RASKIN Recipient Eligibility Decision Support System

Using the AHP Method

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Abstract

Abstract : Some of the people in Sei Silau Timur Village in Buntu Pane, Kisaran have low incomes. With the existence of a government policy in the food management program that cooperates with Bulog to ease the burden on the community by distributing Raskin to villages where people have low incomes. And not all people get the chance to receive RASKIN because the quota is limited. There needs to be a selection in determining the eligibility of RASKIN for the right people and avoiding mistakes. The selection process can be completed using the application of computer science. Based on this, a decision support system is needed that can be used by the Sei Silau Timur village head's office staff in the process of distributing RASKIN rice, which later this application can help and benefit the village community. This research uses the AHP method, where the method is carried out by comparing a matrix of a number of criteria and alternatives. The results of the final assessment that were selected were the implementation of the AHP method, where the criterion of Amount of Income was selected with the alternative being Selamet.

**Keywords**: AHP; public; RASKIN; selection; SPK

**1. INTRODUCTION**

Currently, countries are experiencing a financial crisis, both developed and developing countries. The impact of the crisis will be that many people will experience job loss. As a result of the prolonged economic crisis, the ability of the Indonesian population to meet various basic needs such as food, clothing and housing is increasingly difficult. The overall impact of this condition is a decline in the level of welfare in certain sectors of life in Indonesian society. One way to overcome this crisis is the government's Special Market Operations program, which provides monthly rice assistance to needy people throughout Indonesia. The Special Market Operation Program distributes medium quality rice to underprivileged families (KPS) or poor families in every village throughout Indonesia. Just like the East Sei Silau Village Head's Office carried out the government's mandate to provide rice to poor families (RASKIN). The method used in the East Sei Silau village head's office in making decisions on rice recipients for poor families (Raskin) still uses manual methods and the database used is still in paper form, so it takes a long time to process and the biggest obstacle is the difficulty in determining who the residents are. who has the right to receive Raskin and other issues such as storage or searching for archives that have been stored.

Decision making to determine the criteria for rice recipients that has occurred usually does not refer to the criteria for poor families. Determining the criteria for poor families requires a good information system to prevent mistakes made by the management committee. This decision support system is designed to help assess each poor family, change criteria and change weight values. This is useful for making it easier for decision makers related to the problem of selecting recipients of rice for poor families (RASKIN), so that families will be found who are most worthy of receiving RASKIN. Therefore, in this research the decision support system for poor families (RASKIN) will use several criteria which are expected to be in accordance with the criteria for poor families.

The existence of a good decision support system is very necessary as a tool to aid decision making. And improving the quality of decisions is further supported if it is supported by a computer-based decision system. The creation of a decision support system for selection of rice recipients for poor families (RASKIN) is intended to provide support to decision makers based on needs precisely, quickly and accurately.

**2. RESEARCH METODOLOGY**

**2.1 Research stages**

The research stages were carried out in the following way[1]:

1. Document Data Collection

Data collection was carried out among the people of East Sei Silau Village in Buntu Pane, Kisaran, using an assessment matrix form in collecting data (documents). Data collection was carried out by observation, interviews and literature study[2]. This research uses a questionnaire or questionnaire which functions as instrumentation to obtain data in determining families who are worthy of family status as Beneficiary Families in the area[3] Sei Silau Timur Village in Buntu Pane, Kisaran.

1. Analyzing Data

Analyze and design the system to be used with a number of specified criteria.

1. Testing the System

Testing the system using the Excel matrix application, system testing is carried out using the AHP method calculations which are carried out using existing calculations in the system.

**2.2.Rice for Poor Families (RASKIN)**

RASKIN assistance (Rice for the poor) is an example of a social assistance program organized by the government through the Central Statistics Agency (BPS) which is intended for poor and vulnerable households[4]. Poor Rice is one of the government's efforts which aims to reduce the expenditure burden on target households in meeting basic food needs in the form of rice[5].

The RASKIN program is a national program that aims to help meet food sufficiency and reduce the financial burden on poor households (RTM) through the provision of subsidized rice[6]. In general, the problems that occur in providing poor rice assistance are still not optimal, because when selecting poor rice recipients there is no supporting system so that during the selection process only estimates are used and there are no calculations when selecting poor rice recipients. So that a small or large number of people sometimes protest because people are supposed to get help but they don't get that help, and vice versa. For this reason, a decision support system is needed[7].

The method used to determine the distribution of aid to poor families in each village is still manual. So processing, storing and searching data archives still takes a long time. The selection of the Analytic Hierarchy Process (AHP) method was used in making this decision support system. Application of appropriate methods to support the creation of this decision support system. Apart from that, AHP is suitable if applied in the analysis of decision making with substantive complexity. This is because the properties being modeled can be done in a comprehensive, structured and logical way[8].

**2.3 Decision Support Systems**

Decision Support System or decision support system, which we will abbreviate in this thesis to SPK, is generally defined as a system that is able to provide both problem-solving capabilities and communication capabilities for semi-structured problems[9]. Decision Support Systems (DSS) are built to support solutions to problems or opportunities and are used to make decisions[10]. A decision support system is a specific information system intended to assist management in making decisions relating to structured, semi-structured and unstructured issues[11].

**2.4 Analytical hierarchy Process (AHP**)

Basically, the decision making process is choosing an alternative. The main tool of AHP is a functional hierarchy with the main input being human perception. The existence of a hierarchy allows complex or unstructured problems to be broken down into sub-problems, then arranging them into a hierarchical form. AHP has many advantages in explaining the decision making process. One of them is that it can be depicted graphically so that it is easy to understand by all parties involved in decision making.

**2.5 AHP Procedure**

The procedure in the AHP method includes several steps as follows[12]:

1. Definition of the problem and determining the desired solution, then compiling a hierarchy of the problems faced. Hierarchizing is the human ability to perceive objects and ideas, identify them, and communicate what they observe. To obtain detailed knowledge, our minds organize complex reality into parts that are its main elements, and then these parts are divided into further parts, and so on in hierarchical stages[13]–[19].
2. Determination of element priorities

The first step in determining element priority is to create a pair comparison matrix[20]. The pairwise comparison matrix is filled in using numbers to represent the relative importance of one element to other elements.

1. Syntesis

Considerations from pairwise comparisons are synthesized to obtain overall priorities.

1. Consistensy Measurement

In making decisions, it is important to know how good the consistency is because we do not want decisions based on considerations with low consistency. The things done in this step are:

1. Calculating Consistency Index (CI)

 with the formula:

 $CI = (λ maks - n) / n - 1$ (1)

where n = number of elements

λmaks = *maximum eigenvalue of the pairwise comparisons matrix*

1. Calculating the Consistency Ratio (CR)

with the formula :

$ CR = CI / RI$ (2)

where CR = *Consistency Ratio*,

 CI = *Consistency Index*,

 RI = *Random Index*

1. Hierarchy consistency check

If the value is more than 10%, then the judgment data assessment must be corrected. However, if the consistency ratio (CI/IR) is less than or equal to 0.1, (CR < 0.1) then the calculation results can be declared correct.

 CR < 0,1 (3)

Criteria 2 (C2)

 Criteria 1(C1)

 Criteria 3 (C3)

Alternative 1(A1)

**GOAL**

Alternative 2(A2)

Alternative 3(A3)

**Figure 1.** Hierarchy Structure in the Analytical Hierarchy Process Method

A Decision Support System is a computer-based information that produces various alternative decisions to assist management in dealing with various structured and unstructured problems using data and models[21]. Decision support systems can handle semistructured and unstructured situations), a problem can be described as structured or unstructured only by considering the decision maker or a specific problem.

1. **RESULT AND DISCUSSION**

The results of data collection in the field using a filling form for assessment of the people of East Sei Silau Village in Buntu Pane, Kisaran. The criteria data used are 5 criteria, the criteria chosen in this study are: Number of Dependents (C1), House Condition (C2), Owner Status (C3), Total Income (C4) and Welfare Status (C5).

**Table 1.** Hierarchical Assessment

|  |  |  |
| --- | --- | --- |
| **Value** | **Meaning** | **Description** |
| 1 | Equally important | Have the same influence |
| 3 | Slightly important | Moderate comparison of others |
| 5 | More important | Comparison more than others |
| 7 | Very important | Comparison is much more than others |
| 9 | Absolutely important | Very strong comparison of others |
| 2, 4. 6. 8 | Values include | Adjacent assessment |

**Table 2.** Calculation of Criteria

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | C1 | C2 | C3 | C4 | C5 |
| C1 | 1 | 5 | 3 | 0,333 | 3 |
| C2 | 0,2 | 1 | 0,333 | 0,2 | 0,333 |
| 3C3C4C5Amount | 0,33330,3334,867 | 35317 | 15312,333 | 0,210,3332,067 | 0,333317,667 |

**Table 3.** Normalizing Criterion Values

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Criteria | C1 | C2 | C3 | C4 | C5 | Amount |
| C1 | 0,205 | 0,294 | 0,243 | 0,161 | 0,391 | 1,295 |
| C2 | 0,041 | 0,059 | 0,027 | 0,097 | 0,043 | 0,267 |
| C3C4C5Amount | 0,0680,6160,0681 | 0,1760,2940,1761 | 0,0810,4050,2431 | 0,0970,4840,1611 | 0,0430,3910,1301 | 0,4662,1910,7805 |

**Table 4.** Ranking and Priority Results

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Priority | Persentage | Rangking  |
| C1 | 0,259 | 25,9 | 2 |
| C2 | 0,053 | 5,3 | 5 |
| C3C4C5Amount | 0,0930,4380,1561 | 9,343,815,6100 | 413 |

**Table 5.** Maximum eigenvalue results

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | λ maksimum | CI | CR |
| C1 | 1,261 | 0,105283 | 0,094002679 |
| C2 | 0,908 |  |  |
| C3C4C5Amount | 1,1500,9061,1965,421 |  |  |

If the Consistency Ratio (CR) value is <0.1. The criteria will be met.

 $CR = CI / RI$

CR = Consistency Ratio

CI = Consistency Index

RI = Random Index

$CI = (λ maks - n) / n - 1$

n = number of elements (n=5)

λmax = maximum eigenvalue result from the pairwise comparisons matrix.

The result of the maximum λ value with the addition in table 2, multiplied by the priority percentage column in table 4, IR value = 1.12

CR value = CI/IR = 0.105283/1.12 = 0.094002679, CR < 0.1. The conditions are met

 **Selection of RASKIN Recipients**

House Condition(C2)

 Owner Status (C3)

Number of Dependents (C1)

Welfare Status (C5)

Total Income (C4)

Basri (A2)

Selamet (A1)

Suriono(A4)

Nasib(A3)

Solihin (A5)

**Figure 2.** Hierarchical Selection Chart of Raskin Recipients

**Table 6.** Indeks Random(RI)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| n | 1, 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| RI | 0 | 0,58 | 0,90 | 1,12 | 1,24 | 1,32 | 1,41 | 1,45 | 1,49 | 1,51 | 1,48 | 1,56 | 1,57 | 1,59 |

In table 4 Ranking and Priority Results, the criterion that received rank 1 is Total Income (C4). The selection of Raskin recipients with the names of 5 people from East Sei Silau Village in Buntu Pane, Kisaran as alternative RASKIN recipients, namely: Selamet (A1), Basri (A2), Nasib 1(A3), Suriono (A4) and Solihin (A5). The maximum eigenvalue results are in table 10, with the sum in table 7 multiplied by the priority column in table 9.

**Table 7.** Alternative Calculation Method

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Alternative | A1 | A2 | A3 | A4 | A5 |
| A1A2A3A4A5Amount | 10,3330,3330,3330,1432,143 | 3120,50,3336,833 | 30,5120,3336,833 | 320,510,3336,833 | 7333117 |

**Table 8.** Normalizing Alternative Values

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Alternative | A1 | A2 | A3 | A4 | A5 | Amount |
| A1A2A3A4A5Amount | 0,4670,1560,1560,1560,0671 | 0,4390,1460,2930,0730,0491 | 0,4390,0730,1460,2930,0491 | 0,4390,2930,0730,1460,0491 | 0,4120,1760,1760,1760,0591 | 2,1960,8440,8440,8442,2725 |

**Table 9.** Ranking and Priority Results

|  |  |  |  |
| --- | --- | --- | --- |
| Alternative | Priority | Persentage | Rangking |
| A1A2A3A4A5Amount | 0,4390,1690,1690,1690,0541 | 43,916,916,916,95,4 | 12345 |

**Table 10.** Maximum Eigenvalue Results

|  |  |  |  |
| --- | --- | --- | --- |
| Alternative | λ maksimum | CI | CR |
| A1 | 0,941 | 0,081616338 | 0,07287173 |
| A2 | 1,154 |  |  |
| A3A4A5Amount | 1,1541,1540,9245,326 |  |  |

The results of the CR value, CR = 0.081616338/1.12 = 0.07287173, CR < 0.1 are declared correct (consistent). In the final assessment of the test results, it turned out that the selection of RASKIN recipients based on the Total Income (C4) criteria was Selamet (A1) who was selected based on these criteria.

1. **CONCLUSION**

The use of the AHP method can provide an assessment on a number of criteria with several alternative choices in selecting RASKIN recipients in East Sei Silau Village in Buntu Pane, Kisaran. The selected final assessment result is an implementation of the AHP method, where the selected criteria are the amount of income with the alternative being Selamat. Priority results whose values coincide with alternatives need to be reassessed to obtain the required ranking priority results based on a comparison of the criteria. To get better results, it is necessary to add a number of appropriate and necessary criteria.

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