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Application of the Weighted Product Method to Determine House Renovation Assistance in PringsewuRegency

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A B S T R A C T

The challenge faced by local governments in implementing house renovation assistance is determining which residents are eligible to receive house renovation assistance. This problem can be overcome by creating an effective and efficient assessment system for receiving house renovation assistance. By using the Weighted Product (WP) method, it is hoped that it can help simplify and speed up the performance of local governments in selecting the recipients of house renovation assistance. The function of this method is to determine the weight value for each alternative and the criteria having been determined. From the analysis of the manual system using 9 criteria/indicators, the result is that prospective recipients who have a vulnerable value of 0.03 to 0.04 are more worthy of priority for house renovation assistance. If the vulnerable value is below 0.029, the prospective beneficiaries will be reviewed for the next year's RTLH program.

I. INTRODUCTION

A decent house is a dream for every human being in living life in society. With the large number of unemployed and the poverty rate which is still high, it is very possible for the community to be unable to have a decent house to live in. The house has a very important function for all communities. It is a place to unwind from family gatherings and as a place of refuge for humans. Therefore, Pringsewu Regency Government held a house renovation program for the underprivileged in Pringsewu Regency. Poverty makes a person unable to complete the basic needs of himself and his family which includes physical, mental and social needs[1]. Pringsewu Regency is the largest recipient of the BSPS Program in Lampung Province in 2019. This is due to the large distribution of uninhabitable houses in Pringsewu Regency. Based on TNP2K data from 2015, there were

2,980 houses unfit for habitation. The program has handled 1,887 while uninhabitable houses which have not been handled are 1,093[2]. Based on data from the Pringsewu Regency Social Service in 202, the beneficiaries in PagelaranRegency were 21 (twenty one) families from 8 (eight) villages, in Pringsewu Regency there were 14 (fourteen) families from 3 (three) villages, in Pardasuka sub-district there were 12 (twelve) families from 5 (five) villages, in Ambarawa sub-district there were 8 (eight) families from 3 (three) villages, in Adiluwih sub-district there were 7 (seven) families from 3 (three) villages, in Banyumas sub-district there were6 (six) families from 2 (two) villages, in North Pagelaran sub-district there were 4 (four) families from Way Kunyir Village, in Gading rejo sub-district there were 22 (twenty two) families from 10 (ten) villages, and in Sukoharjo sub-district there were 6 (six) families from Sukoharjo and Waringin sari Barat Villages [3].

From several previous studies in an effort to improve the selection system for prospective beneficiaries, House Renovation in Pringsewu Regency has carried out a literary study as carried out by [4] which uses six criteria or indicators in determining prospective house renovation recipients. There are (1) Wall of the house, (2) Roof Structure (3) Residential Floor (4) Condition of WC/Latrine (5) Occupation of Head of Family (6) House Ownership Certificate. From the results of the test using these six indicators, 5 samples of prospective house renovation recipients in one sub-district were used so that they could not represent indicators in other sub-districts in Pringsewu using the WP (Weighted Product) method.

In research [5], this research focuses on the Ambarawa sub-district by using research indicators in determining the recipients of uninhabitable housing assistance using nine (9) criteria used. There are: (C1) Poor Households, (C2) Owning a House on Own Land , (C3) The area of the house is less than 8 meters, (C4) the roof of the house is made of easily damaged materials (rumbia, zinc, thatch, palm fiber, tile), (C5) the walls of the house are made of cubicles, boards, bamboo, inner bark Damaged Condition, (C6) Ground Floor Made Of Plank, Bamboo, Cement in Damaged Condition, (C7) No Place for Bathing, Washing, Toilet, (C8) Have ID card/identity and family card, (C9) Never received RTLH assistance. The test uses a sample test of nine alternatives with a Manual testing system and is based on Excel data using the Analytical Hierarchy Process (AHP) method. Research conducted by [6] used five criteria indicators in determining prospective recipients of house renovation assistance in Semuli Raya Village. There are: (1) house condition (2) house status (3) occupation (4) monthly income (5) number of residents.

The results of the research studies conducted by several researchers above focused on manual test research studies to determine house renovation in one particular area. However, in this research study, we will combine the criteria from previous research results with the implementation of the WP (Weighted Product) method with a more varied sample test involving nine sub-districts in Pringsewu Regency with a manual test of 33 samples. Furthermore, the results of the Manual Test will be converted to a Web-based Application System test and compare the test results obtained to see the accuracy of the sample test. By applying the WP (weighted product) method to the assessment of recipients of house renovation assistance, a method for selecting the best house renovation will be obtained as a standard for house renovation in the PringsewuRegency. The research was taken with the research problem of how to determine prospective house renovation recipients in Pringsewu Regency using the Weight Product method and how to obtain criteria or assessment variables for house renovation assistance recipients in PringsewuRegency.

II. LITERATURE REVIEW

a. Previous Research

The results of research to determine the feasibility of prospective house renovation

recipients have been carried out by several researchers such as that conducted by [7] with the results of a study using the MOORA method which is a very useful method to be applied in decision making with various alternatives and criteria in determining the feasibility of house renovation for poor families quickly and accurately. The level of accuracy of the test results using this method is 99% so that no one is harmed for all parties. The decision support system application which is designed is dynamic in determining the criteria and the weight of the criteria as well as the value of the criteria used. It can be changed according to the needs of the village head in determining which families are entitled to house renovations in accordance with applicable regulations. [8] The results achieved by the system produce 100 alternatives having been sorted from the largest alternative to the smallest alternative. This resulted in 32 alternatives with a rating of 1 to 10 which can be considered in determining the self-help housing stimulant host. Based on the validation test, Microsoft Excel can be used because the error value is only slightly, -9%. The study was conducted using the Weighted Product method with a test approach using Microsoft Excel so that it has limitations in access and data management which has more than 100 alternatives.

Research conducted by [9] uses the TOPSIS method which will be combined with fuzzy logic to determine the weight value for each criterion attribute in determining the Recipient of House Renovation Assistance at the Department of Housing and Settlement Areas of Deli SerdanRegency, followed by a ranking process to select the best alternative. In this case, the best alternative is a valid alternative as a beneficiary which meets the criteria. With this method, it is hoped that the assessment process will be more precise and accurate because it is based on predetermined criteria and weights.

The research conducted [10] explained that the results of this experiment used 15 alternative data and 5 criteria. The ranking of data generated by recipients of house renovation assistance is unfit for habitation with top priority seen from the order which shows the most appropriate renovation assistance to those which cannot be inhabited by its residents. The decision-making system uses the Simple Additive Weighted Method approach which is then tested using the Java programming language and MySQL database so that data ranking reports can be printed directly.Based on research conducted by [11], the weighted model used is ROC (Rank Order Centroid). ROC is based on the level of importance or priority of the criteria. This weighting technique will give weight to each criterion according to the ranking which is assessed based on the priority level. The results obtained in this study were to obtain accurate information in registering applicants for house renovation assistance.

b. Concept of Decision Support System

Michale S. Scott-Morton (1970), first articulated the important concept of a decision support system (DSS) as an interactive computer-based system, which helps decision makers to use data and various models in solving problems related [12].

According to [13], the decision support system as a system which is used as a tool to solve problems to assist decision makers (managers) in determining decisions but not to replace the capacity of managers in giving consideration. DSS is intended for decisions requiring judgment or for decisions which cannot be supported by the algorithm at all. According to [14], a decision support system is an interactive information system which provides information, modeling, and manipulating data. This system is used to assist decision making in semi-structured and unstructured situations, where no one knows exactly how decisions should be made. The objectives of a decision support system are [15] :

1. Assist managers in making decisions or semi-structured problems.
2. Provide support for the manager's consideration and not to replace the manager's function.

3. Increasing the effectiveness of decisions taken by managers more than improving their efficiency.
4. Allows decision makers to do a lot of computing quickly at low costs.
5. Increased productivity.
6. Quality support
7. Competitive
8. Overcome cognitive limitations in processing and storage.

c. FMADM (Fuzzy Multi Atribute Decision Making)

According to [16] Fuzy Multiple Attribute Decision Making (FMADM) is a further development of MADM. Basically the MADM process is carried out in 3 stages. Those are the preparation of the components of the situation, analysis, and synthesis of information. There are several methods which can be used to solve FMADM problems, including:

a. Simple Additive Weighting Methode (SAW)
b. Weighted Product (WP)
c. Elimination et choix traduisant la realite (ELECTRE)
d. Technique for Order Preference ny Similarity to Ideal Solution (TOPSIS)
e. Analitycal Hierarchy Process (AHP)

d. Uninhabitable House

According to [17],The house is the main refuge for humans from the climate and from other physical disturbances. The house is a base for maintaining production capabilities, a place to rest, a place to maintain health, a place to learn and prepare.

Based on the Regulation of the Minister of Social Affairs No. 20 of 2017 Article 1 concerning Social Rehabilitation of Uninhabitable Houses, Uninhabitable Houses are places of residence which do not meet health, security and social requirements. Social Rehabilitation of Uninhabitable Houses is the process of restoring the social functioning of the poor through efforts to improve the condition of uninhabitable Houses, either partially or completely, which is carried out in mutual cooperation in order to create decent housing conditions as a place to live. Criteria for uninhabitable houses which can be improved include:

a. The walls and/or roof are in a damaged condition which can endanger the safety of occupants
b. Walls and/or roofs are made of easily damaged/rotten materials
c. Floors made of earth, planks, bamboo or/cement, or ceramic in a damaged condition
d. There is no place for bathing, washing and latrines. The floor area is less than 7.2 meters per person (seven point two square meters per person).

Criteria for uninhabitable houses which can be repaired based on the Minister of Social Affairs Regulation No. 20 of 2017 include:

a. The condition of the walls and or roof in a damaged condition which can endanger the safety of the occupants,
b. Walls and or roofs are made of materials which are easily damaged or weathered,
c. Floors are made of earth, planks, bamboo or cement or ceramic in a damaged condition,
d. Does not have a place for bathing, washing and latrines,
e. The floor area is less than 7.2 m^2 per person (seven point two square meters per person).

According to [11]**,** the characteristics of families who are eligible for house renovation assistance include:

1. Have a valid ID card / identity card,
2. Registered as a poor family,
3. Income below the minimum wage,
4. Daily life still requires help to support his family,
5. Owning private land,
6. The residence owned and occupied is an uninhabitable house.

The criteria for houses which are worthy of housing renovation assistance in this study were measured using the indicators: (1) The walls of the house, (2) the roof structure, (3) the floor of the residence, (4) the condition of

the WC/latrine, (5) Occupation of the head of household, (6) Land ownership certificate.

Research conducted by [5], Determination of Uninhabitable House Assistance Recipients uses nine (9) criteria: (C1) Poor Households, (C2) Owning a House on Own Land, (C3) house area less than 8 m^2, (C4) house roofs made of materials easily damaged (rumbia, zinc, weeds, fibers, tile), (C5) Walls of houses made of cubicles, planks, bamboo, bark in damaged conditions, (C6) floors made of soil, boards, bamboo, cement in damaged conditions, (C7) There is no place for bathing, washing, and latrines, (C8) Has ID and Family Card, (C9) Has never received RTLH assistance.

III. RESEARCH METHODS

a. WP (Weighted Product) Method

Based [18] The Weighted Product method requires a normalization process because this method multiplies the results of the assessment of each attribute. The multiplication result is not meaningful if it has not been compared (divided) with the standard value. The weight for the benefit attribute functions as a positive power in the multiplication process, while the cost weight functions as a negative power. The weighted product method uses multiplication to connect attribute ratings, where the rating of each attribute must first be raised to the power of the corresponding weight. This process is the same as the normalization process. According to Yoon in [19], the weighted product method uses the multiplication technique in using multiplication to connect attribute ratings, where the rating of each attribute must be raised to the power of the attribute weight in question. The stages in using the weighted product method are to determine the criteria which will be used as a reference in decision making.

1. Determine the suitability rating of each alternative on each criterion. (Matrix X)
2. Determine the preference weight of each criterion. (Matrix W)
3. Multiplying all attributes for an alternative with the weight as a positive power for the benefit attribute and the weight with a negative power for the cost attribute. (Matrix S)
4. The multiplication results are added together to produce a V value for each alternative. (Matrix V)
5. Look for alternative values by performing the same steps as in step one, only using the highest value for each highest attribute, for each benefit attribute and the lowest value for the cost attribute.
6. Divide the value of V for each alternative by the standard value (V(A*)) which results in R.
7. Look for the ideal alternative value.

Formulation:

$$A = \prod_{A=1}^{n} (Xij)^{wj} \text{ .....(1)}$$

Where :

S = states alternative preferences which are analogous to the vector S
X = states the value of the criteria
W = states the weight of the criteria
i = states alternative
j = states criteria
N = states the number of criteria

WJ is a positive value for the profit attribute, and a negative value for the cost attribute. The relative preferences of each alternative are given:

$$A = \frac{\prod_{j}^{n}=1(Xij)^{wj}}{\prod_{j}^{n}=1(Xi*)^{wj}} \text{.....(2)}$$

Where:

V = states an alternative preference which is analogous to a vector V
X = states the value of the criteria
W = states the weight of the criteria
i = states alternative
j = states criteria
n = states the number of criteria
* = states the number of criteria which have been assessed on the vector S.

b. Determination of Respondents

Determination of the sample is done by non-probability sampling with stratified random sampling technique. The number of samples taken is 33 candidates for house renovation in the village in Pringsewu Regency. The sample taken is the village which is the Target of Recipients of House Renovation Assistance in Pringsewu Regency. Manual Test Data used 33 houses representing each village. The research location is the village in Pringsewu Regency, Lampung.

c. Data analysis

The data collection method used in this research is to use a personal questionnaire. Personal questionnaires are used to obtain data about the dimensions of the constructs being developed in this study. The questionnaire used in this study contains two main parts:

1. The first part is about the social profile of the respondent which contains respondent data related to the identity of the respondent such as name, address, origin of the village and gender.
2. The second part contains statements related to the variables studied. The scale used as a measurement of the variables in the answers or filling out the questionnaire from the respondents is using the Likert scale, which contains five levels of answers from Very Low to Very High.

Based on the existing criteria, there is a determination of the criteria by distributing a questionnaire of criteria answered by respondents with statements agreeing and strongly agreeing, and then these criteria will be made into an assessment.

IV. RESEARCH RESULTS

a. Determination of Criteria and Quality

In this study, there are weights and criteria in determining the assessment of house renovation in Pringsewu Regency. The criteria are:

Table 1. Criteria Table

Criteria	Information	Score	Attribute Type (Cost/Benefit)
C1	House wall	10	Cost
C2	Roof Structure	10	Cost
C3	Residential Floor	10	Cost
C4	Family Head Income	15	Cost
C5	Land Ownership Certificate	15	Benefit
C6	House Area	10	Cost
C7	Have an Identity Card and Family Card	10	Benefit
C8	Never Received RTLH Assistance	10	Cost
C9	House Improvement Plan	10	Benefit
	Total	100	

Source: [4][5]

Table 2. Description of Quality Values

Quality	Value
Very bad	1
Bad	2
Pretty good	3
Well	4
Very good	5

Table 3. Criteria of House Wall

House Wall Criteria	Quality	Attribute Type (Cost/Benefit)
Bamboo	1	Cost
Plywood	2	Cost
Board	3	Cost
Wall	5	Benefit

Table 4. Criteria for Roof Structure

Roof Criteria	Quality	Attribute Type (Cost/Benefit)
Thatch/Thatch Roof	1	Cost
Asbestos/Zinc	2	Cost
Rooftile	5	Benefit

Table 5. Criteria for Residential Floor Types

Criteria	Quality	Attribute Type (Cost/Benefit)
Ceramic	5	Benefit
Land	2	Cost
Cement	4	Cost

Table 6. Criteria for Head of Household Income

Criteria	Quality	Attribute Type (Cost/Benefit)
>2.200.000	5	Benefit
1.501-2.000.000	4	Cost
1.000.000-1.500.000	3	Cost
<1.000.000	1	Cost

Table 7. Criteria for Land Ownership Certificate

Certificate Criteria	Quality	Attribute Type (Cost/Benefit)
Own yourself	5	Benefit
Owned by parents/ Inheritance	2	Cost
Do not have	1	Coat

Table 8. Criteria for House Area

House Area Criteria	Quality	Attribute Type (Cost/Benefit)
Less than 8 m^2	2	Cost
12 m^2-18 m^2	3	Cost
More than 20 m^2	4	Benefit

Table 9. Criteria for Domicile Identity

Identity Criteria	Quality	Attribute Type (Cost/Benefit)
Have Family Card&Identity Card According to Domicile	5	Benefit
Do not have Family Card & Identity Card	1	Cost

Table 10. Criteria for Never Received RTLH Assistance

RTLH Criteria	Quality	Attribute Type (Cost/Benefit)
Already Got RTLH	4	Benefit
Never Got RTLH	2	Cost

Table 11. Criteria for Building Quality Improvement Plan

Criteria of Development Plan	Quality	Attribute Type (Cost/Benefit)
Planning and Savings on Building Materials	5	Benefit
Planning, No Building Material Savings	2	Cost
Not Planning	1	Cost

After knowing the quality of each sub-criteria and the type of attribute used, the prospective recipients of house renovation assistance for each sample are given a checklist to find out the number of each quality in the sub-criteria. From the summary of the checklists, the results are shown in Table 12 below:

Table 12. Alternative Assessment on each criterion

No	Kecamatan	Alternatif	Jenis Dinding	Jenis Atap	Jenis Lantai	Penghasilan	Sertifikat Kepemilikan Tanah	Luas Rumah	Identitas Domisili	RTLH	R.P. Kualitas Rumah
1	Pringsewu	Rumah 1	3	5	4	3	5	3	5	2	5
2		Rumah 2	1	2	4	4	5	3	5	4	5
3		Rumah 3	5	2	4	3	2	3	5	2	5
4		Rumah 4	1	2	4	4	5	2	5	4	5
5		Rumah 5	1	5	4	4	5	2	5	4	2
6		Rumah 6	5	2	2	2	5	2	5	2	5
7	Gadingrejo	Rumah 7	5	5	4	1	2	3	5	2	5
8		Rumah 8	2	2	4	4	5	3	5	4	5
9		Rumah 9	3	5	4	3	5	3	5	2	2
10		Rumah 10	3	2	4	4	5	2	5	4	5
11	Sukoharjo	Rumah 11	5	5	4	2	5	2	5	2	5
12		Rumah 12	2	2	4	1	2	3	5	4	5
13		Rumah 13	1	2	2	4	5	2	5	4	5
14	Adiluwih	Rumah 14	1	2	2	1	5	3	5	4	2
15		Rumah 15	2	5	2	4	5	4	5	4	5
16		Rumah 16	5	2	2	3	1	2	5	2	5
17	Pagelaran	Rumah 17	3	5	4	1	5	4	5	4	5
18		Rumah 18	1	5	4	3	5	3	1	2	5
19		Rumah 19	5	5	4	4	2	4	1	2	5
20		Rumah 20	5	2	5	3	2	4	5	2	5
21		Rumah 21	5	5	2	4	5	3	5	4	1
22	Pagelaran Utara	Rumah 22	5	5	5	4	2	4	5	2	5
23		Rumah 23	3	5	4	5	5	4	5	2	5
24		Rumah 24	3	2	4	3	5	3	5	4	5
25		Rumah 25	5	5	4	5	2	3	5	2	5
26	Padasuka	Rumah 26	3	5	4	4	5	3	5	4	2
27		Rumah 27	1	2	2	4	5	3	5	2	2
28		Rumah 28	3	5	4	2	2	5	4	4	5
29	Ambarawa	Rumah 29	2	2	4	2	5	5	2	4	5
30		Rumah 30	1	5	2	4	5	3	5	2	5
31	Bayumas	Rumah 31	2	2	4	2	1	2	3	4	2
32		Rumah 32	3	2	4	2	5	2	5	4	2
33		Rumah 33	5	5	4	3	5	3	5	2	5

From the manual test data, it was found that **14th House** had the highest score as a candidate for house renovation assistance which has a weight value of 0.04. Furthermore, the lowest value of this test is **19th House** which has a weight value of 0.02.

V. Design

The design stage is a stage in the form of drawing, planning and manufacturing by uniting several separate elements into a unified whole to clarify the form of a system. In the website-based SPK application system, the Weighted Product Method, the steps needed are Creating Context Diagrams, Data Flow Diagrams, Entity Relationship Diagrams (ERD), Data Dictionary, Flowcharts, Input Dialogs (Input Displays), Output Dialogs (Output Displays). Context diagram

is a diagram which describes the relationship between external entities, inputs and outputs of the system. The following is an overview of the application design context diagram design.

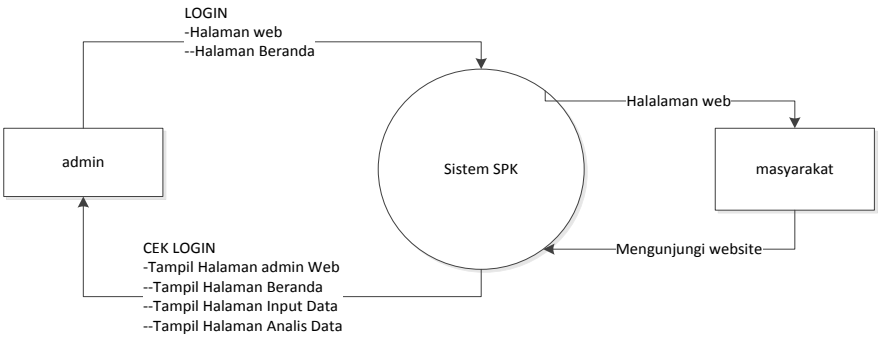

Figure 1. Context Diagram

Data Flow Diagram Level 1 is a more detailed solution of the Context diagram. This diagram contains data storage which can be seen in the following figure:

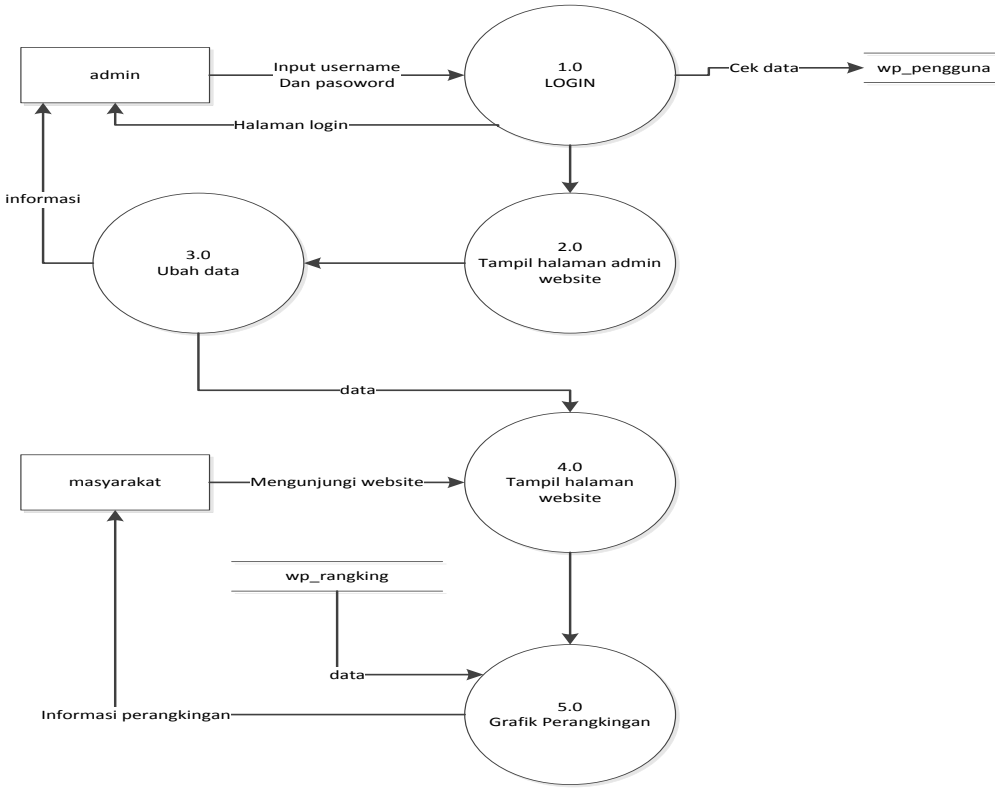

Figure 2. Data Flow Diagram Level 1

Data Flow Diagram Level 1 process 2 is a breakdown of the DFD process level 1 process 2.0 and process 3.0. Data Flow Diagram Level 1 process 2 contained in the decision-making application using the Web-based Weighted Product Method can be seen in the following figure:

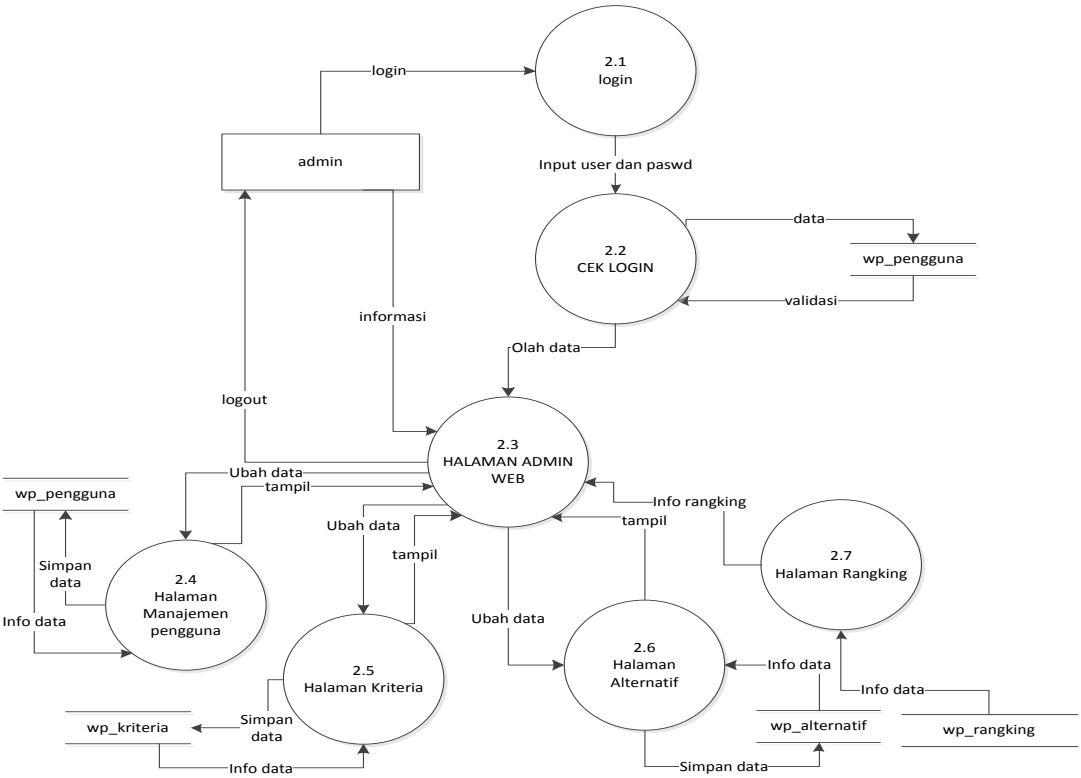

Figure 3. Data Flow Diagram level 1 Process 1 and Process 2

a. *Entity Relationship Diagram*

ERD or entity relationship diagram on the Web-based Decision Support System Application of the Weighted Product Method can be seen in the following figure:

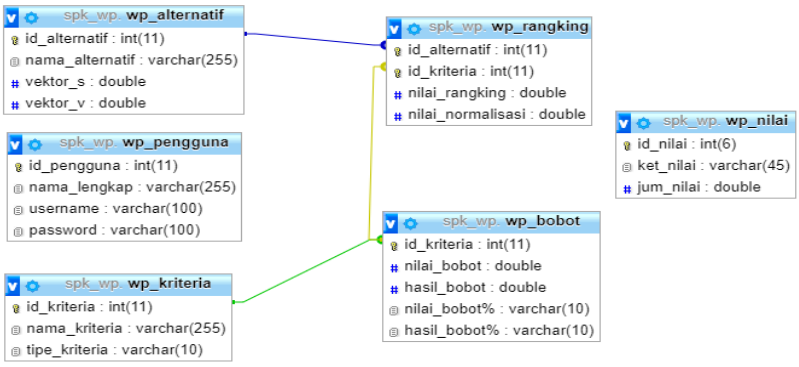

Figure 4.Entity Relationship Diagram

b. Comparative Analysis of Manual Testing and Website-Based Application Systems

After the system design has been built and implemented on a web-based information system, the manual system is tested using a website application. Before the test, the admin logs in and a test page will appear as shown in the following image:

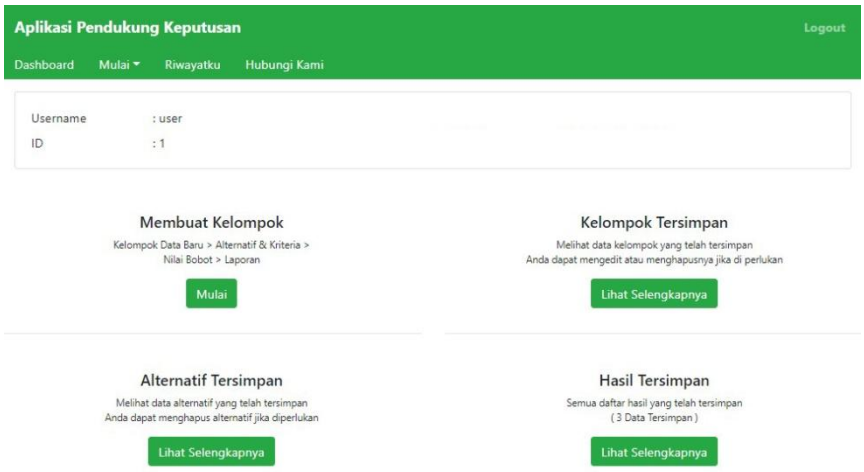

Figure 5. Main Page of Application Testing of Decision Support Systems

Next, the admin or user inputs the criteria and weights on the group menu to determine the standard value which will be determined in the final test results. The determination of the weights and criteria had previously been tested using the Weighted Product Method manually. The system is then adjusted to the equation or formula which has been tested. The results of the system test can be seen in the following figure:

Figure 6. Final Results of the Application System Test

The test results of the application system can also be seen with a graphical model so that it looks more attractive. The overall results of the application test can be seen in the following graph:

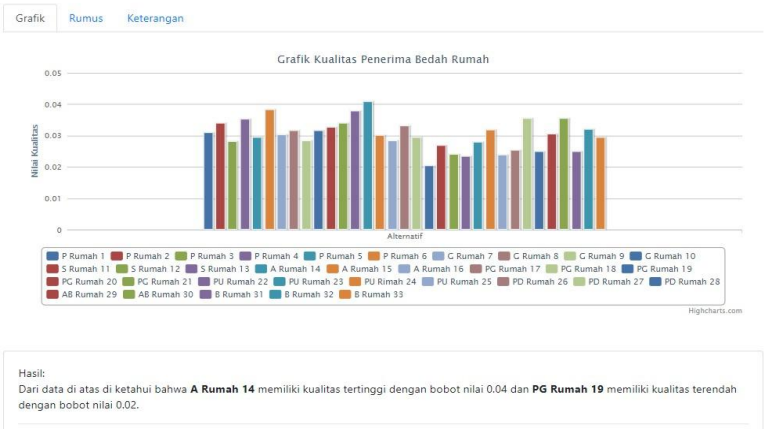

Figure 7. Priority Graph for Recipients of House Renovations with Wighted Product Method

To find out how effective and accurate the application system for prospective House Renovation recipients is with the Wighted Product Method, the results of the application system are compared with a system which has been tested manually using 33 samples which have been calculated manually with the same equations/formulas and criteria. The results of the comparison values can be seen in table 13 below:

Table 13. Comparative Results of Manual and Application Wighted Product Test Methods

No	Sub-Districts	House	Value of Manual Test Results	Rank	Value of Application System Test Results	Rank
1	Pringsewu	1st House	0.031	15	0.03101	15
2		2nd House	0.034	7	0.03389	8
3		3rd House	0.028	22	0.02814	24
4		4th House	0.035	6	0.03530	6
5		5th House	0.029	19	0.02938	21
6		6th House	0.038	2	0.03830	2
7	Gadingrejo	7th House	0.030	16	0.03028	17
8		8th House	0.032	11	0.03162	13
9		9th House	0.028	23	0.02829	23
10		10th House	0.032	12	0.03162	14
11	Sukoharjo	11th House	0.033	9	0.03260	10
12		12th House	0.034	8	0.03393	7
13		13th House	0.038	3	0.03783	3
14	Adiluwih	14th House	0.041	1	0.04081	1
15		15th House	0.030	17	0.03005	18
16		16th House	0.028	24	0.02831	22
17	Pagelaran	17th House	0.033	10	0.03314	9
18		18th House	0.029	20	0.02946	19
19		19th House	0.020	33	0.02034	33
20		20th House	0.027	26	0.02674	26
21		21st House	0.024	30	0.02402	30
22	Pagelaran Utara	22nd House	0.023	32	0.02337	32
23		23rd House	0.028	25	0.02790	25
24		24th House	0.032	13	0.03171	12
25		25th House	0.024	31	0.02378	31
26	Padasuka	26th House	0.025	27	0.02528	27
27		27th House	0.036	4	0.03552	4
28		28th House	0.025	28	0.02490	28
29	Ambarawa	29th House	0.030	18	0.03042	16
30		30th House	0.036	5	0.03552	5
31	Bayumas	31st House	0.025	29	0.02488	29
32		32nd House	0.032	14	0.03202	11
33		33rd House	0.029	21	0.02946	20

Based on the results of the comparison test of the manual system in determining house renovation in Pringsewu Regency using the Wighted Product Method, the highest score was obtained at 14th House with a value of 0.41, which means that the house is a priority for house renovation assistance. The application test has a higher accuracy by placing 14th House as the highest candidate for house renovation assistance and detecting changes in ranking because the application system reads five digits behind the comma which results in a ranking change in determining the candidate for house renovation assistance. Thus, the manual test and the application system have the same accuracy, but the application test is better because it can read in more detail using five letters behind the comma so that samples which have the same value when rounding numbers will decompose and are more acceptable because the system has an

explanation in detail. By using a web-based application system, the determination of house renovation assistance requires a fairly short time. To test 33 samples of houses, it only takes less than 10 minutes and the data being tested can accommodate more than 200 data in one test and can be stored in a database which can be accessed in real time, making it easier for users. The range of values used to determine the priority of prospective house renovation recipients is if the value is ≥0.30 while prospective recipients of house renovation assistance with a value is≤0.029, it is prioritized for review in the next year of acceptance.

VI. CONCLUSION

From this research, it can be concluded that the Wighted Product Method can assist in making decisions to determine the recipients of house renovation assistance in Pringsewu Regency with the criteria which have been determined by the researchers. From the analysis of the manual system using 9 criteria and indicators, the results obtained prospective recipients which have a vulnerable value ≥ 0.03 to 0.04 will be prioritized to get houserenovationassistance. If the vulnerable value is below 0.029, the prospective recipient of assistance will be reviewed for the next year's RTLH program. Furthermore, the results of the manual test are compared with the results of a web-based application system using 33 samples of prospective recipient houses involving nine sub-districts spread across Pringsewu Regency with the results that 18 houses had priority to be built in the first fiscal year with a vulnerable test value using the Wighted Product Method 0.03. Furthermore, there are 15 houses which have a vulnerable value ≤ 0.029 so that they will receive priority for the second year budget with a review by the assessment team.

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