Input results are stored in a database and can be viewed on a computer monitor.

A data collection information system that runs well requires several stages, namely input, process and output (Anam and Muharram, 2018). Inputs in the catch data collection system at PPI Dumai include data of fishermen, fish type, weight and selling price. The process required by this system is processing fishermen data, fish types, fish weight, and selling price. The output required in the form is data recapitulation and fishermen reports, data of fish types, weight and fish selling prices.

Information system design begins with process modeling. This stage is to describe in general the system processes that occur between the user and the program (Nurjamiyah and Dewi, 2018). The aim is to provide an explanation of the data flows that occur in the program to be built at PPI Dumai. Process modeling in research uses a context diagram which will describe in general the process relationship that occurs between the user and the application. The context diagram also depicts the actors who play a role in the catch data collection system. Another benefit of using context diagrams is that it makes it easier for system designers to analyze what information should be stored in the database (Lasminiasih *et al*., 2016).

The description of the fish catch data collection information system is described in more detail using a zero level diagram. The zero level diagram is part of a context diagram that stores data and describes the interactions and information flows that exist in the system (Manurung, 2019). The zero level diagram illustrates the table needed in designing a catch data collection information system. The zero level diagram is the basis for designing the system database model (Supriyono and Muslimah, 2018).

The database modeling used in the fishermen's catch data collection information system is the Entity Relationship Diagram (ERD) method. This approach describes the relationship of a database model. Several terms commonly used in ERD are explained by Fridayanthie and Mahdiati (2016), namely (1) entities are data objects that have data storage characteristics; (2) attribute is a feature of a particular entity; (3) a relation is a relationship between an object and other data objects; (4) a link is a connecting line between attributes, entity sets and relationships.

Each main relationship in ERD is to show entities (data objects) and relations that exist in the next entity (Sukmaindrayana and Sidik, 2017). Simarmata (2010) explains that ERD is the main data reference that can connect data into data objects to determine the relationship between entities. ERD analysis results in a database design that can be efficiently stored and reported on.

The program structure in this research uses HIPO. HIPO stands for Input Process Output Hierarchy. HIPO serves to describe the stage system. The benefits of using it are to understand the functions of a system, describe the components that must be completed by the programmer, provide a complete explanation of the input to be used, the process to be carried out and the desired output (Yulianti and Yupianti, 2012). HIPO shows a tiered chart that is used to prepare data flow diagrams to go to lower levels (Hidayati *et al*., 2016; Fatmawati *et al*., 2015; Hutagalung *et al*., 2019). The program structure using HIPO in the catch data collection information system at PPI Dumai is described in Figure 7.

Conclusion

The design of the catch data collection system at PPI Dumai consists of several flow diagrams compiled through analysis of an existing system, the new system and system design using DFD, ERD and HIPO. The data design that is inputted is fishermen data, fishing gear, fish production, price per day, fish distribution, customer data and employee data. The output are data reports of user, fishing gear specifications, fish production and distribution. The research is very limited till design of a data collection information system. The suggestion that can be conveyed is that further research is carried out. The next research is building a system, testing and implementing an information system for catches data collection landed at PPI Dumai or elsewhere.

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