



A Review of Social Knowledge among Forestry Graduates in Forest Education Curriculum in Indonesia

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Abstract. Educational forests must align their main goals with a comprehensive education plan that emphasizes the essential knowledge of forestry. Within learning modules at Educational Forestry (KHDTK), graduates are required to possess in-depth knowledge of conflict resolution for forest management, stakeholder mapping communities, learning modes for millennials education, and community involvement in environmentally friendly forest management. However, there have been few studies that delve into this knowledge to develop effective forest management models. This review aims to discuss the evolution of social research in forests, specifically educational forests. We limited the articles to those published within the last twenty years. We had 82 articles for analysis. The presented study shows that forest education (KHDTK) should contain at least four educational modules related to the social sciences domain. The modules include Knowledge about Conflict and Enforcement, Understanding Stakeholders, the Young Generation Learning Model, and Increasing Community Participation. We need graduates with extensive knowledge and proficiency in the social aspects of forestry to maintain the health of forests and their environment, paving the way for a better future and improved forest management in Indonesia.

Keywords: Forest Educations, Social Knowledge, Forestry Graduate, Module.

1 Introduction

Educational forests have been developed in Indonesia. Several universities have transformed thoughts and theories into instructional approaches that equip students with real insights [1]. Forest knowledge is an invaluable source of wealth. Forests offer many beneficial natural resources. We must be able to properly maintain this. Forest is the relationship between forests and their inhabitants [2]. Therefore, a system of mutually beneficial interactions must be implemented for sustainable forest management [3]. If there is continuity between the forest and surrounding communities, the forest will be sustainable and passable from generation to generation [4]. In addition to knowledge of forest richness, it also includes knowledge of forest management. Effective management and utilization of forests [5]. Numerous examples of forest management

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R. Legino and Y. Ahmad (eds.), *Proceedings of the International Conference on Science Technology and Social Sciences – Social Science Track (ICONSTAS-SS 2023)*, Advances in Social Science, Education and Humanities Research 865,

https://doi.org/10.2991/978-2-38476-293-4_19

are used in educational forests. Students can implement the forest management model demonstrated by the educational forest if they enter a community [6].

Educational forests managed by the government and private sector in several universities in Indonesia are anticipated to serve as models of sustainable forest management from both human and natural resource perspectives [7]. One of the educational forest's expectations is that it will serve as a standard for forest administration. Until now, forest management has consisted of over-exploitation, which damages forests and creates calamities [8]. The government allows students, faculty, and community members to develop innovative ideas and methods of forest management. The education forest or a Special Purpose Forest Area (KHDTK) is where people put their ideas for new forest management models and conduct experimental projects [9].

The KHDTK was established as a research forest to act as a field laboratory for many forest research and development activities [10]. Experiments, protecting species, and empowering society are only some of the many scientific tasks. This function aligns with the mandate's requirements outlined in Law No. 41 of 1999. The Special Forest Area is available from the Forestry Research Center and other research institutions, including universities, business institutions, students, and local community members, to promote forest research and development [11]. Forest areas designated as having uses have the mission of preserving and ensuring the existence of forest areas as economic drivers at the local, regional, and national levels, as well as providing support for life at these levels [12].

It is difficult for private universities and public universities to manage educational forests because of the many challenges they face. These challenges include forest fires, pressure on forests in the form of deforestation, the use of forests for agriculture, and timber theft by communities close to educational forest [13]. Educational forests are required to generate effective forest management models to promote responsible forestry management in Indonesia [14]. If they fail to accomplish this, their existence becomes meaningless. Forest education is needed to facilitate the development of modules and facilities for students' learning activities [15]. This review describes some of the required social modules in educational forests. Forest management requires a robust understanding of the social sciences. Undergraduate students are often unprepared to go out into the working world and solve the social problems they will encounter in the forest [16]. You can divide these modules into the following categories: 1. Conflict resolution and enforcement of regulations 2. Stakeholder Mapping Learning Module 3. Younger Generation Learning. 4 Learning Module on Community Engagement Improvement. Module The fourth module is the Learning Module on Community Engagement Improvement. However, supplementing it with a wide variety of other modules tailored to the student's specific field of study and the forest manager's skill needs would be more beneficial. Although this module is still considered a sufficient requirement, it is essential to note that it is still considered the very minimum requirement. Suppose that we are successful in developing learning modules. In this scenario, the market's demands will prepare students for the workforce, and if they work in fields directly related to society, they will also be ready for society. If we fail to develop

learning modules, our students will not be prepared to work according to market demands.

2 Method

The first step in compiling a review paper on social knowledge curricula in educational forests in Indonesia is to analyze related papers and link social knowledge to forest management. In this process, relevant articles were searched using search engines, including Science Direct Google scholar Scopus Key words such as "Legal Foundations of Forest Education," "Young Generation Learning," "Traditional Law Learning," "Learning to Increase Community Involvement," "Stakeholder Mapping Learning," and "Provisions for Settlement and Enforcement of Forest Conflicts." This resulted in the identification of 82 articles, and we used all the articles in this paper.

Following this introduction, this paper focuses on the following points: "Legal Foundations of Educational Forests," "Learning of the Young Generation," "Learning Customary Laws," "Learning to Increase Community Involvement," "Learning Stakeholder Mapping," and "Provisions for Completion and Forest Conflict Enforcement." These points are very important for understanding sustainable forest management from a social science perspective. Social science is required for sustainable forest management within communities. The analysis of this review article was conducted descriptively by aggregating relevant topics into a single discussion. The findings identified six recurring social aspects from the articles analyzed.

3 Results and discussion

3.1 Conflict Resolution and Regulation Enforcement Module for Forest Management

Alternative techniques that can be established for forest conflict management should prioritize the concepts of togetherness and learning [17]. In addition to togetherness and learning, the three concepts help conflict management efforts: organization or institution strengthening, coaching, and empowerment. Three concepts are required to establish alternative techniques for forest conflict management. An integrated forest management system and learning policy for the community are necessary to manage forest conflicts. This policy should unify all forestry operation components and methods for conducting forestry work [18]. In most cases, the failure of government agencies to effectively communicate and coordinate their resource management efforts is the root cause of policy disagreement among these agencies [19].

Forest managers' attempts to resolve conflicts through forestry partnerships are innovative [20]. The government's most successful method for settling disputes should serve as a model for managing forests. The first step in implementing this plan is to change the manager's mindset from one that is bureaucratic, centralized, and fraught

with anxiety to one that is loving, accommodating, and facilitative [21]. One technique employed is the Focus Group Discussion (FGD). The FGD dramatically influences how people think about things after participating [22]. Another efficient technique is the use of FGD to resolve concerns and actions linked to land encroachment, land claims, and land burning during agricultural land clearance [23].

Once conflicts have been resolved, law enforcement consists of preventive and repressive activities. Preventive activities include negotiations, supervision, information, and guidance. Repressive activities include investigations and application of administrative and criminal law sanctions. People feel that there are no laws in their area or that they live in lawless jungles because of the ineffectiveness of law enforcement. To ensure that forestland disputes are resolved in a manner that complies with the law, conflict resolution must involve coordination with law enforcement agencies, such as the police and district courts [21]

Repressive means such as routine patrols, joint operations, functional operations, and preventative measures based on counselling are used to conduct surveillance and prevention activities [24]. These activities are also known as "surveillance and prevention." People's legal awareness is still low, with unclear legal regulations relating to the presence of hamlets and villages in and around forests, and the overlap of village areas with areas of forests. The success of law enforcement is dependent on its ability to overcome obstacles and obstacles, specifically: 1) obstacles and obstacles in the form of diverse levels of public knowledge that can lead to different perceptions of the law; 2) people's legal awareness is still low; and 3) unclear legal regulations relating to the overlap of village areas with areas of forests. 4) Ineffectiveness of law enforcement and 5) Struggles with finances [25].

To provide alternative models for conflict resolution and law enforcement, it is desirable to avoid repressive law enforcement and to increase preventive activities. Repressive law enforcement is counterproductive [26]. Interactions with local populations are an essential part of forest management. Conflict resolution strategies should involve the students in forest education. The students involved will be linked to continuous learning from students and instructors to be equipped with models and formulas for solving problems in forest management communities. These models and formulas enable them to engage better with communities affected by forest management. The following are some probable steps that must be taken to complete the conflict:

1. Conduct formal meetings between the relevant institutions. Mediators trusted by each party can initiate meetings. This formal meeting is crucial for disseminating management's existence to relevant agencies or communities in the forest [21, 27].
2. Identifying effective conflict resolution solutions and tactics should be simpler by identifying forest dispute issues. This decision is necessary to identify and understand in greater depth the issues related to educational forest conflicts [28].
3. Institutional approaches are also used to promote ecological improvement and prevent the loss of forests and land. Discovering a community-based institutional model requires knowledge of the problem, expectations, and level of

- need, and establishing common perceptions and shared values so that all parties can recognize and support it [29,30].
4. The empowerment approach is done on the community's social and economic aspects. The participatory approach encourages [29, 31].
 5. Conflict resolution by establishing communication and coordination with other parties and building partnerships with existing forest farmer groups can be continued with further agreements [32,33].
 6. To reduce and resolve conflicts at the community level, it is essential to create clear categories of the order in that forest managers should perform [34,35]
 7. Once the key representatives of each location can socialize, discuss, and develop clear and effective channels of communication with each other, only conflict resolution activities can be carried out [36].

The participation of students in this endeavor is essential because none of the steps mentioned above can be carried out simultaneously. Instead, forest managers and other relevant parties must gradually and consistently put it into practice through official meetings to come to agreements and compromise. The involvement of students will result in learning that will give them a sense of ownership of forest management.

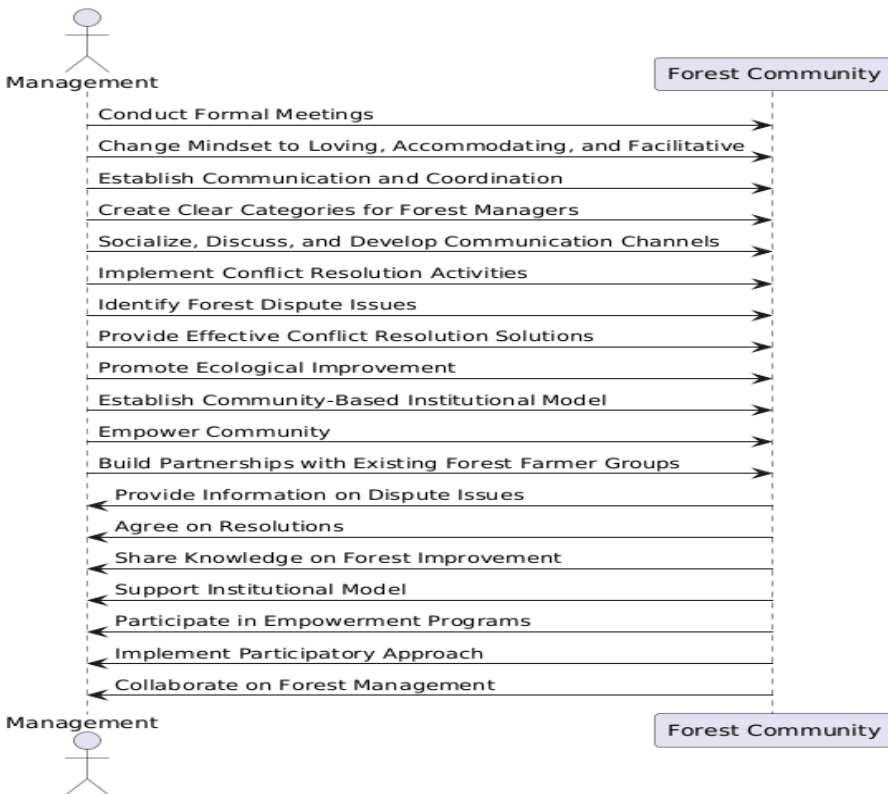


Figure 1. Illustration of Conflict Resolution and Regulation Enforcement

3.2 Stakeholders Mapping Learning Module

Understanding and cooperating with numerous stakeholders involved in forest management is one of the primary problems in sustainable forest management. Many groups such as governmental entities, private businesses, local communities, indigenous peoples, and conservation organizations can be stakeholders in forest management. Every stakeholder has unique interests and viewpoints, and conflicts may result when these interests and perspectives diverge. Hence, good stakeholder participation is a secret to sustainable forest management [37]. For forest managers, mapping and analyzing stakeholders is a critical responsibility for comprehending many stakeholders. Stakeholder analysis is a technique used to locate and comprehend the various parties involved in forest management. The processes involved in conducting stakeholder analysis include identifying stakeholders, figuring out their interests, determining their level of influence, evaluating their potential impact on the forest, and coming up with engagement methods [38]. Forest managers can make the best decisions and guarantee sustainable forest management by being aware of the interests and viewpoints of stakeholders. Some of the steps involved in carrying out a stakeholder analysis are as follows:

- a. Identify stakeholders and their roles [39].
- b. Distinguish and categorise stakeholders based on their interests and influence with the scoring method [40].
- c. Defining relationships between stakeholders [41].

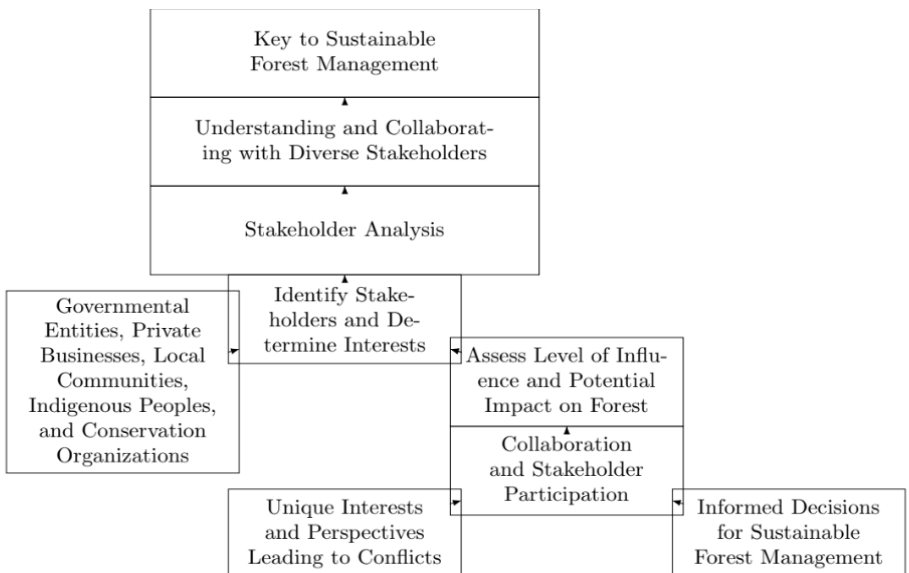


Figure 2. Stakeholders Mapping Illustration

A list of stakeholder analyses was generated based on this list. The degree of interest is determined by stakeholder participation in forest management, stakeholder dependence on forests, the work programs of each stakeholder related to forests, the benefits acquired by stakeholders from forests, and the role stakeholders play in forest management. Each stakeholder's level of influence is determined by their instruments and sources of power they possess [38]. The sources of strength are the individual and organization [37]. The main tasks of forest managers and the norms of private entities involved in forest management specify the relationships between parties. Relationship between stakeholders by categorizing them into four groups: synergy, overlap, contradiction, and no relationship [42]. Each group of links is studied according to the forest management components of conservation, tourism, management, economy, natural resource usage, participation, incentives, and environmental implications. Stakeholder analysis is the initial stage of identifying problems and needs when creating a forest management policy [43]. Stakeholders are a group whose concerns and interests in a situation are characterized by their significant position and level of influence [44].

There are many different stakeholders in the forest and the types of stakeholders play a unique role. The Environment and Forestry (KLHK) and local Administrative Administration are also considered among these parties (Sub-districts, Villages, & Hamlets). 3) Forest management institutions, 4) Researchers, 5) Non-Governmental Organisations (NGOs), and 6) Community Groups Represented by Community Leaders Who Reside Within and Around the Forest Area [45]. In this scenario, the individual category comprises vacationers who go into the forest for various excursions such as tracking, camping, and other outdoor activities [42].

When all stakeholders have been identified, the next step is to perform a mapping exercise depending on the relevance and importance of each stakeholder in the forest management process [46]. Each stakeholder has a different degree of relevance and impact. How stakeholders participate in forest management, the degree to which those stakeholders are reliant on forests, the nature of the work that each stakeholder has concerning forest management, the advantages that stakeholders derive from forest management, and the role that stakeholders play in forest management are all factors that impact the various levels of interest that each stakeholder possesses [47].

3.3 Learning Module for Millennials

Education consists primarily of training and activities designed to foster student development. Education is required for a better social life and a more manageable job. Furthermore, education is a lengthy process that makes students more adaptable to life changes [48,49]. Children can learn about human attitudes towards the natural environment through exposure to adaptive attitudes and behaviors of the community in managing local forests. The community included children and millennials in forest management at an early age [48]. Early education indicates that millennials have been incorporated into efforts to protect forests through cultural inheritance from generation to generation, through a structured and informal learning process [51].

Formal education begins with early childhood education and continues through higher education [52,53]. However, informal education begins with enculturation and socialization within the family environment. Parents' jobs are highly significant in socializing and teaching children's cultural values in the subsequent generation [54,55]. Children should be taught to respect local wisdom early to preserve the natural environment [52]. They are taught to act in a manner that supports their attempts to conserve the environment. Incorporating indigenous knowledge and experience into adaptive forest management has direct implications for promoting behaviors that are helpful for environmental conservation efforts [53].

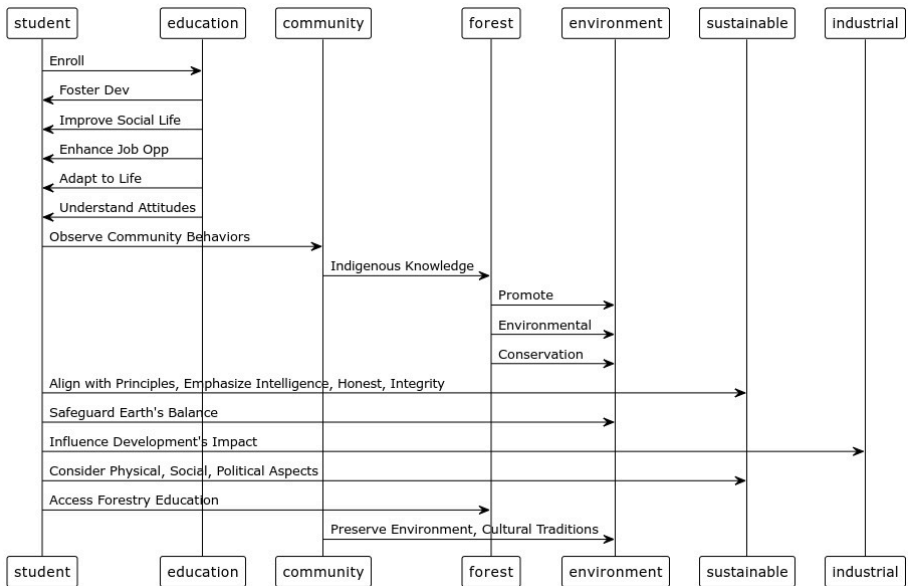


Figure 3 Learning illustration for millennial

The educational process of the millennial generation, which is adaptable to nature, is by the principles of education in the era of the Industrial Revolution 4.0 that are in effect today. These principles include thinking, feeling, sports, and processing the heart to create individuals with good intelligence, honesty, and integrity (care, resilience, independence, and nationalist and religious beliefs [56,57]. The school is the primary framework responsible for teaching a standard value system during these years and for leading individuals towards mature forms of role placement for which they are judged competent or have a reasonable level of drive [58]. The growth and modification of pupils' behaviors are the primary focus of the educational process [59]. Education instills in a person the ability to think objectively and equips them with the capacity to evaluate whether the culture of their society will adapt to the requirements of the time. Education plays a significant role in determining social rank and transmitting social standing from father to son [60]

Increasing educational attainment might be considered a potential solution to the issues that drive the encroachment of these forests, as stated by the experts' viewpoints

presented before. Sustainable development is a method that maximizes the benefits of natural and human resources. Efforts to conserve the environment fall under the category of sustainable development. The term "sustainable" can be defined as sustainability that takes into consideration physical, social, and political aspects by paying attention to the management of natural resources such as forests, land, and water, as well as the management of development impacts on the environment, and the development of human resource capacity. These criteria can be satisfied if the institutional apparatus incorporates multisectoral elements, such as the government, business sector, non-governmental organizations (NGOs), and international agencies [61].

The next generation will be able to retain the beauty of the environment and make efforts to preserve it if they have access to forestry education. Through forest education, communities can become a focus of environmentally responsible forest development. They continue to work towards preserving the environment and cultural traditions of the area, in addition to their desire to establish an economically prosperous society. The community's perspectives and actions concerning the adaptive management of forests serve as a direct instructional model for local millennial children to undertake environmental preservation [62]. In addition, it is the responsibility of the millennial generation to look after planet Earth, ensure that the ecosystem's natural balance is preserved, and lead the way in protecting and preserve the natural world. In the current era of 4.0, there are at least three different approaches that industrial development might take toward the environment. These approaches are redistributive, restorative, and regenerative [63,64].

3.4 Learning Module Increases Community Participation

The forest protection and management model, which is considered an effective forest in Indonesia from various articles in general based on cultural background and community mindset, is a collaborative management model with the community where the community is always in development and involved in operational activities in the field, especially as a group collecting superior products in the region [65,66,67]. People with backgrounds such as farmers, fishermen, and miners tend to be considered illegal because they only seek basic needs. Based on their background, they can be used as a basis to gather and form permanent foster groups as managers of resources in the forest. They can be given intensive training to improve the quality of their work to produce as many products as possible, according to market demand. Routine activities are carried out by forest management in forest areas according to the products requested by the market by continuously maintaining and maintaining forests to be safe. Enrichment and captive breeding activities of several endemic types, especially forest producers, such as traditional medicinal and ornamental plants, are continuously carried out to maintain sustainable production while maintaining product quality and quantity [68].

To complement the actions of management groups, forest managers must constantly seek market demand data on superior marketable goods. Based on the findings of an earlier study, each forest region has potential and superior goods, which are used as a basis for assessing the community's willingness and capacity to produce forest products with the support of forest managers [69]. In addition, it connects the community to the

buyer. This activity, if implemented systematically, will significantly reduce community activities that harm trees, as these activities can become a source of money for the community, and the community can rely on this activity to meet its economic needs [70].

Engagement of local populations in forest protection is essential; however, participation on the ground remains relatively low. The low participation of local communities in development is due, among other things, to the following: (a) dominant communities are only involved in the functions of "distribution" and "maintenance"; they are not involved in management, planning, and implementation functions that allow for the accommodation of local community aspirations; (b) communities are only involved in information and consultation; they are not involved in decision-making, action initiatives, and total control; and (c) communities living in remote areas have limited access to information and consultation. Specific participatory roles must be strengthened in diverse social groups [71]. All parts of the local community should be actively included in every development implementation process, because the success and sustainability of development cannot be achieved without the active participation of the local community [72].

Solving social problems requires an awareness of the community's values and participation of essential community groups in forest management decision-making. Today, the key to effective forest resource management is the ability to address the community's socioeconomic issues [73]. The socioeconomic conditions of forest village communities impact their woods through economic dependency, hunting areas for protein needs, farming, planting areas, building materials, and other activities related to the community's traditional social institutions. The socioeconomic situation of forest-adjacent populations is a variable that must be considered when defining forest management objectives [74]. Obtaining information about the relationship between and influence of the existence of forests and their functions on the lives of communities surrounding their forests, including making plans or evaluations of forest management activities, requires a study of the socioeconomic and cultural conditions of communities surrounding the forest [75].

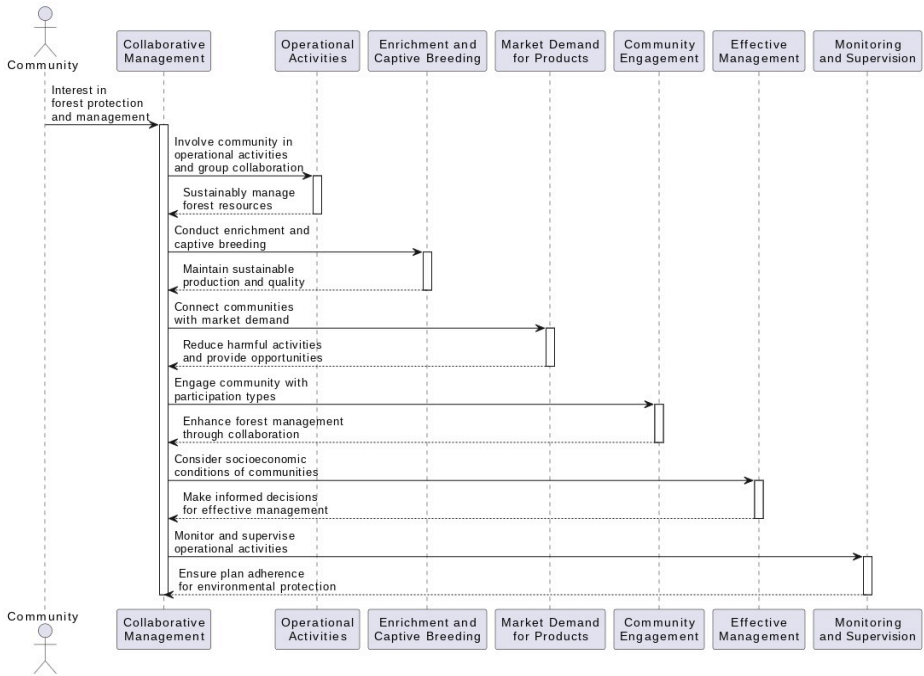


Figure 4. Illustration of community participation in forest management

Mind, energy, expertise, goods, and money are the types of community engagement [76]. Mind and energy are types of communal participation offered by the community. In addition to their intellect, the community contributes physical energy to numerous managerial activities. Planning is the initial step for community participation in numerous activities. Planning should carefully consider and decide what will be done to achieve the defined goals [77,78]. In forest areas, managers and communities plan by discussing and exchanging ideas through site selection activities for planting and supporting facilities to ensure that forest management is consistent with the plan [79].

Community participation in forest management drives all resources, including natural resources in the form of ecosystems and human resources in the form of communities [80]. In addition, community involvement in forest management fosters cooperation between the community, forest managers, and the government, so that forest management can be conducted effectively. The subsequent engagement is an overview. Supervision is a comprehensive effort to monitor the implementation of operational operations and verify that the predetermined plan carries them out. This idea corresponds to the situation on the ground, notably in forest regions, where the community engages in monitoring and improvement operations. Communities in the forest are willing to contribute because of their awareness of the environment and their desire to protect it, so they know the benefits they have received. Several hurdles can prevent a shift, including personality-based difficulties such as reliance [81,82].

4 Conclusion

Effective forest conflict management requires a holistic approach incorporating togetherness, learning, organisation strengthening, coaching, and empowerment. Essential components include an integrated forest management system, community learning policies, and coordination with law enforcement to handle both preventive and repressive actions. Alternative conflict management models should prioritise preventive measures over repressive actions. Key steps for successful conflict resolution involve formal meetings, identifying effective solutions, adopting institutional approaches, and enhancing communication and coordination among stakeholders.

Effective sustainable forest management hinges on understanding and collaborating with diverse stakeholders, including governmental bodies, private businesses, local communities, indigenous groups, and conservation organizations. Each stakeholder has distinct interests and levels of influence, which can lead to conflicts if not properly managed. Stakeholder analysis is essential for forest managers to map and comprehend these parties, involving steps such as identifying stakeholders, assessing their interests and influence, and defining their relationships. By systematically analyzing stakeholders, forest managers can make informed decisions that balance various interests and enhance sustainable forest management practices.

Education is essential for fostering environmental stewardship and adapting individuals to change. Through both formal and informal education, students learn to engage in sustainable forest management and conservation. By integrating indigenous knowledge and promoting values of integrity and resilience, education helps address forest encroachment and supports sustainable development. The involvement of millennials in these efforts ensures the preservation of ecological balance and cultural traditions. Effective forest management in Indonesia requires a collaborative approach involving local communities. Engaging these communities through training, market access, and active participation in decision-making enhances sustainability and reduces harmful practices. Addressing communities' limited involvement and considering their socioeconomic conditions is critical for successful forest management.

Acknowledgments. Thanks to Universitas Brawijaya and Universiti Putra Malaysia for the facilities support when conducting the study. The study is part of PhD project funded by Universitas Brawijaya..

Disclosure of Interests. The founding sponsors had no role in the study's design; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.Z.

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