Master's Thesis

Place attachment, community attachment, and local people's support for peat land REDD+ project in Indonesia

인니 이탄지 REDD+ 사업에서의 장소애착, 공동체 애착과 지역 주민의 지지

August 2016

Department of Forest Sciences
Seoul National University
Forest Environmental Science Major

Kim Dong-hwan

Place attachment, community attachment, and local people's support for peat land REDD+ project in Indonesia

Under the Supervision of Professor Seong-il Kim

Submitting a master's thesis

August 2016

Department of Forest Sciences
Seoul National University
Forest Environmental Science Major

Kim Dong-hwan

Confirming the master's thesis written by
Kim Dong-hwan
August 2016

Chair	Youn Yeo-Chang (Seal)
Vice Chair	Seong-il Kim (Seal)
Examiner	Hong Sok (Brian) Kim (Seal)

Abstract

Understanding local people's attitude toward development of REDD+ project is important because the goal of REDD+ cannot be achieved without supports and participation of local people. This study was conducted for a peat land REDD+ project in Sumatra, Indonesia, to test relations among place attachment, community attachment and local peoples' attitude to support a REDD+ project. Two hundred seventy five sets of data was collected from households around project area through household survey, and used for the analysis. Structural equation analysis was carried out to test a model with the variables. Moderating effect of forest-income dependence was also analyzed by dividing households into two groups, whether they get income from REDD+ project area, or not. Being mostly indigenous people, the respondents showed consistent community attachment and place attachment on project area. In the model, both place attachment and community attachment were statistically significantly related, but only place attachment showed influence on local people's attitude to support the project. The moderating effect of forest-income dependence was not significant. However, it was found that forest-income gaining group has more experiences of compensations, provided by project, than the other group. It is concluded that place attachment has a significant relationship with, and can be a predictor of, local people's attitude to support REDD+ project, if local people feel attachment on their community, and are

compensated for project disadvantages. To motivate and keep local people to support REDD+ projects, it is important to well define and inform disadvantages of and compensation by the projects to local communities..

Keyword: REDD+, local participation, pro-environmental behavior, place attachment, community attachment

Student Number: 2014-22818

Table of Contents

List of Figures

List of Tables

Chapter 1. Introduction

1.1. Study background

The importance of REDD+ (Reducing Emissions from Deforestation and forest Degradation, plus the conservation and enhancement of carbon stocks and the sustainable management of forests) for fighting climate change has been reconfirmed by the adoption of the Paris Agreement in UNFCCC COP-21, 2015. Although there are several technical and institutional challenges to be solved (Angelsen, 2008), REDD+ has been considered as an effective mean to mitigate climate change (Parry et al., 2007; Stern, 2007; Eliasch, 2008). According to Stern Review (2007), “curbing deforestation is a highly cost-effective way of reducing greenhouse gas emissions and has the potential to offer significant reductions fairly quickly.” To keep the rise in temperature well below 2°C, REDD+ has possibility to provide significant contribution to emissions reduction and removal since “deforestation and forest degradation account for nearly 20% of global greenhouse gas emissions, second only to energy sector”(UN-REDD, 2016). After adoption of the Cancun Agreements (COP-16), which developed REDD into REDD+, REDD+ has been received more attention because of its potential to achieve multiple-benefits including mitigation of climate change, alleviation of poverty, and conservation of biodiversity and natural habitats (UNFCCC, 2011).

1.2. Rationale of study

Although REDD+ would be able to contribute significantly to mitigation of global climate change, it contains several uncertainties which should be solved to fulfill the expectations. As a type of forest carbon projects, REDD+ has a great many risks to be solved. The risks can be distinguished into “classic” risk, which are inherent to ordinary carbon projects, and “forest carbon” risk, which are specific to forest carbon projects (Chenost & Gardette, 2010). Among the forest carbon risks, non-permanence of the emissions reductions and removals through the forest project is one of the most critical problem (Chenost & Gardette; 2010; Pamler, 2011). The non-permanence can be caused by both anthropogenic and natural causes in REDD+, and it can cause reversal in the projects, which may results the project failure.

Sustainable management of REDD+ project by reducing non-permanence risk is essential to achieve the goals of the project, and such management cannot be made without the supports of local people. Daviet et al. (2011) expected that “if a post-2012 climate regime is to be effective, local participation represents the most important pillar of any global forest protection mechanism” because of the advantages it provides for REDD+ implementation and management. In addition, due to the lack of legitimacy

of government's forest rules in local level, participation of indigenous and local populations on designing and implementing REDD+ is significant (Skutsch & Van Laake, 2008).

In order to prevent, mitigate negative impacts of REDD+ on local communities and environments, various safeguards initiatives for REDD+ have been developed, and it covers several measures to guarantee full and effective local participation (Moss & Nussbaum 2011; McDermott et al. 2012). However, critics suggest that REDD+ may not generate improvements for local participation, and Krause, Collen, & Nicholas (2013) note that "even though the terms of the program required a community involvement, the majority of the respondents did not participate the project properly", and highlight the need of improvements to enhance local engagement.

The importance of local communities supports for successful management of natural resources and environment has been also studied in researches on national parks and protected areas (Andrade & Rhodes, 2012; Barkin & Bouchez, 2002). To draw out managerial implications, the studies focused on understanding local people's intention to protect natural resources, using the concept of place attachment and community attachment (Trentleman, 2009; Cheng & Monroe, 2012; Davis, Green & Reed, 2009; Mesch & Manor, 1998). Authors revealed that people show tendency to protect the place, where they are emotionally tied (Bonaiuto et al, 2002;

Halpenny, 2010) and the community attachment also should be considered since it enhances the inclinations by catalyzing development of the place attachment (Sampson and Goodrich, 2009; Stedman, 2003).

1.3. Research objective

To achieve the goals of the REDD+, the project should be well-designed to strengthen inclusive participation (Krause, Collen, & Nicholas, 2013), and understanding local people's intention to support REDD+ might be the first step as a bottom-up approach for the improvement. Thus, focusing on the importance of local participation on the REDD+ and better understanding of the local people's participatory intention, this study explores the role of place attachment and community attachment on the local people's support for the REDD+.

Chapter 2. Literature review

2.1. REDD+ mechanism

REDD+ could be acknowledged as a suitable mechanism for mitigation of climate change after continuous discussions and development for the mechanism since the adoption of the Kyoto Protocol in 1997. The importance of the protection and enhancement of sustainable forests management and relative activities were referred in Article 2 of Kyoto Protocol (UNFCCC, 1997). Although deforestation and forest degradation were acknowledged as important issues related to land use for climate change mitigation, they were excluded from the decision because the MRV(measurement, reporting and verification) of the REDD+ was not ready to be carried out (Carbon Planet, 2009) and concerns about leakage, permanence, and additionality (Carbon Planet, 2009; Transparency international, 2012). In COP-11, 2005, however, the Parties support and agreed on the importance of reducing emissions from deforestation (RED) in developing countries to mitigate climate change. In COP-13 (2007) the need to reduce forest degradation, which was found to be more threatening than deforestation, was also affirmed, and the Bali Action Plan stated the need of a comprehensive efforts for climate change mitigation including

REDD in developing countries (UNFCCC, 2008). Finally, by the adoption of Cancun Agreements, REDD has become REDD+ and includes additional components; Reducing emissions from forest degradation; Conservation of forest carbon stocks; Sustainable management of forests; Enhancement of forest carbon stocks.

As REDD become REDD+, it gained more attention since the mechanism gains potential to achieve multiple benefits more than carbon, including poverty alleviation, biodiversity conservation, and sustainable management of ecosystem services (UNFCCC, 2012). In COP-21, 2015, the significance of REDD+ was reconfirmed by the adoption of the Paris Agreement. According to the agreement, the parties are to conserve and enhance sinks and reservoirs of greenhouse gas including forest, and to support REDD+ in developing countries through 'results-based payments' (UNFCCC, 2015).

In Article 5 of Paris Agreement (2015), the importance of forest and REDD+ has been discussed:

> "Parties should take action to conserve and enhance… sinks and reservoirs of greenhouse gases… including forests [5:1]. Parties are encouraged to take action to implement and support, including

through results-based payments, … for policy approaches and positive incentives for activities relating to (REDD+) [5:2].”

Since all parties are to undertake efforts to mitigate climate change by adoption of the Paris Agreement, and to take action to conserve and enhance forests, REDD+ is expected to be more vitalized in tropical developing countries.

2.2. Local participation for REDD+

2.2.1. Importance of local participation for REDD+

The importance of local participation on REDD+ has been noted by previous studies and discussed by parties of UNFCCC (Krause, Collen, & Nicholas, 2013). The local engagement on REDD+ is critical because (1) rules for forest protection by the central government often failed to apply at the local level, (2) the REDD project management can be benefited significantly with indigenous participation, and (3) texts of UNFCCC recognized and requires to include local communities on designing and implement of the REDD for sustainable management of forests.

Without engagement and support of the local communities, REDD would not be able to be implemented (Skutsch & Van Laake 2008; Nelson & Chomitz, 2009). It is common that rules imposed from above have little legitimacy and the government does not have resources to enforce them. Skutsch & Van Laake (2008) noted that building strength on community management and responsibilities by inclusion of local people on REDD project is important because it can make up for the failures of the forest protection rules from above. In addition, the local participation becomes more important when the indigenous people possess broad forest areas, since their forests are often under pressure of conversion rapidly (Nelson & Chomitz, 2009). In Brazil, for example, indigenous lands found to have

large contribution to REDD because they cover three times the area and are often in the path of land use conversion (Ricketts et al. 2010).

The advantages on REDD+ implementation brought by local participation also explains significance of local engagement. The inclusion of local communities in REDD+ project may make the local people to share responsibilities and collaborate for the project, and this would provide advantages on REDD+ implementation (Foti et al., 2008). Since result-based payment for emissions reduction/removal is the major premise of REDD+ (UNFCCC, 2015), maintaining the quality and costs of MRV is important. Local communities and forest users engaged in the REDD+ helped reducing the cost of project implementation including monitoring, and strengthened the monitoring abilities on the areas difficult to access (Daviet et al. 2011; Skutsch & Van Laake 2008).

The importance of local and indigenous participation has been recognized by the parties of UNFCCC, and several UNFCCC texts have been elaborated for it. In the Bali Action Plan, parties noted the need to engage stakeholders in development and implementation of REDD and at the COP 14, “(r)ecognizing the need to promote the full and effective participation of indigenous people and local communities, taking into account national circumstances and noting relevant international agreements” was found to be important by the parties (Daviet et al., 2011). At COP 16 in Cancun, the needs to promote and support the REDD+ safeguards should were claimed

by the parties, and the claim is effective on REDD+ policies at any level (FCPF & UN-REDD, 2011).

2.2.2. REDD+ Safeguards and local participation

The attempts to guarantee full and effective participation of local communities and indigenous people have been tried by preparation and implementation of REDD safeguards (McDermott et al. 2012; Ahrin, 2014). The main goal of the safeguards is to prevent and to reduce negative social and environmental effects by the REDD, and it contains several guidelines to guarantee local participation.

Various safeguard initiatives for REDD+ project have been developed (Moss and Nussbaum 2011; McDermott et al., 2012; Ahrin, 2014) by several organizations such as UN-REDD Proagramme (UN-REDD, 2011), the Forest Carbon Partnership Facility (FCPF) (FCPF 2011) (Table. 1). It has been anticipated that the full and effective participation would be achieved with the safeguards, however, only a few studies have analyzed how the social safeguards achieved in practice (Corbera et al., 2007; Krause, Collen, & Nicholas, 2013). In addition, the lack of rigor of researches to assess the influences of REDD projects (Caplow et al., 2011), makes it difficult to judge whether the safeguards worked properly as we anticipate. According to the research of Krause, Collen, & Nicholas (2013), the local

participation was not fully achieved as the safeguard, and the need to strengthen the local engagement in the project was emphasized.

Table 1. Various REDD+ safeguards and social goals (Modified from Ahrin, 2014).

Goal	Cancun Safeguards	FCPF	FIP	UN-REDD	GEF	REDD+ SES	CCB Standards	VCS
Policies, laws and regulations should be consistent with international and national policies	√	√	√	√	√	√	√	√
Protecting rights of vulnerable and marginalized groups such as indigenous people	√	√	√	√	√	√	√	-
Full and effective participation of relevant stakeholders	√	√	√	-	√	√	√	√
Transparent governance and decision-making	√	√	√	√	-	√	√	√
Acquiring free prior and informed consent from local and indigenous communities	√	√	-	√	√	√	√	-
Grievance mechanism to address conflicts and concerns	-	√	√	√	√	√	√	√
Supporting tenure and resource rights of communities	-	√	√	√	-	√	√	√
Enhancing livelihoods through income generation and capacity	-	√	√	√	-	√	√	√
Sharing of Benefits	-	√	√	√	√	√	√	-
Avoided resettlement	-	√	-	√	-	√	√	-

***Acronyms**

FPCF: Forest Carbon Partnership Facility; FIP: Forest Investment Programme; GEF: Global Environment Facility; REDD+ SES : Guidelines on Stakeholder Engagement in REDD+.; CCB Standards: Community, Climate and Biodiversity Standards; VCS: Voluntary Carbon Standard.

2.3. Place and community attachment for res ources management

The issue of local participation for successful management of natural resources is not a new problem, and has been studied in the management of protected areas and national parks. Due to the interactions of local communities with the natural resources through resource uses and familiarity with surrounding environments, the communities adjacent to protected areas and national parks have been recognized to play a crucial role in achieving sustainable management and conservation of the resources (Schelhas et al., 2002; Buta et al., 2014).

Place attachment was found to affect the initiation of community action, (Trentleman, 2009) and community attachment assists the development of place attachment (Hidalgo & Hernandez, 2001; Uzzell, Pol, & Badenas, 2002), researchers have been studied to draw out implications on local community involvement for the resource management improvement with the concepts (Buta et al,, 2014; Bonaiuto, 2002; Halpenny, 2010).

2.3.1 Place attachment

Place attachment is a sense of connection which people can feel to a particular place, and place dependence and place identity are commonly considered as components of the place attachment (Kyle, Bricker, & Greafe, 2004; Williams et al., 1992). As dimensions of place attachment, place dependence explains goal-oriented connections to a certain place, where personal goal can be supported with in, while place identity represents emotional and symbolic connections to a place (Kyle, Bricker, & Greafe, 2004).

Brown et al.(2015) sorted previous studies on place attachment into three groups, first group is studies emphasizing on development of place attachment on individual context, which focused on “emotional connections between an individual and a setting” (Bricker & Kerstetter, 2000; Williams et al., 1992). Second group is studies dealing the development of place attachment in social context, focusing on the connections developed among people in a place with consideration of community place attachment, social bonding (Hammitt, Backlund, & Bixler, 2004). The third stream how the characteristics of physical setting affects the development of personal place attachment (Mayer & Frantz, 2004; Raymond et al., 2010).

For the improvement of natural resources management, the studies of place attachment was focused on both personal and social context, as a part

of the second research group. The studies noted that the development of place attachment on a resource is result of personal interaction with a setting, and social interaction in the setting (Mesch, 1998; Eisenhauer et al, 2006; Buta et al., 2014). The importance of place attachment has been emphasized since previous researches notes that when people are attached to a place, they show attitudes and behaviors to protect the place by supporting resource protection (Stedman, 2003; Cheng & Monroe, 2012, Green & Reed, 2009; Buta et al., 2014).

2.3.2 Community attachment

Community attachment represents residents' emotional connections and investment to their community or locality, and it develops sense of belonging and rootedness (Hummon, 1992). In general, the development of one's community attachment is known to be affected by social characteristics in his or her community, such as residence length, community-activity participation, social connectedness, and socio-demographic characteristics (Brennan, 2007; Trentleman, 2009). However, studies revealed that factors affecting on development of community attachment are not only social factors, but environmental factors (Wilkinson, 1986; Arnberger and Eder, 2012). According the studies, the community attachment appears stronger, if one perceive the natural environment helps development of social integration (Wilkinson, 1986) or has more chance to interact with the natural environment while the community activities occur (Arnberger & Eder, 2012).

According to previous studies, community attachment catalyzes development of place attachment (Hidalgo & Hernandez, 2001; Uzzell, Pol & Badenas, 2002). The positive relationship between the intensity of social ties to a place and emotional attachment to a place was identified (Kyle et al, 2004). Thus, the social environment is important for supports of attachment on certain place (Brown et al, 2003; Hinds & Sparks, 2008). Meanwhile,

according to Brehm, Eisenhauer, & Krannnich (2006), community attachment itself also can be a predictor of local environmental concern, if the environmental issues are related to their community, or inherently 'social'.

2.4. Pro-environmental behaviors

Studies on place attachment and community attachment of local people, which are conducted to understand local engagement on management and protection of natural resources, often considered the local engagement as pro-environmental behavior and concerns (Buta et al., 2014). Pro-environmental behaviors (PEB) can be understood as careful behaviors which to reduce one's negative impacts on structure and system of natural environment, including the choice that directly cause environmental damage (Rosa & Dietz, 1998; Kollmus & Agyeman, 2002)

To understand how PEB is occur, Guagnano et al.(1995) proposed "ABC theory", which formulate "behavior(B) is an interactive product of personal sphere attitudinal variables(A) and contextual factors(C)". It explains that in one's behavior, the relationship of attitudinal variables and contextual factors decides whether the behavior happens or not (Figure 2).

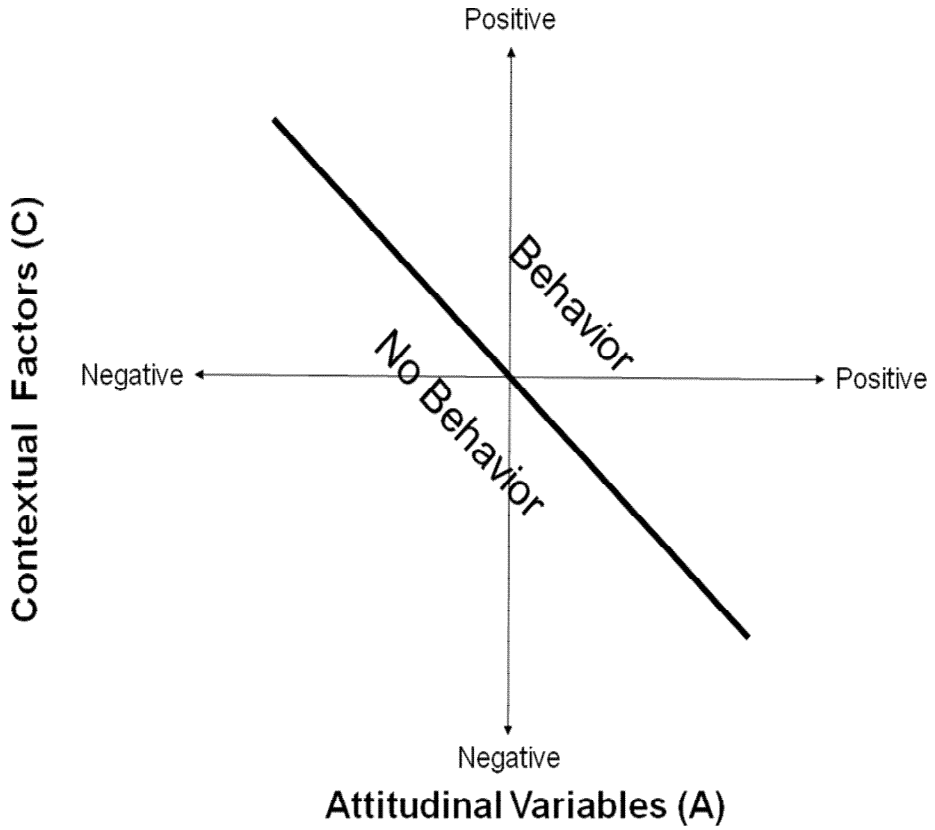

Figure 1. ABC Theory (Modified from Guagnano, Stern, & Dietz, 1995).

Based on the insight of the ABC theory, Stern (2000) classified the causes of PEB into four categories: attitudinal factors, external or contextual forces, personal capabilities, and habit or routine (Table 2). The attitudinal factors includes personal norms, beliefs, and values. The contextual forces contain interpersonal influences, government regulations, monetary incentives and costs, etc. Personal capabilities includes knowledge and skills for the behavior. It have been suggested that the different types of causal variables differently important for certain behaviors, therefore, consideration on only

one type of causal variables may mislead the understanding of the behavior (Stern, 2000).

Table 2. Dimension of causal variables of pro-environmental behavior (Stern, 2000)

Dimension of causal variables	Causal Variables
Attitudinal	• General environmentalist predisposition
	• Behavior-specific norms and belief
	• Non environmental attitudes (e.g., about product attributes)
	• Perceived costs and benefits of action
Contextual factors	• Material costs and rewards
	• Laws and regulations
	• Available technology
	• Social norms and expectations
	• Supportive policies
	• Advertising
Personal Capabilities	• Literacy
	• Social status
	• Financial resources
	• Behavior-specific knowledge and skills
Habit and Routine	• Consumption and use

Chapter 3. Research frame and hypothesis

3.1. Research frame

PEB is an intentionally chosen behavior among behavioral options during pursuing one's goal, to reduce one's negative impacts on natural environment or natural system. In developing countries, local people are often forest-dependent, and this causes significant pressure on degradation and deforestation of the forests. After development of REDD+ project, activities of local people in the forest would be prohibited, but the forest can be protected and better managed. In this study, therefore, local people's supports for REDD+ projects was regarded as a pro-environmental concern.

One's PEB can be caused by attitudinal variables, contextual factors, personal capabilities, habit and routines (Stern, 2000). In order to well expect one's PEB, those 4 dimensions of causal variables should be considered together, and focusing on the only one of the dimensions may lead to misunderstanding the behavior. In this study, among the 4 dimensions of causal variables of PEB, attitudinal and contextual factors were included, as a stepping stone for further research. Place attachment and community attachment represented the attitudinal dimension, while the local people's forest income loss due to the REDD+ project was dealt as a variable of contextual factors.

3.2. Research hypothesis and model

Both place attachment and community attachment are commonly known to have implication for place attachment (Buta et al., 2014), thus those are considered as attitudinal factors of pro-environmental intention in this study. Place attachment is often measured through place dependence and place identity. Place dependence often leads development of place identity; social bonds associated with community attachment are known as catalyst for development of place attachment (Hidalgo & Hernandez, 2001; Uzzell, Pol, & Badenas, 2002), and finally leads to pro-environmental intentions and behavior (Buta et al., 2014).

The following hypothesis were drew based on above arguments (Figure3).

H1. Community attachment is related to place attachment (place dependence)

H2. As components of place attachment, place dependence is related to place identity

H3. Place attachment (place identity) is related to local support for REDD+

H4. Community attachment is related to local support for REDD+

In consideration of relationship between attitudinal factors and contextual

factors for a certain behavior, as explained with “ABC theory“(Guagnano, Stern, & Dietz, 1995) and the needs to understand both attitudinal causal variables and non-attitudinal variables to prevent misunderstanding (Stern, 2000), the forest income loss of local households by the REDD+ was considered as a moderator of the model.

H5. The applicability of the proposed model would be decided by the forest income loss of local households by the REDD+.

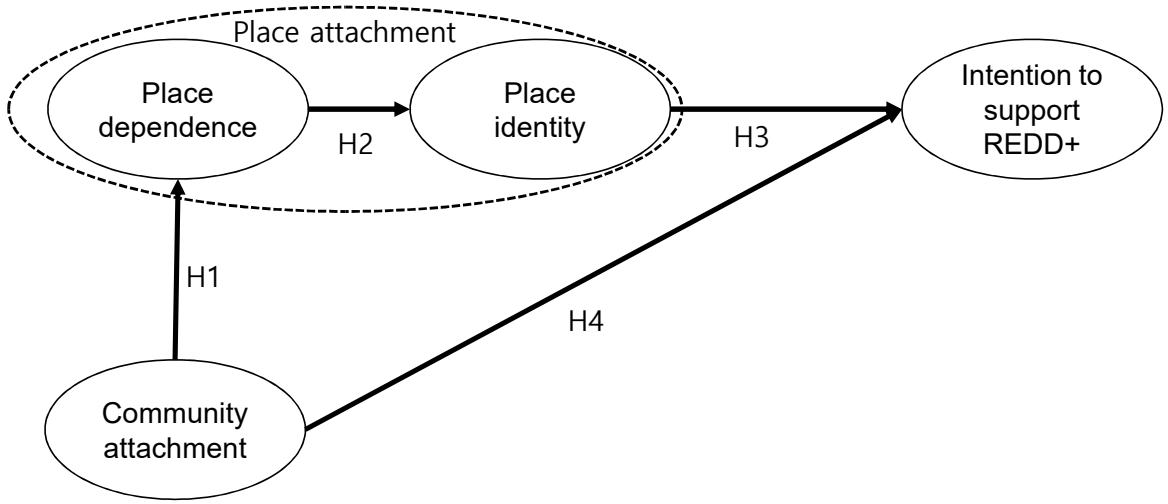

Figure 2. Proposed measurement model for research.

Chapter 4. Methodology

4.1. Description of study area

KPHP Model Tasik Besar Serkap (KPHP TBS), a forest management unit established by Indonesian government, is geographically located in Kampar Peninsula, on the east coast of Riau province, Sumatra (N 00°10’12”~00°43’48”, S 101°55’48” ~ 103°16’12”) (Figure 4). Among 513,276ha of forest area under KPHP TBS, about 14,000ha is under developing for a REDD+ pilot project as a part of Korea-Indonesia FMU/REDD+ Joint project since 2013.

The project area, mostly peat land primeval forests, has high conservation value for both mitigating carbon emissions reduction and biodiversity. Since the majority of project area is peat land forest with peat depth of 10~12.5meters, it is a huge carbon sink reserving 87 million tons of carbon. In addition, it is habitats of endangered flora and fauna species including Sumatran tigers.

However, the project site is under pressure of deforestation and forest degradation because it is surrounded with commercial plantations, primarily palm plantations, and small scale illegal logging and land conversion for agriculture also have been occurred by local communities. Five villages are seemed to be able to affect the project area since the villages are relatively adjacent and have access to the site, and the local people depends on forest

to sustain their livelihoods.

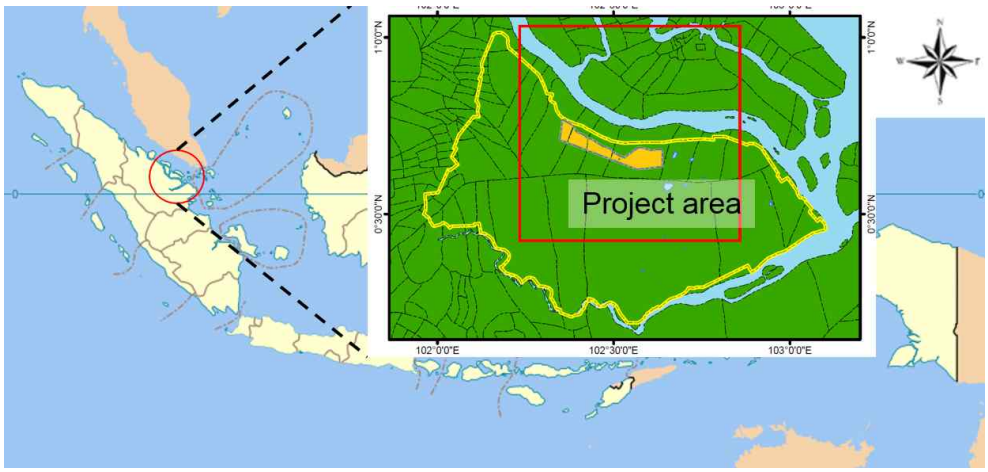

Figure 3. Map of study area.

4.2. Data collection

Data for this study was collected in five villages between 18th to 28th of September, 2015. Among villages in Riau, 5 villages around the REDD+ project area were selected, which have high possibility to influence and be influenced by the project. The five villages selected have 1,921 private households. The data collection was undertaken in two phases. An initial meeting with each leader of villages was arranged to present the objectives of the survey and asked permission to interview community members. After the initial meeting, survey respondents who were sampled to represent the communities participated the survey by gathering in a place, and questionnaires were collected. Since the concept of REDD+, PEB, community attachment and place attachment was unfamiliar to the respondents, several measures were taken to minimize bias and misunderstanding of survey questionnaire items. Before handing out the questionnaire to the respondents, the REDD+ project was carefully explained by professors of Lancang Kuning University and local experts. In addition, surveyors explained and answered the questionnaire items asked by the respondents during the data collection. The person over 18 years old was surveyed. Two hundred seventy-five sets of usable questionnaires were obtained.

4.3. Measurements

The instrument was developed to measure respondents' opinion with a series of questions about community attachment, place attachment, intention to support REDD+, and several socio-demographic characteristics (age, gender, religion, education, occupation, monthly income, length of residence). The instruments were previously employed in other studies and were found to be appropriate for this study. Therefore, the 5 items for the community attachment were adapted from Buta et al. (2014), and measured on a five point Likert scale ranging from strongly disagree (1) to strongly agree (5). In this study, although there are several different views on the structure of place attachment, the attachment was measured through two sub-dimensions: place dependence and place identity (Williams et al., 1992; Buta et al., 2014). Nine items were derived from previous research conducted by Raymond, Brown, & Weber (2010). The respondents' attachment to forests in local area was measured using items on a five point Likert Scale ranging from strongly disagree (1) to strongly agree (5). Scales for measuring local people's intention to support REDD+ were prepared by adapting the related items used in previous studies (Buckley, 2012; Wang & Xu, 2015).

A preliminary survey was carried out before collecting data for reliability and validity assessments of the measurement items. Firstly, a draft

questionnaire was reviewed by professors and revised. The revised questionnaire were translated into Indonesian, and the questionnaire was revised again to fit the study setting and minimize errors in translations that may occur through consultation with local experts. The preliminary survey was conducted on 40 local people in two villages (Desa Sungai Rawa and Desa Rawa Mekar Jaya) to identify reliability and validity of the measurement items. The surveyors carried out face-to-face survey, and randomly selected respondents answered the questionnaire. Finally, the survey questionnaire for this study comprised 27 items (18 for the proposed mode (Table 3)) including respondents' socio-demographic variables (age, gender, religion, education, occupation, monthly income, length of residence) and 2 variables related to compensation (income gain from forest in the project area, and compensation from the project).

Table 3. Description of measurement items (Buta et al, 2014; Buckely, 2012; Wang & Xu, 2015; Raymond, Brown, & Weber, 2010).

Factor	Measurement items	
Community attachment	C1	The associations that I have with other people in this community mean a lot to me
	C2	I feel loyal to the people in this community
	C3	If the people in this community were planning something, I'd think of it as something WE were doing rather than THEY were doing.

	C4	I agree with most people in this community about what is important in life
	C5	I like to think of myself as similar to the people who live in this community
Place attachment (Place dependence)	PD1	No other place can compare the forest on project area
	PD2	I would not substitute any other area for the activities I do in the forest on project area
	PD3	Doing my activities in the forest on project area is more important to me than doing them in any other place
	PD4	The forest on project area is the best place for the activities I like to do
Place attachment (Place identity)	PI1	The forest on project area is very special to me.
	PI2	The forest on project area mean a lot to me
	PI3	I am very attached to the forest on project area.
	PI4	I identify strongly with the forest on project area.
	PI4	Living near forest on project area says a lot about who I am
	PI5	I feel the forest on project area is a part of me
Intention to support REDD+ project	S1	I support the development of Kampar REDD+ project in the region.

	S2	I will follow and support the land use regulation on forest for Kampar REDD+ project.
	S3	My village should participate Kampar REDD+ project in the region.
	S4	I’d like more REDD+ projects implemented near my village.

4.4. Data analysis

The data analysis was conducted for descriptive statistics of the respondents, and SEM analysis to verify proposed model and hypothesis. The analysis was performed with the Statistical Package for the Social Sciences (SPSS) version 22 and Analysis of Moment Structure (AMOS) version 18.

To understand socioeconomic characteristic of the sample, average age, monthly income, occupation, education level, length of residence, of the respondents were analyzed. In addition, to understand the impact of REDD project, whether they got income forest and compensated by the project were also examined.

Structural Equation Modeling (SEM) enables evaluation of the hypothesized relationship between abstract variables by simultaneous testing of relationships multiple independent and dependent variables (Kline, 2005). SEM is composed of structure model and measurement model. The structure model is a model to verify the relationship between latent variables and observed variable, while the measurement model is a theoretically proposed model which explains relationship among the latent variables, verified by the structure model.

In this study, two-step approach analysis was adopted for the SEM analysis. Confirmatory factor analysis (CFA) was conducted to examine the

measurement items and to confirm the relationships among 4 latent variables and 18 observed variables. The construct validity of the structure model, which is prepared through the CFA, was estimated to determine how well the observed variables explains their latent variables (convergent validity) and how well a latent variable is differentiated to the others (discriminant validity) (Gallagher, Ting, & Palmer, 2008, Hox & Bechger, 2007; Anderson & Gerbing, 1988).

Goodness-of-fit (GOF) of the proposed model was calculated to assess the model fit. GOF explains how well the proposed model reproduces the covariance matrix among the measured variables, and acceptable GOF indicates tenability of the suggested relations (Gallagher, Ting, & Palmer, 2008). Absolute indices, relative indices, and parsimony indices are three major groups of GOF, and each indices has criterion for a good fit (Gallagher, Ting, & Palmer, 2008) (Table 4). Absolute indices examines how well the proposed model fits the observed data, and it includes the ratio between Chi-square and degrees of freedom (X^2/df), the Goodness-of-fit (GFI), Roots Mean Squared Residual (RMSR) and, Roots Mean Square Error of Approximation (RMSEA). Relative indices indicates how a proposed model comparatively better fits to the data than a null model, and it includes the Normed Fit Index (NFI), the Incremental Fit Index (ICI), and the Comparative Fix Index (CFI). Parsimony Indices assess the suitability of alternative models, and helps to choose the best model with conciseness,

however, the parsimony indices were not assessed, because it is not related to the goal of this research.

Table 4. Model fit indices and criteria for SEM (Gallagher, Ting, & Palmer, 2008)

	Model fit index	Criteria
Absolute indices	X^2/df	<3.00
	GFI	>0.90
	RMR	<0.05
	RMESA	<0.08
Relative indices	NFI	>0.90
	IFI	>0.90
	CFI	>0.90
Parsimony indices	PGFI	>0.50
	PNFI	>0.50
	PCFI	>0.50
	CN	200

After assessing the GOF, path analysis was conducted among the variables to verify the model and hypothesis. As a final stage of the SEM evaluation, the moderator effect of “forest income” was explored by applying the model on the two divided groups, based on the forest income.

Chapter 5. Results

5.1. Sample description

The average age of respondents was 38.41 years old and the average length of residence was 27.96 years. The average monthly income was Rp.1,091,871 (Table 5).

Table 5. Age, length of residence, and monthly income of the respondents.

	N	MIN	MAX	MEAN	SD
Age	261	19	81	38.41	11.497
Length of residence (yrs)	231	1	81	27.96	17.432
Monthly income (Rp)	187	60,000	5,000,000	1,091,871.66	807107.689

More than 2/3 of the respondents were Muslims (72.1%), and 12% were believe in Christianity. The majority of the respondents were farmers (47.8%), and 23.9% were craftsmen. About 1/2 indicated elementary school as the highest level of education attained, 16.3% had graduated middle school, and 19.6% had graduated high school as the final level of education (Table 6). 63.3% of the respondents answered that they have incomes from the forest, while 36.7% did not. 39.3% answered that their family was compensated by the projects, 41.5% answered they did not gain any

compensations, and 8.9% expressed neutral (Table 7).

Table 6. General characteristics of the respondents

Religion	**N**	**%**
Islam	198	72.1
Christian	33	12.0
Catholic	1	.3
Buddhism	19	6.9
Others	24	8.7
Total	275	100%
Education	**N**	**%**
primary graduated or less	128	46.8
middle school	45	16.3
high school	54	19.6
college/university	12	4.3
Others	36	13.0
Total	275	100
Occupation	**N**	**%**
Farmer	131	47.8
Fisherman	10	3.6
Clerk	2	.7
Merchant	10	3.6
Craftsman	66	23.9
Others (%)	56	20.3
Total (%)	275	100

The relationship between forest income gain of respondents and compensation from the project to the respondents were examined through Chi-square test. The respondent group, which has forest income, had more individuals who were compensation from the project (58.42%), than the other group with no forest income (29.31%). This result indicates that more compensation were provided to the respondents, who are expected to loss

there forest income by development of the REDD+ project.

Table 7. Relationship between forest income gain and compensation from the project to the respondents

		Forest income_No	Forest income_Yes	X^2
Compensated from the project	**Neutral**	36 (20.69%)	9 (8.91%)	X^2=23.35***
	No	87 (50%)	33 (32.67%)	
	Yes	51 (29.31%)	59 (58.42%)	
	Total	174 (100%)	101 (100%)	**275**

5.2. Measurement verification

Through the two-step approach analysis, the measurement model were examined and enhanced, through confirmatory factor analysis (CFA). The data indicates the responses of the respondents to the 5 point Likert-scale questionnaire items. The relationship between each latent variables and its questionnaire items (observed variables) are represented by estimates (factor loading), Critical Ratio (CR), and Cronbach **α** (Table 8)**.** The estimate indicates regression weight of the items, and equal to factor loading in SPSS. The estimate value 1.0 means the initial estimation of parameter was fixed to 1. Standardized estimates represents standardized regression weight, and identical with standardized factor loading in factor analysis on SPSS. The standardized estimates of measurement item shares same variance, and the larger value represents more importance of the item on the factor. Through the CFA, some observed variables (C1, C2, C3, PD3, PI4) were

dropped due to its low factor loadings (<0.4) and their significance, to enhance the fitness of each measurement model composed of sets of a latent variable and observed variable. The standardized estimates of the measurement items were higher than .6, and indicated that all of the items had positive relationship and acceptable significance on the factors. The C.R. represents t-value, and if the C.R value is larger than +1.96 or less than -1.96, it indicates statistical significance. In the results, the estimates were found to be significant (p<.05). The internal consistency was confirmed with Cronhach's alpha value. In general, Cronbach's alpha higher than 0.6 indicates credibility of the measurement items in the field of social sciences. The internal consistency of the measurement items used to measure the factors was acceptable since the lowest Cronbach's alpha was .618 (Community attachment)

Table 8. Summary results of measurement model (CFA).

Factor	Measurement Items	Estimates	Standardized estimates	C.R.	Cronbach α
Community attachment	C4	1.000	.740	-	.618
	C5	.685	.616	6.667	
Place dependence	PD1	1.000	.635	-	.671
	PD2	1.054	.629	7.649	
	PD4	1.109	.642	7.661	
Place identity	PI1	1.000	.826	-	.811
	PI2	.856	.758	12.424	

	PI3	.849	.684	11.179	
	PI5	.789	.638	10.394	
Intention to support REDD+	S1	1.000	.728	-	.816
	S2	1.079	.803	11.401	
	S3	.706	.652	9.668	
	S4	.942	.716	10.526	

Construct validity indicates the conformity of construct factors and measurement items in the model, and it can be divided into convergent validity and discriminant validity. Convergent validity evaluates the conformity of measurement items (observed variables) with its construct factor (latent variable). Thus, convergent validity indicates that the items used to measure a same factor should have high correlation between them.

To verify high convergent validity, Standardized regression weights should exceed .50, or above .70 is ideal, with statistical significance, (Hair et al. 2006). The convergent validity of the model was demonstrated since observed variables' loading were ranged from .629 to .826 and all of the loading were significant at 95% confidence level (<.001) (Table 9).

Table 9. Convergent validity of the measurement model. The validity was assessed based on standardized regression weights.

Factor	Measurement Items	Standardized Regression Weights
Community attachment	C4	0.74
	C5	0.616
Place dependence	PD1	0.635
	PD2	0.629
	PD4	0.642
Place identity	PI1	0.826
	PI2	0.758
	PI3	0.684
	PI5	0.638
Intention to support REDD+	S1	0.728
	S2	0.803
	S3	0.652
	S4	0.716

Discriminant validity indicates how well the construct factors (latent variables) are differentiated to each other base on correlation or divergence. In this study, the discrimination validity was demonstrated with two standard-error interval estimate. In this estimation, discrimination validity can be verified, if 1 is not included in the range of two standard-error based on the correlations (Correlations ± (2 x standard error) ≠1). In table 11, it was found that all inter-correlations among latent variables were not 1, which indicates the discriminant validity was acceptable. The construct validity of the proposed model was found to be acceptable, and further

analysis was conducted

Table 10. Discrimination validity of the measurement model. The validity was measured based on two standard-error interval estimate.

Discriminant validity				
Relationship between factors	Correlations	Standard error	Two standard-error interval	
Community attachment ↔ Place dependence	0.75	0.058	0.634	0.866
Community attachment ↔ Place identity	0.418	0.051	0.316	0.52
Community attachment ↔ Support for REDD+	0.28	0.045	0.19	0.37
Place dependence ↔ Place identity	0.593	0.048	0.497	0.689
Place dependence ↔ Support for REDD+	0.43	0.042	0.346	0.514
Place identity ↔ Support for REDD+	0.508	0.045	0.418	0.598

The model-fitness of the measurement model was examined with several GOF indices. The measurement model composed of three latent variables; community attachment, place attachment, and support for REDD+ (pro-environmental behavioral intentions) was tested for model fitness based on GOF. Table 9 indicates the GOF of the measurement model. Absolute indices were found to adequate since the values of $\chi 2/df$, RMR, RMSEA, GFI and AGFI are acceptable based on the criteria. The $\chi 2/df$ ratio was lower than the suggested criteria (<3.0; Kline, 2005), RMR was lower than 0.05. RMESA was also lower than 0.1, both GFI, and AGFI were higher

than 0.9. Among the relative indices, NFI was lower than its criterion (.9) However, GOF of the model was still seemed to be plausible because the other two indices, CFI and IFI showed acceptable value, higher than .9 (Table 9).

Table 11. Model fit of the measurement model

Fit index	Absolute indices					Relative indices		
	χ2/df	RMR	RMSEA	GFI	AGFI	CFI	NFI	IFI
Criteria	<3.00	<0.05	<0.08	>0.90	>0.90	>0.90	>0.90	>0.90
Model	2.164	.048	.065	.938	.904	.941	.897	.942

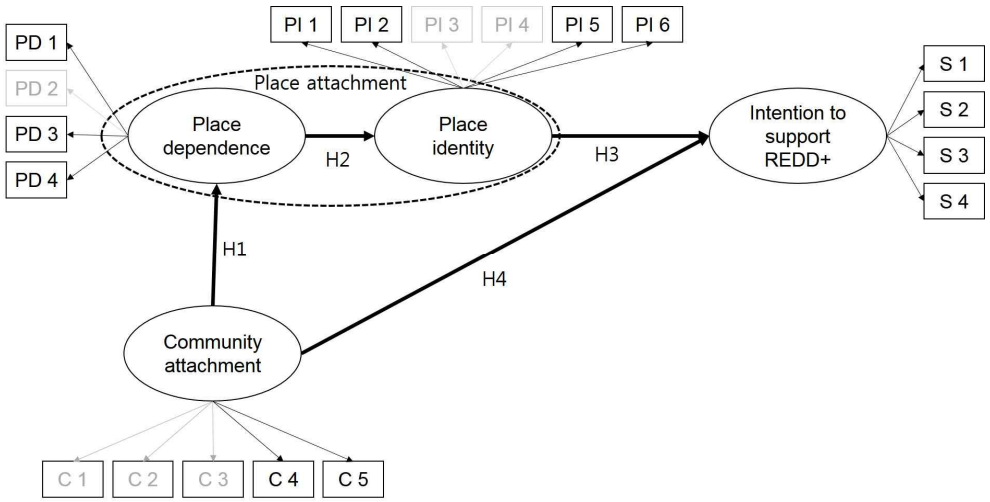

Figure 4. Measurement model developed through CFA.

5.3. Hypothesis verification

The proposed Model included the direct effects from community attachment to place attachment (place dependence), from place dependence to place identity, from place attachment (place identity) to support for REDD+, and from community attachment to support for REDD+. The model, including relationships among the latent variables, was examined with SEM analysis to verify the hypothesis relationships of this research. The goodness-of-fit indices of model to data were acceptable. Significant path coefficients were found from community attachment to place attachment (place dependence) (path estimate=.746; p<.001), from place dependence to place identity (path estimate =.590; p<.001), from place attachment to support for REDD+ (path estimate =.466; p<.001) However, the path from community attachment to support for REDD+ was not significant (path estimate =.111; p>.05) (Table 12).

Table 12. Hypothesis verification (standardized estimates)

Hypothesis	Paths	Path Estimate	Critical Ratio (t-value)	p	Results
H1	C.A→P.D	.637	5.892	<.001	Supported
H2	P.D→P.I	.699	6.585	<.001	Supported
H3	P.I→Sup	.430	5.433	<.001	Supported
H4	C.A→Sup	.104	1.284	>0.05	Not supported

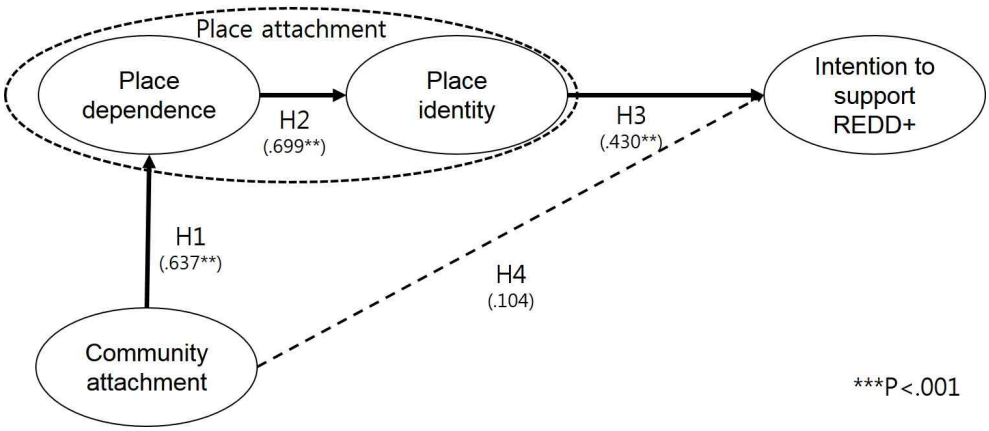

Figure 5. Results of the hypothesis verification.

The moderate effect of "forest income loss" was examined by applying the model on two sub group; a group which gains income from forest, and the other group does not. However, the moderator effect of "forest income" was not significant (Chi-square=4.013, P=.404) (Table 13).

Table 13. Moderating effect of forest income loss.

Model	DF	Chi-square	P	NFI	IFI	RFI	TLI
	4	4.013	.404	.003	.003	-.004	-.004

Chapter 6. Discussion and Conclusion

The importance of understanding local participants' emotional relationship on their community and place has been emphasized for sustainable management of local natural resources. Based on the previous studies, this study was attempted to investigate the relationship among community attachment, place attachment, and local participants' intention to support REDD+, and to draw out managerial implication for REDD+.

The results revealed that both community attachment and place attachment showed influence on local people’s intention to support the project. Specifically, community attachment was found to have direct effect on place attachment, and place attachment was found to have mediation role between the community attachment and the pro-environmental intention. This finding is consistent with the previous studies, which identified the importance of social environments in supporting emotional connection with natural environments (Brown et al, 2003), and the relationship that community attachment expands to include place attachment, and finally develops pro-environmental concerns (Buta et al., 2014). However, attachment on one’s community and a place does not always leads to one’s positive attitude toward natural resource conservation (Brockington, 2014). Although the local people are attached to their community and a related place, they do not support the protection of natural resources when the

support are expected to negatively influence on their economic activities (Marcus, Omoto, & Winter, 2013).

To identify the impact of economic disadvantage on the proposed relationship among community attachment, place attachment, and support for the project, the moderating effect of local participants' forest income loss was analyzed. However, the group, which have gained but will lose forest income from the project area, also showed intention to support the project as attachment on community and place developed. This result can be explained that the compensations provided to the households, which gains income from the forests, had mitigated the negative expectation of REDD+, or, the local people perceived the economic loss is not so critical to not support the project. Thus, it can be expected that the local people would not support the project even though they are attached to their communities and the project area, if the negative impacts are found to be more significant than they thought, or the loss is not compensated properly.

This study identified the significant role of community attachment and place attachment on local participants' support for a REDD+ project. Therefore, in order to encourage local participants' engagement for the projects, various endeavors to increase and to keep the attachments should be considered on project design and the REDD+ institution.

The results of the study is mainly focused on some predictors of PEB in attitudinal and contextual dimensions. So, the findings of this research

should be further expanded to consider other variables, which influence the pro-environmental concern. Among the dimensions of causal variables of PEB, the predictors in personal capacity dimension are expected to provide further implications for understanding of local people's pro-environmental behavior and management of REDD+ projects, since one's personal capacity may limit personal PEB and participation on the REDD+ project.

Bibliography

Andrade, G. S., & Rhodes, J. R. (2012). Protected areas and local communities: An inevitable partnership toward successful conservation strategies?. Ecology and Society, 17(4), 14.

Angelsen, A., Streck, C., Peskett, L., Brown, J., & Luttrell, C. (2008). What is the right scale for REDD+? The implications of national, subnational and nested approaches. Center for International Forestry Research (CIFOR), Bogor.

Arhin, A. A. (2014). Safeguards and Dangerguards: A framework for Unpacking the Black Box of Safeguards for REDD+. Forest Policy and Economics, 45, 24-31.

Arnberger, A., & Eder, R. (2012). The influence of green space on community attachment of urban and suburban residents. Urban Forestry & Urban Greening, 11(1), 41-49.

Anderson, J.C. & erbing D.W. (1988): Structural Equation Modeling in Practice: A Review and Recommended Two - Step Approach. Psychological Bulletin, 103, 411-423.

Asquith, N. M., Rios, M. T. V., & Smith, J. (2002). Can forest-protection carbon projects improve rural livelihoods? Analysis of the Noel Kempff Mercado Climate Action Project, Bolivia. Mitigation and Adaptation Strategies for Global Change, 7(4), 323-337.

Barkin, D., & Bouchez, C. P. (2002). NGO–community collaboration for ecotourism: A strategy for sustainable regional development. Current issues in Tourism, 5(3-4), 245-253.\

Berry, N. J., Harley, R., & Ryan, C. M. (2013). Enabling communities to benefit from REDD+: pragmatic assessment of carbon benefits. Carbon Management,4(6), 571-573.

Brown, B., Perkins, D. D., & Brown, G. (2003). Place attachment in a revitalizing neighborhood: Individual and block levels of analysis. Journal of environmental psychology, 23(3), 259-271.

Brown, G., Raymond, C. M., & Corcoran, J. (2015). Mapping and measuring place attachment. Applied Geography, 57, 42-53.

Bonaiuto, M., Carrus, G., Martorella, H., & Bonnes, M. (2002). Local identity

processes and environmental attitudes in land use changes: The case of natural protected areas. Journal of economic psychology, 23(5), 631-653.

Bricker, K. S., & Kerstetter, D. L. (2000). Level of specialization and place attachment: An exploratory study of whitewater recreationists. Leisure sciences,22(4), 233-257.

Buckley, R. (2012). Sustainable tourism: Research and reality. *Annals of Tourism Research*, *39*(2), 528-546.

Buta, N., Holland, S. M., & Kaplanidou, K. (2014). Local communities and protected areas: The mediating role of place attachment for pro-environmental civic engagement. Journal of Outdoor Recreation and Tourism, 5, 1-10.

Caplow, S., Jagger, P., Lawlor, K., & Sills, E. (2011). Evaluating land use and livelihood impacts of early forest carbon projects: Lessons for learning about REDD+. Environmental Science & Policy, 14(2), 152-167.

Climate, Community & Biodiversity Alliance and Cooperative for Assistance and Relief Everywhere (CCBA and CARE). (2010). REDD+ Social & Environmental Standards. Climate, Community & Biodiversity Alliance and Cooperative for Assistance and Relief Everywhere.

Cheng, J. C. H., & Monroe, M. C. (2012). Connection to Nature Children's Affective Attitude Toward Nature. Environment and Behavior, 44(1), 31-49.

Corbera, E., N. Kosoy, & M. Martínez Tuna. (2007). Equity implications of marketing ecosystem services in protected areas and rural communities: case studies from Meso- America. Global Environmental Change (17)

Daviet, F., Mabel, M., & Halverson, E. (2011). A draft framework for sharing approaches for better multi-stakeholder participation practices. FCPF & UN-REDD, 1.

Davis, J. L., Green, J. D., & Reed, A. (2009). Interdependence with the environment: Commitment, interconnectedness, and environmental behavior.Journal of Environmental Psychology, 29(2), 173-180.

Eliasch, J. (2008). Climate change: financing global forests: the Eliasch review. Earthscan, London ; Sterling, VA :

Forest Carbon Partnership Facility (FCPF). (2011). Introduction to the Forest Carbon Partnership Facility. World Bank, Washington, D.C., USA.

Forest Carbon Partnership Facility (FCPF) and UN-REDD. (2011). Guidelines on stakeholder engagement in REDD+ readiness with a focus on the participation of indigenous peoples and other forest dependent communities. Forest arbon Partnership Facility & UN-REDD Programme.

Foti, J., & De Silva, L. (2008). Voice and choice: Opening the door to environmental democracy. World Resources Institute.

Gardette, Y. M., Demenois, J., Grondard, N., Perrier, M., & Wemaere, M. (2010). Bringing forest carbon projects to the market. Paris, France: UNEP.

Gallagher, D., Ting, L., & Palmer, A. (2008). A journey into the unknown; taking the fear out of structural equation modeling with AMOS for the first-time user. The Marketing Review, 8(3), 255-275.

Gebara, M. F. (2013). Importance of local participation in achieving equity in benefit-sharing mechanisms for REDD+: a case study from the Juma Sustainable Development Reserve. International Journal of the Commons, 7(2).

Grieg-Gran, M. (2006). The cost of avoiding deforestation. report prepared for Stern Review, International Institute for Environment and Development.

Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on attitude-behavior relationships a natural experiment with curbside recycling. Environment and behavior, 27(5), 699-718.

Halpenny, E. A. (2010). Pro-environmental behaviours and park visitors: The effect of place attachment. Journal of Environmental Psychology, 30(4), 409-421.

Hidalgo, M. C., & Hernandez, B. (2001). Place attachment: Conceptual and empirical questions. Journal of environmental psychology, 21(3), 273-281.

Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. Journal of Environmental Psychology,28(2), 109-120.

Hummon, D. H. (1992). Community attachment: Local sentiment and sense of place. In: I. Altman, & S. M. Low. (Eds.), Place attachment (pp. 253–278). New York, NY: Plenum Press.

Palmer, C. (2011). Property rights and liability for deforestation under REDD+: Implications for ‘permanence’in policy design. Ecological Economics,

70(4), 571-576.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?.Environmental education research, 8(3), 239-260.

Kyle, G., Bricker, K., Graefe, A., & Wickham, T. (2004). An examination of recreationists' relationships with activities and settings. Leisure Sciences, 26(2), 123-142.

Manzo, L. C., & Perkins, D. D. (2006). Finding common ground: The importance of place attachment to community participation and planning.Journal of planning literature, 20(4), 335-350.

Marcus, B. J., Omoto, A. M., & Winter, P. L. (2011). Environmentalism and community: Connections and implications for social action. Ecopsychology,3(1), 11-24.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: amature of individuals' feeling in community with nature. Journal of Environmental Psychology, 24(4), 503-515

McDermott, C. L., Coad, L., Helfgott, A., & Schroeder, H. (2012). Operationalizing social safeguards in REDD+: actors, interests and ideas. Environmental Science & Policy, 21, 63-72.

Mesch, G. S., & Manor, O. (1998). Social ties, environmental perception, and local attachment. Environment and behavior, 30(4), 504-519.

Mertz, O. (2009). Trends in shifting cultivation and the REDD mechanism. Current Opinion in Environmental Sustainability, 1(2), 156-160.

Moss, N., Nussbaum, R., Muchemi, J., & Halverson, E. (2011). A review of three REDD+ safeguard initiatives. UN-REDD Programme & Forest Carbon Partnership Facility.

Myers, E. C. (2007). Policies to reduce emissions from deforestation and degradation (REDD) in tropical forests. Resources Magazine, 7.

Nelson, A., & Chomitz, K. M. (2009). Protected area effectiveness in reducing tropical deforestation. A global analysis of the impact of protection status.

Palmer, C. (2011). Property rights and liability for deforestation under REDD+: Implications for ‘permanence’ in policy design. Ecological Economics 70, 571–576.

Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., & Hanson, C. E.

(2007). IPCC, 2007: climate change 2007: impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change.

Ramkissoon, H., Smith, L. D. G., & Weiler, B. (2013). Testing the dimensionality of place attachment and its relationships with place satisfaction and pro-environmental behaviours: A structural equation modelling approach. Tourism Management, 36, 552-566.

Raymond, C. M., Brown, G., & Weber, D. (2010). The measurement of place attachment: personal, community and environmental connections. Journal of Environmental Psychology, 30, 422-434.

Ricketts, T. H., B. Soares-Filho, G. A. B. da Fonseca, D. Nepstad, A. Pfaff, A. Petsonk, A. Anderson, D. Boucher, A. Cattaneo, M. Conte, K. Creighton, L. Linden, C. Maretti, P. Moutinho, R. Ullman, and R. Victurine. 2010. Indigenous lands, protected areas, and slowing climate change. PLoS Biology 8:e1000331

Rosa, E. A., & Dietz, T. (1998). Climate change and society speculation, construction and scientific investigation. International Sociology, 13(4), 421-45

Sampson, K. A., & Goodrich, C. G. (2009). Making place: Identity construction and community formation through "sense of place" in Westland, New Zealand. Society and Natural Resources, 22(10), 901-915.

Sandbrook, C., Nelson, F., Adams, W. M., & Agrawal, A. (2010). Carbon, forests and the REDD paradox. Oryx, 44(03), 330-334.

Scannell, L., & Gifford, R. (2010). The relations between natural and civic place attachment and pro-environmental behavior. Journal of environmental psychology, 30(3), 289-297.

Schelhas, J., Sherman, R. E., Fahey, T. J., & Lassoie, J. P. (2002, May). Linking community and national park development: A case from the Dominican Republic. In Natural Resources Forum (Vol. 26, No. 2, pp. 140-149). Blackwell Publishing Ltd.

Skutsch, M., & Van Laake, P. E. (2008). Redd as multi-level governance in-the-making. Energy & environment, 19(6), 831-844.

Stedman, R. C. (2002). Toward a social psychology of place predicting behavior from place-based cognitions, attitude, and identity. Environment and

behavior,34(5), 561-581.

Stern, N. (2007). The economics of climate change: the Stern review. cambridge University press.

Stern, P. C. (2000). Towards a Coherent Theory of Environmentally Significant Behavior, Journal of Social Issues, 56(3), 407-424.

Trentelman, C. K. (2009). Place attachment and community attachment: A primer grounded in the lived experience of a community sociologist. Society and Natural Resources, 22(3), 191-210.

Krause, T., Collen, W., & Nicholas, K. A. (2013). Evaluating safeguards in a conservation incentive program: participation, consent, and benefit sharing in indigenous communities of the Ecuadorian Amazon. Ecology and Society,18(4), 1.

UNFCCC (2011). Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 -Addendum Part Two: Action taken by the Conference of the Parties at its sixteenth session.

UN-REDD. (2011). UN-REDD Programme Social and Environmental Principles and Criteria, Version 3 draft for consultation. UN-REDD Programme.

UN-REDD. (2016). UN-REDD Programme . http://www.un-redd.org/

Uzzell, D., Pol, E., & Badenas, D. (2002). Place identification, social cohesion, and enviornmental sustainability. Environment and Behavior, 34(1), 26-53.

Wang, S., & Xu, H. (2015). Influence of place-based senses of distinctiveness, continuity, self-esteem and self-efficacy on residents' attitudes toward tourism.*Tourism Management*, *47*, 241-250.

Williams, D. R., Patterson, M. E., Roggenbuck, J. W., & Watson, A. E. (1992). Beyond the commodity metaphor: Examining emotional and symbolic attachment to place. Leisure sciences, 14(1), 29-46.

Wilkinson, K. P. (1986). In search of the community in the changing country-side. Rural Sociology, 51,1–17.

Zhang, Y., Zhang, H. L., Zhang, J., & Cheng, S. (2014). Predicting residents' pro-environmental behaviors at tourist sites: The role of awareness of disaster's consequences, values, and place attachment. Journal of Environmental Psychology, 40, 131-146.

Abstract (in Korean)

인니 이탄지 REDD+사업에서의 장소 애착, 공동체 애착과 지역 주민의 지지

서울대학교 산림과학부 산림환경학전공

김동환

지역주민의 지지와 참여 없이는 REDD+의 목적을 달성하는 것은 매우 어려우며, 지속가능한 REDD+사업을 위해서 지역주민의 사업 참여와 지지에 관한 태도를 이해할 필요가 있다. 이 연구는 한국 정부와 인니 정부가 공동으로 인도네시아 수마트라 섬에서 개발 중인 이탄지 REDD+ 사업에 대한 지역주민의 장소 애착, 공동체 애착, 그리고 사업 지지 의도 간의 관계를 확인하기 위하여 실시되었다.

한-인니 정부가 공동 개발 중인 이탄지 REDD+사업은 수마트라 섬 Siak군 Riau주에 위치하며, REDD+사업에 영향을 미치는 동시에 영향을 받을 것으로 예상되는 5개 마을 주민들을 대상으로 설문조사가 실시되어 275세트의 유효한 응답을 얻었다. 구조방정식 모델을 통하여 지역주민의 장소 애착, 공동체 애착, 그리고 REDD+사업 지지 의도 간의 관계를 분석하였고, 이들 간의 관계가 비태도적 요소인 산림소득 손실에 의해 영향을 받는지 확인하였다. 구조방정식 분석을 통하여 공동체 애착과 장소 애착과의 관계가 통계적으로 유의한 것으로 확인되었다.

하지만 장소 애착만이 지역주민의 사업지지 의도에 직접적인 관계를 갖는 것으로 확인되었고, 장소 애착은 공동체 애착과 사업 지지의도 간의 매개 역할을 하는 것으로 확인되었다. 비태도적 요소로 고려된 산림소득 의존성이 모델에 미치는 조절효과는 없는 것으로 확인되었으며, 이는 REDD+사업을 통하여 산림소득 손실을 입을 집단이 과거에 사업단으로부터 보상을 받았기 때문인 것으로 판단되었다.

장소 애착이 지역주민의 REDD+ 사업 참여 태도와 관련이 있고, 예측변수로 작용할 수 있으나, 지역주민들이 자신이 속한 공동체에 대한 애착과 사업으로 인한 불이익에 대한 보상이 전제되어야 할 것으로 판단된다. 지역주민의 REDD+사업 참여와 지속적인 지지를 얻기 위해서는 사업이 지역사회에 미치는 영향과 그에 따른 보상을 명확히 정의하고 알리는 것이 중요할 것으로 보인다.

키워드: REDD+, 지역 참여, 친환경적 행위, 장소애착, 공동체 애착

학번: 2014-22818