

Micro-hydro Power Plant-Based Social Entrepreneurship Practices in Rural West Java (A Case Study of Cintamekar Village, Subang Regency)

Praktik Kewirausahaan Sosial Berbasis Pembangkit Listrik Mikrohidro di Perdesaan Jawa Barat (Studi Kasus Desa Cintamekar, Kabupaten Subang)

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ABSTRACT

Cintamekar Village in Subang Regency, West Java, is a peripheral village. One of its characteristics is that residents, especially from the pre-prosperous group, have not been able to enjoy the flow of electricity even though the source of electricity through the PLN is available. To overcome this, on the initiative of the non-governmental organization Initiative of People's Business and Economy (IBEKA), a PLTMH was built in the area. The purpose of this research is to analyze factors affecting social entrepreneurship for community empowerment. The research uses a quantitative approach which is reinforced by qualitative data. The method chosen is the case study. The results showed that overall, the formation of cooperatives was able to build social entrepreneurship by creating social benefits (score 3.6), carrying out social innovation (score above 3), and making the economic activities of citizens more diverse (score 4). The results from the data processed using SEM-PLS show that the development of social entrepreneurship is influenced by the characteristics of technology and innovation by 0.281. The communication channel factor is more dominant in influencing the development of social entrepreneurship, which is equal to 0.487. These two factors explained that there was a change of 33.3 percent in social entrepreneurship. The social entrepreneurship practice of the PLTMH program in Cintamekar Village is built on the characteristics of technology, innovation, and communication channels. The characteristics of technology and innovation as well as communication channels are the driving force for residents to change their social entrepreneurship behavior. This means that the technological and innovation characteristics of the PLTMH development and the communication channels used, through cooperative institutions, have a good impact on the development of social entrepreneurship in Cintamekar Village, and as a whole, they are able to build social entrepreneurship in creating social innovation and economic activities.

Keywords: social innovation, social benefits, PLTMH, social entrepreneurship



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INTRODUCTION

Social entrepreneurship is seen as one of the solutions for community empowerment, especially for the poor by utilizing innovation and technology. Previous research on social entrepreneurship tended to focus on economic, management, and social dimensions. In relation to the utilization of social entrepreneurship as community empowerment, this structural-functional theory is then derived within the framework of Figueroa's theory of integrated communication, which is manifested by the existence of a stimulus brought by reforming agents, so that there will be a process of community dialogue and collective action as a communication process (Figueroa et.al 2002).

Picazo et al. (2021) argue that concerns about the problems of poverty, environmental damage, and other social problems cause more attention to be paid to sustainable development goals. Social entrepreneurship, and entrepreneurship in general, shows a direct link to these sustainable development goals, mainly due to the activities carried out by social entrepreneurs related to product development, market search, and introduction of innovations.

One of the social entrepreneurship programs is the utilization of electrical energy. According to Skutsch (2005), there are four positive impacts of the electric energy program: increased welfare, economic productivity, empowerment, and project efficiency. Sahrakorpi and Bandi (2021) argue that electricity-based social entrepreneurship can affect social change, as was the case with their research on the Husk Power System (HPS) project in Bihar, India.

In the implementation of PLTMH development, the role of communication is very large when conveying information, according to Thomas (2002) in Nindatu (2019). The role of communication in empowering the community can be realized through the following strategies: (1) training communicators, for example reforming agents or companions; (2) focusing on integrated participatory communication activities, (3) investing in community-based communication; (4) involving community in communication planning; (5) giving people access to information/communication. This is in line with the theory put forward by Figueroa et al. (2002), namely analyzing the social situation and identifying development problems in rural areas.

The purpose of this study is to analyze social entrepreneurship practices for community empowerment, based on micro-hydro power plants. This research focuses on the beneficial aspects of social entrepreneurship which is built on community dialogue and collective action that are assumed to influence the level of benefits of social entrepreneurship through a formal institution, in this case, a cooperative with the development of a PLTMH in the community.

This study uses the structural-functional theory initiated by Talcott Parson. Parson states that society is made up of certain structures that have their respective functions and sees society as a system of interdependent parts. Thus, the influence relationship that affects between parts is reciprocal. Even if social integration can never be perfectly achieved, social systems in essence always tend toward dynamic balance (Sciortino 2021). Despite the tension, dysfunction, and abuse, social systems are still on their way to integration. Changes in the social system occur gradually through adaptation and do not occur in a revolutionary way. The most important factor that has the integration of a social system is agreement among the members of the community, which results from a community dialogue that will always be harmoniously related through cooperation activities, trying to avoid conflict; it is impossible to destroy its existence, and it can produce a benefit of social entrepreneurship. Henderson 2014; (Turama 2018); (Irdansyah and Meiyani 2018); (Lestary 2004); (Roffies et al. 2019); Yulasteriyani et. al 2020; (Niko and Yulasteriyani 2020)).

One of the social entrepreneurship programs is the utilization of electrical energy. According to (Skutsch 2005), there are four positive impacts of the electric energy program: improved welfare, economic productivity, empowerment, and project efficiency. Sahrakorpi and Bandi (2021) argued that electricity-based social entrepreneurship can influence social change, as was his research on the Husk Power System (HPS) project in Bihar, India. IBEKA as a reforming agent in carrying out the electrification development program (PLTMH), brings technology and innovation, as well as the idea of social entrepreneurship for rural communities to be empowered, independent, and reliable in ensuring the benefits of change. Changes in behavior due to empowerment carried out in the community create different conditions in society.

Increasing economic empowerment in society creates the development of social entrepreneurship (Samineni 2018). Social entrepreneurship shows a process of creating new values, with an approach to

conveying information to the community, so that people can increase their income ((Maulinda 2019), (Wibhawa 2019), (Zahra et al. 2009)). Another opinion states that social entrepreneurship can overcome unmet needs and can create value (Dacin PA 2017); (Mair and Marti 2006), (Santos 2012)). Meanwhile, Hulgard (2010) summarizes the definition of social entrepreneurship in a more comprehensive manner, namely as the creation of social value formed by working with other people or community organizations involved in a social innovation which usually implies an economic activity.

The results of a literature study conducted by Bansal et al. (2019) state that social entrepreneurship has been recognized as a tool for achieving increased development and community welfare. Furthermore, Lacap (2018) found that social entrepreneurship intentions are the spearhead for the sustainability of social enterprise creators. The PLTMH program carried out by IBEKA, as a companion institution, is expected to empower the community. Community empowerment can be seen from the formation of various businesses as support for electricity financing, increased access to information, and increased income ((Maulinda 2019), (Wibhawa 2019), (Wati 2014), (Arend 2021), (Firdaus Nur 2014), (Sutowo 2020)). The aim of the PLTMH - IBEKA program is to strengthen the capacity of village communities, to be able to plan and manage their development, to improve their livelihoods, and to manage PLTMH (IBEKA Publication 2004).

Some of the research above shows that social entrepreneurship as a strategy for ongoing community empowerment activities has a relatively big influence on increasing income and community welfare ((Arend 2021), (Firdaus Nur 2014)). It can be seen that the process of communication in society is influenced by the dynamics of group discussions, which becomes a communication activity in increasing community empowerment in developing the social benefits of entrepreneurship. For this reason, it is necessary to examine further how social entrepreneurial practices based on micro-hydro power plants for the community increase their empowerment.

METHODS

The research uses a quantitative approach which is reinforced by qualitative data. The chosen method is a case study. The research was conducted for five months (January - May 2022) in Cintamekar Village, Subang Regency, West Java Province. The data was collected through surveys and in-depth interviews using structured interview guidelines with the community, village field assistants, turbine operators, water regulator operators, cooperative administrators, and beneficiaries of the PLTMH construction. Samples were taken from as many as 200 people from a total population of 2,546 people, which were selected at simple random. Because the ultimate goal of this research is to formulate social entrepreneurship practices, the data is processed and analyzed using SEM-PLS and qualitative data using data processing as proposed by Miles et al. (2014).

RESULTS AND DISCUSSION

One of the remote villages in Serang Panjang, Subang, West Java, namely Cintamekar Village, which is on the border of Sagalaherang, has an area of 4,388.26 square hectares. Most of the land used in Cintamekar Village is used for rice fields and plantations (dry land), with an area of 151 ha (84.59%) of the total land area of Ciptamekar Village (178.5 ha). Thus, the availability of water becomes very important for the life and livelihood of residents. In Cintamekar Village there are water sources from two public hydrants which are in good condition and 2 streams as a source of water for the residents' various needs. The population of Cintamekar village consists of 1,249 men and 1,297 women. The population density in Cintamekar Village is 1,498/km² which means more than 1000 people/m². This shows that Cintamekar Village is a densely populated village. The data obtained shows that 25.52% of the population of Cintamekar Village falls into the pre-prosperous category, which means that one of the level 1 family welfare indicators is not fulfilled, according to the National Family Planning Coordinating Agency (BKKBN) (BPS 2019).

In 2003, the People's Business and Economic Initiative (IBEKA) as the initiator, brought innovation, namely micro-hydro power plants (MH/renewable energy sources) to Cintamekar Village, to help underprivileged people get electricity. Because Cintamekar Village is included in the ferry village, where PLN has entered this area, there are still residents who are classified as poor and cannot install

electricity meters. The electrification problem faced by these pre-prosperous people is that they do not have the financial capacity to install meters, so they still do not have lighting.

The construction of the turbines was approved by the community, especially the underprivileged, then they were invited to make criteria and choose which residents (KK) were deemed entitled to receive assistance. The criteria for being poor are not based on criteria issued by the government, but the community makes their criteria for being poor, the four criteria are: 1) not having a job/farming worker; 2) not owning land; 3) the condition of the house on stilts; 4) unable to send children to school. Out of these four criteria, only four households were considered poor, so these criteria are tiered to:

1. Poor 1 that meet all criteria
2. Poor 2 that meet 3 criteria
3. Poor 3 that meet 2 criteria
4. Poor 4 that meet 1 criterion

During the development of these criteria, it was found that 220 families were considered poor, who would later receive assistance from the results of the PLTMH construction, namely the installation of meters, and monthly electricity payments (results of interviews with turbine operators).

During the construction of the turbine, it turned out that it required a lot of money, so additional investors were needed. IBEKA as the initiator then looked for investors who wanted to build the turbines. Finally, IBEKA collaborated with PT HBS to build a water turbine (PLTMH). Site selection and the construction of the turbine house were carried out together with the community, in cooperation. This activity is included in the on-grade activity, where the power plant that produces electricity is injected into the PLN network, and purchased by PLN. The power capacity generated is 120 KW per day.

While the development is going on, the community is invited to form cooperative institutions, which are expected to become a forum for operationalizing these activities, this is in line with what was conveyed by O'Mahony and Bechky (2008), that forming institutions to accommodate community activities minimizes contestation. The choice of cooperative institutions is not without reason, because cooperatives are independent institutions and have legal status so that in the future they can develop activities other than electricity. From the proceeds from the sale of electricity to PLN, as many as 120 residents identified as poor according to the criteria then received an electricity meter installation with a power of 450 KwH/KK, without having to pay, and are exempted from paying electricity usage per month. Meanwhile, other residents who are considered more capable than the poor according to their criteria, pay electricity dues with an average payment of electricity used only reaching Rp. 15,000 – Rp. 20,000. This fund is intended for the maintenance of turbine houses along with remuneration for turbine operators and water operators.

The proceeds from the sale of electricity to PLN are then shared among investors, IBEKA, and the community, in this case, managed by a cooperative. The community is also invited to decide what kind of assistance will be given so that the following percentages for assistance to the community appear: 50% is given to IBEKA (for turbine engine maintenance, and pays turbine operators and water operators) and investors, and the other 50% will be managed by a cooperative. Of the 50% managed by the cooperative, the management of the cooperative is further divided into: 62.5% for the installation of electricity meters for poor households, 3.5% for regional infrastructure, 5% for education, 5% for health, 10% for cooperative activities, and 14% for business capital which is a savings and loan business unit. Existing funds are circulated for both economic and social activities of the cooperative members.

The results of data processing with a sample of 200 show a gender ratio of 136 (72%) male and 64 (32%) female, all of whom are cooperative members. In terms of work, most of them are farmers, farm laborers, and shopkeepers. The average electricity generated is between 33 and 120 KwH. This is possible due to the relatively abundant availability of river or spring water around the area because it is close to a large river.

The results of interviews with several respondents who were considered early figures in the PLTMH development show that at the beginning of the socialization of renewable energy sources, many people were against the construction of turbines as power generators because they were worried that their rice fields would not be flooded with irrigation water. An approach that involved the community was used by holding dialogues and deliberations several times, which were held at the village hall, as well as informing the use of turbine construction for underprivileged communities. Agreements with the

community were reached, that is, if the condition of water for the rice fields was lacking, then the water gate that entered the turbine would be temporarily stopped. The priority for irrigation is for the rice fields, and when it has finished irrigating the fields, the water to the turbines will be reopened, so that electricity can be obtained again. In the end, the community agreed with the construction of the turbines, and what they were worried about so far did not happen.

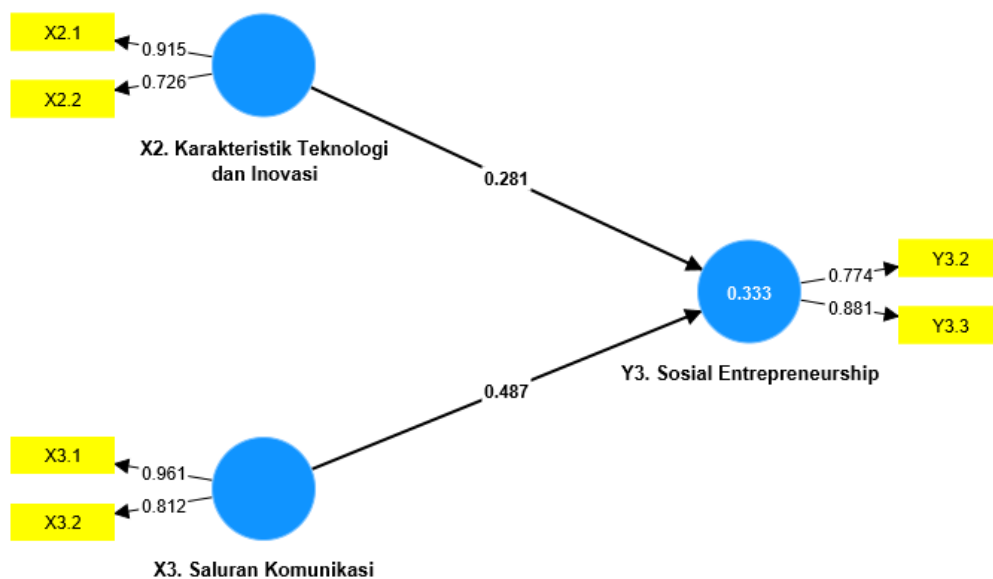


Figure 1. The relationship between the characteristics of technology and innovation and communication channels on social entrepreneurship

The results of the analysis using SEM-PLS (Figure 1), show the regression equation as follows:

$$Y_3 = 0.281 X_2 + 0.487 X_3 \dots\dots\dots(1)$$

This equation illustrates that of the three latent variables, namely X1 (characteristics of reform agents), X2 (characteristic of technology and innovation), and X3 (communication channels), only two latent variables have a significant direct influence on social entrepreneurship, namely X2 (characteristics of technology and innovation) and X3 (communication channels). Social entrepreneurship is influenced by the characteristics of technology and innovation by 0.281. The communication channel factor is more dominant in influencing social entrepreneurship by 0.487. These two factors explain that there is a change in social entrepreneurship of 33.3%. This means that the characteristics of technology and innovation and communication channels from the development of the PLTMH have had a good impact on the development of social entrepreneurship in Cintamekar Villages, towards carrying out social innovations and carrying out economic activities. This is in line with what was conveyed by the chairman of the Mekar Sari Cooperative:

"Before the construction of the turbines, many children dropped out of school, because they did not have fund, their income was only from farm laborers. After receiving scholarships, some went on to junior high and even high school."

Kadus conveyed the same thing:

"Some residents are already aware of the importance of education, moreover there is a scholarship program from the cooperative, which is quite helpful for them."

Likewise, RW and RT also conveyed:

"The children can go to school again because there is financial assistance from the turbine, through the cooperative."

Although not all parents think that education is not important, some parents think that children must complete at least basic education because elementary school is still free of charge. Some parents have

the idea that their children should continue to secondary education so that their standard of living changes, unlike their parents. This is in line with the research conducted by O'Mahony and Bechky (2008), and Wibhawa (2019), institutions such as cooperatives can provide benefits through the social innovations they make. Technology and innovation in the form of MHP and institutions such as cooperatives provide benefits and good impacts for the community, awareness of the importance of children's higher education, and awareness of families' health.

The characteristics of innovation and communication channels do not directly affect the social benefits provided. The people of Cintamekar Village do not think that the construction of the turbine will provide benefit to the environment, but they see that the presence of the turbine drives the community to preserve local wisdom. In other words, *gotong royong* is always done in various activities. This is in line with the local wisdom movement of *Gunung Talingakeun, Leuweung Kanyahokeun* which means that mountains and valleys cannot be destroyed and damaged. They are still maintained by the community by not cutting down trees carelessly, and maintaining several springs in their area. This activity is also carried out together from generation to generation so the community has been doing this long before the existence of the turbines.

The communication channels that dominate it are interpersonal communication channels such as community leaders who actively provide information to residents, and group communication through study groups. Community leaders in Cintamekar Village apart from the village head and government officials such as the Kadus, RW, and RT, also religious leaders such as ustadz. The role of community leaders is very dominant, especially in relaying information about various activities. Understandably, the very dominant channel is interpersonal communication, other channels such as channels through mass media, both print and especially electronic, are difficult to enter this village because there is no electricity yet, so the information conveyed is more dominant when done personally, both formally in recitation or informal meetings when meeting at various events or activities.

These two variables are related to the usefulness of social entrepreneurship, only on two indicators of social entrepreneurship, namely carrying out social innovation, with ideas and initiatives that can trigger social change in the form of social entrepreneurship, as well as carrying out economic activities that balance business activities and social activities. Social innovation is carried out through cooperative institutions, namely providing school children, starting from the elementary school level to the senior high school level, with scholarship assistance. Free-of-charge health services are given by providing a place that is close to the community, because the distance between PUSKESMAS and the community environment is very far, and it requires a lot of transportation costs

The impact of social innovation is in terms of economic activity, such as cooperatives that through their savings and loan units provide business capital loans to open new businesses or develop existing businesses. It is a way to overcome social problems by making changes in society, thus forming new social values that support community development, which is the goal of social entrepreneurship. As stated by the treasurer of the Mekar Sari cooperative:

"Most of the members of the cooperative are given loans for new business capital or to expand their business."

The same thing was conveyed by several members of the cooperative:

"It's nice to have cooperatives because I can borrow capital for business, I set up a small shop, to increase the risk."

"It helps a lot to be able to borrow at the cooperative, so I can make additional capital to buy Neng fertilizer."

The process of creating new social values gives people the creativity to find ways to increase their income, this is in line with what was expressed by Maulinda (2019), Wibhawa (2019), and Zahra et al. (2009)

Business activities developed due to capital loans from cooperatives are not limited to new businesses but also to existing businesses. Another activity of the cooperative is as a forum for the operation of electrification activities, which accommodates the proceeds from the sale of electricity to PLN. In the end, these funds are returned to the underprivileged community in various forms of assistance. The social values that are instilled in cooperatives through various steps in the development and utilization

of PLTMH are awareness of the strengths that gather potential in joint ventures, social responsibility (tolerance and willingness to share), and environmental preservation for mutual benefit.

Data processing using R analysis on the results of interviews using a questionnaire to the people in Cintamekar Village who received assistance from the construction of a micro hydro power plant (PLTMH), shows that social entrepreneurship provides the community with three benefit activities, namely social benefits, social innovation, and economic activities. The construction of a micro-hydro power plant in Cintamekar Village as a whole helps build social entrepreneurship by creating social benefits and giving it a score of 3.6 out of 5. About 88 percent of the community gives a "High" rating which makes basic education more affordable, as conveyed by Several RWs and RTs who felt happy that many of their residents were able to send their children back to school, and only 12 percent said they were neutral (question V6).

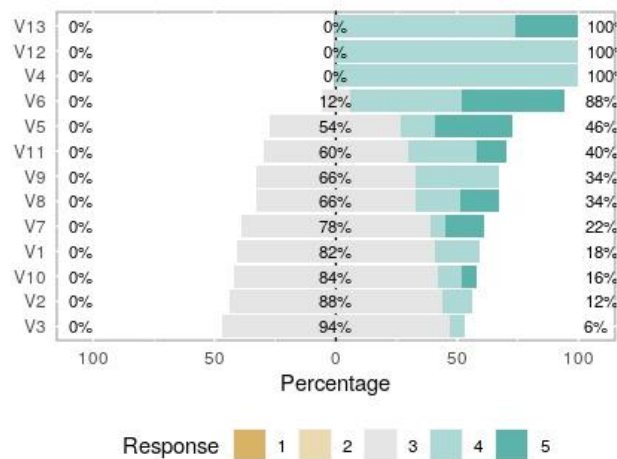


Figure 2. Social entrepreneurship creates social benefits

Meanwhile, 94 percent gave a "neutral" assessment to the use of water in their area to be more efficient (Question V3), because they feel that the use of water related to micro-hydro development does not affect other water needs, especially for irrigation of rice fields. At the beginning of construction, the community was worried that the water for irrigating the rice fields would be disrupted by the construction of the turbine house; therefore, it was necessary to hold an agreement and select turbine operators and water operators separately with different tasks to make the community more confident that irrigation water would not be disturbed. In addition to this, the aspect of moving the community to preserve local wisdom is felt to be getting stronger (question V4), this is reflected in the various activities that are always carried out in cooperation.

Xie et al. (2022) put forward one practice of social entrepreneurship in which all social program capital is funded by a social enterprise, namely the organizational support model. This model is appropriate to describe the characteristics of MHP-based social entrepreneurship in rural West Java, namely, MHP sells its products and services to the public in a profit-oriented manner. The net profits obtained are used to fund the organization's social programs. One of the parameters of this model is social innovation carried out by people in rural areas in West Java. For example, with educational assistance that is carried out in rotation for 3 months, assistance for elementary schools is IDR 30,000/month, and SMP, SMA/SMK is IDR 60,000/month. The educational aspect has also been greatly assisted by the existence of tuition assistance, starting from the elementary, junior high, and high school/vocational school levels. With this assistance, elementary school students can buy school supplies, while junior high school, and high school/vocational school students are helped to pay their school fees. Thus, awareness of education and continuing education to a higher level has relatively increased, and there are no more reasons to drop out of school. Before this rotating assistance, many children dropped out of school, both at the elementary, junior high, and high school/vocational school levels because their parents didn't have any money to send them to school. The highest number of dropouts were in grades 4-6 elementary school (73%), grades 2-3 middle school (18%), and the rest dropped out in grades 2-3 senior high school (7%). Children drop out of school because they have to help their parents work in the fields or help with other work related to earning a living for the family. Educational assistance is said to be a social innovation because so far they have never received educational assistance for free.

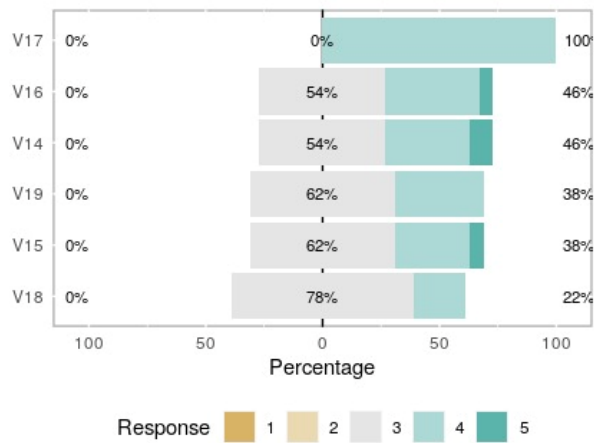


Figure 2. Social entrepreneurship carrying out social innovation

Another thing is in the health sector, initially the community was given a medical card, but this could not be implemented, due to the distance to the Puskesmas. If you go to the health center, this will cost Rp. 60,000 for the round-trip transportation, so the people object to it. Then a room was provided behind the cooperative office as an auxiliary health center by inviting health paramedics to Cintamekar Village so that all residents could more easily get access to health. As stated by the chairman of the Mekar Sari Cooperative:

"It's not that people don't want treatment, but because the distance to the Puskesmas is far and the fees can be more expensive, so we are trying to bring health access closer. What a coincidence that in the cooperative there is a room that can be used".

This is in line with what was conveyed by several residents:

"Thank God there is a place for a closer treatment it used to be expensive, we should eat, and if (we are) sick (we) can buy medicine at the stall"

Health activities are carried out once a week, and the poor can receive free medical treatment (Question 17), this is in line with the results of a study by Farnsworth et al. (2014), regarding empowering communities to achieve behavioral and social changes to accelerate the reduction of mortality under five years and optimize early childhood development. Likewise, in the field of education, as much as 46 percent of the community is aware of the right to education for children, especially at the primary and secondary education levels (Question V16). Overall, this aspect of carrying out social innovation gets an average score of above 3.

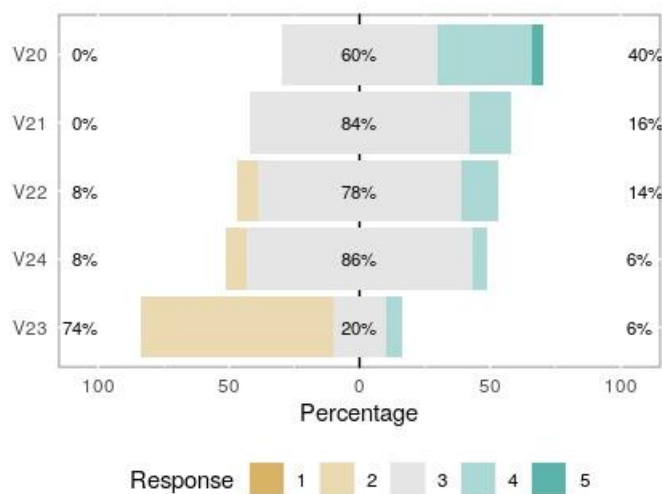


Figure 3. Social entrepreneurship carrying out economic activities

The last aspect of the formation of social entrepreneurship is due to the construction of micro-hydro power plants, namely carrying out economic activities. From an economic standpoint, the people who received assistance with meter installation and payment for electricity experienced an increase, especially in terms of building houses that were originally on stilts, and then became brick houses for 4 families. In terms of income, although some are farm workers because they are members of a cooperative, they are also allowed to borrow business capital. This business capital loan is given in rotation to members who apply for the loan so that there are many benefits for the people who receive assistance, one of which is a capital loan for businesses that are formed to become very diverse (Question V20). Most of the residents who received the assistance were able to develop their businesses. The business carried out by the residents is making small food stalls, stalls selling prepared food, and traveling traders.

The existence of a cooperative as an institution that can help the community does not necessarily make the community aware of the use of the savings in the cooperative for their productive business (Question 24) so the responses given are more neutral. Dependence on middlemen is still very high, especially for marketing agricultural products owned by the people of Cintamekar Village who have farming businesses, as shown in Figure 3; as many as 74 percent of the community still considers their dependence to be very high, only 6 percent stated that their dependence has begun to decrease (Question V23). This is understandable because the distance between Cintamekar village and the market in Subang City is relatively far so farmers are constrained by transportation costs. If they have to market it themselves, they sell their agricultural products to dealers. Market days exist and are crowded only on Thursdays every week, so if you are going to market agricultural products or other businesses you are bumped on market days as well.

CONCLUSION

Social entrepreneurship is influenced by the characteristics of technology and innovation of 0.281. The communication channel factor is more dominant in influencing the development of social entrepreneurship, which is equal to 0.487. These two factors explain that there is a change of 33.3% in social entrepreneurship. This means that the technological and innovative characteristics of the PLTMH construction and the communication channels used have had a good impact on the development of social entrepreneurship in Cintamekar Village. The development of micro-hydro power plants in Cintamekar Village as a whole can build social entrepreneurship by creating social innovation by giving a score of 3.6 out of 5. The community can carry out social innovations, such as educational assistance which is carried out in rotation for three months at both the elementary middle, and high school levels, so there is awareness of the right to education. On the health side, an auxiliary health center was held, so that all residents could more easily get access to health care every week. In addition to being able to carry out social innovations, it can also increase economic activities or the activity, by developing businesses or establishing other small businesses. The practice of social entrepreneurship based on MHP has been built because of the relationship between technology and innovation characteristics and communication channels towards the development of social entrepreneurship.

Based on the research findings, it is recommended that social entrepreneurship practices based on micro-hydro power plants in Cintamekar Village, Subang Regency can be duplicated in areas that carry out community empowerment in creating and building the benefits of social entrepreneurship. In addition, more thorough research is needed using an integrated communication model to be able to capture the phenomenon of social entrepreneurship in West Java Province.

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