

PAPER • OPEN ACCESS

## Levelling up the collaborative forest management in Indonesia: a review

To cite this article: Desmiwati and F Y Christian 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **285** 012008

View the [article online](#) for updates and enhancements.

# Levelling up the collaborative forest management in Indonesia: a review

Desmiwati<sup>1\*</sup>, F Y Christian<sup>2</sup>

<sup>1</sup> Forest Tree Seed Technology Research and Development Center. Jl. Pakuan  
Ciheuleut, PO. BOX 105 Bogor 16001

<sup>2</sup> Center of Coastal and Marine Resources Studies-Bogor Agricultural University

\*Corresponding author: desmiwati.wong@gmail.com

**Abstract.** Forestry-related conflict in Indonesia urgently requires a solution, and regional authority has failed to protect forest areas. This failure rooted on the unequal power relations and the discourse applied in governing the forest area. "Collaboration" only exists superficially. The ongoing narration shows that the management of forest resources became the arena of contestation, not for collaboration. Bureaucracy rises with policy and legal narration, private corporations rise with growth and welfare narration, and communities rise with resistance and exclusion narration. The respective narration is diametrically negating and compete to dominate each other, resulting the practice of "legal not legitimate" and "illegal but authentic" on the other side. Starting with that issue, the concept of Collaborative Management's effectiveness should be levelled up through devolution based on local-users in a polycentric system. These three steps of the policy development are: 1) the formulation of collective narration based on knowledge and local multi-stakeholders discourse; 2) the creation of local actor web as authentic resource users, and 3) institutionalisation of forest resources management and the local resource mobilisation.

## 1. Introduction

After Reformation in 1998, forestry conflicts in Indonesia increased both by quantitative and qualitative measures. Based on Forest Watch Indonesia (FWI) and the Center for International Forestry Research (CIFOR) data, since 1997-2003, 359 cases of forest conflict occurred, most cases in East Kalimantan, followed by Central Java, North Sumatra and West Java [1]. In the post reform period, forestry conflict rose substantially from 1997, from 14 cases to 53 cases in 2000. Of the total conflict, 39% were in HTI (Industrial Plantation Forest), 27% in the concessions area (HPH) and 34% in the conservation area.

The amount of conflict is a legacy of forest management discourse that never changes. There is a constellation and informal web that uses formal instruments of the state to run the practice of control over resources called "Legal Not Legitimate" (LTL) or insecure property rights. This discourse claims the right is legal by rules and formal procedures but not acknowledged by the local community [2]; [3]. This situation rises the dispute and conflict in the field [4]. Meanwhile, from the public perspective, practice "Not Legal, but Real" exists and considered legitimate by policymakers. Therefore, a breakthrough needed in forest management within the framework to restore the policy narrative of forest resource management to ensures its sustainability in the long-term period ecologically, economically,



and socially for by putting revolution on the institutional aspects of Collaborative Forest Management [5]. The collaborative approach itself is not new, because it has been practice in Indonesia since the 1970s. But observing the numbers of forestry conflict, the researchers found it necessary to conduct a study on the evaluation of the implementation of collaborative management conducted in Indonesia.

This research examines the effectiveness of the collaborative forest management implementation in Indonesia, identifies where gaps still exists, and in which part of the effectiveness of collaborative forest management can be improved. The purpose of this study is to provide input for policy makers and advocates of community-based forest management, as well as grass-roots agencies of forest resources users by providing a conceptual analysis of lessons-learned from the implementation of collaborative forest management.

## 2. Methodology

This study uses literature based on cases of forestry collaboration that have been published. There are ten cases of collaborative forest management used in this review. Prior to the review, it is necessary to convey the analytical approach used in approaching those cases, and to measure the achievement of the indicators. We used two descriptive analytic tools as comparative material on the achievement. The tools are:

### 2.1. Collaborative Forest Management Policy in Indonesia

The emergence of policy on forest resources starting with Law No. 5 of 1960 on the Basic Regulation of Agraria, Law No. 41 of 1999 on Forestry and Forestry Minister Regulation P.19/Menhut-II/2004 on collaborative management of Natural Reserve and Conservation Area. Law No. 5 of 1960 declared the state's relationship with the resources through the concept of rights to control over resources. The state receives the mandate to make policy, make arrangements, maintenance, management, and supervision over resources for the purpose of the people's prosperity. However, in 1967 (Law No. 5 of 1967 on Basic Principles of Forestry, Article 2) the government included a justification where the state can own the land that used for state revenues, based on property rights as the basis for the statement of state ownership. With this tool, countries can claim the area and exclude local communities from their communal forests which had been taken as their common-property which is not based on formal property rights.

Law 41 of 1999 on Forestry is a second step for territorialisation phase where the state defines the zonation, create maps, and put boundary and get rid of those considered does not have the right [6]. Just in 2004 through the Forestry Ministry Law No P.19/Menhut-II/2004 on Collaborative Management of Natural Reserve and Conservation Areas, the term "collaboration" is defined as the process of cooperation undertaken by the parties to the agreement on the basis of principles of mutual respect, mutual respect, mutual trust and mutual benefit. However, the "collaboration" in this regulation intrinsically only an "add-on" or additional argument for conservation by the state. Definition of "collaboration" does not include the indicator of a collaboration, even the "collaboration" narrated merely as attachment for program implementation within a certain time limit.

### 2.2. Adaptive Co-Management Approach

In [7] co-management has many facets that can be used as indicators of collaborative management achievement in Indonesia. The facets are the division of power/authority, institutional development, as social capital and the trust maintenance, as a process, as a problem solver, and as governance. When these six facets have been achieved in implementation, all parties were ready to undertake collaborative forest management. In addition, there are criteria and indicators to evaluate the implementation of forest management in Indonesia. These criteria were developed by the Center for International Forestry Research (CIFOR) in 2003 (see [8]) as three categories of a sustainable forest management:

- 1) The social process, shows the extent to which the quality of articulation and communication, as well as the level of integration and collaborative action.

- 2) Management of natural resources in an adaptive way, this indicate the level of planning, implementation, monitoring and adjustments made in managing forest resources. Included here is a personal, ecological, technical and finance capacity to carry out sustainable management.
- 3) Impact of /condition of collaboration and adaptive management of resources, it shows the expected impact of collaborative and adaptive management and how collaborative and adaptive management is applied.

### 3. Results and Discussions

#### 3.1. *Between collaboration and participation*

“Collaboration” by [9] is defined as the process by which many people look at a problem with a lot of diverse perspectives so that they can be used constructively to solve existing problems, which go beyond the limitations of each party's vision. In “collaboration” there is the division of responsibility and interdependence [10] so that many people can work together, share information and perceptions, authority and responsibility to improve the quality of planning and decision-making [11]. Thus “collaboration” is not limited to the participation as frequently occurs in a program implementation, a collaboration requires the high level of participation of diverse social groups and institutions in an equal position to share information, authority and responsibility by face to face, so that a form called “collaboration” actually is a network, working groups or partnerships, not in the relation between patron-client or donor-implementing that can be said only as “participation”. Nevertheless, participation is a ladder toward collaboration which at least consist of four levels starting from the lowest type namely a network, the type of dialogue or forum of communication group, type of working group, and the strongest are partnership [12].

Forest collaborative management has a lot of definitions that depart from the need for restrictions on bureaucratic control [13] as well as the involvement of science [14] or the distribution of rights and responsibilities between the government and society. According to [7] collaborative management can be applied in the form of integration between conservation and development, management of resources in a participatory manner, participatory studies, decentralization and devolution, community-based natural resource management, and joint management by the public and the government, which in finally got the formal position within the relation of state and public institutions [15].

#### 3.2. *Evolution of Collaborative Forest Management in Indonesia*

Conception of collaborative forest management in Indonesia has lasted for more than thirty years, when the government started to involve communities in forest management. Although initially the form of community involvement is merely by invitation, collaborative management evolved through a series of policies [16]. The 1970s model of social forestry sought to improve the socio-economic conditions of local communities by granting communities the ability to plant the non-timber crops between teak trees planted by Perhutani (state forestry corporation operating in Java); access is the point that emerged in this era. In the next era of community based forest management in Indonesia, participation came in the form of Forest Village Community Development (PMDH) or Community Forest (HKM), where communities can use forests that have been degraded, even though the authority to revoke the rights remained in government hands. Forest use rights were fully titled by communities in 1998, finally recognizing indigenous peoples' right to manage and to use forests. This first occurred in Krui, West Lampung [4]. Thus, the second stage in the evolution of collaborative forest management represents community-based forest management. The third stage is delegating authority for the community in decision-making in forest management as well as the involvement of other stakeholders. This third stage raises other challenges, namely the fragmentation of interest groups in the forest and remaining property rights-based institutions often strengthens the position of official state managers and private land holders over communities [16].

Further, the policy on collaborative forest management in Indonesia remains limited to natural reserve and conservation areas, leaving out Natural Forest Production lands [17]. This indicates a lack

of trust in communities by the state. There remains a discourse that welfare is a tool to prevent (poor) communities from damaging protected areas; this discourse discourages collaborative forest management. This conception is in accordance with *environmental orthodox* term by [18] which considers local communities as actors who often damage the natural world.

Perhaps the most deep-seated barrier to collaborative management in Indonesia is the inherited colonial tradition. This tradition politicizes natural resource management, erasing a prevailing neutral orientation in the management of natural resources because natural resource management is a result of a politicized environment that involves many actors with their own interests at local, regional, and global scales. In the context of the Global South, there is a tendency for ecological policy to be inextricably connected to the unequal relationship between state, society and the environment itself [19]. In the Global South, forest resources are viewed from two angles: *First*, conservation is part of the economic growth trade-off, but can override aspects of social justice. *Second*, the use of categorization as "owner" and "user" within the framework of property rights automatically creates gaps because differentiating institutions based on rights and no-rights would hinder the emergence of equal power. As a consequence, the meaning of the collaboration will be reduced to "participation" or "attending."

### 3.3. Review of the Implementation of Collaborative Forest Management

From a study conducted of ten manuscripts regarding the case of collaborative forest management, there are some indications useful for looking up which level of Indonesian collaborative forest management is being practiced. Using the analytical adaptive co-management framework [8]; [7] can identify feedback to improve the effectiveness of Collaborative Forest Management in Indonesia.

In the case of National Parks Bantimurung Bulusaraung (TN Babul) in Makassar, South Sulawesi, collaborative forest management encountered problems such as the disfunction of organizational networks among stakeholders, especially among community near TN Babul [20]. Moreover, there is highly potential for conflict because the TN Babul took the land previously managed as farming and residential areas by community. The problem of conflict of interest that leads to a diametrically conflicts also occur between Cenderawasih Bay National Park (TNTC), West Papua with the communities around national parks [21]. In the Halimun Salak Mountain National Park (TNGHS), West Java, collaboration is more advanced in practice. Here, collaboration is characterized by the existence of community organizations who participate in co-management in terms of ecotourism development. The division of powers remains, thus the collaboration is still limited in implementation phase. Community monitoring and evaluation process have not been started, so in the process of implementation in the field there are no lessons to be drawn. Community institutions are still weak and, coupled with a lack of adequate understanding of its role in the collaborative management, the national park staff raises additional difficulties. Community groups are expecting an agreement review conducted between TNGHS with the community by involving more stakeholders, strengthening institutional capacities in the community and create a legal justification to accommodate existing agreements so that it can be a binding all parties in governance [22].

The problem of the absence of mechanism for mutual learning among stakeholders occurred in Sentarum National Park (TNDS), West Kalimantan. This problem occurred because of low willingness and motivation among its stakeholders, a lack of information sharing, as well as cost and time to develop collaboration because the communication among stakeholders itself is rare indeed. Communication is performed informally and is not institutionalized [23]. Institutional problems also occur in the National Park area of Rawaopu Watumohai (TNRW) Southeast Sulawesi. In TNRW there are problems involving a commitment agreed upon by the district government, provincial government, NGOs, the National Park Authority and community organizations. Despite wide agreement—both with and without a MoU—there was ineffective practice that did not result in community-level monitoring and patrolling. Further, no institutions responded to the complaint and the violation of the agreement [24].

In Kutai National Park (TNK), East Kalimantan and Ujung Kulon National Park (TNUK), Banten there is emergence the issues of program-dependency. In TNK the community is involved in a

collaborative endeavor as participants in a corporate program [25] while in TNUK community is involved as a participant in a program under the national park office [26]. Besides institutional issues that have not appeared in this location, community participation is limited and does not encourage an third level collaboration.

Implementation of the collaboration that has the greatest potential appears in PHAPL (Management of Natural Production Forest) Katingan, Central Kalimantan where the community and the forest department manages certified wood together in a production forest [17]. In TN Kayan Mentarang (TNKM) East Kalimantan they combine the management of national parks with traditional institutions (*adat*) and arrangement of boundaries together [27] while in PHBM (Community Based Forest Management) Kuningan and Majalengka, West Java shows the level of implementation is quite high, but at the level of planning and monitoring still reaching on a medium level scale [28].

The ten cases demonstrate a trend: the implementation of the collaboration in the area of the National Park does not provide evidence of effective collaboration except in the case of Kayan Mentarang National Park (TNKM), East Kalimantan. While of collaboration is implemented outside the region is categorized as protected area is relatively successful, resulting in potential collaborations. Table 1 provides information on all cases summarized here, based on achievement indicators according to the conception of the policy of national legislation, adaptive co-management approach by [7] as well as categories and indicators of sustainability from [8].

**Table 1.** Achievement collaboration based indicators

Location	Forestry Ministry Law P.19/2004	ACM Berkes et al 2009	Sustainability Indicators Pokorny et al 2003
TN Bantimurung 2015	+	-	-
TN G Halimun Salak	+	-	-
TN Danau Sentarum	-	-	-
TN Rawaopu Watumohai	-	-	-
TN Bantimurung 2011	-	-	-
TN Kutai	-	-	-
PHAPL Katingan	+	-/+	+
TN Ujung Kulon	+	-	-
TN Teluk Cenderawasih	-	-	-
TN Kayan Mentarang	+	+	-/+
PHBMKuningan/Majalengka	+	+	+

Source: Processed Data

Information:

- Not found
- + Found indication of collaboration
- /+ Found some elements of collaboration and potential for development

Table 1 indicates that the output of the collaboration, when using indicators of Forestry Minister Law P.19 2004, is that many projects are still unable to achieve “collaboration” due to the difficulty on creating a relationship based on trust and shared benefits. In the indicator of achievement from the six faces of collaboration from [7] there remains an absence of power sharing and lack of contribution to the development of local institutions. Meanwhile, on indicators of sustainability, challenges arise from the weak articulation of communication and integration, lack of technical capacity and governance.

### 3.4. Lesson from other countries

In general, achievement of ideal collaborative management did not demonstrate effective and sustainable impact on the social, economic and ecological outcomes. Learning from good practices in

forestry and fisheries from other countries ([29]; [30]; [31]; [32]; [33]), there are some points that can be a good lesson to improve the quality of collaborative management in Indonesia. These points are:

- 1) Although the state is an institution that holds the authority of forest tenure, devolution does not mean reducing the power of the state in managing forest [30]. Basically, the legitimation over tenure is the result of negotiations and bargaining of power, thus the diversity of stakeholders in the collaboration are not in a subordinate position but a continuous negotiations and the balance of power ([34]; [29]; [33]).
- 2) It is a good lesson to distribute authority for every stakeholder to access the forests and recognize the community tenure right as a common-property, while the terms and agreement on controls are at the level of collaboration norm [32]. Resources can be better managed when the local beneficiaries and other stakeholders are fully involved in resource management and use rights are recognized individually and collectively [35].
- 3) Implementation of the management of collaborative forest must run consistently from beginning through the handover of responsibility and power of forest use such as Community Forestry in Nepal [36] and Community-based Forest Management in Phillipine [31]. Furthermore but related, the implementation of the collaboration must applies as a social learning process so the community has a space of learning in managing forests.
- 4) Recognizing that communities are diverse and not homogeneous, therefore the management of multistakeholder thorough and detailed agenda should be applied so that all interest groups can be met within the framework of ecological balance and the effective collaboration [37].
- 5) A general partnership characterized by a more polycentric approach provides a better guarantee for long-term partnerships and decision-making than the dominant-sub-ordinat partnership, both from the state and the private rights owner. Polycentric partnership itself is defined by Ostrom as an organizational structure with a variety of independent actors cooperate in a specific order under a general nature of working system of [38].

For forestry policy in Indonesia, the crucial point in collaborative management is a balance of power and providing wide access to collective resource utilization in a pattern of non-subordinate partnership. Thus, the points related to power over forest resources as defined in the Basic Agrarian Law (Law Decree No. 5 of 1960) must be incorporated back into forest policy narrative and formalized in a model of collaborative-based forest governance. It is crucial to avoid conflicts between narratives that would preclude any form of collaboration, to avoid the emergence of free-riders who benefit from forest products without the responsibility of restoration, and provide space for legitimate implementation of forest management by local communities. To level up the collaborative forest management, it is possible to create a model of polycentric partnership that centers on the local level, including community, the private sector, non-governmental organizations, and governments at the local level (web of local-based actors), as well as avoiding the concentration of authority in both non-place-based government institutions or private organizations, in order to avoid generalizations and discontinuity of communication in collaborative work. The third suggestion is the institutionalization of collaborative forest management and resource mobilization at the local level and formally design legality and legitimacy for all stakeholders.

#### **4. Conclusions**

Lesson from cases in forest areas that are the object of this research, the effectiveness of collaborative forest management implementation in Indonesia has not reached the three indicators used, namely Forestry Minister Law P.19 Year 2004. Out of ten locations only three that have positive points on the three indicators, namely in PHAPL Katingan, Kayan Mentarang National Park, and PHBM Kuningan/Majalengka achieved optimal effectiveness. Meanwhile the other seven locations do not show integral indicators of effectiveness. The gap in this ineffectiveness lies in several aspects, namely the weak level of trust among forestry stakeholders, the lack of willingness of holders of dominant power to share their power with other parties, the institutional weakness at the local level to function as a

government equivalent partner, weak communication between parties and issues of technical capacity and forestry governance. To improve the gaps above, a new paradigm is needed by the government, where centralization without strong technical capacity and multi-stakeholder governance capabilities, the collaborative forestry management will never be achieved. A policy revolution is needed to devolve power by dividing responsibility and authority and dissolving the structures of domination of one party over another in the dynamics of equal and polycentric type of power because the stakeholders of all forestry sectors in state jurisdiction in Indonesia, are never homogeneous.

## References

- [1] CIFOR 2008 *Adaptive Collaborative Management Can Help Us Cope With Climate Change* (Bogor: InfoBrief CIFOR)
- [2] Erbaugh, J T Nurrochmat D R and Purnomo H 2017 Regulation, formalization, and smallholder timber production in northern Central Java, Indonesia *Agroforestry. Syst.* **91**(5) 867-880
- [3] Nurrochmat D R Dharmawan A H Obidzinski K Dermawan A and Erbaugh J T 2016 Contesting national and international forest regimes: Case of timber legality certification for community forests in Central Java, Indonesia. *Forest. Policy. Econ.* **68** 54-64.
- [4] Kartodiharjo H (ed) 2013 *Kembali ke Jalan Lurus: Kritik Penggunaan Ilmu dan Praktek Kehutanan Indonesia* (Bogor and Yogyakarta: Forci Development IPB and Tanah Air Beta).
- [5] Hidayat H (ed) 2015 *Pengelolaan Hutan Lestari: Partisipasi, Kolaborasi dan Konflik* (Jakarta: Pustaka Obor Indonesia)
- [6] Contreras-Hermosilla A and Fay C 2006 *Memperkokoh pengelolaan Hutan Indonesia melalui pembaruan penguasaan tanah: permasalahan dan kerangka tindakan* (Bogor: World Agroforestry Centre)
- [7] Berkes F 2009 Evolution of co-management: Role of knowledge generation, bridging organization and social learning *J. Environ Manage* **90**(2009) 1692-702
- [8] Pokorny B, Cayres G, Nunes W, Segebart D, Drude R and Steinbrenner M 2003 *Adaptive Collaborative Management: Criteria and Indicator for Assessing Sustainability* (Bogor: Center for International Forestry Research-CIFOR)
- [9] Gray B 1989 *Finding Common Ground for Multy-party Problems* (San Fransisco: Jossey-Bass)
- [10] Chrislip D and Larson C 1994 *Collaborative Leadership: How Citizens and Civic Leaders Can Make a Difference* (San Fransisco: Jossey-Bass)
- [11] Moote A 2006 *Collaborative Forest Management: Policy and Practice* (Northern Arizona University: Ecological Restoration Institute)
- [12] Moote A and Lowe K 2005 *Collaborative Resource Management*, Unpublished manuscript (Flagstaff: Ecological Restoration Institute)
- [13] Holling C S and Meffe G K 1996 Command and control and the pathology of natural resource management *Conserv. Biol.* **10**(2) 328-337.
- [14] Allen T F H, Tainter J A, Pires J C, and Hoekstra T W 2001 Dragnet ecology – “Just the facts, Ma’am”: The privilege of science in a postmodern world *Bioscience.* **51**(6) 475-485
- [15] Armitage D, Berkes F and Doubleday N (Ed) 2007 *Adaptive Co-Management: Collaboration, Learning, and Multi-level Governance* (Vancouver: University of British Columbia Press)
- [16] Kusumanto T, Yuliani E L, Macoun P, Indriatmoko Y and Adnan H 2006 *Belajar Beradaptasi: Bersama-sama mengelola hutan di Indonesia* (Bogor: CIFOR, YGB, PSHK-ODA)
- [17] Siagian H 2015 *Kolaborasi Antar Pemangku Kepentingan: Pengelolaan Hutan di Kabupaten Katingan*, ed Hidayat H *Pengelolaan Hutan Lestari: Partisipasi, Kolaborasi dan Konflik* (Jakarta: Yayasan Pustaka Obor)
- [18] Forsyth T 2003 *Critical Political Ecology: The Politics of environmental science* (London and New York: Routledge)
- [19] Bryant R L and Bailey S 1997 *Third World Political Ecology* (London and New York: Routledge)



- [20] Wakka A K, Muin N and Purwati R 2015 Menuju pengelolaan kolaborasi Taman Nasional Bantimurung, Bulusaraung, Provinsi Sulawesi Selatan *J. Penelitian, Kehutanan, Wallacea*, **4(1)** 41-50
- [21] Winama A and Mukhtar A S 2011 Potensi Kolaborasi dalam Pengelolaan Taman Nasional Teluk Cenderawasih *J. Penelitian. Hutan. Dan. Konservasi. Alam.* **8(3)** 217-226
- [22] Wulandari 2011 *Implementasi Manajemen Kolaboratif dalam Pengelolaan Ekowisata berbasis Masyarakat, Studi Kasus Kampung Citalahab Sentral-Cikaniki, Taman Nasional Gunung Halimun Salak, Kabupaten Sukabumi, Jawa Barat* (Bogor: Department of Communication Science and Community Development IPB)
- [23] Anshari G Z 2006 *Dapatkah Pengelolaan Kolaboratif Menyelamatkan Taman Nasional Danau Sentarum* (Bogor: CIFOR)
- [24] Kasim S 2008 Analisis Efektivitas Manajemen Kolaborasi dalam Pengelolaan Hutan Lestari: Studi Kasus Pengelolaan Taman Nasional Rawaopa Watumohai (TNRAW) *Agriplus* **18(1)** 60-65
- [25] Haba J 2015 *Pengelolaan Hutan secara Kolaboratif: Kabupaten Kutai Timur, Kalimantan Timur*, ed Hidayat H, *Pengelolaan Hutan Lestari: Partisipasi, Kolaborasi dan Konflik* Yayasan (Jakarta: Pusataka Obor Indonesia)
- [26] Suciyanto N 2008 *Evaluasi Desa Model di Taman Nasional Ujung Kulon: Studi Kasus Desa Tamanjaya* (Bogor: Department of Forest Resource Conservation and Ecotourism IPB)
- [27] GTZ (Gesellschaft für Technische Zusammenarbeit) 2009 *Menuju Manajemen Kolaborasi di Taman Nasional Kayan Mentarang* Briefing (Jakarta: Forest and Climate Change Programe)
- [28] Theresia C P 2008 *Efektivitas Pengelolaan Hutan Kolaboratif antara Masyarakat dengan Perum Perhutani: Kasus PHBM di KPH Kuningan dan KPH Majalengka Perum Perhutani Unit III Jawa Barat* (Bogor: Department of Forest Management IPB)
- [29] Carlsson L 2001 *Keeping away from the Leviathan: The Case of the Swedish Forest Commons. Management of Social Transformation* (New York: Unesco)
- [30] Cronkleton P, Pulhin J M and Saigal S 2012 Co-management in Community Forestry: How the partial devolution in Management Rights Creates Challenges for Forest Communities *Conserv. Soc.* **10(2)** 91-102
- [31] Umali R M and Agaloos Jr B 2008 *Collaborative Forest Management in a Sustainable Development Unit* (Manila: ITTO Tropical Forest)
- [32] Jumbe C B L and Angelsen A 2006 *Forest Dependence and Participation In Forest Co-Management in Malawi* (Bali: the 11<sup>th</sup> Biennial Conference of the International Association for the Study of Common Property-IASCP)
- [33] Fleishman R 2006 Co-management as a Solution to the “Tragedy of the Commons”? Lessons from Thai Fisheries *J. Dev. Soc. Transform.* **1** 46-56
- [34] Borrini-Feyerabend G, Farvar M T, Nguinguiri J C, and Ndangang V A 2000 *Co-Management of Natural Resources: Organising, Negotiating and Learning by Doing* (Heidelberg: Kasperek Verlag)
- [35] Pomeroy R 2013 *Devolution and Fisheries Co-Management* (Washington D.C: World Resource Institute)
- [36] McDougall O H, Pandey R J, Banjade M and Pandit H 2007 *Enhancing Adaptiveness and Collaboration in Community Forestry in Nepal: Reflections from Participatory Action Research*, ed Fisher R, Prabhu R and McDougall C, *Adaptive Collaborative Management of Community Forestry in Asia: Experiences from Nepal, Indonesia and Philippines* (Bogor: CIFOR)
- [37] Ostrom E 2005 *Understanding Institutional Diversity* (New Jersey: Princeton University Press)
- [38] Araral E and Hartley K 2013 *Polycentric Governance for a New Environmental Regime: Theoretical Frontiers in Policy Reform and the Environment* (Lower Kent Ridge Rd: National University of Singapore)