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Community Empowerment Participation in Forest Revegetation: An Analysis Study on the Slope Communities of Mount Arjuna, Indonesia

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Abstract
The research objectives was to determine the analysis of community empowerment participation for the forest revegetation in Arjuna Mount. This service uses a Participatory Rural Appraisal approach, with the study population covering communities around the forest of Arjuna Mount Pasuruan-East Java Indonesia. Data obtained from respondents with a questionnaire and analyzed using SEM (structural equation modeling), to find out an overview of respondents' responses about community participation in the preservation of the Arjuna Mount Forest. Community participation in the form of human capital, economy, social, local institutions, facilities and infrastructure has significant influence on community empowerment for the preservation of the Arjuna mount forest. Estimated regression weights for each indicator of community empowerment in Leduk, Jatiarjo and Dayurejo villages are human resources 0.99, economy 0.99, social 0.97, local institutions 1.00 and facilities and infrastructure 1.00. This explains that local institutional factors, facilities and infrastructure have a significant influence on community empowerment for the preservation of the Arjuna mount forest.

Keywords: community empowerment; forest rehabilitation

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Introduction

Forest revegetation is increasingly becoming a priority at international and national levels. Identifying forest degradation, however, is challenging because its drivers are underlying and site-specific. Existing frameworks and principles for identifying forest degradation are useful at larger scales, however, a framework that includes iterative input from local knowledge-holders would be useful at smaller scales (Ferretti-Gallon et al., 2022).

Forest loss and degradation are global issues that are of increasing public concern, garnering international and national commitments to mitigate or reverse these trends. International agreements such as the Bonn Challenge, Convention on Biodiversity (CBD).

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Sustainable forest preservation was important for forests, as a function of the hydrological system, especially the effect of sponges capable of holding rainwater and regulating its drainage, thereby reducing the occurrence of flooding and maintaining water flow in the dry season. However, with the reduction in agricultural land, increasing population living in the surrounding forests, changes in the management of protected forests into production forests and tourist destinations, expansion of industrial investment areas, as well as increasing community living needs, these conditions lead to uncontrolled taking Forest resources include water, flora and fauna by human activities.

Indonesia is a large nation with approximately 192 million hectares of land. Of this area, 120.6 million hectares (or 63 percent of the entire land area) is designated as state forest. Most of Indonesia's remaining land area is made up of non-forest public lands known as areas for other purposes (Forestry, 2018). FAO research (Food and Agricultural Organization [FAO], 1990) shows that forest cover in Indonesia has decreased from 74% to 54% over a period of 30-40 years, where different regimes have had different main deforestation drivers (Tsujino et al., 2016). Deforestation rates have fluctuated in recent years from a low of 0.40 million hectares in 2013-2014 and a high of 1.09 million hectares in 2014-2015 (0.45 million hectares in 2009-2011, 0.61 million hectares in 2011-2012, 0.73 million hectares in 2012-2013, 0.63 million hectares in 2015-2016, 0.48 million hectares in 2016-2017, and 0.44 million hectares in 2017-2018) (Forestry, 2020). Indonesia still retains 94.1 million hectares of tropical forest (Forestry, 2020), the third largest after Brazil and the Democratic Republic of Congo, but deforestation and forest degradation have increased the area in need of forest cover and rehabilitation. According to The Minister of Forestry Decree No. 30/2009, forest degradation is a deterioration in the amount of forest cover and carbon stock over a certain period of time as a result of human activities. In this document, forest degradation is defined as the change of primary forest class to secondary forest class. The secondary forest categories represent forests that have degraded or decreased in quality as a result of selective logging or other external factors which affect the partial loss of primary forest stands (Indonesia, 2022).

USAID monitoring results for the last 20 years show that there has been a rate of forest destruction on Arjuna Mount, and a decrease in the flow of the springs. The number of dry springs is 30, out of a total of 41 springs. The main causes of forest destruction are fires and illegal logging. The forest area of Arjuna Mount, Pasuruan, East Java, reaches 12,000 hectares.

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About 1,500 hectares were damaged by fires in 2012. Of the 1,500 hectares burned, only 300 hectares were rehabilitated. According to a study by the Clinton Foundation, USA in 2011-2012, the rate of forest destruction on Arjuna Mount reached 0.24% or equivalent to 68 ha/year. If this condition continues, it will threaten the supply of clean water for nearly 2 million people, 4.7 thousand hectares of irrigated rice fields and around 500 industries in Pasuruan area (Nugroho et al., 2019).

To date, it is estimated that more than three-quarters of Indonesia's population depend on forest products where more than 50 million of them live in forest areas (Budi & Bambang, 2018). Hafizianor *et al.* (2013) revealed that the human resources of the forest community still very low in addition to the minimum empowerment efforts. This means that there are approximately 50 million Indonesian people who have non-optimal human resources because they live in a forest area. According to Hani *et al.,* (2014), the poor welfare of forest community is caused by many forestry development policies which are considered not able to improve the economy and welfare of the communities around the forest area. Many of the cases are caused by the distrust between the government and the community regarding the management of forest areas. There is still an assumption that the forest community destroys the forest. Such conditions make the efforts to empower forest community have not been able to alienate the lack of economic, social, and individual cultural abilities.

Development of communities around forests, with approaches based on conditions of human resources, socio-cultural, economic, community institutional structures, natural resources, environmental tourism, harmonization between institutions and community capabilities are appropriate strategies for conservation of forest biodiversity (Haque et al., 2016). Based on some of the facts and problems mentioned above, the analysis of community empowerment participation for the forest revegetation in Arjuna Mount was needed.

Method

This service uses a Participatory Rural Appraisal approach, with the study population covering the community around the forest and springs, who lived in three villages, namely Leduk, Jatiarjo and Dayurejo Village, Pasuruan, East Java-Indonesia. Data obtained from respondents with questionnaires and analyzed using SEM (structural equation modeling), to

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find out a general description of respondents' responses about community participation in the preservation of Arjuna Mount Forest.

Results and Discussion

Analysis of Human Resource Capital for Community Empowerment

The profile of human resource empowerment in the communities of Leduk, Jatiarjo and Dayurejo Villages was: (1) the minimum education level of junior secondary schools; (2) most of the main work of the farming community; (3) there were jobs as breeders and fisheries; (4) there were people who have a side business, besides being farmers and breeders. The response of 210 respondents to the profile of human resources, in Figure 1. shows that human capital was a determinant of the success of community empowerment for the preservation of the Arjuna mount forest, because 57.6% of respondents said they strongly agreed and agreed. Figure 1. describes respondents' perceptions of empowerment in Leduk, Jatiarjo and Dayurejo Villages.

The constraints of human resources related to the empowerment of communities in Leduk, Jatiarjo and Dayurejo Villages were the level of education of the community as farmers in general was junior high school and elementary school. The survey results showed that there were 7 formal education institutions, 10 elementary schools, 4 junior high schools, non-formal, 2 pursuit packages C and 3 Islamic boarding schools. There are 361 active members in women's organizations, 178 youth organizations, and professional organizations such as 69 people. Based on these data, the community was conditioned to develop dryland agriculture as the basis of their livelihood, and some do livestock business. The lack of knowledge and skills of the community around the forest, so that people use the forest as their main source of income, this has resulted in them doing things that are actually a factor in forest destruction. The level of community education has a significant effect on community empowerment and forest revegetation. Adekola & Mbalisi (2015), explained that the education of rural communities regarding forest conservation has a significant influence on preventing damage to forest ecosystems.

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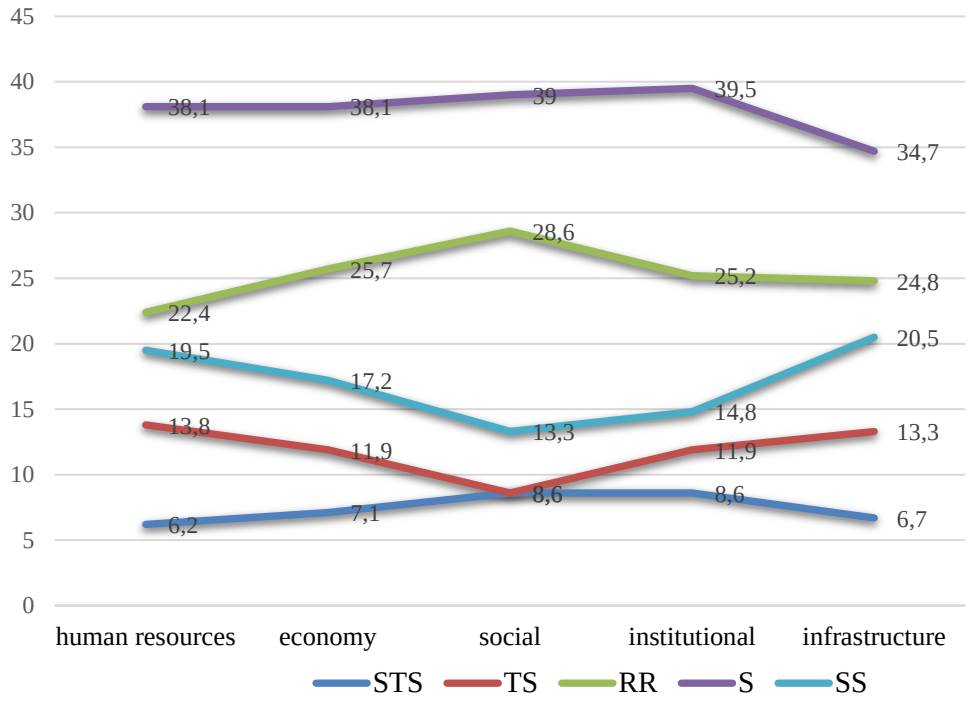


Figure 1. Respondents' perceptions of community empowerment

Note:

STS	:	explain the perceptions of respondents strongly disagree about community empowerment
TS	:	explain the perceptions of respondents disagree about community empowerment
RR	:	explain the perceptions of respondents hesitant about community empowerment
S	:	explain the perceptions of respondents agreeing about community empowerment
SS	:	explain the perceptions of respondents strongly agree about community empowerment programs

The successes that have been carried out in the development of human resources in Leduk, Jatiarjo and Dayurejo Villages include: (1) the formation of a group discussion of communities around the source of water; (2) an environmental school was held once a week, every Sunday by the Cempaka Foundation; (3) livestock skills training activities and (4) tourism service business development, the Arjuna mount forest area has high tourism potential.

Based on the results of surveys and socialization in group discussions, the 2 objectives to be implemented in human resource empowerment in Leduk, Jatiarjo and Dayurejo Villages were: (1) increasing knowledge and changing attitudes of the community, towards the revegetation movement of the Arjuna mount forest and (2) the environmental school model, which implements education on forest conservation and biodiversity through a local competency-based curriculum by the Cempaka foundation. According to Budi & Bambang

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(2018) their extensive knowledge is obtained from higher levels of education or networks that enable these farmers or forest village community to have the potential to develop their knowledge. Based on field findings. These farmers typically have narrow land, few networks, limited knowledge due to low education level and friendship in which they also struggle with their lives in the forest area.

Analysis of Economic Capital for Community Empowerment

The economic profile of empowering the people of Leduk, Jatiarjo and Dayurejo villages was: (1) the village community has a yard/field for agricultural business; (2) the average income of the community every month, at least 2 million and more; (3) the minimum number of dependents in one family was 3 people (wife, child, parent); (4) most citizens who have jobs and businesses have savings or assets; (5) most residents of Leduk or Jatiarjo and Dayurejo villages have family farms (such as chickens, goats or cows). The perception of 210 respondents to the economic profile of empowering the people of Leduk, Jatiarjo and Dayurejo villages, in Figure 1. shows that 55.3% of respondents agreed and strongly agreed on community economic empowerment.

The constraints on economic conditions related to the empowerment of communities in Leduk, Jatiarjo and Dayurejo villages were the increasing economic pressure and family needs, which has an impact on changing the function of forests into agricultural fields. Looking at the natural conditions, the people of Leduk, Jatiarjo and Dayurejo Villages were conditioned to develop dryland agriculture as the basis for their livelihoods. In its development, most of the community's agricultural land that has been sold to people outside the area has made them penetrate the forest as agricultural land. The economic limitations of the surrounding forest communities and the absence of awareness of the dangers caused by land clearing make them plant annual crops in an effort to meet their daily needs. Chen *et al*. (2022), explain that government and society as stakeholders and ecosystem protection aims to increase the supply of agricultural ecosystem services and reduce deforestation caused by changes in forest function to agricultural production land. In addition, in response to deforestation and climate change, United Nations proposes Reducing Emissions from Deforestation and the Forest Degradation (REDD) program.

The successes that have been carried out in economic empowerment in Leduk, Jatiarjo and Dayurejo villages include: (1) increasing the economic value of families through organic

farming, goat farming, wasp honey and tourism services around the Arjuna Mountain Forest. overcome because economic needs can be fulfilled; (2) forest village community institutions carry out forest conservation effectively based on ecological, economic and social aspects; (3) community economic empowerment projects such as programs for underdeveloped villages, infrastructure development programs to support underdeveloped villages, strengthening character education, people's business credit, community empowerment program, Urban Poverty Reduction Program. Community empowerment is an effort to increase the role of the community that aims for change so that they can have the ability and strength to be independent in meeting their needs. The achievement of goals is carried out with the active participation of the community in development through increased motivation, initiative and creative ideas. It requires commitment and cooperation to apply the principle of empowerment. With empowerment, the community has the opportunity to be able to advance the economy and improve welfare. These programs generally have similar dimensions of approach, such as: revolving capital assistance, infrastructure development assistance, local institutional development, strengthening and development of business partnerships, and facilitation of mentoring (Albart et al., 2020; Eger et al., 2018).

Based on the results of surveys and socialization in group discussions, the objectives to be implemented in the economic empowerment of communities in Leduk, Jatiarjo and Dayurejo villages were: (1) economic improvement of farmer families; (2) increasing the work capacity and income of women's groups; (3) the development of environmentally sound forest agriculture, namely changes in the forest management system by the community from pure agricultural patterns to intercropping patterns.

The socio-economic factors that influence local communities' participation in economic empowerment in forest communities, such as education, income and occupation, need to be considered when planning for local communities' participation in forestry management. Considering that community-based forestry enterprises increase opportunities for households to participate in forestry, there is a need to strengthen the existing and encourage the formation of new community-based forestry enterprises owned and managed by community members. This will enhance their access to forestry opportunities that can influence their participation (Chiwaya & Mzuza, 2022).

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Analysis of Social Capital for Community Empowerment

The social profile of empowering the people of Leduk, Jatiarjo and Dayurejo villages was: (1) mutual cooperation activities were still being carried out in Leduk or Jatiarjo and Dayurejo villages; (2) most of the residents actively and voluntarily participate in mutual cooperation activities in the community; (3) the culture of social activities such as helping each other at death ceremonies, sick people, marriages and being hit by calamities still exist in the community; (4) most residents know that there was a revegetation program for the Arjuna mount forest; (5) community leaders (indigenous leaders, community leaders, hamlet and village heads, heads of neighborhood community/neighborhood participate actively in forest rehabilitation. The perception of 210 respondents to the social profile of empowering the people of Leduk, Jatiarjo and Dayurejo villages, in Figure 1. shows that the social capital of Leduk, Jatiarjo and Dayurejo villages was a determinant of the success of community empowerment for revegetation of the Arjuna mount forest, because almost 52.3% of respondents agreed and strongly agree.

The results of direct surveys in the communities of Leduk, Jatiarjo and Dayurejo village have 2 tribes namely Madura and Javanese, so the language of the day-to-day association uses the languages of Madura and Javanese. The majority of the population was moslem, some hamlets were adhering to the Kejawen's belief with holding strong Javanese traditional wisdom. Regional art that was still developing was Laro flying and Gandul flying, namely art that uses Ketipung, flying and Jidor instruments combined with Javanese verses and Islamic songs. Community organization plays a significant role in the well-being of a given community. From the social ties built and maintained through non-occupational association to the multi-faceted social capital held through in person attendance at civil associations, meeting up in person has several positive effects on local communities. Foremost of these are the (1) building of social capital and (2) supporting local venues that allow for organization. Both of these facets serve to reinforce each other when in full force (Horan, 2022).

Constraints on cultural and social conditions related to the empowerment of communities in Leduk, Jatiarjo and Dayurejo Villages are beginning to decline in values and norms as well as patterns of social interaction in regulating the daily lives of community members, because more and more industries were penetrating several neighboring villages some of the people who previously farmed live within the norms of mutual cooperation,

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especially women who switched professions as individualized factory workers, and there was not enough time to contract with the surrounding community.

The emergence of mutual trust between the community and Indonesian state forest company, so that forest management activities run independently without coordination. Adaptation of community-based forest management was also not optimal because of the weak socialization and exclusive approach. Indonesian state forest company's position was weak because people who have no land use the conditions of the reform era that often use coercion. Community empowerment requires the development of social capital on an ongoing basis, namely improving social relations, trust, and norms. Social interaction and social processes can be explained not only by the characteristics of individuals, but also by their integration into a social environment. The social relations in question include participation, cooperation, mutual care, and reciprocity. Trust and norms in social capital were considered as very important components because they support existing social relations (Light & Moody, 2020).

The successes that have been carried out in the social empowerment of communities in Leduk, Jatiarjo and Dayurejo villages include: (1) implementing forest resource conservation in accordance with the social characteristics of the forest communities; (2) increasing the social capital of forest village communities in accordance with local wisdom. Examples of activities that are routinely carried out every year were ritual social activities of thanksgiving, salvation of the community and preservation of springs in the villages of Dayurejo, Jatiarjo and Leduk. According to Santoso (2007), revealing that communities around the forest still maintain elements of social capital such as the types of customs, culture, beliefs and rituals that were consistently maintained until now. The village community living around the forest has customary regulations in utilizing forest resources, these values or norms are mutually agreed and implemented, with the aim of forest resources remaining sustainable and they can continue to survive.

Based on the results of surveys and socialization in group discussions, the objectives to be implemented in community social empowerment in Leduk, Jatiarjo and Dayurejo Villages were: increasing the active role of community social capital such as social/work networks, level of trust between people, adherence to norms, concern for fellow human beings and families and involved in community social activities in forest village community institutions,

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then forest management will be more effective in supporting conservation based on ecology, economics and social. Social capital is particularly important in resource-dependent communities as it is the backbone of sustainable resource management and adaptation to climate change. Without good resource management and adaptation, these communities may be vulnerable to a multitude of issues such as extreme weather events and environmental degradation (Pretty et al., 2020).

Analysis of Local Institutional Capital for Community Empowerment

The profile of local institutions for the empowerment of the people of Leduk, Jatiarjo and Dayurejo villages was: (1) the establishment of the forest village community institution in Leduk, Jatiarjo and Dayurejo villages; (2) the functions and responsibilities of the forest village community institution were responsible for revegetation and forest preservation; (3) communities around the forest actively engage in the implementation of forest revegetation programs (planning, financing, organization, implementation, monitoring and evaluation, and reporting); (4) Forest village community institutions have cooperation with other parties in managing forests (companies, Indonesian state forest company, universities); (5) the forest village community institution in Leduk or Jatiarjo and Dayurejo villages in carrying out cooperation for revegetation of forests experience many obstacles that hinder the preservation of the Arjuna mount forest. The perception of 210 respondents to the profile of local institutions for the empowerment of the communities of Leduk, Jatiarjo and Dayurejo villages, in Figure 1. shows that the capital of local institutions, namely the forest village community institution Leduk, Jatiarjo and Dayurejo villages determines the success of community empowerment for revegetation of Arjuna mount forest, because it was almost 54.3% of respondents agreed and strongly agreed.

In the villages of Leduk, Jatiarjo and Dayurejo there were the forest village community institution, which actively manage 350 ha of forest in the Indonesian state forest company area of Arjuna mount. Forest management of the Leduk village area carried out by the forest village community institution of Bumi Lestari Mulyorejo, Jatiarjo village area carried out by the forest village community institution of Ngudi Lestari and the Dayurejo village area was carried out by the forest village community institution of Indrokilo Manunggal. As a legal entity, the forest village community institution has the authority to be able to cooperate between the community and Indonesian state forest company in forest management and preservation, so

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that in its implementation, forest management provisions are set forth in the articles of association and by-laws, and have received mutual consent from the community.

The constraints on the condition of forest village community institutions related to community empowerment in Leduk, Jatiarjo and Dayurejo villages were: (1) the capacity and role of forest village community institutions as forest managers was still not effective; (2) forest village community institutions did not have a more effective forest management program that supports conservation based on ecology, economics and social. The role of the forest village community institutions in forest management was important, this was explained by Harmadji *et al*. (2022), that community institution is an abbreviation of the Forest Village Community Institution, which is a community institution located in the Village Forest. The formation of community institutions occurs so that community goals can be accommodated and so that community members can take part in actions designed to maintain and conserve local forests. Forest Village Community Institution where people living around forest areas act as members and administrators of the institution. Indonesian state forest company, the village, and the residents themselves worked hand in hand to establish Forest Village Community Institution. This is done in a coordinated effort. The Forest Village Community Institution management was chosen through a deliberation process, which was then formalized into a Decree on the establishment of Forest Village Community Institution by the Village Head.

Some of the successes that have been carried out by forest village community institutions in empowering communities in Leduk, Jatiarjo and Dayurejo villages include: (1) forest village community institutions with the Indonesian state forest company was able to prevent forest resources from the threat of damage from looting activities by people living around the forest, this strategy in accordance with the regulations listed in PP No. 72 of 2007; (2) forest village community institutions has conducted mapping of forest management rights in collaboration with the Indonesian state forest company, which has been legally stipulated in the forest village community institutions articles of association and By-Laws.

Based on the results of surveys and socialization in group discussions, the objectives to be implemented in the guidelines for developing village forest community institutions for community empowerment in Leduk, Jatiarjo and Dayurejo Village were: (1) establishing plans, implementation and monitoring of forest village community institutions performance for

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community empowerment and revegetation of the Arjuna mountain; (2) evaluating community development programs through forest village organizations/ institutions/groups in relation to improving the welfare of the people of Leduk, Jatiarjo and Dayurejo villages; (3) strengthening institutional capacity of forest village community institutions of Bumi Lestari Mulyorejo in Leduk village, forest village community institutions of Ngudi Lestari Jatiarjo and forest village community institutions of Indrokilo Manunggal Dayurejo.

Participation in community development and forestry management increased with an increase in the level of education. It is concluded that the environment can be conserved once the people have enough land because they can have a certain portion of land for growing trees hence people will be able to use those trees rather than destroy the reserved forests and woodlands. The results have shown that the participation of men and women are almost the same. Forestry development and community participation need to be integrated if they are to benefit from the existence of forestry resources and ensure their sustainability (Chiwaya & Mzuza, 2022).

Analysis of Capital of Facilities and Infrastructure for Community Empowerment

The profile of facilities and infrastructure for empowering the people of Leduk, Jatiarjo and Dayurejo villages, namely: (1) access to the infrastructure of the entrance roads in Leduk, Jatiarjo and Dayurejo villages has been paved; (2) village transportation infrastructure such as motorcycle taxis were available; (3) clean water infrastructure was available for communities in Leduk, Jatiarjo and Dayurejo villages; (4) health infrastructure was available for communities in Leduk, Jatiarjo and Dayurejo villages; (5) basic education infrastructure such as buildings and supporting facilities for primary schools and buildings and supporting facilities for junior secondary schools was available for the community in Leduk, Jatiarjo and Dayurejo villages. The perception of 210 respondents to the profile of facilities and infrastructure for the empowerment of the people of Leduk, Jatiarjo and Dayurejo villages, in Figure 1. shows that the infrastructure of Leduk, Jatiarjo and Dayurejo villages was a determinant of the success of community empowerment for the preservation of Arjuna mount forest, because almost 55.2 % of respondents agreed and strongly agreed.

The constraints on the condition of facilities and infrastructure for empowering communities in Leduk, Jatiarjo and Dayurejo villages include: (1) places and equipment for improving business skills not available to the community; (2) technical guidance on business

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skills not available to the community; (3) village unit cooperatives were not yet available that can provide capital assistance to the community; (4) facilities and infrastructure were not available for forest conservation. Land preparation facilities and infrastructure to spur plant growth, reduce fire risk and minimize erosion, for example: plow and harrow mechanical devices, while chemicals were herbicides for rocky sloping land. Planting facilities and infrastructure such as plows, pick-up transporting plant seeds and seedling nursery locations. Weeding facilities and infrastructure, to mechanically use tractor tools, while manually using hoes, herbicides and tanks. Fertilizer facilities and infrastructure were hoes, fertilizers, and tanks. Waridin (2018) Infrastructure is currently a major requirement in rural development. The availability of infrastructure both buildings and roads will provide easy access for local economic development. Infrastructure is important to accelerate economic progress and reduce poverty. Infrastructure is public goods and services that enter the production process as complementary input to traditional production factors such as capital, labor, and entrepreneurship. They help increase return on investment by reducing production costs and improving transition efficiency. Availability of infrastructure and service efficiency determine the success of other production processes. Investments in infrastructure such as energy, water, transportation, and communication technology promote economic growth, reduce poverty, and improve living conditions in developing countries.

Some of the successes that have been carried out regarding facilities and infrastructure for empowering communities in Leduk, Jatiarjo and Dayurejo villages were the availability of facilities and infrastructure for road access, transportation equipment, clean water, health and education facilities in Leduk, Jatiarjo and Dayurejo villages. Laah *et al.* (2014) explain that developing countries have experienced growth in infrastructure development although there are still many deficiencies in the number, quality, and accessibility for the community, especially rural communities. Such shortcomings will affect the competitiveness of slowing performance in the economic, health, and education sectors that would harm the poor in rural areas. Community participation in infrastructure development in the region will create awareness, mobilization, and creative potential including talent, skills, human resources, and finance. The needs of the people involved in rural infrastructure development through empowerment demonstrate specific implementation shifts. Policies and strategies are directed primarily at nature control, technology considerations, economic structures, and

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demographic conditions by considering values, customs, social structures and political participation.

Based on the results of surveys and socialization in group discussions, the target to be implemented regarding the facilities and infrastructure for empowering communities in Leduk, Jatiarjo and Dayurejo villages was the development of environmental facilities and infrastructure as a form of increasing community empowerment, attention, support, guidance and of course assistance from various related parties, namely the government of Prigen subdistricts and the Leduk, Jatiarjo and Dayurejo villages. Furthermore, if there were problems regarding the implementation of the ccommunity empowerment program, a solution can be found. Therefore, it was good to develop environmental infrastructure as a manifestation of the implementation of the community empowerment program that needs continuity or sustainability so that the community can be smoother and more comfortable in carrying out daily activities.

Based on the results of the regression weights analysis SEM (structural equation model), in Figure 2., shows that the variable community empowerment has a very significant effect on the preservation of the Arjuna mount forest. The better the community empowerment, the better revegetation of the forest, and vice versa. Wakarmamu *et al.* (2015), explained that there was a significant influence of empowerment factors such as profile, institution, economy and policy on forest rehabilitation productivity. Haque *et al.* (2016), explained that sustainable community development based on alternative income-generating approaches that were environmentally friendly was very important in supporting forest sustainability globally.

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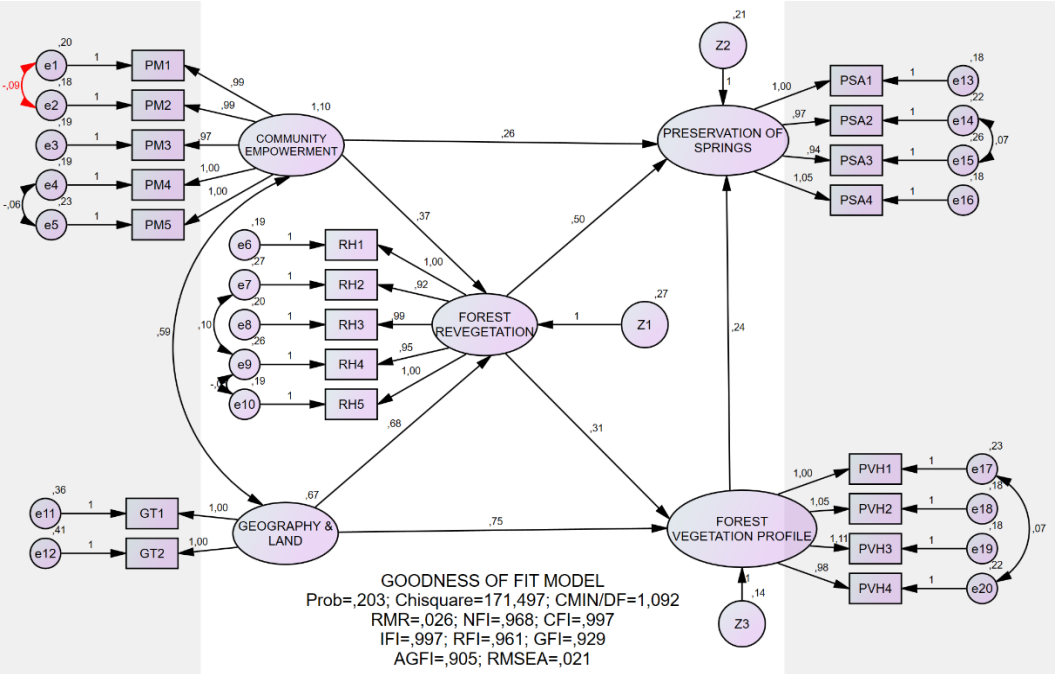


***Figure 2**. Results of estimation of structural model modifications*

Setiajiati *et al.* (2017), explain that communities are important actors in natural resources management, and can be the most effective stewards in forest management when they are given an opportunity in decision making. Participation of local community has been shown to be a major factor in the success or failure of natural resource protection. Therefore, community empowerment is needed for improving community participation. Community empowerment can also minimize social conflicts and maximize equity of benefit sharing. Community empowerment has a positive influence on forest conservation and preventing illegal logging which includes 3 aspects, namely: (1) increasing income and growing economy of rural communities that were environmentally sound; (2) provision of facilities and infrastructure; (3) creation and positive behavior in environmental preservation.

Estimated value of regression weights SEM (structural equation model), in Figure 2., for each community empowerment indicator shows that: human resources were 0.99, economy was 0.99, social was 0.97, local institution was1.00 and facilities and infrastructure were 1.00. This condition explains that according to respondents the factors of local institutions, facilities and infrastructure have a higher role than other factors in community empowerment for revegetation of the Arjuna mount forest. The role of forest management institutions was increasingly clear functionally after a decision and decree from the Indonesian

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Minister of Forestry Number P. 89 of 2014, that forest village community institutions in the management and preservation of forest resources were responsible to the village head.

The forest village community institution, which is a community institution located in the village forest. The formation of community institutions occurs so that community goals can be accommodated and so that community members can take part in actions designed to maintain and conserve local forests. The forest village community institution where people living around forest areas act as members and administrators of the institution. Indonesian state forest company, the village, and the residents themselves worked hand in hand to establish the forest village community institution (Harmadji et al., 2022).



Figure 3. *Community socialization and participation in forest village community*

Empowerment of forest village communities through the program of strengthening village forest community institutions can optimize the results of efforts to prosper rural communities around forest areas, because planning, implementation, monitoring and evaluation of activities effectively and efficiently is carried out by forest village community institutions (Choiria et al., 2015). While Anam & Soedarto (2022), explains that institutional strengthening was the key to empowering farmers' welfare through the dynamic sustainable development of modern agriculture requires as follow: (1) farm management is carried out as a business entity; (2) the production process is carried out efficiently, effectively, and sustainably in make use of available resources; (3) institutional development to encourage capacity building personal and communal so that farmers earn adequate income; (4) awareness of the farming community is formed about the importance of technology through sustainable innovation system development. In addition to institutions, facilities and

infrastructure also have a higher role than other factors in community empowerment for revegetation of the forests of Arjuna mount. According to the Indonesian Large Dictionary 1997, the means are anything that can be used as a tool to achieve goals and objectives. Whereas infrastructure was a potential factor that was very important in determining the direction and future development of a region, because development will not be successful and run well without adequate infrastructure support. Facilities and infrastructure explain the various facilities that can be used as tools and support for achieving the activity process as intended, in this research the facilities and infrastructure for empowering the people of Leduk, Jatiarjo and Dayurejo villages include village road access, village transportation, clean water infrastructure, facility infrastructure health and education facilities. This was in accordance with Nugroho *et al*., (2019) that 6 indicators of the assessment of facilities and infrastructure for community empowerment include: (1) agricultural production facilities, (2) educational facilities and infrastructure, (3) health facilities and infrastructure, (4) economic facilities and infrastructure, (5) communication facilities and infrastructure, and (6) transportation facilities and infrastructure.

Conclusion

Community participation in the form of human capital, economy, social, local institutions, facilities and infrastructure has significant influence on community empowerment for the preservation of the Arjuna mount forest. The better participation of empowerment of the community of Leduk, Jatiarjo and Dayurejo villages, the better preservation of the Arjuna mount forest will be, and vice versa. Community participation in the form of human, economic, social, local institutions, facilities and infrastructure has a positive influence on forest conservation and can prevent illegal logging, natural forest fires during the dry season, making forest charcoal by the community and opening up agriculture in forest areas.

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