



# The family hope program using AHP method

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## Abstract

The Government program in tackling the economic crisis that has occurred so far is by providing direct assistance to very poor families (KSM) in every village throughout Indonesia. The Family Hope Program (FHP) is one of the government's conditional aid programs as a form of compensation from the fuel price increase, which certainly affects the lives of the wider community, including the poor. In order for the expected results to be more accurate and the system designed is arranged systematically, the authors decided to use Analytical Hierarchy Process (AHP). This decision support model will describe the problem of multi-factor or multi-criteria into a form of hierarchy. From the results of the test the shrill and weight of FHP assistance is the type of work of the head of the family is not fixed in the first rank with 4.9 shrill. With the results of the output is feasible or not prospective recipient in FHP, obtained from the comparison of the lamda weight of the rating category with the weight value of the predetermined ratio.

**Keywords:** Family Hope Program; Harvest; Analytical Hierarchy Process.

## 1. Introduction

### 1.1. Background

The benefit of adopting the wide range of technology enhancement refers to the whole means to provide the goods necessary for the survival and comfort of human life [1-3]. The use of technology by humans begins with conversion of natural resources into simple tools [4-6]. The prehistoric discovery of the ability to control fire has increased the availability of food sources, while wheel creation has helped humans in the streets and controlled their environment [7-9]. Recent technological developments, including printing presses, telephones, and the Internet, have narrowed down the physical barriers to communication and allowed humans to interact freely on a global scale [10-12].

In addition, the entire process with the development of the times and technological advances would have chance in encouraging the initiative to always get access in accessing the necessary task to improve the ability in terms of mastery of information technology [13-15]. In particular, the Family Hope Program (FHP) for instance might have some core points out delivering the potential value about poverty reduction program [16-18]. It points out expanding the entire attempt in developing the wide range of conditional social protection system for the poor aimed at accelerating the achievement [19-21]. In enlarging the core potential of the Millennium Development Goals (MDGs) objectives by providing conditional cash transfers to Very Poor Families (KSM), toddlers, elementary school children, junior high school and high school age children [22-24].

Acquisition of the amount of aid is determined by the number of categories in the SHG concerned with the obligation of the FHP

participants to carry out two important commitments in the field of health and education [25-27]. Healthcare committees apply to pregnant women and toddlers who must check their health regularly every month at the nearest health facility or other clinic initiative. It is necessary to particularly adopt the significant value of expanding the components to achieve the good result [28-30]. In this view, the particular value with an innovative and effective enhancement should begin to enhance the selection programs [31-33] in the sense which could be determined with an effective performance [34-36].

The existence of FHP aims to improve the socio-economic conditions of KSM, improve the educational level of KSM children and improve the health and nutrition status of pregnant women and children under five years old. Ultimately, FHP is expected not only to reduce poverty and increase human resources, especially in very poor communities, but can also break the poverty chain itself [37-39].

In addition, the contribution here refers to enhance the basic role through incorporating one of initiatives such as Analytical Hierarchy Process (AHP). It seems quite effective in simplifying and accelerating the process and quality of decision-making results which is a flexible model that allows individuals or groups to form ideas and limit problems by making their own assumptions and produce the desired solution [40-42]. By integrating data and knowledge to improve effectiveness in the decision-making process, it is hoped that later it will be able to assist decision makers in deciding the best alternatives in determining the right target households to receive cash transfers [43-45].

### 1.2. Formulation of the problem



Based on background above can be formulated problems to be solved are:

- 1) How to determine the distribution of the FHP assistance,
- 2) How to determine the decision support system that must be taken, so that the FHP aid distribution is right on target to be given to people who are less able and deserve to get it.

### 1.3. Boundaries

In this research, the boundaries are needed to match what has been planned before so that the research objectives can be achieved. The limitations of the problems discussed in this study are:

- 1) So that the distribution of FHP assistance, the right target to be given to the less fortunate.
- 2) Sample data conducted for this study was obtained from the Bangun Rejo Village, Punduh Pidada District, Pesawaran Regency.
- 3) Methods of data retrieval obtained by using questionnaire.

### 1.4. Goals

- 1) Applying AHP method in planning of decision support system for beneficiary community
- 2) The purpose of this research is to build a decision-making model by using AHP to determine who will receive FHP help in accordance with the requirements specified.

### 1.5. Benefits

With the implementation of Decision Support System AHP to facilitate decision making in the village Bangun Rejo. So that will help the village headman for the election of citizens who deserve to receive FPH assistance, the research is a study that implements, develops, determines the people who deserve FHP assistance in this Bangun Rejo village.

## 2. Literature review

### 2.1. Decision support system

The concept of decision support system (DSS) was developed in the 1960s, but the term Decision support system itself only emerged in 1971, created by G. Antony Gorry and Michael S. Scott Morton with the aim of creating a framework for directing computer applications to management decision making [46-48]. The system is a computer-based system intended to assist decision makers by utilizing certain data and models to solve unstructured problems. The term decision support system refers to a system that utilizes computer support in the decision-making process [49-51]. In further, the entire attempts in delivering the wide range of initiative to give insights into decision support system would need gather computer-based system [52-54]. It refers to point out consisting of three interacting components namely: language system, knowledge system and problem processing system [55-57]. Decision support systems are not emphasized to make decisions. With a set of capabilities to process the information data required in the decision-making process, the system serves only as a management tool [58-59]. So this system is not meant to replace decision-making function in making decisions. But this system is designed only to assist decision makers in performing their duties.

#### 2.1.1. Decision support system criterion

Decision support systems are designed specifically to support a person who must make certain decisions [3]. Here are some criteria of decision support systems.

- 1) Interactive. Decision support system has a communicative user interface so that users can access quickly to the data and obtain the required information.

- 2) Flexible. Decision support systems have as many input variables as possible, the ability to process and deliver output that presents decision alternatives to the user.
- 3) Data Quality. Decision support system has the ability to receive quantitative quality data that is subjective of its users, as input data for data processing. For example, for beauty that is quality, can be quantized by giving weight value like 75 or 90.
- 4) Expert Procedure. Decision support system contains a procedure that is designed based on formal formulation or also in the form of person or group expertise procedure in solving a problem area with certain phenomenon.

### 2.2. Analytical hierarchy process (AHP)

Analytical Hierarchy Process method is one of the models for decision making that can help the framework of human thinking. This method was first developed by Thomas L. Saaty in the 70s. The rationale for the Analytical Hierarchy Process method is the numerical scoring process to rank each decision alternative based on how it should be matched against the decision-making criteria. Analytical Hierarchy Process is one method to help set a priority of various options using various criteria. Because of its multi criteria, Analytical Hierarchy Process is widely used in the preparation of priorities. For example, to prepare research priorities, parties management research institutes often use several criteria such as research impact, cost, human resource capability, and execution time [3].

#### 2.2.1. Advantages of AHP method

The advantages of the AHP model compared to other decision-making models lie in its ability to solve multi objectives with multi criteria problems. Most existing models use single objectives with multi criteria. The Linear Programming model, for example, uses a goal with a many constraints (criteria). The advantages of the AHP model is more due to its high flexibility especially in hierarchy making. This flexible nature makes the AHP model able to capture multiple goals and multiple criteria at once in a model or a hierarchy.

#### 2.2.2. Disadvantages of AHP method

In addition to the advantages it has, the AHP model also has several disadvantages. The dependence of this model on inputs in the form of an expert's perception will make the end result of this model meaningless when the expert gives wrong judgment. Most people ask whether the perception of an expert can represent the interests of the people or not.

This doubt is due in part to the fact that everyone has a different perception with others. Therefore, for this AHP model can be accepted by the public, it is necessary to give criteria and strict limits of an expert and convince the public to assume that the perception of the expert can represent the opinion of the community or at least some of the community.

#### 2.2.3. Steps to use the AHP method

It basically has the number of steps in the AHP method including as follows [2-4]:

- 1) Define the problem and determine desired solution.
- 2) Determining the priority of the elements
- 3) Synthesis
  - a) Divide each value of the column by the corresponding column total to obtain the normalization of the matrix.
  - b) Sums up the values of each row and divides it by the number of elements to get the average value.

## 3. Methodology

### 3.1. Data collection

Methods of data collection by type of data, data collected in the study [5] are as follows:

1) Primary Data

Primary data is data taken directly from the object of research or is data originating from the original or first source. Primary data collection technique is done through observation technique by collecting information directly to the research location to observe how the determination and distribution of FPH conducted by the local government district Pesawaran by way of observation and recording by direct review and interviews by conducting structured interviews by providing a list of questions to interview the District Social Welfare Officer (FPH Assistant) on how the FPH distribution has been implemented so far. The resulting data is information in the form of opinions from those parties.

2) Secondary Data

Secondary data is data that is not obtained directly from the object of research, but data derived from sources that have been collected by other parties. The technique of collecting secondary data was done by studying documentation and literature study.

3.2. Design model

In solving the problem in AHP there are several procedures [1] to do:

1) Prepare Hierarchy

Preparation of the hierarchy is to determine the objectives that are the overall target system at the top level. The next level consists of criteria for assessing or considering alternatives and determining those alternatives. Each criterion can have sub criteria below and each criterion can have an intensity value of each.

2) Criteria and Alternative Assessment

Criteria and alternatives are done by pairwise comparisons. For various issues, a scale of 1 to 9 is the best scale for expressing opinions. a) Set priorities. Criteria and alternatives are done by pairwise comparisons. For various issues, a scale of 1 to 9 is the best scale for expressing opinions. The value and definition of qualitative opinion from the comparison scale of Saaty can be measured using the analysis table. b) Calculating Logical Consistency. Consistency has two meanings. Firstly, similar objects can be grouped according to uniformity and relevance. Second, it concerns the level of relationship between objects based on certain criteria.

3.2.1. Criterion

It is often questioned by individuals (families, households or groups) who are eligible for FHP. Institution and statistical assistance to collect data on the number of households using variables or indicators respectively as criteria of acceptance of FHP funds. In accordance with the decision of the Indonesian republic's social ministry is as follows:

C1: Pregnant women

C2: Toddlers

C3: School-aged children 7-18

C4: House floor area <- 50 m2 Residents.

C5: the type of residential building widest place is bamboo / tassel / wood with low quality.

C6: the work of the head of the family is not fixed.

3.2.2. Weighting

Table 1 shows specifying the weighting type.

Table 1: Weighting Type

No	Gap	Weight Score	Information
1	0	5	No difference (Competence as required)
2	1	4.5	Competence Individual excess 1 level
3	-1	4	Individual Competence at least 1 level
4	2	3.5	Competence Individual excess 2 levels
5	-2	3	Individual Competence lacks 2 levels
6	3	2.5	Competence Individual excess 3 levels /

level

3.2.3. Data analysis

In making decision support system for determining FHP aid recipient in Bangun Rejo village needed internal data type and private data.

1) Internal Data

Internal data is data already in the organization. In this study the internal data is the data of poor people in the village of rejo wake.

2) Private Data

Private data is data of opinion from user. In this research private data is data criteria that have been set that will be used in solving problem.

4. System analysis and implementation

4.1. System analysis

Decision support system that is made is make decisions which is the type of decision support that provides decision is waiting for legitimization of the management to implement. This application uses a top down approach that is the cirri of the design structure. This application involves the ability to view internal data and external data in the form of assessment criteria so the decision can discuss the various criteria and alternatives. AHP complex problems can be in groups, then set to be hierarchical, the system work only set the input to complete to do but not make choice. Application has control over all so make decision to rule out computer recommendation when the process directly.

4.2. Decomposition

1) FHP Data

2) Data is used to display FHP data and value criteria to be tested. The first step of the assessment criteria as shown in table 2.

Table 2: Scoring Table

Recipient	U	TT	P
Expectant Mother	2	3	3
Children aged under five	4	3	3
School-aged children 1-18 years old	4	2	3
floor area of the house <50 m <sup>2</sup>	3	4	2
type of residential building wall	2	4	4
the work of the head of the family is not fixed	4	3	4
Scoring	3	3	4

Notes:

U = age

TT = residence

P = job

3) The second step is the weighting of FHP value as shown in table 3.

Table 3: Weighting of FHP Value

Recipient	U	TT	P
Expectant Mother	4	5	4.5
Children aged under five	4.5	5	4.5
School-aged children 1-18 years old	4.5	4	4.5
floor area of the house <50 m <sup>2</sup>	5	4.5	3
type of residential building wall	4	4.5	5
the work of the head of the family is not fixed	4.5	5	5

4) The third step is to determine the value of NCF and NCP on FHP as shown in table 4.

**Table 4:** NCF and NCP

Recipient	NCF	NCP
Expectant Mother	4.5	4.5
Children aged under five	4.8	4.5
School-aged children 1-18 years old	4.3	4.5
floor area of the house <50 m <sup>2</sup>	4.8	3
type of residential building wall	4.3	5
the work of the head of the family is not fixed	4.8	5

Note:

$$NCF = (U+TT)/2$$

$$NCP = P$$

- 5) Calculation of the total value of each aspect is shown in table 5.

**Table 5:** Total calculation

Recipient	N
Expectant Mother	4.5
Children aged under five	4.7
School-aged children 1-18 years old	4.4
floor area of the house <50 m <sup>2</sup>	3.9
type of residential building wall	4.7
the work of the head of the family is not fixed	4.9

- 6) From the above test the shrill and the weight of the help FHP is the type of work the head of the family does not remain in the first rank. Table 6 shows rank result.

**Table 6:** Rank Result

No.	Recipient	Rank
1	Expectant Mother	4.9
2	Children aged under five	4.7
3	School-aged children 1-18 years old	4.7
4	floor area of the house <50 m <sup>2</sup>	4.5
5	type of residential building wall	4.4
6	the work of the head of the family is not fixed	3.9

## 5. Conclusion

Based on the results of design and implementation of decision support system FHP recipient with Analytical Hierarchy Process method, the authors draw the following conclusions: 1) By using analytical hierarchy process method, a decision support system can be built by comparing the input of assessment category and the weight of predetermined ratio. 2) This system may help decide the eligibility of a prospective recipient of FHP based on the rating category entered into the system. 3) The output result of the decision whether or not the candidate receiving in receiving FHP, obtained from the comparison of the lamda value of the weight of the rating category with the weight value of the predetermined ratio.

Suggestions that can be submitted for the development and improvement of Decision Support System to determine the acceptance of FHP is for further research can be equipped with Geographic Information System (GIS) to know the pattern so that it can be mapped areas of decent or inappropriate residents receive FHP Assistance.

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