



## **DECISION MAKING MODEL FOR MEASURING THE FEASIBILITY OF SOCIAL ASSISTANCE FOR TPS3R AREA OF PRINGSEWU DISTRICT**

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### **Abstract**

Poverty is a major social welfare problem in Indonesia. Various efforts have been made by the government to overcome the main problems of social welfare in accordance with the Constitution of the Republic of Indonesia Number 11 of 2009 concerning social welfare, such as the provision of social assistance, social rehabilitation, social security, social empowerment, and social protection. In fact, various efforts made by the government in overcoming social welfare problems in Indonesia are considered not optimal. The lack of optimal distribution of government social assistance is affected by several factors, among others, the large number of data used as parameters and data collection and calculations that are still carried out simply and manually cause errors so that the results obtained are not on target. The study was conducted by examining the determining variables of eligibility for social assistance recipients using the *Simple Additive Weighting* method. To optimize the determination of the eligibility of beneficiaries in the TPS3R area of Pringsewu district, in this study the determining criteria will be applied to a system using the *Decision Support System* model. The decision-making system will be carried out by applying several variables as a basis for decision making including, Domicile, Family Economic Status, Employment, Income, Beneficiary Status Assistance, Number of Dependents and Home Conditions. By using the Decision Support system, poverty alleviation programs in the TPS3R area of Pringsewu district can be carried out quickly, effectively and efficiently and on target.

## **1.0 INTRODUCTION**

Developing countries are often faced with social welfare problems, social welfare problems arise due to income inequality. Income inequality is a major factor causing poverty which is a major social welfare problem. Poverty is a state when there is an inability to meet basic needs such as food, clothing, shelter, education, and health. Poverty can be caused by

a scarcity of basic necessities, or difficult access to education and employment. The government currently has various integrated poverty reduction programs ranging from poverty reduction programs based on social assistance, poverty reduction programs based on community empowerment, and poverty reduction programs based on small business empowerment run by various elements of the Government both central and regional, as an effort to increase the effectiveness and efforts to reduce poverty in accordance with the Constitution of the Republic of Indonesia Number 11 of 2009 concerning social welfare. The implementation of Social Welfare is a directed, integrated, and sustainable effort carried out by the Government, local governments, and communities in the form of social services to meet the basic needs of every citizen, which includes social rehabilitation, social security, social empowerment, and social protection. However, in its implementation, the achievement of the poverty alleviation program goals is still not optimal. This is shown by the large number of poor people in Indonesia. Based on the central statistics agency, the number of poor people in Indonesia in March 2022 was 26.16 million people. As for Lampung Province itself contributes to the number of poor people in urban areas as much as 8.31% and in rural areas as much as 13.14%, thus overall Lampung has a number of poor people as much as 11.57%.

Based on research conducted [1] it shows that the application of the AHP method in determining the eligibility of households receiving free electricity used in this study obtained the results of priority subcriteria where applicants with eligibility value = 1 get eligible status. Conversely, the applicant gets an unworthy status if the value obtained is <1. So it was concluded that the AHP method can be used in decision support systems to assist related parties in determining the eligibility of households receiving free electricity. Research [2] the results of the study show that the prediction of the level of receipt of basic food assistance used is two classes, namely feasible and inadequate. The data used for prediction is data taken from a sample of residents in XYZ village. From the evaluation results using confusion matrix, accuracy was obtained for 135 training data with 40 testing data and seven attributes used resulting in accuracy of 86%, recall of 85%, and precision of 88%. Research [3] showed the results that the trial of 6 variations in the weight of criteria, the stability of the ranking position of KPM participants, the Weighted Product Method method (WPM) can be said to be quite stable because it produces 21.6% of KPM whose position is very stable and 67.5% of KPM whose position is stable so that 89.1% of KPM ranking positions are said to be stable. Research [4] shows the results of research that has been done, so with this it can be concluded that the SAW method is effectively used to analyze data related to decision making, especially in terms of determining priorities for providing social assistance to the community. The test results showed that the system built was able to display output in the form of recommendations for social assistance recipients with 70% accuracy. The accuracy of testing data on social assistance recipients is not used to assess the correctness of government-issued data. Research [5] shows that the Decision Support System in this case the MOORA method can provide solutions in determining residents who are eligible to receive home renovation assistance according to specified criteria.

Based on several studies that have been conducted, the study conducted focuses on the problem of recipients of general social assistance while the focus of the study in the research conducted is to determine the eligibility of recipients of special social assistance intended for people living in the TPS3R area using the SAW method. The determination of variables used in the research conducted was based on social ministry regulations. The implementation of a decision support system in the process of determining recipients of social assistance can be done quickly, effectively and efficiently and on target.

The poverty alleviation program has not been optimal with poverty reduction programs based on social assistance, based on community empowerment, and based on small business empowerment because uncertain criteria must be met so that a family is eligible to receive poverty alleviation assistance. The criteria used as parameters and data collection and calculations that are still carried out simply and manually to determine the recipients of social assistance for poverty alleviation programs can cause errors so that the results obtained are not on target. The mechanism for verifying and confirming data is still not neat so that data duplication often occurs. Optimization of poverty alleviation programs based on social assistance in the TPS3R area can be done by utilizing technological development. Technological developments can be used to make an innovation in social assistance-based

poverty reduction programs in determining system-based beneficiaries. By using a poverty alleviation program system in determining recipients of social assistance can be done quickly, effectively and efficiently and on target.

## 2.0 THEORETICAL

### 2.1. Decision Support System Concept

According to Julius Hernawan (2005: 1) *Decision Support System* is defined as a system that is able to provide both problem-solving and communication skills for semi-structured problems. in[6]. *Decision Support System* is an interactive computer-based system, which helps decision makers to use data and various models to solve unstructured problems. [7]. DSS is an information system at the management level of an organization that combines sophisticated data and analysis models or data analysis tools to support semi-structured and unstructured retrieval[8].

From some of the opinions above, it can be concluded that DSS is a computer-based system that provides information at the management level of an organization and has the ability to solve problems by combining data and models for semi-structured and unstructured decision making.

The decision support system should include three main components of the BBMS, MBMS, and user interface. A knowledge-based management subsystem is optional, but can provide many benefits because it provides *intelligence* for all three key components. These components form the application system, the decision support system forms the decision support system. The architecture of the decision support system is shown in figure 2.1 as follows:

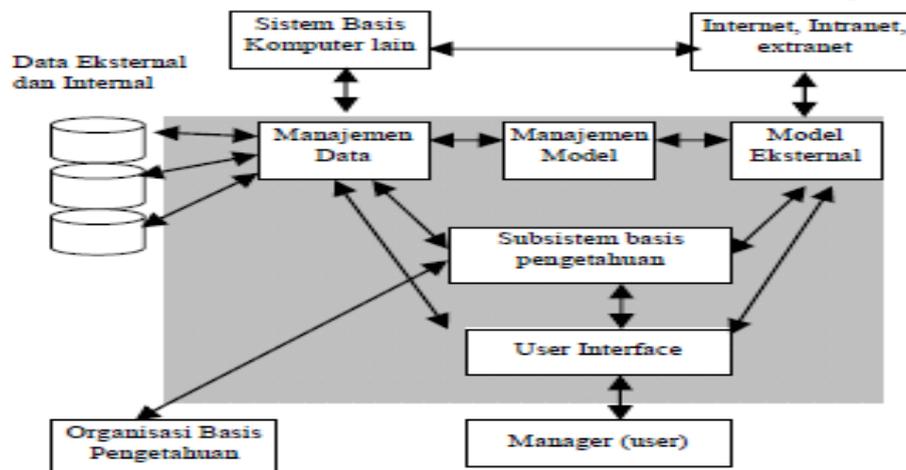


Figure 1 DSS Architecture [9]

### 2.2 Reuse, Reduce, Recycle (TPS3R) Waste Management Site

TPS3R is a Place for Reuse, Reduce, and Recycle Waste Management (reduce – use – recycle) then The 3R management approach starts from picking up waste from each house, sorting waste, managing organic waste to be composted. Reduce, Reuse, Recycle (TPS3R) is a waste management system and technology intended as a solution in overcoming waste problems and their impacts, especially in tourist areas. Through this TPS3R, not only environmental pollution problems caused by waste can be reduced, but also economically valuable products are produced from the processed waste. The purpose of this program is for the government to provide facilities to people in dense residential areas who want to carry out community-based waste management in accordance with their choices and environmental conditions.

### 2.3 Poverty Potential of TPS3R Area of Pringsewu Regency

PS3R is a Place for Reuse, Reduce, and Recycle Waste Management (reduce – use – recycle) then The 3R management approach starts from picking up waste from each house, sorting waste, managing organic waste to be composted. Pringsewu Regency itself has a TPS3R area which includes West Pringsewu, North Pringsewu and South Pringsewu Villages. The purpose of the TPS3R program is that the government provides facilities to people in dense

residential areas who want to carry out community-based waste management in accordance with the choices and conditions of the surrounding environment.

The economic condition of the Pringsewu region, represented by economic growth, inflation, open unemployment, and poverty, still needs attention. Based on the Central Statistics Agency (BPS), the poverty rate of the Pringsewu region (P0) in 2019 reached 10.15%, while in 2020 it reached 9.97%, then rose in 2021 with a percentage of 10.11%. The Poverty Depth Index (P1) in 2019 reached 1.13%, increased in 2020 by 1.20%, and in 2021 experienced a fairly significant increase with 1.38%. The Poverty Severity Index (P2) in 2019 was 0.21%, in 2020 it was 0.21% and increased in 2021 by 0.26%. The number of poor people in Pringsewu Regency in 2019 was 40.55 people, in 2020 it reached 40.12 people and in 2021 it reached 41.04 people. The poverty line of Pringsewu Regency in 2019 was 422 691, in 2020 it reached 458 627 and in 2021 it reached 475 983.

## 2.4 Multiple Attribut Decision Making (FMADM)

Multiple Attribute Decision Making (FMADM) is a decision-making method used to handle situations where there are many attributes to consider and uncertainty in the assessment of those attributes. The Multiple Attribute Decision Making (MADM) method is an approach used to address situations where there are several attributes to consider in decision making. MADM helps decision makers to compare and evaluate alternatives based on relevant attributes.

Multiple Attribute Decision Making is a method used to find alternatives with certain criteria. FMADM functions to determine the weight value for each attribute, then followed by a ranking process that will select alternatives that have been given. In the objective approach, the value of weights is calculated mathematically thus ignoring the subjectivity of decision making. There are several methods used to solve FMADM problems, including (Kusuma Dewi, 2013)[10]

- a. Simple Additive Weighting (SAW)
- b. Weight Product (WP)
- c. Elimination and Reality Choices (ELECTRE)
- d. Technique For Order Preference By Similarity To Ideal Solution (TOPSIS)
- e. Analytic Hierarchy Process (AHP)

## 2.5 Research Roadmap

Literally, a road map can be interpreted as a direction guide or a determining map/ road map. In the context of efforts to achieve the results of an activity, a road map is a detailed work plan document that integrates all plans and implementation of programs and activities within a certain time span.

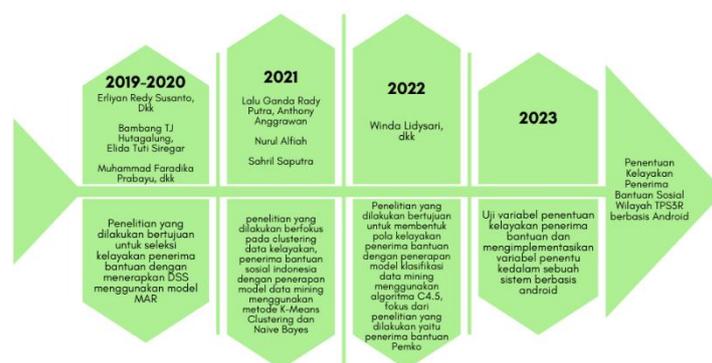


Figure 2. Research Road Map [4][4][4][11][12][13][14][15][12][13][14]

## 3.0 METHODOLOGY

### 3.1 Data Retrieval Techniques

The data collection method is an important thing in research and is a strategy or method used by researchers in collecting data needed in research. The data collection methods used in this study are:

#### 1. Field Research

Direct observation or observation is a technique or way of collecting data by observing ongoing activities [16]. Observation or observation is a technique or way to collect data by

observing ongoing activities. Observations can be made with participation or non-participation [17]. Based on the above understanding, observation is an observation made directly to collect data used in research.

The data and information collection techniques carried out during field studies are observation, namely data collection carried out during direct observation in the TPS3R area of Pringsewu Regency.

## 2. Research Library

Literature review is carried out by reading, quoting and making notes sourced from library materials that support and are related to research in this case regarding *the SAW Method*.

## 3. Questionnaire

A questionnaire is a set of written questions and usually involves many people. Questionnaires can be done in writing (paper based) or electronically. Usually the sample is chosen to represent a specific population. (Hanif Al Fatta, 2007: 70). Based on the above understanding, questionnaires are a technique of collecting information through a set of written questions and involving many people, and usually the sample used represents a certain population. The questionnaire is divided into two, namely open questionnaires and closed questionnaires. Sudaryono (2015: 84) "Open questionnaires contain questions or main statements that can be answered or responded to by respondents freely". In open questionnaires, respondents have the freedom to respond according to their perceptions. While the closed questionnaire according to Sudaryono (2015: 85) "questions or statements are arranged in a structured manner, in addition to the main question there are alternative answers (*options*) that only need to be chosen by respondents". Djaali and Muljono (2004). A closed questionnaire is a questionnaire that is presented in such a form that respondents are asked to choose one of the answers according to their characteristics by giving a cross (X) or check mark (✓). Respondents cannot provide answers or other responses except those that are available as alternative answers (in Sudaryono, 2015: 85). Data collection through questionnaire techniques requires the population as a sampling of the data to be used. Kurniawan (2012) Population is a generalized area consisting of objects or subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions are drawn (in Sudaryono, 2015: 95).

Based on the above understanding, in this study a closed printed questionnaire will be used. The answers provided are adjusted to the *Likert scale*. According to Sugiyono (2016: 136) "*Likert scale* is used to measure the attitudes, opinions, and perceptions of a person or group about social events or phenomena". Alternative answers on the Likert scale used are scored as seen in table 3.1:

Table 1 *Likert Scale*

Type	Shoes
<b>Strongly Agree/Very Positive</b>	5
<b>Agree/Often/Positive</b>	4
<b>Hesitant/Sometimes/neutral</b>	3
<b>Disagree/Almost Never/Negative</b>	2
<b>Very Disagree/Never</b>	1

Source: Sugiyono (2016:137)

## 3.2 Sampling Techniques

Research samples are an important factor in the research we do. The sample taken at the time of the study will determine the final result of the study. Sugiyanto (2003) The sample is a subset of the population, including a selected number of members of the population. Thus, some elmen from the population is a sample (in Sudaryono, 2015: 96).

Sample is the population that will be taken partly to be used as an object in the study. According to Arikunto (1986: 107) if the number of subjects is less than 100, it is better to use all subjects so that the research is a type of population research. Furthermore, if the number of subjects is more than 100, it can be taken 10% - 15% or 20% - 25% (Ekaresta Prihardjati Saputro, 2018). In a study conducted in the TPS3R area of Pringsewu Regency took samples as much as

20% of the 3 TPS3Rs in Pringsewu Regency. The subjects used as samples are communities representing each TPS3R area of Pringsewu Regency can be seen in table 3.2.

Table 2 List of Sampling Sites

No	Region Name
1	South Pringsewu
2	West Pringsewu
3	North Pringsewu

### 3.3 Simple Additive Weigting (SAW) Method

The SAW method is often also known as the weighted addition method. The basic concept of the SAW method is to find the weighted sum of performance ratings on each alternative on all attributes. The SAW method requires normalizing the decision matrix (X) to a scale that can be compared with all available alternative ratings. The SAW method recognizes two attributes, namely the benefit criterion and the cost criterion. The fundamental difference between these two criteria is in the selection of criteria when making decisions. [18]

The following is the formula of the *Simple Additive Weighting (SAW)* method.

$$r_{ij} = \begin{cases} \frac{x_{ij}}{\text{Max}(x_{ij})} & \text{jika } j \text{ adalah keuntungan(benefit)} \\ \frac{\text{Min}(x_{ij})}{x_{ij}} & \text{jika } j \text{ adalah kriteria biaya(cost)} \end{cases} \dots (1)$$

Where:

- $r_{ij}$  = nilai r at i n g k i n e r j a t e r n o r m a l i s a s i
- $x_{ij}$  = nilai atribut yang dimiliki dari setiap kriteria
- $\text{Max}_{ij}$  = nilai terbesar dari setiap kriteria  $i$
- $\text{Min } x_{ij}$  = nilai terkecil dari setiap kri t e r i a  $i$
- B e n e f i t = j i k a n i l a i t e r b e s a r a d a l a h t e r b a i k
- C o s t = j i k a n i l a i t e r k e c i l a d a l a h t e r b a i k

Where  $r_{ij}$  is the normalized performance rating of alternative  $A_i$  on attribute  $C_j$ ;  $i=1, 2,..m$  and  $j=1,2,..,n$ . The preference values for each alternative ( $V_i$ ) are given as:

$$V_i = \sum_{j=1}^n w_j r_{ij} \dots (2)$$

Where:

- $V_i$  = Preference value
- $W_j$  = Rank weight
- $R_{ij}$  = normalized performance rating

### 3.4 Beneficiary Eligibility Variables

The data to be used in research is data from the results of questionnaires distributed using printed media, where the attributes to be used in the research questionnaire will be tested for validity and reliability first. The attributes to be used are based on several Ministry of Social Affairs regulations as can be seen in table 3.3 below.

Table 3. Beneficiary Eligibility Variables

No	Variable	Weight	B/C
1.	Domicile	5	Benefit
2.	Family Economic Status	4	Cost
3.	Work	3	Cost

4.	Income	4	Cost
5.	Beneficiary Status	3	Benefit
6.	Number of Dependents	3	Benefit
7.	Home Conditions	3	Cost

Source: Ministry of Social Affairs

### 3.5 Research Flowchart

Research flow charts help researchers to clarify the process and flow of research that must be carried out. This can help researchers avoid errors and errors in the research process and ensure that the research can make a significant contribution. The flow chart of the research conducted can be seen in figure 3 below.

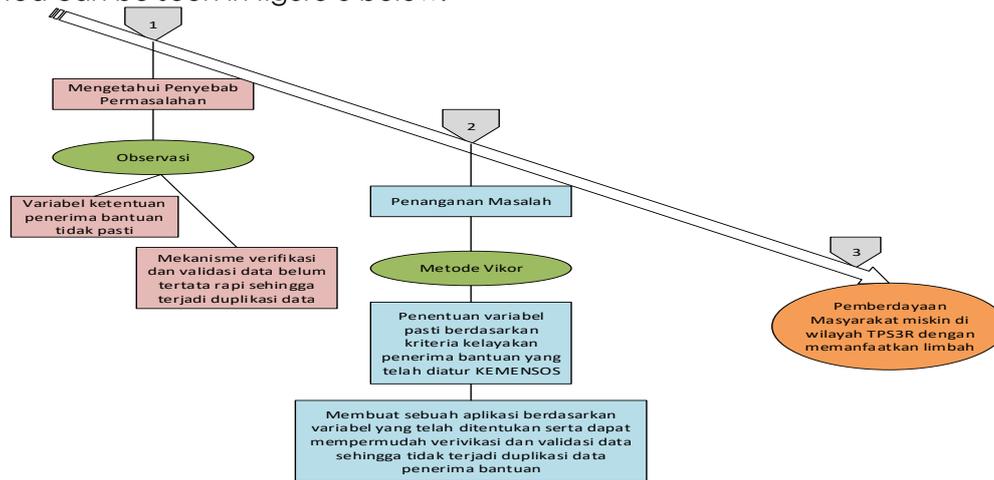


Figure 3. Research Flowchart

## 4.0 RESULTANTS

### 4.1 Weight Variables and Values

Before determining the eligibility of social assistance recipients using the SAW method, weight criteria and weight values are required.

Tabel 4. Variable Weighting

No	Assessment Components	Sub Criteria	Weight
1	Domicile	Permanent Domicile	4
		Temporary Domicile	2
2	Family Economic Status	Medium Family	4
		Low Family	2
		Poor Families	1
3	Work	Employee	4
		Self employed	3
		Farmer	2
		Laborer	1
4	Yieldn/Month	> 1,5 Jt	3
		1-1,5 Jt	2
		<1 Jt	1
5	Beneficiary Status	Active	3
		Passive	2
6	Number of Dependents	> 7	4
		5-7	3
		≤ 4	2
7	Home Conditions	Permanent	4
		Semi-Permanent	2
		Temporary	1

After weighting the variables, they then give weight to each criterion based on the data obtained by each family.

Table 5 Match rating of each alternative on each criterion

Alternative	Criterion						
	C1	C2	C3	C4	C5	C6	C7
<b>A1</b>	4	1	3	2	3	3	4
<b>A2</b>	4	2	2	2	3	3	2
<b>A3</b>	2	1	1	1	3	2	2
<b>A4</b>	4	4	2	3	2	2	4
<b>A5</b>	2	4	3	2	3	2	4
<b>A6</b>	4	1	1	1	3	3	4

After the value is given a criterion value for each alternative, a decision matrix is formed from table 2 of the match rating of each alternative on each criterion.

$$X = \begin{bmatrix} 4 & 1 & 3 & 2 & 3 & 3 & 4 \\ 4 & 2 & 2 & 2 & 3 & 3 & 2 \\ 2 & 1 & 1 & 1 & 3 & 2 & 2 \\ 4 & 4 & 2 & 3 & 2 & 2 & 4 \\ 2 & 4 & 3 & 2 & 3 & 2 & 4 \\ 4 & 1 & 1 & 1 & 3 & 3 & 4 \end{bmatrix}$$

After the formation of matrix X, the next step is to normalize matrix X based on equation 1 as follows:

$$r_{11} = \frac{4}{\text{Max}(4; 4; 2; 4; 2; 4)} = 1$$

$$r_{21} = \frac{4}{\text{Max}(4; 4; 2; 4; 2; 4)} = 1$$

$$r_{31} = \frac{2}{\text{Max}(4; 4; 2; 4; 2; 4)} = 0,5$$

$$r_{41} = \frac{4}{\text{Max}(4; 4; 2; 4; 2; 4)} = 1$$

$$r_{51} = \frac{2}{\text{Max}(4; 4; 2; 4; 2; 4)} = 0,5$$

$$r_{61} = \frac{4}{\text{Max}(4; 4; 2; 4; 2; 4)} = 1$$

After normalizing matrix X, a normalized matrix R is obtained as follows:

$$R = \begin{bmatrix} 1 & 1 & 0.33 & 0.5 & 1 & 1 & 0.5 \\ 1 & 0.5 & 0.5 & 0.5 & 1 & 1 & 1 \\ 0.5 & 1 & 1 & 1 & 1 & 0.67 & 1 \\ 1 & 0.25 & 0.5 & 0.33 & 0.67 & 0.67 & 0.5 \\ 0.5 & 0.25 & 0.33 & 0.5 & 1 & 0.67 & 0.5 \\ 1 & 1 & 1 & 1 & 1 & 1 & 0.5 \end{bmatrix}$$

After obtaining the normalized matrix R, then ranking is carried out based on equation 2 as follows:

$$V_1 = (5)(1) + (4)(1) + (3)(0.33) + (4)(0.5) + (3)(1) + (3)(1) + (3)(0.5) = 19,5$$

$$V_2 = (5)(1) + (4)(0.5) + (3)(0.5) + (4)(0.5) + (3)(1) + (3)(1) + (3)(1) = 19,5$$

$$V_3 = (5)(0.5) + (4)(1) + (3)(1) + (4)(1) + (3)(1) + (3)(0.67) + (3)(1) = 21,5$$

$$V_4 = (5)(1) + (4)(0.25) + (3)(0.5) + (4)(0.33) + (3)(0.67) + (3)(0.67) + (3)(0.5) = 14,3$$

$$V_5 = (5)(0.5) + (4)(0.25) + (3)(0.33) + (4)(0.5) + (3)(1) + (3)(0.67) + (3)(0.5) = 13$$

$$V_6 = (5)(1) + (4)(1) + (3)(1) + (4)(1) + (3)(1) + (3)(1) + (3)(0.5) = 23,5$$

Based on the ranking results using equation 2 above, you can see the results of alternative rankings in the table below.

Table 6 Alternative Ranking

Alternatif	Hasil	Rank
A1	19.5	3
A2	19.5	3
A3	21.5	2
A4	14.33333	4
A5	13	5
A6	23.5	1

Based on the ranking table above, it can be seen that the selected alternatives that get priority social assistance for the TPS3R area are alternative 6 (six) with a total value of 23.5. Selected alternatives in calculations using the decision support system model Simple additive weighting is the alternative with the highest value with variables Alternative domiciled fixed, Family Status Poor, Labor Jobs, < income of 1 million, Active Beneficiary Status, Number of Dependents 5-7 people, and Permanent Home Conditions.

## 5.0 CONCLUSION

Based on the calculations that have been done, the use of the Simple additive Weighting method in determining the eligibility of beneficiaries in the TPS3R Area is carried out using several variables as a basis for decision making including Domicile, Family Economic Status, Employment, Income, Beneficiary Status, Number of Dependents and House Conditions. By using the SAW method in measuring the feasibility of social assistance in the TPS3R area of Pringsewu Regency, it is hoped that more objective and data-based decision making can be achieved. In addition, the decision support system model provides a systematic and transparent framework in evaluating the eligibility of social assistance recipients in the TPS3R area, thus poverty alleviation in the TPS3R area of Pringsewu district can be carried out quickly, effectively, efficient and on target. And is expected to increase the effectiveness of social assistance programs and provide maximum benefits to the community.

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