
Social Forestry Management Policy Guidelines in Yehsumbul Village Forest, Bali Province

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Article info :

Article History:

Received: September 20, 2025

Revision: October 18, 2025

Accepted: October 28, 2025

Online Publication: October 29, 2025

Abstract

The implementation of the social forestry program in the protected forest area of Yeh Sumbul Village, Jembrana Regency, Bali Province, is more focused on planting banana trees and plantation crops than forestry crops. This activity is feared to disrupt the hydrological cycle and water availability for agricultural activities in downstream areas as well as clean water sources for the community. The purpose of this study is to formulate policy directions for sustainable social forestry management in Yeh Sumbul Village Forest, Jembrana Regency using the Interpretative Structural Modeling method. The results of the study indicate that the key sub-elements found are understanding of forest management that has not been optimally understood, extension, agroforestry development and tree stand arrangement, biodiversity conservation, implementing reforestation, the Ministry of Environment and Forestry, the Bali Provincial Government, Universities/academics and environmental care non-governmental organizations as the main driving institutions (independent quadrant), other sub-elements are located in the linkage, dependent, autonomous quadrants. For this reason, the policy direction for social forestry management is to increase the intensity of outreach to the Yeh Sumbul Village Forest Management Institution regarding key sub-element programs by involving the main driving institutions

Keywords: Policy Direction, Village Forest, Interpretative Structural Modeling

1. Introduction

According to the Ministry of Environment and Forestry (KLHK), social forestry is a sustainable forest management system implemented in state forest areas or customary forests, implemented by local communities to improve their welfare, environmental balance, and socio-cultural dynamics. One of the social forestry programs in Jembrana Regency, Bali Province, is implemented in the protected forest area of Yeh Sumbul Village, covering an area of 210 hectares under a village forest scheme. Based on field observations, the implementation of Yeh Sumbul Village Forest management still has many weaknesses, and the direction of social forestry policy tends to be uncontrolled. The social forestry program, the Yeh Sumbul Village Forest, was established by the government in 2017 with the goal of maintaining its protective function, ensuring the production of non-timber forest products and utilizing the forest's function for tourism development. In practice, the Yeh Sumbul Village Forest management involves

planting banana trees, other fruit trees, and plantation crops. This activity can disrupt the hydrological cycle and water availability for agricultural activities in downstream areas, as well as clean water sources for communities. The forest's function as a protective life support system for regulating water management, preventing flooding, controlling erosion, and maintaining soil fertility will be disrupted.

Indonesia's target area for social forestry is 12.7 million hectares by 2030, an ideal figure for community access to forest management. By 2024, this target had been achieved by approximately 8 million hectares. In Jembrana Regency, all forest areas bordering villages have been subject to social forestry programs. This policy has not been accompanied by community capacity to manage forests sustainably and sustainably, as has been the case in the Yeh Sumbul village forest. The Yeh Sumbul Village Forest area functions ecologically and serves to meet the economic needs of the surrounding community. Forest conservation policies need to be reviewed to balance efforts to improve the well-being of communities surrounding forest areas. Therefore, research is needed to reformulate social forestry management policy guidelines. The formulation of the problem in this study is what is the policy direction for sustainable social forestry management in the Yeh Sumbul Village Forest, Jembrana Regency?

According to research by Nandini [1], candlenuts, a Multi-Purpose Tree Species (MPTS) crop, and coffee planted under trees can provide greater economic benefits than bananas. The Kalibiru Community Forestry Community has an integrated agricultural and forestry management concept, managed using an intercropping system to maintain forest sustainability. Communities can also improve their welfare through independent forest management, including the sale of forest products and through cooperative forest farmer groups [2]. The community-based forest management (CBFM) or social forestry movement arose due to the lack of participation of forest managers in improving the welfare of forest communities, and the continued difficulty of accessing forest areas and forest products for their benefit [3]. Globally, there is a trend toward greater access for local communities to forest resources. Over the past fifteen years, governments in Latin America have implemented policies favoring local communities, granting them the management of 1,000,000 hectares of forest. In Mexico, nearly 75% of communities have acquired rights to forest resources. Similarly, Africa has seen increased recognition of local communities' rights to forest resources. In Asia, community forestry has expanded rapidly in India, Nepal, the Philippines, and China. These countries have allocated degraded land to smallholder farmers [4].

Communities living in social forestry areas participate in the social forestry program at all stages, including planning, protection, utilization, and evaluation. The highest level of community participation occurs in utilization activities, while the lowest level occurs in evaluation activities [5]. The Social Forestry Program, a forestry partnership scheme carried out by LMDH Rimba Mas Sejahtera, has an impact on forest sustainability by reducing timber theft, forest fires and the success of forestry staple crops and increasing income by 62.5% [6]. Priority strategies that can be implemented in the social forestry program are strengthening the institutional capacity of social forestry groups, developing business development programs based on sustainability and increasing the quantity and quality of human resources assisting social forestry groups [7].

2. Research Methods

Research Design

This research is a qualitative research using a questionnaire as the main instrument in the study. Data obtained from the results of key respondents' responses are qualitative data analyzed using the

Interpretive Structural Modeling (ISM) analysis method. This research was conducted in the social forestry area in the Yeh Sumbul Village Forest, Jembrana Regency, Bali. The selection of the research location was determined to be a protected forest area in Jembrana Regency. The reason for choosing the Yeh Sumbul Village Forest location is because there have been community activities in the form of plantation activities in the forest and it is one of the village forests that has received permission from the government, namely the Ministry of Environment and Forestry. The data sources used are primary and secondary data. The primary data in this study comes from the results of Focus Group Discussions (FGD) and in-depth interviews conducted with general respondents and experts. Secondary data is data obtained from the results of documentation studies and studies of research results, related literature and monographic data of the research location. The criteria used as the basis for consideration in determining or selecting experts to be respondents are as follows: 1) having adequate experience according to their field, 2) having a reputation, position/title and demonstrating credibility as a consistent stakeholder or expert in the field being studied, 3) willingness and availability to be respondents. The total number of general and expert respondents was 9 people. This is in accordance with Hora's (2004) opinion which states that an adequate number of experts with high precision is 3 to 7 people. The data collection method in determining general and expert respondents was carried out using a nonprobability sampling approach through a purposive sampling method, namely deliberately selecting community leaders who live around the village forest and government officials who are very familiar with the management of the Yeh Sumbul village forest as well as lecturers, including professors who have conducted extensive research related to social forestry.

Saxena's ISM method, developed by [8], is used to capture complex problems using graphics and sentences, transforming an unclear model into a visible system model. The elements in the ISM analysis are determined through FGD stages with experts (Table 1).

Table 1. Expert Institutions in the Policy Direction FGD

No	Institutions	Capacity
1	Bali Provincial Government / West Bali Forest Management Unit	Government
2	Minister of Environment and Forestry/BPSKL Java Bali Nusra	Government
3	Minister of Environment and Forestry/BPDAS Unda Anyar	Government
4	IDEP Foundation	NGO
5	Udayana University	College
6	Udayana University	College
7	Yeh Sumbul Village Forest Management Institution	Practitioner
8	Head of Yeh Sumbul Village	Government
9	Regional Development Planning Agency (BAPPEDA) of Jembrana Regency	Government

There are nine elements in the ISM analysis, namely 1) social or community sector, 2) program needs, 3) main limitations, 4) possible variations or modifications, 5) program targets, 6) target assessment benchmarks, 7) activities required in the realization plan, 8) activity measurements for final evaluation, 9) agents involved in implementing the program [9]. From these nine elements, elements related to the social forestry management program in the Yeh Sumbul Village Forest, Jembrana Regency were determined. Determination of sub-elements from the selected elements was carried out through

FGDs from each expert. Attira et al. [10] argue that ISM is conducted to examine the relationships between related aspects of an activity. Data analysis begins with identifying the main elements that influence village forest management, which are then divided into several mutually influential sub-elements. The stages of the ISM analysis in this study are as shown in Figure 2. The presentation of the results of the ISM analysis is in the form of a hierarchy and sub-element classification matrix, namely:

a. Hierarchical Arrangement

- The program being reviewed is divided into elements where each element is further broken down into a number of sub-elements.
- Determine the contextual relationship between sub-elements that contain a direction in subordinate terminology that leads to pairwise comparisons (by experts). If there is more than one expert, an average is performed. The assessment of contextual relationships in the pairwise comparison matrix uses the following symbols:

☒ V if $e_{ij} = 1$ then $e_{ji} = 0$; V= *i*th subelement should be addressed earlier than *j*th subelement

☒ A if $e_{ij} = 0$ then $e_{ji} = 1$; A= the *j*-th subelement should be addressed earlier than the *i*-th subelement

☒ X if $e_{ij} = 1$ and $e_{ji} = 1$; X= both subelements must be handled together

☒ O if $e_{ij} = 0$ and $e_{ji} = 0$; O = both subelements are not priorities

The meaning of the value $e_{ij} = 1$ is that there is a contextual relationship between the *i*-th and *j*-th sub-elements, while the value $e_{ji} = 0$ means there is no contextual relationship between the *i*-th and *j*-th sub-elements.

- The processed results are arranged in a structural self-interaction matrix (SSIM). The SSIM is made in the form of a reachability matrix (RM) table by replacing V, A, X and O with the numbers 1 and 0.
- After the Structural Self Interaction Matrix (SSIM) is filled in according to the respondents' opinions, the symbols (V, A, X, O) can be replaced with symbols (1 and 0) with the existing provisions so that the value of the final element reachability matrix (RM) can be known (Table 2).
- By adding up the sub-element values horizontally; the ranking value is determined based on the driver power value which is sorted from the largest to the smallest; the dependence value is obtained from adding up the sub-element values vertically; the level value is determined based on the dependence value which is sorted from the largest to the smallest (Table 3).

b. Classification of Sub-Elements

In general, the classification of sub-elements is divided into 4 sectors (Figure 1), namely:

- Sector 1: Weak driver-weak dependent variables (Autonomous). Sub-elements included in this sector are generally unrelated to the system and may have little or no relationship, although the relationship can be strong. Sub-elements are included in sector 1 if: DP value $\leq 0.5 X$ and D value $\leq 0.5 X$, where X is the number of sub-elements.

- Sector 2: Weak driver-strongly dependent variables (Dependent). Generally, sub-elements included in this sector are those that are not independent. Sub-elements are included in sector 2 if: DP value $\leq 0.5 X$ and D value $> 0.5 X$, where X is the number of sub-elements.
- Sector 3: Strong driver-strongly dependent variables (Linkage). Sub-elements included in this sector must be carefully examined, as the relationships between elements are unstable. Every action on a sub-element will impact other sub-elements, and the feedback effect can magnify the impact. A sub-element falls into sector 3 if: DP value $> 0.5 X$ and D value $> 0.5 X$, where X is the number of sub-elements.
- Sector 4: strong driver-weak dependent variables (Independent). Sub-elements included in this sector are the remaining part of the system and are called independent variables. Sub-elements are included in sector 4 if: DP value $> 0.5 X$ and D value $\leq 0.5 X$, where X is the number of sub-elements.

Table 2. Results of the Reachability Matrix (RM) Final Elements.

	1	2	3	4	5	6	7	8	9	n	DP	R
1														
2														
3														
4														
5														
6														
7														
8														
9														
..														
n														
DP														
R														

Source: [11]

Table 3. Results of the Reachability Matrix (RM) Final Elements.

	1	2	3	4	5	6	7	8	9	n	DP	R
1														
2														
3														
4														
5														
6														
7														
8														
9														
..														

n														
DP														
R														

Source: [11] Description: DP (driven power), R (ranking), D (dependence), L (level/hierarchy)

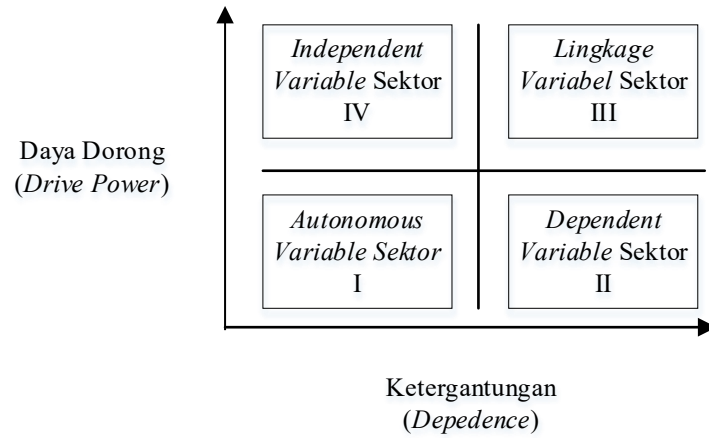


Figure 1. Matrix Analysis of Sub-element Classification [12]

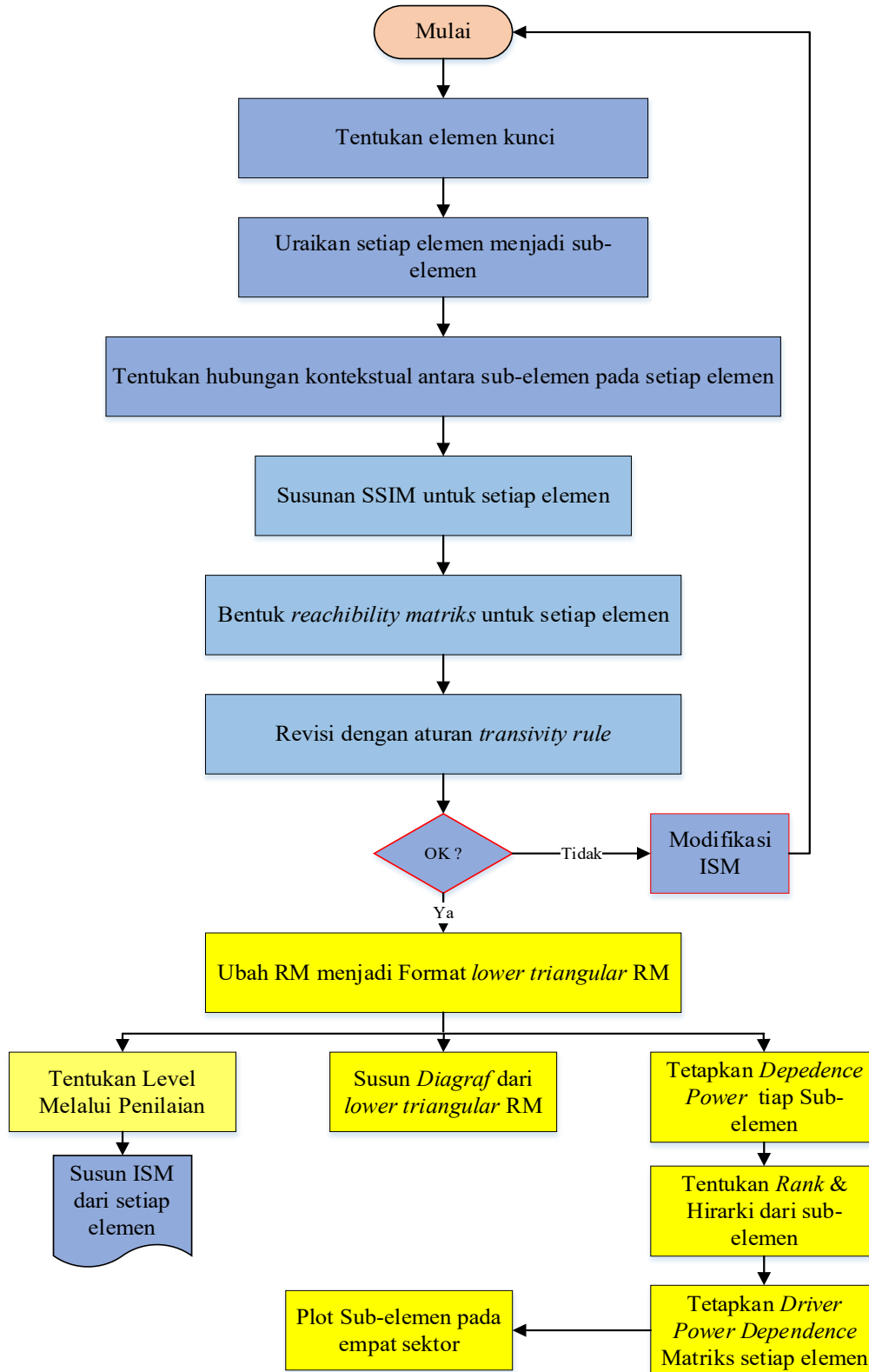


Figure 2. ISM Technical Descriptive Flowchart

3. Results and Discussion

The initial stage in the ISM approach is to conduct a focus group discussion (FGD) with several experts using a questionnaire as a guide. Based on the FGD results, five elements were obtained that were used as indicator variables in developing policy directions for social forestry management in the Yeh Sumbul Village Forest, Jembrana Regency. These research elements are program objectives, program constraints, program needs, institutions/communities involved, and evaluation activities. From each element of the expert FGD results, a total of 47 sub-elements were obtained.

1. Program Objective Elements

In the program objectives element, there are 9 important sub-elements related to the sustainability of social forestry management, namely:

- E1: Maintaining forest sustainability
- E2: Maintaining biodiversity
- E3: Maintaining water resource availability
- E4: Preventing forest degradation
- E5: Creating agroecotourism
- E6: Increasing community income
- E7: Creating jobs
- E8: Enforcing laws and regulations
- E9: Maintaining traditional forest conservation values (Tri Hita Karana and Wanakerti)

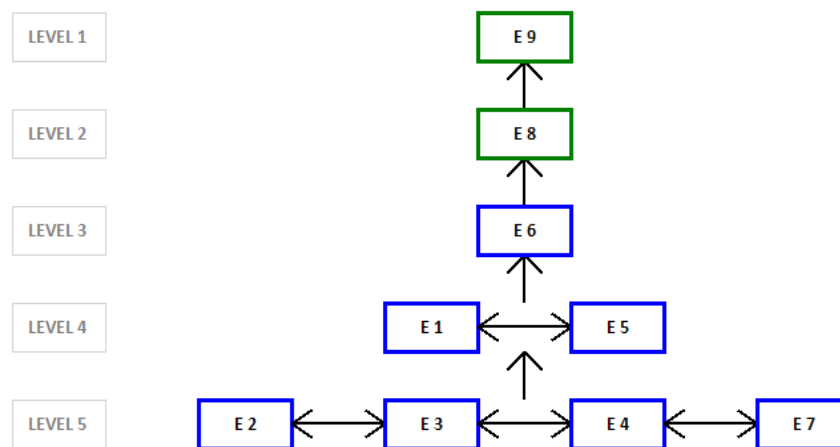


Figure 3. Structural Model of Program Objective Sub-elements

Figure 3 shows that sub-elements E2, E3, E4, E7, E1, E5 and E6 are at levels 3, 4 and 5, which means these sub-elements influence the sub-elements at the next level. The sub-element of maintaining the traditional values of forest conservation is at level 1, which means it is influenced by higher sub-elements, namely levels 2, 3, 4, and 5. The grouping of sub-elements based on driver power (DP) and

dependence (D) is presented in Figure 4. The nine policy sub-elements that influence the objectives of sustainable social forestry management in Yehsumbul Village Forest can be grouped into 4 sectors. Figure 4 shows that none of the sub-elements are in the autonomous group (sector I), meaning none of the sub-elements have a weak relationship in relation to sustainable social forestry management. No sub-elements are included in the independent group (sector IV). Sub-elements E8 and E9 are included in the dependence group (sector II), indicating that these sub-elements are dependent variables influenced by other sub-elements. Sub-elements E1, E2, E3, E4, E5, E6, and E7 are sub-elements included in the linkage group (sector III), indicating that these sub-elements are intervening variables influenced by sub-elements in the dependent group and, in turn, will influence sub-elements in the independent group (sector IV).

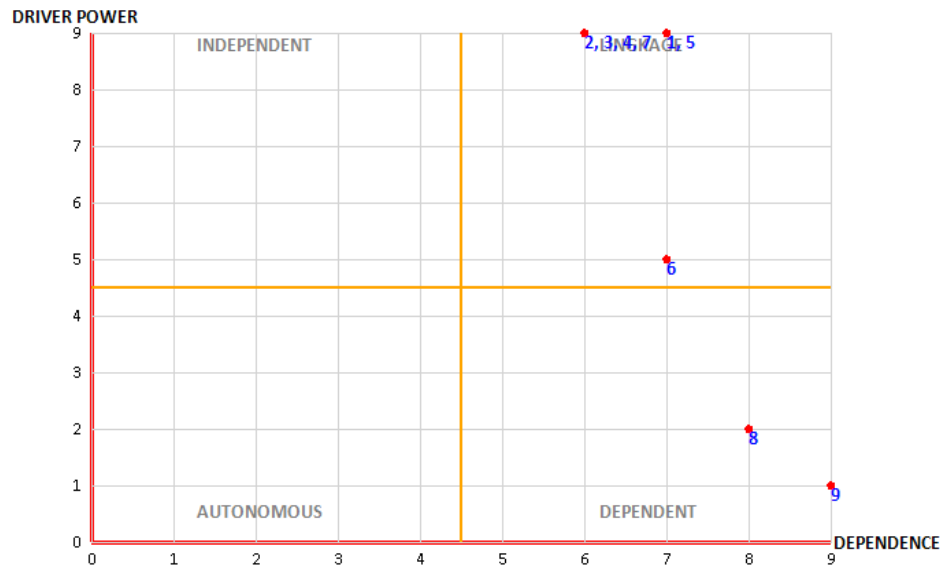


Figure 4. Quadrant of contextual relationships of sub-elements of Program Objectives

2. Program Requirement Elements

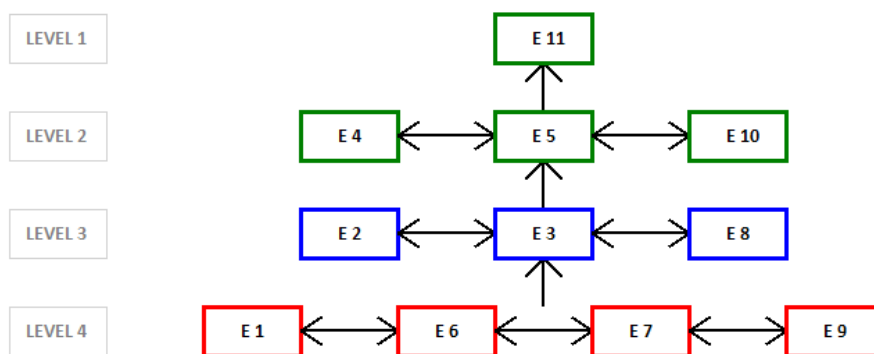


Figure 5. Structural Model of Program Needs Sub-elements

In Figure 5 there are 11 important sub-elements related to program needs in the sustainability of social forestry management, namely:

- E1: Extension
- E2: Institutional development
- E3: Human resource capacity building
- E4: Regulation and law enforcement
- E5: Strengthening group business capital (PUMK)
- E6: Agroforestry development and tree stand management
- E7: Biodiversity conservation
- E8: Formulation of customary forest conservation regulations
- E9: Implementation of reforestation activities
- E10: Development of ecotourism access and facilities
- E11: Visitors, post-harvest processing, marketing, payments PNBP

Figure 5 shows that sub-elements E1, E6, E7, and E9 are at level 4, meaning these sub-elements are the main drivers and influence the sub-elements at the next level. The sub-elements of visitor presence, post-harvest processing, marketing, and PNBP payments are at level 1, meaning they are influenced by higher sub-elements, namely levels 2, 3, and 4. Sub-elements E1, E6, E7, and E9 which are at level 4 have a strong influence on the other sub-elements. The grouping of sub-elements based on driver power (DP) and dependency (D) is presented in Figure 6, showing that none of the sub-elements are in the autonomous group (sector I), meaning that none of the sub-elements have a weak relationship in relation to sustainable social forestry management. Sub-elements E4, E5, E10, and E11 are included in the dependence group (sector II), indicating that these sub-elements are dependent variables influenced by other sub-elements.

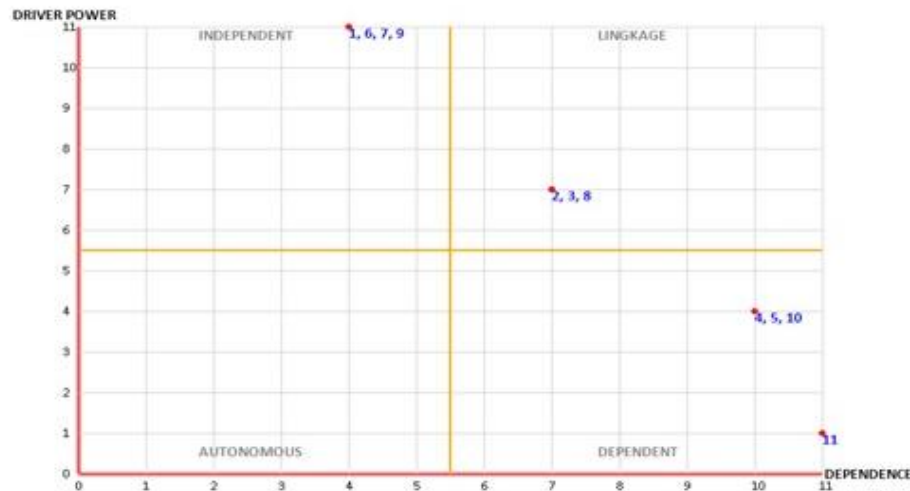


Figure 6. Quadrant of contextual relationships of sub-elements of Program Needs

Sub-elements E4, E5, E10, and E11 are included in the dependence group (sector II), indicating that these sub-elements are dependent variables influenced by other sub-elements. Sub-elements in the dependent group will influence sub-elements in the independent group (sector IV). Sub-elements E1, E6,

E7, and E9 are sub-elements that are included in the independent group (sector IV), indicating that these sub-elements are sub-elements that influence others.

3. Program Constraint Elements

In the program constraint elements involved, there are 10 sub-elements, namely:

E1: Village forest management does not comply with laws and regulations

E2: Work plans have not been comprehensively prepared

E3: Low human resources for village forest management

E4: Lack of capital assistance

E5: Lack of mentoring

E6: Low community awareness of forest management

E7: Continued expansion of village forest areas

E8: Lack of government officials to supervise and provide guidance

E9: Lack of coordination between stakeholders

E10: Understanding of forest management is not yet optimal

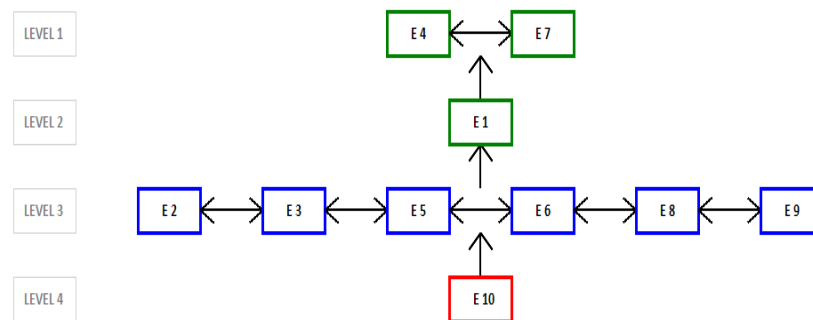


Figure 7. Structural Model of Program Constraint Sub-elements

Figure 7 shows that sub-element E10 is at level 4, meaning this sub-element is the main driver and influences the sub-elements at the next level. Meanwhile, the elements of lack of capital assistance and lack of mentoring are at level 1, meaning they are influenced by higher sub-elements, namely levels 2, 3, and 4. Conversely, sub-element E10 which is at level 4 has a strong influence on other sub-elements. The grouping of sub-elements based on driver power (DP) and dependence (D) is presented in Figure 8, showing that none of the sub-elements are in the autonomous group (sector I), which means that none of the sub-elements have a weak relationship in relation to sustainable social forestry management. Sub-elements E1, E4, and E7 are included in the dependence group (sector II) which shows that these sub-elements are dependent variables that are influenced by other sub-elements. E2, E3, E5, E6, E8, E9 are sub-elements that are included in the linkage group (sector III) which shows that these sub-elements are intervening variables that are influenced by sub-elements in the dependent group and will influence sub-elements in the independent group (sector IV). E10 is a sub-element that is included in the independent group (sector IV) which shows that this sub-element is a sub-element that influences other sub-elements.

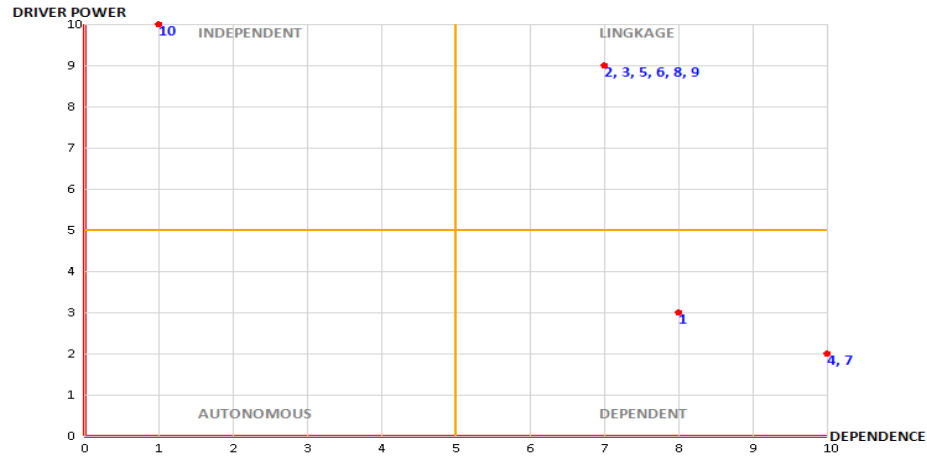


Figure 8. Contextual relationship quadrant of the Program Constraints sub-element

4. Institutional/Community Elements Involved

In the institutions/communities involved there are 11 sub-elements, namely:

- E1: Ministry of Environment and Forestry
- E2: Bali Provincial Government
- E3: Jembrana Regency Government
- E4: Village Government
- E5: Traditional Village
- E6: Forest Farmer Group
- E7: Village-Owned Enterprises
- E8: Tourism Organization
- E9: Environmental NGO
- E10: Cooperative
- E11: University

Figure 9 shows that sub-elements E1, E2, E9, and E11 are at levels 7 to 9, which means these sub-elements are the main drivers and influence the sub-elements at the next level. The tourism organization sub-element is at level 1, which means it is influenced by higher sub-elements, namely levels 2, 3, 4, 5, 6, 7, 8, and 9. Sub-elements E1 and E11 which are at level 9 have a strong influence on other sub-elements. The grouping of sub-elements based on driver power (DP) and dependency (D) is presented in Figure 10, showing that none of the sub-elements are in the autonomous group (sector I), meaning that none of the elements have a weak relationship in relation to sustainable social forestry management. Sub-elements E3, E4, E5, E7, and E8 are included in the dependency group (sector II), indicating that these sub-elements are dependent variables influenced by other sub-elements. E6 and E10 are sub-elements that fall into the linkage group (sector III), indicating that these sub-elements are intervening variables influenced by sub-elements in the dependent group and will influence sub-elements in the independent group (sector IV).

E1, E2, E9, and E11 are sub-elements that fall into the independent group (sector IV), indicating that these sub-elements influence other sub-elements.

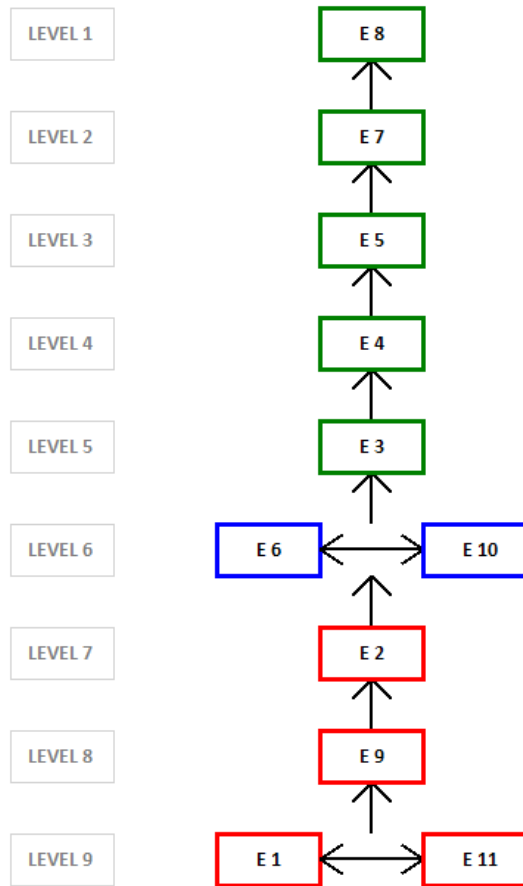


Figure 9. Structural Model of the sub-elements of the Institutions/Communities involved

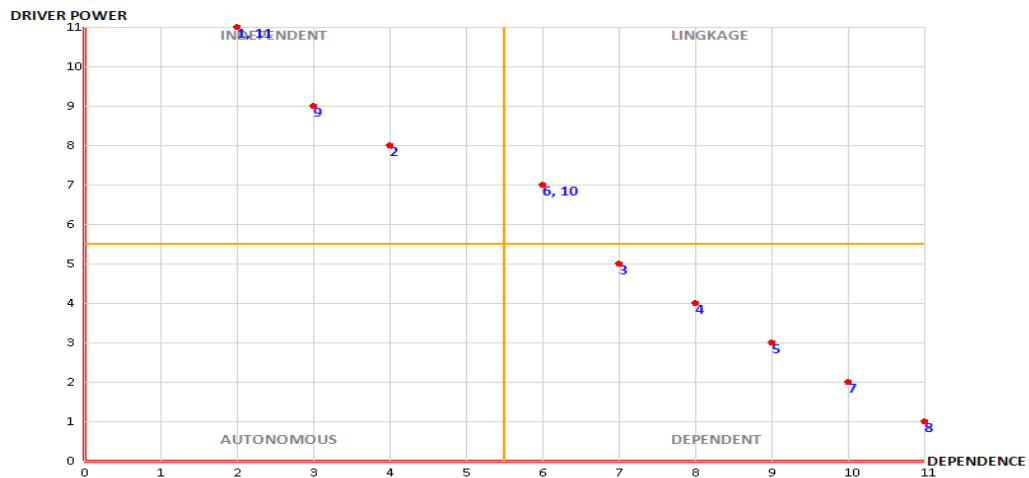


Figure 10. Quadrant of contextual relationships of sub-elements of Institutions/Communities Involved

5. Activity Elements for Evaluation

In the evaluation activities, there are six important sub-elements related to the sustainability of social forestry management, namely:

- E1: Increased water discharge
- E2: Increased forest tree stands
- E3: Increased forest sustainability
- E4: Increased tourist visits
- E5: Increased farmer income
- E6: Increased environmental service contributions

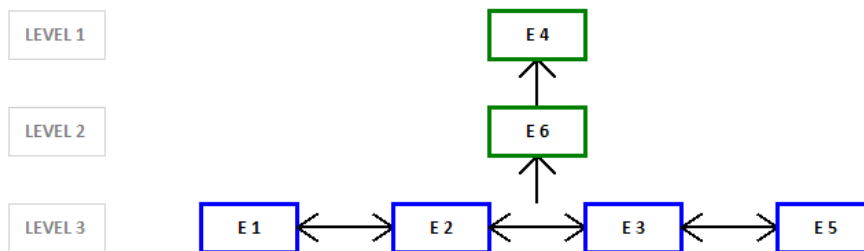


Figure 11. Structural Model of Activity Sub-elements for Evaluation

Figure 11 shows that sub-elements E1, E2, E3, and E5 are at level 3, which means these sub-elements are the main drivers and influence the sub-elements at the next level. The sub-element increasing tourist visits is at level 1 meaning it is influenced by higher sub-elements, namely levels 2 and 3. Sub-elements E1, E2, E3, and E5 which are at level 3 have a strong influence on other sub-elements. The grouping of sub-elements based on driver power (DP) and dependency (D) is presented in Figure 12. The six sub-elements of government policy that influence sustainable social forestry management can be grouped into 4 sectors.

Figure 12 shows that none of the sub-elements are in the autonomous group (sector I), meaning that none of the sub-elements have a weak relationship in relation to sustainable social forestry management. Similarly, none of the sub-elements are in the independent group (sector IV), indicating that these sub-elements influence other sub-elements in relation to sustainable social forestry management. Sub-elements E4 and E6 are included in the dependence group (sector II) indicating that these sub-elements are dependent variables that are influenced by other sub-elements. E1, E2, E3, and E5 are sub-elements that are included in the linkage group (sector III) indicating that these sub-elements are intervening variables that are influenced by sub-elements in the dependent group and in turn will influence sub-elements in the independent group (sector IV). Finally, none of the sub-elements are included in the independent group (sector IV).

The results of the ISM analysis produced key sub-elements for each element, presented in Table 4. However, for the objective element and activity element for evaluation, there were no sub-elements included in the independent group (sector IV) so they were not included in the key elements.

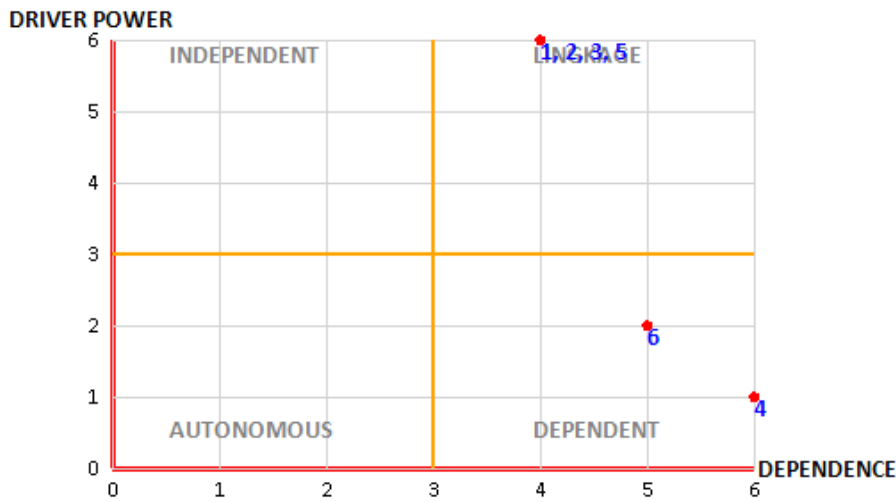


Figure 12. Contextual relationship quadrant of Activity Sub-elements for Evaluation

6. Drivers of Sustainable Social Forestry Management

Based on the results of the Interpretative Structural Modeling analysis as shown in the hierarchy and quadrant image of the contextual relationships of the sub-elements of the ISM analysis, the strongest driver power is in the elements of program constraints, program needs, and the institutions/communities involved which are key sub-elements (Table 4). To increase public awareness, an outreach program is needed on the importance of forest conservation, thereby providing greater understanding to forest farmers and communities surrounding the forest. This outreach includes the development of agroforestry, including the arrangement of tree stands in village forest areas. The agroforestry pattern encourages communities to plant a minimum of 400 woody plants or NTFP trees in every hectare of forest area in accordance with the Minister of Environment and Forestry Regulation Number P.2/MENLHK/SETJEN/KUM.1/1/2020 [13]. Much social forestry land remains unmanaged according to its intended use. Therefore, government monitoring and evaluation are needed to optimize the social forestry program [14]. The implementation of the social forestry management policy for the village forest scheme in Ubadari Village has not been effective, the factors causing this are unclear regulations, limited budgets (from both central and local governments) for village forest management, inadequate human resources (HR), inefficient assistance, limited information provided to communities in and around forest areas, unclear priority programs, lack of socialization in the field, and weak coordination between stakeholders [15].

Social forestry is essentially an approach taken to mitigate increasing deforestation and forest degradation and address the negative impacts of local community activities in forests by involving the community as subjects in forest management [16]. The use of protected forests should be maximized according to the economic needs of the community, various forestry programs and their regulations have been created, communities are given permission to manage forests on the condition that they do not develop types of plants with a monoculture system but with a mixed garden system or agroforestry [17]. This will of course be supported by biodiversity conservation efforts such as reforestation so that sustainable social forestry management will be achieved. The Social Forestry Program increases community production and income through sustainable and effective forest management, such as reforestation and agroforestry. This program creates employment opportunities in the agroforestry sector, non-timber forest product processing, and local product marketing [18].

Table 4. Key Sub-Elements of Sustainable Social Forestry Management Yeh Sumbul Village Forest

No	Element	Key Sub Elements
1	Program Requirements	Extension, agroforestry development and tree stand management, biodiversity conservation, carrying out reforestation activities.
2	Program Constraints	Understanding of forest management is not yet fully understood
3	Institutions/communities involved	Ministry of Environment and Forestry, Universities, Environmental NGOs, Bali Provincial Government

Improving understanding of forest management also involves understanding the implementation of local wisdom values (Tri Hita Karana and Wanakerti). Village forest management in Bali, particularly in the Selat Village Forest in Buleleng Regency, is carried out based on custom, based on the Tri Hita Karana concept through customary village rules (awig-awig) that regulate the obligations of village communities (krama) to maintain the sustainability and security of village forests [19]. Local wisdom is a sediment of values and norms from the mystical realm of thought, where hidden views of life (philosophy) implied in mythology. This is where humans always give place to the meaning of natural forces [20]. Several customary laws have been implemented in forest management and protection under the customary forest scheme [21].

Counseling and dissemination of local wisdom values are essential to maintain awareness among forest farmers about sustainable forest management. The government must pay attention to the culture of the community. This is crucial because if development plans do not conflict with local culture, the community will participate in the development plan [22]. Synergistic collaboration between the Ministry of Environment and Forestry, the Bali Provincial Government, universities, and environmental NGOs is essential to achieving the sustainability goals of the Yeh Sumbul Village Forest. The results of research by [23] using the ISM approach, there are 11 institutions involved in the management of Rawa Aopa National Park, three institutions namely (Rawa Aopa National Park Office, Southeast Sulawesi Provincial Forestry Service and Southeast Sulawesi Provincial Environmental Service) which have the greatest influence and are key factors in the formulation of government policies regarding the sustainable management of mangrove forests in TNRA. Social forestry cannot be done alone, it requires coordinated action and balance between stakeholders [24]. Therefore, institutional aspects are crucial as one aspect of sustainable forest resource management [25]. Policy directions for sustainable social forestry management based on driver power elements are presented in Table 5.

7. Sub-elements of Linkage for Sustainable Social Forestry Management

Based on the results of the Interpretative Structural Model analysis, the driver power (DP) sub-element will influence the sub-elements included in the linkage group. Through these sub-elements, policies in the form of DP sub-elements will influence the creation of desired conditions for sustainable social forestry management. The linkage sub-element serves as a link between driver power and the desired consequences for social forestry management. In the medium term, various obstacles faced in social forestry management include low human resources for village forest management, low community awareness of forest management, lack of government officials/forest police, lack of stakeholder coordination requiring improvement of human resources for Village Forest management, preparation of customary rules, improvement of institutional capacity, preparation of work plans, establishment of cooperatives by the Village Forest Management Institution with government assistance. According to [26],

the objectives of sustainable forest management are to maintain the sustainability of forest production and environmental services, ensure the conservation of forest resource diversity/biodiversity, the sustainability of forest land, water, and carbon stocks, support food security, culture, and livelihoods for communities dependent on forests, and ensure fair distribution of responsibilities and benefits from maintaining forests.

Table 5. Policy Directions for Sustainable Social Forestry Management of Yeh Sumbul Village Forest Based on Key Sub-Elements of ISM Analysis Results

Element	Policy Direction
Program constraints	Improving understanding of forest management.
Program requirements	Implementation of extension activities. Biodiversity conservation.Melaksanakan reboisasi. Implementation of agroforestry and stand management.
Institutions/communities involved	Ministry of Environment and Forestry, Universities, Environmental NGOs, Bali Provincial Government

Village Forest Management Institutions play a vital role in maintaining biodiversity, maintaining water availability, preventing forest degradation, increasing tree stands, and maintaining forest sustainability to realize agroecotourism that can create jobs and thus increase farmers' incomes. In line with the increasing spirit of returning to nature and the increasing population, as well as the development of industry in large cities, forest conservation efforts as natural tourist attractions as a vehicle for research, education, and scientific development greatly support cultivation, tourism, and recreation [27].

8. Sub-elements of Sustainable Social Forestry Management

Based on the results of the Interpretative Structural Model analysis, the consequences of policy implementation, manifested as driver power sub-elements, are sub-elements that fall into the dependence group (bound sub-elements). These bound sub-elements must be created to ensure sustainable social forestry management. In the long term, social forestry that is able to maintain traditional values can become an ecotourism (eco-spiritual) that can attract visitors so that tourist visits and environmental service deposits increase. Environmental services are services provided by natural or artificial ecosystem functions whose values and benefits can be felt directly or indirectly by stakeholders in order to help maintain and/or improve the quality of the environment and community life in realizing sustainable ecosystem management [28]. Traditional villages in collaboration with the District Government, the Village Government can formulate regulations and law enforcement so that the management of Village Forests that have not yet complied with the Laws and Regulations can finally implement the Regulations and Laws to suppress the expansion of village forest areas, referring to the Guidelines for the Preparation of Village Forest Management Plans [29] requires Annual Management Plan (RKT) and Business Work Plan documents.

BUMDES can collaborate with the Village Government, District Government, Tourism Organization in terms of developing ecotourism access and facilities, capital assistance/strengthening group business capital (PUMK) for post-harvest processing, marketing so that PNBP payments can be achieved. Community development not only increases intelligent, healthy people so that they are competitive, but also have a responsible mentality and character in all aspects. In this regard, a mental revolution is needed that is in line with the Sustainable Development Goals (SDGs), namely: an environmentally friendly mindset (aware of the cyclical/reciprocal relationship with nature) and plays an active role in realizing it in everyday life (social and economic life) [30]. The scheme of the stages of policy directions for sustainable social forestry management of Yeh Sumbul Village Forest, the results of the ISM analysis, are presented in Table 6.

Creating these bound sub-elements is intended to encourage the development of Yeh Sumbul Village Forest conservation efforts to be stronger for human resources from generation to generation with stakeholder performance that is aligned with the development of forest farmer activities and the community around the village forest. The community still greatly needs assistance with counseling regarding area management plans, funding schemes and marketing networks [31]. The strategies implemented in implementing social forestry include facilitating the formation and strengthening of group institutions, facilitating business actors who wish to invest with community groups through mutually beneficial collaboration, and developing agroforestry system patterns that have products and economic value [32].

The results of [33] research show that the social forestry program is very important to implement and there are still several issues that need to be improved in the implementation of its regulations to bring maximum benefits to communities around the forest, both in terms of environmental dimensions, economic dimensions, socio-cultural dimensions as well as legal and institutional dimensions. Redesigning social forestry policies by positioning communities as the primary actors in the forest governance system with four main pillars: first, recognition of strong management rights for communities based on the constitution and legal decisions; second, strengthening local institutions that integrate cultural values, customs, and ecological wisdom practices; third, utilizing digital technology to increase transparency, participation, and accountability in governance; and fourth, opening up equitable access to economic value chains based on non-timber forest products [34].

Wanagiri Village Forest management is considered quite sustainable with a success rate of 54.4%, with the highest success rate contribution in the socio-economic aspect (62.7%), followed by the institutional aspect (51%), and the lowest is the environmental aspect (49.9%) [35]. Based on the Circular Letter of the Ministry of Home Affairs Number 522/1392/SJ of 2020 [36], the Regency Government should include the social forestry program in the Regency RPJMD as a poverty alleviation program and a source of increasing PAD. Social Forestry can provide significant benefits to communities and the environment, but it also faces complex challenges. Community participation, clarity of tenure, government support, and multi-stakeholder collaboration are crucial for implementing Social Forestry. Policy reform, capacity building, and stronger collaboration between government, communities, and the private sector are needed to address these challenges and realize these potential [37]. In the long term, forests can function as a life-supporting system and contribute to food production. Therefore, forestry development always prioritizes and aims to achieve sustainable forest management (SFM) due to its crucial role in supporting community life and well-being [38].

	Constraint	Program Requirements	Related Institutions	Program Objectives	Evaluation
Dependent	E1. Village forest management does not comply with statutory regulations E4. Lack of capital assistance E7. Village forest areas continue to expand	E4. Regulation and law enforcement E5. Strengthening group business capital (PUMK) E10. Developing ecotourism access and facilities E11. Visitors, post-harvest processing, marketing, and non-tax state revenue (PNBP) payments.	E3. Jembrana Regency Government E4. Village Government E5. Traditional Village E7. Village-Owned Enterprises E8. Tourism Organizations	E8. Implementing laws and regulations E9. Maintaining traditional forest conservation values (Tri Hita Karana and Wanakerti)	E6. Increased environmental service contributions E4. Increased tourist visits
Linkage	E2. The work plan has not been comprehensively developed E3. Low human resources for village forest management E5. Lack of mentoring E6. Low community awareness of forest management E8. Lack of government officials to supervise and provide guidance E9. Lack of coordination between stakeholders	E2. Institutional development E3. Human resource capacity building E8. Formulation of customary forest conservation regulations	E6. Forest Farmer Groups/LPHD E10. Cooperatives	E2. Maintain biodiversity. E3. Maintain water availability. E4. Prevent forest degradation. E7. Create jobs. E1. Maintain forest sustainability. E5. Create agro-ecotourism. E6. Increase community income.	E1. Increased water discharge E2. Increased forest tree stands E3. Increased forest sustainability E5. Increased farmer income
Independent	E10. Understanding of forest management is not yet fully understood	E1. Extension E6. Agroforestry development and tree stand management. E7. Biodiversity conservation. E9. Implementing reforestation activities.	E1. Ministry of Environment and Forestry. E11. Universities. E9. Environmental NGOs. E2. Bali Provincial Government.		

Table 6. Scheme of Stages of Policy Directions for Sustainable Social Forestry Management of Yeh Sumbul Village Forest

4. Conclusion

Based on the results of the Interpretative Structural Modeling analysis, the strongest driver power lies in the program constraints, program needs, and the institutions/communities involved, which are key

sub-elements. Because the elements of the constraints in understanding forest management are not yet fully understood, a program is needed to increase extension activities on the importance of preserving forests so that it will provide a better understanding to forest farmers and communities around the forest. This extension includes the development of agroforestry including the arrangement of tree stands in village forest areas, biodiversity conservation efforts such as reforestation so that sustainable social forestry management will be achieved. Synergy cooperation, collaboration between the Ministry of Environment and Forestry, the Bali Provincial Government, Universities and environmental NGOs need to be improved because they are the actors/institutions that have the highest driver power for realizing the goals of the sustainability of the Yeh Sumbul Village Forest. The need for policy reconstruction is not only for the purpose of increasing participation and achieving the target area of social forestry, but also strengthening forestry technical policies, which can guarantee transparency and accountability in village forest governance. The importance of a budgeting approach in sustainable forest development policies, especially in efforts to increase the intensity of extension and supervision.

Acknowledgements

The author would like to express his gratitude to all those who contributed to the completion of this research and this article. Special thanks are extended to the academic community of Dwijendra University and Udayana University who provided invaluable support during data collection, analysis, and review. While the author cannot name each contributor individually, the contributions of colleagues have been instrumental in shaping the results of this research. Their support, expertise, and time are greatly appreciated, and the author expresses his sincere gratitude to all those who have played a role in this research.

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