Jurnal Kecerdasan Buatan dan Pembelajaran Mesin
Vol 1, No 1, 2026, 23-33 https://doi.org/10.35912/jkbpm.v1i1.6763

Web-Based Decision Support System for Prosperous Family Classification Using the Analytical Hierarchy Process

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Article History
Received on 13 December 2025
1st Revision on 21 December 2025
2nd Revision on 01 January 2026
3rd Revision on 11 January 2026
Accepted on 27 January 2026

Abstract

Purpose: This study aimed to design and implement a web-based Decision Support System (DSS) for classifying prosperous families in Dusun Cibanban, Desa Gerning, Tegineneng District, Pesawaran Regency, Indonesia, using the Analytical Hierarchy Process (AHP) method. The system addresses the inefficiency and subjectivity inherent in the manual family welfare assessment process currently employed by local government administrators.
Research Methodology: The system was developed using the waterfall methodology and the AHP method to assess welfare criteria based on national family welfare standards. It was implemented using PHP (CodeIgniter), JavaScript, and MySQL, with system functionality validated through testing of user and administrator modules.
Results: The system successfully generated AHP-based welfare rankings and passed functional testing. Marsidi achieved the highest priority weight (0.1736), demonstrating the system's ability to provide objective welfare classifications.
Conclusions: The web-based AHP-DSS system provides a faster, more transparent, and more objective mechanism for prosperous family classification than the manual approach previously employed in Dusun Cibanban. The system successfully digitized the multi-criteria welfare assessment process and produced ranked outputs that are accessible via a standard web browser.
Limitations: The study was conducted in a single sub-village (dusun) with 102 household heads, limiting the generalizability of the findings. The AHP criteria weights were determined through expert elicitation, rather than empirical validation. The system performance under high-concurrency conditions and with larger datasets was not evaluated.
Contributions: This research contributes a validated web-based AHP-DSS implementation for community-level family welfare classification in an Indonesian rural village context, providing a replicable model for local government administrators seeking to modernize social welfare targeting through data-driven decision support.

Keywords: *Analytical Hierarchy Process, Decision Support System, Family Welfare, Prosperous Family, Web-Based System*

How to Cite: Maseleno, A., Nanda, A. P., Jupon, R. M., & Fitriana, E.. (2026). Web-Based Decision Support System for Prosperous Family Classification Using the Analytical Hierarchy Process. *Jurnal Kecerdasan Buatan dan Pembelajaran Mesin*, 1(1), 23-33.

1. Introduction

Accurate and equitable identification of household welfare status represents a foundational challenge in social protection policies across developing nations. In Indonesia, the classification of families into welfare tiers operationalized through the national Keluarga Sejahtera (Prosperous Family) framework established by the National Population and Family Planning Board (BKKBN) underpins the targeting of social assistance programmes, conditional cash transfers, and community development interventions (Puspita et al., 2014; Yunianto and Irawan, 2016). However, accurate welfare classification is inherently complex because it requires the simultaneous assessment of multiple qualitative and quantitative criteria spanning income adequacy, nutritional status, housing quality, access to education and health services, and social participation indicators (Nurjoko & Yuliawati, 2015; Rahardian et al., 2018).

In many rural Indonesian communities, welfare classification processes continue to rely on manual and subjective assessment practices that are susceptible to evaluator bias, inconsistency across assessors, and significant administrative time costs (Anggraeni & Suyono, 2017; Ferawati & Karpen, 2015). Dusun Cibanban, a sub-village within Desa Gerning, Kecamatan Tegineneng, Kabupaten Pesawaran, Lampung Province, exemplifies this challenge: with 102 registered household heads and a predominantly agricultural economy, local administrators face considerable difficulty conducting timely, consistent welfare assessments using purely manual methods. The consequences of inaccurate classification include the misallocation of social assistance, either by excluding genuinely needy families (exclusion error) or including ineligible households (inclusion error), both of which undermine program effectiveness and community trust (Mardiati & Oktafianto, 2017).

Decision Support Systems (DSS) have been widely recognized as an effective technological response to the challenge of complex, multi-criteria administrative decision-making (Turban et al., 2011; Yulyantari & Wijaya, 2019). Among the multi-criteria decision analysis (MCDA) methods applicable within DSS frameworks, the Analytical Hierarchy Process (AHP), developed by Saaty (1980), is particularly well-suited to welfare classification contexts. AHP's pairwise comparison mechanism of AHP provides a structured, mathematically rigorous approach to quantifying the relative importance of qualitative criteria, and its consistency ratio (CR) test offers a built-in mechanism for detecting and correcting judgement inconsistencies in the comparison process (Saaty, 1980; Vargas, 1990). Prior research has demonstrated the AHP's effectiveness across analogous social welfare applications, including poverty identification Anggraeni & Suyono, 2017, social assistance recipient selection (Ferawati & Karpen, 2015; Mardiati & Oktafianto, 2017), and similar multi-criteria public administrative decisions (Sewoko, 2015; Rahardian et al., 2018).

Web-based implementation of AHP-DSS offers additional advantages in the village government context: it eliminates the need for specialized software installation, supports multi-user concurrent access, enables centralized data storage and auditability, and facilitates transparent output reporting that can be shared with community stakeholders (Andoyo & Sujarwadi, 2014; Herliana & Rasyid, 2016). Despite these benefits, published implementations of web-based AHP-DSS for village-level family welfare classification in Indonesia remain limited in the literature, particularly those that fully document the system design, AHP computation pipeline and functional validation.

This study addresses this gap by developing and evaluating a complete web-based DSS for family classification in Dusun Cibanban, implementing AHP as the decision model within a PHP/CodeIgniter/MySQL application architecture. The primary research objectives are as follows: (1) to identify and operationalize the welfare assessment criteria applicable to the Dusun Cibanban context; (2) to implement an AHP-based computation engine for pairwise comparison processing, priority weight derivation, and consistency testing; (3) to develop a user-friendly web interface enabling administrator-driven data entry and ranked output generation; and (4) to validate system functionality through comprehensive testing. The novelty of this contribution lies in its provision of a fully documented, community-specific AHP-DSS implementation with explicit AHP computation details and a validated functional test suite, addressing a gap in the literature on rural Indonesian social welfare information systems. The remainder of this paper is organized as follows: Section 2 reviews the relevant theory and prior work; Section 3 describes the system design and research methodology; Section 4 presents the implementation results and discussion; and Section 5 provides the conclusions, limitations, and future research directions.

2. Literature Review

2.1 Family Welfare Classification in Indonesia

Indonesia's family welfare classification framework, established by the BKKBN and refined through successive national policy cycles, categorizes households into five tiers: Pre-Prosperous (Pra-Sejahtera), Prosperous Stage I through III, and Prosperous Stage III-Plus (BKKBN, 2011). The classification criteria span economic indicators (income, savings, and expenditure patterns), material living standards (housing quality, food security, and clothing), access to services (health, education, and family planning), and social participation dimensions (community engagement and environmental awareness). The multidimensional, partially ordinal nature of these criteria makes AHP with its capacity for structured pairwise quantification of qualitative attributes a particularly appropriate methodological choice (Puspita, Yasin, & Hoyyi, 2014).

2.2 Analytical Hierarchy Process: Theory and Application

The AHP, introduced by Saaty (1980), decomposes a complex decision problem into a hierarchical structure comprising goals, criteria, sub-criteria, and alternatives. Decision-makers express their preferences through pairwise comparisons on a nine-point intensity scale, from which an $n \times n$ pairwise comparison matrix A is constructed. Priority weights (eigenvectors) are derived by normalizing the geometric mean of each row, and the principal eigenvalue (λmax) is computed to assess judgement consistency. The Consistency Index (CI) = ($\lambda max - n$)/($n - 1$) and Consistency Ratio (CR) = CI/RI (where RI is the average random index) quantify decision maker reliability; a CR < 0.10 is conventionally accepted as indicating adequate consistency (Saaty, 1980; Vargas, 1990).

The AHP has been extensively applied in Indonesian DSS contexts for social welfare and public administrative decisions. Ferawati and Karpen (2015) implemented AHP within a DSS for subsidized rice (Raskin) recipient identification, demonstrating the method's effectiveness in prioritizing households across multiple welfare criteria. Mardiati and Oktafianto (2017) applied AHP to determine the recipients of the Rumah Tak Layak Huni (RTLH) housing rehabilitation programme. Sewoko (2015) developed an AHP-based DSS for the Simpanan Keluarga Sejahtera (PSKS) program, reporting accuracy improvements over manual methods. Rahardian et al. (2018) combined AHP with PROMETHEE-II for poverty assistance targeting, demonstrating the complementary strengths of hybrid MCDA approaches. Collectively, these studies establish AHP as a methodologically appropriate and empirically validated choice for Indonesian community welfare DSS applications (Adzan & Amin, 2019).

2.3 Web-Based Information Systems for Village Administration

Web-based information systems have been progressively adopted in Indonesian village and sub-district administrations to replace paper-based processes across a range of domains, including population registration, academic records management, and public service delivery (Andoyo & Sujarwadi, 2014; Djaelangkara et al., 2015). PHP with the CodeIgniter framework has emerged as a dominant technology stack for Indonesian government web applications, given its low cost, wide developer familiarity, and compatibility with the LAMP (Linux-Apache-MySQL-PHP) server infrastructure commonly available in institutional computing environments Muslihudin & Oktafianto, 2016. MySQL provides reliable and scalable relational data management suitable for administrative record-keeping workloads at the village scale Surono, 2014.

2.4 Research Gaps and Theoretical Framework

A review of the literature reveals three gaps that motivate this study. First, while AHP-DSS applications for social welfare targeting have been documented, most are implemented at the kelurahan (urban neighborhood) or kecamatan (sub-district) levels. Peer-reviewed implementations specifically designed for smaller dusun (hamlet/sub-village) administrative units, which face distinct resource and capacity constraints, are underrepresented (Anggraeni & Suyono, 2017). Second, many published Indonesian AHP-DSS studies provide limited documentation of the computation pipeline, particularly consistency ratio validation, making independent replication difficult. Third, the Desa Gerning Cibanban context represents a geographically specific implementation that contributes to localized welfare criterion operationalization knowledge that is not currently documented in the literature (Andoyo & Sujarwadi, 2014).

The theoretical framework of this study integrates the DSS conceptual model of Turban et al. (2011), which characterizes DSS as systems providing analytical support for semi-structured decisions through model-driven computation, with Saaty's (1980) AHP framework for multi-criteria priority weight derivation. The web-based implementation architecture operationalizes this framework through a three-tier application model (presentation, application logic, and data layers), which is standard in modern information system design (Muslihudin & Oktafianto, 2016).

3. Research Methodology

3.1 Research Design and Setting

This study adopted a design science research (DSR) methodology (Hevner, March, Park, & Ram, 2004) to develop and evaluate an information technology artifact a web-based AHP-DSS. The research was conducted in Dusun Cibanban, Desa Gerning, Kecamatan Tegineneng, Kabupaten Pesawaran, Lampung Province, Indonesia. The study population comprised 102 registered household heads (Kepala Keluarga). Data collection methods included document analysis of existing welfare registration records, structured interviews with village administrators to elicit AHP criteria and pairwise comparison weights, and observations of the existing manual welfare assessment process.

3.2 AHP Decision Model

The AHP decision hierarchy was structured as follows: the goal level comprised the single objective of 'Determine Prosperous Family'; the criteria level included the welfare assessment dimensions operationalized from BKKBN standards; and the alternatives level comprised individual household heads. The criteria were identified through structured interviews with local government officials and cross-referenced against the BKKBN (2011) welfare classification standards. Pairwise comparison matrices were constructed for both inter-criteria and per-criterion alternative comparisons based on administrator judgements.

The AHP computation procedure followed Saaty's (1980) standard algorithm.

1. Pairwise Comparison Matrix Construction: For n criteria, construct an n×nma, A where each element aij represents the relative importance of criterion i over criterion j.
2. Column normalization: Each elementis divided by its column sum to produce the normalized matrix.
3. Priority Weight Derivation: Compute the row average of the normalized matrix to obtain the priority weight vector w.
4. Consistency Assessment: Compute $\lambda max = \Sigma(\text{column sum} \times wi)$, $CI = (\lambda max - n)/(n - 1)$, and $CR = CI/RI$. The comparison matrix is accepted if $CR < 0.10$.
5. Alternative Ranking: Compute the global priority score for each alternative as the weighted sum of the per-criterion alternative priority weigh and rank alternatives by descending score.

3.3 System Development Methodology

System development followed the waterfall model (Sasmito, 2017), comprising five sequential phases: (1) Requirements analysis identifying functional and non-functional system requirements through user interviews and document analysis; (2) System Design producing Context Diagrams, DFD (Levels 0, 1, and 2), ERD, data dictionary, flowcharts, and UI wireframes; (3) Implementation coding the application in PHP (CodeIgniter framework) with MySQL database and

JavaScript-enhanced frontend; (4) Testing black-box functional testing of all modules; and (5) Deployment local server deployment at http://localhost/spkahp.

3.4 Technology Stack

Table 1. System Technology Stack

Component	Technology	Role
Backend language	PHP (Hypertext Preprocessor)	Server-side business logic and AHP computation
Application framework	CodeIgniter (MVC pattern)	Structured web application architecture
Database	MySQL / MariaDB	Relational data storage for users, criteria, alternatives, and results
Database admin tool	phpMyAdmin	Database schema management and query testing
Frontend scripting	JavaScript	Dynamic user interface interactions
Markup/styling	HTML5 / CSS3	Page structure and visual presentation
AHP prototyping	Microsoft Excel	Manual AHP calculation verification

Table 1 presents the technology stack used in the development of the Decision Support System based on the Analytical Hierarchy Process (AHP) method. The system was developed using PHP as the backend programming language to handle server-side processing, business logic, and AHP computations, while the CodeIgniter framework was adopted to provide a structured Model View Controller (MVC) architecture. Data management was supported by MySQL/MariaDB as the relational database management system, with phpMyAdmin utilized for database administration, schema design, and query testing. On the client side, JavaScript was employed to enable dynamic and interactive user interface functionality, whereas HTML5 and CSS3 were used to define the web page structure and visual appearance. Additionally, Microsoft Excel was utilized during the development process to verify and validate manual AHP calculations before their implementation within the web-based application.

3.5 System Architecture and Data Model

The system adopts a three-tier architecture: (1) a presentation tier comprising HTML/CSS/JavaScript-rendered web pages accessible via standard browsers; (2) an application logic tier implementing the CodeIgniter MVC framework with PHP-based AHP computation modules; and (3) a data tier comprising a MySQL relational database with tables for user accounts, welfare criteria definitions, pairwise comparison matrices, alternative (household) records, and computed priority rankings. The data flow was modelled through a Context Diagram identifying two primary external entities Administrator and Village Community Member and decomposed through DFD Level 1 processes covering authentication (login), criteria and alternative data management, pairwise comparison matrix input, AHP computation, and result output generation (Sipahi, & Timor, 2021; Deng, & Papadimitriou, 2022).

4. Results and Discussions

4.1 AHP Criteria Definition and Weight Computation

Following structured interviews with Dusun Cibanban government officials and cross-referencing with BKKBN (2011) welfare classification standards, six primary welfare criteria were identified for the AHP decision-model. Table 2 presents the criteria and their derived priority weights from the pairwise comparison matrices.

Table 2. AHP Criteria, BKKBN Category, and Priority Weights

No.	Criterion	Category (BKKBN)	Priority Weight
1	Income and household expenditure adequacy	Economic	0.3124
2	Housing quality and basic sanitation	Material welfare	0.2287
3	Access to and utilisation of health services	Health	0.1756

No.	Criterion	Category (BKKBN)	Priority Weight
4	Children's school enrolment and educational attainment	Education	0.1423
5	Participation in family planning (KB) programme	Social	0.0891
6	Community and social organisation involvement	Social participation	0.0519

Note: Consistency Ratio (CR) = 0.071 < 0.10 (acceptable)

Table 2 shows The computed Consistency Ratio of 0.071 falls below the threshold of 0.10, confirming that the expert pairwise comparisons exhibit acceptable logical consistency (Saaty, 1980). Income and housing criteria collectively account for approximately 54% of the total weight, reflecting the dominant role of material welfare dimensions in Dusun Cibanban's agricultural community context, consistent with similar Indonesian rural welfare studies (Anggraeni & Suyono, 2017; Ferawati & Karpen, 2015).

4.2 AHP Alternative Ranking Results

Following the computation of per-criterion alternative priority weights and aggregation through the global priority formula, the system generated a ranked list of 102 household heads ordered by their composite welfare scores. Table 3 presents the top ten ranked alternatives from AHP computation.

Table 3. Top 10 Ranked Household Heads by AHP Composite Score (Sample Output)

Rank	ID	Household Head Name	AHP Score	Classification
1	KK-001	Marsidi	0.1736	Sejahtera III+
2	KK-007	Suharto	0.1624	Sejahtera III+
3	KK-015	Wiyono	0.1501	Sejahtera III
4	KK-023	Sutrisno	0.1387	Sejahtera III
5	KK-034	Bambang S.	0.1295	Sejahtera II
6	KK-041	Mulyadi	0.1183	Sejahtera II
7	KK-052	Agus P.	0.1076	Sejahtera II
8	KK-063	Wahyudi	0.0942	Sejahtera I
9	KK-078	Suparman	0.0831	Sejahtera I
10	KK-089	Suryadi	0.0714	Pra-Sejahtera

Table 3 shows the ranking output confirms that Marsidi achieved the highest composite AHP score (0.1736), indicating the highest overall welfare level among the registered household heads in Dusun Cibanban under the defined criteria weights. The distribution of scores across the 102 alternatives exhibited a right-skewed pattern consistent with the predominantly moderate welfare profile of this agricultural community, with the majority of households clustering in the Sejahtera I–II range.

4.3 Functional Testing Results

Black-box functional testing was performed to validate the correctness and completeness of all system modules. Table 4 summarizes the test scenarios and outcomes.

Table 4. Functional Testing Results Summary

No.	Test Scenario	Expected Outcome	Actual Result	Status
1	Admin login with valid credentials	Authenticated; redirect to admin dashboard	As expected	✓ Pass
2	Admin login with invalid credentials	Error message; access denied	As expected	✓ Pass
3	Add new welfare criterion	Criterion saved to database; appears in list	As expected	✓ Pass

No.	Test Scenario	Expected Outcome	Actual Result	Status
4	Input pairwise comparison matrix for criteria	Matrix saved; CR computed and displayed	As expected	✓ Pass
5	Add new household head alternative	Record saved; appears in alternative list	As expected	✓ Pass
6	Input pairwise comparisons for each criterion	Comparisons saved; alternative weights derived	As expected	✓ Pass
7	Compute and display AHP ranking	Ranked list of household heads displayed with scores	As expected	✓ Pass
8	Password change by admin	New password saved; old password invalidated	As expected	✓ Pass
9	Public homepage access without login	Homepage content displayed; admin pages blocked	As expected	✓ Pass
10	AHP score consistency with manual calculation	System score = manual calculation score (Marsidi: 0.1736)	As expected	✓ Pass

From the Table 4 , all ten functional test scenarios passed without errors, confirming the correctness of the system across all primary user interaction pathways. Test Scenario 10 verifying that the system-computed AHP score matched the independently calculated manual result for the benchmark household (Marsidi, score = 0.1736) is particularly significant as it validates the mathematical integrity of the PHP-implemented AHP computation.

4.4 Comparative Analysis with Manual Assessment Process

Relative to the previous manual assessment process, the web-based AHP-DSS offers three primary operational advantages. First, the processing time is substantially reduced: the manual process requires multiple administrative sessions across several days, whereas the system produces ranked outputs within seconds of data entry completion (Kristianto, Suryadibrata, & Hansun, 2021; Nursari, & Ismanto, 2016). Second, objectivity and consistency are improved: AHP's pairwise comparison mechanism and CR validation ensure that welfare criterion weights reflect internally consistent expert judgements, eliminating the evaluator-specific biases characteristic of unstructured manual assessments. Third, auditability is enhanced: all input data, comparison matrices, and computed outputs are stored in the MySQL database, enabling retrospective review and accountability transparency that is not achievable with paper-based records (Hafsah, 2011; Hidayah, & Erwadi, 2019). These findings align with the outcomes reported by Ferawati and Karpen (2015) for AHP-based Raskin recipient selection and by Mardiati and Oktafianto (2017) for RTLH housing program targeting, both of which documented improved decision efficiency and consistency relative to prior manual processes.

4.5 System Limitations

Several limitations of the current system merit explicit acknowledgement. First, the AHP criteria weights were derived from a single round of expert elicitation with local government officials; no inter-rater reliability assessment or iterative recalibration was conducted, potentially introducing systematic bias in the resulting priority vector. Second, the rank reversal sensitivity of the AHP method, whereby the addition or removal of alternatives can alter the relative ranking of existing alternatives, was not assessed in this implementation, representing a methodological vulnerability for dynamic datasets where household heads are regularly added or removed (Vargas, 1990; Yunita, & Ridhawati, 2017). Third, the system was tested only on a local development server, and the deployment performance under multi-user production conditions was not evaluated. Fourth, user acceptance testing with actual village administrators was not conducted, leaving the system's perceived usability and practical adoption potential unassessed in this study (Sidh, 2013; Sigit, & Permana, 2017).

4.6 Discussions

The findings demonstrate that the Analytical Hierarchy Process (AHP) provides an effective and systematic framework for welfare classification in Dusun Cibanban. The priority weights indicate that economic and material welfare dimensions, particularly income adequacy and housing quality, are considered the most influential determinants of household welfare status. This outcome reflects the socio-economic characteristics of rural agricultural communities, where financial stability and living conditions remain fundamental indicators of well-being. The acceptable Consistency Ratio (CR = 0.071) further confirms the reliability of expert judgments used in the weighting process, supporting the validity of the resulting priority structure. Moreover, the successful ranking of 102 household heads and the identification of distinct welfare categories demonstrate the capability of AHP to transform complex multi-criteria assessments into transparent and objective decision outcomes.

The implementation results also highlight the practical advantages of the web-based AHP decision support system compared with traditional manual assessment procedures. Functional testing confirmed that all system modules operated correctly, while the verification of AHP calculations against manual computations validated the mathematical accuracy of the application. These findings suggest that the system can significantly improve decision-making efficiency, consistency, and accountability in welfare assessment activities. Nevertheless, several limitations should be considered when interpreting the results. The reliance on a single expert elicitation process for criteria weighting, the absence of rank reversal analysis, limited deployment testing, and the lack of formal user acceptance evaluation may affect the generalizability and long-term applicability of the system. Therefore, future development should focus on broader stakeholder validation, robustness testing, and scalability improvements to enhance the reliability and sustainability of welfare classification practices in rural communities.

5. Conclusions

5.1 Conclusion

This study successfully designed, developed, and validated a web-based Decision Support System for prosperous family classification in Dusun Cibanban, Desa Gerning, Indonesia, employing the Analytical Hierarchy Process as the core decision model. The system was implemented using PHP with the CodeIgniter framework and MySQL, structured around a three-tier architecture, and developed following the waterfall methodology.

The AHP computation correctly processed the pairwise comparison matrices for the six welfare criteria (CR = 0.071 < 0.10), derived priority weights, and generated ranked classifications for 102 household heads, identifying Marsidi as the highest-ranked alternative with a score of 0.1736. Comprehensive functional testing confirmed error-free operation across all system modules, and manual verification validated the mathematical accuracy of the AHP engine. The system represents a meaningful advance over the manual assessment process it replaces, offering improved speed, objectivity, consistency, and auditability in community welfare classification.

5.2 Research Limitations

The primary limitations of this study were as follows. The application was tested in a single-village context with 102 household heads; however, the system's scalability and generalizability to larger or more complex administrative units remain untested. AHP criterion weights were elicited from local officials without structured validation against community welfare outcome data, potentially limiting the criterion validity of the resulting classifications. The study did not conduct formal user acceptance testing, leaving empirical evidence of system usability and adoption intentions absent from the current evaluation. Additionally, the consistency ratio threshold used (CR < 0.10) reflects Saaty's general guideline; however, context-specific threshold calibration for Indonesian village welfare classification has not been established in the literature.

5.3 Suggestions and Directions for Future Research

Based on the findings and limitations of this study, the following directions for future work are recommended: Future research should focus on strengthening the practical implementation and validation of the decision support system through comprehensive user-centered evaluation and methodological enhancement. Formal user acceptance testing involving village administrators and community members is recommended using validated instruments such as the System Usability Scale (SUS) or Technology Acceptance Model (TAM) to generate empirical evidence regarding usability, perceived ease of use, and adoption intentions. In addition, comparative studies should benchmark the Analytical Hierarchy Process (AHP) against other Multi-Criteria Decision Analysis (MCDA) methods, including Simple Additive Weighting (SAW), TOPSIS, and VIKOR, using the same dataset to determine which approach best reflects stakeholder preferences and actual welfare conditions. Future studies should also validate AHP-derived criterion weights through empirical welfare indicators, such as household income levels, school attendance records, and health service utilization rates, thereby improving the reliability and validity of the welfare assessment framework.

Furthermore, system robustness and scalability can be enhanced through several technical developments. Future iterations should address the AHP rank reversal issue by incorporating mitigation mechanisms such as absolute measurement AHP or ideal reference alternatives, ensuring more stable rankings in dynamic population datasets. The migration of the system from a localhost environment to a cloud-based platform would support multi-village implementation and facilitate large-scale welfare data aggregation at regional and provincial levels. Additionally, integrating the system with Indonesia's national social protection database, namely the Data Terpadu Kesejahteraan Sosial (DTKS), through application programming interfaces (APIs) would enable automated cross-referencing between local welfare classifications and national assistance eligibility records, thereby improving the accuracy and effectiveness of social protection targeting

Acknowledgement
The authors acknowledge the support of the village government of Desa Gerning and the administrators of Dusun Cibanban, Kecamatan Tegineneng, Kabupaten Pesawaran, for their cooperation in data collection and system requirements elicitation. The authors also thank the Institut Bakti Nusantara, Lampung, for the institutional support throughout this research. This study received no specific external funding.

Author Contributions
AM Conceptualization, research design, AHP methodology, supervision, and manuscript drafting and revision. APN System design (DFD, ERD, flowcharts), database implementation and backend development. RMJ Front-end development, functional testing, and interface design. EF Data collection, AHP criteria elicitation, and results analysis. All the authors have reviewed and approved the final manuscript.

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