



Web-Based Population Data Information System at Suwaduk Village Office to Improve Service Efficiency

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Abstract

The rapid development of information technology has encouraged government agencies, including village offices, to utilize digital systems to improve the effectiveness of data management. At the village level, population data management is still largely done manually or using Microsoft Excel files, which have various limitations in terms of search speed, data security, and information integration. This study aims to design and build a Web-Based Population Data Collection Information System to assist village governments in recording, processing, and presenting population data more effectively and efficiently. This system was developed using the Waterfall method, which consists of the stages of needs analysis, system design, implementation, testing, and maintenance. The implementation results show that this system is able to overcome various previous problems, increasing efficiency, accuracy, and transparency in population data management. Features such as Excel data import with automatic validation, population data and family card management, data conversion history, and automatic generation of certificates, work as expected. Thus, this system has a positive impact on administrative services and data-based decision-making in Suwaduk Village.

Introduction

The rapid development of information technology has led both government and private agencies to utilize computers as supporting tools to improve data recording and processing systems (Lestari et al., 2018). According to Akpakwu et al. (2017) and Afolabi et al. (2018), the use of technology not only simplifies various tasks but also accelerates access to information and expands communication networks. One of the most widely used forms of technology is the computer, which allows for easier, faster, and more organized data storage, management, and retrieval (Londa et al., 2022).

Antlöv (2003); Riawati (2018); Nurcholis et al. (2019) said that, one of the lowest-level government agencies is the village office, which plays a crucial role in population administration. The village office is responsible for comprehensive population data collection, including data on heads of households (KK), deaths, relocations, and the issuance of various certificates required by the community (Munthali et al., 2018; Kirera, 2023; Koagouw et al., 2021). Accurate and organized data management at the village level is essential for supporting the smooth operation of public services and development planning (Sugianur & Nurcahyanti, 2017).

Currently, population data management at the village level is still carried out in a simple manner, namely by storing data in Microsoft Word or Excel documents on a computer (Turino & Adisusilo, 2024; Rusdiyanto et al., 2023). However, this method is not yet an optimal solution, as officials still experience difficulties in obtaining complete and integrated population information. Furthermore, the use of manual documents often creates problems such as disorganized data accumulation, difficulty in retrieval, and the risk of computer hardware damage, which can lead to the loss of all stored data (Candra & Pardika, 2024; Syofiawan et al., 2024; Telaumbanua et al., 2024).

This research was conducted to design and build a web-based population information system aimed at facilitating village governments in conducting effective and structured population data collection. This system is also designed to simplify the process of filling in community data and creating various certificates such as death certificates, moving certificates, cover letters for ID cards, and various other documents. With this information system, it is hoped that administrative processes and services to the community can be carried out more quickly, accurately, and efficiently (Adeliana & Idifitriani, 2023).

Based on the problems outlined above, an application system is needed that can assist in the effective and integrated management and presentation of population data (Holdsworth, 2003; Fang et al., 2014; Sutter et al., 2015). One potential solution is the development of a Population Data Collection Information System, which aims to support operational population administration activities. This system is expected to accelerate, accurately, and efficiently record, process, and provide services for population administration (Suria et al., 2025; Supriyanto et al., 2021)

Methods

Method of Collecting Data

The first step in system analysis is collecting data. Techniques used to obtain this data include observation and interviews: (1) Observation, the author conducted direct observation at the Suwaduk Village Office located in Wdarijaksa District, Pati Regency. Observations were conducted to observe the population data processing process and identify problems that may arise in the process; (2) Interview, to obtain more detailed and in-depth information, researchers conducted interviews with those directly involved in population data processing. The interviewee was Mr. Eko Purwanto, a staff member and Head of Administration & General Affairs at the Suwaduk Village Office. The purpose of these interviews was to obtain clearer, more detailed, and more comprehensive information regarding the public service process and population data collection, particularly aspects unknown to the researchers through previous observations.

System Development Methods

This system was developed using the waterfall method which consists of five main stages, namely analysis, design, implementation, testing, and maintenance (Hidayati & Sismadi, 2020; Herawati et al., 2021; Sallu et al., 2023). The selection of this method was carried out to ensure that each phase in system development can be carried out in a structured manner, starting from needs analysis to maintenance.

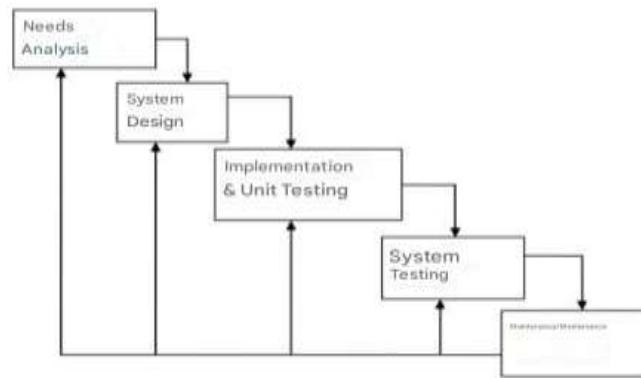


Figure 1. Waterfall Method

Needs Analysis

In the needs analysis stage, the author works with government agencies to understand the application needs in depth (Wright & Geroy, 1992). This process involves identifying the purpose of the application and understanding the problems to be solved. The author will conduct interviews with related parties, collect information, and analyze specific needs. The results of this analysis will be used as a basis for designing an application that meets user expectations.

System Design

In the design phase, the author will design in detail all parts of the application to be built. This includes the appearance of the user interface, database, and application workflow (Horsky et al., 2012). The goal is to create a structured framework for application development. The author will plan the application components in detail, design an easy-to-use user interface, and create an efficient database structure. The design phase also considers aspects of security, scalability, and application performance. The results of this design phase will be used as a guide for the next implementation phase.

Implementation

Align with research from Singh et al. (2007) and Lano & Kolahdouz-Rahimi (2014), In the implementation phase, the author will transform the application design into a real form. This involves writing program code, developing application features, integrating components, and testing. The author will use the PHP programming language in accordance with established development standards. This process includes programming, database integration, and testing to fix bugs or errors.

System Testing

In the testing phase, the author will undergo a series of trials to check the performance of the application built, ensure compliance with the requirements that have been set, and detect and fix bugs or errors that may occur. This testing aims to ensure that the application is of high quality, stable, and ready to be launched to users with optimal performance according to their expectations.

Maintenance

In the maintenance phase, the author will continuously monitor and improve the application after it is launched. The purpose of this phase is to maintain the performance and reliability of the application, as well as provide support to users in terms of troubleshooting and feature enhancements. The author will respond to user feedback, identify and fix bugs or errors that

arise, and make updates and improvements as needed. In addition, the author will also monitor the performance of the application, and optimize the application to stay in line with the latest technological developments. This maintenance phase is an important step in keeping the application running well and providing a satisfying experience for users.

System Design

Use Case Diagram



Figure 2. Use Case Diagram

The Use Case Diagram below is a visual representation of user interaction with the web-based population data information system at the Suwaduk Village Office. This diagram serves to illustrate the various features or services that can be accessed by system users, in this case village officials or administrators. Through this diagram, it can be seen that users have access to several main system functions, such as viewing the dashboard as the main page, managing data import to enter population data automatically, and managing population data and family card data. In addition, users can also manage special data such as death data, relocation data, and certificates. This system also provides features for managing report data and data conversion history. This diagram is important as a reference for understanding user needs, system flow, and facilitating the communication process between system developers and users so that the system is built according to the needs and objectives, namely to improve service efficiency at the Suwaduk Village Office (Arham, 2024; Sidiq et al., 2025).

Results and Discussion

System Implementation

Dashboard Page

On this page, several cards are displayed, such as the number of Population Data, the number of Family Cards, the number of Women and the number of Men, which are taken from the

population data that has been converted and entered into the Population page and the Family page.

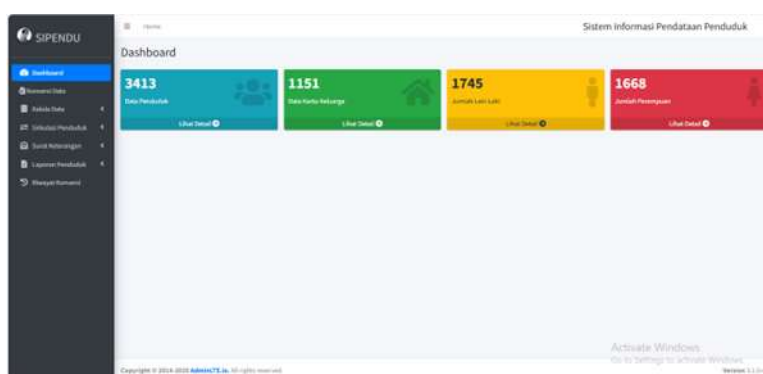


Figure 3. Dashboard Page

Data Conversion Page

On this page, users can access the data conversion page through the application sidebar. On the data import page, users will be asked to upload an Excel file that already contains data according to the specified format. The required Excel column structure includes `no_kk`, `full_name`, `gender`, `place_of_birth`, `date_of_birth`, `religion`, `education`, `marital_status`, `family_relationship`, `occupation`, `head_of_family`, `address`, `rt`, `rw`, `sub-district`, `district`, `province`, `village`, `postal_code`, `citizenship`, `father_name`, `mother_name`. After clicking import, the data is now automatically entered into population data and family data.

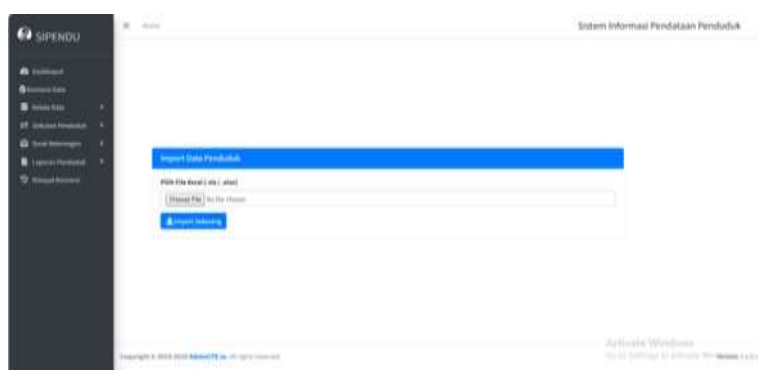


Figure 4. Data Conversion Page

Manage Data Page

Population Data Page

On this page displays all data that has been successfully imported from the data conversion page. On this page users can add data, search data, edit data, delete data one by one and can delete data completely

No	Nama	No. KK	Umur	Alamat	Tanggal Lahir	Jenis Kelamin	ST	RT	RW	Agama	Rasio	Status	Pekerjaan	Pendidikan	Penghasilan	Nama Ayah	Nama Ibu	Tanggal Kelahiran
1
2
3
4
5
6
7
8
9
10

Figure 5. Population Data Page

Population Data Addition Page

This page is the Add Population Data form for the web-based Population Data Information System. Users can fill in complete population data, such as their National Identity Number (NIK), name, address, education, occupation, family relationships, and parents' identities. Once completed, the data can be directly saved to the system by pressing the Save button.

Figure 6. Add Population Data Page

Family Page

The Family Card Data page displays a list of Family Cards (KK) along with complete information such as the head of the family's name, address, and region. Users can easily search, view details, edit, and delete data.

No	No. KK	Nama Kepala Keluarga	Alamat	RT	RW	Desa	Kecamatan	Kabupaten	Provinsi	Aksi
1	3118201040001	SURYANI	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
2	3118201070001	YANTON AFUANTO	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
3	3118201110011	SUPNADI	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
4	3118201110001	SURALI	Jl. Mantaran No 2	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
5	31182020110001	WISAN EKA YUNAR	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
6	3118202100001	HADI SUGILO	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
7	3118202100010	SUNARPO	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
8	3118202100011	LEURAN	Jl. Mantaran No 2	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
9	31182030111011	KANGSI	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]
10	3118203000010	PKDI	Jl. Mantaran No 1	1	1	sewaduk	wedijahsa	pati	jawa tengah	[View] [Edit] [Delete]

Figure 7. Family Data Page

Family Detail Page

This page displays complete family information, such as the head of the family's name, address, and region. It also displays a list of family members along with detailed personal data such as their National Identification Number (NIK), name, gender, place of birth, date of birth, religion, education, and occupation. Users can also view additional data such as marital status, family relationships, citizenship, father's and mother's names.

The screenshot shows the 'KARTU KELUARGA' (Family Card) page. It displays the following information:

- Family Head Information:**
 - Nama Kepala Keluarga: SUKAWATI
 - Alamat: Jl. Mekarani No. 1
 - RT / RW: 1 / 1
 - Desa / Kelurahan: Cakrabala
 - Kecamatan: Westeljana
 - Kabupaten / Kota: pati
 - Provinsi: Jawa Tengah
 - Kode Pos: 59132
- Data Anggota Keluarga (Bagian 1):**

Nama	NIK	Jenis Kelamin	Tempat Lahir	Tanggal Lahir	Agama	Pendidikan	Pekerjaan
SUKAWATI	531815412000001	Pemangsaan	PATI	04.10.1965	Islam	TIDAK/SELESAI SEKOLAH	Karyawan Swasta
DAD NAWYUDI	5318130812000001	Laki-Laki	PATI	08.12.1985	Islam	TAMAT SD/SEDERAJAT	Wiraswasta
- Data Anggota Keluarga (Bagian 2):**

Status Perkawinan	Hubungan Keluarga	Kewarganegaraan	Nama Ayah	Nama Ibu
Cara Hidup	Kepala Keluarga	WNI	SUKADAR	RUSMI
Belum Kawin	Anak	WNI	MALFOND	SUKAWATI

Figure 8. Family Detail Page

Family Edit Page

Displays the family and family member data edit page, where users can update information such as address, area, and details of each family member easily through the available form.

The screenshot shows the 'Edit Data Keluarga' (Edit Family Data) page. It contains the following input fields:

- Family Head Information:**
 - No KK: 531815412000001
 - Alamat: Jl. Mekarani No. 1
 - Kecamatan: Westeljana
 - Kode Pos: 59132
 - Provinsi: Jawa Tengah
 - Desa: Cakrabala
 - RT: 1
 - RW: 1
 - Nama Kepala Keluarga: SUKAWATI
 - Kabupaten: pati
- Edit Anggota Keluarga:**
 - Nama: SUKAWATI
 - NIK: 531815412000001
 - Jenis Kelamin: Pemangsaan
 - Tempat Lahir: PATI
 - Tanggal Lahir: 04/10/1965
 - Agama: Islam
 - Pendidikan: TIDAK/SELESAI SEKOLAH
 - Pekerjaan: Karyawan Swasta
 - Status Perkawinan: Cara Hidup
 - Hubungan Keluarga: Kepala Keluarga
 - Kewarganegaraan: WNI
 - Nama Ayah: SUKADAR
 - Nama Ibu: RUSMI

Figure 9. Edit Family Data Page

Population Circulation Page

Moved Data Page

Through this page, users can view a list of residents who have moved and can add new resident moving data using the Add Moving Data button.

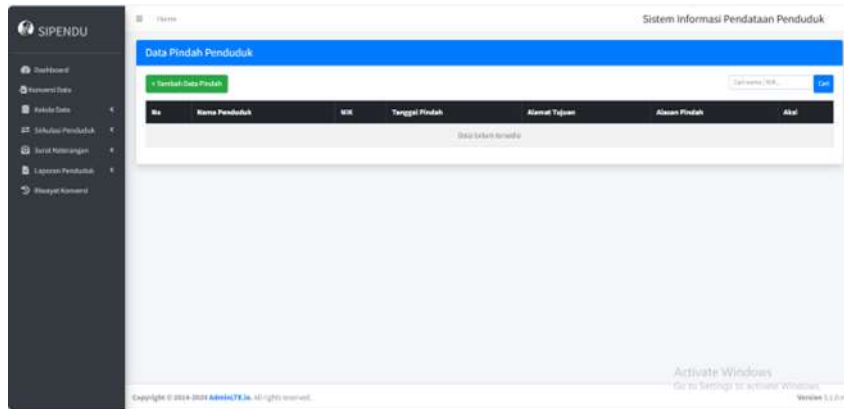


Figure 10. Data Page Moved

Add Data Move Page

Through this page, users can input data on residents who have moved domicile by filling in information such as the resident's name, date of moving, destination address, and reason for moving, then saving it into the system.



Figure 11. Add Data Move Page

Death Data Page

On this page, users can view, search, and manage deceased residents' data, such as name, NIK (National Identity Number), KK (Family Card) number, address, neighborhood association (RT/RW), date of death, and cause of death. There are also buttons for adding new data or editing and deleting data.



Figure 12. Death Data Page

Add Death Data Page

On this page, users can add data about deceased residents by selecting their name, entering the date of death, and listing the cause of death. Once the data is complete, users can save it to the system.

Figure 13. Add Death Data Page

Letter of Reference Page

Death Certificate Page

On this page, users can view a list of deceased residents' data, complete with name, National Identification Number (NIK), date of death, and address. There's also a "Print Letter" button that can be used to print a death certificate based on the available data.

No	Nama	NIK	Tanggal Meninggal	Alamat	Aksi
1	SUJARI	31815711250002	24-06-2025	Jl. Mentaram No 1	Cetak Surat

Figure 14. Death Certificate Page

Death Certificate Print Page

This letter contains complete data on the deceased resident, such as name, National Identification Number (NIK), Family Card (KK) number, address, and date and cause of death. This feature makes it easier for village officials to automatically and neatly print official letters according to the village's administrative format.

Figure 15. Death Certificate Print Page

Certificate of Domicile Page

This page displays a complete list of residents, including names, National Identification Numbers (NIK), and addresses, and provides a Print Letter button for each item. This feature makes it easier for village officials to quickly and accurately issue domicile certificates for administrative purposes.

No	Nama	NIK	Alamat	Aksi
1	ANAN SURABHARU PUTRI (2015)	310401120700000	Jl. Mekarjaya No. 1	Print Letter
2	ANAN PRASANTO	310401121200000	Jl. Mekarjaya No. 1	Print Letter
3	ANAN SURABHARU (2015)	310401120400000	Jl. Mekarjaya No. 1	Print Letter
4	ANAS DARUL ANAM	310401120470000	Jl. Mekarjaya No. 1	Print Letter
5	ANIS RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
6	ARBAH SALAM ALAM SURAH	310401120412000	Jl. Mekarjaya No. 1	Print Letter
7	ARJUN MUHAMMAD	310401120700000	Jl. Mekarjaya No. 1	Print Letter
8	ARJUN RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
9	ARJUN RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
10	ARJUN RIZKI	310401121100000	Jl. Mekarjaya No. 1	Print Letter

Figure 16. Domicile Certificate Page

Domicile Letter Print Page

This letter contains complete information regarding the resident's identity, such as name, National Identification Number (NIK), place and date of birth, complete address, and the purpose of the letter. There's also a Print button that allows village officials to print the letter officially for administrative purposes.



Figure 17. Certificate of Domicile

Certificate of Inability to Pay Page

This page displays a list of residents who have requested a certificate, complete with their name, National Identification Number (NIK), and address. A Print Letter button is available on each row, allowing the administrator to directly print the letter based on the recorded data.

No	Nama	NIK	Alamat	Aksi
1	SURABHARU PUTRI (2015)	310401120700000	Jl. Mekarjaya No. 1	Print Letter
2	ANAN PRASANTO	310401121200000	Jl. Mekarjaya No. 1	Print Letter
3	ANAN SURABHARU (2015)	310401120400000	Jl. Mekarjaya No. 1	Print Letter
4	ANAS DARUL ANAM	310401120470000	Jl. Mekarjaya No. 1	Print Letter
5	ANIS RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
6	ARBAH SALAM ALAM SURAH	310401120412000	Jl. Mekarjaya No. 1	Print Letter
7	ARJUN MUHAMMAD	310401120700000	Jl. Mekarjaya No. 1	Print Letter
8	ARJUN RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
9	ARJUN RIZKI	310401120700000	Jl. Mekarjaya No. 1	Print Letter
10	ARJUN RIZKI	310401121100000	Jl. Mekarjaya No. 1	Print Letter

Figure 18. Page of Certificate of Inability to Pay

Print Page of Certificate of Inability to Pay

This page of the letter contains the applicant's complete data, including name, National Identification Number (NIK), place and date of birth, and address. The letter is signed by the Village Head and can be printed directly for administrative purposes or to apply for assistance.



Figure 19. Certificate of Inability to Pay

KTP Introduction Letter Page

The list of KTP (ID Card) Cover Letters in the population data collection system. Each row contains the resident's name, NIK (National Identity Number), and address, as well as a Print Letter button that allows village officials to print the cover letter directly for population administration purposes.

No	Nama	NIK	Alamat	Aksi
1	SUNANDA	311210411000003	J. Menturum No. 1	Print Letter
2	RIZKYANILDA	311210012000003	J. Menturum No. 1	Print Letter
3	WANTONAFIANTO	311210012000003	J. Menturum No. 1	Print Letter
4	SUDIRNADARI	311210403000003	J. Menturum No. 1	Print Letter
5	HABIBUZZAMAN	311210001000003	J. Menturum No. 1	Print Letter
6	SHED HAFIL YUSWITO	311210405000003	J. Menturum No. 1	Print Letter
7	SUPARI	311210007000003	J. Menturum No. 1	Print Letter
8	ALBANTO	311210007000003	J. Menturum No. 1	Print Letter
9	IMP. MENDIYANTO	311210007000003	J. Menturum No. 1	Print Letter
10	WIKSI A. SALWA ABILA YEMAH	311210404000003	J. Menturum No. 1	Print Letter

Figure 20. KTP Introduction Letter Page

Certificate of Loss

This page displays a list of residents along with their names, NIK, and addresses, and provides a Print Letter button to print a lost certificate directly, facilitating the administrative process at the village office.

No	Nama	NIK	Alamat	Aksi
1	SURABDI	3111111111111111	Jl. Merdeka No. 1	Cetak Surat
2	ERIK WIRYONO	3111111111111111	Jl. Merdeka No. 2	Cetak Surat
3	YANTON ANUGRAH	3111111111111111	Jl. Merdeka No. 3	Cetak Surat
4	SUDHARMO	3111111111111111	Jl. Merdeka No. 4	Cetak Surat
5	WALDI SUPRIANINGRAH	3111111111111111	Jl. Merdeka No. 5	Cetak Surat
6	WALDI RAHMAN YOGAARTI	3111111111111111	Jl. Merdeka No. 6	Cetak Surat
7	SUPRIEN	3111111111111111	Jl. Merdeka No. 7	Cetak Surat
8	SURABDI	3111111111111111	Jl. Merdeka No. 8	Cetak Surat
9	WALDI RAHMAN YOGAARTI	3111111111111111	Jl. Merdeka No. 9	Cetak Surat
10	WALDI RAHMAN YOGAARTI	3111111111111111	Jl. Merdeka No. 10	Cetak Surat

Figure 21. Lost Letter Page

Lost Letter Form

Displays the Lost Certificate input form on the system, where the user can fill in the name of the lost item and then print the certificate by pressing the Print Certificate button.

Figure 22. Lost Letter Form

Lost Certificate Page

Displays a printed version of the Lost Certificate, which contains resident identification information and a description of the lost item. This certificate is issued by the Suwaduk Village Head and is used as an official document for administrative purposes related to lost reports.



Figure 23. Certificate of Loss

Income Statement Page

The Income Statement page contains a list of residents with their name, National Identification Number (NIK), address, and an action button to print the letter. This page allows users to easily print income statements for each registered resident.

No	Nama	NIK	Absahat	Amt
1	AMM KURNIAHATI SU, MARYO	311811120709004	J. Penghasilan No. 1	Print Surat
2	AMM PERWATI	311811121000001	J. Penghasilan No. 1	Print Surat
3	AMM BIRUVAHATO	311811120200002	J. Penghasilan No. 1	Print Surat
4	AMM DIBUL ARIAH	311811104170004	J. Penghasilan No. 1	Print Surat
5	AMM SITI	311811200140001	J. Penghasilan No. 1	Print Surat
6	AMM SALAH ULIN RUMAH	311811101120001	J. Penghasilan No. 1	Print Surat
7	AMM MARDIANAWATI	311811070120001	J. Penghasilan No. 1	Print Surat
8	AMM SUFI	311811210170004	J. Penghasilan No. 1	Print Surat
9	AMM AZIS	311811020100002	J. Penghasilan No. 1	Print Surat
10	AMM GHOFLAR	311811111000001	J. Penghasilan No. 1	Print Surat

Figure 24. Income Statement Page

Income Information Form Page

The Income Statement form displays, where users can enter their income and the purpose of the letter. Once entered, users can print the letter by clicking the Print Letter button.

Figure 25. Income Information Form

Income Statement Page

Displays a printed version of the Income Statement Letter, which contains the resident's identity, income amount, and the purpose of the letter. This letter is ready to be printed and used for administrative purposes according to the needs of Suwaduk Village residents.



Figure 26. Income Statement

Report Page

School Age Children Page

Displays a report on school-age children's data, including their National Identification Number (NIK), full name, and age. This report is useful for village officials to determine the number and age distribution of children within the school-age range.

Hasil Laporan: Anak usia sekolah			
No	NIK	Nama Lengkap	Usia
1	3118158001130001	MAIDA SYIFA SAYYAMA	10 Tahun
2	3118152405090002	BATID NAJFAL YUHANITO	16 Tahun
3	3118151711120002	MUHAMMAD YUSUF AL YAMASAH	12 Tahun
4	3118151207130001	KHORUL HUDA	13 Tahun
5	3118155201090001	JENY SOFIATUN NAJWA	17 Tahun
6	3118157004130001	RISWATURROHM	12 Tahun
7	3118151000140001	GANEVORA PRAMAYOGA	11 Tahun
8	3118159904090001	SANAKHTA TANAYA	16 Tahun
9	3118150210070003	DIKO RIYADH RAMADHAN	17 Tahun
10	3118150303110001	YASIN AL FARUQ SONAWA PUTRA	14 Tahun
11	3118156112100001	ZALFA REGHIBA FADYAWATI	14 Tahun
12	3118157004110001	HANIFA MELINDA	14 Tahun
13	3118155312070001	ANDHA RAMHAWATI	17 Tahun

Figure 27. School Age Children Page

Report Page Per Education

This report presents population data based on education level in Suwaduk Village. The information presented includes education levels ranging from no education to higher education, along with the number of residents in each category, totaling 3,413. This report is useful for supporting education program planning and community empowerment.

Hasil Laporan: Pendidikan	
Pendidikan	Jumlah
KKADHI DIPLOMA B.E. WUJDI	7
DIPLOMA 09	6
DIPLOMA 01/STMP/01	79
M.TERUSBERKAS	407
M.TERUSBERKAS	440
STRADA 6	5
TAMAT SD/SEDEKAT	1149
TAMAT SMP/SEDEKAT	711
TAMAT VEJLJH SENGKAP	958
Total Data:	3413

Figure 28. Report Page Per Education

Report Pages Per Age Category

Displays population data reports based on age categories in Suwaduk Village. The population is classified into three groups: 1,507 elderly (>45 years old), 1,489 adults (19–45 years old), and 417 children (6–18 years old), totaling 3,413.

Hasil Laporan: Usia	
Kategori Usia	Jumlah
Lansia (>45)	1307
Dewasa (19-45)	1489
Anak (0-18)	417
Total Data:	3413

Figure 29. Report Page Per Age Category

Conversion History Page

Displays a population data conversion history, showing a list of Excel files that have been successfully imported into the system. Each row lists the file name, the number of successfully imported data points, and the import time. The total number of imported data points to date is 17,065, providing clear and measurable information about the conversion activity that has occurred in the system.

Riwayat Konversi Data			
No	Nama File	Jumlah Data	Waktu Import
1.	d_data_penduduk skripsi.xlsx	0	2025-06-24 01:16:45
2.	1750702648_data_penduduk skripsi.xlsx	3413	2025-06-23 18:18:09
3.	1750697903_data_penduduk skripsi.xlsx	3413	2025-06-23 16:59:33
4.	d_data_penduduk skripsi.xlsx	3413	2025-06-23 09:32:49
5.	d_data_penduduk skripsi.xlsx	3413	2025-06-23 01:28:07
6.	d_data_penduduk skripsi.xlsx	3413	2025-06-21 16:52:55
Total Data Terimport:		17065	

Figure 30. Conversion History Page

System Testing

Table 1. Black Box Testing

No	System Testing	Results	Status
1.	Dashboard	The system successfully displays several cards from the population data collection.	Succeed
2.	Data Conversion	The system successfully imported the Excel data and saved the data in the database and then displayed the data on the population data and family data pages.	Succeed
3.	Population Data Page	The system successfully displays the Excel data that was successfully imported.	Succeed
4.	Add Population Data	The system successfully added population data	Succeed
5.	Edit Population Data	The system successfully edited the population data	Succeed
6.	Delete Resident Data	The system successfully deleted data in its entirety or individual resident data.	Succeed

7.	Family Data Page	The system successfully displays family data per head of family	Succeed
8.	Family Details Page	The system successfully displays all family members.	Succeed
9.	Family Edit Page	The system successfully edited the family data.	Succeed
10.	Delete Family Data	The system successfully deleted the family data.	Succeed
11.	Data Move	The system successfully displays and searches for data on residents who have moved.	Succeed
12.	Add Move Data	The system successfully added data by selecting the resident, entering the date of moving, destination address, and reason for moving.	Succeed
13.	Delete Move Data	The system successfully deleted the moved data.	Succeed
14.	Death Data Page	The system successfully displays death data and can search for death data.	Succeed
15.	Add Death Data	The system successfully added data by selecting population data, entering the date of death, and cause of death.	Succeed
16.	Delete Deceased Data	The system successfully deleted data on deceased data.	Succeed
17.	Deceased Suket Page	The system successfully displays data on deceased residents along with buttons for searching data and printing letters.	Succeed
18.	Print Death Certificate Button	The system successfully displays the death certificate and is ready to print.	Succeed
19.	Domicile Certificate Page	The system successfully displays population data along with buttons to check letters and search for data.	Succeed
20.	Print Domicile Letter Button	The system successfully displays the domicile certificate and is ready to print.	Succeed
21.	Certificate of Inability to Pay page	The system successfully displays population data along with a print letter button and a data search column.	Succeed
22.	Print Letter Button Not Working	The system successfully displays a certificate of inability and is ready to print.	Succeed
23.	KTP Issuance Certificate Page	The system successfully displays the population data page along with the print letter button and the data search button.	Succeed
24.	Print KTP Application Letter Button	The system successfully displays the KTP issuance certificate	Succeed
25.	Loss Certificate Page	The system successfully displays the population data page along with the print letter button and the data search button.	Succeed
26.	Print Loss Letter button	The system successfully displays the lost letter form by entering the name of the lost item.	Succeed
27.	Missing Print Button	The system successfully displays the lost certificate	Succeed

28.	Income Statement Letter Page	The system successfully displays the population data page on the income certificate with the print letter and data search buttons.	Succeed
29.	Print Income Letter button	The system successfully displays the income statement form by entering the amount of income and requirements.	Succeed
30.	Print Income Letter	The system successfully displays the income statement	Succeed
31.	Education Report Page	The system successfully displays education data from all population data.	Succeed
32.	Age Category Report Page	The system successfully displays the age category of the complete population data along with the number of residents.	Succeed
33.	School Age Children Report Page	The system successfully displays data on school-age children.	Succeed
34.	Conversion History Page	The system successfully displays conversion history data from data import.	Succeed

Black Box Testing is known as behavior-based testing, where the internal structure and logic of the software being tested are unknown to the tester. This testing is conducted purely based on system requirements specifications without the need to analyze program code. Black Box Testing is conducted from the end-user's perspective to ensure the system functions as expected. There are several types of testing in the Black Box Testing method, including: equivalent partitioning, boundary value analysis, cause-effect graphing, orthogonal array testing, state transition testing, and fuzzing. The Black Box Testing method has advantages and disadvantages. One advantage is that it can help identify discrepancies between the system and predetermined requirements specifications (Leveson et al., 1994; Alshazly 2014; Ramesh & Jarke, 2002). However, its disadvantage is that testing cannot be carried out comprehensively due to the tester's limited knowledge of the internal details of the software being tested (Praniffa et al., 2023).

Conclusion

Based on the research results and system implementation, it can be concluded that the development of the Web-Based Population Data Information System at the Suwaduk Village Office was successful and provided a solution to previously encountered problems. This system has proven to improve the effectiveness, accuracy, and ease of population data management, which was previously carried out manually or using separate Excel files. With this system, the process of recording, searching, and processing data has become more systematic, efficient, and easily accessible for village officials. Features such as importing data from Excel files with automatic validation, a Data Conversion History feature, managing population data and family cards, and automatically generating various types of certificates such as Domicile Certificates, Poverty Certificates, KTP Cover Letters, Loss Certificates, Income Certificates, and Death Certificates have all performed as expected. Furthermore, the system also provides a population reporting feature that facilitates village officials in obtaining statistical data such as population numbers by age, education, occupation, and marital status. Thus, the implementation of this system has a positive impact in the form of increased efficiency, accuracy, and transparency in the population administration service process in Suwaduk Village, as well as making it easier for village officials in the decision-making process based on accurate and reliable data.

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