

# Decision Support System for the Selection of Poor Families as Recipients of Government Assistance Using the ELECTRE Method

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## ARTICLE INFO

## ABSTRACT

### Keywords

Poor Family,  
Decision Support System,  
Electre

**Introduction:** Poverty is a global problem that is often associated with needs, difficulties, and shortages in various life circumstances. The problem that occurs in Bahodopi District, Morowali Regency where there are often problems in determining the recipients of this assistance, because it still uses subjective assessments, based on manual calculations and there is still a lot of assistance aimed at poor families and not on target. **Method:** Researchers conducted research with the ELECTRE method of completion based on ranking and influenced by many criteria such as Employment, Number of Dependents, Income, House Condition, and House Status. For each alternative that determines the decision by ranking the best alternative. **Result and Discussion:** Based on testing on this system using two tests, namely black box testing and Beta Testing. In the Blackbox testing that the author did, the results showed that each function of the components in the system had run well and correctly. In the beta testing, the author conducted a questionnaire distribution process to five respondents in the aid recipient sector who would use the application to provide an assessment of the system and 30 people in the community. Based on the questionnaire, it will be obtained how accurate or suitable it is for the system that has been created. **Conclusion:** This system was created to facilitate decision-making in selecting poor families as recipients of government assistance so that the sub-district office can make decisions correctly with computerized data.

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## 1. Introduction

Poverty is categorized into natural poverty and structural poverty. Natural poverty is a condition in which poverty occurs due to biological, psychological, and social factors (laziness, lack of skill, lack of intellectual ability, physical weakness, and others). The physical environment makes it difficult to do business or work. According to Todaro [1]. Meanwhile, structural poverty is unfair in the comparison of exchange values (terms of trade) between the value of goods and services produced and sold by the poor compared to the value of goods and services that must be purchased, unfairness in labor services (low wages and exploitation of workers) and the

imposition of burdensome and relatively squeezing levies on the poor [2]. The total poverty rate in 2019 was 9.41%. or as many as 25.14 million people who were categorized as poor people in Indonesia. The very complex problem of poverty requires the intervention of all parties to be coordinated [3].

Until now in Bahodopi District, Morowali Regency, where in determining residents for recipients of poor family assistance, problems often occur in determining prospective recipients of this assistance because they still use subjective assessments. The assessment of prospective recipients of assistance is still based on manual calculations, in this way the poverty reduction field in the sub-district will take a long time to get results and some errors still occur that are not on target so that a decision support system (SPK) is needed to facilitate the determination of the eligibility of prospective recipients of poor family assistance both distribution of assistance from the government and from other agencies, so as to minimize the distribution of assistance that is not on target [4]. Some studies that use SPK with the ELECTRE method such as the application of the ELECTRE (Elimination and Choice Translating Reality) method in determining people who are entitled to receive home improvement assistance in West Siantar District. This research aims to provide an objective solution in determining aid recipients by considering various relevant criteria [4]. Furthermore, the research explores the model of providing assistance in the Family Hope Program using the Elimination Et Choix Traduisant la Réalité (ELECTRE) method. The main focus of this research is to prioritize beneficiaries using an effective and efficient method [5]. Further research uses the ELECTRE method to prioritize poor rice recipients (Raskin). The goal is to improve accuracy and fairness in aid distribution by considering various relevant criteria [6].

This researcher will use the ELECTRE method to help determine families who are eligible to receive assistance from the government. This research is entitled "Decision Support System for the Selection of Poor Families as Recipients of Government Assistance" in Bahodopi District, Morowali Regency using the *Elimination Et Choix Traduisant La Realite (ELECTRE)* method. With this decision support system, researchers hope that it can help to determine the people who are entitled to assistance from the government so that the distribution of assistance is right on target.

## 2. Reserch Method

### 2.1 Literature Study

The study stage is a stage that involves searching, reading, and recording all information relevant to the research topic to be carried out which aims to enable the author to understand the methods and issues raised in the research [7]. The sources used in this literature study include books, articles, and journals that can be accessed via the Internet.

### 2.2 Data Collection

At the data collection stage in this study, the authors used interviews, observation, and literature study techniques. Researchers conducted direct interviews with the head of the community holder section in the Bahodopi sub-district of Morowali Regency and the topics asked were in the form of the process of receiving assistance in the Bahodopi sub-district and with direct observation of supporting things that will later be needed for system design with data collection.

### 2.3 Software Design

At the software design stage, this time what is done is to build a decision support system for muskin families as recipients of government assistance using the *Elimination Et Choix Traduisant La Realite (ELECTRE)* method.

### 2.4 Software Creation

Making software for this research is a stage where the process of executing all the data that has been collected and designed in the previous stages, which will then be converted into software. In making the software itself, a programming process that can be recognized by the computer is needed.

## 2.5 Software Testing

This study is to determine whether the tests carried out to provide the accuracy value of the *Elimination Et Choix Traduisant La Realite* (ELECTRE) method are running well as expected as a decision support system for poor families as recipients of government assistance. Testing is done on the menu and sub-menu in the system. Researchers conduct testing in two ways, namely functional testing (*black box*) and testing (*Beta Testing*) to describe the testing process and authorize software [8]. This test aims to find out whether the system has errors or not. This can be seen in Figure 2

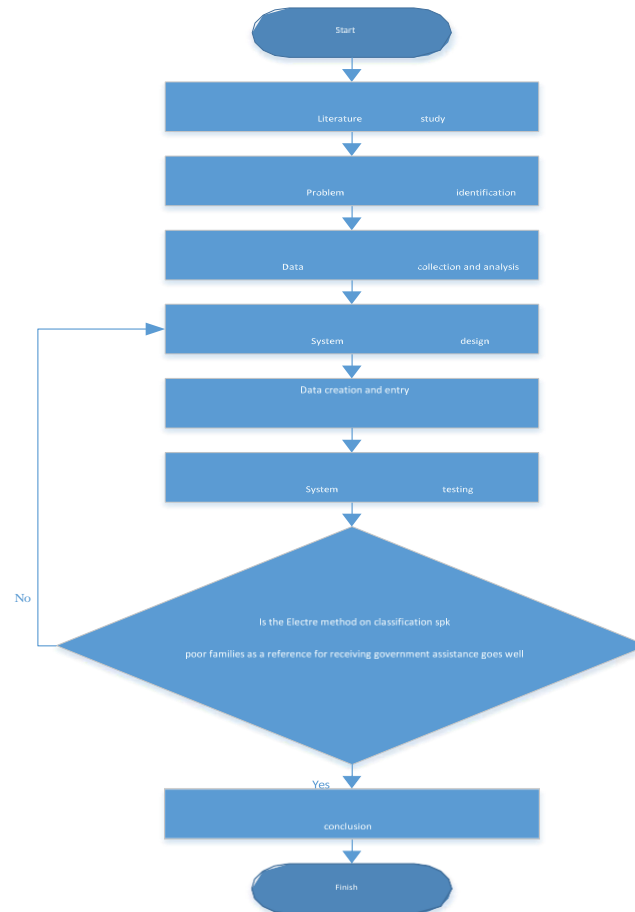


Fig. 1. Research Stage

## 3. Results and Discussion

### 3.1 System Implementation

#### - Hardware and Software Implementation

The hardware implementation used in this study to build a decision support system for poor families as recipients of government assistance with the specifications of an Intel Core i5 ram 4 Gb processor, 1 TB Hardisk Drive (HDD), with a 1920x1080 layer resolution, Xampp, Web Browser (Mozilla firefox) sublime.

#### - Database Implementation

The tables contained in the *database* used in the decision support system for selecting poor families as recipients of government assistance can be seen as follows.

**Table 1.** tb\_resident Data Table

Field	Type	Length/Values	Index
Id_resident	INT	11	Primary
Name of citizen	VARCHAR	34	-
No_kk facility	VARCHAR	50	-
	TEXT	-	-

**Table 2.** Data table tb\_facilities

Field	Type	Length/Values	Index
Id_facility	INT	11	Primary
Type_facilities	VARCHAR	50	-
Type	ENUM	-	-
assessment	TEXT	-	-

**Table 3.** tb\_criteria Data Table

Field	Type	Length/Values	Index
Id_criteria	INT	32	Primary
criteria	TEXT	-	-
weight	TEXT	-	-

**Table 4.** tb\_evaluation Data Table

Field	Type	Length/Values	Index
Id_alternative	SMALLINT	11	-
Id_criteria	TINYINT	4	-
value	FLOAT	-	-

**Tabel . 5.** Tabel Data tb\_kriteria

Field	Type	Length/Values	Index
Id_alternatif	SMALLINT	6	Primary
Nam_Citizen	VARCHAR	50	-

### 3.2 System Testing

#### - Black Box Testing

*Blackbox* testing is one of the software tests that focuses on the functionality side, where the test is carried out to find out all the functions of the system and whether it runs smoothly or not [9]. *Blackbox* testing can be seen in Table 6 below.

Table 6. Citizen Data Testing Table

Input Data	What the Expect	Observation	Result
Admin inputs citizen data	The inputted data will be saved to the database without any problems.	Functions properly as expected	Good
Changing Data that has been saved	Resident data is changed by the admin, then the changed data is saved in the database.	Functions properly as expected	Good
Delete saved data	If citizen data is deleted, the data will be deleted from the system and database.	Functions properly as expected	Good
Displays all citizen data stored in the system	Citizen data is displayed completely from the database to the system.	Functions properly as expected	Good

#### - Beta Testing

Beta testing is testing that is directly in the actual environment. The beta testing questionnaire is a medium used by application users to provide an assessment of the application being built [10]. Based on the questionnaire, calculations will be made so that conclusions can be drawn on the assessment of the application application that is built.

### 3.3. Discussion

Based on testing on this system using two tests, namely *black box* testing and *Beta Testing*. In the *Blackbox* testing that the author did, the results showed that each function of the components in the system had run properly and correctly in accordance with the author's expectations. Components used in the system include *login*, citizen data, criteria facility data, user data, assessment data, weight criteria data, alternative data, and method results. In *beta* testing, the author conducts a questionnaire distribution process to five respondents in the beneficiary field who will use the application to provide an assessment of the system and 30 people in the community. Based on the questionnaire, it will be obtained how accurate or suitable the system that has been made by the author.

### 4. Conclusion

Based on the results of testing and analyzing the design of a decision support system using the *elimination et choix radiant la reality* (Electre) method as a reference for receiving government assistance (a case study of Fatufia village, Bahodopi sub-district, Morowali district), it can be concluded that:

1. This decision support system is built using the web-based *HyperText Preprocessor* (PHP) programming language and does not use a *framework*. This system was created in order to make it easier to assist in making decisions on the Selection of Poor Families as Recipients of Government Assistance, so that the sub-district office makes decisions appropriately with computerized data, and is expected to overcome all weaknesses in determining the eligibility of

beneficiaries, as evidenced by the results obtained from *Black Box* system testing and *Beta Testing*.

2. The calculation process with the Electre method in this decision support system can be done by entering the weight value of the criteria and an assessment as to the importance of these criteria for each recipient of assistance.
3. The Electre method has advantages over other methods. Electre method is not a calculation of credit points, because Electre for weighting is more to numbers while other algorithms are more to cost and benefit. So when determining the dominant concordance matrix F and discordance G is built with a threshold value, namely by multiplying each element of the concordance matrix by the threshold value. Determining the corresponding Aggregate matrix, namely concordance multiplied by discordance in the concordance matrix F and discordance G. Elimination of *Less Favorable* Alternatives thus the best alternative is the alternative that dominates other alternatives, this method compares the weight of the criteria that are seen to be more of a top priority to get the final results of the beneficiaries with several alternatives based on poverty status criteria.

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