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Decision Support System for Selection of the Superior Mango Seeds Using Web-based Analytical Hierarchy Process (AHP) Hybrid Simple Additive Weighting (SAW) Method

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Abstract— Indonesia is a horticultural country that agricultural production, one of which is mango production. Mango (*Mangifera indica L*) is one of the leading horticultural commodities in Indonesia. The use of high-quality seeds has made an impact influence on the productivity of farming, to increase the productivity of farming, it is very necessary to provide superior seeds for farmers so that farmers can increase yields and quality of production. With so many manga seeds available, a Decision Support System is needed or often called a Decision Support System (DSS). DSS is a model-based system consisting of procedures in processing and considerations to assist farmers (users) in making decisions on the selection of high-quality manga seeds. In this research, the method used is the Analytical Hierarchy Process (AHP) in searching for the weighting criteria and the Simple Additive Weighting (SAW) method in performing alternative rankings. The results of this study are to make it easier for farmers and the community in choosing superior manga seeds.

Keywords— Decision Support System, AHP Method, SAW Method, Hybrid, Mango Seed Selection

I. INTRODUCTION

Indonesia is a horticultural country that agricultural production, one of which is mango production, one of which is the production of mangoes.by use of superior seeds has a major effect on the productivity of farming, to increase the productivity of farming, it is very necessary to provide high-quality seeds for farmers and the community so that farmers can increase the yield and quality of production of superior mango seeds (Yahyan and Siregar 2019).

A Decision Support System (DSS) is a model-based system consisting of procedures in processing and considerations to assist farmers (users) in making decisions. In order to succeed in achieving its objectives, the system must be simple, robust, easy to control, fully adaptable to important matters, and easy to communicate with (Oktaputra, et al 2014). In this research, using a combination of two methods, namely AHP and SAW. The AHP method is used to determine the weight of importance between criteria (Sugianto, et al 2016). The SAW method is used to determine the value of alternative preferences based on criteria, so as to produce a ranking of each alternative.

Based on the description of the background of the problems mentioned earlier, the formulation of the problems proposed for this research One of the problems is that a large number of existing manga seeds can make it difficult for farmers to determine high-quality superior manga seeds. Therefore, special knowledge is needed about high-quality mango seeds so that harvest yields are more optimal, for that a decision support system application is needed that is able to provide information and recommendations to farmers about good quality mango seeds.

The purpose of this research is to design a computer-based decision support system to choose alternative superior mango seeds that can be used to help facilitate farmers who cultivate mango plants in choosing superior mango seeds.

II. LITERATURE REVIEW

A. Literature Study

Some of the literature that used as a guide and reference in this research include:

Research conducted by Beni Irawan (2013) entitled "Decision Support System for Selection of Oil Palm Seeds Using the Simple Additive Weighting (SAW) Method". The system made for this decision is using the SAW (Simple Additive Weighting) method. The SAW method is to find the weighted sum of the performance ratings for each alternative on all attributes.

Research conducted by Ardhy (2018) entitled "Decision Support System for Corn Seed Selection Using the Analytical Hierarchy Process (AHP) Method at the Abadi Jaya Store, East Lampung". In this research, a decision support system can help users determine Corn Seeds according to the desired alternatives and criteria. The method used is Analytical Hierarchy Process (AHP).

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Research Aripin, et al (2018) entitled "Decision Support System for Selection of the Best Mango Seeds Applying SAW and WASPAS Methods". This study also uses two comparison methods, namely the Simple Additive Weighting (SAW) method, and the Weighted Aggregated Sum Product Assessment (WASPAS) method. It will be able to select each attribute from the best alternative from several available alternatives.

Research conducted by Yahyan and Siregar (2019) entitled "Decision Support System for Selection of Web-Based Superior Rice Seeds using the Analytical Hierarchy Process (AHP) Method". This study reviews how to select superior rice seeds. If farmers can choose quality rice seeds, the harvest will be as their wishes, then a decision support system for selecting superior seeds is made using a web-based Analytical Hierarchy Process (AHP) method to facilitate farmers in obtaining information and assisting farmers in making decisions about seeds to be harvested.

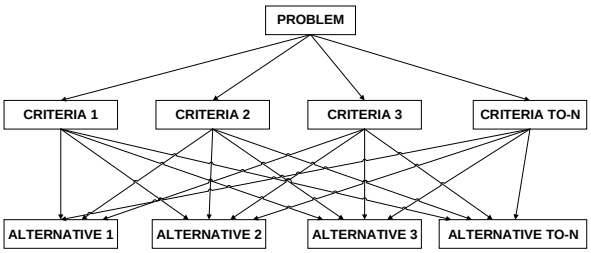
Research (Didik Heriyantoro, et al (2020) entitled "Decision Support System for Determining Outstanding Teachers with AHP and SAW Methods at Markus High School in Tangerang". In this research, to build a decision support system application that provides recommendations for the selection or determination of outstanding teachers at Markus High School in Tangerang, accessed quickly, directly, and accurately in determining the results. The method used is the Analytical Hierarchy Process (AHP) and Simple Additive Weighting (SAW) methods to provide an alternative assessment of outstanding teachers. The results of this study in determining the criteria at Markus High School in Tangerang using 5 (five) parameters, namely pedagogics, personality, social professionals, absences, and the sub-criteria used are illness, permission, and neglect. The results of this study can be concluded that the highest and best value using the SAW method falls on the *Pracaya* alternative with a value of 4.46 this highest value can be taken into consideration by the teacher to be selected for determining the desired outstanding teacher.
Theoretical Foundation

1. Decision Support System

A Decision Support System (DSS) is part of a computer-based information system including a knowledge-based system or knowledge management that is used to support decision making in an organization or company. It can also be said as a computer system that processes data into information for making decisions from specific semi-structured problems (B. Ali 2019). Artificial intelligence-based decision support systems can perform diagnoses in the form of knowledge, expert analysis, pattern recognition, and others in the scope of various cases (Muslimin B 2012).

2. Analytical Hierarchy Process (AHP)

Analytical Hierarchy Process (AHP) is a multi-criteria decision method for solving complex or complicated problems, in an unstructured situation into parts (variables) which are then formed into functional or structural hierarchies to display the problems to be solved and then build a priority order for alternatives. Through pairwise comparisons based on the judgment of the decision-maker on the system. In this system, the AHP method is used in calculating the weight value of each criterion (Fatmawati, et al 2017). Troubleshooting hierarchy for AHP method can be seen in Picture 1.



Picture 1. AHP method troubleshooting hierarchy

a. Basic Principles of APH's Analytical Hierarchy Process Procedure

In solving problems with AHP several principles must be understood, including (Fatmawati, et al 2017):

1) Make a hierarchy
2) Assessment of criteria and alternatives. AHP method comparison scale analysis can be seen in table 1.

Table 1. AHP method comparison scale analysis

Score	Description
1	Have the same effect.
3	One element is slightly more important than the other.
5	One element is more important than the other.
7	One element is clearly more important than the other elements
9	One element is definitely more important than the other.
2, 4, 6, 8	The value between two adjacent values of comparison.
opposite	If activity i get one point compared to activity j, then j has the inverse value compared to i.

3) synthesis of priority

For each criterion and alternative, it is necessary to do pairwise comparisons. The weights or priorities are calculated by manipulating the matrix or by solving mathematical equations. The considerations for pairwise comparisons are synthesized to obtain overall priorities through the following steps:

a) Square the matrix of pairwise comparisons.
b) Count the number of values from each row, and then normalize the matrix.

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4) *logical consistency*
consistency has two meanings. First, similar objects can be grouped according to uniformity and relevance. Second, it concerns the level of relationship between objects based on certain criteria. Procedure Analytical Hierarchy Process (AHP)

The procedures or steps in the AHP method include:

1) Define the problem.
2) Set the priority of the synthesis element:
   a) Add up the values of each column in the matrix.
   b) Divide each value from the column by the corresponding column total to obtain a normalized matrix.
   c) Add up the values of each row and divide by the number of elements to get the average value.
3) Measuring consistency:
   a) Multiply each value in the first column by the relative priority of the first element, the value in the second column by the relative priority of the second element, and so on.
   b) Sum each row.
   c) The result of the row sum is divided by the corresponding relative priority element.
   d) Add up the results of each criterion divided by the number of elements present the result is called max which is shown in the equation:

$$\lambda \text{ max} = \frac{\sum \lambda}{n}$$

4) Calculate Consistency index (CI) with the formula:
   CI = (λ mask-n/n)
   Where n = number of elements
5) Calculate *Consistency ratio* (CR) with the formula:
   R = CI/IR
6) Checking hierarchy consistency
   If the value is more than 10%, then the data judgment assessment must be corrected. However, if the consistency ratio (CI/IR) is ≤0.1. then the calculation results can be declared correct. List *Index Random Consistency* can be seen in table 2.

Table 2. List *Index Random Consistency*

Elements	Score IR
1, 2	0,00
3	0,58
4	0,90
5	1,12
6	1,24
7	1,32
8	1,41
9	1,45
10	1,49
11	1,51
12	1,48
13	1,56
14	1,57
15	1,59

3. Simple Additive Weighting (SAW)

The Simple Additive Weighting (SAW) method is often also known as the weighted addition method. The basic concept of SAW is to find the weighted sum of the performance ratings on each alternative on all attributes. The SAW method requires the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative ratings. The SAW method must have several alternatives (A), criteria (C), and weight (Weight/W) which have the weight of provisions. SAW solution steps:

a) Determine the alternative, namely Ai.
b) Determine the criteria that will be used as a reference in making decisions, namely Cji.
c) Provide the value of the suitability rating of each alternative on each criterion.
d) Determine the weight of preference or level of importance (W) for each criterion (1)

$$w = [w_1 w_2 w_3 \dots w_j] \quad (1)$$

e) Create a match rating table for each alternative on each criterion.
f) Make a decision matrix X which is formed from the suitability rating table of each alternative on each criterion. The x value of each alternative (Ai) on each predetermined criterion (Cj), where, i=1,2,…m and j=1,2,…n (2)

$$x = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1j} \\ \vdots & & & \vdots \\ x_{i1} & x_{in} & \cdots & x_{ij} \end{bmatrix} \quad (2)$$

g) Normalize the decision matrix by calculating the value of the normalized performance rating (rij) from the alternative Ai on the Cj criteria (Kusmandewi, 2006).

$$r_{ij} = \begin{cases} \dfrac{x_{ij}}{Max_i x_{ij}} & \text{If j is a profit attribute (\textit{benefit})} \\ \dfrac{Min_i x_{ij}}{x_{ij}} & \text{If j is a cost attribute (cost)} \end{cases} \quad (3)$$

Description of each criterion(3)
r_{ij} : normalized performance rating value.
x_{ij} : attribute value belonging from
$Max\ x_{ij}$: greatest value of each criterion.
$Min\ X_{ij}$: smallest value of each criterion.
Benefit: if the biggest value is the best.

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Cost : if the smallest value is the best (Sumbawa, 2015).

h) The results of the normalized performance rating value (rij) form a normalized matrix (R).

$$r = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1j} \\ \vdots & & & \vdots \\ r_{i1} & r & \cdots & r_{ij} \end{bmatrix}$$

i) The final result of the preference value (Vi) is obtained from the sum of the normalized matrix row elements (R) with the preference weights (W) corresponding to the matrix column elements (W).

$$Vi = \sum_{j=1}^{n} W_j R_{ij}$$

The calculation results of a larger Vi value indicate that alternative Ai is the best alternative (Beni Irawan 2013).

4. Unified Model Language (UML)

In designing this system the author uses the Object-Oriented Analysis and Design method, with activities that focus on model development using the Unified Model Language as a system design tool consisting of use cases, activities, and class diagrams. According to Booch "UML is a standard language for creating software designs, UML is usually used to build documents from software-intensive systems". UML is a standard language that is often used to describe the process of analysing and designing object-oriented systems (Yusman 2013).

5. Hypertext Preprocessor (PHP)

PHP or Hypertext Preprocessor is a web-based programming language that can process dynamic data. PHP is said to be a server-side embedded script language, meaning that the syntax and commands that we provide will be fully executed by the server but included in ordinary HTML pages. Applications built by PHP, in general, will give results in a web browser but the whole process is run on the server, in principle, the server will work if there is a request from the client. In this case, the client uses PHP codes to send requests to the server (Elisa 2012).

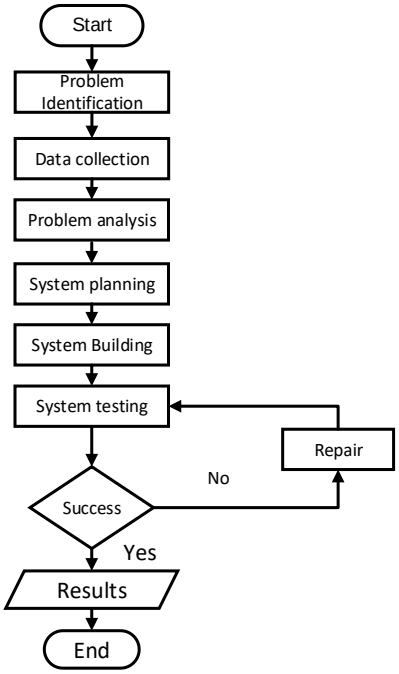
6. My Structured Query Language **(**MySQL)

My Structured Query Language MySQL is a very popular type of database server. MySQL is a type of RDBMS (Relational Database Management System). MySQL supports the PH programming language, a structured query language because SQL has several rules that have been standardized by an association called ANSI. MySQL is an RDBMS (Relational Database Management System) server. RDBMS is a program that allows database users to create, manage, and use data in a relational model (Fahrozi and Harahap 2018).

III. RESEARCH METHODS

A. Research Procedure

This research was conducted based on the research steps. The flow of application creation is shown in Picture 2.



Picture 2. Flowchart of research procedure

B. Research Method Flow

In this method flow describes a flow of the application of two combined (hybrid) methods where each method has different but related tasks. The first method is the AHP method to compare each criterion to produce a weighted value for each criterion. While the SAW method evaluates each alternative by normalizing each alternative to produce a ranking. The following is the flow of the research method, which can be seen in Picture 3.

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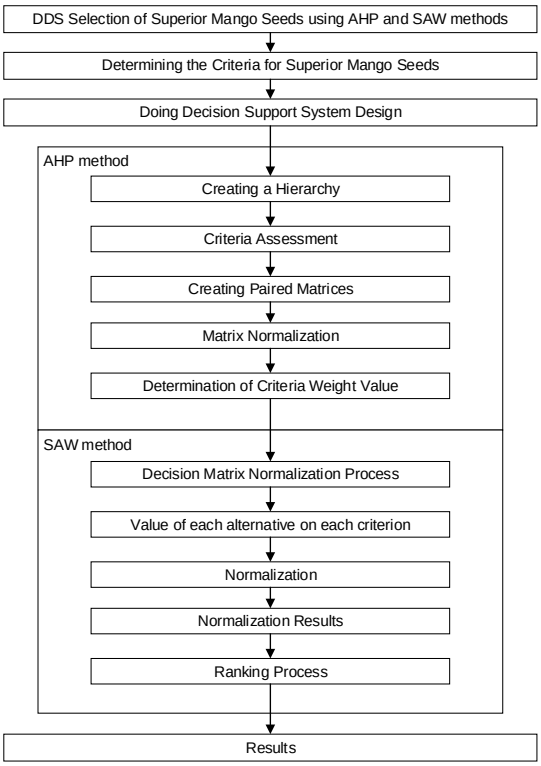
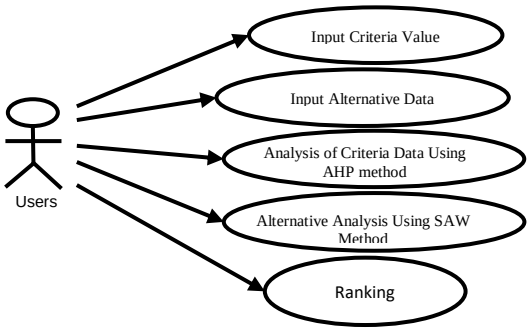


Picture 3. Flow of the method

C. Design system

System design uses the next stage after system analysis, to get a clear picture of what will be done in system analysis then proceed with thinking about how to form the system. System design is a phase where design expertise is needed for the commuter elements that will use the system, namely the recovery of equipment and computer programs for the new system. Use case diagram for system can be seen in Picture 4.



Picture 4. Use Case Diagram

The explanation of the Use Case flow in Picture 4 can be seen in table 3.

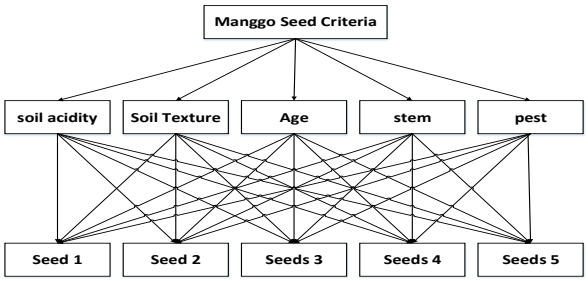
Table 3. Use Case Diagram Description

Actor	*Use Case Name*	*Use Case* Description
Admin	Change Criteria value	Admin can do a re-comparison of the criteria.
Admin	Input Alternative Data	admin can add or enter alternative data.
Admin	Criteria Analysis	The system analyzes the criteria and then generates a weight value for each criterion.
Admin	Alternative Analysis	The system analyzes alternatives with data on each criterion so that it can generate the accumulated value of each alternative from the largest value to the smallest value.
Admin	Ranking	Admin can see the ranking results of the mango seed selection assessment.

D. Case Manual Calculation

In this research, the AHP method is used to determine the weight of the mango seedling criteria. The criteria used were soil pH, soil texture, seedling age, stems, and pests. The criteria data used are data from interviews with Mr. Ali as a resource person/expert of manga seeds in Lobang Tiga Samarinda. The steps in using the AHP method are:

1. Defining the problem and determining the desired solution, then compiling a hierarchy of the problems encountered. The hierarchy of determining superior mango seeds can be seen in Picture 5.



Picture 5. Mango Seed Hierarchy Structure

2. The comparison matrix from level two is the criteria by taking into account the relationship with level one. Comparison of Criteria Can be seen in Table 4.

Table 4. Criteria Comparison

Criteria		C1	C2	C3	C4	C5
Soil Acidity	C1	1	3	5	7	9
Soil Texture	C2	1/3	1	3	5	7
Age (Month)	C3	1/5	1/3	1	3	5
Stem	C4	1/7	1/5	1/3	1	3
Pest	C5	1/9	1/7	1/5	1/3	1

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3. The result of comparison of criteria matrix with decimal conversion. Can be seen in Table 5.

Table 5. Comparison With Decimal Conversion

Criteria	C1	C2	C2	C4	C5
C1	1	3	5	7	9
C2	0,333	1	3	5	7
C3	0,2	0,333	1	3	5
C4	0,142	0,2	0,333	1	3
C5	0,111	0,142	0,2	0,333	1
Total	1,787	4,676	9,533	16,333	25

4. Perform normalization in a way, the value of each cell of the column is divided by the number of each column. Then, the next step is to create a normalized matrix. Normalization matrix can be seen in Table 6.

Table 6. Normalization matrix

Criteria	C1	C2	C3	C4	C5	Total
C1	0,56	0,642	0,524	0,429	0,36	2,514
C2	0,187	0,214	0,315	0,306	0,28	1,301
C3	0,112	0,071	0,105	0,184	0,2	0,672
C4	0,08	0,043	0,035	0,061	0,12	0,339
C5	0,062	0,031	0,021	0,02	0,04	0,174
Total	1	1	1	1	1	5

5. Calculate priority weights. Add the values of the line and divide the results with many numbers of elements/criteria to get the average score/priority weight. The criteria weights table can be seen in Table 7.

Table 7. Priority weight

Criteria	Weight
Soil Acidity	0,502819495770497
Soil Texture	0,260231587786683
Age (Month)	0,134350440573111
Stem	0,0677776668474781
Pest	0,0348208090222311
Total	1,0000

6. Calculate the maximum Eigen by multiplying each first cell value with the priority weight, the value in the second cell column with the second priority, and so on. The maximum eigen table can be seen in Table 8.

Table 8. Eigen Max

Criteria	C1	C2	C3	C4	C5	Total
C1	0,502	0,78	0,671	0,474	0,313	2,743
C2	0,167	0,26	0,403	0,338	0,243	1,413
C3	0,1	0,086	0,134	0,203	0,174	0,699
C4	0,071	0,052	0,044	0,067	0,104	0,34
C5	0,055	0,037	0,026	0,022	0,034	0,177

7. Calculate λ values by dividing the maximum number of Eigen every criterion with the weight of the criteria. Lambda Value Table can be seen in Table 9

Table 9. Lambda value

Total	Weight	λ
2,743097411	0,502819496	5,455431689
1,413523405	0,260231588	5,431790266
0,699095248	0,134350441	5,203520323
0,340901248	0,067777667	5,029698779
0,177328227	0,034820809	5,09259353

8. Getting a λ max value by summing the results of each value in the first row with the priority weight of the first element, the value in the second row with the weight of the priority of the second element and so on (4)

$$\lambda \text{ maks} = \frac{\sum \lambda}{n} \quad (4)$$

$$\lambda \text{ maks} = \frac{26,21303459}{5} = 5,37394554$$

9. Calculate the Consistency Index (CI) based on the equation.

$$CI = \frac{\lambda \text{ mask} - n}{n-1} = \frac{5,37394554 - 5}{5-1}$$

$$CI = 0,093486385$$

10. Calculate the consistency ratio (CR) ratio. The CR value must be less than equal to 0.1. If you exceed the limit, the comparison value of the matrix must be done again. If Seed criteria are 5, then:

IR = 5 = 1,12

so that:

$$CR = \frac{CI}{IR} = \frac{0,093486385}{1,12}$$

CR = 0,083469987

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CR ≤ 0.1, the consistency ratio of the calculation can be accepted.

Furthermore, the SAW method calculates to get the final score and handle alternative mango seeds according to the final value obtained. The steps of the SAW method are as follows:

1. Determine the criteria used as references in decision support. Can be seen in Table 10, 11, 12, 13, and 14 (M. Ali 2021).

Table 10. Soil Acidity

Criteria	Range	Value	
Soil Acidity	5,0-5,9	1st Variable 1/3 =	0,33
	6,0-6,9	2nd Variable 2/3 =	0,66
	7,0-7,8	3rd Variable 3/3 =	1

Table 11. Soil Texture

Criteria	Range	Value	
Soil Texture	Corrective clay black loose soil	1st Variable 1/3 =	0,33
		2nd Variable 2/3=	0,66
		3rd Variable 3/3=	1

Table 12. Age of seed

Criteria	Range	Value	
Age	4-7 month	1st Variable 1/3 =	0,25
	8-11 month	2nd Variable 2/3 =	0,5
	12–14 month	3rd Variable 3/3 =	0,75
	>15 month	4th Variable 4/4 =	1

Table 13. Stem

Criteria	Range	Value	
Stem	The main stem is moldy	1st Variable 1/2 =	0,5
	Fresh green main stem	2nd Variable 2/2 =	1

Table 14. Pest

Criteria	Range	Value	
Pest	There are no pests	1st Variable 1/1=	1
	White flea	2nd Variable 1/2=	0,5
	Rod borer	3rd Variable 1/3=	0,333

2. Determine the criteria advantage table for the calculation of the saw method that can be seen in Table 15.

Table 15. Criteria profit

Criteria	Description	Profit
C1	Soil Acidity	Benefit
C2	Soil Texture	Benefit
C3	Age	Benefit
C4	Stem	Benefit
C5	Pest	Cost

3. Determine each value of each criterion by alternative data that has been collected before. Then determine the rating of each alternative match on each criterion. In determining the match rating, the value of each criterion is included in the compatibility rating table that has been adjusted to the value of the criteria table. The compatibility rating table can be seen in table 16.

Table 16. Compatibility rating

Alternative	C1	C2	C3	C4	C5
A1	0,33	1	0,25	1	1
A2	0,66	0,66	0,5	0,5	0,5
A3	0,66	0,33	0,5	0,5	1
A4	1	0,33	0,25	1	0,33
A5	0,33	0,66	1	1	0,33
A6	1	1	0,75	0,5	1
A7	0,66	0,66	1	1	0,33
A8	1	1	0,25	0,5	0,5
A9	0,33	0,33	1	0,5	0,5
A10	1	1	0,5	1	1

4. Make a decision matrix based on criteria (CI). The value of the match's table results is then made into the form of the matrix.

$$X = \begin{bmatrix} 0,33 & 1 & 0,25 & 1 & 1 \\ 0,66 & 0,66 & 0,5 & 0,5 & 0,5 \\ 0,66 & 0,33 & 0,5 & 0,5 & 1 \\ 1 & 0,33 & 0,25 & 1 & 0,33 \\ 0,33 & 0,66 & 1 & 1 & 0,33 \\ 1 & 1 & 0,75 & 0,5 & 1 \\ 0,66 & 0,66 & 1 & 1 & 0,33 \\ 1 & 1 & 0,25 & 0,5 & 0,5 \\ 0,33 & 0,33 & 1 & 0,5 & 0,5 \\ 1 & 1 & 0,75 & 1 & 1 \end{bmatrix}$$

5. Then normalize the matrix based on equations that are tailored to the type of attribute (benefit attributes and cost attributes) so that the Equal Matrix is obtained R. The results of the matrix that have been predicted after calculating using the benefit and cost formula.

$$R = \begin{bmatrix} 0,33 & 1 & 0,25 & 1 & 0,33 \\ 0,66 & 0,66 & 0,5 & 0,5 & 0,66 \\ 0,66 & 0,33 & 0,5 & 0,5 & 0,33 \\ 1 & 0,33 & 0,25 & 1 & 1 \\ 0,33 & 0,66 & 1 & 1 & 1 \\ 1 & 1 & 0,75 & 0,5 & 0,33 \\ 0,66 & 0,66 & 1 & 1 & 1 \\ 1 & 1 & 0,25 & 0,5 & 0,66 \\ 0,33 & 0,33 & 1 & 0,5 & 0,66 \\ 1 & 1 & 0,75 & 1 & 0,33 \end{bmatrix}$$

6. The process of the circle is done by checking the C1 weight value with the first-row value in the

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first column of the results of the normalization of the matrix. Then the value of C2 weights with the second-row value in the second column and the set. The ranking table can be seen in Table 17.

Table 17. Ranking Results

Ranking		
Alternative	Total	Ranking
10th seed	0,943	1
6th Seed	0,909	2
8th Seed	0,853	3
7th Seed	0,740	4
4th Seed	0,724	5
2nd Seed	0,627	6
5th Seed	0,574	7
1st Seed	0,539	8
3rd Seed	0,530	9
9th Seed	0,443	10

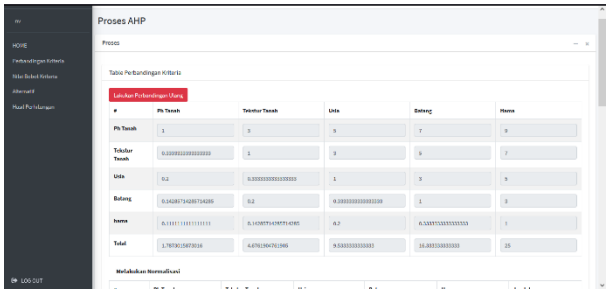
IV. RESULTS AND DISCUSSION

The stage is the coding stage of the implementation that has been made into a programming language. The coding will produce an interface or display for the Decision Support System for Selection of Superior Mango Seeds Using the Analytical Hierarchy Process (AHP) Hybrid Simple Additive Weighting (SAW) method based on WEB.

Here are some of the views contained in the application:

A. Criteria comparison page

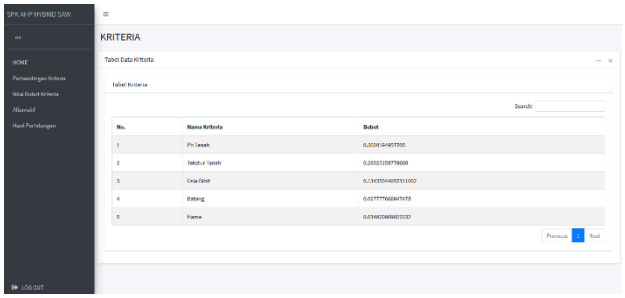
The Comparison Page Criteria can be accessed by the admin and user. However, the admin has advantages, where the admin can re-impair any criteria, while the user does not. This page also displays the calculation of the criteria for obtaining the criteria weights. The admin criteria and user calculation page can be seen in Picture 6.



Picture 6. Criteria comparison page

a. Criteria and Weights Page

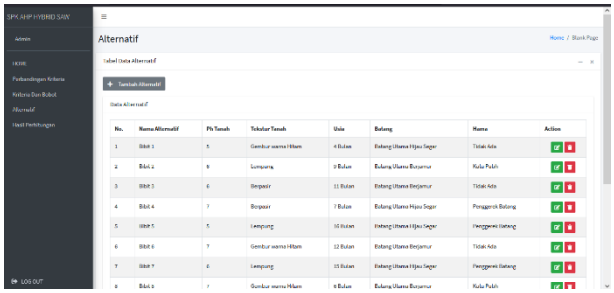
This page displays the results of the criteria weight values that have been compared with the criteria that have resulted in the weight values in the previous calculation. This page can be accessed by admin and user levels and the data on this page can only be viewed without being biased by the admin or user. The criteria weight page can be seen in Picture 7.



Picture 7. Criteria and Weights Page

B. Alternative Page

The Alternative page contains alternative data, where the admin and user levels can access this page. In addition, the admin and user levels can add, edit and delete alternative data. Alternative pages can be seen in Picture 8.



Picture 8. Alternative Page

C. Calculation results page

This page displays the results of the combined calculation of the AHP Hybrid SAW method and produces a preference value that determines the superior mango seeds. The greatest preference value of all available alternatives is the first rank of superior mango seed and is the best seed. The display of SAW calculation results can be seen in picture 9.

Picture 9. The Ranking Result Page

V. CONCLUSION

Decision Support System for Selection of Superior Mango Seeds designed with the Analytical Hierarchy Process (AHP) Hybrid Simple Additive Weighting (SAW) method can make it easier for users to choose the best seeds from mango plants, so users who are still difficult to determine superior mango seeds can easily choose mango seeds without having to be confused about which one is the best.

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By applying the Analytical Hierarchy Process (AHP) Hybrid Simple Additive Weighting (SAW) method on the Decision Support System, it was found that the calculation results for the selection of mango seeds were following the manual calculations that had been carried out which concluded that the application had worked well.

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