Implementasi Metode *Waterfall* dalam Sistem Informasi Profil Desa Rinjani Kabupaten Luwu Timur

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Abstrak

Pengelolaan data potensi desa yang masih bersifat manual maupun semi-digital sering menimbulkan beberapa masalah, antara lain terbatasnya akses informasi, data yang belum tertata dengan baik, serta kurang efektifnya dukungan terhadap proses perencanaan pembangunan desa. Pengembangan sistem dilakukan dengan metode Waterfall yang terdiri atas tahapan analisis kebutuhan, perancangan, implementasi, pengujian, dan pemeliharaan. Sistem dibangun menggunakan framework Laravel untuk mengelola logika aplikasi, MySQL sebagai basis data, serta teknologi web untuk mendukung antarmuka yang mudah digunakan. Pengujian sistem dilakukan dengan Black Box Testing untuk memastikan setiap fungsi berjalan sesuai kebutuhan, serta User Acceptance Testing (UAT) untuk mengukur tingkat penerimaan pengguna terhadap sistem yang dikembangkan. Hasil pengujian UAT menunjukkan tingkat penerimaan pengguna sebesar 92,65%, yang termasuk dalam kategori sangat setuju. Dengan demikian, sistem informasi profil desa yang dikembangkan telah memenuhi kebutuhan pengguna dan dapat dioperasikan dengan baik.
Kata Kunci: Sistem Informasi, Website, Waterfall, Black-Box, User Acceptance Testing (UAT), Desa Rinjani.

Implementation of the Waterfall Method in the Village Profile Information System for Rinjani Village East Luwu Regency

Abstract

The management of village potential data, which is still carried out manually or semi-digitally, often causes several problems, including limited access to information, poorly structured data, and low effectiveness in supporting village development planning. The system was developed using the Waterfall method, consisting of requirements analysis, design, implementation, testing, and maintenance stages. The system was built using the Laravel framework to manage application logic, MySQL as the database, and web technology to support an easy-to-use interface. System testing was conducted through Black Box Testing to ensure that every function runs according to requirements, as well as User Acceptance Testing (UAT) to measure users' acceptance of the developed system. The UAT results showed a user acceptance rate of 92.65%, which falls into the strongly agree category. These results indicate that the village profile information system developed has met user needs and can be operated properly.
Keywords: *Information System, Website, Waterfall, Black-Box, User Acceptance Testing (UAT), Rinjani Village*

I. INTRODUCTION

The rapid development of information technology has encouraged village governments to improve administrative services and information transparency. An integrated information system is needed to support data management, public services, and development planning at the village level. Rinjani Village, located in East Luwu Regency, still manages village profile data manually. This condition causes limited

access to information, unstructured data, and difficulties for the community and stakeholders in obtaining accurate and up-to-date information (Hartatik et al., 2024; Sumiartin & Salsabila, 2024).

Manual data management also tends to require more time and is prone to recording errors. Administrative data such as demography, economic potential, development programs, and public services are often stored in separate documents and have not been integrated with one another (Islamia, 2024; Rachmat et al., 2024). As a result, the village government experiences obstacles in presenting accurate information and supporting data-based decision-making. A village profile website can be used as a strategic medium to promote village potential and improve information services (Ischan & Yuliawati, 2020).

A system is a set of interrelated elements that work together to achieve certain outputs. In information systems, data are processed into meaningful information to support decision-making (Efendi et al., 2023; Ridho, 2021). An information system integrates technology, procedures, and human resources to collect, process, store, and distribute information (Sari et al., 2022). Therefore, system development must be carried out systematically and in accordance with user needs (Alfa, 2023).

The Waterfall method is a software development model that uses a systematic and sequential approach, starting from requirements analysis, design, implementation, testing, and maintenance (Ningsih & Nurfauziah, 2023; Pricillia & Zulfachmi, 2021). This method was selected because the system requirements can be defined clearly at the beginning of the development process, so that each stage can be completed before proceeding to the next stage (Dewi et al., 2024). In addition, the use of Laravel and MySQL supports the development of structured and maintainable web-based information systems (Awaluddin et al., 2020; Patni et al., 2021).

Based on this background, the problem formulation of this study is how to design and develop the Rinjani Village Profile Information System, East Luwu Regency, using the Waterfall method. The objective of this study is to design and build a web-based village profile information system that can improve the efficiency, accuracy, and accessibility of village information.

II. METHOD

A. Research Framework

This research was conducted over six months, from March 2025 to August 2025. The research was carried out at the Rinjani Village Office, Wotu District, East Luwu Regency.

B. Materials and Tools

The materials used in this study were administrative data obtained from the Rinjani Village Office, Wotu District, East Luwu Regency. The hardware used included a Lenovo laptop with 16 GB RAM, a printer, and a mouse. The software used included Windows 11, XAMPP, MySQL, Visual Studio Code, Google Chrome, and the Laravel framework.

C. Research Stages

The following preprocessing steps were applied to the review text: (1) case folding to convert all text to lowercase; (2) removal of URLs, mentions, hashtags, and special characters; (3) removal of numbers; (4) tokenization; (5) stopword removal using Indonesian stopword list; and (6) stemming using the Sastrawi stemmer for Indonesian language. Table 2 presents examples of preprocessing results.

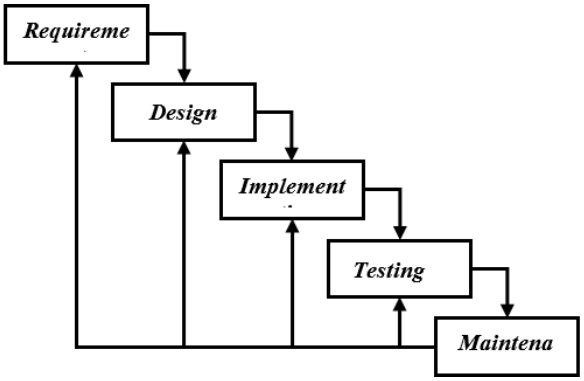


Figure 1. Waterfall Method

The research procedure is presented in Figure 2. The process starts with problem identification, followed by data collection, system design, implementation, system testing, and report preparation

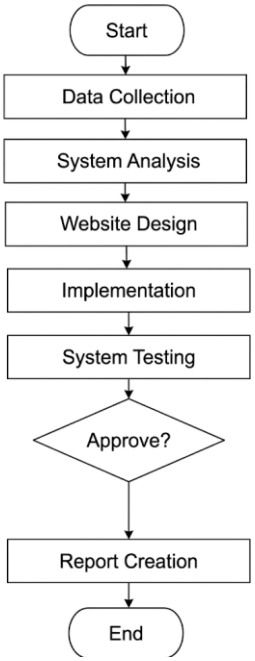


Figure 2. Research Stage Flowchart

III. RESULTS AND DISCUSSION

A. Current System

The current information delivery process in Rinjani Village is still carried out manually. The community must visit the village office directly to obtain information regarding regional data, village potential, government activities, and other public services. This manual system is considered less effective and efficient because it requires time and staff effort to respond to every information request. In addition, limited storage and information distribution media often hinder the community from obtaining accurate and up-to-date data.

B. Proposed System Analysis

Based on the analysis of the current system, a village profile information system is needed to help the Rinjani Village government manage and deliver information more effectively. The proposed system is

intended to simplify the management of village profile data, including regional data, government structure, population data, village potential, development activities, and community services. With this system, information dissemination is expected to be faster, more structured, and easier for the community to access without having to visit the village office directly.

C. Database Design

The database design was created to support data integration between system components. The main entities include user, village profile, government structure, population data, news, gallery, and administrative letters. The relationship among entities is illustrated in the Entity Relationship Diagram (ERD) in Figure 3. The use of UML and ERD helps clarify system requirements and data relationships during the design stage (Aryani et al., 2025).

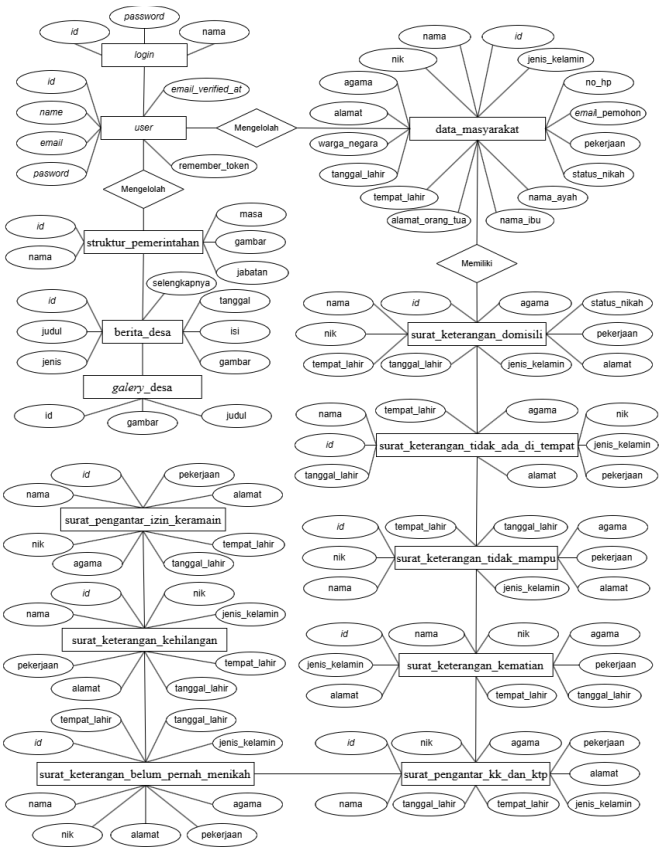


Figure 3. Entity Relationship Diagram (ERD)

D. Interface Implementation

The system interface was developed to provide an easy-to-use experience for users. The home page displays the village profile, vision and mission, and main navigation menus, as shown in Figure 4. The village location map is presented in Figure 5 to help users find the village office. The government structure page is shown in Figure 6.

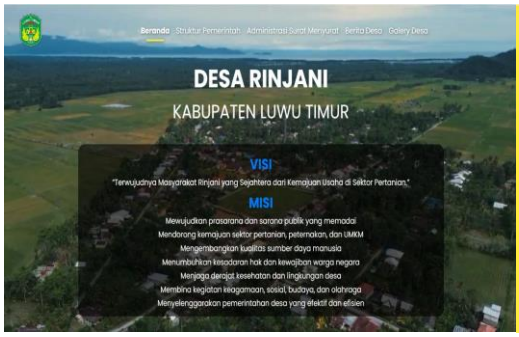


Figure 4. Home Page

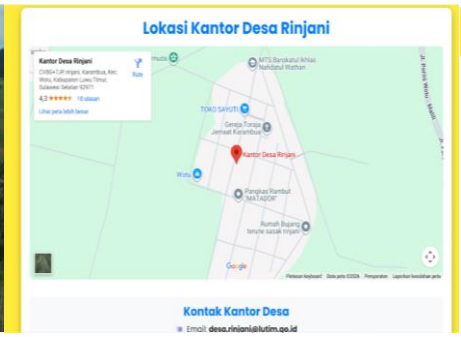


Figure 5. Village Location Map



Figure 6. Government

The mail administration page is presented in Figure 7. Users can select the type of letter and enter their National Identity Number (NIK) as shown in Figure 8. If the NIK is found, the system displays population data and allows the user to submit a letter request, as shown in Figure 9. The village news page and village gallery page are presented in Figures 10 and 11.

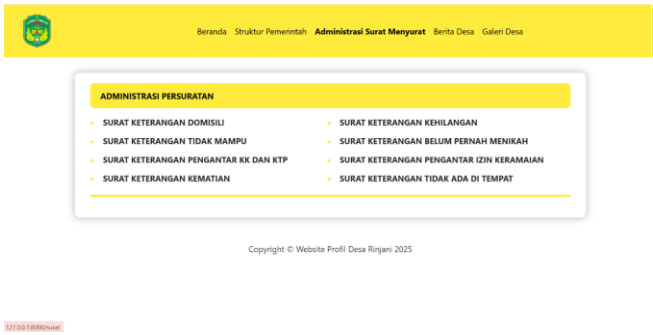


Figure 7. Mail Administration Page

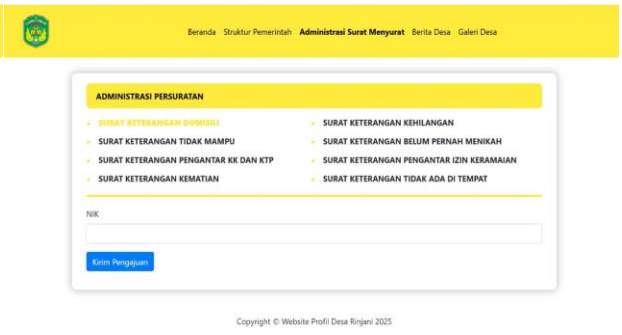


Figure 8. Letter Type and NIK Input Page

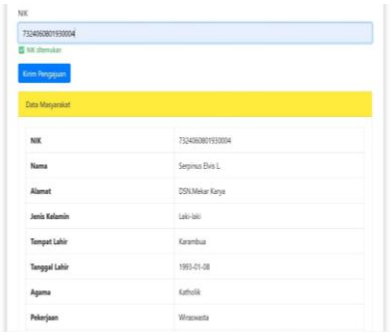


Figure 9. NIK Search Result and Letter Submission

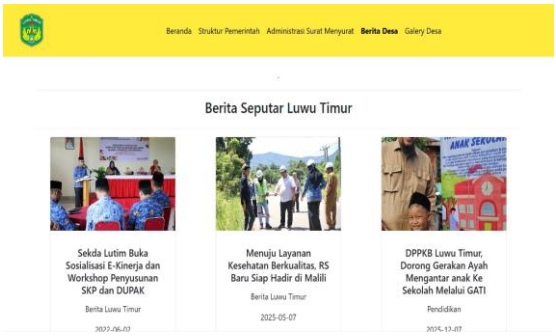


Figure 10. Village News Page

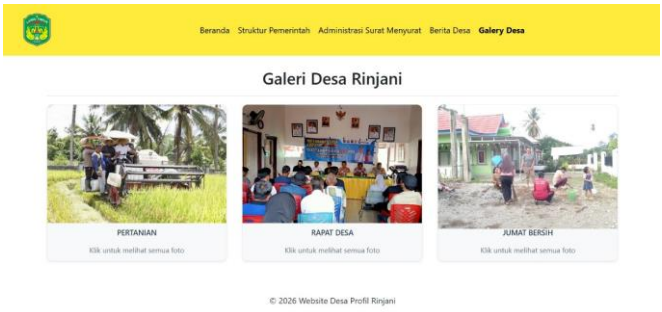


Figure 11. Village Gallery Page

E. Testing and Discussion

Functional testing was conducted using Black Box Testing to ensure that each system function runs according to the requirements. The results showed that the main features, including village profile, government structure, mail administration, news, and gallery, functioned properly. Black Box Testing is suitable for evaluating system functionality from the user's perspective (Ar Rachman et al., 2024).

User acceptance was measured using User Acceptance Testing (UAT). The UAT involved community users and village office staff. The community group obtained a score of 94.1%, while the village office staff group obtained a score of 91.2%. The average score of both groups was 92.65%, which is categorized as strongly agree. The UAT results are presented in Table 1.

Table 1. User Acceptance Testing Results

User Group	Percentage	Category
Community	94.1%	Strongly Agree
Village Office Staff	91.2%	Strongly Agree
Average	92.65%	Strongly Agree

These results indicate that the Rinjani Village Profile Information System can be used well by both community users and village office staff. The system is considered easy to use, useful, and able to support information delivery and administrative services in Rinjani Village.

IV. CONCLUSION

Based on the research results, the web-based Rinjani Village Profile Information System developed using the Laravel framework successfully replaced the previous information management and mail administration processes that were carried out through paper archives. The system includes features for village government structure, mail administration, village news, and village gallery, so that it can improve the speed, accuracy, and efficiency of village data management. The Black Box Testing results showed that all features ran according to system requirements, while the User Acceptance Testing (UAT) result reached 92.65%, indicating that the system is highly feasible, easy to use, and well accepted by users. Therefore, the system makes it easier for the community to access village information and submit letter requests online, thus supporting the improvement of public service quality and village information transparency.

For future development, it is suggested to add more interactive features, such as letter status notifications and service process tracking, to improve service quality. In addition, system security should be strengthened through user access rights management, regular data backup, and data security mechanisms to maintain the confidentiality and integrity of village information. Further development to a mobile platform or integration with other digital services can also be considered so that village services become more flexible and in line with information technology developments.

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