

Rights and Wellbeing: An Analytical Approach to Global Case Comparison of Community Forestry

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Abstract

Many countries have adopted policies supported community forestry. Trends towards community empowerment, livelihood improvement and decentralized decision-making are being done by providing more rights to forest dependent people. However, empirical data to support clear understanding on the correlation between resource rights and wellbeing or poverty are missing. The paper provides an analytical approach to figuring out forest resource rights and their connections to wellbeing. Twenty seven cases of community forestry in Asia, Africa and Latin America were selected, clustered and analyzed using non-linear principle component analysis. We found there was correlation between rights of forest resources and wellbeing although was not very strong. There was also connection between income and equity as well as between equity and sustainability of forest. This implies that giving more rights to local people is not enough for improving wellbeing without facilitating for better institution and governance.

Keywords: community forestry, global comparison, poverty, non-linear principle component analysis, institution

1. Introduction

Over the last three decades many countries have adopted policies supported community forestry. It is inline with Principle 22 of the 1992 Rio Declaration on Environment and Development highlights the importance of local people and their participation in sustainable development. Trends towards community empowerment, decentralized decision-making and increased involvement of the private sector in forest management are increasing, although 84% of the world's forests remain publicly owned (FAO, 2006). Significant investment has been made in numerous projects to develop community forestry around the globe. Much of this investment is based on the premise that the involvement of people in forestry activities will lead to forest resource conservation and improved wellbeing of local community. Others argue that community forestry development intervention can lead to reducing conflict and winning in the globalizing market. However, these arguments are supported by scattered, inconsistent and case-base research. The decreasing number of people in developing world's living on less than \$1 a day, from 1.2 billion or 28% in 1990 to 0.8 billion or 19% in 2002 (UN, 2006), was not shown due to community forestry.

Forest is not empty, various stakeholders with various legitimate interests need to be counted, particularly those who less powerful (Purnomo et al., 2012). FAO (1978) defined community forestry as "any situation which intimately involves people in forestry activities". Wollenberg (1998) provides assumptions that shape the nature of local forest management practices, which among others are: local people are the best forest managers and local people can manage forests sustainably. These assumptions need to be questioned. In different setting the local population has different norms and knowledge for managing it and deriving different benefits from forests. Developing and supporting community forestry is a mix of ideological, technological and pragmatic beliefs, which not necessary effective to forest conservation and livelihood improvement. In cases of commercial non-timber forest products (NTFPs), the producers tend to be poor and very poor relative to national average (Belcher et al., 2005).

Furthermore Wollenberg (1998) provided descriptors of community forestry as follows (1) Type of management

aims and resource use; (2) Key parameters defining the resource potential: productive potential, resource pressure, and resource stability and resilience; (3) Key parameters defining the potential of community forestry: coherence of interests and activities among managers, strength of local institutions, incentives to local people; and (4) Key parameters defining the potential of the political and economic context: role of outside actors in supporting forest management, potential economic context, and potential of political context.

This study aims at comparing community forestry in developing countries in Asia, Africa and Latin America. The global comparison would give lesson to tenure regime of community forestry to play roles in supporting better livelihood, income, equity and forest condition. The paper aims at answering the question, what are the differential impacts of different tenure regimes on income and livelihoods, equity and forest condition? This answer will help to understand how kinds of tenure, user rights and access to forest lands and resources favor poverty alleviation, forest condition and equity. The paper did not aim to make any future prediction but show the correlations between variables concerning community forestry. We used community forestry (CF) as a general terms for forest management activity which involve community.

2. Method

The research was started by comparative analysis of a wide range of community forestry cases. We collated information from many cases that already been studied, documented and described the cases using set of descriptors and to carry out exploratory analysis as described by Belcher and Ruiz-Pérez (2001) i.e. to get (1) clusters community forestry cases; (2) Identify conditions associated with particular kind conservation and poverty reduction; and (3) develop and test hypotheses about community forestry roles.

Following Ostrom (2003) on definition of rights, we differentiated rights into three dimensions, which are 'component of right bundle', 'basis of right' and 'resource ownership'. 'Component of right bundle' comprises access, use, manage, transfer and decide rules (Figure 1). 'Access right' is a right to enter a defined physical area and enjoy non-subtractive benefits (e.g. hiking, canoeing, and sitting in the sun). 'Use right' is a right to obtain resource unit or products of a resource system (e.g. cutting fire wood or timber, harvesting mushrooms, diverting water). 'Management right' is a right to regulate internal use patterns and transform the resource by making improvements (e.g. planting seedling and thinning trees). 'Transfer right' is a right to sell or lease management rights. 'Decide rules' is a right to determine who will have an access right and how that right may be transferred.

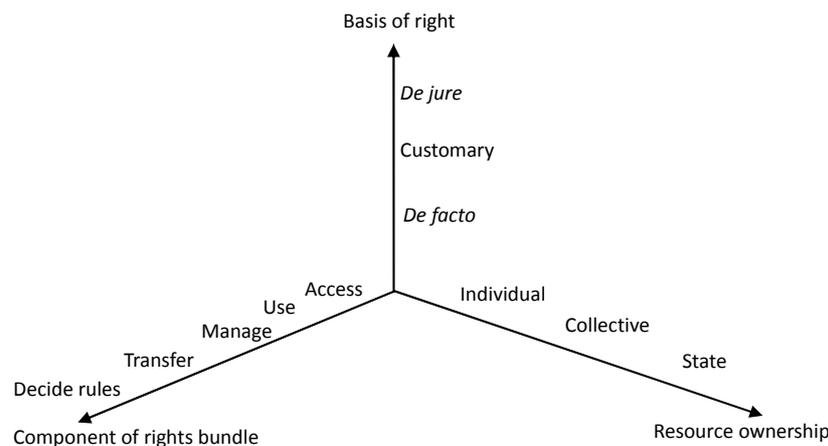


Figure 1. Dimensions of rights

We distinguished 'basis of right' into *de facto*, 'customary' and *de jure*. *De facto* is defined as community (individual, collective) only have access to land but not having legal right (not legitimated by the law/certificate of ownership). 'Customary' is defined as people (individual or collective) have the right of ownership of the land since it is inherited by their ancestors, but still not legitimated by the law. And *de jure* is defined as community (individual, collective) have the rights of ownership of the land and is legally admitted by the government through certificate of ownership, government decree/decision, etc.

We differentiated 'resource ownership' into individual, collective and state. 'Individual' is defined as resources collected/obtained from the forest become the possession of the individual who collect it. 'Collective' is defined

as the resources collected/obtained from the forest become the possession of the community in which the individual are part of. 'State' is defined as the resources collected/obtained from the forest become the possession of the state/government, where community/individual only maintain and harvest the resource and get incentives from the work they do.

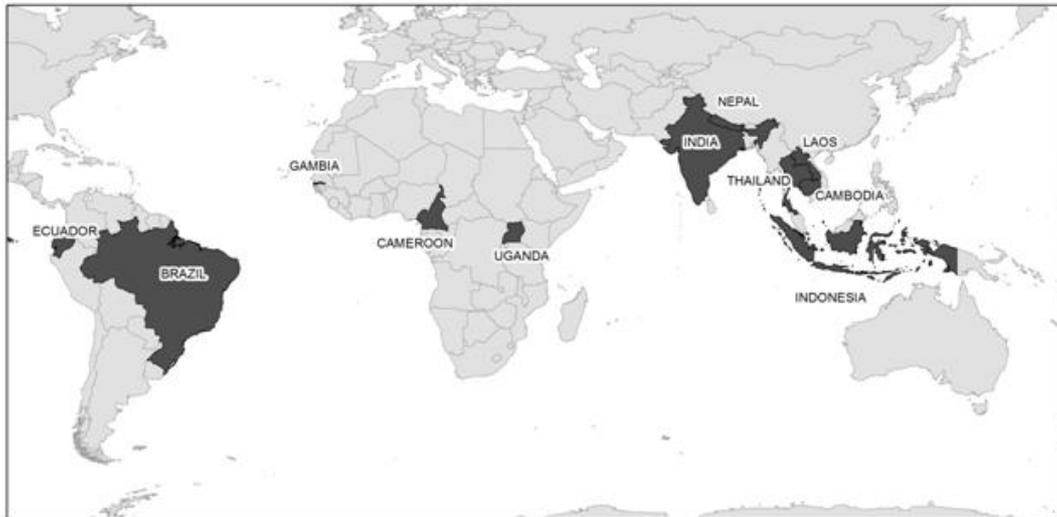


Figure 2. Distribution of studied community forestry cases

To carry out the global comparison of community forestry on rights and wellbeing in Asia, Africa and Latin America we used the following steps.

- 1) Collected information from many cases that already been studied, documented and described the cases base on definition and description, forest resource use, purpose of forest management, land tenure arrangement, policy context, formal regulation framework and market access (Wollenberg, 1998).
- 2) Clustered community forestry cases based on e.g. nature of resource, geographical areas and social attributes using the selected data (Everitt & Dunn, 1991). Using hierarchical cluster analysis.
- 3) Identified impacts associated with community forestry to indicators of livelihoods (L) income (I) equity (E) forest condition (F) and analyst the relations using non-linear principle component analysis (PCA).
- 4) Tested hypotheses of the correlations between rights and LIFE indicators using Spearman-rank method.

Figure 2 shows the country location where cases of community forestry were compared and analyzed. There was no particular sampling method applied in selecting cases. However, we ensured that all community forestry types were represented in this study and the cases distributed in three different continents where community forestry was becoming an issue. The paper did not aim to make any projection of the future of community forestry, nevertheless provided understanding how rights and wellbeing correlated.

3. Results

3.1 Collecting and Describing Community Forestry Cases

We collected 36 community forestry cases. The data sources comprised journal papers, books and project reports that were written by international organizations, governments, non-government organizations (NGOs) and national research organizations. From 36 cases we selected 27 cases that were relevant to the analysis. Table 1 shows the data source characteristics of the 27 selected cases.

Table 1. Data source characteristics

Source of data	Intl. organizations/scope	National research org.	Governments	NGOs	Total
Journal papers	2	0	0	0	2
Book/ Book chapter	10	0	0	0	10
Project reports	0	0	5	0	5
Other papers	8	1	0	1	10
Total	20	1	5	1	27

Each case was attributed with definition and description, forest resource use, purpose of forest management, land tenure arrangement, policy context, and formal regulation framework and market access. Annex 1 provides some of the detail of case description. Table 2 shows the cases with right arrangement and impacts indicators.

Table 2. The cases, tenure regime and indicators (Note 1)

Case No	Cases		Right arrangement				Indicators		
	Code (country, type and number)	Country	Basis of right	Component of right	Resource ownership	Livelihoods	Income	Forest condition	Equity
1	idCF1	Indonesia	3	5	1	5	5	3	4
2	idCFM1	Indonesia	1	2	3	2	2	1	1
3	idCFM2	Indonesia	1	2	3	2	2	2	2
4	idTFM1	Indonesia	1	5	2	3	2	4	1
5	idSF1	Indonesia	3	3	2	2	2	1	1
6	idTFM2	Indonesia	1	3	2	3	3	4	2
7	npFUG1	Nepal	1	1	2	1	1	1	1
8	npFUG2	Nepal	1	1	2	1	NA	NA	2
9	npFBE1	Nepal	3	3	2	2	3	4	1
10	thCFM3	Thailand	1	3	3	3	3	3	2
11	cbCFM4	Cambodia	1	1	3	3	3	4	3
12	laCFM5	Lao PDR	1	2	3	3	3	4	NA
13	laCFM6	Lao PDR	1	1	3	3	2	4	NA
14	laCNTFP1	Lao PDR	1	2	2	3	4	3	NA
15	laCNTFP2	Lao PDR	1	2	2	3	4	3	NA
16	thCFM7	Thailand	1	3	2	2	2	3	2
17	inJFM1	India	1	2	2	2	2	2	1
18	inJFM2	India	1	2	2	2	2	3	2
19	inSHG1	India	1	2	3	4	4	4	3
20	cmTFM3	Cameroon	1	2	1	2	2	3	2
21	cmCAF1	Cameroon	1	3	2	4	5	4	4
22	gbCFM8	Gambia	1	3	2	3	4	5	4
23	ugCFM9	Uganda	1	2	2	3	2	4	2
24	ecCFM10	Ecuador	3	3	2	2	2	4	2
25	brCFM11	Brazil	1	3	2	3	3	4	2
26	brCFM12	Brazil	1	2	2	5	5	4	3
27	brCFM13	Brazil	1	2	2	2	2	4	1

The 'basis of rights' was treated as ordinal variables of degree of formal law from 1 to 3. We also presumed 'resource ownerships' as ordinal variable of private-collective-public ownerships. 'Component of right bundles' was treated as ordinal variable from 1 to 5. '1' is the weakest access right and '5' is the strongest one. All indicators are ordinal variables from 1 to 5. Annex 2 provides the definition and criteria for scoring each

indicator.

3.2 Clustering Community Forestry Cases and Principle Component Analysis

The cluster analysis result that using average linkage (between groups) of the cases tenure is shown in Figure 3. All cases are similar with similarity level 75%. Case 6 (TFM Indonesia) and Case 25 (CFM Brazil) are very similar (98%). Case 18 (JFM India) and Case 20 (TFM Cameroon) have similarity 95%. While Indonesian CF (Case 1) is similar at 75% with the rest of group. According to this cluster, we can expect that any response of given action or treatment to Case 26 (Brazil) closer to Case 21 (Cameroon) rather than to Case 24 (Ecuador), although Brazil and Ecuador are located in the continent.

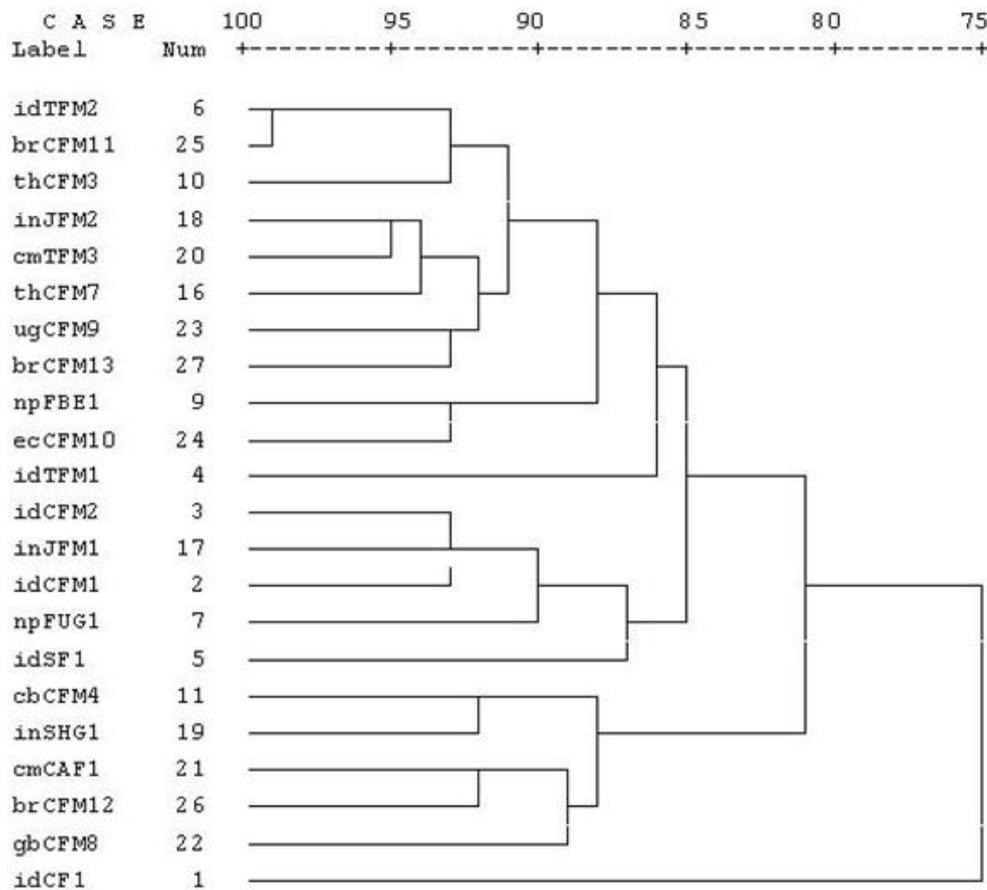


Figure 3. Hierarchical clustering of the cases (% similarity)

The analysis shows there is no reason to cluster the cases into typologies of community forestry i.e. CF (community forestry), CFM (collaborative forest management), TFM (traditional forest management), SF (Government program based social forestry), FUG (forest user group), FBE (forest based enterprises), CNTFP (community based Non Timber Forest Products), and CAF (community agro-forestry). Each type is characterized with different main characteristic as the words underlined. Each case was treated independently from known typology and country. There was no proof that community forestry in a particular country is more similar than community forestry in the other country.

Another analytical approach we applied was non-linear principle component analysis (NL-PCA). Figure 4 describes how the cases distribute along two principle components. We can see Case No 1 is quite unique. It does not close to the others, while Case 24 and 9 close each other. The PCA result was quite similar to clustering result.

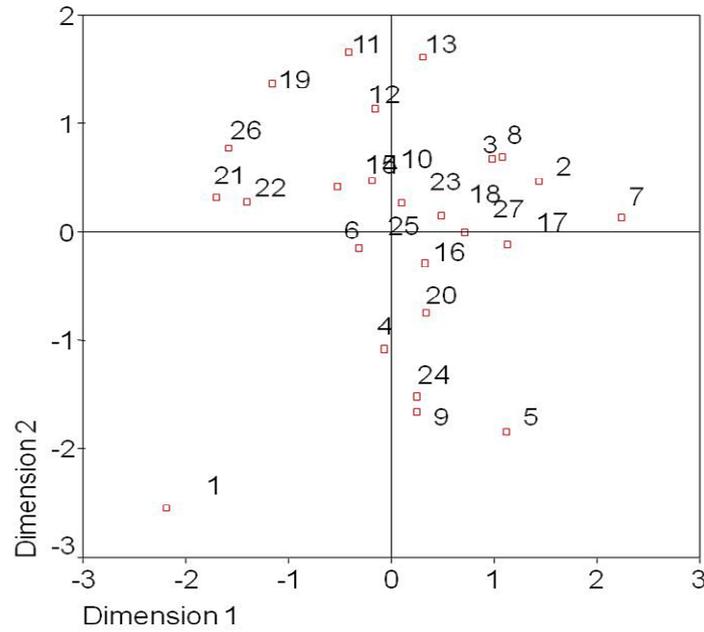


Figure 4. The case distribution in two principle dimensions

Figure 5 shows the variables used distribute along two principal components. The 27 cases show that high right access 5 (decide rule) close to resource ownership 1 (individual) and basis of the right 3 (de jure). CF cases which have state ownerships close to low right access. Cases with high livelihood close to high income. Cases with high livelihood tend to close to high equity.

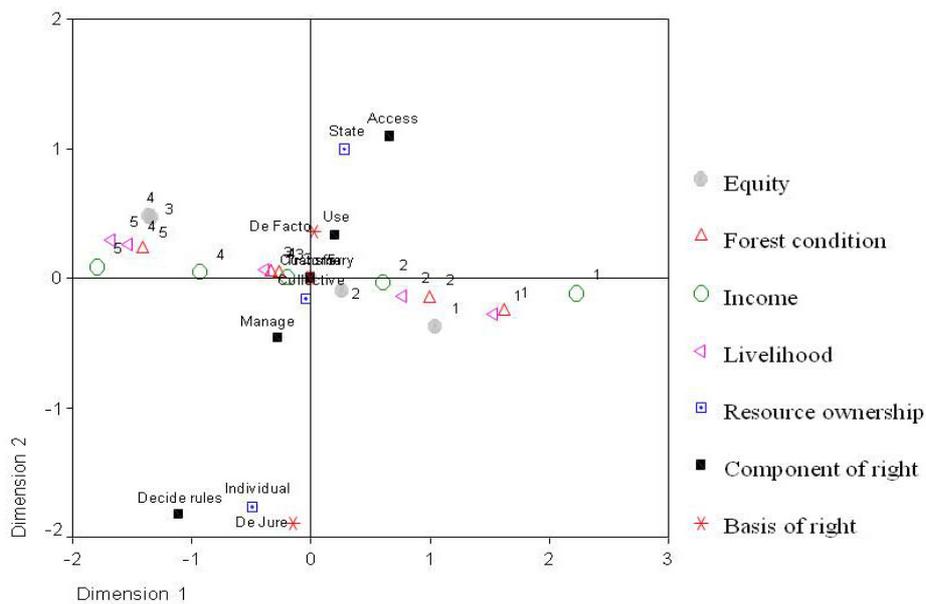


Figure 5. Correlation among indicators of equity, forest condition, income, livelihood, resource ownership, right component and right basis in 2 principle dimensions

3.3 Community Forestry Roles in LIFE Indicators

Non-parametric correlation between variables was computed using bivariate correlations with Spearman Rho coefficient correlation. This correlation measured how variables or rank orders were related. The correlations

between two variables among seven independent and dependent variables are shown in Table 3. There was positive significant correlation among independent variables (tenure regime) of 'basis of right' (degree of formal law involvement) with 'component of right' (degree of access power). Legal right provided better right access.

There was negative but not significant correlation between legal and strong right accesses with collective resource ownership types (individual, community and state). It means legal and strong right access lied more in individual ownership rather than community and state ownership. Collectivity reduced right access and legality of right.

Indicator of livelihood had positive and very significant relationship with income, forest condition and equity indicators. Income indicator also had very significant relationship with equity indicator and significant relationship with forest condition indicator. Forest condition indicator had significant relationship with equity indicator.

Table 3. The correlations among variables

			Correlations						
			Basis of right	Component of right	Resource ownership	Livelihood	Income	Forest condition	Equity
Spearman's rho	Basis of right	Correlation Coefficient	1.000	.480*	-.323	-.100	.038	-.077	-.101
		Sig. (2-tailed)	.	.011	.100	.620	.855	.709	.647
		N	27	27	27	27	26	26	23
	Component of right	Correlation Coefficient	.480*	1.000	-.367	.282	.271	.179	.101
		Sig. (2-tailed)	.011	.	.060	.154	.180	.381	.646
		N	27	27	27	27	26	26	23
	Resource ownership	Correlation Coefficient	-.323	-.367	1.000	.085	-.056	.044	-.027
		Sig. (2-tailed)	.100	.060	.	.672	.787	.832	.902
		N	27	27	27	27	26	26	23
	Livelihood	Correlation Coefficient	-.100	.282	.085	1.000	.825**	.526**	.684**
		Sig. (2-tailed)	.620	.154	.672	.	.000	.006	.000
		N	27	27	27	27	26	26	23
	Income	Correlation Coefficient	.038	.271	-.056	.825**	1.000	.410*	.758**
		Sig. (2-tailed)	.855	.180	.787	.000	.	.038	.000
		N	26	26	26	26	26	26	22
	Forest condition	Correlation Coefficient	-.077	.179	.044	.526**	.410*	1.000	.463*
		Sig. (2-tailed)	.709	.381	.832	.006	.038	.	.030
		N	26	26	26	26	26	26	22
	Equity	Correlation Coefficient	-.101	.101	-.027	.684**	.758**	.463*	1.000
		Sig. (2-tailed)	.647	.646	.902	.000	.000	.030	.
		N	23	23	23	23	22	22	23

*. Correlation is significant at the .05 level (2-tailed).

**. Correlation is significant at the .01 level (2-tailed).

Independent variables of tenure regime did not provide statistically significant relationship with dependent variables (LIFE indicators). However, we can see 'component of right' and 'basis of right' have positive relationship with livelihood and income indicators but insignificant. Figure 6 shows the scatter plots of right access and livelihood indicator. While Figure 7 shows relationship between right access and equity indicator. Both figures show weak relations.

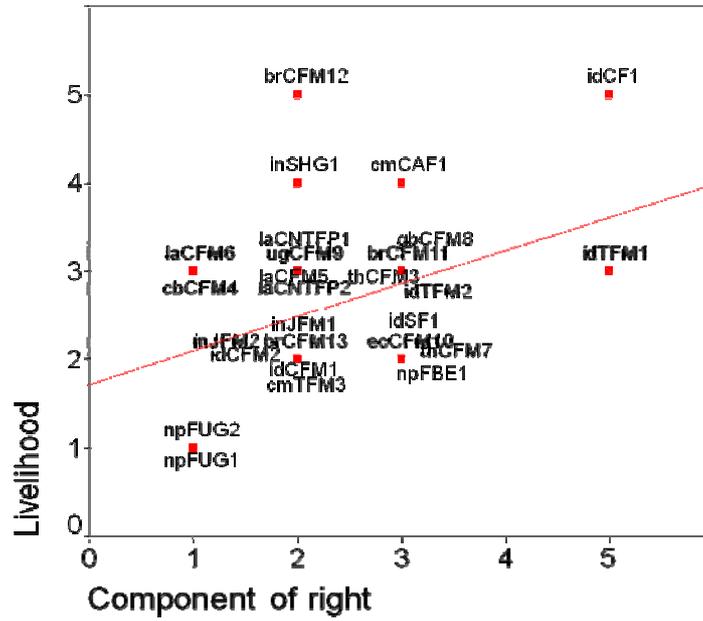


Figure 6. Scatter plot between degree of access and livelihood indicator

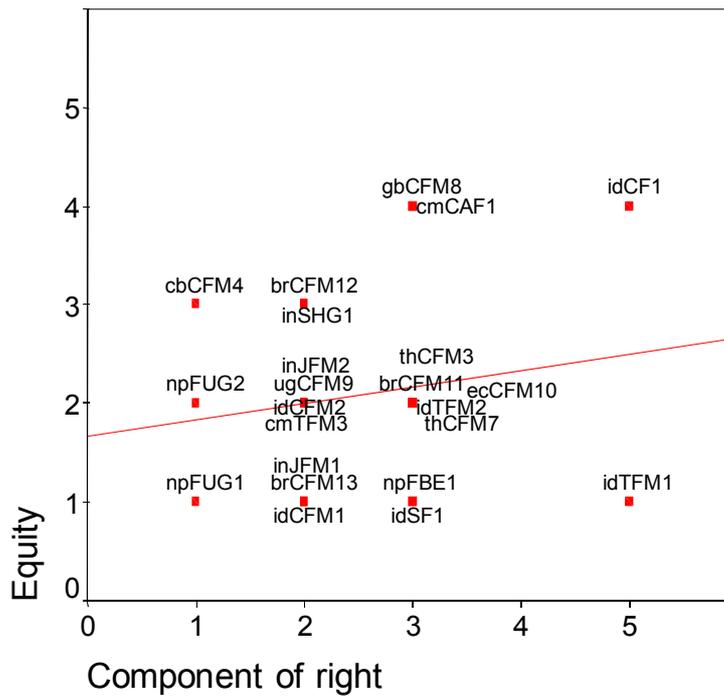


Figure 7. Scatter plot between degree of access and equity indicator

4. Discussion

During searching for data sources such as paper, journal, report, etc., we found difficulties in finding the appropriate papers that can be analyzed. Most sources do not provide the necessary information directly. The necessary information requires a case specific or site specific cases. The combination of case/site specific and the information required can only be fulfilled by a certain number of papers. Some cases also can not fulfill the entire information we need, and it is also hard to complete the missing information from other sources, since it is

very hard to find more than one paper that discuss the same site or the same theme.

Most cases are from Asia. This might be caused by more projects and/or researches were conducted more in Asia rather than other regions, or the availability of literature from Asia is more complete than that in other region. Other possibility that other region also have many cases of community forestry, but it is not available in English.

Most of the case studies are the result of community forestry project initiated either by government, NGOs or the community itself. The projects end up with different degree of success. Failure of the project are caused by among others are the existence of land tenure conflicts, lack of capacity of the community, lack of legal support, weak marketing system, or the project is inappropriate with the local culture/origin of the local community.

From the analysis we are provided the connection between right of resource and poverty indicated by livelihood and equity proxies. Moving from access right to use, management, transfer and decide right will give more power to local community. This empowerment produces better livelihood and equity for local community from forestry. Although, the correlation between right and poverty is not significant, but empowering right can be used among others to reduce poverty, due to simply connection among them. Purnomo et al. (2011) underlined the importance of fair distribution of value added along the chain of forest products to reduce poverty of local communities.

As mentioned in Table 3, there is a significant correlation between legal right and strong access right, livelihood and income, equity and forest condition. Right provides power which can produce better income and equity and finally forest condition. The good forest condition will not only effect to forest dependent people but also to other community who lives far outside the forest. Irawati et al. (2009) described furniture value chain in Jepara, Indonesia, where forestry sectors provide logs as the raw material for the industry, which consist of sawmills, furniture producers and retailers. Securing wood and improving furniture industry will increase the quantity of jobs available, reduce unemployment and improve wellbeing. In Indonesia, demand for timber is about 60 millions m³/year, while wood supply from natural forests and plantations is only about 25 millions m³/year. This indicates how large the gap between supply and demand of wood. An effort to balance between wood demand and supply is increasing community forestry. It will provide livelihood of the community and providing income to them.

Giving more right, which means empower local community, is a solution to have better forest and wellbeing for local community. This is inline with Peluso (1987), who provided an example of poor people with rich forest in Java, Indonesia due to unfair land tenure arrangement. Sense of belonging upon forest and its problem is a key to find solutions and to promote social and political transformations (Selener, 1997). Furthermore, local communities have already sufficient indigenous knowledge to manage forest sustainably (Purnomo et al., 2005).

The proxies of power were found to be a key determinant of forest condition and equity. Greater power inequalities will produce injustice to communities. Powerful leaders may provide positive externalities to the group in the form of norms. However, results indicate that greater power inequality tends to lead to more forest degradation (Pérez-Cirera & Lovett, 2006). Giving more right to local community will improve forest condition and reduce forest degradation. In addition to right, for better equity it is necessary to build institutional and governance mechanisms that encourage poorer and more marginal households to access government officials and create incentives to promote more interactions between less powerful communities and government officials (Agrawal & Gupta, 2005). Giving right to community is necessary but it not enough to reduce poverty.

Involving substantially local community and have a multi-stakeholder perspective and better governance may low the decision-making process in forest management particularly at the beginning. Impatience, however, may undermine long term social and ecological sustainability (Ribot, 2006). Good governance involves producing rules for sharing benefit and cost of any new standard. Without this rule enforcement capability, problems related to free riders and rent seekers can emerge easily. Moreover, the problem of elite captures as described by Platteau and Gaspart (2003) may also arise. In good governance, the government shall have commitment to poverty reduction in policy and capacity to respond to the poor (Hobley, 2007).

5. Conclusion

Global comparison of community forestry using quantitative approach is a very challenging task due to the availability of data and sources of information. Conclusions can be drawn as follows:

- The methods shown above can be used to cluster CF cases and to perceive how tenure regime and LIFE indicators associated.
- There is statistically very significant relation between 'basis of right' (degree of formal law involvement in CF) with 'component of right' (degree of access).

- Livelihood indicator has positive and very significant relationship with income, forest condition and equity indicators.
- None of independent variables (tenure regime) has statistically significant relationship (>95% confidence) with dependent variables (LIFE indicators). Right access has positive relationship with livelihood and income indicators.

Giving more rights to local community correlates with reducing poverty, although empirically those have weak relation. In other words, having right is necessary but is not enough to improve wellbeing of forest dependent people. It needs more work on institution and governance in order to make rights more meaningful for wellbeing of communities.

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Note

Note 1. Typology of community forestry i.e. CF: community forestry; CFM: collaborative forest management; TFM: traditional forest management; SF: social forestry; FUG: forest user group; FBE: forest based enterprises; CNTFP: community base NTFP; CAF: community agro-forestry; and NA: not available.

“Basis of rights” are categorized into (1) De Facto, (2) Customary, (3) De Jure. “Component of Rights Bundles” are categorized into (1) Access, (2) Use, (3) Manage, (4) Transfer, (5) Decide rules. “Resource Ownerships” are categorized into (1) Individual, (2) Collective, (3) State.

Annex 1. Case characteristics

No	Case	Typology	Main products	Country	Source of information	Organization
1	Teak small-scale plantation in South Konawe, Southeast Sulawesi	CF1	Teak timber	Indonesia	Paper Report	NGO
2	Teak state company-community partnership in Sukabumi	CFM1	Teak timber	Indonesia	Project report	Ministry of Forestry, Indonesia
3	Teak state company-community partnership in Rembang	CFM2	Teak timber	Indonesia	Project report	A state owned company of PERHUTANI
4	Traditional forest management (Agroforestry) Sukabumi	TFM1	Mix	Indonesia	Project report	Ministry of Forestry, Indonesia
5	Social forestry in West Lampung	SF1	Coffee	Indonesia	Project report	Ministry of Forestry, Indonesia
6	Traditional forest management in Krui Lampung	TFM2	Damar	Indonesia	Project report	Ministry of Forestry, Indonesia
7	Forest Research Program Study on Forest Dependent Poor in Siraha, Dolakha, Kabhrepalanchok, Chitwan, Nawalparasi, Banke and Kailali	FUG1	Bamboo and wood	Nepal	Journal	International journal
8	Community forestry user group in Kabhrepalanchok and Sindhupalchok Districts	FUG2	Cultivation	Nepal	Journal	International journal
9	Forest-Based Enterprise in Jiri, Dolakha District, Ramechhap District, and Okhaldunga District	FBE1	Cultivation	Nepal	Journal	International journal
10	Benefit Sharing Mechanism in Yak Loam Ecotourism project in Ratanikiri Province	CFM3	Ecotourism	Thailand	Book	RECOFTC, WWF, and SNV
11	Benefit Sharing Mechanism in Ecotourism of Chambok Commune people	CFM4	Ecotourism	Cambodia	Book	RECOFTC, WWF, and SNV
12	Community Based Tourism, Communities around the Nam Ha Protected Area in northern Lao PDR	CFM5	Ecotourism	Lao PDR	Book	RECOFTC, WWF, and SNV
13	Community Based Tourism, Khong Mountain in Phou Xieng Thong National protected Area in southern Lao PDR	CFM6	Ecotourism	Lao PDR	Book	RECOFTC, WWF, and SNV
14	Production and Sale of NTFPs Nam Pheng village	CNTFP1	Bamboo	Lao PDR	Book	RECOFTC, WWF, and SNV
15	Production and Sale of NTFPs, villages in Pathoumphone District of Champasak Province	CNTFP2	Honey	Lao PDR	Book	RECOFTC, WWF, and SNV
16	Collaborative Country Support Program in Khao Rao Thien Thong and Huay Hin Dam	CFM7	Cultivation crop plants and bamboo	Thailand	Paper	RECOFTC
17	Village Forest Council (within the frame of Joint Forest Management) in Tamilnadu State	JFM1	-	India	Paper	RECOFTC
18	Joint Forest Management, Madhya Pradesh State	JFM2	-	India	Paper	CAPRI
19	Sel-h-help Group in Adilabad District	SHG1	Protection and cultivation Tendu, Moha and Gum	India	Paper	IFAD

Annex 1. Case characteristics (continued)

No	Case	Typology	Main products	Country	Source of information	Organization
20	Community Forest Management at Kilum-Ijim Mountain Forest Region	TFM3	Agroforest	Cameroon	Paper	FAO
21	Cocoa Agroforestry	CAF1	Agroforest	Cameroon	Paper	DFID, FRR, and ODI.
22	Community-Controlled State Forest, Villagers from Bessi/Foni Brefet	CFM8	Cultivation	Gambia	Paper	FAO and GTZ
23	Buto-buvuma Forest Reserve, Mpigi District	CFM9	Protection	Uganda	Paper	FAO and GTZ
24	Alliances in Chocó Forests	CFM10	Extraction	Ecuador	Book	
25	Company-Community Partnership in the State of Pará	CFM11	Cultivation, Extraction of NTFPs such as nuts	Brazil	Book	
26	Company-Community partnership with NTFP FSC in Marajó Island	CFM12	Extraction	Brazil	Book	
27	Establishment of Extractive Reserve in State of Rondônia	CFM13	Extraction (rubber, Brazil nuts, copaiba oil, açai fruits)	Brazil	Book	

Annex 2. Criteria for Scoring Community Forestry

The indicators of community forestry (LIFE) was scored with the score ranging from 1-5, where 1 is defined as very poor, 2 is poor, 3 is medium, 4 is rich, 5 is very rich, which can be defined as follows:

a) Livelihood:

- 1 = people are very poor. What they get from forest only enough for daily lives, sometimes might be not enough. They are remote and do not have health facilities, ignored by society or government. Sometimes do not care of land ownership because they only know that they have to get some food.
- 2 = people are poor, however they are still living “appropriately”, have meals for their lives and their families’ life. Most of them live in remote area and have big worries of land ownership and access to forests.
- 3 = people are living appropriately, not considered as poor and have good access to “civilization”. Also have problems with government regarding land ownership.
- 4 = people are wealthy enough and able to support their selves, have good income from their activities.
- 5 = people are very well managed, have relatively high income. They do not have problem on land ownership.

b) Income Generation

- 1 = income generation is very poor. People have to work very hard but what is earned is far from enough. They cover other needs with non-income-needed activities such as hunting, gather food from forest, etc.
- 2 = income generation is poor. What is earned is not enough for daily lives. Sometimes because they can not control the price so the price they get is very cheap, or because their remoteness that separate them from market.
- 3 = income generation is medium. People can still live appropriately with the income they earned, although sometimes is also not enough.
- 4 = income generation is relatively high. People can cover their daily lives and have quite an appropriate live and place for living. Marketing of product faces not a problem.
- 5 = income generation is high, above average of the communities surrounding them. Marketing of product is not a problem.

c) Forest Condition

- 1 = no forest, land is degraded/bare land/filled with shrubs without trees.
- 2 = forest condition are poor, heavily degraded or in process of degradation and or still in early process of rehabilitation.
- 3 = forest condition is relatively good. There is forest cover and the forest can still provide the community’s need.
- 4 = forest condition is good. There are strata in the forest, biodiversity is mentioned, people get benefit from the forest explicitly such as water, tourism, etc. in some cases also include willingness of people to sustain the forest.
- 5 = forest condition is very good. Biodiversity exist, and there are relatively no threats to forest in a long term.

d) Equity

- 1 = there are certain part of community which is mentioned explicitly as set aside or marginalized, such as women, “usual people”/non leaders, lower castes, etc.
- 2 = some part of community members are marginalized, sometimes mentioned explicitly or implicitly.
- 3 = equity is acknowledged or in process of acknowledgement. Most often is mentioned implicitly in papers.
- 4 = community is aware of everyone in the community. Almost everybody participate in community’s activity with one way or another.
- 5 = people aware of everyone in the community. If there is certain group marginalized, others will ask them to participate in communities’ activity.