Alternative Community-Based Village Development Strategies in Indonesia: Using Multicriteria Decision Analysis

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Abstract: To achieve a prosperous village community by utilizing all the potential and resources they have, village development needs to be carried out in a planned and sustainable manner by the village government and the community. This research aims to analyze alternative community-based village development strategies, and formulate the best strategies and programs for community-based village development. The data analysis method used is multicriteria decision analysis (MCDA). The location of this research is Parentas Village and Cidugaleun Village, Indonesia. The results showed that the utilization of the five development capitals at the research site could not be utilized optimally. This is influenced by the poor state of infrastructure, which causes an increase in farm production costs and reduces the price of produce at harvest. From the results of the analysis, there are also five main strategic factors that influence community-based village development: the culture of mutual assistance, community dependence on assistance, private investment, availability of technology, and outside parties that can trigger conflicts between communities. From the results of the analysis, the best conclusion in the strategy that can be applied is to use alternative V in the form of maximizing government programs in infrastructure development by involving the community. Based on the results of the analysis, it is expected to be an alternative and strategy for the government in the development of community-based villages.

Keywords: multicriteria decision analysis (MCDA); development strategy; village development; community; Promethee

1. Introduction

For village development efforts to be more successful and prosperous, it is necessary to involve the village government and the community in achieving sustainable village development [1,2]. This needs to be done in an effort to utilize all the potential and resources owned by every village in Indonesia. The implementation of village development in Indonesia is a response to Law no. 6 of 2014, which concerns village mandates and provides legal certainty for villages. Every village in Indonesia needs to be protected and empowered to be strong, advanced, independent, and democratic [3]. An independent village is a strong foundation in implementing governance and development toward a just and prosperous society [4]. Village development is aimed at improving the quality of human resources [5], including creating a climate that encourages the growth of village community initiatives and self-help. Regional development refers to improving the welfare of rural communities and as an effort to accelerate rural development through the provision of facilities and infrastructure, which is to create effective regional economic development [6–8]. Development that directly involves village communities can produce more efficient results than village development based on project mechanisms. This is because it is considered capable of providing opportunities for villages to manage their households accompanied by the authority of balanced costs [9].

The main focus in developing a more advanced village lies in the potential and the community itself. In this case, the potential of the village in question is all the natural...
resources and human resources owned in the village, as the basic capital that needs to be managed and developed for the survival and development of the village. In supporting the existing potential, other aspects need to be considered in the form of infrastructure development and increasing human resources. The population or rural community is a potential human resource that has a dual role, namely as an object and subject of development [10], which is seen from the quality aspect, still needs to be empowered. Meanwhile, as a development subject, it plays a very important role as a determining force (actor) in the rural development process. In addition to factors from the community, potential factors in the village also need to be considered [11]. Based on the potentials possessed by the village, the community is expected to be able to improve and create a better life through livelihood strategies. In this case, livelihoods are related to the pentagonal of assets, which are the basic principles in the management of livelihoods. The basic principles of pentagonal assets include human capital, natural capital, financial capital, social capital, and physical capital. The existence of pentagonal assets becomes an awareness instrument that can revolutionize people’s mentality if it is intensely conveyed to the community or individual [12]. Village potential means the ability, strength, and power possessed, but not yet optimally realized.

Research related to village development has been carried out by Indiaarti and Munir (2016), where the results indicated development by increasing rural human resources in the tourism sector, where the tourism sector has the opportunity to reduce poverty. In the research conducted in increasing cultural tourism, the identification and study of the potentials in rural areas were carried out. The research was conducted in a rural area located in Banyuwangi Regency, Indonesia. Amerta [13] conducted research in Karangasem Regency, Bali Province, where the area has become a natural and cultural resource-based tourist spot. In the research conducted, namely developing community-based tourism not only in the natural and cultural resource sector but in the business sector, it needs to be developed to be able to attract more tourists and absorb more human resources. Another study conducted by Bagus et al. [14] shows that community-based tourism is a solution in village development. In addition, the tourism sector can be an alternative for improving human resources and the economy of rural communities. In order for community-based tourism to continue to develop and be sustainable, it is necessary to evaluate village development strategies and programs that have been implemented. Setokoe [15] conducted research in the form of analyzing village development in the community-based tourism sector. In a study conducted to analyze the contribution of community-based tourism programs for improving people’s welfare in Esa Nqileni, East Cape, South Africa, results show that community-based tourism programs can open new jobs, empower local communities, develop skills, and improve community welfare.

Based on the research that has been done previously, there is a gap, where previous research in community-based village development efforts only examined the potential, benefits and systems that were already running. However, previous research has not paid attention to the obstacles faced in developing the potential of community-based villages, and formulating the best strategies and programs for community-based village development. Research carried out by Budiasa and Ambarawati [16] examined development of community-based agrotourism in rural areas in Bali that utilized and created an integrated and innovative sustainable agricultural system. Furthermore, Manaf et al. [17] reviewed the extent to which collaboration exists between the community and organizational institutions for improving the social economy of the community from village development programs. In their research, Maryati et al. [18] conducted an analysis of the benefits obtained in the development of community-based agricultural road infrastructure in rural areas of Indonesia. Arintoko et al. [7] identified factors that became opportunities and threats in the sustainability of the community-based village development program in the tourist area of Borobudur Temple. In their research, Priatmoko et al. [19] conducted a review of the involvement of local communities in village development efforts and the level of community economic growth from tourism programs that were carried out. Based on the existing gaps, this study aims to determine a community-based village development strategy by identifying
the constraints faced, analyzing alternative development strategies, and formulating the best strategies and programs for community-based village development. The development strategy plays an important role as an alternative in following market developments in the form of changes in the internal and external environment of the community that can affect village development. In this study, the constraints identified were factors that caused the village development program to not run optimally. This constraint is determined from the results of interviews and observations of the research location.

This study also uses an asset-based community development approach that prioritizes the use of assets and potentials that are available and owned by the community. The community has valuable potential for a village. The existence of the community becomes a human resource in ongoing or future development efforts from the potential of the existing village. In general, asset-based community development prioritizes the use of assets and potentials that are available and owned by the community. Utilization of assets is in the form of natural resources, infrastructure, and village infrastructure development, while the potential utilization is in the form of community experience and the agricultural sector. Based on existing assets and potential, they are then used as materials that empower the community itself in village development efforts. Furthermore, village development efforts are carried out through agricultural training centers that are expected to be able to understand the internal situation in the form of strengths and weaknesses, as well as external environmental conditions in the form of opportunities and challenges to formulate good and correct development strategies. The results of this study are expected to provide recommendations for the government in formulating community-based village development strategies. In addition, the strategy formulation obtained can build better village capabilities that enable village communities to survive, compete, coexist, and function independently.

2. Literature Review

Rural development is rural-based development that prioritizes local wisdom in rural areas, which includes the demographic structure of the community, sociocultural characteristics, physical/geographical characteristics, patterns of agricultural business activities, patterns of rural–urban economic linkages, village institutional sectors, and characteristics of residential areas [20,21]. According to Moseley [22], interpreting rural development is a process for improving the quality of life and economic welfare of people living in rural areas. Village development is an effort to improve the quality of life of rural communities. Therefore, a village development planning process is needed, based on the needs and aspirations of the community. Village development planning can utilize all the potential or resources it has [3]. In addition, village development planning can be interpreted as a process of stages of activities organized by the village government. In addition, in the design of development, it is necessary to involve the village consultative body and elements of the community in a participatory manner. This is an effort to utilize and allocate village resources in order to achieve sustainable village development goals. In the village development process, community involvement is very necessary [23]. Community-based development is known as a development concept that opens more space for the community to be involved in the development process. Thus, development can refer to the needs and takes advantage of the existing potential for the sake of improving the quality of life in the community. Community-based village development, in simple terms, can be interpreted as a development process that refers to community needs, planned and implemented by the community by utilizing the potential of resources that can be accessed by the local community [24].

Asset-based community development (ABCD) is a methodology for the sustainable development of communities based on their strengths and potential. This involves assessing the resources, skills, and experience available in the community; organizing communities around issues that move members into action; and then determining and taking appropriate action [25–27]. This method uses the community’s own assets and resources as the basis for
development; it empowers people by encouraging them to use what they already have [28].

The potential of community resources in community-based development can be interpreted
as an effort to change potential resources into actual ones. Basically, the using the potential
of community resources must be interpreted as an effort to utilize or mobilize resources
that have not been previously touched, but it can also mean increasing the usefulness or
optimizing resources that have not previously been worked on [24]. To take advantage of
the potential of community resources, people who have innovative skills are needed; thus,
human resources are development resources in achieving prosperity. Human resources
occupy a very important position and role in development as managers and development actors
who can provide benefits and improve human life and welfare. Involving the
community in village development is very important because it is the community who
know better what they need; development will operate more effectively and efficiently, and
automatically the community will have a sense of responsibility [29]. In addition, assistance
from the local government is needed to add insight and improve community capabilities.
Thus, the community can improve the latest innovations in the village development process.

Based on previous research, it shows that community-based village development
has an important role in improving the welfare of the community. Community-based
village development is simply defined as rural-area development that refers to community
needs, planned and implemented by the community by utilizing the potential of existing
resources. The increasing the potential of resources in the community business sector can be
in the form of culinary tourism, nature tourism, and cultural tourism. In community-based
village development, openness is needed, especially when discussing financial resources
in sustainable tourism development. In improving sustainable village development, rural
communities need to obtain assistance in the form of guidance, either from the government
or from the community itself through training centers and rural self-help, so that commu-
nity independence can be achieved by improving the tourism sector from existing natural
resources. Furthermore, to determine the development of research related to village develop-
ment, mapping of research was carried out using VOSviewer to observe the relationship
among existing research results. Mapping results of previous studies are given in Figure 1.

Figure 1. Mapping of research results for village development system innovation.
Based on the results of previous studies discussing community-based village development, there have been significant developments in developing village development system innovations. Based on Figure 1, it can be seen that developing innovations include village development based on potential natural resources [30,31], tourism-based village development [19,35], community-based village development [19,35], tourism management systems in sustainable village development efforts [36,37], and other village development innovations. The potential of human resources in community-based village development can be interpreted as an effort to change potential resources in a village into economic value [38]. Basically, the utilization of this community resource potential must be interpreted as an effort to utilize or mobilize resources that have not previously been touched or converted into economic value [39,40]. Community-based village development can be interpreted as an effort to increase the usefulness and optimization of resources that have not been worked on before. To take advantage of the potential of community resources, it is necessary to have good people who have innovative skills. Therefore, the government’s role is needed in increasing community creativity and innovation, so that community resources have development power in achieving prosperity [41,42]. Human resources occupy a very important position and role in village development as managers and development actors who can provide benefits and improve the life and welfare of the community itself.

3. Materials and Methods

3.1. Material

This research uses case studies for two villages in Indonesia, namely Parentas Village and Cidugaleun Village, Cigalontang District, Tasikmalaya Regency, which are the research locations that were chosen intentionally (purposively). This case study research is instrumental and conducted by examining cases to provide an in-depth understanding or to re-explain a generalization process. In other words, the case study is positioned as a means (instrument) to show an in-depth explanation and understanding of factors other than those usually explained. Through the case studied, we intend to show that there is something unique that can be learned from a case study, which is different from the explanations obtained from other objects. In addition, this research uses a comparative case study in an effort to compare related variables by determining their differences and similarities. Based on the results of the comparison between variables, an evaluation is carried out to obtain efficient results from the designed alternatives. The research locations, the two villages in Tasikmalaya Regency, were selected because this region in Indonesia has various types of natural wealth potential. As one of the regencies, it is quite large and is a green hilly area with relatively fertile soil and the availability of abundant water resources. Cigalontang subdistrict is the largest and most populous subdistrict, and has a variety of resources that can be a major contributor in Tasikmalaya Regency. Of the 16 villages in Cigalontang District, only 13% have developed status, 44% are developing villages, 38% are underdeveloped villages, and 6% are very underdeveloped villages. It is noted that Cidugaleun Village and Parentas Village can improve their accessibility, which would develop and increase the potential for economic diversity in each village by joint management of BUMDEs and collaboration between villages in several fields. The map showing research locations for community-based village development is given in Figure 2.

This study uses primary and secondary data to support the identification process of community-based village development policy strategies. Primary data were obtained from an interview process and mapping the research location. Secondary data used were obtained from the Central Statistics Agency of Tasikmalaya Regency, BPP Cigalontang District, Tasikmalaya Regency, and related agencies. Other data deemed relevant to this field and library research project were obtained directly or indirectly from the parties that manage the data, such as statistical offices, technical agencies, and research institutes.
3.2. Method

The method used in this study is multicriteria analysis in the form of making decisions from various alternatives, based on many criteria, with the aim of providing guidance in decision-making to take efficient action. This method is used to support decision-making and explore the advantages and disadvantages of various alternatives. This allows for comparing alternatives against a set of explicitly defined criteria that take into account the most relevant aspects of a given decision-making process. The stages in the multicriteria analysis process are given in Figure 3, as follows:

![Figure 3. The process and stages of multicriteria analysis.](image)

Based on Figure 3, the stages of the multicriteria analysis process in this study are divided into three, namely context and decision structuring, analysis, and decisions. At the context and decision-structuring stage, the location of the research object was chosen, where in this study the locations used were Parentas Village and Cidugaleun Village. Furthermore, the formulation of criteria was adapted to the conditions at the research site. Based on the formulation of these criteria, an alternative package of policies in community-based village development was formed. In the second stage, analysis was carried out in the form of criteria assessment, aggregation criteria, sensitivity analysis, and weighting. In this second stage, obtaining the weight value of the alternatives that were compiled was carried out. In the third stage, decisions were made based on the ranking of the best alternatives; priority grouping was carried out from the existing potential for further development. The limitation of this research was that it only determines alternative policy schemes that were analyzed using Promethee. The factors considered in the alternative scheme were obtained from the results of interviews and observations of the research location.
In this study, at the multicriteria analysis stage, an analysis of alternative strategies for effective community-based village development was carried out using Promethee to obtain the ranking value of policy alternatives. The stages in the alternative decision analysis process using Promethee follow: (1) determine several alternatives; (2) determine multiple and dominant criteria; (3) determine the type of assessment, where the type of assessment has two types: minimum and maximum; (4) determine the type of preference for each criterion that is most suitable based on the data and the results of the considerations; (5) provide a threshold value or trend for each criterion based on the preferences that have been selected; (6) calculate entering, leaving, and net flow; and (7) order results from ranking.

4. Analysis Results

4.1. Overview of Research Locations

Parentas Village and Cidugaleun Village have a major role in the agricultural sector. Parentas Village and Cidugaleun Village are located in Cigalontang District, which is one of the potential development areas for rural areas in Tasikmalaya Regency. Cigalontang subdistrict plays a major role in receiving regional income from the agricultural sector. The role of the village government is very necessary to direct the community in managing resources. This shows the potential that exists in their work area in the hope of increasing the community’s ability to manage existing resources. Village development by utilizing potential is generally directed at optimizing the mainstay and leading sectors to encourage economic growth, increase regional income, empower the community’s economy, expand employment and business opportunities, and improve people’s welfare with resource management strategies.

The condition of human resources and infrastructure in the study villages are still far behind in terms of village facilities and access to village transportation. If further explored, Parentas Village and Cidugaleun Village have many potential objects and natural panoramas that can be used as village advantages. Village development programs have been launched and implemented, but are not running optimally. Some of the programs that have been carried out are tourism-based village development, the agricultural sector, and farming. Inadequate infrastructure and village roads have made village development programs ineffective. Based on these problems, it is necessary to analyze priority alternative strategies that need to be further developed so that the village can develop. This is performed by taking advantage of existing opportunities, starting from their strengths, being able to overcome threats, and suppressing the weaknesses of the village.

4.2. Criteria for Community-Based Village Development

Alternatives and policy strategies or the best solutions from various alternative strategies in community-based village development in Cigalontang District, Tasikmalaya Regency are carried out by applying the multicriteria decision analysis (MCDA) method, using Promethee software. The alternative strategy model is composed of criteria and scenarios. The criteria built include economic impact consisting of criteria for total costs and increasing community income. The second is environmental impact, which consists of indicator criteria for losses to natural disasters, and the third is social impact, having criteria for indicators of productivity at work and level of program acceptance. The criteria are made with the aim of becoming a strategy in the implementation of community-based village development. Data analysis of the criteria for implementing community-based village development is given in Table 1:
Table 1. Matrix for multicriteria analysis of community-based village development efforts.

<table>
<thead>
<tr>
<th>Alternative Choice</th>
<th>Economic Capital (IDR)</th>
<th>Physical Capital (IDR)</th>
<th>Natural Capital</th>
<th>Human Capital</th>
<th>Social Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TB</td>
<td>PPM</td>
<td>PI</td>
<td>PPD</td>
<td>KL</td>
</tr>
<tr>
<td>Type I</td>
<td>350,000,000</td>
<td>800,000</td>
<td>250,000,000</td>
<td>100,000,000</td>
<td>3</td>
</tr>
<tr>
<td>Type II</td>
<td>200,000,000</td>
<td>500,000</td>
<td>100,000,000</td>
<td>100,000,000</td>
<td>4</td>
</tr>
<tr>
<td>Type III</td>
<td>400,000,000</td>
<td>400,000</td>
<td>100,000,000</td>
<td>100,000,000</td>
<td>4</td>
</tr>
<tr>
<td>Type IV</td>
<td>450,000,000</td>
<td>700,000</td>
<td>500,000,000</td>
<td>100,000,000</td>
<td>3</td>
</tr>
<tr>
<td>Type V</td>
<td>4,000,000,000</td>
<td>1,000,000</td>
<td>4,000,000,000</td>
<td>100,000,000</td>
<td>3</td>
</tr>
</tbody>
</table>

Referring to Table 1, economic capital data for the criteria for total costs and community improvement are based on the results of interviews with key persons; the assessment is in the form of numbers in rupiah, which is the total cost incurred to carry out community-based village development activities in accordance with the established strategy. The data for the total cost criteria for each alternative are determined based on the cost of implementing the alternative strategy in the previous implementation. Alternative type I is optimizing natural resources (SDA) by cooperating with investors; the total cost incurred is IDR 350,000,000. While the type II alternative is an activity to utilize investors, facilities, infrastructure, and potential water resources for farming, the total cost incurred in this activity is IDR 200,000,000. Alternative type III is an activity using technology to optimize tourism potential by collaborating with the private sector, with a total cost of IDR 400,000,000. Alternative type IV is an activity to organize training for the implementation of appropriate technology to increase farmers’ independence, with a total cost of IDR 450,000,000. The last alternative, type V, is an activity to maximize government programs in infrastructure development by involving the community, with a total cost of IDR 4,000,000,000.

Based on Table 1, estimates for minimizing environmental damage to village development are almost felt by the surrounding community; the results of the impact of community-based village development affect the quality and quantity of products produced from the agricultural sector. The criteria for environmental damage in the assessment use a scale of 1 to 5, where the higher the value, the lower the impact of environmental and land damage, especially in the agricultural sector. The alternative in type I environmental damage is worth 5, which means the strategy of optimizing natural resources by cooperating with investors has a very low environmental damage impact. Alternative type II for the criteria for environmental damage is worth 3, which means the strategy for utilizing investors, facilities, infrastructure, and potential water resources for farming and the environment is of moderate value. Alternative type III for the environmental damage criteria is worth 5, which means that the strategy for utilizing investors, facilities, infrastructure, and potential water resources for farming and the environment is of very low value. Alternative type IV for the environmental damage criteria is worth 5, meaning that the strategy of using technology to optimize tourism potential by collaborating with the private sector has an impact on environmental damage and very low-value land. Alternative type V for the environmental damage criteria is worth 5, which means that the strategy of organizing training for the implementation of appropriate technology is to increase the independence of farmers; for this, the impact on environmental and land damage is of very low value. The alternative type V for the environmental damage criteria is worth 5, which means that in the strategy of maximizing government programs in infrastructure development by involving the community, the impact on environmental damage is categorized as very low.

Based on Table 1, social capital for the criteria of community skills and community experience with village development is assessed using a scale of 1 to 5, where the higher the scale, the higher the experience and skills of the community in implementing certain strategies. Alternative type I for the criteria of optimizing natural resources by cooperating with investors is 4 and 5, which means that the strategy has a very high impact on the performance of the surrounding community. Alternative type II for the criteria of community...
skills and community experience each is worth 5, which means the strategy for utilizing investors, facilities, infrastructure, and potential of water resources for farming has a very high impact on the performance and skills of the surrounding community. Alternative types III and IV for the criteria of community skills and community experience are each worth 5, which means the strategy of utilizing technology to optimize tourism potential by collaborating with the private sector and organizing training for the implementation of appropriate technology to increase farmer independence has an impact that is very high on the performance and skills of the surrounding community. Alternative type V for the community skills criteria is worth 5, which means that in the strategy of maximizing government programs in infrastructure development by involving the community, it has a low impact, and for the community experience criteria it is worth 5, which means it has a very high impact on the performance of the surrounding community.

Another criterion is the level of program acceptance, if the community-based village development program is not accepted by the community it will be worth zero, and if the community-based village development program is highly accepted by the community it will be worth one. Based on Table 1, the alternative type I level for acceptance of the strategy is worth 1, where the implementation of the strategy of optimizing natural resources by cooperating with investors has a high level of acceptance by the community. Alternative type II at level 1 criteria, where the implementation of the type II strategy has a high level of program acceptance from the community, the strategy for utilizing investors, facilities, infrastructure, and potential of water resources for farming is very much needed by the community. Alternative type III for technology acceptance criteria to optimize tourism potential by collaborating with the private sector is accepted by the community. Alternative type IV for the criteria for acceptance of the strategy is worth 1, where the strategy of organizing training for the implementation of appropriate technology to increase farmer independence, has a high level of acceptance. Alternative type V for the strategy acceptance criteria is worth 1, where the level of strategy acceptance is high. This is due to the strategy of maximizing government programs in infrastructure development by involving the community.

4.3. Alternative Community-Based Village Development Strategies

The alternative community-based village development program strategy in this study has ten criteria; each criterion has a different purpose for each capital in it. The criteria for the total cost of economic capital have the aim of minimizing, which aims to have a smaller and therefore better value. On the other hand, the criteria for increasing people’s income, avoidable environmental damage, environmental damage, productivity at work, and the level of program acceptance have the aim of maximizing value. The weight given to each criterion in each aspect is equal or equivalent. The ranking and net flow of each alternative strategy in an effort to develop community-based villages in Ciganjukang District, Tasikmalaya Regency, is shown in Figure 4, as follows.
4.3. Alternative Community-Based Village Development Strategies

The alternative community-based village development program strategy in this study has ten criteria; each criterion has a different purpose for each capital in it. The criteria for the total cost of economic capital have the aim of minimizing, which aims to have a smaller and therefore better value. On the other hand, the criteria for increasing people’s income, avoidable environmental damage, environmental damage, productivity at work, and the level of program acceptance have the aim of maximizing value. The weight given to each criterion in each aspect is equal or equivalent. The ranking and net flow of each alternative strategy in an effort to develop community-based villages in Cigalontang District, Tasikmalaya Regency, is shown in Figure 4, as follows.

Figure 4. Promethee ranking for community-based village development strategy in Cigalontang District, Tasikmalaya Regency.

Based on Figure 4, the choice of positive and negative values is also considered in the analysis using Promethee software. A positive value describes an alternative that dominates over the others. The results of the analysis showed that in the Promethee ranking conditions that were close to positive (closer to 1), the highest was type V with a net flow score of 0.3500, then type I with a score of 0.0500, and type IV with a score of 0.0250. Promethee ranking with negative score conditions (below 0) applied to types II and III.

The results of Promethee processing to determine the most optimal community-based village development strategy in Cigalontang District, Tasikmalaya Regency, were obtained from the distribution of Phi+ and Phi− values of each alternative strategy. The most optimal strategy is type V, namely by maximizing government programs in infrastructure development by involving the community. The distribution of Phi+ and Phi− values for community-based village development strategies in Cigalontang District, Tasikmalaya Regency, can be seen in Table 2, as follows.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Action</th>
<th>Phi</th>
<th>Phi+</th>
<th>Phi−</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type V</td>
<td>0.3500</td>
<td>0.4250</td>
<td>0.0750</td>
</tr>
<tr>
<td>2</td>
<td>Type I</td>
<td>0.0500</td>
<td>0.2750</td>
<td>0.2250</td>
</tr>
<tr>
<td>3</td>
<td>Type IV</td>
<td>0.0250</td>
<td>0.2250</td>
<td>0.2000</td>
</tr>
<tr>
<td>4</td>
<td>Type III</td>
<td>−0.1250</td>
<td>0.1500</td>
<td>0.2750</td>
</tr>
<tr>
<td>5</td>
<td>Type II</td>
<td>−0.3000</td>
<td>0.1000</td>
<td>0.4000</td>
</tr>
</tbody>
</table>
To visualize Promethee processing, the contribution of each criterion to the score for each alternative is presented by using the Promethee Rainbow (Figure 5). The determination of the type V score has eight criteria that contribute positively, including total costs, increased community income, infrastructure development, village infrastructure development, environmental damage, program acceptance rate, productivity at work, and community experience; the criteria that contribute negatively are community skills and the beauty of the environment. The determination of the score in type I has seven criteria that contribute positively, including community skills, increasing community income, environmental damage, infrastructure development, village infrastructure development, program acceptance rate, and productivity at work; the criteria that contribute negatively are community experience, total cost, and the beauty of the environment.

Table 2. Phi, Phi+, and Phi− values for community-based village development strategies in Cigalontang District, Tasikmalaya Regency.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Action</th>
<th>Phi</th>
<th>Phi+</th>
<th>Phi−</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type V</td>
<td>0.350</td>
<td>0.425</td>
<td>0.075</td>
</tr>
<tr>
<td>2</td>
<td>Type I</td>
<td>0.050</td>
<td>0.275</td>
<td>0.225</td>
</tr>
<tr>
<td>3</td>
<td>Type IV</td>
<td>0.025</td>
<td>0.225</td>
<td>0.200</td>
</tr>
<tr>
<td>4</td>
<td>Type III</td>
<td>0.125</td>
<td>0.150</td>
<td>0.275</td>
</tr>
<tr>
<td>5</td>
<td>Type II</td>
<td>0.300</td>
<td>0.100</td>
<td>0.400</td>
</tr>
</tbody>
</table>

The determination of the score in type IV has seven criteria that contribute positively, including total costs, infrastructure development, environmental damage, increased community income, village infrastructure development, program acceptance rate, and productivity at work; the criteria that contribute negatively are community skills, community experience, and beauty of the environment. The determination of the score in type III has six criteria that contribute positively, namely beauty of the environment, environmental damage, total costs, village infrastructure development, program acceptance rate, and productivity at work; the criteria that contribute negatively are community skills, community experience, infrastructure development, and increased income public.

The determination of the score on the type II criteria has four criteria that contribute positively including environmental beauty, village infrastructure development, program acceptance rate, and productivity at work; the criteria that contribute negatively are community skills, community experience, increasing community income, infrastructure development, total costs, and environmental damage. Sensitivity analysis on Promethee processing can be seen by using the “stability interval” based on changes in the weight of the criteria. The criteria that are sensitive and not sensitive to changes in ranking can be seen in Figure 6.
Two criteria, namely the total cost and the increase in people’s income, are used to test the sensitivity of ranking changes. Figure 6 shows that changing the weights of the two criteria change the order (rank) of the choices. The total cost criteria have changed to a weight of more than 11% (the weight of the total cost criteria was changed from 10% at the baseline to 100%), wherein the order of the choices will be types V, IV, III, I, and II. The criteria for increasing community income have changed in weight above 27% (the weight of the criteria for increasing community income has been changed from 10% at the baseline to 100%), wherein the order of the choices will be type V, I, IV, II, and III.

5. Discussion

The results of data analysis with Promethee software obtained the best solution that can be applied to community-based village development efforts, namely alternative choice V. The strategy of maximizing government programs in infrastructure development by involving the community has the highest impact on increasing community income, compared to other types, although alternatively the strategy requires the most development costs but many of the other more profitable aspects can be covered. Alternative V provides maximizing government programs in infrastructure development, one of which is the construction of village roads. Alternative V can provide benefits in the form of convenience in obtaining cheaper fertilizers, thereby marketing agricultural products. In the field, the price of fertilizer is expensive due to limited access. On the other hand, when marketing agricultural products, the community has difficulty due to limited access. From the results of the analysis of alternative V, it can increase the potential of other villages because infrastructure development, which is an important aspect, needs to be further improved. Maximizing government programs in infrastructure development by involving the community in every development program is a key part to successful development of the village. This is in line with the research of Effendi et al. [43], which states that one of the important aspects in the success of village development is the availability of adequate infrastructure. According to Damayanti and Syarifuddin [23], the community is not only placed as an object of development, but must also be played as an executor from the planning stage to the stage of implementation and evaluation of development programs. This is very possible to implement at the study site, considering that the culture of gotong royong is still a tradition inherent in the sociocultural life of the community at the study site. The community also has openness and is ready to accept the renewal of innovation systems and village development policies that come from outside. Several policies can become a top priority in the strategy to maximize government programs, namely implementing a road infrastructure development program by involving the community. This program will create new agricultural roads for farming communities. Thus, it can reduce the cost of producing agricultural products, because there is an increase in the quality of existing
village roads. If it is in a damaged condition, the community will experience difficulties in marketing their agricultural products and obstacles in other farming activities.

An alternative strategy by maximizing government programs in infrastructure development by involving the community in terms of environmental aspects or capital will have the maximum impact on reducing environmental damage, and provide the best environmental beauty impact. From the aspect of social capital, it can have an impact on the community in the form of productivity at work, which tends to be high. It was concluded that an alternative strategy by maximizing government programs in infrastructure development by involving the community was the best solution that could be chosen as an alternative strategy in an effort to develop community-based villages in Cigalontang District. This is in line with the research results of Manggat et al. [44], which states that the availability of complete infrastructure can improve and optimize village development. In addition, the research of Waridin et al. [45] states that in order to optimize the infrastructure development program that was launched by the government, it is necessary to involve the village community for more optimal and efficient development. Thus, it can have a positive impact on economic, physical, environmental, natural, and social capital; the reliability in village development is also estimated to be quite high because it is a combination of several complementary programs.

Comprehensive and sustainable community-based village development is the duty and responsibility of all parties, including agencies, institutions, and communities involved in the technical and nontechnical matters. According to Wikantiyoso et al. [46], in a village development program involving the community, it is necessary to consider the sustainability aspect by collaborating. Efforts to develop local villages, especially in the study area, were carried out by several parties, including Bappeda, the agriculture service, public works, and the spatial planning office, and assisted by the Balai Besar and others who were in the location of this study. This led to achieving optimal results and involving all parties related to village development (according to the Pentahelix concept). In the Pentahelix concept, elements of government, academics, business entities or actors, communities or communities, and the media unite to coordinate, and are committed to developing the local potential of villages and rural areas so that collaboratively they can produce results according to the needs of the local community.

Concretely, several sectors in the village development concept have their respective roles and tasks that synergize with one another. First, academics on the Pentahelix concept act as drafters, such as identifying the potential and skills of human resources that support increasing the potential of the village. Academics in this case are a source of knowledge with the latest concepts and theories, and are relevant to the conditions of developing village potential. This is in line with the results of research by Zielinski et al. [35], which states that the quality of human resources is a supporting factor for community-based village development, where one factor that distinguishes the village development system from one another lies in the quality of human resources. Second, the private sector or investors in the Pentahelix concept act as enablers. The private sector is an entity that carries out business processes in creating added value and maintaining sustainable growth. The private sector can act as an enabler to provide technology and capital infrastructure. With the change to the digital era, it can help develop village potential to be more effective, efficient, and productive. Third, the community on the Pentahelix concept acts as an accelerator. In this case, the community consists of people who have the same interests and are relevant to the potential development, thereby acting as an intermediary or a liaison between stakeholders to assist the community in the whole process and facilitate the adoption of the development process. Based on the research results of Li et al. [31], development requires collaboration among various communities in achieving the sustainability of the development programs that have been carried out. Fourth, the government must act as a regulator as well as a controller that has regulations and responsibilities in developing the village. In this case, it involves all types of activities such as planning, implementation, monitoring, control, financial allocation, licensing, programming, development and knowledge of public inno-
vation strategies, support for innovation networks, and public-private partnerships. The government also has a role in coordinating stakeholders who contribute to community-based village development. Finally, the media must be able to provide content creation or ideas that will promote a brand image to the public regarding village potentials.

To realize community-based village development, of course, it must be realized synergistically with all parties, especially in the form of collaboration with Pentahelix, which includes the government, relevant regional apparatus organizations (ODP), the community (community), private parties to universities, and the media. The partnership is built according to the existing tupoksi by eliminating sectoral egos between each sector. In addition, strong potential and leadership character is needed at the village level to jointly mobilize the community and develop existing potential through innovative strategies or strategies.

6. Conclusions

Based on the results of this analysis of the community-based village development strategy, there are five capital constraints faced in development at the research site that have not been used optimally. The condition of infrastructure in the form of poor road conditions isolates the study location, and increases production costs in farming and reduces the price of production at harvest. In addition, irrigation canals have not been able to meet all community needs in farming. Based on the problems at the research site, five alternative strategies were designed that were then analyzed to optimize the community-based village development system. Based on the results of the analysis, it is found that the best strategy that can be applied is community-based village development efforts, namely alternative V, in which the strategy is implemented by maximizing government programs in infrastructure development by involving the community. In realizing community-based village development, of course, it must be realized synergistically with all parties, especially in the form of collaboration with Pentahelix, which includes the government, relevant regional apparatus organizations (ODP), the community (community), private parties to universities, and the media. In addition, the alternative V scheme can be a solution by creating a more effective village development program. This increase will be accompanied by the level of economic growth of the community.

Regardless of the results of the research conducted, this study has limitations. The limitation of this research is that it has not analyzed the factors that have a significant influence on community-based village development. The determination of alternative policies is carried out based on the general problems faced at the research location, obtained from the results of interviews and location observations. It is hoped that future researchers in determining alternative policy strategies will first conduct an analysis of influencing factors in community-based village development programs.

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