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# Development of Data Bank Application at the Agriculture and Plantation Service of West Nusa Tenggara Using the Prototyping Method

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***Abstract*** **This research aims to develop a Data Bank application that can assist Information and Documentation Management Officers (PPID) in providing public information services more quickly, accurately, and in a structured manner. This application is designed to address the problem of data management spread across various sectors, as well as delays in delivering information to the public. Development was carried out using a prototyping method, with direct user involvement in the design, testing, and evaluation processes of the system. The developed Data Bank application has several key features, including: storing and searching agricultural commodity data by category and year, data visualization in the form of interactive graphs, grouping data by district/city area, and an integrated information management system across sectors. This application is also equipped with data export, graph printing, and dynamic filtering features to facilitate information access by PPID officers and the public. System testing covered six aspects: functionality, performance, security and reliability, user interface (UI), user experience (UX), and its impact on PPID officer performance. The results showed that the Data Bank application successfully met all tested aspects with a user satisfaction level reaching 89%. This application is able to accelerate the process of providing information, improve work efficiency, and facilitate data storage and retrieval. Thus, the Data Bank application has been proven to support improving the quality of public information services within the NTB Agriculture and Plantation Service.**

***Key words*****: PPID, Data Management, Information Services, Agriculture and Plantation, Prototyping Method**

## I. INTRODUCTION

The development of digitalization in Indonesia is very rapid, this can be seen from various sectors of life, such as in the employment and education sectors. Fast and accurate presentation of information is one of the main focuses of research and development in order to provide fast and precise information services. Good and quality technology is an important factor and is needed to improve a productive work system in accordance with the times. This is also needed by the West Nusa Tenggara Agriculture and Plantation Service (DISTANBUN) to provide the best service to the community [1].

The West Nusa Tenggara Agriculture and Plantation Service is a regional government agency that is responsible for planning, implementing, supervising, and evaluating the development of the agricultural and plantation sectors in the NTB province and is tasked with organizing regional government affairs in the fields of agriculture and plantations, such as food crops, horticulture, plantations, agricultural resources, supervision and protection of plants [2].

The Agriculture and Plantation Service (DISTANBUN) of West Nusa Tenggara Province is an agency that has a strategic role in providing and managing agricultural sector data. However, based on observations and discussions with related parties, it was found that the process of managing public information data still faces a number of real obstacles in the field. Some of these include: delays in searching and providing data, difficulties in monitoring data developments from each field (horticulture, food crops, and plantations), and the risk of data loss due to storage scattered in Excel files on various devices. This system, which has not been properly digitized, has a direct impact on the effectiveness of the work of Information and Documentation Management Employees (PPID), who are at the forefront of serving public information requests This problem is not just a matter of the file format used, but also concerns an inefficient workflow, lack of a centralized archiving system, and lack of support for fast data visualization or reporting. Therefore, a system solution is needed that can unify data management in various fields, accelerate the information search process, and support documentation and reporting in digital and printed forms. To answer this problem, a desktop-based Data Bank application was developed using the prototyping method. Prototyping method is a system development method by developing a prototype to help in getting a more detailed picture of the system specifications [3]. The prototyping method is widely used in software development such as savings and loan applications and information systems in general. The benefits obtained in implementing the prototyping method are saving development time and providing better application details [4]. This method was chosen because it provides flexibility in development, allows continuous iteration between users and developers, and helps in getting a picture of the system that suits the needs of

partners. With this approach, the application is expected to increase the effectiveness of PPID work and accelerate information services to the community as a whole.

The Data Bank application has previously been designed/built, but there are still some shortcomings that make users of this application not satisfied in its operation. Such as some features that do not work as desired, the UI display is still difficult to understand, the data coverage in the application is not optimal, and there are features that have not been built. With these shortcomings, this Data Bank application was developed with the hope that all application components will run according to what is needed by the user.

The development of the Data Bank application was carried out to address problems in the process of managing and delivering public information which was previously manual, slow, and unstructured. This system is specifically designed to assist the Information and Documentation Management Staff (PPID) of the NTB Agriculture and Plantation Service in improving work efficiency. Problem solving is focused on several aspects, namely: first, accelerating information searches with integrated and responsive data search features; second, enabling data storage from each field (horticulture, food crops, and plantations) in an organized manner in one system; third, providing the ability to edit and delete data according to information update needs; fourth, facilitating visualization of data developments between fields through graphs; fifth, providing the option to export data to PDF files for digital documentation; and sixth, enabling data printing as hard copies for physical purposes or official reports. With these solutions, the Data Bank application is expected to be able to improve information services to the public more quickly, accurately, and effectively.

## II. Related Works

There are several previous studies that have been conducted in the development of agricultural information systems, including the journal "Development of Mobile Applications for Agricultural Product Information Systems" in 2022. This study produced an Android-based mobile application designed to present agricultural product data, farmer group information, and agricultural reports to the public quickly. This application helps accelerate the process of delivering information and increase the effectiveness of public services in the agricultural sector, so that it is very much in line with the purpose of the Data Bank application in facilitating the provision of centralized and easily accessible agricultural information [5].

Research that also supports the development of agricultural data applications is "Integrated Agricultural Information System Design: Case Study of UPT Agricultural Mekanisasi North Sumatera" 2023. This research produces a web-based information system that combines agricultural equipment and machinery data in one integrated system. The main objective of this application is to accelerate and simplify the process of managing technical data in government agencies, which is relevant to the development of the Data Bank application that combines data from various fields under DISTANBUN NTB [6].

Another study that supports the digitalization of the agricultural sector is “A Case Study of a Digital Data Platform for the Agricultural Sector” in 2022. This study discusses the development of a cloud-based digital data platform to store, process, and present agricultural information in real-time. This platform is designed with a Data Lake approach and is used for data-based decision making. This system is very relevant to the development of the Data Bank application which functions as a center for storing and visualizing data from various fields [7].

Research with an information management system approach in the agricultural sector was also conducted in the journal "Digitalization of Agricultural Production for Precision Farming: A Case Study" in 2022. This study examines the application of an integrated agricultural management system that utilizes digitalization to improve production efficiency and presentation of agricultural data. The concepts offered, such as data centralization, graphic visualization, and intuitive user interface integration, have similarities with the features developed in the Bank Data application [8].

Another study that discusses the presentation of agricultural product reports is "Development of a Website-based Agricultural Product Marketing Information System" in 2021. using the prototype method to build a system that helps farmers market products online in the COVID-19 pandemic era. Using the ISO9126 quality standard, this system was tested on aspects of functionality, usability, compatibility, and portability, and was declared feasible with a user satisfaction level above 90%. As a result, the application is effective in presenting agricultural product reports quickly and accurately—similar to the purpose of the Data Bank application in presenting agricultural information in a structured and reliable manner [9].

Research with an information system approach in the field of agriculture was also conducted in the journal "Design and Build of Information System for Data Needs of Yellow Hybrid Corn Farmers Based on Android" in 2024. This study developed an Android application to monitor hybrid corn production needs. This application helps farmers obtain input needs data and production predictions quickly and accurately. The application uses an intuitive mobile interface and real-time data search features, reflecting similar needs for the Data Bank system in providing instant data access to users [10].

Another relevant study is "Development of a Web-Based Agricultural Product Sales Information System" in 2024. This study discusses the development of a web-based information system aimed at simplifying the agricultural product sales transaction process, starting from data input, stock management, to sales reports. This system was created to minimize manual recording errors and increase the efficiency of services to consumers. With this approach, this study supports the idea that information

systems can increase the effectiveness and accuracy of data management in the agricultural sector, in line with the objectives of the Data Bank application in organizing agricultural data in a structured manner and accelerating services to the public [11].

Based on the literature review that has been studied, it can be concluded that although there have been many previous studies that have developed desktop and web-based information systems or applications in the agricultural sector, each study generally focuses on aspects of agricultural product marketing, sales management, or transaction recording. This study is different because it specifically develops a Data Bank application to support the performance PPID at the West Nusa Tenggara Agriculture and Plantation Service (DISTANBUN NTB) in presenting public information quickly, accurately, and in a structured manner. In addition, the application of the prototyping method in this study is not only used as a technical approach, but is also part of a collaborative strategy with the service to ensure that the system built is truly in accordance with the needs of partners. This makes this study have a more focused practical contribution in the context of local government public information services, which has not been discussed in depth in previous studies.

## III. Methodology

### *A. Research Stages Using Prototyping Method*

The following are the stages of research carried out using the stages of the prototyping method as follows:

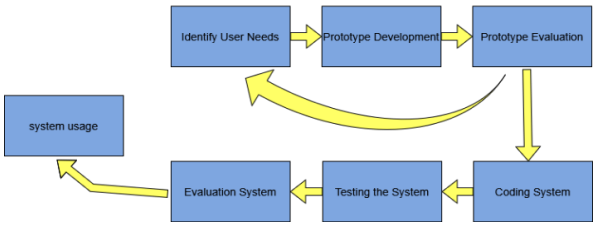


Fig. 1. Research Flow Using Prototyping Method [12]

### *B. Identify Needs*

The requirements gathering stage is the initial step in the system development process, which aims to collect all datasets obtained from users, formulate software formats, and determine the specifications of the system to be developed. To obtain comprehensive system requirements, the methods used include interviews and direct observation of the West Nusa Tenggara Province Agriculture and Plantation Service (DISTANBUN), which consists of the Information and Documentation Management Officer (PPID), related fields, and the Head of the General Subdivision. Based on the observation results, the developer received raw data from users as a reference in the database design and normalization process. In addition, the developer also succeeded in mapping the system workflow carried out by the PPID and the technical field, which was then used as the basis for designing system features such as data addition, data deletion, data editing, data visualization in graphical form, and data search features to speed up the process of presenting and requesting information.

### *C. Prototype Development*

The prototype development stage is a direct continuation of the previously conducted requirements identification process. At this stage, developers begin translating all the system requirements gathered into an initial application design, called a prototype. The prototype was developed with the aim of providing a concrete picture of the system's appearance and basic functions, and as an initial means of aligning perceptions between users and developers. In this development, developers utilized the Java programming language and the NetBeans development environment due to its ability to build stable, structured desktop applications that adhere to object-oriented programming principles. Key features designed in this prototype include user data management, including the ability to add, edit, and delete data according to the agency's needs, as well as a feature for displaying data in graphical form to facilitate information visualization. Furthermore, a data search feature is included so users can quickly find the information they need without having to perform a complete manual search. The user interface design process was structured with the principles of ease of use and compatibility with user workflows, as determined through previous observations and interviews.

During this stage, the database structure was also concretely formed based on the normalization of the raw data obtained from the agency. The tables, relationships between entities, and required fields are systematically designed to support data integrity and processing efficiency. All of these elements are designed by considering the role of each user actor, such as PPID and the field (Horticulture, Food Crops, Plantations), so that the system can accommodate each individual's needs while maintaining data consistency and security. This prototype development stage not only focuses on technical aspects, but also considers functional requirements and user convenience. With the prototype, users can begin to understand the system they will use and provide input in the next stage to improve the overall system.

### *D. Prototype Evaluation*

After the initial prototype was developed, an evaluation process was carried out by several internal parties of DISTANBUN NTB, namely from the PPID team, each technical field, and the Head of the General Sub-Division. The evaluation was carried out by directly testing the application prototype, observing the workflow, and providing feedback on the features and appearance of the system. From the evaluation process, several deficiencies and additional important feature needs were found so that the application can be used optimally:

- Add role or field options during registration to limit user access to data that is relevant and appropriate to the task.
- Added features to dynamically add year, commodity, and district/city data according to real-time needs in the field.
- Added the feature to export and import system table formats to Excel to speed up data input.
- Added features for saving in PDF format and printing data for reporting and data summary purposes.
- Added a feature to view data development graphs and make decision making easier.
- Added user activity tracking feature, only accessible by admin for transparency purposes of system usage by authorities only.
- Added user management feature, accessible only to users.

*E. System Coding*

After passing the prototype evaluation stage and obtaining user feedback, the system development process proceeds to the system coding stage. At this stage, the system begins to be functionally built according to the established design and requirements. The programming language used in coding is Java, chosen for its multiplatform nature, support for object-oriented programming paradigms, and reliable performance in building medium- to large-scale desktop applications. In this coding, the user will create four JFrame. From for each prototype: the registration page, the login page, the PPID dashboard, and the field dashboard.

*F. Testing the System*

After the coding process is complete and a system prototype has been built, a system testing phase is conducted to ensure that all application components function as intended. System testing is conducted comprehensively on all developed features, from data input and storage, editing, and deletion, to graphical display and data search. The testing method used in this research is black-box testing, a software testing method that focuses on system output based on various input combinations, without considering the internal structure of the program code. With this method, testing is conducted from the user's perspective to assess whether the system can respond to input correctly and produce output that meets the requirements specifications.

In the context of the NTB DISTANBUN Data Bank application, testing is conducted by prospective end users of the system, namely the PPID (Regional Information Technology Agency) and related technical departments. They run various usage scenarios, such as adding new data, editing existing data, deleting data, and displaying data in graphical form and search results. The results of this testing are recorded and corrected to ensure there are no bugs, errors, or logical flaws that could disrupt system operation. If functional errors or inappropriate output are found during testing, the system is returned to the coding phase for correction. This testing phase is repeated until all system functions are confirmed to be running correctly and stably. System testing is a crucial step in ensuring the quality and reliability of an application before it is deployed in a live work environment.

*G. System Evaluation*

The system enters the evaluation phase to assess the suitability of the application implementation to the previously formulated requirements. The system evaluation is conducted directly by users, namely relevant parties within the NTB DISTANBUN, including the PPID (Regional Information and Communications Agency) and technical departments. The purpose of this phase is to ensure that all system functions function properly, in accordance with the workflow and initial development objectives.

The evaluation method used is system testing, which focuses on the application's functions and output, rather than on the code structure or other internal technical aspects. This testing assesses whether features such as adding, editing, deleting, searching, and graphic visualization function correctly and produce results that meet user expectations. The evaluation also covers the user interface's ease of use, system response speed, and data processing accuracy. During the evaluation process, users are given the freedom to explore all parts of the application and provide feedback on deficiencies, usage issues, and suggestions for improvement. If any functional inconsistencies or system errors are discovered, the developers return to the coding phase for revisions or improvements. This process is carried out iteratively until the system is declared stable, accurate, and ready for use in daily operations. Thus, the evaluation stage is a crucial step in ensuring the quality and suitability of the application to the real needs of users in the field. In order to maximize the evaluation results, a questionnaire is given to be answered by the user as in Table I.

TABLE I. SYSTEM TESTING METHOD QUESTIONNAIRE

| Category | Question | Answer Types |
|---|---|---|
| Application Functionality | Are all the features in the app working as they should? | Yes No |
| | Are there any errors or crashes while using the app? | Yes No |
| | Does the app run smoothly without any annoying lag or delay? | Yes No |
| Performance | Is the app using too many device resources (CPU, RAM, battery)? | Yes No |
| | Are you having trouble logging in or accessing certain features? | Yes No |
| | Is the entered data stored correctly without losing information? | Yes No |
| Security and Reliability | Does the app remain stable after long-term use? | Yes No |
| | Does the app run well on | Yes No |

*H. System Usage*

At this stage, the application is ready to use with various stages that must be passed before. Users must ensure that before the application is used, all components are running well and according to user wishes. For that, all previous stages must be passed properly so that the results of the application are maximized.

## IV. Result and Discussion

*A. Needs Identification Results*

Based on the needs identification results, it is apparent that users experience difficulties in managing, searching, and presenting agricultural and plantation data quickly and accurately, especially when there are data requests from the public or other agencies. Therefore, a desktop-based information system is needed that can assist in centralized, effective, and efficient data management. Several functional system requirements are formulated, there are two actors who will carry out activities in the system, namely the PPID and related fields which include: features for adding data, editing data, deleting data, searching data, and data graphic visualization. Furthermore, because the developer has been provided with raw data by the user, the data has been normalized as shown in Table II. There are 3 fields with their respective types that serve as references for designing the Data Bank application database. The data will be processed into a database.

TABLE II. Data Bank Application Dataset Summary

| No | Field | Type | Commodity |
|---|---|---|---|
| 1 | Horticulture | Ornamental Plans | • Adenium<br>• Aglonema<br>• Anthrium Bunga<br>• Anggrek<br>• Heliconia<br>• Chrysanthemum<br>• Roses<br>• Jasmine<br>• Palm |
| | | Annual Fruits and Vegetables | • Durian<br>• Mango<br>• Mangosteen<br>• Jackfruit<br>• Pineapple<br>• Papaya<br>• Banana<br>• Rambutan |
| | | Seasonal Fruits and Vegetables | • Garlic<br>• Potatoes<br>• Kubis<br>• Cabbage<br>• Chili Peppers<br>• Bird's Eye Chili Peppers<br>• Green Beans<br>• Tomatoes |
| | | Biopharmaceutical Plants | • Galangal<br>• Turmeric<br>• Ginger<br>• Javanese Ginger<br>• Galangal |
| 2 | Plants Food | Fixed Rate Rice | |
| | | Fixed Rate Crops | • Corn<br>• Soybeans<br>• Peanuts<br>• Mung Beans<br>• Cassava<br>• Sweet Potatoes |
| 3 | Plantation | Annual Plants | • Coconut<br>• Robusta Coffee<br>• Arabika Coffe<br>• Cloves<br>• Kapok<br>• Cashew Nut<br>• Vanili<br>• Cocoa<br>• Areca Nut<br>• Tamarind<br>• Pepper<br>• Candlenut<br>• Sugar Palm<br>• Palmyra<br>• Jatropha Curca |
| | | Annual Crops | • Sugar Cane<br>• Cotton<br>• Smallholder Tobacco<br>• Virginia Tobacco<br>• Sesame<br>• Jatropha Curca |

*B. Prototype Development Results*

At this stage, development does not begin immediately with the creation of the application interface. Instead, database normalization and system structure design are first performed using the Unified Modeling Language (UML) approach. The goal is to comprehensively describe the user interaction flow with the system and define the main required functionality. The UML documents developed include the database design, Swimlane Activity Diagram, Use Case Diagram, and Swimlane Activity Diagram. The system interface is then developed.

*B.1. Database Design*

Figure 2 shows the implementation of the Bank Data application database designed using MySQL tools. There are 18 tables in the database such as the tables "komoditi_th", "komoditi_bst", "komoditi_sbs", "komoditi_tbf", komoditi_paliwija", "komoditi_tanhun", komoditi_tansim", "hasil_th", "hasil_bst", "hasil_sbs", "hasil_tbf", "hasil_tanhun", "hasil_tansim", "hasil_atap_paliwija", "atap_padi", kabupaten_kota", "tahun", and the "user" table.

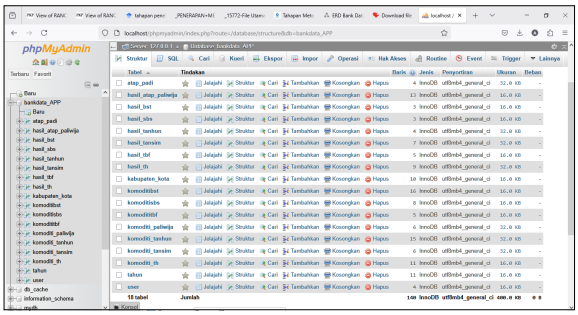


Fig. 2. Database Application Bank Data

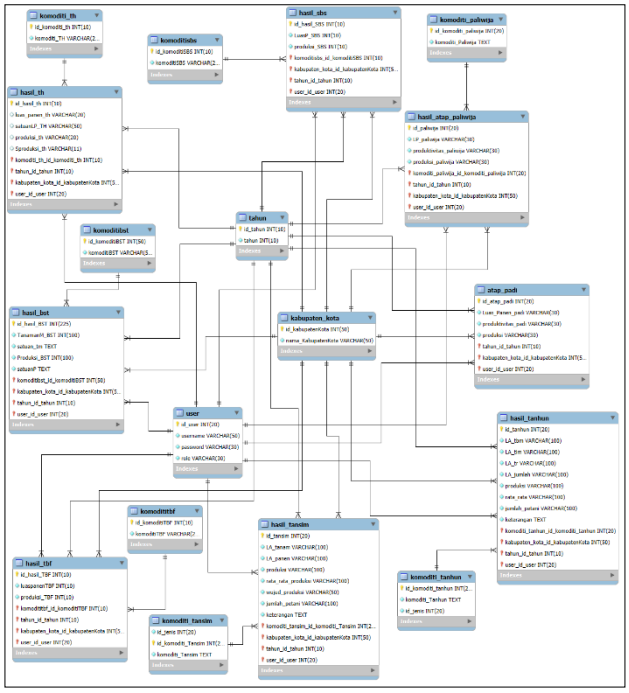

Fig. 3 Database Design

Figure 3 shows that there are 18 interrelated tables, such as the “komoditi_th” table which is related to the “hasil_th” table, then the “hasil_th” table is related to the “tahun” table, the “kabupaten/kota” table, and the “user” table. There is also a “komoditibst” table related to the “hasil_bst” table, the “hasil_bst” table is related to the “tahun” table, the “kabupaten/kota” table, and the “user” table. The “komoditibf” table is related to the “hasil_tbf” table, while the “hasil_tbf” table is related to the “tahun' table, the “kabupaten/kota' table, and the “user” table. Then the “komodity_tanhun” table is related to the “yield_tanhun” table, while the “yield_tanhun” table is related to the “year” table, the “district/city” table, and the “user” table. Furthermore, the “komoditi_tansim” table is related to the “hasil_tansim” table, while the “hasil_tansim” table is related to the “tahun” table, the “district/city” table, and the “user” table. There is also a “komditi_paliwija” table related to the “hasil_atap_paliwija” table, while the “hasil_atap_paliwija” table is related to the “tahun” table, the “district/city” table, and the “user” table. Finally, there is a “atap_padi” table related to the “tahun” table and the “district/city” table.

### *B.2. Use Case Diagram*

Figure 4 shows the design of the Bank Data application use case diagram. The use case diagram of the Data Bank Application at DISTANBUN NTB illustrates the interaction between two main actors, namely PPID as admin and Field Users, each of whom has different access rights in the system. Admin has full authority, including logging in, managing users and access rights, adding, changing, deleting, searching, printing, saving data in PDF format, viewing data graphs, performing data recaps and reports, and tracking user activities for monitoring purposes. Meanwhile, Users (fields) only have access to log in and manage data such as adding, changing, deleting, searching, printing, saving data in PDF format, and viewing graphs according to the roles and tasks of each field. Every activity carried out by these two actors is directly connected to the central database system which allows data storage and processing in a structured and efficient manner. The difference in access rights between Admin and User emphasizes control and security in data management, while providing flexibility for each field to work independently according to its needs in one integrated platform.

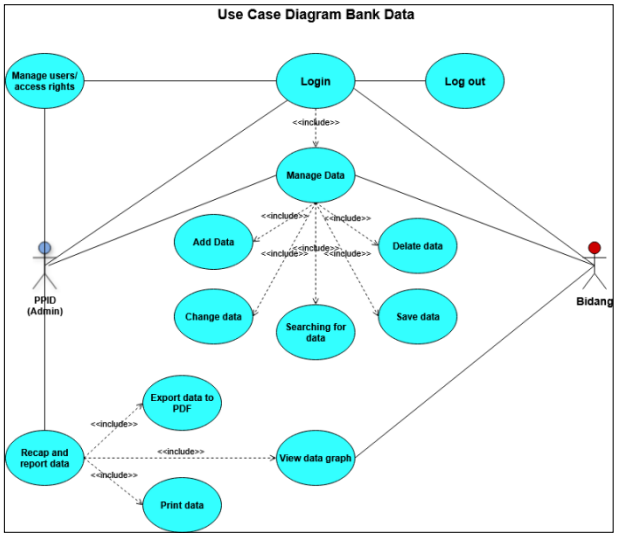


Fig. 4. Use Case Data Bank Application Diagram

### *B.3. Swimlane Activity Diagram*

Figure 5 illustrates the interaction between the two main actors in the Data Bank application system: the PPID (Information and Documentation Management Officer) and the Field. This diagram aims to clearly map the flow of activities for each actor and demonstrate the interconnectedness of the processes running within the system. The Field actor acts as an internal user who directly manages data, including inputting, editing, deleting, viewing graphical data, and searching. All of these activities are automatically saved to the central database without requiring submission or verification by the PPID, thus supporting work efficiency.

Meanwhile, the PPID actor has broader responsibilities within the system. In addition to inputting, editing, deleting, and analyzing graphical data, the PPID is also equipped with additional features such as user management, user activity tracking (activity logs), and more comprehensive data searches. This reflects the PPID's role as the central information manager, tasked with ensuring data order, security, and transparency. This diagram also emphasizes that all data managed by both actors is stored in the same database, strengthening integration and alignment between work units. With the

swimlane approach, the flow of responsibility of each actor can be visualized in a structured and easy-to-understand manner, and becomes an important basis in designing information systems based on user needs.

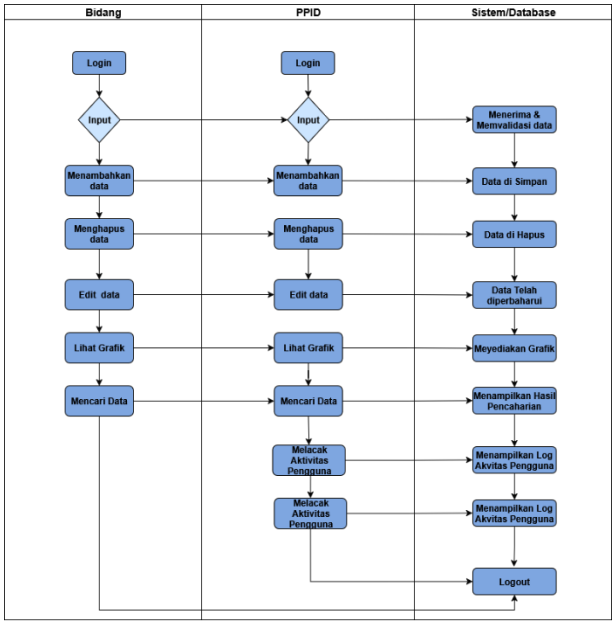


Fig. 5. Swimlane Activity Diagram

*B.4. PPID Dashboard Final Prototype Development*

As shown in Figure 6, one example of the final prototype development approved by users is the PPID homepage, which now features a data search feature that functions as expected. This feature allows users to search for information more quickly and efficiently. When users want to search for data in a specific field, for example, Horticulture, they can search by commodity name, year, or district/city. Search results are automatically displayed in the search results table on the page, allowing users to quickly find the information they need without having to manually search for the data. Not only that, the display has now been beautified with the addition of unique icons that match the data section.


Fig. 6. Final Development Stage Dashboard Menu Display

*B.5. Final Prototype Development Field*

Figures 7, 8, and 9 show that the system has been developed for the Horticulture, Food Crops, and Plantation sectors by adapting to a number of user inputs. As shown in the figures, the system now provides various features aimed at simplifying user data management. These features include the ability to quickly search for data, add data, edit data, delete data, and present data in interactive graphical form. Furthermore, the system also provides a facility to download table formats into Excel files, which users can use as references or templates when inputting data. These features are expected to improve user efficiency and convenience in utilizing the database system.

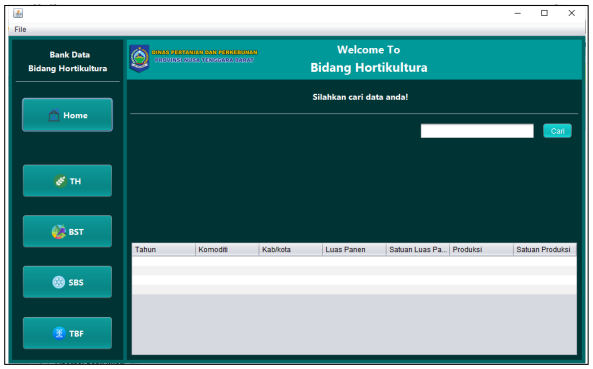


Fig. 7. System Development in the Horticultural Sector


Fig. 8. System Development in the Food Crops Sector


Fig. 9. System Development in the Plantation Sector

*B.6. Final Prototype Development of the User Management Feature*

The User Management feature allows admins to monitor and manage user lists based on their usernames and areas of responsibility, such as PPID, Plantations, Food Crops, and Horticulture. Meanwhile, the User Activity

Log, which documents every user action in the system, including data addition activities, is very important. The implementation of this feature aims to support transparency and accountability, as well as facilitate monitoring of system usage by various stakeholders. To perform this activity, admins must first click the file button above the JMenuBar as shown in Figure 10, which will automatically display a list of other activities, such as printing data, adding year or district/city data, activity tracking, managing users, and logging out. Clicking the activity tracking button will bring up a page like Figure 11. Clicking the user management button allows administrators to delete associated accounts, depending on the number of usernames registered in the system.


Fig. 10. User Activity Log Page View

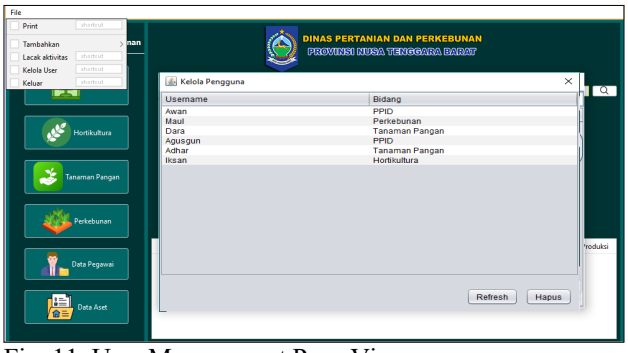


Fig. 11. User Management Page View

*B.7. Graphic Display On System*

Figure 12 shows a bar graph in this application developed using Java Swing and the JFreeChart library to visualize total commodity production data by district/city in West Nusa Tenggara Province. Data taken from existing tables in the system is processed into a dataset with rows representing commodity types and columns representing administrative regions (districts/cities). The horizontal axis (categories) in the graph displays the names of districts/cities, while the height of the bars reflects the production volume of each commodity in each region. Bar coloring is customized by district/city and displayed through a manual legend (custom legend) to facilitate visual identification between regions. The application also provides a data filtering feature by year and the ability to save the graph in image format (PNG) for documentation. In addition, the system automatically generates conclusions in the form of identifying districts/cities with the highest total production based on the available data, which is displayed at the bottom of the interface.

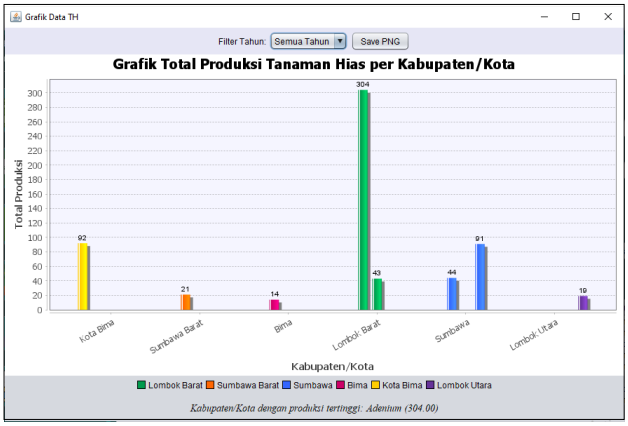


Fig. 12. Graphic Display on the System

*B.8. Encoding Results*

As previously stated, the programming language used in the database application is Java. Java is a high-level programming language widely used in software development due to its simplicity, robustness, neutral architecture, and support for multithreading. Furthermore, Java is known as a dynamic and easy-to-maintain language due to its clear and consistent syntactic structure. The use of Java in developing this database application is also supported by the use of the NetBeans IDE, which provides various features such as a code editor, debugger, and database integration that accelerate and simplify the coding process. The coding phase involves developing program logic, designing interactions between components, and implementing pre-defined key features, such as data management (add, edit, delete), graphical data visualization, and a data search system. Figure 13 shows a snapshot of the coding file for the developed Data Bank application system. The entire coding process is carried out in a modular manner so that the system is easy to develop, maintain, and test in the next stage [13].

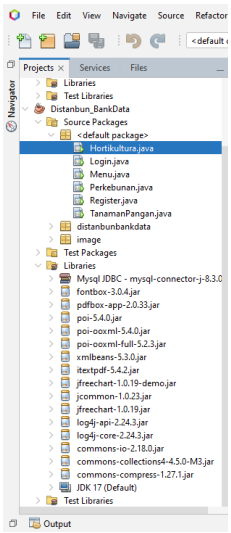


Fig. 13. Data Bank Application Coding File

*C. Testing the System*

In the Bank Data application system testing process stage, the author uses the system testing method to evaluate and ensure the suitability of the application's performance to user needs. This testing involved 20 respondents consisting of PPID officers, horticulture, food crops, plantations, and general sub-section heads at the NTB Provincial Agriculture and Plantation Service. The questionnaires compiled include six main categories, namely: application functionality, performance, security and reliability, user experience (UX) and interface (UI), user scenario testing, and PPID officer performance in providing public information. The last category contains questions about work efficiency, data accuracy, officer satisfaction, and effectiveness of information delivery, which aims to assess the application's contribution to increasing the speed, accuracy, and professionalism of public information services. Thus, this test not only measures the technical aspects of the system, but also its impact on the quality of public services carried out by PPID. The following are questions from the six categories, including:

*C.1. Application functionality*

- Are all the features in the app working as they should?
- Are there any errors or crashes while using the app?
- Does the app run smoothly without any annoying lag or delay?

*C.2. Performance*

- Is the app using too many device resources (CPU, RAM, battery)?
- Are you having trouble logging in or accessing certain features?
- Is the entered data stored correctly without losing information?

*C.3. Security and reliability*

- Does the app remain stable after long-term use?
- Does the app run well on your device and operating system?
- If there are integrations with other services (e.g. APIs, databases, or third parties), do they all work well?

*C.4. User Experience (UX) and Interface (UI)*

- Is the application display easy to use and understand?
- Do colors, icons, and UI elements help the user experience or confuse them?

*C.5. User scenario testing*

- Overall, how would you rate this app 1-10?
- Would you recommend this app to others?

*C.6. PPID officer performance in providing public information*

- Does the application help you speed up the process of providing public information?
- Is the data displayed by the application reliable and in accordance with public information needs?
- Do you feel that this application improves the professionalism of PPID services?

Table III and Figure 14 show the results of user satisfaction evaluations obtained from a questionnaire using the system testing method. Of the 20 respondents who tried using the Bank Data application, almost all responded positively to all aspects, including functionality, performance, security, and user experience. This indicates that the application functions well, is stable, and satisfies the majority of users.

$$\text{Presentase} = \frac{Average\ Value}{Maximum\ Weighted\ Value}\ X\ 100\%$$

so that,

$$\text{Presentase} = \frac{317}{320}\ X\ 100\% = 99{,}06\%$$

Based on the formula above, the calculation shows that the categories of Application Functionality, Performance, Security and Reliability, User Scenario Testing, and PPID Employee Performance achieved 100% results. Meanwhile, the UX/UI category achieved 93% results. Overall, the test achieved a score of 99.06%.

TABLE III. QUESTIONNAIRE ANSWER RESULTS

| No | Respondent Name | Application Functionality | Performance | Security and Reliability | UX and UI | User Scenario Testing | Score (1-10 | Recommendation (Yes/N | PPID Officer Perform |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Herlina | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 2 | Achmad Arief | Yes | Yes | Yes | Yes | Yes | 9 | Yes | Yes |
| 3 | Dewi Novita | Yes | Yes | Yes | Yes | Yes | 7 | Yes | Yes |
| 4 | Aryyana Hasim | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 5 | Ahmad Zarkasi | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 20 | Syamsul Makriful Akbar | Yes | Yes | Yes | Yes | Yes | 9 | Yes | Yes |
| 7 | Iwan Sofiyan | Yes | Yes | Yes | Yes | Yes | 6 | Yes | Yes |
| 8 | Fahrin | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 19 | Ariani's Wisdom | Yes | Yes | Yes | Yes | Yes | 7 | Yes | Yes |
| 18 | Evi Bodiarti | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 11 | Ni Nyoman Sukeni | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 12 | Sukomu | Yes | Yes | Yes | Yes | Yes | 9 | Yes | Yes |
| 13 | Sugiman | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 14 | BQ. Sri Wahyuni | Yes | Yes | Yes | Yes | Yes | 9 | Yes | Yes |
| 15 | Septi Magriani | Yes | Yes | Yes | Yes | Yes | 8 | Yes | Yes |
| 16 | Heri Purnama | Yes | Yes | Yes | Yes | Yes | 9 | Yes | Yes |
| 17 | Leny Surdiana | Yes | Yes | Yes | Yes | Yes | 7 | Yes | Yes |

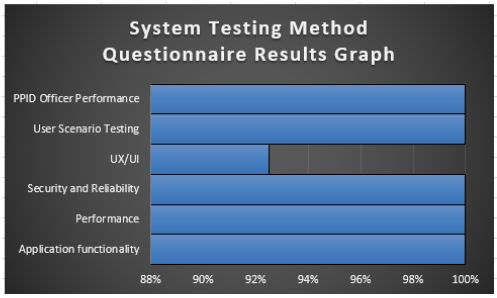

Fig. 14. User Satisfaction Graph

## V. CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that the development of the Bank Data application has been proven to improve the performance of the Information and Documentation Management Officer (PPID) and related departments in providing faster, more accurate, and more effective public information services. The application simplifies the processes of searching, managing, and delivering information, thereby accelerating responses to public data requests. In addition, the implementation of the Bank Data application has enabled data storage at the Agriculture and Plantation Service of West Nusa Tenggara Province to become more structured, well documented, and centralized within a single system that is easily accessible to authorized personnel. This improvement enhances work efficiency while minimizing the risk of data loss and duplication. Furthermore, the use of the prototyping method during the application development process has provided significant benefits for both developers and users, as it facilitates iterative development through continuous user involvement and feedback at every stage. As a result, the final application is better aligned with user requirements and is well prepared for optimal implementation. Suggestions given for further development to be even better, namely the UI display is beautified again and certainly easy to understand by users and this Data Bank application can operate or be run using a smartphone / cellphone. that way this Data Bank application will facilitate the PPID because the data needed remains available quickly anywhere and anytime.

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