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Development of an Integrated Web-Based Multi-User Application for Village Fund Usage Reporting Using CodeIgniter

Fitriyani*, Mukhsin Nuzula, Cut Lilis Setiawati

Informatic Engineering Department, Universitas Jabal Ghafur, Sigli
***Corresponding author**: fitryani10juni@gmail.com

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Abstract
Currently, there is an increasing need for a transparent and efficient reporting system in the management of village funds (Dana Gampong), as many fund management processes still rely on manual methods or systems that are not well-integrated. Therefore, this research focuses on the development of a multi-user web-based application for reporting the use of village funds, integrated with the CodeIgniter framework. This application aims to provide a transparent and efficient system for managing and reporting village budget allocations, expenditures, and activities at various levels, including categories, fields, villages, and subdistricts. The system is designed to allow both administrators and village operators to input and manage data, ensuring accurate and up-to-date financial reporting. The admin interface enables users to update account credentials, manage categories, fields, villages, and subdistricts, while the operator interface facilitates detailed activity reporting. Additionally, the application ensures accessibility across various devices, including personal computers, laptops, tablets, and smartphones, making it flexible and user-friendly for all stakeholders. This research also explores the importance of an integrated system in improving transparency in village governance, providing a comprehensive view of fund usage across different categories and time periods.
Keywords: *village fund reporting, web-based application, multi-user, codeigniter framework, financial transparency, system integration*.

Abstrak
Saat ini, kebutuhan akan sistem pelaporan yang transparan dan efisien dalam pengelolaan dana desa (Dana Gampong) semakin mendesak, mengingat banyaknya pengelolaan dana yang masih mengandalkan metode manual atau sistem yang belum terintegrasi dengan baik. Oleh karena itu, penelitian ini berfokus pada pengembangan aplikasi berbasis web multi-user untuk pelaporan penggunaan dana desa, yang terintegrasi dengan framework CodeIgniter. Aplikasi ini bertujuan untuk menyediakan sistem yang transparan dan efisien dalam mengelola serta melaporkan alokasi anggaran desa, pengeluaran, dan kegiatan di berbagai tingkat, termasuk kategori, bidang, desa, dan kecamatan. Sistem ini dirancang agar baik admin maupun operator desa dapat memasukkan dan mengelola data, sehingga pelaporan keuangan dapat dilakukan dengan akurat dan terkini. Antarmuka admin memungkinkan pengguna untuk memperbarui kredensial akun, mengelola kategori, bidang, desa, dan kecamatan, sedangkan antarmuka operator memungkinkan pelaporan kegiatan yang lebih rinci. Selain itu, aplikasi ini memastikan aksesibilitas di berbagai perangkat, termasuk komputer pribadi, laptop, tablet, dan smartphone, sehingga fleksibel dan mudah digunakan oleh semua pemangku kepentingan. Penelitian ini juga mengkaji pentingnya sistem terintegrasi untuk meningkatkan transparansi dalam pemerintahan desa, memberikan gambaran menyeluruh mengenai penggunaan dana pada berbagai kategori dan periode waktu.
Kata Kunci: *pelaporan dana desa, aplikasi berbasis web, multi-user, framework codeigniter, transparansi keuangan, integrasi sistem*

1. Introduction

The Village Revenue and Expenditure Budget (APBDes) is an annual financial plan familiar to village officials and stakeholders, who are consistently engaged in managing and allocating village income for various activities aimed at developing the village. However, not all of these activities are known to the community due to their sheer number and the involvement of multiple institutions managing the APBDes. This is especially true for non-physical activities, such as training, health education, community empowerment, and other programs that lack tangible documentation [2].

Often, village residents raise questions about the progress made by village authorities in developing their area. They may inquire about what has been achieved, the milestones reached, and the challenges

encountered. These inquiries, if not addressed transparently, can lead to distrust or dissatisfaction among the community regarding the village administration's efforts [5].

The concept of multi-user systems offers a solution to enhance transparency and efficiency. A multi-user system enables simultaneous access by multiple users to a single operating system or application, fostering collaboration and accessibility. Unlike single-user systems, multi-user systems are ideal for environments where multiple stakeholders require access to shared data and operations [4].

In this context, CodeIgniter, a framework based on the Model-View-Controller (MVC) design pattern, provides an effective solution for developing web applications. Its structure offers robust methods for solving common software development challenges, making it a suitable tool for building integrated reporting systems [5].

To address the transparency issues and facilitate accessible reporting, this study proposes the development of an integrated, web-based application for reporting village fund usage. This application, designed with PHP and MySQL and utilizing CodeIgniter, will allow both government officials and the community to access real-time information on village development activities [3]. The system will also integrate with the DPMG (Village Community Empowerment Agency) in Pidie Regency to ensure seamless data sharing and accessibility for authorized stakeholders. By implementing this system, it is anticipated that community trust in village administration will increase, and any potential misunderstandings or suspicions about the use of village funds will be minimized. This study focuses on the development of a web-based information system for reporting the realization of the Village Revenue and Expenditure Budget (APBDes), building upon previous studies with different approaches.

One relevant study was conducted by [2], this research developed a web-based system for reporting APBDes realization without utilizing a framework. While the system functioned effectively, the lack of a framework led to inefficiencies in code management and development. In contrast, the current study adopts a different approach by utilizing the CodeIgniter framework for building the web-based application. CodeIgniter provides a structured development environment, enhancing efficiency and simplifying maintenance and further system development.

Another relevant study was conducted by [3], this study developed a reporting system for village fund usage, focusing on access via smartphones and digital boards connected to the application. The programming language used in this research was Arduino, primarily oriented toward hardware-based applications. While the system offered unique features, its accessibility was limited to smartphones and digital boards, which restricted its usability.

In contrast to these prior studies, the application developed in this research is designed to be accessible across multiple devices, including personal computers, laptops, tablets, and smartphones. This approach ensures greater flexibility, allowing various stakeholders to access the system regardless of the device they use. User must have internet connection makes maintenance easier, then the server used is in the form of web hosting [6] . By leveraging the CodeIgniter framework and creating a system with broad accessibility, this study aims to provide a more efficient, flexible, and structured solution for APBDes realization reporting. The system is also designed to enhance transparency and accessibility of information for the community and relevant stakeholders.

2. Material and Methods

The analysis of the system development aims to comprehensively understand the process of designing the system. Several basic techniques were applied to ensure that the system functions optimally and meets user requirements. The steps involved in the system design were as follows [1]:

1. Defining Additional Features for the Admin

The system includes added features for admin users, such as a dedicated admin login and password change functionality [7]. These features are implemented to enhance security and facilitate system management by the admin.

2. Defining Additional Features for Village Operators

In addition to the admin, village operators are provided with specific access through operator login and password change features. These features enable operators to perform their tasks securely and in an organized manner [8].

3. Selecting the Programming Languages

The system development utilizes a combination of web-based programming languages, including PHP, HTML, CSS, and JavaScript. To ensure a more structured and efficient development process, the CodeIgniter framework is employed as the primary framework.

4. Designing and Building the Database

The database is designed and developed according to the system requirements. MySQL is chosen as the primary database due to its capability to handle complex data with stable performance. The database structure is organized to support fast and accurate data processing.

5. Choosing Software for Coding and System Design

The development process employs Macromedia Dreamweaver as the main tool for coding and designing the system. Dreamweaver is selected for its ability to support web-based application development and integration with various programming languages used in the project.

By following these methodological steps, the system was designed to meet user needs, ensuring security, accessibility, and ease of management and operation. Several business rules must be considered when designing the Entity Relationship Diagram (ERD) for this system. These rules ensure that the relationships between entities are accurately represented. The business rules were as follows [4]:

1. A category can have multiple fields.
2. A category can have multiple activities.
3. A field can have multiple activities.
4. A village can have multiple activities.
5. A subdistrict can have multiple villages.

Based on the above business rules, the ERD for the application was structured to reflect these relationships and ensure data integrity. The diagram (as shown in Figure 3.1) illustrates the entities and their relationships within the system, highlighting how categories, fields, activities, villages, and subdistricts interact with one another [9]. The relationships and cardinalities in the ERD were designed to accommodate the system's functional and data requirements, ensuring the system operates efficiently and effectively.

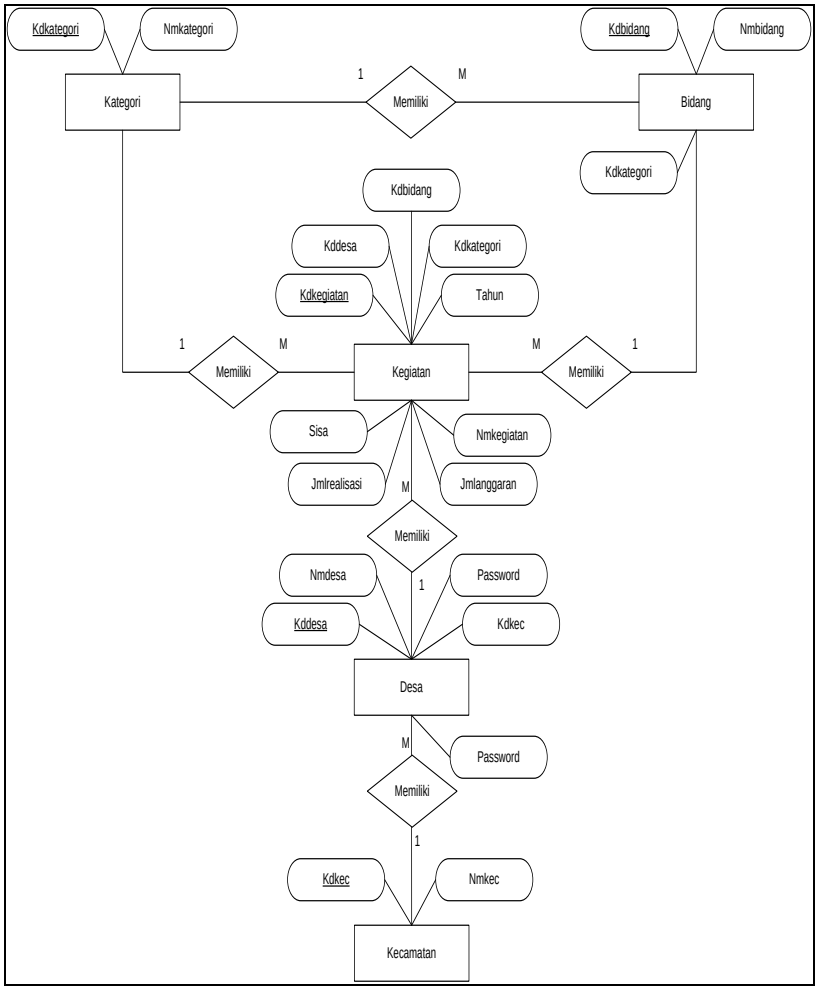

Fig. 1: Entity relationship diagram (ERD)

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3. Results and Discussion

3.1 Index Page View

The index page was the first page displayed when a user accesses this system. This page serves as the system's main interface, providing an overview or initial navigation options for users [10]. The layout and features of the index page were designed to ensure user-friendliness and quick access to the system's functionalities. A visual representation of the index page is shown in **Figure 2**. This figure illustrates the arrangement of elements, menus, and any additional features available on the page. Through its design, the index page aims to provide an intuitive and efficient entry point for all users of the system.

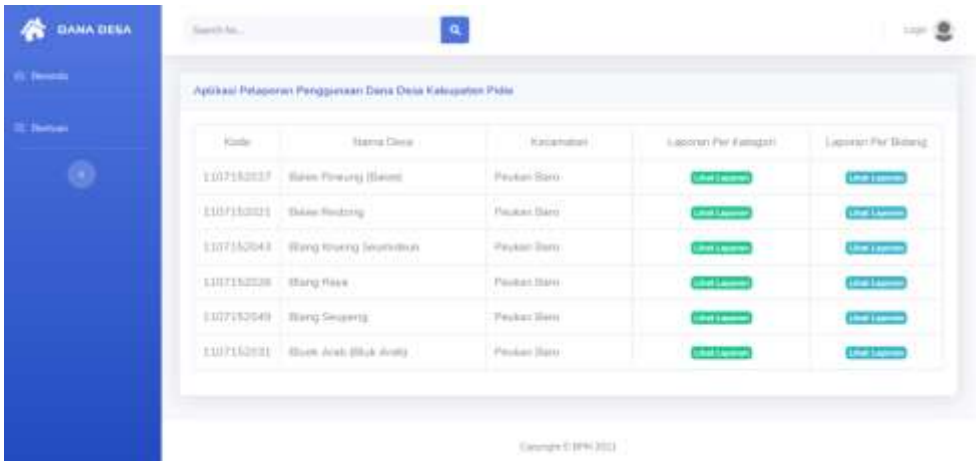

Fig. 2: Index Page View

3.2 Admin Login Page View

The admin login page was displayed when a user accesses the specific admin section of the system for the first time. This page serves as a security measure, designed to identify and authenticate users who were authorized to access the admin area. It ensures that only authorized personnel can manage and control the administrative features of the system. The layout and functionality of the admin login page were optimized to provide a secure and user-friendly authentication process. A visual representation of this page is shown in **Figure 3**, which illustrates the placement of fields such as username and password, along with any additional login features or instructions. By implementing this login page, the system ensures that only legitimate admin users can access sensitive areas and features, protecting the integrity and security of the system.

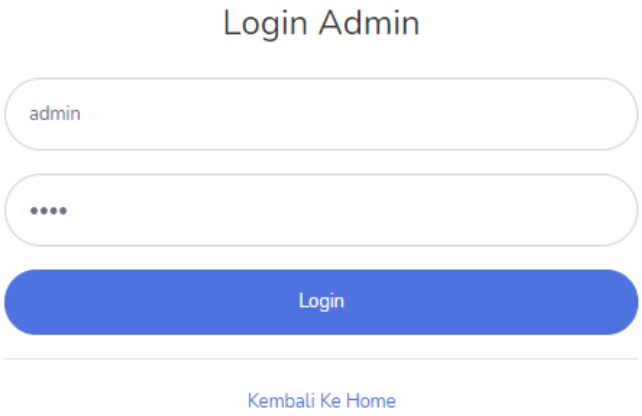

Fig. 3: Admin Login Page View

3.3 Admin Account Update Page View

This page was used by the admin to change their password. It provides a secure interface for the admin to update their account credentials when needed, ensuring that the system maintains strong security practices. The layout of the update account page was designed to be simple and user-friendly, with fields for entering the current password, the new password, and confirming the new password [11]. This page helped the admin maintain control over their account security. A visual representation of this page is shown

in **Figure 4**, which illustrates the placement of the fields and buttons necessary for password update. The page design prioritizes ease of use while ensuring that password changes are processed securely.

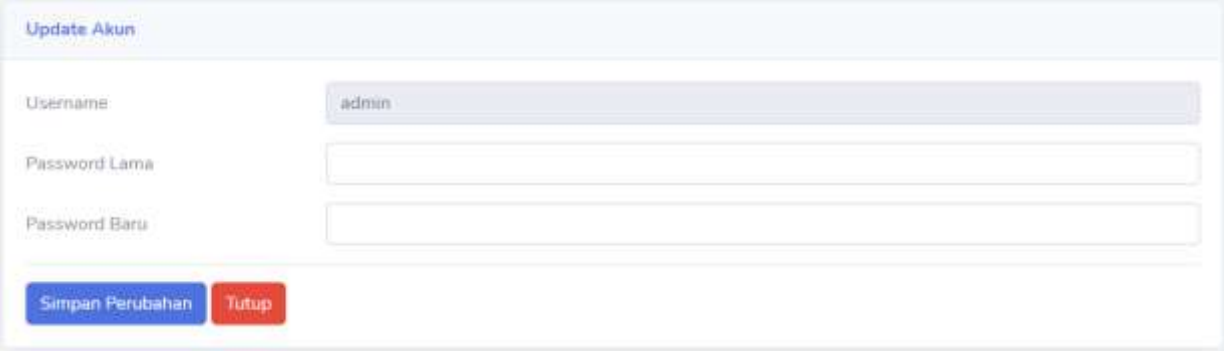

Fig. 4: Admin Account Update Page View

3.4 Category Data Page View

This page was used by the admin to manage and organize category data within the APBDes (Village Revenue and Expenditure Budget). The admin can view, add, edit, or delete categories related to the APBDes activities, ensuring that the system remains up-to-date with the correct data. The design of this page is user-friendly, with clear options for managing category data. It typically included a table or list displaying existing categories, along with buttons for performing actions like adding new categories or editing existing ones. A visual representation of this page was shown in **Figure 5**, which illustrates the layout of the category management interface. The design ensured that the admin can easily navigate and manage the categories within the system.

Fig. 5: Category Data Page View

3.5 Field Data Page View

This page was used by the admin to manage and process field data within the APBDes (Village Revenue and Expenditure Budget). The admin can view, add, edit, or delete fields related to the APBDes activities, ensuring that the system is up-to-date and accurate. The layout of this page was designed to be intuitive, providing a clear display of existing field data. It typically includes a list or table of fields, along with options for adding new fields or editing and removing existing ones. A visual representation of this page was shown in **Figure 6**, which illustrates how the field data management interface was structured. The page was designed to be simple to navigate, allowing the admin to effectively manage the fields within the system.

Fig. 6: Field Data Page View

3.6 Subdistrict Data Page View

This page was used by the admin to manage and process subdistrict data within the Pidie Regency. The admin can view, add, edit, or delete subdistricts, ensuring that the system contains accurate and up-to-date information about the subdistricts in the region. The design of this page was user-friendly, with a table or list displaying the existing subdistrict data. It included options for managing subdistrict information, such as adding new subdistricts or editing and removing current entries. A visual representation of this page was shown in **Figure 7**, which illustrates how the subdistrict data management interface is structured. The layout was designed for ease of navigation, enabling the admin to effectively manage and update the subdistrict information within the system.

Fig. 7: Subdistrict Data Page View

3.7 Village Data Page View

This page was used by the admin to manage and process village data within Pidie Regency. The admin has the ability to view, add, edit, or delete village information, ensuring that the system is always up-to-date with accurate data for each village in the region. The design of this page is streamlined for ease of use, typically featuring a table or list of the existing village data, with options for adding new villages or editing and deleting existing entries. A visual representation of this page was shown in **Figure 8**, which illustrates the layout of the village data management interface. The page was designed to be intuitive and user-friendly, allowing the admin to efficiently manage and update village information within the system.

Fig. 8: Village Data Page View

3.8 Village Operator Login Page View

This page was used to authenticate and identify users who are attempting to access the village operator section of the system. It ensured that only authorized personnel can enter the operator area, thereby maintaining security and restricting access to sensitive information. The layout of the village operator login page was designed to be simple and secure, typically including fields for entering a username and password. This ensured that only verified users can access the operator's functionalities within the system. A visual representation of this page was shown in **Figure 9**, which illustrates the design and elements of the village operator login page. The page was created for ease of use, allowing authorized users to quickly access their specific area of the system.

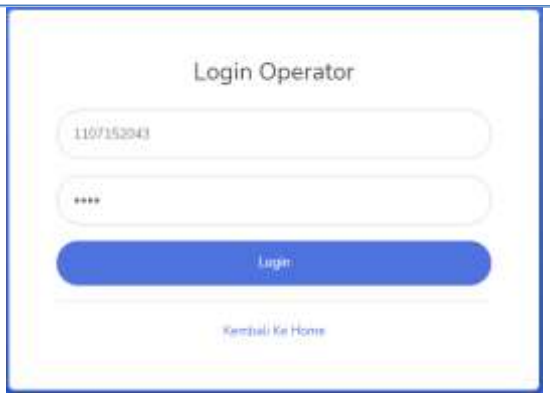

Fig. 9: Village Operator Login Page View

3.9 Activity Data Page View

This page was used by the village operator to manage data regarding the use of village funds for each fiscal year. The operator can view, add, edit, or delete activity data related to the allocation and utilization of funds for various village activities. This page plays a crucial role in ensuring that the financial data is accurately recorded and updated. The layout of this page was designed to be user-friendly, typically featuring a table or list of activities, along with options to manage each entry [14]. It provides fields for entering specific details about the activities, including budget allocation, expenditures, and other relevant information. A visual representation of this page is shown in **Figure 10**, which illustrates the structure of the activity data management interface. The design ensures that the operator can easily navigate and manage the financial data related to village activities.

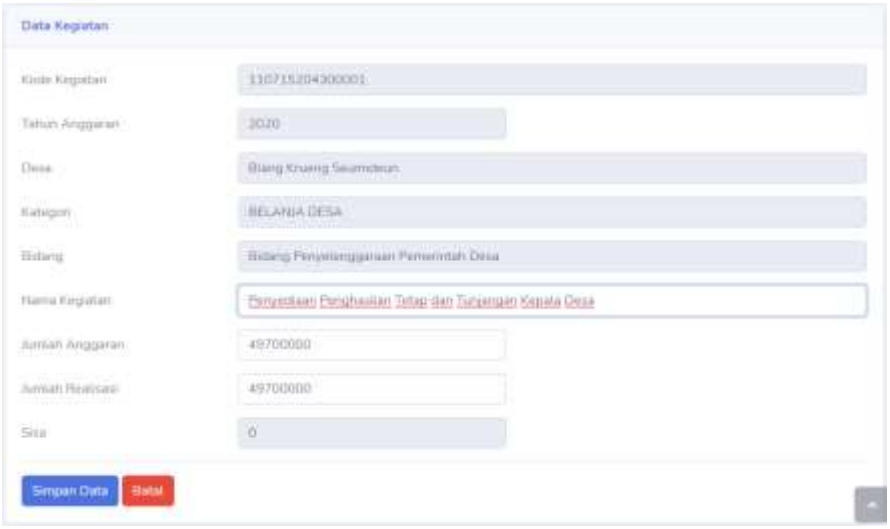

Fig. 10: Activity Data Page View

3.10 Village Fund Usage Report by Category

This report provides detailed information regarding the usage of village funds, categorized by fiscal year and activity category. It allowed users to track how funds are allocated and spent within each category, offering a comprehensive view of financial management at the village level. The layout of this report was designed to present the data in a clear and organized manner, typically displaying categories along with corresponding financial figures such as budget allocation, expenses, and remaining funds [13]. The report aims to provide transparency and clarity regarding fund usage, ensuring that stakeholders can easily access and understand the financial data. A visual representation of this report was shown in **Figure 11**, which illustrates how the data is displayed for the user. The design prioritizes ease of understanding and efficient navigation of financial information related to village fund usage by category.

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Fig. 11: Village Fund Usage Report by Category Page View

3.11 Village Fund Usage Report by Field

This report provides detailed information on the usage of village funds, categorized by fiscal year and field. It allowed users to track the allocation and expenditure of funds across various fields of activity within the village, providing a comprehensive overview of the financial management for each specific area [12]. The layout of this report was designed to clearly present the data, typically displaying fields along with associated financial figures, such as allocated budget, actual expenses, and remaining funds. This organization ensures that the financial usage within each field is transparent and easy to understand. A visual representation of this report is shown in **Figure 12**, which illustrates how the data is displayed for users. The design focuses on making the report accessible and easy to navigate, ensuring that stakeholders can efficiently review the financial usage of village funds per field.

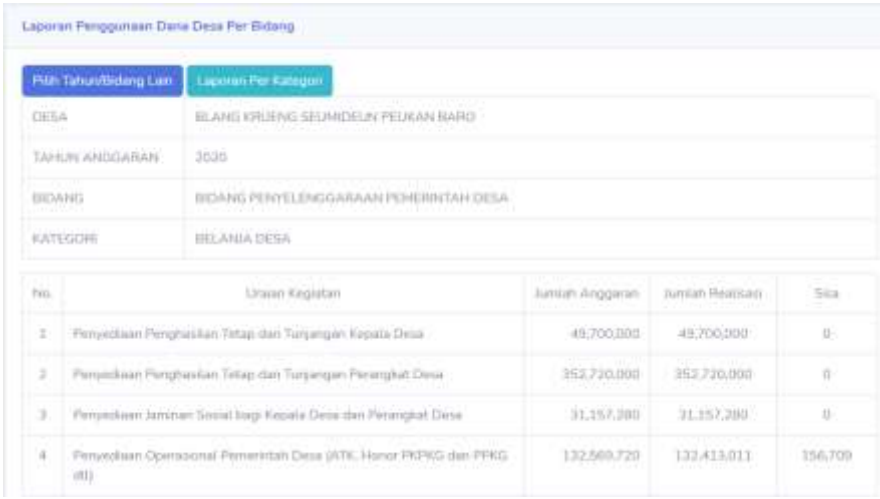

Fig. 12: Village Fund Usage Report by Field Page View

3.12 Village Fund Usage Report by Year

This report provides detailed information on the usage of village funds, categorized by fiscal year. It allowed users to monitor the financial allocation and expenditures over a specific year, offering a clear view of how funds were managed and utilized throughout the year. The layout of this report was designed to present the data in a structured and easy-to-read format, typically displaying the year along with the total allocated funds, actual expenditures, and remaining funds for that year [15]. This ensures transparency and helps stakeholders assess the overall financial performance of the village for each fiscal year. A visual representation of this report is shown in **Figure 13**, which illustrates how the data is organized and displayed for users. The design is focused on simplicity and clarity, enabling users to efficiently analyze the financial data based on the year.

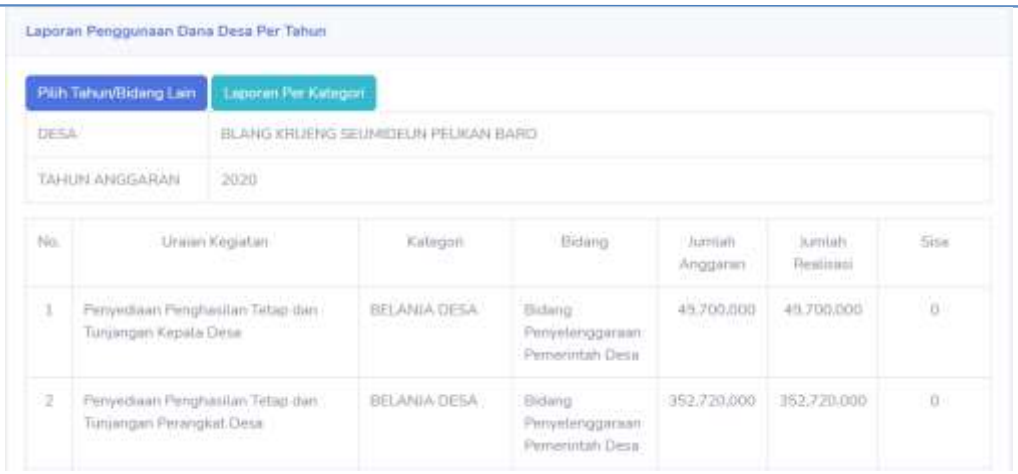

Fig. 13: Village Fund Usage Report by Year Page View

4. Conclusion

This research successfully developed a multi-user web-based application for reporting the use of village funds (Dana Gampong), integrated with the CodeIgniter framework. The application provides a transparent, efficient, and user-friendly system for stakeholders at the village level, including administrators and village operators. With this application, the management and reporting of village funds can be carried out in a more structured, accurate, and up-to-date manner, ultimately enhancing the transparency and accountability of village fund management. Through the use of web technology and integration with various devices (personal computers, laptops, tablets, and smartphones), this application simplifies access to information for all relevant parties, both at the village government level and the community. The facilities provided for administrators and village operators, such as managing data on categories, fields, villages, subdistricts, and activity reports, make it easier to manage village funds in compliance with applicable regulations. Overall, the system developed in this research can serve as an effective solution for increasing community involvement, accelerating the reporting process, and improving financial management at the village level. It is hoped that this application can be implemented more widely and contribute positively to better and more accountable village fund management

5. Acknowledgment

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