Economic Evaluation on the Application of Collaborative Forest Management (CFM)

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Article Info	Abstract
	This study aims to analyze the collaborative forest management as well as the economic benefits obtained by forest village communities through intercropping of maize plants and cattle productive business. 80 respondents were selected through non probability sampling techniques with saturated sample methods. The research data was collected by conducting observations, in-depth interviews and distributing questionnaires to respondents and key informants. The data obtained were analyzed using descriptive analysis with quantitative methods consisting of income analysis, R/C ratio, co-management analysis and stakeholder analysis and productive business of cattle. The results show that the economic benefit of maize cropping obtained by Sumberejo village and Padaan Village has given them profit with an R/C ratio of 1.4 and 1.7. For cattle productive business, Sumberejo Village has gotten a profit with the R/C ratio over the total cost of 1.07 and Padaan Village has an R/C ratio of 1.00 (Break Even Point). Through the Mann Whitney statistical test there are differences in income between the sharing forest village (Sumberejo Village) and the non-sharing forest village (Padaan Village). Cattle productive businesses are found to have no difference in income values. Collaborative based forest management at the research location through the concept of co management analysis showed good results with a total score of 3.5 (close to 4). A co management approach is needed for better future forest management.

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INTRODUCTION

Indonesia is a country with the 9th largest forest area in the world. Therefore, Indonesia's forests are very beneficial in supporting the productivity in agricultural sector. As what is stated in the Act No. 41 year 1999 that due to the wide forest area, the use of forest is focused on benefiting the people. Therefore, forest management and utilization in Indonesia needs to be carried out effectively and efficiently. Figure 1 shows the ranking of Indonesia's forests in the world in 2015. Since nearly 70% of Indonesia's land consists of forest areas, the risk of deforestation becomes really high. Up to now, deforestation is still one of Indonesia's unsolved issues. In 2010-2015 there were 684 thousand forest areas lost each year. This is not only caused by natural factors, but also due to the existence of centralized forest management which causes over-exploitation of forest areas. Therefore, the forests lose their roles as a source of food, prevention of natural disasters, to fulfill housing needs for the collaborative. Deforestation also occurs in Java, where the island has the third largest forest area after Sumatera and Kalimantan. Deforestation on Java Island occurs in 5,500 hectares of forest area (Agro Indonesia, 2018).

The centralized forest management supports a new paradigm in forest management in Java, namely *Pengelolaan Hutan Bersama Masyarakat* (CBFM) or Collaborative Forest Management by Perhutani. CBFM is intended to improve forest management and utilization by considering the welfare of the collaborative (Perhutani, 2001). The purpose of CFM is not only so that Perum Perhutani can gain as much profit as possible from the managed forests, but also to pay attention to the social and economic aspects of forest village communities (Tito, 2017). The successful realization of the CBFM objectives is inseparable from the participation of the collaborative around the forest (Damayantanti, 2011).

The Decree of the Board of Directors of Perum Perhutani Number 136 / KPTS / DIR/2001 concerning Forest Management (CBFM) encouraged Perhutani KPH Blora to cover 15,000 hectares of forest to implement the management system. The CBFM system was implemented in Sumberejo Village and Padaan Village, Japah District since 2003 as a village where most of the areas are forests. Activities from collaborative forest management are carried out with land use understanding plants. the people who live around the forest have gained economic benefits from intercropping of maize plants in forest land and the implementation of cattle productive business. In addition, economic benefits are obtained in the form of sharing funds for forest villages that have standing plants that are old enough to be harvested. Sumberejo Village specifically benefited from the wood sharing fund from the activity. CBFM implementation in Sumberejo and Padaan villages has provided economic benefits from year to year. However, due to lack of coordination between stakeholders and the low quality of human resources, the implementation of CBFM in both villages experienced a less than optimal development.

Collaboration between stakeholders involved between local government, non-governmental organizations, academics, the private sector and other parties can encourage better management success (Ardiansyah et al, 2018). The approach to income and R/C ratio analysis and co-management analysis have been widely used to calculate and analyze the benefits obtained from farming, knowing stakeholder collaboration in forest management, including the calculation of economic benefits obtained by Sumberejo and Padaan forest communities on CBFM programs.

Research on the same topic was carried out by Sari (2016) who calculated and analyzed the economic benefits of rice farming obtained by forest village communities due to the CBFM program in Situraja KPH Village, Indramayu. Gunawan et al., (2012) examined the implementation of CBFM in Cepu KPH, Kurniawati (2015) which examined the application of co management in the management of wood sharing funds. Susilowati (2001) also examined the prospect of successful co-management in the prohibited fish system in West Sumatra.

Figure. 1 Countries with Highest Forest Area (2015)
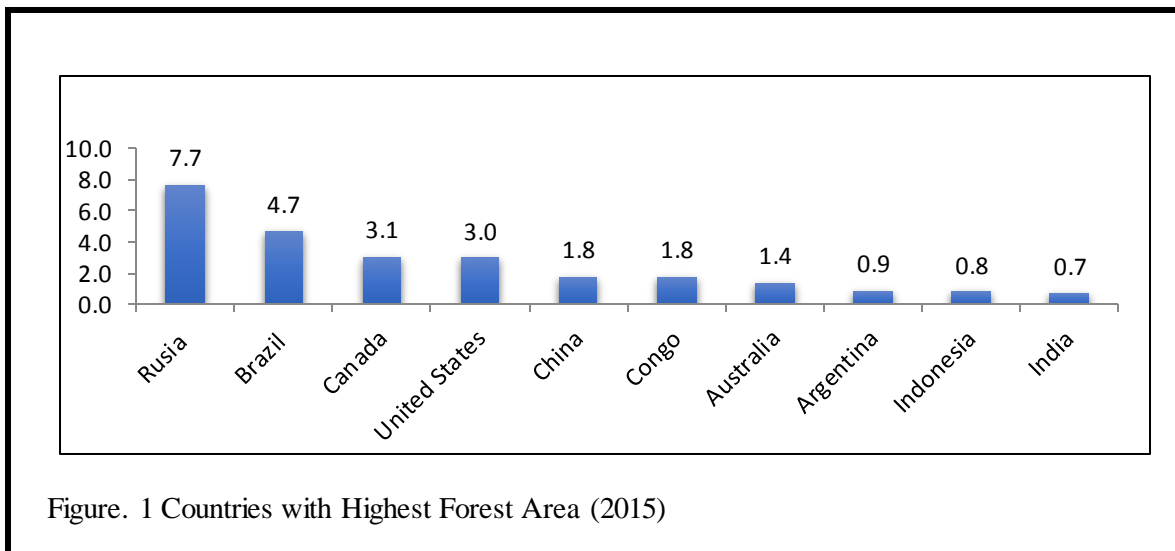
Kadir et al. (2013) which examined the collaboration of the management of Bantimurung National Park in South Sulawesi.

The purposes of this study are: 1) to estimate and compare the economic benefits obtained by the collaborative in forest villages that receive sharing funds to the collaborative in forest villages that do not receive sharing funds. 2) to analyze the forest management in both villages. The benefit of this research which is conducted in Blora, a regency that has the largest forest area, is that it can be used as a reference for further researches.

RESEARCH METHODS

Sumberejo Village and Padaan Village, Japah Subdistrict, Blora Regency, Central Java, were chosen as research locations because the two villages had implemented a Collaborative Based Forest Management (CBFM) program. The analytical method used in this study is quantitative analysis. This method is explained using a descriptive statistical approach to explain the profile of respondents, analysis of income and R / C ratios, co management analysis, and stakeholder analysis with in-depth interviews with key-figures (Perum Perhutani KPH Blora, BPH, Agriculture and Food Security, villages, sub-districts, *pesanggem*, NGOs, LMDH, academics, and entrepreneurs of *meubel*-teak) about CBFM.In general, the calculation of economic benefits is intended to find out the benefits generated by a resource economically.

The method used to describe the economic benefits obtained from the CBFM program in the forest village that receives sharing funds and that does not receive sharing funds is the analysis of income and R/C ratios of maize cropping and cattle productive business. Mann Whitney statistical difference test is also used to determine the difference in income generated from the business. The assessment of 11 key conditions in accordance with Susilowati (2001) research and the results of the assessment from in-depth interviews were used to determine collaboration in forest management in the research area. Those 11 key conditions include 1) Clear boundaries, 2) Membership needs to be determined, 3) Group cohesion, 4) Existing organizations, 5) Benefits exceeding costs, 6) Participation from influential people, 7) Enforcement of management rules , 8) Legal rights to organize 9) Cooperation and leadership at the community level, 10) Decentralization and delegation of authority 11) Coordination between the government and the community. The assessment of those 11 key conditions uses the Linkert 1-5 scale.

A stakeholder analysis is used to describe the importance and influence of each stakeholder involved in CBFM activities. Stakeholder analysis is carried out by identifying, classifying stakeholders and then evaluating interests, stakeholder influences with rating scales of 0 (not

important) to 4 (very important). Identify stakeholders in four quadrants based on their interests and influences which include key players, context setter, subject and crowd (Reed et al., 2009).

RESULTS AND DISCUSSION

Sumberejo Village and Padaan Village are located in Japah District, Blora Regency. Forest management in those villages is under the auspices of Perhutani KPH Blora. Based on data obtained from Blora KPH through the evaluation of forest resource potential in 2017,13,285.82 hectares of the total forest areas are production forest areas, 1,606.50 hectares are protected areas, and other uses of 212.67 hectares. The borders of the KPH Blora area are KPH Mantingan in the north, KPH Cepu in the east, KPH Purwodadi and KPH Pati in the west, KPH Randublatung in the south.

Table 1 Socio-Economic Characteristics of Respondents in Sumberejo Village and Padaan Village, Japah District.

Respondent Characteristics		Padaan Village			Sumberejo Village		
		Freq	(%)	Information	Freq	(%)	Information
Age	20-40	8	20,0%	Mean : 49,5	2	5%	Mean : 53,6
	41-60	27	67,5%	Max : 70	31	77,50%	Max : 75
	>60	5	12,5%	Min : 31	7	17,50%	Min : 38
Education Level	Not graduating	0	0%	Mean : 8,85	0	0	Mean : 8,85
	SD	16	40%	Max: 12	19	47,5%	Max: 12
	SMP	10	35%	Min: 6	12	30%	Min: 6
	SMA	14	25%		9	22,5%	
Farming Type	Monokultur	40	100%	-	40	100%	-
	Multikultur	0	0%		0	0	
Farming Experience	<20 tahun	19	47,50%	Mean: 18,9	5	12,50%	Mean :26,3
	20-40 tahun	21	52,50%	Max: 35	33	82,50%	Max: 45
	>40 tahun	0	0.0	Min: 5	2	5%	Min: 10
Land area	0,2	2	5,0%				
	0,25	2	5,0%		5	12,50%	
	0,30	5	12,5%	Mean: 0,5	3	7,50%	Mean: 0,49
	0,4	2	5,0%	Max: 2,0	3	7,50%	Max: 1
	0,5	22	55,0%	Min: 0,3	22	55%	Min: 0,25
	0,6				1	2,50%	
	0,75				5	12,50%	
	0,8	3	7,5%				
	1,0	3	7,5%		1	2,50%	
	2,0	1	2,5%				

Source: Processed Primary Data (2018), *N* = 80

The forest area in the Perum Perhutani KPH Blora working area of the is managed by dividing the working area into 3 Forest Parts (BH), 6 BKPH, and 17 RPH. Each RPH and BKPH has various tasks ranging from planting, maintaining, monitoring, assisting / assisting extension agents to logging. Sumberejo Village is under BKPH (Forest Stakeholder Unit Section) Nglawungan with an area of 2,843.2 hectares. Whereas Padaan Village is under BKPH Ngapus with an area of 2,970.6 hectares. Administratively, Sumberejo Village is bordered by Padaan Village in the South. A summary of the socio-economic characteristics of the respondents of the two villages is presented in Table 1.

The respondents are those who joined as pesanggem who receive maize field assistance from Perum Perhutani in CBFM program. The number of respondents in this study are 40 people from each village. People in both villages have an average age of 41-60 years. More than 50% of the pesanggem in the two villages have education equivalent to Elementary School (SD). All parties in both villages do monoculture farming. The average farming experience of each village ranges from 20-40 years. The average land area owned by pesanggem in the two villages is almost the same, namely 0.5 hectare.

Table 2 Income Analysis and R/C Ratio of Maize Farming in Sumberejo Village and Padaan Village

Analysis of Maize Farming	Padaan Village			Sumberejo Village		
	Physic Amount (kg)	Unit Price (Rp/kg)	Total (Rp)	Physical Amount (kg)	Unit Price (Rp/kg)	Total (Rp)
I Revenue						
1 Cash Receipt	6.072	5.641.24	34.253.609	5.524,50	5.003	27.639.074
2 Receipts Calculated	710,2	5.641,24	4.006.578	143	5.003	715.429
Total Revenue	6.782,2	5.641,24	38.260.187	5.667,50	5.003	28.354.503
I Cost						
1 Cash Cost			7.809.027			3.370.505
2 Calculated Cost			19.234.265			12.851.136
3 Total Cost			27.043.292			16.221.641
EBT (Earning Before Tax)			11.216.896			12.132.862
EAT (Earning After Tax)			10.816.896			11.732.862
R/C of Total Cost			1,4			1,7

Source: Processed Primary Data (2018)

Analysis of Revenue and Cost Ratio (R/C) of Maize Farming and Cattle Productive Businesses, Maize farming income is obtained from the multiplication of corn production with the production price per kilogram, then deducted by the amount of costs incurred. The cost of producing corn farming includes cash costs and calculated costs. Cash costs include seeds, inorganic fertilizers, pesticides, out-of-family labor (TKLK), tractor rental, and transportation costs. The calculated costs include depreciation costs, labor in the family (TKDK), and organic

fertilizer. The results of the analysis of CBFM economic benefits in the form of maize farming show that income in both forest villages after reduced by Sumberejo Village tax is IDR 10,816,896 / MT and Padaan Village is IDR 11,732,862 / MT (Table 2). Maize farming in both villages provides benefits. This is indicated by the

R/C ratio of Padaan Village amounting to 1.4 and Sumberejo Village 1.7. A value of R/C ratio of more than 1 is said that the business provides benefits (Nahak, 2018). Analysis of income and R/C ratio of corn farming are described in Table 2

Table 3. Analysis of Revenue and R/C Cattle Productive Business Ratio of Sumberejo Village and Padaan Village.

Analysis of Cattle Productive Business	Desa Padaan			Desa Sumberejo		
	Physical Amount (kg)	Unit Price (Rp/kg)	Total (Rp)	Physical Amount (kg)	Unit Price (Rp/kg)	Total (Rp)
I Revenue						
1 Cash Receipt	1	16.364.583	16.364.583	1	14.878.205	14.878.205
2 Receipts Calculated	0	-	-	0	-	-
Total Income	Total Revenue		16.364.583			14.878.205
I Cost						
1 Cash Cost			10.253.252			10.141.366
2 Calculated Cost			5.087.680			4.678.522
3 Total Cost			15.340.932			14.819.888
EBT (Earning Before Tax)			1.023.651			58.317
EAT (Earning After Tax)			1. 010.220			34.367
R/C of Total Cost			1,07			1,00
R/C of Cash Cost			1,6			1,5

Source: Processed Primary Data (2018)

The income of cattle productive business is derived from the average income of cattle in a year then reduced by the total cost. Cattle production costs consist of cash costs and calculated costs. Cash costs include livestock seedlings, vaccines, out-of-family labor (TKLK), electricity, and water. Costs are calculated including depreciation costs, family labor, and green feed..The results of the income analysis from CBFM activities show that the income for the total cost of the village after tax is Rp. 1,010,220 and Desa Sumberejo is Rp. 34,367. The value of R / C ratio for the total productive cost of Desa Padaan cattle is 1.07, which means that the business is profitable. While the R/C ratio for the total productive costs of the Padaan village cattle is 1.00 where the business

experiences BEP. Analysis of income and R/C ratio of cattle productive business is presented in Table 3.Related to the income analysis and R / C ratios presented in Table 2 and Table 3, Mann Whitney statistical difference test is conducted to determine the differences in the income between the sharing forest village and the non-sharing forest village. Based on the hypothesis proposed on corn farming in both forest villages, the Mann Whitney Test shows the value of Asymp. Sig. (2-tailed) <α (0.05), which is 0.011 <0.05, meaning that there are differences in corn farming income between the sharing forest village and the non-sharing forest village. Cattle productive business shows the value of Asymp. Sig. (2-tailed)> α (0.05), which is 0.992> 0.05, which means that there is no

difference in cattle productive businesses income between the sharing forest village sharing with the non-sharing forest village. Co-Management Analysis, Co management analysis is carried out

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by evaluating 11 key conditions of Collaborative-Based Forest Management in Sumberejo Village and Padaan Village, Japah District, Blora Regency (Susilowati et al., 2003) shown in Table 4

Table 4. Co-Management Analysis of Collaborative-Based Forest Management (CBFM) in Sumberejo Village and Padaan Village, Japah District.

Key Condition	Circumstances	Evaluation (1 to 5 scale)
Clear boundaries	Managed areas have different physical boundaries in order to be noticeable by people	
	Communities can understand and observe boundaries based on existing ecosystems	4,8
	The community manages land in accordance with agreed limits	
Membership needs to be determined	Only people who are members of the LMDH have the right to carry out forest management in restricted areas.	
	LMDH members and communities participate in forest resource management	3,7
	The number of LMDH members is not too large to avoid the effectiveness of decision making	
Group Cohesion	The managed area is close to the Forest Village Community group	
	High levels of homogeneity (kinship, ethnicity, religion, habits, beliefs, ideology	3,8
	Understand problems, strategies and results	
Existing Organization	The Village Forest Community, both those who are members of the LMDH and do not understand the traditional community-based system	
	The Village Forest community understands the existence of the organization	3,4
	Village Forest Communities (LMDH) as representatives of stakeholders and resource users participating in forest management.	
Benefits exceeding cost	Compliance with community-based management exceeds the investment costs for activities	
	There are expectations from individuals that come from participation	3,3
	Individuals get profit greater than the capital issued.	
Influential participation from people	People who collect information about forestry also make decisions about management arrangements	
	Management arrangements mostly affect individuals who make and change their settings.	2,9
	Individuals understand and are affected by the rules that are compiled.	
Enforcement of management rules	All Forest Village Communities can enforce laws and regulations.	3,1
	The rules for managing forest resources are simple	

Key Condition	Circumstances	Evaluation (1 to 5 scale)
	Forest village members and communities understand the rules in theory and their application.	
Legal rights to organize	The government has regulations to determine and clarify responsibilities and authorities	
	Legal rights are owned by organizations / groups in making and managing arrangements according to their needs	3,6
	Forest village communities or LMDH members apply regulations / norms that exist in the implementation of CFM.	
Cooperation and leadership at the community level	The community has the willingness and incentives to participate (money, time, energy, money) in managing fisheries resources	
	In the management process there is a group of individuals who have a responsibility in leadership	3,4
	The most appropriate form of collaboration here is: Implementation of coaching and training activities Discussion	
Decentralization and delegation of authority	The government has established policies / regulations for decentralization of administrative functions	
	The delegation of responsibility / authority with a partnership approach in forestry resource management.	3,3
	The delegation of authority / responsibility is well structured.	
Coordination between the government and the community	Coordination in monitoring management arrangements, conflict resolution, strengthening enforcement of regulations by implementing a partnership approach, coordination is carried out by: Local government Local People Universities	
	The partnership approach will facilitate coordination between stakeholders	3,1
	The partnership approach facilitates management monitoring and conflict resolution from various levels of stakeholders	
	Total Score	38,5
	Average Score	3,5

Rating scale: (1) Strongly disagree (2) Disagree (3) Doubtful (4) Agree (5) Strongly agree.
(1) Very bad (2) Bad (3) Neutral (4) Good (5) Very Good.

The total score of the assessment of 11 key conditions in Collaborative-Based Forest Management (CBFM) in Sumberejo Village and Padaan Village, Japah District, Blora District, Central Java in Table 4 is 38.5. The average score is 3.5, which is close to 4 on the Linkert scale. This implies that forest management with the community in Sumberejo Village and Padaan

Village, Japah District, Blora Regency is good. This condition illustrates that the co management approach is a concept of forest management that is suitable for better PBHM implementation.

Stakeholder Analysis Stakeholder analysis is carried out with the aim of analyzing the level of importance and influence of each stakeholder in PBHM. Stakeholders involved in PBHM in Sumberejo and Padaan Villages consist of Perum Perhutani, Forest Management Center (BPH), Village Authority, Agriculture and Food Security (Dipertan), NGOs, Subdistrict Authority, Teak Meuble Entrepreneurs, *pesanggem* and academics. According to Reed et al (2009) the classification of stakeholders is differentiated into key-players, context setter, subject, and crowd. Figure 2 shows the mapping of stakeholders based on their dependence and influence.

Relations between stakeholders can be explained through classification which includes a quadrant 1 context setter where the relevant stakeholders have a low dependency relationship and high influence. Stakeholders who occupy this position are academics. Key-players 2 quadrant has a high dependency relationship and high influence. Stakeholders who occupy this position are Perum Perhutani, Village Authority, District Authority, Agriculture and Food Security (Dipertan), and the Forest Village Community Institute (LMDH). Quadrant 3 is occupied by NGOs and *pesanggem* who belong to the category of subject (subject) in which the relevant stakeholders have a high dependence but influence is low. Quadrant 4 (crowd) has BPH and teak meuble entrepreneurs where the relevant stakeholders have a low dependency relationship and low influence.
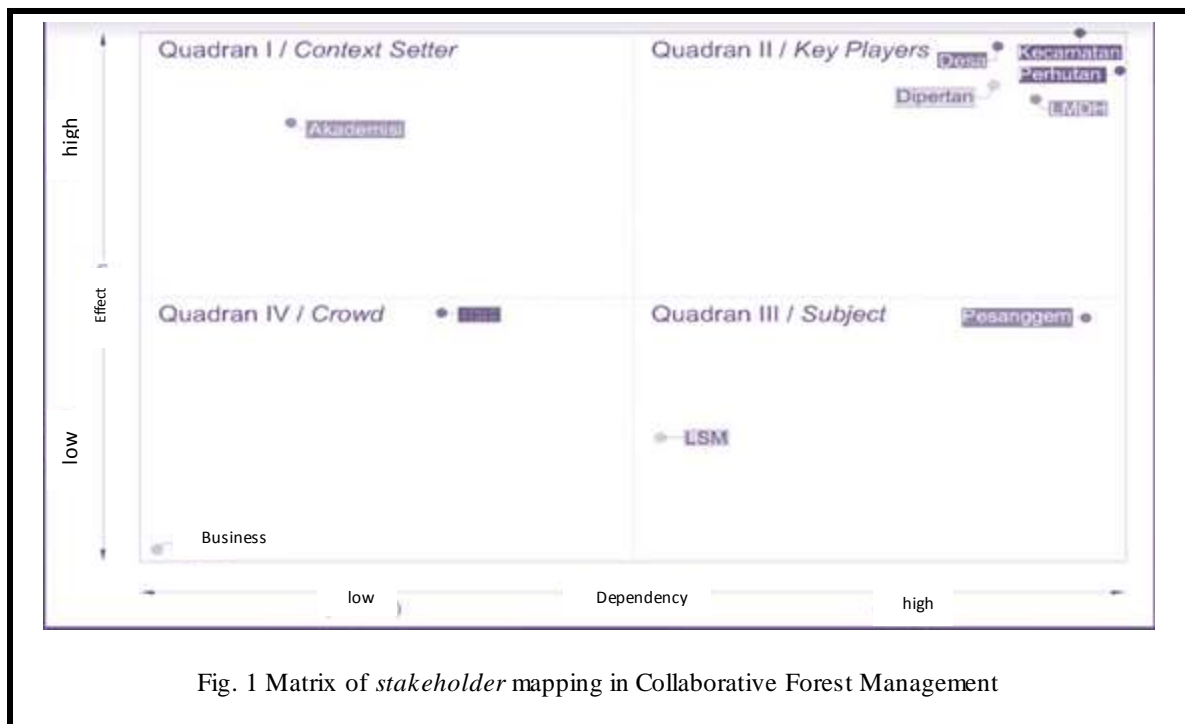

Fig. 1 Matrix of *stakeholder* mapping in Collaborative Forest Management

Figure 2 The Matrix of Stakeholder Mapping of CFM in the Sumberejo and Padaan Villages
Source: Processed primary data (2018)

CONCLUSION

CFM in Sumberejo Village and Padaan Village, Japah District, Blora Regency has provided economic benefits. It is proved by the CFM activities in the form of maize cropping and cattle productive business cattle that have provided benefits for the forest village community. Through analysis of co management and stakeholders, the collaborative forest management in Sumberejo and Padaan Villages is considered to be good. This is indicated by the total score of the assessment of the 11 key conditions of forest management with the community is 38.5, where the average value is 3.5 which is close to 4 in the Linkert scale.

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