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ANALYSIS OF PRIORITY AREAS FOR HANDLING STUNTING CASES IN SIGI REGENCY USING THE TOPSIS METHOD BASED ON WEB DASHBOARD

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ABSTRACT

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Stunting is a condition of growth failure in children, where a toddler has a length or height below the average. Stunting is a problem for children because it has the potential to slow down brain development with prolonged effects. Central Sulawesi Province is one of the provinces with the highest stunting prevalence rate and the area with the highest stunting rate is in Sigi Regency at 36.8%. Stunting cases are an important concern for the Sigi Regency government, especially the Health Office and Community Health Centers. To identify and determine areas that are prioritized for handling stunting cases, seven indicators are used, including the number of stunting cases, number of villages covered, number of health workers, number of integrated service posts, number of exclusive breastfeeding, percentage of clean drinking water, and percentage of proper sanitation. To support in reducing the percentage of stunting in Sigi Regency, research was conducted and a web dashboard system application was made to support priority area selection decisions using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method, a best alternative method that has the shortest distance from the positive ideal solution and the farthest distance from the negative ideal solution. The results obtained in this study are the areas that are prioritized for handling stunting cases in Sigi Regency is the Sigi Biromaru area with a total of 495 stunting cases, the number of coverage villages is 18, the number of integrated service posts is 53, the number of health workers is 96, the number of exclusive breastfeeding is 35, the percentage of proper drinking water is 44%, and the percentage of proper sanitation is 84.00% with the highest preference value through the TOPSIS method analysis of 0.660.

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1. INTRODUCTION

Stunting is a condition where a toddler has a body length or height below the average. This is due to the lack of nutritional intake provided over a long period of time. Stunting is a problem for children because it has the potential to slow brain development with long-term impacts that can lead to mental retardation, neurological disorders, and the risk of increased morbidity and mortality **[1]**. Stunting is an indicator of chronic malnutrition due to inadequate food intake for a long time, inappropriate feeding, poor food quality, increased morbidity and an increase in height that is not appropriate for age (TB/U). In general, the problem of linear growth in toddlers is often ignored because it is still considered normal as long as the child's weight meets the standards. According to several studies, stunting is associated with an increased risk of morbidity and mortality as well as inhibited growth of motor and mental abilities **[2]**.

The World Health Organization (WHO), says that growth retardation or stunting in children in developing countries occurs mainly as a result of chronic malnutrition and infectious diseases affecting 30% of children under the age of five **[3]**. The World Health Organization (WHO) set the standard stunting rate at 20%, but the stunting prevalence rate in Indonesia reached 21.6%, this figure exceeds the WHO standard. The problem of stunting is now classified as chronic, because there are still many regions in Indonesia with high stunting prevalence rates. One of them is Central Sulawesi Province, the stunting prevalence rate in Central Sulawesi reaches 28.2%, this figure exceeds the prevalence of stunting on a national scale. Sigi Regency has the highest number of stunting cases at 36.8% **[4]**.

The Central Sulawesi government has tried to tackle this problem by maximizing health services. However, there is one potential that needs to be considered by the local government, especially in Sigi Regency, in reducing the number of stunting cases, namely by conducting Nutrition Surveillance, namely collecting, processing, and analyzing data and disseminating information carried out by each Community Health Center as a report to the Health Office in optimizing government efforts and producing useful information. Utilization of data based on Public Health Centers from each region will show the level of stunting cases with the help of a dashboard web-based decision support system so that it is known which regional Public Health Centers have the potential to have stunting cases that require more priority **[5]**.

In determining regional determination decisions in Sigi Regency, a solution is given to build a decision support system based on the use of the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. The TOPSIS method is used in solving decision making in a practical and computationally efficient manner **[6]**. The TOPSIS method is an assessment method that is interpreted to provide each object to be evaluated for its specific value **[7]**. The TOPSIS method, first presented by Hwang and Yoon, is a simple and efficient multiple criteria method for identifying solutions from a set of several alternatives. The TOPSIS method has been widely used as a decision-making method because it can produce specific decision values **[8]**. Previous research on stunting cases, namely "Kejadian *Stunting* di Tinjau dari Pola Makan dan Tinggi Badan Orang Tua Anak Usia 12-36 Bulan di Puskesmas Kinovaro Kabupaten Sigi Provinsi Sulawesi Tengah" used Cross-sectional testing, but this research did not use decision-based regional determination analysis **[9]**.

Research has also been conducted on "Sistem Pendukung Keputusan Metode TOPSIS Untuk Diagnosa Penyakit Demam Berdarah", but the health cases in this research do not refer to stunting cases **[10]**. This encouraged researchers to analyze the priority areas for handling stunting cases using the TOPSIS method due to the lack of research on cases with this method, making it interesting to study. Therefore, research was conducted with the title "Analysis of Priority Areas for Handling Stunting Cases in Sigi Regency Using the TOPSIS Method Based on Web Dashboard".

2. RESEARCH METHODS

2.1 Research Objects and Research Variables

In this study, the data used was secondary data from the Health Office of Sigi Regency in 2022 and 2023. This data is in the form of a report on the incidence of stunting with several indicators of research variables in the Sigi Regency area. The variables used in this research are stunting cases with indicators including the number of stunting cases (C1), the number of coverage villages (C2), the number of integrated service posts (C3), the number of health workers (C4), the number of toddlers with exclusive breastfeeding

(C5), percentage of clean drinking water (C6), and percentage of proper sanitation (C7) in each region in Sigi Regency totaling 15 sub-district areas.

2.2 Data Analysis

2.2.1 Decision Support System

Decision Support System is generally defined as a system capable of providing problem-solving and communication capabilities for semi-structured and unstructured problems. The initial definition, is a model-based system consisting of procedures in data processing and consideration to assist decision making. Thus, a definition can be drawn, a decision support system is an adaptive, flexible and interactive computer-based system that is used to solve unstructured problems so as to increase the value of decisions taken [11].

Decision support system is an interactive computer-based information system, by processing data with various models to solve unstructured problems so as to provide information that can be used by decision makers in making a decision. In a decision support system, a person's intellectual resources are combined with computer capabilities to help improve the quality of decisions taken. Decision making is a process of choosing an action among several existing alternatives, so that the desired goal can be achieved [12]. Decision Support Systems are designed to be able to support all stages of decision making, such as the problem identification stage, data selection, approaches to activities to evaluate alternative choices. Decision Support Systems have components consisting of 4 subsystems, namely data management, management models, communication, and knowledge management or choice subsystem [13].

2.2.2 TOPSIS

TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) is a method used to solve decision making. TOPSIS provides a solution from a number of alternatives by comparing each best alternative and the worst alternative. This method uses distance to make these comparisons, the more factors that must be considered in the decision-making process, it will be relatively difficult to make a decision on a problem [14].

TOPSIS will rank alternatives based on the results of the relative closeness value of an alternative to a positive ideal solution. Alternatives that have been ranked are then used as preferences for making decisions by choosing the best solution desired. The steps taken in the TOPSIS method are as follows [15].

1. Build a normalized decision matrix
   In TOPSIS, the performance of each alternative is calculated using the following equation.
   $$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \tag{1}$$
   Where:
   $\boldsymbol{x}$: the value of alternative i for j criteria
   $\boldsymbol{r_{ij}}$: the normalized matrix

2. Build a normalized weight matrix
   The positive ideal solution A^+ and negative ideal solution A^- can be determined based on the normalized weight rating ($\boldsymbol{y_{ij}}$) as the following equation.
   $$y_{ij} = w_i r_{ij} \tag{2}$$
   Where:
   $\boldsymbol{y_{ij}}$: the normalized weight matrix
   $\boldsymbol{w}$: weights

3. Determine positive and negative ideal solutions.
   The positive ideal solution matrix and negative ideal solution matrix can be calculated based on the following equation.
   $$\begin{aligned} A^+ &= (y_1^+, y_2^+, \dots, y_n^+) \\ A^- &= (y_1^-, y_2^-, \dots, y_n^-) \end{aligned} \tag{3}$$

Where:
A^+ : the positive ideal solutions
A^- : the negative ideal solutions

4. Calculate the distance of each decision alternative from the positive and negative ideal solutions. The distance between alternative A_i and the positive ideal solution or the negative ideal solution can be calculated with the following equation

$$D_i^+ = \sqrt{\sum_{j=1}^{n} (y_i^+ - y_{ij})^2}\,;\ i = 1,2,\dots,m$$
$$D_i^- = \sqrt{\sum_{j=1}^{n} \left(y_i^- - y_{ij}\right)^2}\,;\ i = 1,2,\dots,m \quad (4)$$

Where:
i : value of 1,2,3 … m
Di^+ : distance of the alternative from the positive ideal solution
Di^- : distance of the alternative from the negative ideal solution

5. Determine the preference value for each alternative.
The preference value for each alternative (V_i) is given by the following equation.

$$V_i = \frac{D_i^-}{D_i^- + D_i^+};\ i = 1,2,\dots,m \quad (5)$$

Where:
V_i : relative closeness to the ideal solutions

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

Descriptive analysis was conducted to briefly explain the general description of the data of each criterion (C_i) which is a variable in the study.

Table 1. Value of Each Research Variable in Sigi District Area

Alternative Areas	Variable Criteria						
	C1	C2	C3	C4	C5	C6	C7
(A1) Kulawi	112	12	24	64	70	0	55.10
(A2) Pipikoro	23	12	14	36	6	0	48.85
(A3) Kulawi Selatan	205	12	19	63	66	20	65.80
(A4) Lindu	39	5	11	45	29	0	83.90
(A5) Palolo	153	15	30	62	127	0	71.70
(A6) Nokilalaki	87	5	11	26	32	53	79.90
(A7) Dolo	179	11	28	70	32	40	95.70
(A8) Dolo Selatan	166	12	23	46	18	0	91.40
(A9) Dolo Barat	151	12	20	75	18	0	59.90
(A10) Marawola	173	8	16	60	43	0	91.05
(A11) Kinovaro	211	10	20	43	21	100	89.60
(A12) Marawola Barat	133	12	23	34	20	40	48.90
(A13) Sigi Biromaru	495	18	53	96	35	44	95.50
(A14) Gumbasa	50	7	13	42	50	40	84.00
(A15) Tanambulava	193	5	13	33	38	13	80.60

Based on Table 1 it is known that each variable criterion value is the number of stunting cases (C1), the number of coverage villages (C2), the number of integrated service posts (C3), the number of health workers (C4), the number of toddlers with exclusive breastfeeding (C5), percentage of clean drinking water (C6), and percentage of proper sanitation (C7) in each area.

3.2 Attributes and Criteria Weight Values

In this study, the weight to be calculated is the determination given by the researcher, presented in the following table.

Table 2. Attribute Assignments and Criteria Weights

Criteria	Attribute	Weight(%)
Number of Stunting Cases (C1)	Benefit	25
Number of Coverage Villages (C2)	Benefit	10
Number of Integrated Service Posts (C3)	Cost	15
Number of Health Workers (C4)	Cost	15
Number of Toddlers with Exclusive Breastfeeding (C5)	Cost	15
Percentage of Clean Drinking Water (C6)	Cost	10
Percentage of Proper Sanitation (C7)	Cost	10

3.3 Decision Matrix

After determining the attributes and weight values for each criterion, a decision matrix will be created.

Table 3. Decision Matrix

Alternative	Criteria						
	C1	C2	C3	C4	C5	C6	C7
A1	112	12	24	64	70	0	55.10
A2	23	12	14	36	6	0	48.85
A3	205	12	19	63	66	20	65.80
A4	39	5	11	45	29	0	83.90
A5	153	15	30	62	127	0	71.70
A6	87	5	11	26	32	53	79.90
A7	179	11	28	70	32	40	95.70
A8	166	12	23	46	18	0	91.40
A9	151	12	20	75	18	0	59.90
A10	173	8	16	60	43	0	91.05
A11	211	10	20	43	21	100	89.60
A12	133	12	23	34	20	40	48.90
A13	495	18	53	96	35	44	95.50
A14	50	7	13	42	50	40	84.00
A15	193	5	13	33	38	13	80.60

3.4 Normalized Decision Matrix

The normalization calculation process uses **Equation (1)** and the following calculation results.

$$|x_1| = \sqrt{\begin{array}{c}(112)^2 + (23)^2 + (205)^2 + (39)^2 + (153)^2 + (87)^2 + \\ (179)^2 + (166)^2 + (151)^2 + (173)^2 + (211)^2 + \\ (133)^2 + (495)^2 + (50)^2 + (193)^2\end{array}}$$
$$= 739.532$$

$$r_{11} = \frac{112}{739.532} = 0.151$$
$$\vdots$$
$$r_{115} = \frac{193}{739.532} = 0.261$$

Through the calculations above, a normalized decision matrix is generated in the following table.

Table 4. Normalized Decision Matrix

Alternative	Criteria						
	C1	C2	C3	C4	C5	C6	C7
A1	0.151	0.281	0.263	0.295	0.365	0.000	0.183
A2	0.031	0.281	0.153	0.166	0.031	0.000	0.162
A3	0.277	0.281	0.208	0.290	0.344	0.141	0.218
A4	0.053	0.117	0.121	0.207	0.151	0.000	0.278
A5	0.207	0.351	0.329	0.285	0.662	0.000	0.238
A6	0.118	0.117	0.121	0.120	0.167	0.374	0.265
A7	0.242	0.258	0.307	0.322	0.167	0.282	0.318
A8	0.224	0.281	0.252	0.212	0.094	0.000	0.303
A9	0.204	0.281	0.219	0.345	0.094	0.000	0.199
A10	0.234	0.187	0.175	0.276	0.224	0.000	0.302
A11	0.285	0.234	0.219	0.198	0.109	0.705	0.297
A12	0.180	0.281	0.252	0.156	0.104	0.282	0.162
A13	0.669	0.422	0.581	0.442	0.182	0.310	0.317
A14	0.068	0.164	0.143	0.193	0.261	0.282	0.279
A15	0.261	0.117	0.143	0.152	0.198	0.092	0.267

3.5 Weighted Normalized Decision Matrix

The weighted normalized decision calculation process uses **Equation (2)**, following the calculation results.

$$y_{11} = (0.25)(0.151) = 0.038$$
$$y_{12} = (0.25)(0.031) = 0.008$$
$$y_{13} = (0.25)(0.277) = 0.069$$
$$\vdots$$
$$y_{113} = (0.25)(0.669) = 0.167$$
$$y_{114} = (0.25)(0.068) = 0.017$$
$$y_{115} = (0.25)(0.261) = 0.065$$

Through the calculations above, a normalized decision matrix is generated in the following table

Table 5. Weighted Normalized Decision Matrix

Alternative	Criteria						
	C1	C2	C3	C4	C5	C6	C7
A1	0.038	0.028	0.039	0.044	0.055	0.000	0.018
A2	0.008	0.028	0.023	0.025	0.005	0.000	0.016
A3	0.069	0.028	0.031	0.043	0.052	0.014	0.022
A4	0.013	0.012	0.018	0.031	0.023	0.000	0.028
A5	0.052	0.035	0.049	0.043	0.099	0.000	0.024
A6	0.029	0.012	0.018	0.018	0.025	0.037	0.027
A7	0.061	0.026	0.046	0.048	0.025	0.028	0.032
A8	0.056	0.028	0.038	0.032	0.014	0.000	0.030
A9	0.051	0.028	0.033	0.052	0.014	0.000	0.020
A10	0.058	0.019	0.026	0.041	0.034	0.000	0.030
A11	0.071	0.023	0.033	0.030	0.016	0.071	0.030
A12	0.045	0.028	0.038	0.023	0.016	0.028	0.016
A13	0.167	0.042	0.087	0.066	0.027	0.031	0.032
A14	0.017	0.016	0.021	0.029	0.039	0.028	0.028
A15	0.065	0.012	0.021	0.023	0.030	0.009	0.027

3.6 Positive and Negative Ideal Solution

The positive and negative ideal solution calculation process uses **Equation (3)**, through the above calculations, a positive and negative ideal solution is generated in the following table.

Table 6. **Positive and Negative Ideal Solution**

The positive ideal solution (A^+)	0.167	0.042	0.018	0.018	0.005	0.000	0.016
The negative ideal solution (A^-)	0.008	0.012	0.087	0.066	0.099	0.071	0.032

3.7 Distance of Alternatives to The Ideal Solution

The process of calculating the distance of alternatives to positive and negative ideal solutions uses **Equation (4)**, following the calculation results.

$$D_1^+ = \sqrt{\begin{matrix}(0.038-0.167)^2+(0.028-0.042)^2+(0.039-0.018)^2+\\(0.044-0.018)^2+(0.055-0.005)^2+(0.000-0.000)^2+\\(0.018-0.016)^2\end{matrix}}$$
$$= 0.144$$
$$\vdots$$
$$D_{15}^+ = \sqrt{\begin{matrix}(0.065-0.167)^2+(0.012-0.042)^2+(0.021-0.018)^2+\\(0.023-0.018)^2+(0.030-0.005)^2+(0.009-0.000)^2+\\(0.027-0.016)^2\end{matrix}}$$
$$= 0.110$$

Table 7. **Distance of Positive Ideal Solutions**

D_i^+	
D_1^+	0.144
D_2^+	0.160
D_3^+	0.114
D_4^+	0.159
D_5^+	0.155
D_6^+	0.148
D_7^+	0.122
D_8^+	0.116
D_9^+	0.123
D_{10}^+	0.119
D_{11}^+	0.123
D_{12}^+	0.128
D_{13}^+	0.094
D_{14}^+	0.160
D_{15}^+	0.110

$$D_1^- = \sqrt{\begin{matrix}(0.038-0.008)^2+(0.028-0.012)^2+(0.039-0.087)^2+\\(0.044-0.066)^2+(0.055-0.099)^2+(0.000-0.071)^2+\\(0.018-0.032)^2\end{matrix}}$$
$$= 0.105$$
$$\vdots$$
$$D_{15}^- = \sqrt{\begin{matrix}(0.065-0.008)^2+(0.012-0.012)^2+(0.021-0.087)^2+\\(0.023-0.066)^2+(0.030-0.099)^2+(0.009-0.071)^2+\\(0.027-0.032)^2\end{matrix}}$$
$$= 0.135$$

Table 8. Distance of Negative Ideal Solutions

	D_i^-
D_1^-	0.105
D_2^-	0.142
D_3^-	0.115
D_4^-	0.130
D_5^-	0.097
D_6^-	0.119
D_7^-	0.111
D_8^-	0.136
D_9^-	0.133
D_{10}^-	0.127
D_{11}^-	0.124
D_{12}^-	0.122
D_{13}^-	0.182
D_{14}^-	0.106
D_{15}^-	0.135

3.8 Preference Value of Each Alternatives

The process of calculating the preference value of each alternative uses **Equation (5)**, following the calculation results.

$$V_1 = \frac{0.105}{0.105 + 0.144} = 0.423$$
$$V_2 = \frac{0.142}{0.142 + 0.160} = 0.470$$
$$V_3 = \frac{0.115}{0.115 + 0.114} = 0.502$$
$$\vdots$$
$$V_{13} = \frac{0.182}{0.182 + 0.094} = 0.660$$
$$V_{14} = \frac{0.106}{0.106 + 0.160} = 0.399$$
$$V_{15} = \frac{0.135}{0.135 + 0.110} = 0.549$$

Table 9. Alternative Preference Value

	V_i
V_1	0.423
V_2	0.470
V_3	0.502
V_4	0.450
V_5	0.386
V_6	0.446
V_7	0.477
V_8	0.540
V_9	0.519
V_{10}	0.518
V_{11}	0.501
V_{12}	0.488
V_{13}	0.660
V_{14}	0.399
V_{15}	0.549

Based on the **Table 9** above, it is known that V_{13} has the largest alternative preference value. The ranking of each alternative is as follows.

3.10 Alternative Ranking Result

After carrying out the calculation process, it is obtained that the area prioritized for handling stunting cases is seen based on the highest preference value and is ranked 1 decision-wise.

Table 10. Alternative Ranking

Area Alternative	Preference Value	Ranking
Kulawi	0.423	13
Pipikoro	0.470	10
Kulawi Selatan	0.502	6
Lindu	0.450	11
Palolo	0.386	15
Nokilalaki	0.446	12
Dolo	0.477	9
Dolo Selatan	0.540	3
Dolo Barat	0.519	4
Marawola	0.518	5
Kinovaro	0.501	7
Marawola Barat	0.488	8
Sigi Biromaru	0.660	1
Gumbasa	0.399	14
Tanambulava	0.549	2

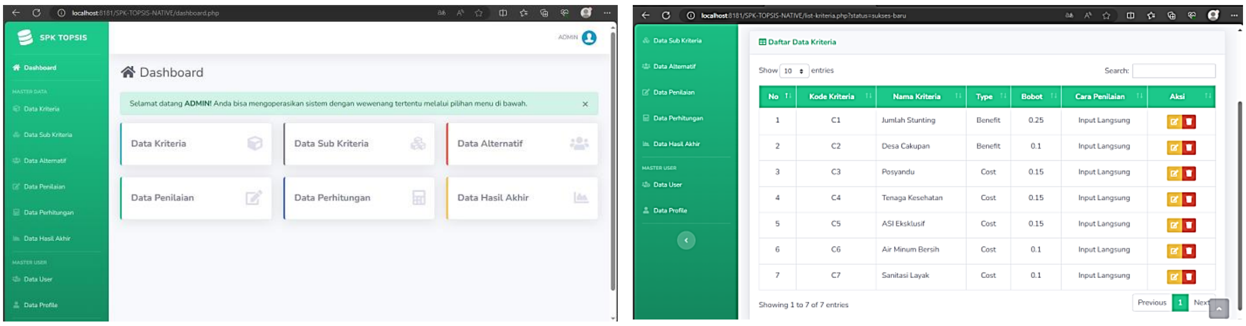
Based on **Table 10** above, it is known that the prioritized area for handling stunting cases is Sigi Biromaru.

3.11 Implementation of Web Dashboard System

The following is a display of the results of the system for selecting priority areas for handling stunting cases in Sigi regency based on a web dashboard.

1. Dashboard Main Page and Criteria Data Input Page

The dashboard page is the main display on data access that will be analyzed according to the steps of the TOPSIS method. Then, there is a criteria data input page, Admin can input analysis criteria data according to research such as Number of Stunting, Village Coverage, Number of Health Workers, Exclusive Breastfeeding, and other variable indicators used in research. Then fill in the criteria weights for all variable indicators, as shown in **Figure 1**.

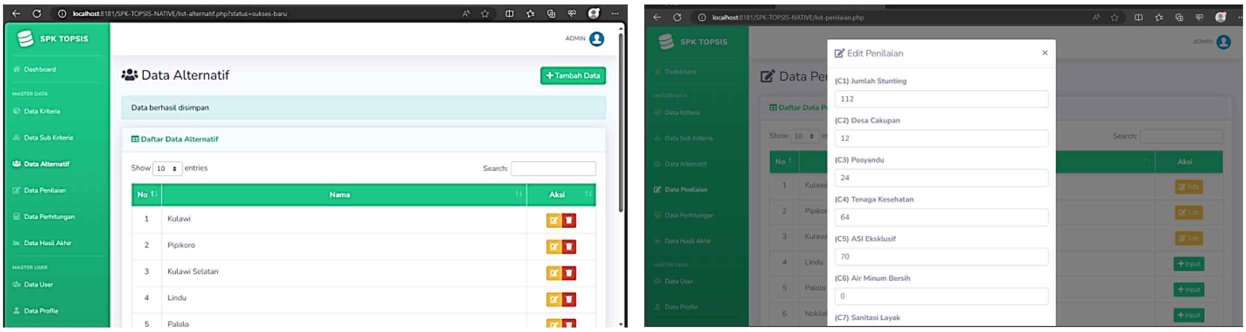


(a) (b)

Figure 1. Main View of Web Dashboard, (a) Main Page, (b) Inputting Criteria Data

2. Alternative Data and Alternative Value Input Page

The alternative data filling page is data on the areas to be analyzed and the determination of priority handling of stunting cases in Sigi Regency. Furthermore, inputting the value of each alternative and the value of the criteria data, for example the Kulawi alternative with the number of stunting as many as 112, 12 coverage villages, 24 integrated service posts, 64 health workers and so on according to the criteria and alternatives or each region, as shown in **Figure 2**.

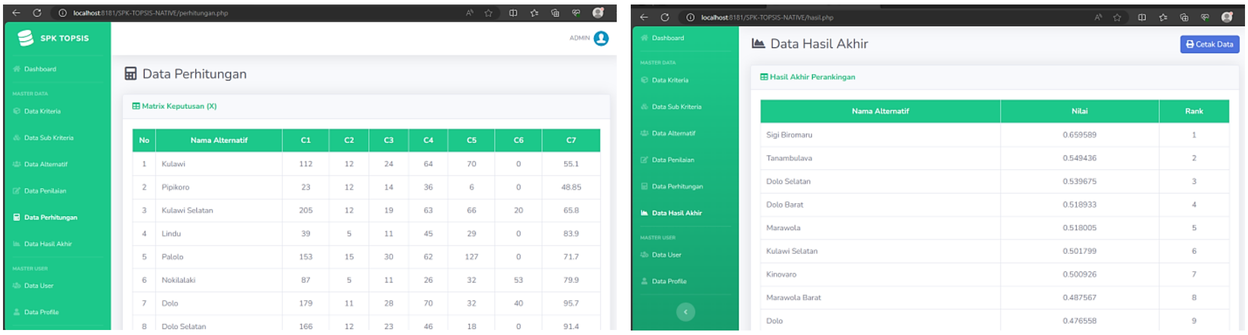


(c) **(d)**

Figure 2. Data Entry Page Display, (c) Alternative Data Entry, (d) Alternative Value Input

3. Data Calculation and Decision Result Page

The calculation data page will display the results of analysis starting from the decision to the alternative distance value after the TOPSIS method algorithm. Finally, the display for the final results will show the ranking of each region, the first rank with the largest value becomes the selected alternative, namely the Sigi Biromaru area with a preference value of 0.659, as shown in Figure 3.



(e) **(f)**

Figure 3. Data Calculation Page Display, (e) Data Calculation System, (f) Final Result

The figure above is the result of the application of the web dashboard system, the results obtained are in accordance with manual calculations, namely the prioritized area for handling stunting cases is Sigi Biromaru.

4. CONCLUSIONS

Based on the results of the analysis and application of the web dashboard system, the area prioritized for handling stunting cases based on indicators of stunting handling is the Sigi Biromaru district area, namely the Sigi Biromaru area with a total of 495 stunting cases, 18 coverage villages, 53 Posyandu villages, 96 health workers, 35 exclusive breastfeeding, 44% percentage of proper drinking water, and 84 percentage of proper sanitation. The highest preference value is 0.660. The suggestions for further research are to add other indicators of stunting cases and different weight values and other regions, then apply others decision-making methods such as Decision Tree, AHP, SAW, and others.

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REFERENCES

[1] A. Rahayu, F. Yulidasari, A. Octania, L. Anggraini, *Study Guide - Stunting dan Upaya Pencegahannya*. Yogyakarta: CV Mine, 2018.

[2] N. Ariati, A. Purnamawati, N. Suarni, I. Padmiari, P. Sugiani, Description of nutrional status and the incidince of stunting children in early childhood education programs in Bali-Indonesia. *Bali Medical Journal*, vol. 7, no. 3, pp. 723-726, 2018.

[3] World Health Organization, *InterpretationGuide Nutrion Landscape Information System (NLIS)*. Switzerland: WHO Press, 2018.

[4] Kementerian Kesehatan Republik Indonesia, *Buku Saku Hasil Studi Gizi Indonesia (SSGI)*. Jakarta: SSGI Kemenkes RI, 2022.

[5] A. Zainal, *Sistem Penunjang Keputusan Penentuan Prioritas Lokasi Penanganan Kemacetan Lalu Lintas Menggunakan Metode Perankingan TOPSIS (Studi Pada Kepolisian Wilayah Kepanjen)*. Program Studi Teknik Informatika Malang: Sekolah Tinggi Informatika & Komputer Indonesia (STIKI), 2016.

[6] X. Qiang, Z. Biao, Z. Jing, L. Guang, *Improved TOPSIS Model and its Application in the Evaluation of NCAA Basketball Coaches*. China: Modern Applied Science 9,2, 2015.

[7] S. Arfian & Indriyati, Sistem Pendukung Keputusan untuk Penentuan Minat Peserta Didik di SMA Menggunakan Metode TOPSIS. *Jurnal Masyarakat Informatika*, vol. 1, no. 6, pp. 11-17, 2015.

[8] Z. Xiaoqian, W. Fei, W. Haiyan, L. Changzhi, T. Run, S. Xiaolei, L. Jianping, TOPSIS method for quality credit evaluation: A case of air-conditioning market in China. *Journal of Computational Science*, vol. 1, no. 5, pp. 99-105, 2014.

[9] R. Miftakhur, S. Regina, Kejadian Stunting di Tinjau dari Pola Makan dan Tinggi Badan Orang Tua Anak Usia 12-36 Bulan di Puskesmas Kinovaro Kabupaten Sigi Provinsi Sulawesi Tengah. *Journal for Quality in Women's Health*, vol. 3, no. 2, pp. 207-215, 2020.

[10] Priyono & Nuzuluarini, Sistem Pendukung Keputusan Metode TOPSIS Untuk Diagnosa Penyakit Demam Berdarah. *Jurnal Inti Nusa Mandiri,* vol. 15, no. 1, pp. 51-58, 2020.

[11] Khoirudin, *Sistem Pendukung Keputusan Penilaian Kinerja Dosen dengan Menggunakan Metode Additive Ratio Assesment (ARAS)*. Yogyakarta: Andi, 2018.

[12] M. Safii & S. Ningsih, Rekomendasi Pemberian Beasiswa Bantuan Siswa Miskin Menggunakan Algoritma TOPSIS. *Jurnal Sains Komputer dan Informatika (J-Sakti)*, vol. 1, no. 2, pp. 243-254, 2017.

[13] L. Al Bahra, *Analisis dan Desain Sistem Informasi*. Yogyakarta: Graha Ilmu, 2015.

[14] Y. Zai, Mesran, B. Nadeak, I. Saputra, Penerapan Technnique for Orders Preference by Similarity to Ideal Solution (TOPSIS) untuk Keputusan Pemberian Kredit pada Calon Nasabah. *Jurnal Media Informatika Budidarma*, vol. 1, no. 1, pp. 1-7, 2017.

[15] S. Wahyuni, D. Niska, E. Hariyanto, Sistem Pendukung Keputusan Penentuan Siswa Berprestasi Menggunakan Metode TOPSIS pada SMA Sinar Husni. *Jurnal Teknik dan Informatika*, vol. 6, no. 1, pp. 46 - 51, 2019.