Hulonthalo Journal of Informatics and Electrical Engineering (HJIEE)
Vol. 1, No. 1, Juni 2025, pp. 1~11

Decision Support System Based on the Weighted Aggregated Sum Product Assessment (WASPAS) Method for Determining the Distribution of Non-Cash Food Assistance

Ona Maliki[1], Yulanda Yunus[2]
[1] Department of Computer Science and Sains, Universitas Gorontalo Utara, Indonesia. Gorontalo

Article Info

Article history:

Received 06 12, 2025
Revised 06 26, 2025
Accepted 07 28, 2025

Keywords:

Decision Support System,
BPNT,
WASPAS,
MySQL,
UML

ABSTRACT (10 PT)

Abstract−The Non-Cash Food Assistance (BPNT) program is one of the government's social assistance initiatives that seeks to enhance community well-being. However, issues like unconfirmed data frequently arise throughout the proposal process for potential beneficiaries, leading to incorrect targeting in the distribution of aid. In order to more precisely identify BPNT users in Tinelo Village, Telaga Biru Sub-district, this study intends to develop a web-based decision support system. This study employs the Research and Development (R&D) methodology, which starts with gathering data via interviews and observation. The Unified Modelling Language (UML) technique was utilized for system analysis, and PHP and HTML were used for application development, with MySQL serving as the database.The Weighted Aggregated Sum Product Assessment (WASPAS) approach is used by the system to make decisions. Systems are tested using both blackbox and whitebox techniques. The whitebox test results on the input value flowchart show Region (R) = 2, Independent Path = 2, and Cyclomatic Complexity (CC) = 2. Meanwhile, the blackbox test results show that all system functions run according to a predetermined scenario. Thus, this system is proven to be able to increase effectiveness, efficiency, and target accuracy in the aid distribution process.

Corresponding Author:

Ona Maliki
Information System, Department of Computer Science and Sains
Universitas Gorontalo Utara
Jln Trans Sulawesi No. 72, Kota Kwandang Kab Gorontalo Utara
Email: lhanly88@gmail.com

1. INTRODUCTION

In the era of digital transformation, the application of information technology in public governance has become increasingly essential. One of the most critical areas requiring efficiency and transparency is the distribution of social assistance, particularly the Non-Cash Food Assistance (Bantuan Pangan Non Tunai or BPNT) program. This program aims to reduce the financial burden of low-income households by providing targeted food support. In line with Presidential Regulation No. 63 of 2017, social assistance is mandated to be distributed in non-cash form to enhance transparency, accountability, and minimize the risk of fund misappropriation [1].

Tinelo Village, located in Telaga Biru Sub-district, is one of the areas allocated to receive BPNT. The majority of residents in this village are classified as low-income families, many of whom qualify as Beneficiary Families (Keluarga Penerima Manfaat or KPM). However, the recipient selection process is still conducted manually. This approach is time-consuming and susceptible to data inaccuracies, subjective bias, and potential social conflicts.

As noted in recent studies, social assistance programs often rely on outdated or manually processed data, which obstructs the accurate identification of eligible recipients [2]. The main challenge lies in the inefficiency and unreliability of data processing, especially when local officials must evaluate multiple alternatives across several criteria. Consequently, there is a growing need for a decision-making solution that is both objective and technology-driven.

A Decision Support System (DSS) offers a promising solution. DSS is a computer-based tool designed to assist decision-makers in solving semi-structured or unstructured problems. Within the context of BPNT, DSS can be used to facilitate the selection process based on clearly defined eligibility criteria, thereby minimizing subjective judgment.

This study adopts the Weighted Aggregated Sum Product Assessment (WASPAS) method as the primary algorithm for the DSS. WASPAS is a multi-criteria decision-making (MCDM) method that combines the strengths of the Weighted Sum Model (WSM) and the Weighted Product Model (WPM). Compared to methods such as Simple Additive Weighting (SAW) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), WASPAS produces more stable and consistent ranking results and is more sensitive to changes in criteria weights [3]. Its integration into DSS allows for faster processing of large datasets and supports more accurate decision-making [4]. Furthermore, WASPAS has demonstrated the ability to reduce subjectivity and bias in performance evaluations, as evidenced in recent applications within transportation systems [5].

Prior research has shown the potential of MCDM methods for beneficiary selection in social assistance programs. Yulianti and Farina applied the SAW method in BPNT selection but found it less sensitive to weight adjustments [6]. Sulasmini and Arta used TOPSIS with positive results, though the method requires more complex calculations [7]. Hence, this research aims to design and implement a WASPAS-based DSS that improves both the accuracy and efficiency of BPNT recipient selection.

The developed system is expected to enhance transparency, accountability, and fairness in the selection process and may serve as a prototype for implementation in other regions with similar challenges.

2. METHOD (12 PT)

2.1 Research Approach

This study adopts the Research and Development (R&D) methodology, which involves the following key stages:

1. Data Collection:
   Primary data were gathered through interviews with village officials and field observations to identify the selection criteria for BPNT recipients. These criteria included household income, number of dependents, housing conditions, and employment status. Secondary data were obtained from official village documents related to previous BPNT recipients.

2. System Analysis:
   A requirements analysis was conducted to understand the existing selection process and design a suitable technological solution. Unified Modeling Language (UML) diagrams were used to visualize the system's functional requirements, including:
   - Use Case Diagram: Depicts system actors (admin and beneficiary candidates) and core system functionalities.
   - Activity Diagram: Illustrates the workflow from data input to the recommendation output.
   - Sequence Diagram: Shows the interactions among system components.
3. System Design:
   The system was designed as a web-based application using the following technologies:
   - Programming Language: PHP for backend and HTML/CSS for frontend.
   - Database: MySQL was utilized to store criteria information and recipient alternatives.
   - Framework: Laravel was employed to accelerate development and maintain a modular code structure.
4. Implementation of the WASPAS Method:
   - Decision Matrix Construction: A matrix was created with recipients as rows and selection criteria as columns.
   - Normalization of Criteria Values: Criteria were normalized using the following formulas:
     - For benefit criteria:

$$Xij = \frac{xij}{maxi\ xiji}$$

     - For cost criteria:

$$Xij = \frac{mini\ xij}{xji}$$

     - Preference Score Calculation (Qi):

$$Q^1 = 0{,}5 \sum^n xij\ wj + 0{,}5 \prod^n (xij)\ wj$$

The optimal recipient is the alternative with the highest Qii value.

B. Case Study: WASPAS Application in Sudirejo-I Village

The application of the WASPAS method was demonstrated using five evaluation criteria and five alternatives (potential recipients). Table I presents the criteria and corresponding weights:

Table 1. Criteria

Criteria	Description	Weight
C1	Employment	20%
C2	Income	20%
C3	Housing Ownership	20%
C4	Number of Dependents	20%
C5	Personal Assets	20%

Table 2. Alternatives

Alternative	C1	C2	C3	C4	C5
A1 (Phahrul Rozi)	Civil Servant	>3,000,000	Owned	3	43,000,000
A2 (M. Ali Banun)	Pedicab Driver	<1,500,000	Rented	4	5,000,000
A3 (Edi Sanjaya)	Private Employee	2,000,000	Rented	1	21,000,000
A4 (Budi R)	Online Ojek	<1,500,000	Rented	3	10,000,000
A5 (G. Marulitua)	Merchant	>2,000,000	Rented	2	23,000,000

The weighting and scoring for each criterion (C1, C2, C3, C5) are detailed in Tables 3 through 6.Q1=0.466448Q_1 = 0.466448

Table 3. Employment Criteria Scoring

Employment Type	Score
Pedicab Driver	3
Online Ojek	2.5
Merchant	2
Private Employee	1.5
Civil Servant	1

Table 4. Income Criteria Scoring

Income Range (IDR)	Score
0 – 1,500,000	5
2,000,000	3
>2,000,000	2

Table 5. Home Ownership Scoring

Ownership Type	Score
Living with others	5
Rented	3
Owned	2

Table 6. Personal Asset Criteria

Asset Value Range	Criterion Score
Less than 10,000,000	5
10,000,000 – 30,000,000	3
More than 30,000,000	2

The next step is to present the suitability ratings of each alternative, as shown in Table 8 below:

Tabel 7. Alternative Suitability Rating

Alternative	C1	C2	C3	C4	C5
	1	2	2	3	2
A_2	3	5	5	4	5
A_3	1,5	3	3	1	3
A_4	2,5	5	3	3	3
A_5	2	2	3	2	3
Max/Min	3	5	5	1	2
Weight	0,20	0,20	0,20	0,2	0,20

After all the required data has been collected, the next step is to implement the Weighted Aggregated Sum Product Assessment (WASPAS) method to obtain optimal results in selecting aid recipients in Sudirejo-I Subdistrict. The following are the stages of implementing the WASPAS method:
Establishing the decision matrix for the alternatives (Xij):

$$R_{ij} = \begin{matrix} 1 & 2 & 2 & 3 & 2 \\ 3 & 5 & 5 & 4 & 5 \\ 1{,}5 & 3 & 3 & 1 & 3 \\ 2{,}5 & 5 & 3 & 3 & 3 \\ 2 & 2 & 0{,}6 & 02 & 3 \end{matrix}$$

Calculating the Normalized Matrix (Rij):

R1.1 = 1/3= 0.33 R1.2 = 2/5 = 0,4 R1.3 = 2/5 = 0,4 R1.4 = 1/3 = 0,33 R1.5 = 2/2 = 1	R2.1 = 3/3= 1 R2.2 = 5/5= 1 R2.3 = 5/5= 1 R2.4 = 1/4= 0,25 R2.5 = 2/5= 0,4	R3.1 = 1,5/3 = 0,5 R3.2 = 3/5 = 0,6 R3.3 = 3/5 = 0,6 R3.4 = 1/1 = 1 R3.5 = 2/3= 0,67	R4.1 = 2,5/3=0,83 R4.2 = 5/5= 1 R4.3 = 3/5= 0,6 R4.4 = 1/3= 0,33 R4.5 = 2/3= 0,67	R5.1 = 2/3= 0,67 R5.2 = 2/5 = 0,4 R5.3 = 3/5 = 0,6 R5.4 = 1/2 = 0,5 R5.5 = 2/3 = 0,67

The resulting normalized matrix is obtained as follows:

$$R_{ij} = = \begin{matrix} 0.33 & 0{,}4 & 0{,}4 & 0{,}33 & 1 \\ 1 & 1 & 1 & 0{,}25 & 0.4 \\ 0.5 & 0{,}6 & 0{,}6 & 1 & 0{,}67 \\ 0.83 & 1 & 0{,}6 & 0{,}33 & 0{,}67 \\ 0.67 & 0{,}4 & 0{,}6 & 0{,}5 & 0{,}67 \end{matrix}$$

The next step is to calculate the QiQ_iQi values:

Q1 =
$0{,}5[(0{,}33*0{,}20)+(0{,}4*0{,}20)+(0{,}4*0{,}20)+(0{,}33*0{,}20)+(1*0{,}20)]+0{,}5(0{,}33^{0{,}20}*0{,}4^{0{,}20}*0{,}4^{0{,}20}*0{,}33^{0{,}20}*1^{0{,}20})$
= 0,5(0,066+0,08+0,08+0,066+0,20) + 0,5(0,80*0,83*0,83*0,80*1)
= 0,246+0,220448
= 0,466448

Q2 = $0{,}5[(1*0{,}20)+(1*0{,}20)+(1*0{,}20)+(0{,}25*0{,}20)+(0{,}4*0{,}20)] +$
$0{,}5(1^{0{,}20}*1^{0{,}20}*1^{0{,}20}*0{,}25^{0{,}20}*0{,}4^{0{,}20})$

= 0,5(0,20+0,20+0,20+0,05+0,08) + 0,5(1*1*1*0,76*0,83)
= 0,365+0,3154
= 0,6804

Q3 = 0,5[(0,5*0,20)+(0,6*0,20)+(0,6*0,20)+(1*0,20)+(0,67*0,20)]+
$0,5(0,5^{0,20}*0,6^{0,20}*0,6^{0,20}*1^{0,20}*0,67^{0,20})$
= 0,5(0,10+0,12+0,12+0,20+0,134) + 0,5(0,87*0,90*0,90*1*0,92)
= 0,337+0,324162
= 0,661162

Q4 = 0,5[(0,83*0,20) + (1*0,20) + (0,6*0,20) + (0,33*0,20) + (0,67*0,20)] + 0,5
$(0,83^{0,20}*1^{0,20}*\ 0,6^{0,20}*0,33^{0,20}\ *0,67^{0,20})$
= 0,5(0,166+0,20+0,12+0,066+0,134) + 0,5(0,96*1*0,90*0,80*0,92)
= 0,343+0,317952
= 0,660952

Q5 = 0,5[(0,67*0,20)+(0,4*0,20)+(0,6*0,20)+(0,5*0,20) +
$(0,67*0,20)]+0,5(0,67^{0,20}*0,4^{0,20}*0,6^{0,20}*0,5^{0,20}*\ 0,67^{0,20})$
= 0,5(0,134+0,08+0,12+0,10+0,134) + 0,5(0,92*0,83*0,90*0,87*0,92)
= 0,284+0,275033
= 0,559033

Based on the calculations above, the ranking results for each alternative using the WASPAS method are presented in the following table:

Table 8. Alternative Ranking Results

Alternative		*Qi Value*	Rank
Pharul Rozi	(A1)	0,466448	5
M. Ali Banun	(A2)	0,680400	1
Edi Sanjaya	(A3)	0,661162	2
Budi R	(A4)	0,660952	3
G. Marulitua	(A5)	0,55900	4

Based on the calculated preference values above, the aid recipient can be determined by examining the ranking results of each alternative. The top-ranked candidate is A2, representing M. Ali Banun

3. RESULTS AND DISCUSSION

3.1 Implementation and Testing Results

3.1.1 System Implementation

a. This system is designed as a web-based application with a main feature: an admin login for managing criteria data and candidate recipients.

Figure 1. Login Page

b. A feature for inputting candidate recipient data based on the selection criteria.

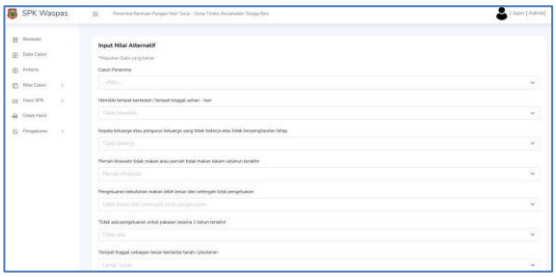

Figure 2. Candidate Recipient Data Input Page

c. A function to process candidate scores using the WASPAS method to determine the ranking results.

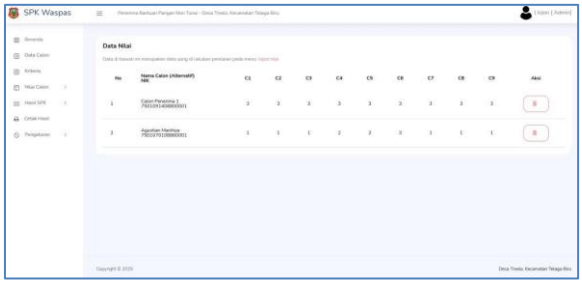

Figure 3. Candidate Score Data Page

d. Final score data page to display the recommended aid recipients.

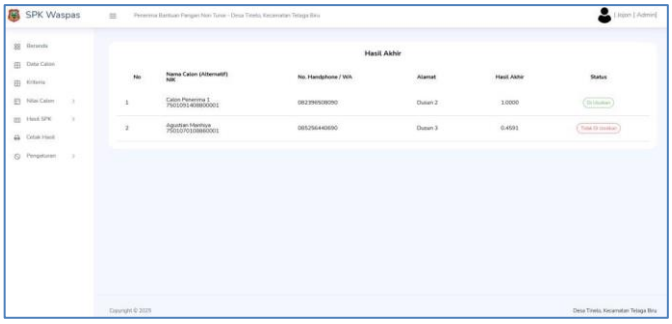

Figure 4. Final Score Data Page

3.1.2 System Testing

The following are the steps of the problem-solving algorithm using the WASPAS method:

Table 9. Criteria

Code	Criteria	Weight
C1	The individual does not have a shelter or permanent residence	12%
C2	Head of household or caretaker is unemployed or has no fixed income	11%
C3	Has experienced food insecurity or gone without eating in the past year	11%

Code	Criteria	Weight
C4	Food expenses account for more than half of total household expenditure	11%
C5	No spending on clothing in the past year	11%
C6	Residence mostly has a dirt or plaster floor	11%
C7	Residence mostly has bamboo, wire, or wooden walls	11%
C8	No private toilet facilities	11%
C9	Electricity source is from a 450-watt PLN connection or not from electricity	11%

The next step is to determine the alternatives used:

Table 10. Alternatives

Alternatives	C1	C2	C3	C4	C5	C6	C7	C8	C9
Candidate 1	3	3	3	3	3	3	3	3	3
Candidate 2	1	1	1	2	2	3	1	2	1
Candidate 3	1	1	1	2	2	1	1	2	2

The following presents the weighting (wjw_jwj) of criteria from C1 to C9:

Table 11. Criterion C1 – Type of Housing Ownership

Housing Condition	Score
Does not own a place to live	3
Rents a place to live	2
Owns a place to live	1

Table 12. Criterion C2 – Employment Status of the Head of Household

Employment Status	Score
Unemployed	3
Irregular employment	2
Permanent employment	1

Table 13. Criterion C3 – Food Insecurity Experience

Condition	Score
Frequently worried about not having enough food	3
Occasionally worried	2
Never worried	1

Table 14. Criterion C4 – Proportion of Food Expenditures

Condition	Score
Food expenses exceed half of total household expenses	3
Food expenses are less than half	2

Table 15. Criterion C5 – Clothing Expenditures in the Past Year

Condition	Score
No expenditure	3
Partial expenditure	2
Regular expenditure	1

Table 16. Criterion C6 – Type of Flooring in the House

Floor Type	Score
Dirt floor	3
Partially plastered	2
Ceramic/tile floor	1

Table 17. Criterion C7 – Type of Housing Wall

Wall Type	Score
Bamboo walls	3
GRC (fiber cement board) walls	2
Brick walls	1

Table 18. Criterion C8 – Access to Sanitation Facilities

Sanitation Access	Score
No private toilet facilities	3
Has private toilet facilities	2

Table 19. Criterion C9 – Electricity Supply Source

Type of Electricity Source	Score
450-watt connection or no electricity	3
900-watt connection	2
1200-watt connection	1

4. CONCLUSION

The findings of this study demonstrate that the implemented system enhances the efficiency of the selection process for Non-Cash Food Assistance (BPNT) beneficiaries at the village level by enabling faster, more structured, and systematic evaluations. Moreover, the system offers improved accessibility and convenience for prospective recipients by allowing them to register and complete application forms online, eliminating the need for physical visits to the village office. The platform can be accessed flexibly, anytime and from anywhere, as long as the registration period is still open.

FUNDING INFORMATION *(mandatory)*

There was no funding for this research.

AUTHOR CONTRIBUTIONS STATEMENT *(mandatory)* (12 PT)

This work was conducted by a single author who contributed to the following roles: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing – Original Draft, and Writing – Review & Editing. The author is also responsible for all correspondence related to this paper.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Author 1 Ona Maliki	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Author 2 Yulanda Yunus		✓				✓		✓	✓	✓	✓	✓		

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT *(mandatory)*

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Authors state no conflict of interest.

ETHICAL APPROVAL

The research involving human participants was conducted in accordance with ethical standards and the principles outlined in the Helsinki Declaration. All participants were informed about the purpose of the study and provided their voluntary participation. Ethical approval was not required as per the institutional guidelines.

REFERENCES

[1] Pemerintah Republik Indonesia, *Peraturan Presiden Republik Indonesia Nomor 63 Tahun 2017 tentang Penyaluran Bantuan Sosial Secara Non Tunai*, Jakarta: Sekretariat Negara, 2017.

[2] A. Supriyanto, H. Rahmawati, and D. Prabowo, "Implementasi Teknologi Informasi dalam Penyaluran Bantuan Sosial," *Jurnal Sistem Informasi dan Komputer Terapan Indonesia (JSIKTI)*, vol. 5, no. 1, pp. 1–8, 2023.

[3] E. Queljoe, R. Sitorus, and R. Armanda, "Penerapan Metode WASPAS dalam Sistem Pendukung Keputusan Pemilihan Karyawan Terbaik," *Jurnal Teknologi dan Sistem Komputer*, vol. 12, no. 2, pp. 100–107, 2024.

[4] D. Wulandari and A. Sari, "Implementasi Sistem Pendukung Keputusan dengan Metode WASPAS dalam Pemilihan Penerima Bantuan," *Jurnal Informatika dan Komputer Indonesia*, vol. 7, no. 1, pp. 22–29, 2024.

[5] A. Purwanto, "Evaluasi Kinerja Pemeriksa dalam Operasi Perkeretaapian Menggunakan Metode WASPAS," *Jurnal Rekayasa Transportasi*, vol. 9, no. 2, pp. 45–53, 2023.

[6] R. Yulianti and D. Farina, "Sistem Pendukung Keputusan Seleksi Penerima BPNT dengan Metode SAW," *Jurnal Teknologi Informasi dan Komputer (JTIKOM)*, vol. 4, no. 1, pp. 55–62, 2020.

[7] N. Sulasmini and I. M. Arta, "Implementasi Metode TOPSIS dalam Penentuan Penerima Bantuan Sosial," *Jurnal Ilmu Komputer dan Aplikasi*, vol. 10, no. 3, pp. 90–97, 2022.

[8] Purwanto, I. (2023). Analisa Penerapan Metode WASPAS Dalam Sistem Pendukung Keputusan Penilaian Kinerja Checker Terbaik Pada Kereta Api. *Bulletin of Computer Science Research*, *3*(6), 392–399. https://doi.org/10.47065/bulletincsr.v3i6.287

[9] Queljoe, D. A. de, Sutejo, H., & Tatuhey, E. L. (2024). SISTEM PENDUKUNG KEPUTUSAN UNTUK PEMILIHAN ASN BERPRESTASI MENGGUNAKAN METODE WASPAS (STUDI KASUS : BALAI PENJAMIN MUTU PENDIDIKAN, KOTARAJA, JAYAPURA PAPUA). *ULLETIN OF NETWORK ENGINEER AND INFORMATICS*, *2*(1), 25–31. https://doi.org/10.59688/bufnets

[10] Supriyanto, A., Mulyani, S., Ariyanto, T., & Razaq, J. A. (2023). Information for the Identification and Verification of Prospective Poverty Social Assistance Recipients. *Jurnal Teknik Informatika (Jutif)*, *4*(2), 429–440. https://doi.org/10.52436/1.jutif.2023.4.2.722

[11] Y. Amol Rathod *et al.*, "Energy Meter Tamper Detection and Alert Messaging System," *Int. J. Technol. Eng. Arts Math. Sci.*, vol. 1, no. 2, pp. 2583–1224, 2022, doi: 10.11591/eei.v9i3.xxxx.

[12] P. Umum and P. Sembako, "PEDOMAN UMUM," 2020.

[13] Q. adar BakhshBaloch, "PERATURAN PRESIDEN REPUBLIK INDONESIA NOMOR 63 TAHUN 017 TENTANG PENYALURAN BANTUAN SOSIAL SECARA NON TUNAI DENGAN," vol. 11, no. 1, pp. 92–105, 2017.

[14] H. Hambali and L. D. Samsumar, "Perancangan Sistem Informasi Penunjang Keputusan Penerima

Bantuan Raskin Berbasis Website Menggunakan Metode simple additive weiting (SAW)," *Explore*, vol. 11, no. 2, p. 135, 2021, doi: 10.35200/explore.v11i2.512.

[15] E. Yulianti and M. Farina, "SISTEM PENDUKUNG KEPUTUSAN PENERIMA BANTUAN PANGAN NON UNAI (BPNT) UNTUK KELUARGA MISKIN MENGGUNAKAN METODE SIMPLE MULTI ATTRIBUTE RATING TECHNIQUE (SMART)," vol. 8, no. 1, pp. 7–13, 2020.

[16] L. A. Sulasmini and I. K. J. Arta, "Seleksi Penerima Bantuan Pangan Non Tunai Untuk Keluarga Kurang Mampu di Desa Sepang Dengan Metode Simple Additive," *J. Manaj. dan Teknol. ...*, vol. 12, no. 2, pp. 1–11, 2022, [Online].Available:https://ojs.mahadewa.ac.id/index.php/jmti/article/view/2109%0Ahttps://ojs.mahadewa.ac.id/index.php/jmti/article/download/2109/1635

[17] R. N. Fahadaena, M. Dasuki, and R. Yanuarti, "Penerapan analytic hierarchy process (AHP) pada sistem pendukung keputusan penerima bantuan pangan non tunai (BPNT)," *J. CoSciTech (Computer Sci. Inf. Technol.*, vol. 4, no. 3, pp. 661–668, 2023, doi: 10.37859/coscitech.v4i3.4946.

[18] S. Prihatmoko, "Analisa Teknik Perancangan Pendukung Keputusan Untuk Menentukan Mahasiswa Berprestasi dengan Metode Analytical Hierarchy Process," vol. 3, no. 1, pp. 25–37, 2023.

[19] S. M. Aspar *et al.*, "Implementasi Program Bantuan Pangan Non Tunai (Bpnt) Terhadap Keluarga Penerima Manfaat (Kpm) Di Kelurahan Bontoduri Kecamatan Tamalate Kota Makassar," *J. Washiyah*, vol. 1, no.2, pp. 305–325, 2020.

[20] R. S. M. Sihombing, U. S. Utara, P. Bantuan, and P. Non, "EVALUASI PROGRAM BANTUAN PANGAN NON TUNAI (BPNT) PADA MASYARAKAT KURANG MAMPU DI DESA TEBIN G TANJUNG SELAMAT KECAMATAN PADANG TUALANG KABUPATEN LANGKAT," vol. 11, pp. 164–174, 2024.

[21] M. J. Tarigan, M. Z. Siambaton, and T. Haramaini, "Implementasi Metode Weighted Aggregated Sum Product Assessment (WASPAS) Dalam Menentukan Jurusan Siswa Pada SMKN 8 Medan," *J. Minfo Polgan*, vol. 11, no. 1, pp. 29–53, 2022, doi: 10.33395/jmp.v11i1.10964.

[22] S. Hummairoh, A. Rahmadhani, and ..., "Penerapan WASPAS Dalam Menetukan Kelayakan Penerima Bantuan Program Keluarga Harapan Kelurahan Sudirejo-I," *Semin. Nas. Sains ...*, pp. 333–337, 2021, [Online]. Available:http://seminar-id.com/prosiding/index.php/sensasi/article/view/671%0Ahttps://seminar-id.com/prosiding/index.php/sensasi/article/download/671/594

[23] T. Susilawati, F. Yuliansyah, M. Romzi, and R. Aryani, "Membangun Website Toko Online Pempek Nthree Menggunakan Php Dan Mysql," *J. Tek. Inform. Mahakarya*, vol. 3, no. 1, pp. 35–44, 2020.

[24] I. A. Mastan, "Perancangan Website Aplikasi Penjualan Restoran Ayam Keprabon," *JBASE - J. Bus. Audit Inf. Syst.*, vol. 2, no. 2, pp. 16–21, 2019, doi: 10.30813/jbase.v2i2.1728.

[25] R. Bangun, S. Informasi, P. Talent, and B. A. Web, "Jurnal Informatika Terpadu," vol. 6, no. 1, pp. 29– 37, 2020.

[26] R. Tejasukmana Putra, S. Adi Wibowo, and Y. Agus Pranoto, "Sistem Pendukung Keputusan Penerimaan Blt Di Kecamatan Sampang Menggunakan Metode Saw Dan Metode Ahp Berbasis Web," *JATI (Jurnal Mhs. Tek. Inform.*, vol. 5, no. 1, pp. 321–327, 2021, doi: 10.36040/jati.v5i1.3236.

[27] D. D. Hutagalung and F. Arif, "Rancang Bangun Sistem Informasi Perpustakaan Berbasis Web Pada Smk Citra Negara Depok," *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2018, doi: 10. 1017/CBO9781107415324.004.