



DECISION SUPPORT SYSTEM TO DETERMINE BLACK PEPPER GRAIN QUALITY IN PEKON DETERMINATION USING SIMPLE ADDITIVE WEIGHTED

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Abstract

Pepper is one commodity exports from Indonesia. Black pepper seed quality for export include some criteria predetermined. However, in determining the quality of black pepper seeds is often constrained this is still a lack of public knowledge about the quality of black mustard seeds. Problem that makes researchers want to create a system that can help the decision support pepper farmers in determining the quality of black pepper seeds. In making the Decision Support System was built taking several criteria such as water content, seed weight, levels of foreign body, and the fruit skin color. The system was built using Simple Additive Weighted method. The existence of Decision Support System to help farmers in determining the quality of the seeds of black pepper quickly and accurately by incorporating the criteria found in the field into the system, and the calculation of SAW result that varieties Petaling 2 is a quality black pepper highest with a value of 1.

1. INTRODUCTION

Indonesia Economic information systems technology at the present time is progressing rapidly. The use of technology in delivering information systems is very helpful and useful information for the institution, agency or company. Submission of information by the information system does not require a long time and can be done from anywhere. Information displayed and presented can change over the course of

time so it is more up to date and current. This simplicity makes the information system as a means of spreading information more popular.

Pepper Black or Blackpaper is a kind of herb that is very well known since many years ago. This plant thrives in tropical and humid. These plants are found in China and Southeast Asia. If seen this Black pepper plant has dark red fruit color, so that when the fruit crushed Black Pepper will be dark. If you see Black pepper plant, just look at his long form of seeds stuck to the bottom, and then verify whether the fruit is ripe or not. Black pepper is an herb that is very important. From long ago, Black Pepper is one type of food that crowded trade.

Quality black pepper can do testing include the highest-grade pepper, then top-notch and the latter (note darkest) - second grade. The demonstrated high quality color from light brown to brown. The more gray, grains of pepper, then the quality decreases. In order to get more benefits, unscrupulous manufacturers often blended into the mixture of pepper Spenta (peel pepper), as well as flour, starch, ground rice, and so on. Look at the pattern on the photo: in the first case we see a gray powder with starch structure and lack of smell, in the second - non-uniform product is gray with a white powder. This forgery! Here are a few pepper.

To check for the presence of impurities can test the black pepper. Pour hot water, powder and see what happens. The dirt will be visible: Brew starch and flour will be sour smell. First shown in the image above grade pepper, filled with class and then a second alloy product is water. (Ostrnum.com)

Sentra pepper production in Indonesia is an area of Lampung, South Sumatra and Bangka Belitung. Both areas are producing approximately 90% of pepper production in Indonesia. Other pepper-producing areas, namely Jambi, Aceh, West Sumatra, West Kalimantan, East Kalimantan, South Kalimantan and South Sulawesi. [1].

As one of the crowded accommodation traded, Black Pepper has a variety of functions. In addition to its primary function of seasoning, Black Pepper also useful for human health. The content in it is suppose to reduce human risk of dangerbreast cancer, Besides the antioxidants in Black Pepper also said to be able to prevent the development of skin cancer cells and colon.

However, in determining the quality of black pepper, farmers often encounter obstacles. Because of the lack of knowledge about what constitutes quality black pepper, if you want to ask the experts costly. The problem is what makes researchers want to design a system that can help farmers pepper, to take title Decision Support System Determine Black Pepper Seed Quality In Pekon Determination Method Using Saw (Simple Additive Weighted).

II. METHODS

Decision Support System is generally defined as a system that is capable of providing a good ability problem solving skills and the ability of communicating to semi-structured problems. Specifically, CMS is defined as a system that supports the work of a manager or group of managers in a semi-structured problem solving by providing information or specific proposals leading to the decision [2]. properly accounting decision is the main function of a manager or administrator. Decision-making activities include problem, search problem solving alternatives, evaluation of

alternatives and alternative selection of the best decisions. A manager's ability to make decisions can be improved if he know and master the theory and techniques of decision making. With the increased ability of managers in decision making is expected to improve the quality of decisions made, and this will certainly improve work efficiency managers concerned. [3]

a. Methods of Observation

Observation is a method of collecting data about the quality of black pepper seeds by means of direct observation of the object studied is with a direct view of pepper gardens in the area Tanggamus. Observations by visiting the pepper farmers in the District's determination Pekon Tanggamus Stage Island for interviews.

b. Methods Interviews

Interview method is a method of data collection black pepper seed quality information by conducting interviews with farmers and civil servants Tanggamus plantations. Interviews conducted by researchers that conducted interviews with pepper farmers in the Tekad village Sub District Pulau Panggung District's Tanggamus and interviews were also conducted employee department of agriculture and plantations on seed quality of black pepper in the region.

c. Literature review

Is a stage that is done by reading the cultivation of pepper, as well as other books that support this research. In the method of literature study authors read and look for references on the internet about the discussion in accordance with the title of the study.

d. **Simple Additive Weighting**

In this analysis, all data obtained will be implemented in the form of decision-making based on SAW method used. The steps are:

a. Determining each of each criterion is as follows:

Table 1. Description Criteria

| Code Criteria | Criteria |
|----------------------|---------------------------|
| C1 | Water content |
| C2 | Seed weight |
| C3 | Levels of Foreign Objects |
| C4 | Fruit skin color |

b. Furthermore, each of these criteria will be determined weight.

Table 2. Alternative types of black mustard seeds

| No. | Alternative | Information |
|------------|--------------------|----------------------|
| 1. | A | Varieties Natar 1 |
| 2. | B | Varieties Natar 2 |
| 3. | C | Varieties Petaling 1 |
| 4. | D | Varieties Petaling 2 |
| 5. | E | Pepper Chunuk |

Decision-making give weight to each of the following criteria:

Table 3. weights Criteria

| Code Criteria | Weight |
|----------------------|---------------|
| C1 | 30% |
| C2 | 20% |
| C3 | 20% |
| C4 | 30% |
| Total | 100% |

III. DISCUSSION

Black pepper containing little water content is a criterion of quality black pepper, and therefore the greater the moisture content the less the value of its weight can be seen in the following table:

Table 4. Moisture (C1)

| Weight | Value |
|----------------------------------|--------------|
| Dried black pepper 1 day | 1 |
| Dried black pepper 3 days | 2 |
| Dried black pepper 4 days | 3 |
| Dried black pepper 5 days | 4 |

Table 5. Seed weight (C2)

| Weight | Value |
|--------------------|--------------|
| 0.80 - 1.82 | 2 |
| 0.1-0.79 | 1 |

Table 6. Levels of Foreign Objects (C3)

| Weight | Value |
|--------------------|--------------|
| 11% - ≥ 20% | 1 |
| 6-10% | 2 |
| 2-5% | 3 |
| 0-1% | 4 |

Table 7. Fruit Skin Color Black pepper (C4)

| Weight | Value |
|------------------------|--------------|
| dark red | 1 |
| yellowish green | 2 |

Table 8. twig Matches

| Alternative | Rating result | | | |
|--------------------|----------------------|-----------|-----------|-----------|
| | C1 | C2 | C3 | C4 |
| A | 1 | 2 | 3 | 1 |
| B | 3 | 1 | 2 | 1 |
| C | 2 | 1 | 3 | 2 |
| D | 4 | 2 | 3 | 2 |
| E | 3 | 2 | 3 | 1 |

Normalization Matrix

$$r11 = \frac{1}{Max(1,3,2,4,3)} = \frac{1}{4} = 0.25$$

$$r12 = \frac{2}{Max(2,1,1,2,2)} = \frac{2}{2} = 1$$

$$r13 = \frac{3}{Max(3,2,3,3,3)} = \frac{3}{3} = 1$$

$$R14 = \frac{1}{Max(1,1,2,2,1)} = \frac{1}{2} = 0.5$$

$$R21 = \frac{3}{Max(1,3,2,4,3)} = \frac{3}{4} = 0.75$$

$$R22 = \frac{1}{Max(2,1,1,2,2)} = \frac{1}{2} = 0.5$$

$$r23 = \frac{2}{Max(3,2,3,3,3)} = \frac{2}{3} = 0.667$$

$$R24 = \frac{1}{Max(1,1,2,2,1)} = \frac{1}{4} = 0.25$$

$$R31 = \frac{2}{Max(1,3,2,4,3)} = \frac{2}{4} = 0.5$$

$$R32 = \frac{1}{Max(2,1,1,2,2)} = \frac{1}{2} = 0.5$$

$$R33 = \frac{3}{Max(3,2,3,3,3)} = \frac{3}{3} = 1$$

$$R34 = \frac{2}{Max(1,1,2,2,1)} = \frac{2}{2} = 1$$

$$R41 = \frac{4}{Max(1,3,2,4,3)} = \frac{4}{4} = 1$$

$$R42 = \frac{2}{Max(2,1,1,2,2)} = \frac{2}{2} = 1$$

$$R43 = \frac{3}{Max(3,2,3,3,3)} = \frac{3}{3} = 1$$

$$R44 = \frac{2}{Max(1,1,2,2,1)} = \frac{2}{2} = 1$$

$$R51 = \frac{3}{Max(1,3,2,4,3)} = \frac{3}{4} = 0.75$$

$$R52 = \frac{2}{Max(2,1,1,2,2)} = \frac{2}{2} = 1$$

$$R53 = \frac{3}{Max(3,2,3,3,3)} = \frac{3}{3} = 1$$

$$R54 = \frac{1}{Max(1,1,2,2,1)} = \frac{1}{2} = 0.5$$

Assign a value to each of the following criteria:

W1 = 0.3, W2 = 0.2, W3 = 0.2, W4 = 0.3

Furthermore, the results on ranking or best value for each alternative (Vt) can be calculated with the following formula:

$$Vt = \sum W_j R_{ij} \dots\dots\dots(1)$$

The results obtained as follows:

$$V1 = (0.3) (0.25) + (0.2) (1) + (0.2) (1) + (0.3) (0.5)$$

$$= 0,075 + 0.2 + 0.2 + 0.15 = 0.625$$

$$V2 = (0.3)(0.75) + (0.2)(0.5) + (0.2)(0.667) + (0.3)(0.25)$$

$$= 0,225 + 0.1 + 0.1334 + 0,075 = 0.5334$$

$$V3 = (0.3)(0.5) + (0.2)(0.5) + (0.2)(1) + (0.3)(1)$$

$$= 0.15 + 0.1 + 0.2 + 0.3 = 0.75$$

$$V4 = (0.3)(1) + (0.2)(1) + (0.2)(1) + (0.3)(1)$$

$$= 0.3 + 0.2 + 0.2 + 0.3 = 1$$

$$V5 = (0.3)(0.75) + (0.2)(1) + (0.2)(1) + (0.3)(0.5)$$

$$= 0,225 + 0.2 + 0.2 + 0.15 = 0.775$$

Based on the above calculation of ranking the calculation results can be seen in the table below:

Table 3.6. SAW Calculation Results

| Alternative | Black Pepper Seeds | Rank | Value |
|-------------|----------------------|------|--------|
| A | Varieties Natar 1 | IV | 0.625 |
| B | Varieties Natar 2 | V | 0.5334 |
| C | Varieties Petaling 1 | III | 0.75 |
| D | Varieties Petaling 2 | I | 1 |
| E | Pepper Chunuk | II | 0.775 |

Based on the above table results obtained black pepper that has the best quality varieties namely Petaling 2 with a value of 1.

IV. CONCLUSION

The conclusion of this study is a decision support system can provide knowledge of how to determine the quality of black pepper seeds and obtained results with the best quality at the Varieties Petaling 2 with a value of 1.

Suggestion

Because in the process of making / planning decision support system is still there kekuranganya and is still far from perfect. The suggestions put forward for further development include:

1. In determining the quality of black pepper can be used with other methods such as TOPSIS, Fuzzy Logic.
2. In determining the criteria can be added that more of the criteria data will be more accurate and better.

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