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Prioritization of Rural Infrastructure Development (Case Study: Bandar Sakti Village, North Lampung District)

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Abstract. Infrastructure development has an impact on every type of spatial area, not only urban, but also has a major impact on rural areas. The presence of Law of Republic of Indonesia Number 6 of 2014 on Villages has been used as a momentum to accelerate village development. The implementation of Dana Desa program is one form of evidence of giving authority to villages to determine the direction of development. Rural infrastructure development that is based on problems and according to community needs will have implications for optimal development benefits. Therefore, the development process must be based on the results of a review of the problems and needs of the village community so as to produce development priorities with optimal benefits, coupled with certain rural criteria, in this case, border villages. The research case study, Bandar Sakti Village, is a border village between districts. Based on this description, this research was conducted to determine the priorities of rural infrastructure development in Bandar Sakti Village, North Lampung Regency. The analytical method used is Analytical Hierarchy Process with the results showing that the priority criteria for infrastructure development are development benefits while the most prioritized alternative is road infrastructure.

Keywords: *prioritize; village; analytical hierarchy process; infrastructure; border.*

1 Introduction

Todaro and Smith in [1] state that the development process has three objectives, namely increasing the availability and expanding the distribution of various basic necessities of life, improving living standards and expanding economic and social choices for each individual and the nation as a whole. One of them is infrastructure development that can have an impact on the economic growth of a region directly or indirectly. Infrastructure development has an impact on every spatial type, not only urban, but also has a major impact on rural areas. According to Setiadi in [2], the empowerment of resources to build infrastructure will trigger

the economic processes, resulting in a multiplication of economic and social impacts.

The presence of Law of Republic of Indonesia Number 6 of 2014 concerning villages is used as a momentum to accelerate village development. According to the law, a village is defined as a legal community unit with territorial boundaries that is authorized to regulate and manage government affairs. The interests of the local community based on initiatives, rights of origin, and/or traditional rights that are recognized and respected in the system of government of Republic of Indonesia. So with statement, illustrates that the village government have their own authority and power in regulating and serving the community with the agreement with the village community. This regulation also provides an illustration of the implementation of Dana Desa program as a form of evidence of giving authority to the village to determine the direction of development. In addition, forms of support for the acceleration of village development are Satu Miliar Satu Desa program (samisade) and Program Pembangunan Infrastruktur Pedesaan (PPIP).

The research case study, Bandar Sakti Village, is a border village between districts. According to Budianta in [3], villages located in border areas, in their implementation there are still many difficulties in integrating various kinds of local government programs and projects. The location at the border of the administrative region, there is often an imbalance of development that shows the gap between regions. Thus, villages in administrative border areas have their own concentration and cannot be ignored.

Existing conditions based on data obtained from *Lampung Utara Dalam Angka 2021* in [4], stated that in 2020, the length of roads according to the condition of good category roads decreased by 12.4% from the previous year, and the condition of damaged roads increased by 66.5%. Thus, it can be concluded that road conditions are one of the issues in North Lampung Regency, especially in relation to Bandar Sakti Village, Abung Surakarta Sub-district.

Rural infrastructure development that is based on problems and community needs will have implications for optimal development benefits. Therefore, the development process must be based on theresults of a review of the problems and needs of the village community so as to produce development priorities with optimal benefits. The presence of the village authority policy is expected to be a solution to village development constraints and be able to be utilized optimally with good development planning through a study of development priorities so that the benefits of development can be absorbed optimally.

Based on the description and background of the problems described, it can be concluded that the formulation of the research problem is "How to determine the priority of infrastructure development in Bandar Sakti Village?". The final research target to be achieved is the knowledge of alternative priorities for rural infrastructure development in Bandar Sakti Village.

2 Material and Methods

2.1 Hierarchy Process (AHP)

Sinha and Labi in [5], state that weighting can be done using pairwise comparisons of performance criteria, anda common tool for doing this is the Analytic Hierarchy Process. In another sense, Saaty in [6] state that AHP assigns weights to performance criteria by allowing survey respondents (decision makers) to consider both objective and subjective factors in assessing the relative importance of each criterion.

In its application, AHP has several stages. The first stage is defining the problem and determining the objective. Next is to organize the problem in a decision hierarchy structure (decomposition). After formulating the problem, the next step is to create a pairwise comparison matrix for the assessment of criteria and alternatives (comparative judgment). Then determine the priority obtained (synthesis of priority). The last stage is testing consistency testing (logical consistency).

2.2 Law of the Republic of Indonesia Number 6 of 2014 on Villages

Villages are considered the smallest unit of government in Indonesia. In its governmental affairs, the village is specifically discussed separately in Law of the Republic of Indonesia Number 6 of 2014 concerning Villages. Various previous regulations have been made to support the process of village development since the Republic of Indonesia was established. Laws and regulations related to villages have been made since the beginning of Indonesia. In the latest legislation on villages, significant changes are in the authority of the village in recognition, the establishment of authority in local village decision-making for the benefit of the village community, as well as the nature and characteristics that are built in the village.

Law of the Republic of Indonesia Number 6 of 2014 concerning Villages contains the achievement of a goal as an effort to build village independence and

prosperity. The discussion consists of 5 (five) aspects, namely legal substance, legal/institutional structure, funding, facilities and infrastructure, and legal culture.

2.3 Border Areas and Village Development

Listiyah M. in [7] state that in a broader scope, the tendency in border areas, the growth of the region is slower than the non-border areas, this is due to the physical isolation for border areas that are also inland areas and the isolation of attention from higher government, as well as frequent clashes of different policies in the allocation of land in border areas.

Based on research conducted by Regional Development Planning, Research and Development Agency of Yogyakarta Province in collaboration with the P4N Research Institute of UGM in 1993 with Listiyah M. in [7], border areas can be grouped into 3 (three) types namely:

a) Dead-end areas characterized by being at the end of the network or even not yet reached by the network system, located on marginal land, low population density and very limited development projects due to ecological factors.

b) Peripheral border areas are characterized by a network system that runs through them, moderate economic activity, and development prospects that are highly dependent on the network system.

c) High-contact border areas, characterized by the position between major regions, the intensity of economic activities on one side or both sides of the border, high population density, population agglomerations and service centers serving both sides of the border.

2.4 Previous Studies

In this study, a review of research journals that have been conducted previously was conducted. The use of criteria used in translating theory and factual conditions. Determination of criteria is not only based on the use that is often used, but draws several criteria that will answer the research objectives and fill the gap of previous research based on the results of the literature review.

Table 1 Previous studies

No	Title	Researcher	Method	Year	Criteria
1		Loneli Costaner and Muhd.	Analitycal Hierarchy Process	2020	Benefits gained in infrastructure development

No	Title	Researcher	Method	Year	Criteria
	[1]Prioritization of village facilities and infrastructure development using analytical hierarchy process method	Agussyah Harofy			The state of the environment in infrastructure development
					Regional conditions of infrastructure development
					Expected needs in development
					Human resources that support proper development
					Function of infrastructure development
2	[2]Application of AHP method in prioritizing infrastructure development in Medan City	Goklim Qugilman Munthe	Analitycal Hierarchy Process	2016	Good spatial planning
					Relatively cheaper development costs
					Ease of acquiring land
					Environmentally friendly process
					Fast process
3	[3]Prioritization of rural infrastructure development (Case Study: Semukut Village, Kampung Meranti Regency)	Muhammad Sofwan	Kualitatif	2017	Technical quality
					Service coverage
					Finance
4	[4]Utilization of AHP method in infrastructure project selection	Herri Suryadi S., A Perwira Mulia T., dan Fahmi fahmi	Analitycal Hierarchy Process	2021	Technical
					Resources
					Government policy
					Contract clauses
					Location
					Design
					Financial
					Political factors

[1] Costaner and Harofy in [8]
[2] Munthe in [9]
[3] Sofwan in [10]
[4] Suryadi S., et all in [11]

No	Title	Researcher	Method	Year	Criteria
					Project objectives

Based on the review of the above research, it is concluded that the criteria used are development costs, development benefits, and a fast process. In addition, the selection is based on a review of previous research as well, along with consideration of the results of informal interviews with expert respondents.

3 RESEARCH METHODS

3.1 Analysis Method

The approach used in this researchis descriptive quantitative. The analysis method used is Analytical Hierarchy Process (AHP). AHP is a hierarchical problem solving method so that prioritization is based on a structured process (hierarchy) and makes sense. In this case, it is used to prioritize infrastructure development in Bandar Sakti Village, North Lampung Regency. According to Saaty in [6], AHP determines the weights of performance criteria by allowing survey respondents (decision makers) to consider both objective and subjective factors in assessing the relative importance of each criterion.

According to Erdogan et al in [12], expert choice 11 is an AHP method-based application used to determine the weight of criteria. Expert choice 11 is able to produce a CR value, where CR <0.1, so it can be said that the respondent's answer is consistent.

3.2 Data Capture Method

The data used as material for analysis in this study is using primary data, namely conducting interviews, observations, and distributing questionnaires with purposive sampling method. Purposive sampling is a sampling method that is tailored to certain criteria so that the selected sample is more representative. According to Sugiyono in [13], purposive sampling is a sampling technique with certain considerations. Sugiyono in [13] also stated that the reason for using this purposive sampling technique is because it is suitable for use for quantitative research, or research that does not generalize.

3.3 Data

In this case, the research respondents totaled 4 (four) people, including village officials, academics, community leaders, and youth leaders of Bandar Sakti Village. According to Saaty in [14], in the application of the AHP method what

is prioritized is the quality of data from respondents, and does not depend on the quantity. Thus, in determining respondents, experts are needed who are considered to be competent people on the issue, people who have influence in policy making in the study area, or who master and understand the information needed. Therefore, according to Saaty in [14], determining the number of respondents in AHP does not have a certain formulation, but there is only a minimum limit of two respondents. So the researcher decided to take 4 (four) respondents with different backgrounds who were considered to complement each other's information or data needs in the data analysis process.

The required data is obtained directly from the research site in the form of criteria and alternatives. The criteria are development costs, development benefits, and a fast process, with priority alternatives namely main roads, farm roads, village transportation, drainage, and waste. The determination of alternatives is based on observations in the study area and interviews with the four respondents.

4 Results and Discussion

4.1 Level 1: Output Analysis(Criteria)

The results of this analysis show which criteria are considered most important and prioritized in rural infrastructure development in the study area. The results of the criteria scoring show that the development benefit criteria with a percentage of 81.6% are the most considered in determining infrastructure development in the study area. With a consistency ratio value of 0.0005 <0.1, it is acceptable.

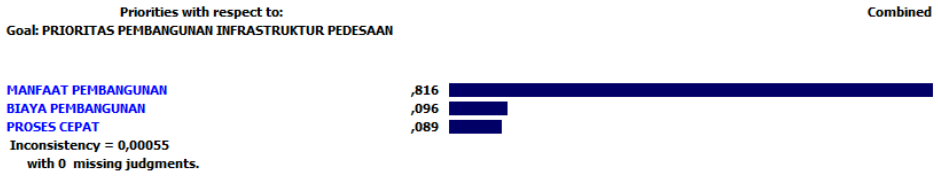


Figure 1 criteria prioritization graphic

4.2 Level 2: Output Analysis (Alternative)

4.2.1 Alternatives for Development Cost Criteria

The priority of infrastructure alternatives according to the development cost criteria is the construction of main roads with a percentage of 65.5% with the largest percentage, followed by farming roads 11.7%, then village transportation

10.9%, drainage 8.7%, and waste 3.2% with the consistency ratio value is 0.08<0.1, the analysis results are acceptable.

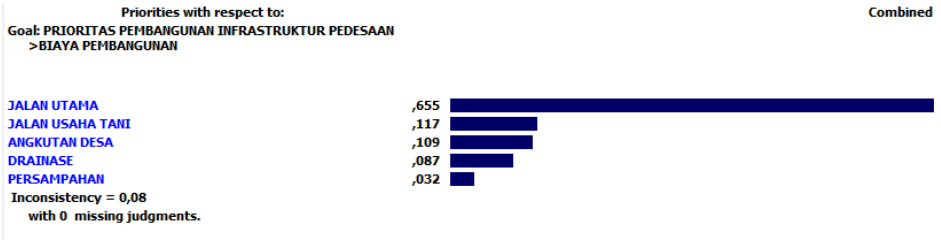


Figure 2 prioritization of alternatives for development cost graphic

4.2.2 Alternatives for Development Benefit Criteria

In the development benefit criteria, alternative priorities with highest percentage is the main road at 66.2%, followed by village transportation at 12.2%, farming roads at 9.2%, drainage at 8.9%, and finally waste at 3.5%. The consistency ratio value is 0.09 <0.1 so it is acceptable.

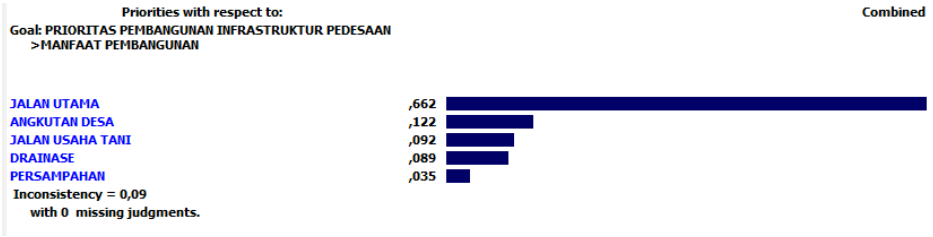
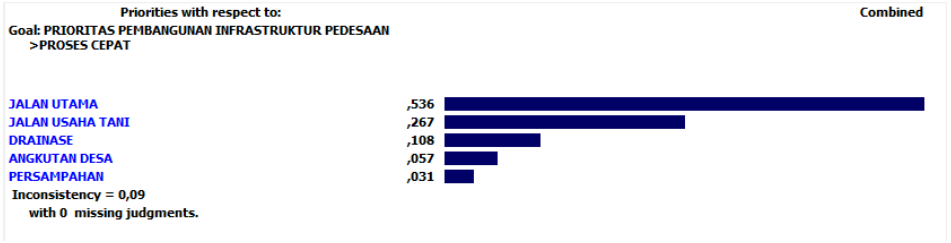


Figure 3 prioritization of alternatives for development benefit graphic

4.2.3 Alternatives for Fast Process Criteria

The priority of infrastructure alternatives according to the fast process criteria is the construction of main roads with a percentage of 65.5% with the largest percentage, followed by farming roads 1.17%, then village transportation 1.09%, drainage 0.87%, and waste 0.32% with the consistency ratio value is 0.08<0.1,



the analysis results are acceptable.

Figure 4 prioritization of alternatives for fast process criteria graphic

4.2.4 Overall Output Analysis

Based on the final results in the Synthesis result, shows that the order of priority of rural infrastructure development as a whole, case study of Bandar Sakti Village, North Lampung Regency, namely: Main Road 64.8%; Village Transportation 11.4%; Farming Road 11.3%; Drainage 9.1%; and Waste 3.4%.

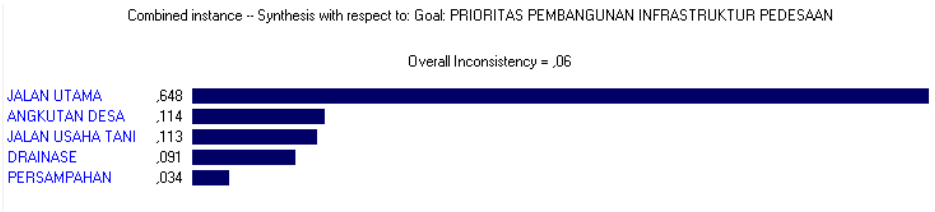


Figure 5 synthesis result of priority infrastructure alternative

5 Conclusions and Suggestions

Based on the results of the AHP analysis, it is known that the benefits of development are the most important in consider infrastructure development. The results of alternative prioritization according to the three criteria components show that the main road is the priority infrastructure for Bandar Sakti Village. This indicates that the existing road infrastructure condition of the research location is in need of improvement.

In relation to the research area taken, which is a border village between districts, it indicates that the constraints of the border area are the difficulty of integrating border facilities and infrastructure with other areas, especially the road network.

From this research, several suggestions or recommendations can be made, such as further studies on the sharpening of rural infrastructure criteria and alternatives, including detailed determination of expert respondents, and development of the analysis methods used. Thus, the results of the analysis of development priorities according to the needs of rural communities and fulfill the responsibility of community services optimally.

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