A DISSERTATION FOR THE DEGREE OF MASTER OF SCIENCES

A Comparative Analysis on Payment for Environmental Services in China, Vietnam, and Republic of Korea
: Further Implications to Reforestation in Democratic People's Republic of Korea

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: 북한 산림 황폐화 복원에 주는 함의

BY

GAYOUNG CHOI

DEPARTMENT OF FOREST SCIENCES
GRADUATE SCHOOL
SEOUL NATIONAL UNIVERSITY

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: Further implications to reforestation in Democratic People's Republic of Korea

UNDER THE SUPERVISION OF ADVISOR
PROF. SEONG-IL KIM

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BY
GAYOUNG CHOI

MAJOR IN FOREST ENVIRONMENTAL SCIENCE
GRADUATE SCHOOL OF SEOUL NATIONAL UNIVERSITY

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APPROVED AS A QUALIFIED DISSERTATION OF
GAYOUNG CHOI

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BY THE EXAMINING COMMITTEE

CHAIR	**VICTOR K. TEPLYAKOV**	_____
VICE-CHAIR	**SEONG-IL KIM**	_____
MEMBER	**KYUNG-SEOK PARK**	_____

Abstract

This study examines the institutional arrangement of incentive-based policies on forest rehabilitation of China, Vietnam and the Republic of Korea (ROK) and synthesizes lessons learned especially relevant to the context of the Democratic People's Republic of Korea (DPRK). These three countries were selected due to their successes in reforestation according to their government-led programs of forest rehabilitation. The programs are as following: Sloping Land Conversion Program (SLCP) in China, Program 661, also known as 5 Million Hectare Reforestation Program (5MHRP) in Vietnam and 1970's The First Ten-Year Forest Rehabilitation Plan in the ROK. These three programs played an important role in forest rehabilitation along with incentive programs, and logging bans, which aimed to reduce deforestation of native forests while increasing forest cover. They have also been called as either eco-compensation or Payment for Environmental Services (PES). Although the ROK reforestation policy does not fit the exact definition of PES, looking over their main efforts to restore forests implemented with various incentive programs including both cash and in-kind, it is regarded as a PES scheme in this research.

By conducting a comparative analysis through the Institutional Analysis and Development (IAD) framework, many similarities have been found. All changes had started from the highest levels of government's understandings of the importance of forests shown by establishment of rules and incentives for forest conservation and shifted major policies in land tenure reform. This motivated

households or communities to take over more responsibilities. On the other hand, many differences exist among the countries in terms of leading actors, payment mechanisms, legal frameworks, communication methods and causes of deforestation. Compared to the other two countries, the ROK had a good communication channel between the Central government and local government. The Vietnamese government gave long-term tenure ownership to the people, with a maximum period of 50 years, thus giving more responsibility to individuals. The China Council for International Cooperation on Environment and Development (CCICED) consisted of high-level and non-profit advisory body including Chinese leaders, international deputy and academics. It fulfilled the implementation of government and research activities in practice.

Although many lessons learned from the experiences of three countries, the research has some limitations. Different political systems might be a barrier to proper application of findings in the context of the DPRK. In the last few decades, China and Vietnam has undergone rapid transitions from a command economy to market economy. Their market-based approach to forest conservation has been implemented along with the changes in social and political system. In contrast, the ROK is a market economy even though former President Park Chung-Hee strongly implemented a planned economy system during his reigning period while also implementing the reforestation policy in 1970s. Contrasting to these countries, the DPRK has a centrally planned economy system where the role of market mechanism is possibly limited. Therefore, different political and economic systems

amongst the four countries should be carefully considered while looking into implications that might relate to the context of the DPRK.

Keywords : PES, Forest rehabilitation, IAD Framework, DPRK

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Acronyms and Abbreviations

5MHRP	5 Million Hectare Reforestation Program
ADB	Asian Development Bank
CCICED	China Council for International Cooperation on Environment and Development
CIFOR	Center for International Forestry Research
CNY	Chinese Yuan
CPC	Commune People Committee
DPRK	Democratic People's Republic of Korea
ES	Environmental(Ecosystem) Services
EU FLGET	European Union Forest Law Enforcement Governance and Trade
FAO	Food and Agriculture Organization
FONAFIFO	the National Fund for Forest Financing
FPD	Forest Protection Department
FPMB	Forest Provincial Management Board
FPSD	Forest Protection Sub Department
FSSP	Forest Sector Support Partnership
HRS	Household Responsibility Scheme
IAD	Institutional Analysis and Development
ICA	International Cooperation Agency
ICDP	Integrated Conservation and Development Project
IUCN	International Union for Conservation of Nature
KFS	Korea Forest Service
MARD	Ministry of Agriculture and Rural Development
MB	Management Board
MOLEP	The Ministry of Land and Environment Protection
MONRE	Ministry of Natural Resources and Environment
N/A	Not Applicable

NDRC	Nation Development and Reform Commission
NGOs	Non-Governmental Organizations
ODA	Official Development Assistance
PES	Payment for Environmental(Ecosystem) Services
PPC	Provincial People's Committee
PSA	Pagos por Servicios Ambientales
ROK	Republic of Korea
SFA	State Forestry Administration
SFE	State Forest Enterprises
UNCCD	United Nations Convention on Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFF	United Nations Forum on Forests
UNHCR	United Nations High Commissioner for Refugees
UNKRA	United Nations Korean Reconstruction Agency
USD	United States Dollar
VFA	Village Forestry Association
WCED	World Commission on Economic and Development
WFP	World Food Program

Chapter 1. Introduction

1.1. Research Background

Forest area in Asian region is recorded to be over 500 million hectares, mainly located in China (41 percent), Indonesia (18 percent), India (13 percent), Myanmar (6 percent), Thailand and Malaysia (4 percent each) (Cheng & Clue, 2010, p. 10). In the last few decades, the net forest cover of Asian region has increased to around 21 million hectares between 2005 and 2010, resulting from large-scale afforestation efforts of China (FAO, 2010, p. 19). However, current research also revealed that around 13 million hectares of forest were converted to other uses or lost due to natural causes each year in the last decade (FAO, 2010, p. 15). Especially in Southeast Asia, agricultural expansion and illegal logging are important factors of deforestation in accordance with international market demand, public policies and governance weakness (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 16).

The DPRK has also suffered from deforestation and land degradation within the last few decades. The DPRK ranked the third highest deforestation rate amidst the 180 countries surveyed which was taken by Maplecroft, a risk analysis firm (Maplecroft, 2012). The main reason of deforestation in the DPRK is not only due to natural disasters such as landslides, floods and drought, but also due to increasing demand for food and energy in response to economic crisis.

There are many methods to overcome rural poverty and improve local livelihoods, but the most important factor lies in creating incentives for people to buy into the

changes (Schwekendiek, 2009; as cited in Teplyakov & Kim, 2012 p.33). This can be realized in different forms including agricultural, forestry, agro-forestry, and fishing industries; it may also include social areas such as tourism, ecotourism and traditional crafts (Teplyakov & Kim, 2012, p. 33). The efforts also can be actualized if relevant framework among stakeholders – from international level to local level – is successfully established.

Concerning this, PES has earned significant global interest as cost-effective means to improve environmental management by rewarding people for their efforts in providing ecosystem services of value to human societies (Zilberman, 2007). There is some confusion of using the abbreviation 'ES', for it can mean either ecosystem services or environmental services. Here ES is defined as 'Environmental Services'.

By creating a way for service beneficiaries to recognize the value of these ecosystem services via monetary payments, PES examines potentials for sustainable financing that complements public funding (UNESCAP, 2009, p. 9). PES is also highly related to mitigation efforts regarding climate change. Recently, policymakers around the world aspire to understand PES mechanism so as to ensure that those programs are implemented in ways to not only maximize the benefit for local communities, but also to make attractive their countries as destinations for carbon investments (UNESCAP, 2009, p. 11).

Therefore, this study tracked and examined advantages of implementing PES through the cases from three countries: China, Vietnam and the ROK. Continually,

in order to understand effective PES design and implementation in command and control, in contexts such as the DPRK, the study focuses on institutional arrangement of PES schemes in China, Vietnam and reforestation efforts (The First Ten-Year Forest Rehabilitation Plan) in the ROK in the 1970s.

Matesaert (2002 p.4) examined that "institutional analysis is particularly important at the pre-project or planning stage of research activities or projects, which allows decision making on appropriate institutional setting for the proposed activity." He also argued that stakeholders and their networks can be identified by conducting institutional analysis, providing a baseline used to monitor, review, make changes and evaluate changes throughout the project's cycle. Appropriate coordination between public and private institutions of various sectors at different levels is the most important factor in PES implementation. In other words, developing a common PES vision, clarifying responsibilities, identifying institutional complementarities, and formalizing communication channels are the ways to achieve the successes of PES implementation in practice (Greiber, 2009, p. xv).

Considering that China and Vietnam have received international attention for the rapid development of their incentive-based environmental policy programs, also known as PES, by examining institutional arrangement of two PES cases would provide valuable insights into PES implementation in the DPRK, also undergoing similar political circumstances. Although the ROK reforestation policy is not exactly referred to PES according to its definition, looking over their main efforts to

restore forests implemented with various incentive programs including both cash and in-kind, it can be regarded as a PES-like scheme in this research. Therefore, by conducting a comparison through relevant framework, this research can offer practical guidance to reforestation implementation in the DPRK.

1.2. Research Objectives

The aim of this study is to capture the evolution and institutional arrangements of incentive-based policies on forest rehabilitation in China, Vietnam and the ROK, summarize the lessons and finally to synthesize the findings especially relevant for the DPRK context. To achieve these objectives, the following research questions have been raised.

1. Why was PES introduced as a reforestation tool as an alternative in the three countries?

2. What are the similarities and differences of PES schemes among the three countries regarding institutional arrangement of PES implementation?
   1) What are the causes of deforestation in each country?
   2) What strategy did they build in terms of legal and regulatory framework?
   3) Did the service providers voluntarily participate in PES?
   4) What were the roles and responsibilities of the actors?
   5) Were the payment features clearly designed before implementation?

3. Considering the current status of deforestation of the DPRK, what are the policy implications for PES implementation in the DPRK context?

1.3. Previous Studies

Up to the recent year, there have been many studies conducted in two different fields of the DPRK studies. Firstly, there have been studies examining the causes of deforestation of the DPRK carried out in early 1990s (Lee, Yoon, & Jung, 1999; Yoon, Park, & Hong, 1999). It continued to measure the size of degraded forest area using satellite images up to the early 2000s (Park J. , 2010; Lee, Kim, Choi, Shin, Kang, & Han, 2003), and has revealed forest cover changes in the DPRK for the last few decades. In the late 2000s, the implementation of international aid and cooperation regarding the DPRK forest development (Park, Lee, & Kim, 2011) has been researched. Secondly, case studies of economic transition in socialist states have been studied. Considering that China, Vietnam and the DPRK have many things in common in regards to historical, political and economic perspectives; they have been compared frequently in terms of economic transition within the last few decades. Since China and Vietnam have experienced rapid growths in industry after opening its markets, there have been many attempts in finding some implications from the cases of China and Vietnam (Choi, 2010; Park H. , 2008; Jeong, 2005) that might be applicable to the DPRK.

However, there have been little studies conducted in policy comparisons among the three countries in forestry field. Although the ROK has a market economy system differing with China and Vietnam, former President Park Chung-Hee strongly implemented a planned economy system during his period in 1970s while implementing the reforestation policy. The ROK has undergone a successful

experience in rehabilitating damaged forest backed by financial assistance from other nations and various incentive programs. In this regard, this study will provide better understanding of the problem given and furnish practical guidance to the DPRK reforestation.

1.4. Thesis Structure

To reflect the purpose of the study mentioned above, the structure of this thesis will be divided into several chapters as follows;

Research background and objectives are presented in Chapter 1, with Chapter 2 offering reviews of current statuses of Asian forests. Continually, a general understanding of PES is described in terms of evolution, definition and principles. Research Methodology is illustrated in detail in Chapter 3; first part of Chapter 3 outlines advantages of comparative case study and case selection while the second part introduces description of the analytical framework, focusing on the IAD Framework developed by Ostrom and her colleagues (Hess & Ostrom, 2005). The results of the analysis have shown in Chapter 4, each case respectively. Chapter 5 focuses on synthesizing the lessons learned that observed in Chapter 4 and finding the further implications to the context of the DPRK. This study is concluded in Chapter 6 by a summary of the main findings and discussion on the main lessons and contribution of the study.

Chapter 2. Literature Review

2.1. The Current Status of Asian Forest

According to the FAO Global Forest Resources Assessment (FAO, 2010), the world's total forest area is over 4 billion hectares, the five most forest-rich countries (the Russian Federation, Brazil, Canada, the United States of America and China) accounting for more than half of the total forest area. See Table 1 for regional statistics.

Table 1 Distribution of forests by region and sub-region, 2010

Region/Sub-region	Forest Area	
	1,000 ha	% of total forest area
Eastern and Southern Africa	267 517	7
Northern Africa	78 814	2
Western and Central Africa	328 088	8
Africa Total	**674 419**	**17**
East Asia	254 626	6
South and Southeast Asia	294 373	7
Western and Central Asia	43 513	1
Asia Total	**592 512**	**15**
Russian Federation	809 090	20
Europe excl. Russian Federation	195 911	5
Europe Total	**1 005 001**	**25**
Caribbean	6 933	0
Central America	19 499	0
North America	678 961	17
North and Central America Total	**705 393**	**17**
Oceania Total	**191 384**	**5**
South America Total	**864 351**	**21**
World Total	**4 033 060**	**100**

Source (FAO, 2010, p. 13)

Forest lands across Asia is recorded to be over 500 million hectares, the net forest cover of Asian region has increased around 21 million hectares between 2005 and 2010, resulting from large-scale afforestation efforts by China (FAO, 2010). Indonesia and some other countries also underwent many ambitious forestry plantation targets despite low performances from existing programs (Cheng & Clue, 2010, p. 18).

However, deforestation is still a serious problem in Asian region especially for the countries in Southeast Asia. Agricultural expansion and illegal logging are the main causes of deforestation, along with international market demand, public policies and governance weakness (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 16). In that sense, the traditional approach to preventing environmental degradation such as command and control policies may be less effective when forest owners convert their forest land to land with agricultural purposes.

To overcome this serious deforestation problem, monetizing natural resources has earned significant interest as a cost-effective method to conserve the environment. According to the IUCN report (Greiber, Thomas(Ed); IUCN, 2009, p. vii), commercial mechanisms and incentives, in particular PES, that can ensure internalization of environmental externalities are increasingly being proposed as a promising conservation approach.

2.2. Payment for Environmental Services

2.2.1. Environmental Services

There are different terms used in the literature to describe market instruments for environmental policy. Firstly, the definition of 'Ecosystem Services' mentioned by the Millennium Ecosystem Assessment (2005 p.5) is stated to be "the benefits people obtain from ecosystems. These include provisioning services such as food and water, regulating services such as regulations of floods, drought, land degradation, and disease, supporting services such as soil formation and nutrient cycling, and cultural services such as recreational, spiritual, and religious and other nonmaterial benefit."

In contrast, 'Environmental Services' can be defined as 'a positive benefit that people obtain from the environment' (Swallow, et al., 2007, p. 27). The environmental services of forests and landscapes, for example, are usually categorized into watershed protection, biodiversity conservation, atmospheric regulation (including greenhouse gas mitigation), and landscape beauty (Pagiola, Bishop, & Landell-Mills, 2002).

Kallesoe et al (2009 p.29) clearly defined that the main difference between ecosystem services and environmental services is the inclusion or exclusion of provision ecosystem services, which is food, fiber, timber, excludable and non-competitive goods for which markets develop most readily.

2.2.2. Market Instrument of Environmental Policy

The Brundlandt Commission report in 1987 states that "poverty is a major cause and effect of global environmental problems" and also "many parts of the world are caught in a vicious downward spiral: poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival more difficult and uncertain" (WCED, 1987, p. 3). In line with this, Swallow et al (2007, p.20) pointed out "the solutions provided were directed at macroeconomic poverty eradication measures and the continuation of short-term land management or protection schemes excluding certain land uses while seeking to protect fragile ecosystems from encroachment by poor people." However, such top-down approaches have failed to achieve both poverty reduction and environmental conservation since it failed to meet the needs of local people and the needs to protect environment. Therefore, more localized and community-based approaches for environment conservation have been raised in 1980s. In line with this, Integrated Conservation and Development Projects (ICDPs) gained momentum in many countries in Asia and Southern Africa with the goal of conserving biodiversity and supporting rural livelihood as an alternative approach to the previous top-down approach (Adhikari, 2009). This scheme combined biodiversity conservation with focus on improvement of rural livelihood, with an assumption that local livelihood practices are important threats to the biodiversity and that diversifying local livelihood options will reduce human pressures on biodiversity (Hughes & Flintan,

2001). However, these ambitious ICDPs have faced many difficulties in terms of implementation in practice due to low awareness regarding the complexity of socio-ecological systems, especially the interdependency that exists between the resources and people living around them (Adhikari, 2009, p. 1). Swallow et al (2007, p.22) argued that "the schemes have often been difficult to sustain in financial terms and their conservation impact have rarely matched expectations because of the inability to decrease demand for ecosystem services."

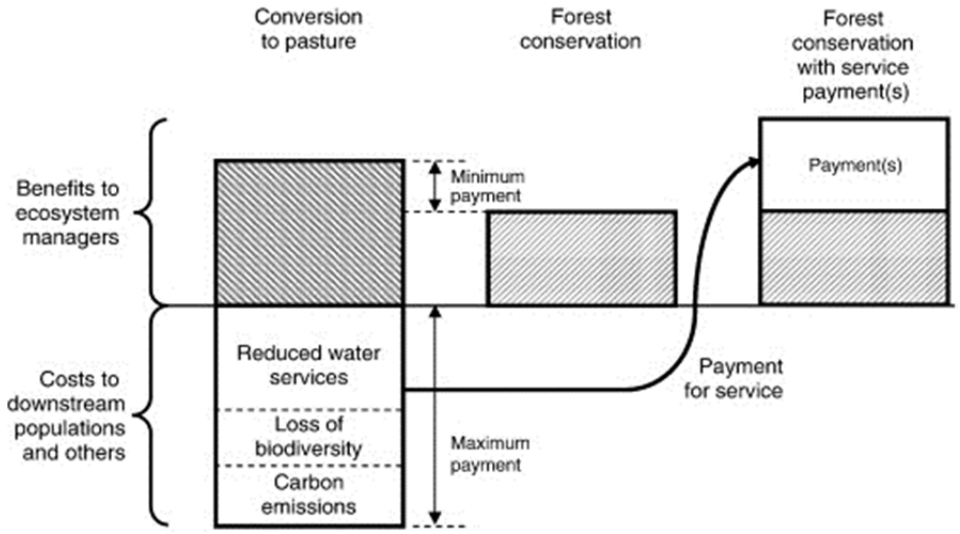
In conclusion, market-based approaches to environmental management have gradually emerged in the past decade in response to the failure of traditional conservation approaches. These new approaches intend to provide direct economic incentives for land stewards for environmental services such as forest management, watershed protection, and biodiversity conservation (Adhikari, 2009, p. 1). The basic idea of market-based approach is to internalize externalities produced by natural and human-managed ecosystems through incentive-based mechanisms. This will encourage individuals to consider their actions in relation to others, which will lead to positive outcomes such as environmental services.

2.2.3. Definition of PES

The most conventional definition of PES is noted as “a voluntary transaction where a well-defined environmental service (ES) (or a land use likely to serve that service) is being “bought” by a (minimum one) environmental service buyer from a ES provider and the ES buyer does so if and only if the ES provider over time secures the conditional provision of that service” (Wunder S. , 2005, p. 3).

Direct economic incentives for service providers by service users are more effective than indirect means of financing and command-and-control regulation for better land stewardship (Ferraro & Kiss, 2002). Thus the economic incentives help internalize the ecological externalities associated with the use of ecosystem services (Adhikari, 2009, p. 1). PES usually divides into four types of environmental services: watershed protection, biodiversity conservation, landscape beauty, and carbon sequestration.

Figure 1 shows the basic logic of PES mechanism. Engel et al (2008 p.3-4) pointed out, “Payments by service users can help make conservation the more attractive option for ecosystem managers, thus inducing them to adopt it.” Therefore, PES can be cost-effective means to improve environmental management by rewarding people for their efforts in providing ecosystem services of value to human societies (Zilberman, 2007).



Source (Pagiola & Platais, 2007)

Figure 1 The logic of PES

2.2.4. PES in the World

Many PES programs have been established all over the world. Interest has been especially high in Central and South America. According to recent reports, since Costa Rica pioneered the first formally-labeled PES program in 1996, there have been more than 280 PES programs documented worldwide (Landell-Mills & Porras, 2002). Water services are one of the major environmental services that PES programs often seek to provide to the world.

In the case of Costa Rica, PSA (Pagos por Servicios Ambientales) program has been established, funded with the National Fund for Forest Financing (FONAFIFO), and under the forestry law 7575 established in 1996 (Sanchez-Anzofeifa, Pfaff, Robalino, & Boomhower, 2007). Based on this, land users can receive payments for specified land uses, including new plantations, sustainable logging, and conservation of natural forests. The purpose of the PSA program is: 1) mitigation of greenhouse gas emissions; 2) maintenance of hydrologic services; 3) biodiversity conservation and 4) protection of scenic beauty for recreation and ecotourism (Southgate & Wunder, 2009, p. 20). FONAFIFO was established to pay for the protection of these ecosystem services on behalf of the public (UNESCAP, 2009, p. 10). PSA program is financed in a variety of ways. The primary funding source was from revenues derived from national tax on fossil fuels, which averages about US $10 million per annum (Southgate & Wunder, 2009, p. 20). Voluntary contracts with private hydroelectric producers who reimburse FONAFIFO for payments given to individuals such as upstream landowners in watersheds are also

key players in funding (Sanchez-Anzofeifa et al., 2007). Funding was also provided from international organizations, such as from World Bank Loan and Global Environment Facility grants that began in 2001 (UNESCAP, 2009, p. 10).

Other countries also have a range of PES initiatives. Mexico implemented the Payment for Hydrological Environmental Services program, which pays for the conservation of forests in hydrologically critical watersheds using revenue from water charges in 2003 (Bulas, 2004). In Ecuador, responding to water shortages and inspired by Costa Rica's PSA program, the city of Quito established a Watershed Fund, which is funded by water users and finances the protection of forest reserve for watershed Protection (Echavarria & Arroyo, 2002).

PES scheme for biodiversity conservation has emerged as well. In El Salvador, environment-conscious consumers pay a price premium for bird-friendly coffee, and the revenue returns back to producers, helping finance the extra costs of producing coffee in an environmentally friendly manner (The & Ngoc, 2006, p. 7).

2.2.5. PES Development in Asia

There are many different forms of PES that have been implemented in Asian countries, especially in Southeastern region. PES is growing rapidly in response to achieve both poverty reduction and environment conservation. Despite the high level of interests shown in PES within Southeast Asia context, PES in Asian region is still in elementary position of implementation compared to the mature programs that can be found in Central American countries that stand at a similar level of economic development. The reasons to why PES still remains in early stage relates to the challenges encountered in the region: incomplete property rights, poverty considerations, weak governance structures, and high costs of PES implementation (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 16).

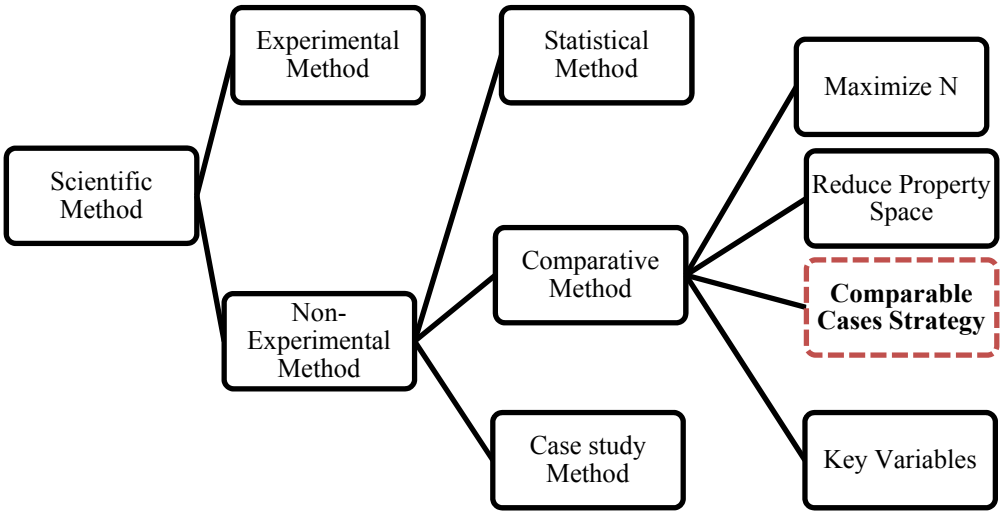
Huang and Upadhyaya (2007 p.1) argued that successful take-off of PES in Asia depend upon five factors: 1) diverse governance structures and regulatory frameworks, 2) risk of high transaction costs from high population density and low land holdings per capita, 3) weak property rights for forest and agricultural and 4) insufficient hydrological data and understanding of watershed services; and low awareness of PES.

Chapter 3. Methodology

3.1. Comparative Case Study and Case Selection

3.1.1. Comparative Case Study

The comparative case study can be defined as the systematic comparison of two or more data points (‘cases’) obtained through use of the case study method (Kaarbo & Beasley, 1999). The case study approach is good for collecting detailed information from the field and can initiate intriguing findings. However, compared to large-N studies, this approach faces difficulty to generalize the findings and faces the problem of external validity. Although there are many disadvantages to conducting a case study, Poteete and Ostrom (2008) argues that there is a lack of data concerning issues at sub-national level and that individual researchers cannot afford to carry out large-N field work.. Therefore, small-scale comparative case studies still dominate empirical studies of natural resource governance because they can portray more specific characteristics of local institutions, leading to further quantitative research (Guo, 2010, p. 35). Figure 2 shown below explains the position of small-scale comparative case study among other scientific research methods.



Source (Lijphart, 1971)

Figure 2 Typology of Scientific Method

3.1.2. Case Selection

Comparability is the core of any scientific investigation and thus is not unique to case study research (Ragin, 1987). As cited in Kaarbo & Beasley (1999, p. 380), "Comparability is the heart of any scientific investigation and thus is not unique to case study research (see Ragin, 1987, p.1)...Without comparability, of course, the researcher will not know if the variation seen in the cases is due to the explanatory variable under consideration or to the other differences between the cases (Lijphart, 1971)."

In this study, three cases have been selected for comparison. The programs are as following: SLCP in China, 5MHRP in Vietnam and The First Ten-Year Forest Rehabilitation Plan in the ROK. These programs played an important role in forest rehabilitation, along with incentive programs and logging bans, aimed at reducing the deforestation of native forests while increasing forest cover. They have also been called as either eco-compensation or PES. The three cases share many features in common: 1) they are government-led PES programs; 2) characterized by strong state authority while implementation and 3) share same side objectives, which are poverty reduction and rural development. Although the ROK reforestation policy does not fit the exact definition of PES, looking over their main efforts to restore forests implemented with various incentive programs including both cash and in-kind, it is regarded as a PES scheme in this research.

3.2. IAD Framework

3.2.1. Introduction

As detailed in Ostrom (2005 p.3)'s study, 'institutions' are defined as "the prescription that humans use to organize all forms of repetitive and structured interaction including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales."

In the field of forestry, institutions include all kinds of formal and informal prescriptions, e.g. the legal documents issued by the central government on forest management, the informal rules allowing state administration at lower levels enabling interpretation of these documents with relative freedom and the collective rules orally shared within a community (Clement F. , Amezaga, Orange, Calder, Large, & Toan, 2008, pp. 7-9).

Institutional analysis is particularly important at the pre-project or planning stage of research activities or projects, which allows decision making on appropriate institutional setting for the proposed activity (Matesaert, 2002, p. 4). He also argued that stakeholders and their networks can be identified by conducting institutional analysis, providing a baseline used to monitor, review, make changes and evaluate changes throughout the project's cycle.

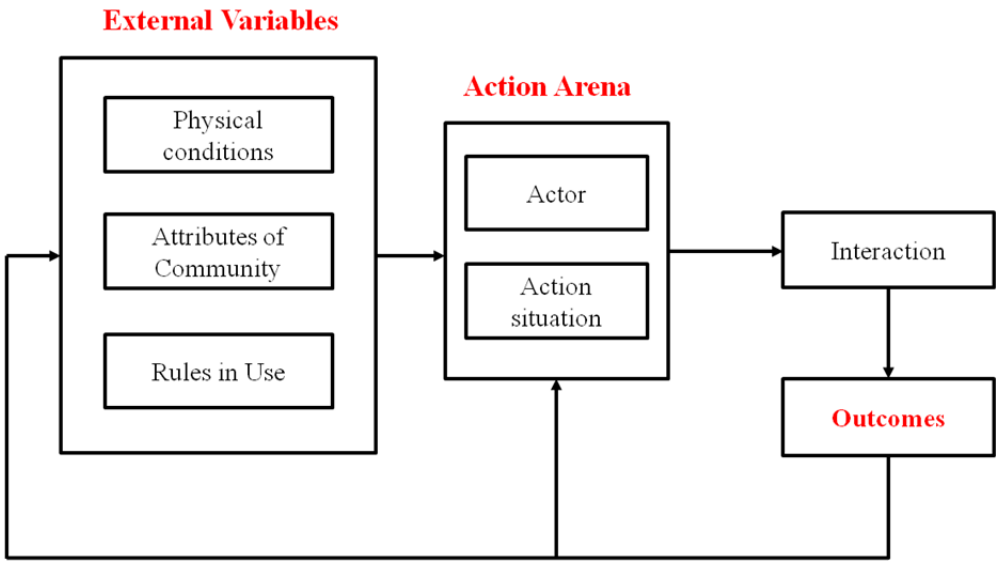
Therefore, this study focuses on analyzing the institutional settings of PES scheme. To achieve this purpose, variables of analytical framework needs to be identified.

The IAD framework, which is developed by Ostrom and other scholars, stands

out as one of the most distinguished and tested frameworks in the field of policy analysis on common-pool resources (Carlsson, 2000). As cited in Hess and Ostrom (2005 p.5)'s study, "this framework has helped researchers see the need to factor in more than the trees when studying a forest. In order to understand why one forest is becoming deforested and another is thriving, researchers need to take into account not just the condition of the soil but take heed in the biodiversity of the flora, and the density of tree growth. Equally important are the understanding of the user communities, the management systems, the various property rights involved, and the multiple levels of the rules-in-use"

3.2.2. The Basic Framework

Inputs included the contextual factors (attributes of the community, nature of the good/biophysical conditions, and rules-in-use) that encompass all aspects of the social, cultural, institutional, and physical environment that set the context within which an action situation is situated (McGinnis, 2011, p. 173). These create effects on the Action Arena consisting of actor and action situation. Figure 3 shows the interaction of the two big factors results in outcomes of policy implementation.



Source (Ostrom, Gardner, & Walker, 1994)

Figure 3 The IAD Framework

The IAD framework considers the co-actions of the external variables and the action arena. For example, the efficiency of a specific set of rules-in-use is affected by both the biophysical conditions and attributes of the community (Ostrom E. , 2005). Moreover, the IAD framework is appropriate to clarify collective action. Clement (2008, p.34) described that in the problem of collective-actions, "the analyst needs to examine how external variables influence actor's behavior, considering the actor as part of a group of actors and not as an isolated individual." The definition of each variable is shown below in Table 2.

Table 2 Definition of each variable of the IAD Framework

Variables	Definition
Actor	Individual, or group functioning as a corporate actor, who takes action
Action Situation	Participants in position who must decide among diverse actions in light of the information they possess about how actions are linked to the potential outcomes and the costs and benefits assigned to actions and outcomes
Physical Condition	Size of the resource, temporal and spatial variability of resource units, current condition
Rules in Use	Shared understanding among those involved that refer to enforced prescriptions about what actions are "required, prohibited, or permitted and the sanctions authorized if the rules are not followed"
Attributes of Community	Generally accepted norms of behavior, the level of common understanding about action arenas, the extent to which preferences are homogeneous, and distribution of resources among members

Source (as cited in Clement F. C., 2008)

3.2.3. Analytical Framework

The IAD Framework would gain analytical power in the study of environmental policy process by introducing some theoretical concepts used in political ecology (Clement & Amezaga, 2008, p. 1). Based on the basic framework, this study focuses on implementation of PES scheme in each country at constitutional level. Constitutional choice outcomes affect collective choice decision-making, which, in-turn, affects activities at an operational-level. As defined by McGinnis (2011 p.173), constitutional level is the processes through which collective choice procedures are defined, including legitimizing and constituting of all relevant collective entities involved in collective or operational choice processes

Relevant variables have been selected based on previous research. Firstly, for contextual factors, biophysical and the trends of deforestation are regarded as Physical Condition. Secondly, Formal legal and regulatory framework can be defined as rules-in-use. Thirdly, project objective and the basis of participation function as attributes of community. Fourth, actor is divided into four levels ranging from international level to local level. Finally, payment mechanism is regarded as action arena in this research. Payment mechanism can also be divided into three different arenas: according to general characteristics of PES program, according to design features and according to payment features. The detailed information is as shown below in the Table 3.

Table 3 Analytical Framework

Dimension	Criteria		Source
Physical Condition	· Biophysical and socio-economic characteristics · The trends of deforestation		Modified from (Koontz, 2003)
Rules in use	· Legal and Regulatory framework · Property Rights		Adapted from (Scherr, Bennet, Loughney, & Canby)
Attributes of Community	· Project Objectives · The basis of participation		Adapted from (Grant, 2003)
Actor	· International level · National level · Provincial level · Local level		Modified from (Kolinjivadi & Sunderland, 2012)
Action Situation	Payment Mechanism	1. Characteristics · Environmental Service · Seller · Buyer · Beneficiaries · Start year · Spatial scale · Side Objective	Adapted from (Wunder, Engel, & Pagiola, 2008)
		2. Design features · Intermediary · Seller selection · Monitoring · Sanctions · Conditionality · Baselines and scenarios · Additionality	Adapted from (Wunder, Engel, & Pagiola, 2008)
		3. Payment features · Mode of payment · Amount · Determination of payment level · Timing of payment · Differentiation · Contract duration	Adapted from (Porras, Grieg-Gran, & Neves, 2008) (Wunder, Engel, & Pagiola, 2008)

Chapter 4. Results

4.1. China's Sloping Land Conversion Program

4.1.1. Background

SLCP, also called as 'Grain for Green' or 'Conversion of Cropland to Forests and Grassland,' was initiated by the Chinese Central Government in 1999, after a devastating flood in Yangtze River Basin the previous year. It is the largest land retirement and reforestation program in the developing world with a total budget of almost CNY 430 billion (USD 45 billion), aiming at converting 14.67 million hectares of cropland to forests (4.4 million of which is on land with slopes greater than 25 degree) by 2010, and an additional goal of afforesting a roughly equal area of wasteland by 2010 (Bennett, 2008, p. 700).

The pilot project has been implemented in 3 provinces: Gansu, Sichuan, and Shanxi in 1999; as a result, it helped finalize the national plan. The whole project was fully implemented in 2002, after the announcement of 'some advices on further improving policy measures for SLCP (国务院 关于进一步完善退耕还林政策措施的若干意见),' and the 'regulations on SLCP (退耕还林条例)'(SFA, 2010). Based on the official paper, the program covers a total of 25 provinces including autonomous regions, municipalities directly under the central government (Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang), involving 1,897

counties (State Council(国务院), 2002).

Multiple agencies were involved in the process, including Ministry of Land and Resources, Ministry of Agriculture, the State Forestry Administration (SFA), and the Ministry of Water Resources, State Development and Reform commission, the office of Western Region Development of the State Council, the State Food Administration and so on (Wang & Bennett, 2004). The central government is the chief funding agency for the project, paying local farmers to stop farming and planting trees.

4.1.2. Institutional Arrangement

4.1.2.1. Physical Condition

4.1.2.1.1. Biophysical and Socio-Economical Characteristics

China is administratively divided into 23 provinces, five autonomous regions, four centrally administered municipalities, and two special administrative regions (Chokkalingam, Zhou, Wang, & Takeshi, 2006, p. 8). Within each province are prefectures and cities that are composed of counties, towns and villages. China's population in 2012 was about 1.3 billion, 64 per cent of which was rural and 36 per cent urban, and population growth rate is about 0.5 percent during 2010-2012 (ADB, 2013). Table 4 shows the biophysical and socio-economical characteristics of China.

Table 4 Biophysical and Socio-Economical Characteristics of China

Category	Contents
Land Area	9327489.9 (sq. km) (2011)
Climate	Diverse
Population	1.351 billion (2012)
GDP	USD $8.227 trillion (2012)
Forest Covered	2096239.4 (sq.km) / About 22% of land area (2011)
Classification of Forest	Arbor forest, Economic forest, Bamboo forest, Open forest land, Shrub land, Unestablished afforestation land, Unestablished enclosure land, Nursery land, Cut-over area and fired-over area, other non-stocked forestry land, forest suitable land, forestry auxiliary land, other land

Source (World Bank, 2013; FAO, 2010)

4.1.2.1.2. The Trends of Deforestation

The major causes of deforestation and expansion of degraded forest lands of China were closely linked to several political movements and the reform of forest ownership. There were two big political movements in relations to deforestation. In 1958, The Great Leap Forward focused on rapid industrial development and finally resulted in excessive logging for fuel steel and iron production. The Cultural Revolution from 1966 to 1976 had a massive impact on deforestation because of forestry administration was weakened nationwide (Chokkalingam, Zhou, Wang, & Takeshi, 2006, p. 13). Frequent tenure changes and unstable forestry policies in previous decades also brought about over-exploiting of forest resources due to fear the policies might change again (Liu, 2003, pp. 1-28). In addition, increasing wood demand for economic development have driven excessive logging and caused serious decrease in forest cover in many areas.

Chinese government implemented the 'logging ban' in 1998, sharply curtailing commercial harvesting in western and northern areas of the country (Xu, White, & Lele, 2010, p. 3). In line with this, central government initiated the SLCP in 1999. SLCP stipulates that farmers who convert degraded and highly sloping cropland back to either ecological forests (defined by SFA as timber-producing forests), economic forests (orchards, or plantations of trees with medical value), or grassland will be compensated with 1) an annual in-kind subsidy of grain; 2) a cash subsidy; and 3) free saplings, provided to the farmer at the beginning of the planting period (Xu, Bennett, Tao, & Xu, 2004, p. 318).

By implementing a large-scale tree planting and land greening campaign, China has realized an increase in both forest cover and stock volume. China has experienced a net gain in forest area, having increased its forest cover by around 40 million hectares since the late 1970s, mainly due to its policy of increasing plantation area (Xu, White, & Lele, 2010, p. 2). FAO examined that in the five years since its 2005 Forest Resources Assessment, China gained almost 14 million hectares of forest cover, showing the result that about 37 percent of China's forest lands are planted forests (Cheng & Clue, 2010, pp. 22-25).

4.1.2.2. Attributes of Community

4.1.2.2.1. Program Objectives

The main goal of the policy is that in the program region farmers are allowed to voluntarily convert sloping farming lands unsuitable for farming into forests or grasslands, and the government will provide these farmers with free grain, cash subsidies and free seedlings (Changjin & Liqiao, 2006, p. 30). As one of the largest and the biggest conservation program in the world, with a total budget of 43 billion USD, the SLCP addresses both environmental and economic concern. Besides, its ambitious goals of restoring forest cover through land conversion, the program also directly develop rural economies and reduce poverty in the areas where it is implemented (Trac C. J., Harrell, Hinckley, & Henck, 2007).

The duration of the Program is from 1999 to 2010, including pilot stage for the first 3 years. It is aiming at converting 14.67 million hectares of cropland to forests (4.4 million of which is on land with slopes greater than 25°) by 2010, and an additional goal of afforesting a roughly equal area of wasteland by 2010 (Bennett, 2008, p. 700).

4.1.2.2.2. The Basis of Participation

Participation in the SLCP is basically voluntary. However, China has a complex system of rights to a farmland, basically sustaining a collective land ownership system. Farmland households hold use rights or residual income while local collective groups or the village level hold actual ownership. Local leaders of collective group maintain land ownership rights and mainly select individual households for inclusion into the program. Since the mechanisms determining participation and implementation are complex arrangements of selection by local leaders, including consultation with village leaders and farm households, the program is not always voluntary at the household level (Lohmar, Nickerson, Uchida, & Jintao, 2007).

4.1.2.3. Rules in Use

4.1.2.3.1. Legal and Regulatory Framework

In China, the environmental governance system had been dramatically developed since 1970s (Guo, 2010, p. 145). Since then, the Chinese Government labeled a great importance on forestry. A series of grand decision making regarding forestry development has been made by central government since 1949, great achievement in forestry have been scored that made the important contribution to national economy and social development (FAO, 2010, pp. 135-136).

A former premier Zhu Rongji's business tour spanned Western China in 1999 and the pilot stage of SLCP was launched and ran from 1999 to 2001. The collected data from this pilot stage helped to finalize the national plan. In 2000, the State Council (国务院) announced 'some advices on better implementation of pilot stages of SLCP (关于进一步做好退耕还林还草试点工作的若干意见),' which became the starting point of implementation. Finally, the whole project was fully implemented at the end of 2002, after the announcement of 'some advices on further improving policy measures for SLCP (国务院 关于进一步完善退耕还林政策措施的若干意见),' and the 'regulations on SLCP (退耕还林条例)' (SFA, 2010). Continuously, based on the 'notice on improvement of food subsidy for the SLCP (管务院办公厅关于改善退耕还林粮食补助方法的通知),' the food subsidy was changed to a cash subsidy (Guo, 2010, pp. 135-141).

4.1.2.3.2. Property Rights

When China decollectivized agriculture in the late 1970s and early 1980s, the Household Responsibility Scheme (HRS) was introduced (Lohmar B. , 2006). The HRS is a village based communal land tenure system that enable farmers to be contracted with land use rights but not rights to the land itself. In line with this, complete ownership rights of natural resources and lands belong to the state, while the SLCP holds use and management rights during the period of the SLCP contract only, rather than ownership rights to the land in perpetuity (Kolinjivaldi & Sunderland, 2012; People's Republic of China, 2005). Land-users are allowed to manage and benefit from the products and services on their assigned land, based on the principle “whoever plants mainatains and benefits” (Xiaoyun, Leshan, Ting, & Bond, 2006). In conclusion, application of tenure has been found to differ obviously across local contexts in practice (Scherr, Bennett, Loughney, Canby, 2006).

4.1.2.4. Actors

4.1.2.4.1. International Level

The CCICED was established in 1992. This institution is a high-level and non-profit international advisory body, consisting of top Chinese Leaders and prominent international deputies such as Li Keqiang (vice premier of China), Zhou Shengxian (Minister of Ministry of Environment and Protection), and Klaus Topfer (former director of the United Nations Environmental Program) (Guo, 2010, p. 128). The CCICED offers channels for spreading stories on international successful experiences in the field of environment and development, conducts research on environment and development policies in China and formulates policy recommendations to the top leaders of Chinese Government (CCICED, 2013).

A number of bilateral and multilateral donor agencies also committed to provide financial aid or environmental loans to China since the 1990. In summary, there are three major types of donor approaches in China: 1) engineering approach from Japan; 2) human development approach from UN; and 3) market-based approach from World Bank (Morton, 2005). By cooperating with various international societies, China's environmental government system has become much developed and further enhanced due to the capacity of the affiliated institutions.

4.1.2.4.2. National Level

SFA is under direct control of the State Council, with the most important task defined to draft the overall annual plan which identifies the scope, key tasks, duration, and objectives of the project, as well as the estimated level of investment, and evaluation (State Council(国务院), 2002). The overall plan is reviewed and approved by the Nation Development and Reform Commission (NDRC), which is examined at Ministerial level. The general Office of Western Development under the State Council plays the role as chief coordinator in facilitating communication between the SFA and the NDRC (Guo, 2010, pp. 141-145).

4.1.2.4.3. Provincial Level

Forestry departments of each provincial government create the provincial annual plans covering exact number of reforestation quotas requested by the province based on the overall plan from SFA. Those agencies played a role in releasing compensation in cash and grain, managing land contracts with farmers, mediating disputes, selecting and measuring land area for conversion, distributing saplings or grass species, issuing contracts and monitoring results of conversion (Weyerhaeuser, Wilkes, & Kahrl, 2005)

4.1.2.4.4. Local Level

Local financial bureaus are not only responsible for managing the funding of the subsidies, but also for compensating extra demands over fixed quotas. Household farmers are the implementers of tree planting; there has being a slow start on HRS in terms of forest management. Basically local institutional units (Prefecture → County → Township → Village → Xiaozu → Household) reflect local capacities, resources, and uniquely crafted SLCP implementation regulations (Kolinjivadi & Sunderland, 2012).

4.1.2.5. Action Situation

4.1.2.5.1. Characteristics of SLCP

The SLCP is aiming at not only to conserve soil and water in China's ecologically fragile areas, but also to restructure the rural economy so that participating farmers can gradually shift into a more environmentally and economically sustainable livelihood (Xu, Bennett, Tao, & Xu, 2004, pp. 317-318). Based on the terminology of Wunder (2005 p.3), the program is a public PES scheme that was primarily paid for by the central government, with program funds managed by Ministry of Finance. Table 5 shows the characteristics of SLCP.

Table 5 Characteristics of SLCP

Category	Contents
ES	Targeted : watershed protection, reforestation Paid for : cropland retirement, conversion to grasslands, reforestation and afforestation
Seller	Rural households
Buyer	Central Government
Beneficiaries	Downstream water users, timber consumers
Initiated by	Central Government
Start Year	Pilot 1999-2001 Full scale 2002-2010
Spatial Scale	14.67 million hectares by 2010
Side Objective	Poverty Reduction

Source (Bennett, 2008)

4.1.2.5.2. Design Features

The SLCP sustains a top-down approach, starting with retirement quotas that are distributed from central to provinces, and it continues down to counties and townships and finally to participating villages. Based on regulation, only 20 percent of counties are monitored by central government and 30 percent of counties are monitored by provincial governments, and remaining counties monitored by county governments (SFA, 2001). Table 6 illustrates the design features of SLCP.

Table 6 Design Features of SLCP

	Contents
Intermediary	Local Government
Seller selection	Based on land slope, plot size, retired land contiguity
Monitoring	Frequently by village officials, less by township County, randomly by upper-level government
Sanctions	Withholding of subsidies – but weak enforcement
Conditionality	Weak Conditionality
Baselines & scenarios	No explicit baselines
Additionality	High for land retirement; lower for reforestation

Source (Bennett, 2008)

4.1.2.5.3. Payment Features

Xu et al (2004 p.318) studied that each participating farmer who convert degraded and highly sloping cropland back to either ecological forest, economic forest or grassland receive three types of compensation (See Table 7) : 1) annual in-kind subsidy of grain; 2) a cash subsidy; and 3) free saplings, provided to the farmer at the beginning of the planting period. Differences in in-kind payments are defined by the inherent differences in regional average yields (Uchida, Xu, & Rozelle, 2004, p. 249). The compensation level is different in regional average yields; 1,500 kilograms per hectare per year in the Yellow River Basin and 2,250 kilograms per hectare per year in the Yangtze River Basin. The cash subsidy is 3,150 CNY per hectare and 2,100 CNY per hectare per year in each region. Both grain and cash subsidies continue for 8 years if ecological forests are planted and for 5 years if economic forests are planted and 2 years for grass planting (Xu et al., 2004, p. 318).

Table 7 Payments Features of SLCP

	Contents
Mode of payment	Cash + grain (phased out), Free seedlings Technical assistance
Amount	Cash : CNY 300/hectare (~USD$36) / per year Grain : Yangtze River Basin : 2250kg/hectare per year Yellow River Basin : 1500kg/hectare per year Seedlings : CNY 750/hectare(including wasteland)
Determination of payment level	Depends on slopes
Timing of payment	Annual, normally
Differentiation	Higher in Yangtze River than Yellow River Basin
Contract Duration	Maximum 8 years (ecological forest) Maximum 5 years (economic forest) Maximum 2 years (grassland)

Source (Bennett, 2008)

4.1.3. Lessons Learned

The SLCP differs from other forest rehabilitation or water and soil conservation programs in China. Firstly, the program aims at integration of environmental goals with those of agricultural restructuring and poverty reduction (Uchida, Xu, & Rozelle, 2004, p. 263). Secondly, the program directly engages millions of rural households as core agents of project implementation, being essentially a public payment scheme for environmental services (Uchida, Xu, & Rozelle, 2004; Xu, Bennett, Tao, & Xu, 2004).

There are many lessons that could be learned from China. Firstly, top leaders are playing an important role in formulating policy and promoting the campaign. The CCICED consisting of high-level and non-profit advisory body including Chinese leaders, international deputy and academics, have executed the implementation of government policy and research activities. Secondly, the recognition for the importance of forestry is the starting point of implementing any kind of environemntal conservation policy. The Chinese government has attached great strategic importance to forestry development and ecological improvement, therefore implementing 6 major nationwide programs: 1)Natural Forest Protection Program; 2) Grain for Green program; 3) Sandification Control Program in Beijing and Tianjin Vicinity; 4) Shelterbelt Forestry projects in the north, northeast and northwest of China and the Yangtze River area; 5) Fast-growing and high-yielding programs; and 6) Wildlife Conservation Program, which has all yielded a considerable synergy effect (UNFF, 2011, p. 5). In order to implement these policies, forest administrative

institutions were strengthened at all levels and a forestry administrative system was gradually improved. Forest Law, a legal framework, has been established and implemented strongly whereas illegal activity was punished more severely than before. Thirdly, since the 1990s, China has joined many international conventions; it has brought China grants, advanced technology, knowledge and norms, helping develop an environmental civic society (Guo, 2010, p. 124).

Securing a tenure right will certainly serve to promote more sustainable practices and help to maintain post SLCP implementation. With regard to market liberalization in China, there has been many rising problem. From Gregersen et al (2011, p.40) stated, "China has earned the dubious honor of probably being the largest importer of illegal timber, much of it converted into furniture and export to markets in the US., Europe and Japan…China is an example of one of the broader problems that arise globally when major countries curb their own deforestation, but still struggle against rapidly growing demand for wood."

4.2. Vietnam's 5 Million Hectares Reforestation Program

4.2.1. Background

Vietnam is a mountainous country with a monsoonal climate; its economy is critically dependent on the watershed services provided by forests, especially in rural uplands where agriculture and hydropower are important sectors (as cited in Kolinjivadi & Sunderland, 2012). In that sense, the value of forest has been strongly promoted by central government of Vietnam through large-scale projects to rehabilitate and reforest millions of hectares of land (McElwee P. , 2009, p. 325). These projects are implemented by central government, international agencies and NGOs based in Vietnam. It aims to provide incentives and rewards to upland farmers to encourage them to afforest and reforest bare hills and mountains and other areas.

5MHRP has been launched as a continuation of Program 327, a nationwide reforestation program supported by the United Nations World Food Program (WFP) in the early 1990s. As detailed in Poel's report (2007, p. 11), "the program ran from 1998 to 2010, the main target being to establish 5 million hectares of forest, of which 3 million hectares aimed at forest protection and 2 million hectares in forest production, through series of cash incentives (forest protection) and preferential loans (forest production)." 5MHRP shows the government's efforts and priority given to forestry field and response to the Rio Declaration and Agenda 21 that emerged from the 1992 United Nations Conference on Environment and Development (UNCED) (MARD, 2001).

4.2.2. Institutional Arrangement

4.2.2.1. Physical Condition

4.2.2.1.1. Biophysical and Socio-Economical Characteristics of China

Vietnam is recognized for its S-like shape and located on the eastern Indochina Peninsular. The total land area of Vietnam was last reported to be 310,070 km2 in 2010, according to World Bank report published in 2012. Vietnam's GDP was recorded at 141.7 billion USD in 2012, and total population in 2012 was about 88.78 million. The climate is that of tropical monsoon: it is subject to the southwest monsoon from May to October and the northeast monsoon in winter (Jong, Sam, & Hung, 2006, p. 11). (See Table 8)

Table 8 Biophysical and Socio-Economical Characteristics of Vietnam

Category	Contents
Land Area	310070 sq km
Climate	Northern hemisphere tropical monsoon, close to equatorial climate, impacted by the Northeast and Southeast Asian monsoon.
Population	88.78 million (2012)
GDP	USD $141.7 billion (2012)
Forest Covered	139410 (2011) /44.96% of land area
Classification of forest	Production forest Protection forest Special-use forest

Source (World Bank, 2010; Vietnam Administration of Forestry, 2013)

4.2.2.1.2. The Trends of Deforestation

Forest in Vietnam has long been dominated by the state, as well as agriculture, which was collectivized in the 1960s and 1970s. McElwee (2012 p.416) noted that "after the Democratic of Vietnam was founded in 1954, forest policy had been aimed at the complete nationalization of the forest estate and the establishment of State Forest Enterprises (SFEs) to manage these lands." This practice continued until the early 1990s; the management, exploitation, processing, and distribution of Vietnam's forest resources were controlled mainly by the state. SFEs were responsible for ensuring that forests were replanted and nurtured, but SFEs that exceeded planning targets were often rewarded for over-cutting, as the revenues from this sector were high (Ogle, Blakeney, Hoe, & Hoang, 1998). In contrast, the local residents who had previously used and managed the forest lands before nationalization granted little to no financial remuneration (McElwee P. , 2012, p. 416). This is the reason for the underlying conflicts between locals and the state over land use in the past decade, in particular in the central highlands of the country (UNHCR, 2002). However, the central government has shifted to a market-oriented economy (known as Doi Moi), which instilled revisions to the national land law beginning in 1988. These changes had allowed households to take primary responsibility for production and stilled into motion a large-scale process of decollectivization (Kerkvliet, 2002).

4.2.2.2. Attributes of Community

4.2.2.2.1. Program Objectives

The 5MHRP is implemented by Government's Decision 661, also known as Program 661 from 1998 to 2010. The 5MHRP is estimated to cost about USD 2.5 billion and the main objectives are as shown in the below Table 9.

Table 9 The objectives of 5MHRP

Category	Contents
Environmental	Establishing and restoring 2 million hectares of protection forests and 3 million hectares of production forests to increase the forest cover to 43% by 2010, to ensure environmental protection requirements
Economic	Ensuring the forest products supply for development (every year 15 million m^3 of timber and 20 million hectares of fuel wood), thereby reducing the pressure on natural forests
Social	Implementing efforts for poverty alleviation, hunger eradication and development of rural mountainous areas, by creating forestry-related employment for 2 million people, and increasing the income of people living in forest areas

Source (UNFF, 2005, pp. 5-6)

4.2.2.2.2. The Basis of Participation

Any households contracting on forest protection will receive all the products from forest thinning and non-timber products in contracted area. However, there is little interest to participation for local authorities; particularly at the communal level because of state management and organization on forestry from the central to provincial level has not been strengthened, failing to create favorable conditions (FSSP CO, 2011, p. 23).

In addition, although SFEs are key actors in the provincial level, implementing units of the 5MHRP by contracting with households for forest protection and production, it failed to create clear and significant changes. Therefore, most land released by SFEs has been re-allocated to other state bodies eligible for state subsidy such as Forest Provincial Management Board (FPMB). This occurrence left most forestland under ineffective state management and many people in mountainous areas without legal access to forest resources (World Bank, 2010).

4.2.2.3. Rules in Use

4.2.2.3.1. Legal and Regulatory Framework

The central government has given high priority to forest rehabilitation, issued more than 100 legal documents and many indirect regulations. The most significant legal framework includes: 1) the Land Law and its multiple revisions (1993, 1998, 2000, 2001) – it has affected the devolution of land use rights to private organizations and households; 2) the Law on Forest Protection and Development (1991) – it has classified land and defined rules for forest protection (The & Ngoc, 2006, p. 8); 3) Decision 327(1992) and Decision 661(1998) by prime minister – it has established two main reforestation programs and 4) Decision 187(1998) by prime minister – it has introduced renovation of SFE organizational structure an management mechanisms (Clement F. C., 2008; The & Ngoc, 2006). However, some previous research revealed that centrally-designed rules have encouraged the bias in forest land classfication and state fund diversion in several ways, such as in lack of clarity and consistency, unclarification of the role of SFEs, and lack of monitoring by the central level (Clement & Amezaga, 2008).

4.2.2.3.2. Property Rights

Land belongs to the state while households, individuals, and organizations are allocated land for long-term agricultural, forestry and aquaculture development purposes (The & Ngoc, 2006, p. 9). These rights are renewable, transferable, and inheritable; land was essentially privatized. Forest ownership and management are mainly based on different forest classification. Generally, protection of forests and special use forests are under the unified management of the state and very little portion of its areas are allocated to organizations, households and individuals for management and protection (The & Ngoc, 2006, p. 9). The government allocates use rights for forest production and protection to different user groups, as shown in Table 10.

Table 10 Different User Groups of land Use Rights

	Rights and Responsibilities
SFE	They currently manage around 2 million ha of forest, 77% of which (1.55 million ha) are natural forest, and the remaining 23% are plantation forest. For the most part, SFEs can harvest timber from the area for production purposes. Some SFEs also manage protection forests, receiving budgets from central government; often local people are contracted to protect these forests. To date, many SFEs have not received land use certificates and therefore, their rights to the land (e.g. ability to exchange, transfer, lease, mortgage, or pass the land on to a third party), are restrictive. In some areas, land conflicts occur between SFEs, district and/or commune authorities and local people.
Management boards of protected areas (MBs)	It belongs to the state currently managing more than 4.3 million ha, primarily for special use and protecting forests for protection and conservation purposes. About 88% are natural forest, and the remaining 12% are plantation forests. MBs receive central government budget allocations, and in many cases, contract local people to implement protection and conservation activities.
Individual households	They manage about 3.28 million ha, 59% of which (1.96 million ha) are natural forest, and the remaining 41% are plantation. More than 1 million households are involved in these programs; many have received land use certificates with clear rights and duty to the land and forests, but not all. In many areas, land boundaries on the ground are not clearly demarcated, or the boundaries on land use noted on the certificates do not match with actual boundaries on the ground. These are sources of many land conflicts.
Commune People Committee (CPC)	They manage around 2.4 million ha, most of which (2 million ha) are natural forests. Owing to the lacking of staff and capacity, CPCs are often unable to effectively manage these areas. 'Open access' issues are common. Despite governmental efforts to allocate these areas to other forest user groups, delays have been caused by lack of budget for allocation processes, weak collaboration between Ministry of Agriculture and Rural Development (MARD) (responsible for managing the forest resources) and Ministry of Natural Resources and Environment (MONRE) (responsible for managing the land).
Community and mass organizations	Farmer unions, women and youth groups, manage approximately 850,000 ha of forest, 87% of which are natural forest. In Vietnam, communities are not yet fully recognized as legal units. None of the community and most of mass organizations have received land use certificates, thus their rights to the land have not been formalized.

Source (EU FLGET, 2011)

4.2.2.4. Actor

4.2.2.4.1. International Level

The central government was enthusiastically seeking international community to support forest rehabilitation. After launching the 5MHRP in 1998, 5MHRP partnership has been established with 15 international partners. Moreover, the broader Forest Sector Support Program and Partnership (FSSP & P) was launched in November 2001, as a means of supporting cooperation in the forest sector among 18 (now 24) international partners and governments (UNFF, 2005, p. 8). FSSP & P has played a significant role in implementing Official Development Assistance (ODA) support and capacity building.

The FSSP & P is supporting the Ministry of Agriculture and Rural Development (MARD) in its work on the revised law and implementing decrees, new strategy, revision of the 5MHRP, undertaking important studies, gender issues in forestry and forestry, poverty, and rural livelihoods (UNFF, 2005, p. 20).

Vietnam has also joined several international conventions related to environment protection, especially focusing on forestry sector, thus amplifying international cooperation.

4.2.2.4.2. National Level

The central government is in charge of formulating national strategies and developing implementation plans in compliance with the guidelines provided by the National Assembly and the Communist Party of Vietnam (MARD, 2001).

MARD is in charge of the overall national forestry strategy, including special-use and protection together with MARD's agencies tasked with forest administration. Department of Forestry is responsible for programs including not only sustainable forest management and development program but also for renovation of the forestry sector institutions, policies, planning and monitoring (Poel, 2007, p. 14). The Agro-forest Product Processing Department and the Rural Industry Department are in charge of the forest product processing sector. Forest Protection Department is in responsible for forest protection, biodiversity conservation and environmental services. The Forestry University and the Forestry Extension Division are linked to the Agriculture Extension Department (Clement F. C., 2008, pp. 65-71). Water and land management are under the responsibility of the Ministry of Natural Resources and Environments (MONRE). The Central Coordinating Committee headed by the Vice Minister of MARD was also established and it has won the entitlement to running regulations under MARD. The committee consists of leaders of specialized divisions of the related ministries and sectors such as Vietnam Administration of Forest under MARD, the Department of Agricultural Economics under the Ministry of Planning and Investment, Investment Department under the Ministry of Finance, etc (FSSP CO, 2011, p. 3).

4.2.2.4.3. Provincial Level

Clement (2008, p. 70) revealed that "rovinces have relative freedom to implement central policies within their administrative boundaries." Two forest administration agencies are main actors at the provincial level and under the control of the Provincial People's Committee (PPC). The first agency named the Department of Agriculture and Rural Development (DARD), forestry sub-department, operates as a specialized agency to assist the Director of DARD in forestry activities. The second agency Forest Protection Sub-Department, serves to advise the provinces regarding forest protection. The FPMB is also established in each locality that participated in the project. It works as a think tank to steer committees to implement the annual project plan (FSSP CO, 2011, p. 23)

4.2.2.4.4. Local Level

Although the role of SFEs has been limited after times of economic transition, they still control many portions of total land area in accordance with Decision 661, which implies an important role for SFEs in program implementation. SFEs acted as sub-project manager and beneficiaries at the same time in the district commune level.

4.2.2.5. Action Situation

4.2.2.5.1. Characteristics of 5MHRP

The main objective of 5MHRP is to establish 5 million hectares of forest, of which 3 million hectares reserved for protection forest and 2 million hectares for production forest, through a series of cash incentives (protection forest) and preferential loans (production forest). Although the central government tried to allocate the right of land management to either individual or household, the government played a significant role as sellers in forest management through the continual existence of many SFEs. McElwee (2012, p.419) pointed out, "SFEs who still controlled significant areas of the forest estate, and who were likely to be important providers of PES services, either as direct land manager or as intermediaries, despite attempts over the past 10 years to restructure the SFEs". Forest lands has been mainly managed by state, with only one quarter of total forest area in private households' control, and the rest held by various divisions of the state, from SFEs to FPMBs to National Parks to local governments to the armed services (FSSP, 2007). Government also acted as a buyer of services through business entities. Example of this can be hydropower companies and water supply organizations, those that are not private and in most cases, state-dominated as well (McElwee P. , 2012, p. 420). Table 11 shows the characteristics of 5MHRP.

Table 11 Characteristics of 5MHRP

Category	Contents
ES	Water services via forest conservation and reforestation
Seller	Individuals, Households, SFEs.
Buyer	Central Government
Beneficiaries	Individuals, Households, SFEs
Initiated by	Central Government
Start Year	1998-2010
Spatial Scale	5 million hectares (3 million hectares – protection forest) (2 million hectares – production forest)
Side objective	Poverty Reduction, Livelihood improvements

Source (modified from Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 12)

4.2.2.5.2. Design Features

Wertz-Kanounnikoff et al (2008, p. 11) reported, "funding mainly comes from the state budget, which contributed to about 63.5 per cent of the total budget; the rest comes from credit loans, overseas funds and self-financing." As also detailed in Poel's report (2007, p. 30), "Central budget directly flows from central to FPMB and SFEs being the main investment owners, whereas local people are mainly engaged and paid as laborers to carry out certain activities." SFEs played the role of intermediary and acted as sub-project managers and beneficiaries at the same time in the district commune level. The most good quality forestry land with high timber and biodiversity value has been managed by the state, while only the very poorest quality lands were distributed to households for rehabilitation (Thuan, 2005, p. 20). Therefore it has a little impact on poverty alleviation and conservation outcomes. Table 12 illustrates the design features of 5MHRP.

Table 12 Design Features of 5MHRP

Category	Contents
Intermediary	State Agencies
Seller selection	Guidelines exist, but ad hoc in reality
Monitoring	Field visits, but undermined by low frequency and local level corruption
Sanctions	In principle no contract renewal, but this is hardly enforcement
Conditionality	N/A
Baselines & scenarios	Implicit, current deforestation trends of forest loss
Additionality	Rather low

Source (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 13)

4.2.2.5.3. Payment Features

Forest lands were given out to households for rehabilitation with very small payments for protection of around $3.5-6.5 USD/hectares/year. However, forest payments were made regardless of what people did with the land. Poorest households often did not participate and lost contracted lands. The report from Vietnam Government examined that households who are contracting on forest regeneration as well as protection have the right to get entire products from forest thinning, agricultural products and non-timber products (FSSP CO, 2011, p. 8). Moreover, poor families in 62 poor districts will also be acknowledged to receive 15 kg of rice per member for one month during the time they are not able to feed themselves, the maximum duration being 7 years (FSSP CO, 2011, p. 8). However, according to reports from CIFOR, 5MHRP is characterized by rather low payment levels, which can hardly compete with more profitable cash crops, although payments have doubled in 2007 (Liss, 2008; Wertz-Kanounnikoff & Kongphan-Apirak, 2008). See Table 13 for payment features of 5MHRP.

Table 13 Payment Features of 5MHRP

	Contents
Mode of payment	Cash, In-kind
Amount	3-6.5 USD/Ha/year
Determination of payment level	Administrative
Timing of payment	Annual
Differentiation (spatial, other)	Higher for afforestation and reforestation
Contract Duration	1-5 years, renewable possible
Transaction Costs(US$)	N/A

Source (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, p. 15)

4.2.3. Lessons Learned

Since the 1990s, the National Assembly of Vietnam has established a legal framework for forest rehabilitation for long-term purposes. In the context of high level government commitment to both forest rehabilitation and economic development, implementation organization has received attention from Party Committees and authorities from central to provincial levels. A government report notes that this project has also attracted participation from many sectors of society and international communities, because of it provision of actual benefits to people, in particular to poor residents in the rural mountainous areas (FSSP CO, 2011, p. 24).

Forest cover in upland areas have been increased as a result of the program, but state-derived financing was insufficient to cover the opportunity costs of contracted land users, and tenure security was also insufficient to provide incentives to farmers (Wertz-Kanounnikoff & Kongphan-Apirak, 2008, pp. 11-12). Economic efficiency was not well-considered in the early stage of 5MHRP, resulting in tree planting that was not executed in a cost-effective and optimal fashion (Thuan, 2005, p. 8).

Land tenure reform has played an important role in successful forest rehabilitation. As Gregersen et al., (2011 p.53) detailed, “this legislation provided the basis for giving households and secured villages, providing long-term renewable land use rights certificates that included rights to trade, to mortgage and lease lands, and to transfer, inherit and transfer their use rights allocated to local

communities, household, and other economic entities." Long term tenure, which was set at a maximum of 50 years handed off more responsibility to individuals.

4.3. The ROK's The First Ten-Year Forest Rehabilitation Plan in 1970s

4.3.1. Background

Before the Japanese colonization, the ROK had a forested country with high density. However, during the colonization and the Korean War, forests were destroyed by excessive and massive cutting for fuel, and exporting purposes. The destroyed forests caused serious social problems, like lack of fuel, severe floods and drought (KFS, 2013). The Korean government established state-led forest rehabilitation projects in the late 1960s and early 1970s. The government implemented major forestry initiatives, backed by the President and with strong political will. Many direct and indirect legal frameworks have been established including the passing of a forest law, establishment of the Korea Forest Service, and the expansion of community forest cooperatives, which later were legally founded as Village Forestry Associations (VFAs) (Gregersen H. , Lakany, Bailey, & White, 2011, p. 42). In 1973, the First 10-year Forest Development Plan for rehabilitation was established. Lee & Lee (2002, p.3) noted, "with this plan, 207,000 hectares of plantation was additionally created and reached the total of 643, 000 hectares in 1977." The success of the projects received global spotlight. Lester Brown, a famous environmentalist noted in his book "South Korea is a reforestation model for the World. We can reforest the earth." (as cited in KFS, 2013)

4.3.2. Institutional Arrangement

4.3.2.1. Physical Condition

4.3.2.1.1. Biophysical and Socio-Economic Characteristics

The Baekdu Daegan Mountain Range stretches from the Baekdu Mountain in the north to Jiri Mountain in the south, forming the geological backbone of the country and dividing the watersheds of the western and eastern slopes (Lee & Park, 2011, p. 146). There are four distinct seasons in the ROK. Spring and autumn are relatively short and summer is hot and humid while winter is cold and dry with abundant snowfall except in the southern coast. Temperatures vary from region to region from 12 to 14℃ in the central and southern regions but from 3 to 10℃ in the northern regions (Lee & Park, 2011, p. 146). Table 14 shows the biophysical and socio-economical characteristics of the ROK.

Table 14 Biophysical and Socio-Economical Characteristics of the ROK

Category	Contents
Land Area	97100 sq km
Climate	Four distinct season
Population	50.00 million (2012)
GDP	USD 1.130 trillion (2012)
Forest Covered	62154 sq km / 64 % of land area
Classification of forest	Natural Forest(Conifers, Non-conifers, Mixed, Bamboo, Un-stocked, Un-surveyed) Plantation (Conifers, Non-conifers)

Source (World Bank, 2013)

4.3.2.1.2. The Trends of Deforestation

During the colonization period, as a result of excessive harvesting of timber in the Korean Peninsula far above the forest capacity, the average volume of timber per hectare decreased considerably (FAO, 2000, p. 84). In the 1950s, the Korean War was one of the worst catastrophes that brought destruction to large areas of forests, in response to needs for fuel and wood supply. Even after this period, forest degradation continued due to the unsustainable cutting and slash-and-burn cultivation (Gregersen H. , Lakany, Bailey, & White, 2011, p. 42).

In order to establish and manage the forest resources efficiently, the Forest Law was enacted in 1961 to produce a national forest plan every ten years. In 1973, the government embarked on an ambitious 'The First Ten -Year Forest Rehabilitation Plan' backed by the President's strong support. The plan was a broad-based community forestry program at the village level for the whole country, and aimed to reforest 1.0 million hectares of denuded land within 10 years. The massive reforestation project could be achieved along with an added enhancement to traditional culture of the village community (VFA), and community forestry program named 'new community movement' (also known as Saemaul Undong). Forest owners, village residents and the government authorities and other public organizations participated in community forest development.

4.3.2.2. Attributes of Community

4.3.2.2.1. Program Objective

The objectives of the First Ten -Year Forest Rehabilitation Plan between 1973 and 1978 are as following:

Objectives are 1) to implement the national tree planting movement through people's participation in various reforestation projects; 2) to develop new economic zones of forest lands in harmony with the goals of land conservation and income generation by reforestation and forest production; 3) to achieve rapid reforestation of denuded forest land through the planting of fast growing species; and 4) to accomplish the stabilization of shifting cultivation, with its fire usage as a tool for agricultural practices. The government chose April as the 'National Tree Planting Period' for its tree planting campaigns as this period is the best time to plant trees. The government encouraged various groups such as farmers, families, and students to participate in the reforestation program. Development of rural fuel wood forests and prohibiting access to the mountains substantially reduced the damage to forests. The reforestation target of 1.08 million originally planned in the First Ten-Year Plan (to be completed in 1982), was accomplished by 1978, so the second Plan began in 1979. In addition, 120,000 ha of destroyed forestland were rehabilitated by an erosion control project for soil conservation (FAO, 2000, p. 45).

4.3.2.2.2. The Basis of Participation

There is no doubt that two of the main factors that has achieved to the success of restoration projects were the keen interest and strong commitment of former President Park, Chung-Hee. In line with this, Saemaul Undong, which was initiated by him, spread out as a whole nation movement. The Korean government concentrated on reforestation with efficient execution of the plan and related this to Saemaul Undong in 1970s; the essence of this movement is characterized by diligence, self-help and cooperation (Lee & Lee, 2002). As previous study (Gregersen et al p.43) noted that "projects (including forestry projects) were selected on the basis of villagers themselves with agreement on priorities, their potential to accomplish the projects successfully, their willingness to commit their own resources to the project, and the prospect that the project actually would increase their incomes in the short run."

Different kinds of support have been provided by the central government to village or individuals solidified in both financial and in-kind resources, as well as low interest loans.

4.3.2.3. Rules in Use

4.3.2.3.1. Legal and Regulatory Framework

One of the earliest established legal frameworks is Forest Law, set in place in 1961. The Forest law promotes forest protection and forest development, besides enhancing forest productivity and public functions of forests (Lee & Park, 2011, p. 142). The Law on Erosion Control (1962), the Law on Voluntary Forest Guard Dispatchment (1963), the Shifting Cultivation Resettlement Law (1966), The Natural Park Act (1967), and The City Planning and Zoning Act (1971) helped in the success of forest rehabilitation. There is some unique existence of legal framework involved. Named 'Proxy Execution,' this legal code established the rule in that if the landowner did not comply himself to plant trees within a certain period, the government can set off the local VFA to carry out the project by proxy. After planting trees, VFA would then receive 90 percent of the output and the landowner would receive 10 percent (Gregersen H. , Lakany, Bailey, & White, 2011, p. 44). This system was mentioned as 'shared income' in the Forest Law; it means the sharing of profit gained after reforestation.

4.3.2.3.2. Property Rights

The Forest area of the ROK can be divided into three categories according to KFS: national forests (23%), public forests (8%), and private forests (69%) (Gregersen H. , Lakany, Bailey, & White, 2011, p. 44). Thus, the ROK is quite different from the cases of China and Vietnam because there was a different kind of shifting in land use rights that took place in the ROK. As detailed in Gegersen et al's study (2011 p.44) "the law of 'Proxy Execution' gave the private owners of degraded or denuded forest land the choice to either reforest and rehabilitate their forest themselves, or let their land be rehabilitated and managed by VFAs in exchange for a percentage of the output… By 1980 some 675,000 ha of private forest land was managed in this way by VFAs"

4.3.2.4. Actor

4.3.2.4.1. International Level

As detailed in Lee and Park's study (2011, p.147), the ROK received different forms of international assistance from organizations like United Nations Korean Reconstruction Agency (UNKRA) and International Cooperation Agency (ICA), or bilateral cooperation. International Organizations provided food as wages for both tree planting and erosion control projects. Food aid was steadily changed to technical assistance during the mid-1960s. The United Nations Development Program (UNDP) provided techniques for forest management which was a key factor in developing the comprehensive national forest plan.

4.3.2.4.2. National Level

In 1967, the Forest Bureau under the Ministry of Agriculture and Forestry was promoted to a status as Korea Forest Service (KFS). And KFS has been separated from the Ministry of Agriculture and Forestry, to be transferred to Ministry of Home Affairs by president's order in 1973. After transferring, KFS could take care of the Saemaul Undong, local administration, and the police strengthened forest protection using both local government and police organization (Lee K.-J. , 2013, p. 141). He noted that this established a triad system of provincial governor, mayor, and county head is in charge of tree planting and general management of the forest, a police chief is responsible for protective control, and forestry officials for technical guidance.

4.3.2.4.3. Provincial Level

Introduction of responsibility system ensures the complete protection of forests. One government official in authority is responsible for one village regarding overall implementation of reforestation. Tree planting and post-management were placed under the charge of the local government (governor, mayor and county head), protective control under the police, and technical guidance under the forestry officials.

4.3.2.4.4. Local Level

VFA and Saemaul Undong association were organized to reinforce reforestation activities. Leaders of VFA were trained to conduct reforestation activities through Saemaul Undong education programs. Lee & Lee (2002, p. 9) noted, “for positive involvement in reforestation activities, the government paid fees to the people conducting village nursery, planting, and afforestation to control erosion.” A unique administrative hierarchy was developed while implementing the policy. It combined both top-down and bottom-up approaches, leading to good lateral interactions between government and private and community entities (VFA) at each level (Gregersen H. , Lakany, Bailey, & White, 2011, p. 45).

4.3.2.5. Action Situation

4.3.2.5.1. Characteristics of the First 10 Year Forest Rehabilitation Plan

The First Forest development plan for rehabilitation strengthened the national reforestation, intensified the forest protection activities, enlarged the development funds for private forest management, expanded the national forests, and conducted forest conservation projects to improve public benefits (KFS, 1997). Lee & Lee (2002, p. 3) noted, "it targeted about one million hectares of the country, which was to advantage 0.5 hectares of planted area per household for 2.4 million households in rural areas." Table 15 describes characteristics of the ROK's the First Ten-Year Forest Rehabilitation Plan.

Table 15 Characteristics of the First Ten-Year Forest Rehabilitation Plan

Category	Contents
ES	Conversion to forests and grasslands
Seller	Individual, Community
Buyer	Central Government
Beneficiaries	Individual, Households, Community
Initiated by	Central Government
Start Year	Initial stage 1967-1972 1st Forest development plan 1973-1978
Spatial Scale	Targeted 1 million hectares for ten years (1973-1982)
Side objective	Poverty reduction, livelihood improvements, economic development

Source (Lee & Park, 2011, pp. 138-149)

4.3.2.5.2. Design Features

Local government played a role in intermediary. Under the responsibility systems, it ensured that one government officer is in charge of caring one village regarding overall implementation of reforestation and local government could select the possible participants (either individual or village level) based on guidelines made by Ministry of Home affairs. They were also in charge of post-management of reforestation. Protective control was placed under the guidance of the police. Technical guidance had been provided to villagers, local governors, and related forestry officials. See Table 16 for design features.

Table 16 Design Features of the First Ten-Year Forest Rehabilitation Plan

Category	Contents
Intermediary	Local Government
Seller selection	Following guidelines made by Ministry of Home affairs
Monitoring	Post-management was placed under the charge of the local government and protective control under the police
Sanctions	N/A
Conditionality	N/A
Baselines & scenarios	N/A
Additionality	N/A

Source (Lee K.-J. , 2013, p. 141)

4.3.2.5.3. Payment Features

The central government implemented different kinds of compensation for the effort of reforestation such as providing free seedlings and fertilizers under the Five-Year Fuel Wood Forest Establishment Plan, which was run from 1968 to 1972. In line with this, government purchased seeds that were collected from planted forest in cash. The households who participated in compulsory labor for plantation also received the right to collect fuel wood. Instead of cash compensation, sometimes corn and wheat-flour were provided for daily compulsory labor for planting. These resources were mainly funded by the United States, in response to Public Law 480. See Table 17 for payment features of the First Ten-Year Forest Rehabilitation Plan.

Table 17 Payment Features of the First Ten-Year Forest Rehabilitation Plan

Category	Contents
Mode of payment	Cash In-kind
Amount	Cash – purchased seeds and daily labor In-kind – provided corn or wheat flour for daily labor for planting, free seedling and fertilizers
Determination of payment level	Administrative
Timing of payment	Daily, Weekly
Differentiation (spatial, other)	Depends on working hours
Contract Duration	Proxy Execution

Source (Lee K.-J. , 2013, pp. 67-77.; Lee & Park, 2011, p. 147)

4.3.3. Lessons Learned

The success of forest rehabilitation in the ROK during the 1970s and 1980s is often regarded as a model for the world. This success was achieved by the strong will drive of the president and determination of the people and government to rehabilitate the country's forests. The ROK's success of reforestation is also different from Europe and United States, where economic growth had positive impact on forest rehabilitation. In many cases of developing countries, it is revealed that economic growth does not guarantee an increase of forest size.

The major factors contributing to success in the forest transition of the ROK is voluntary participation of locals. As Gregersen (2011 p.43) explained "…is the program that involved thousands of villages in the ROK establishing, managing and protecting plantations and carrying out various activities to restore degraded lands. The village forestry program, cooperating with Village Forestry Association and Saemaul Undong, was at the core of the first forest plan, and is credited with the 're-greening' of the ROK."

But the most important factor behind successful forest restoration was the substitution of fossil fuels for fuel wood, as forest degradation had mainly been caused by the excessive fuel wood consumption. Park (2012 p.152) pointed out that "…in this respect, intersectoral cooperation between the energy policy and rehabilitation policy during the mid-1950s was an effective approach."

4.4. The DPRK's Current Status of Deforestation

4.4.1. Background

The DPRK has a mountainous topography covering approximately 80 percent of the total land area by forest; the livelihood of people mainly depends on forest products generated from forest ecosystems (Lee & Park, 2011, p. 151). However, a recent study related to an analysis of satellite image data shows that the area of degraded forests in the DPRK is about 2.84 million hectares out of a total forest land of 8.99 million hectares (Park J. , 2010). This damage has resulted in biodiversity loss, soil erosion and deterioration of hydrological dynamics and natural resources (Lee & Park, 2011, p. 152). Converting forest to farmland coupled with the increasing demand for fuel wood has become the main causes of this decline (Park, Lee, & Lee, 2013, p. 23).

With regard to the growing concern over this problem, the government of the DPRK began to change its forestry policies after 1990. Several laws and regulations have been enacted in accordance with reforestation policy, such as Forest Law in 1992. Park et al (2013, p. 21) noted that the DPRK has implemented more conclusive actions for forest rehabilitation along with seeking the assistance of other nations. In October 2001, the central government also announced 'The Ten Year Reforestation Plan.'

Despite these numerous efforts, soil erosion on sloping lands continued and energy shortage in the rural areas became more severe (UNCCD, 2006, p. 11).

Therefore, in order to rehabilitate degraded lands and forests, fundamental problems must be addressed.

4.4.2. Institutional Arrangement

4.4.2.1. Physical Condition

4.4.2.1.1. Biophysical & Socio-Economical Characteristics

The DPRK is characterized by a mountainous terrain, originally covering about 80 percent of the total land area by forest. The DPRK has four distinct seasons; its winters are long, cold and dry, while its summers are short, hot, humid and rainy. The territory of the DPRK covers more than 10,000 watersheds, which possesses rich wetland fauna and flora. The DPRK has a comparatively rich biodiversity when one considers the size of its territory and water bodies (Teplyakov, 2012, p. 41). See Table 18 for biophysical and socio-economical characteristics of the DPRK.

Table 18 Biophysical and Socio-Economical Characteristics of the DPRK

Category	Contents
Land Area	120,410 sq km (2011)
Climate	Four distinct seasons
Population	24.76 million (2012)
GDP	Not reported
Forest Covered	55394 sq km / 46% of land area (2011)
Classification of forest	Industrial timber production forest Forest with economic values Protected area/conservation forest Non-woody forest Non-forested land Firewood forest Grassland

Source (UNCCD, 2006; World Bank : DPRK, 2013)

4.4.2.1.2. The Trends of Deforestation

The amount of forested area in the DPRK has been declining in recent years. This is due to many factors including population growth and conversion to farmland, increase of firewood consumption, forest fire and failure of pest control (Lee & Park, 2011, p. 151). As detailed in Forest Resource Assessment Report published by FAO, forest cover of the total land area in 1990 is recorded at 68 percent, but only 47 percent in 2010 (as cited in Teplyakov, 2012, p. 47). It means that one percent of forestlands were lost in every single year. Lee and Park (2011 p.152) pointed out, "forest degradation may thus cause the decline of soil productivity, reduction of natural regeneration capacity of the soil, soil erosion and nutrient loss, decrease of water regulation functions and reduction of soil carbon sinks." Consequently, it may have caused a vicious cycle that perpetuated food crisis, soil erosion and many other related social problems. Table 19 illustrates the forest cover in the DPRK over time.

Table 19 Forest Cover in the DPRK over time (area in '000 hectares)

Category	1976	1990	2000	2005	2010
Forests	8,970*	8,201	6,821	6,187	5,666
Total	12,054	12,054	12,054	12,054	12,054
% of forests	74.4%	68.0%	56.6%	51.3%	47.0%

*Data is not calibrated by FAO

Source (Teplyakov, 2012, p. 47)

4.4.2.2. Attributes of Community

The government prohibited cutting trees and cultivation of forest land without permission in order to protect against deforestation and forest degradation. They forced people to sign a document called ‘Contract for Forest Protection’ in 2009.

Traditionally, there existed undersized forest conservation groups called ‘San Yiyongban’ in each county, composed of retired workers and housewives, to take charge of daily forest protection and management (Korea Forest Research Institute, 2008, p. 39). They received certain forest area by armed forest management board as well as being monitored by them. These small groups were allowed to cultivate in the permitted area when the central government could not provide adequate food. However, these became the main causes for forest degradation because food crisis was getting worse. The central government tried to prevent ongoing cultivation on the permitted land, but it failed because these local people were highly depended on the lands for their living – it has provided them with fuel wood. Thus, the local government, responsible for local forests, could not force strict regulations to ongoing cultivation.

4.4.2.3. Rules in Use

In the mid-1990s, the DPRK started to change its forestry policies. Park et al. (2013, p.21) noted that "it was faced with an ongoing economic crisis and the collapse of the eastern European socialist regimes, complete with the natural disasters in the 1990s, which severely impeded the North's economic recovery." In order to overcome this situation, the central government of the DPRK attempted various economic recovery measures such as market reform and finally resorted to international aid in 1995 (Park, Lee, & Lee, 2013, p. 21).

In 1992, Forestry Law was enacted based on government's judgment that the responsibility of forest management falling in the hands of local authorities has led to the acceleration of deforestation due to the lack of support and control from central government (Kim, 2012, p. 71). The central government also established the Department of the Land and Environment Protection in 1996, and re-organized the institutions based on specific purposes. As a consequence of repeated natural disasters in the mid-1990, the high level authorities of the DPRK began to recognize the importance of environmental protection. In 2000, the DPRK started to take more ambitious actions to rehabilitate its forests, seeking the assistance of other nations. The central government announced the 'The Ten Year Reforestation Plan,' which established a long-term plan to expand forest coverage during the period from 2001 to 2010.

With regard to property rights, the forest belongs to the state, but the right to use the forests is reserved by organizations, enterprises, and groups under state control.

The use of the forest is explained in more detail in Park et al. (2013, p.22)'s study, defining that "those permitted to use forest resources have an obligation to preserve and exploit them according to the Forest Development Design Body's plan and the characteristics of particular environments. In 1980s, in order to maximize the production of forest products, the North devised a policy of 'allotment' by which lands were parceled out to organizations, enterprises, schools, and other groups so as to cultivate and manage forests competitively, despite scarce labor and resources." However, despite the numerous policies installed to solve severe deforestation, the real problems in their governance are not effectively organized.

4.4.2.4. Actors

The Ministry of Forestry is responsible for forest administration except for timber producing forests. To add, the main tasks of the forestry offices that are installed in each county are: afforestation, protection, forest fire management, and education and dispatchment of forest firewatchers (Kim, 2012, p. 71). The Ministry of Land and Environment Protection (MOLEP) established for the supervising their territorial integrity, such as managing all of the businesses related to use of national land and natural preservation as well as the fishery and agricultural assets not covered by their respective ministries (Park, Lee, & Lee, 2013, p. 26). As the Table 21 shown below, the DPRK allocates forests to different administrative organizations according to its purposes. Table 20 shows the forest administrative system in the DPRK.

Table 20 The Forest Administrative System in the DPRK

Administrative Structure	Agency in Charge (Timber Production)	Agency in Charge (National Land and Environment Management)
Central government	• Ministry of Forestry • Bureau of Forest Production Management	• Ministry of land and Environment Protection • Bureau of Forest Management
Province	• Bureau of Forestry Management • Forest Products Station	• Bureau of Land and Environment Protection Management • The Forest Development Design Station
County	• Industrial forest division • Forest production division • Propaganda division	• Department of land and Environment Protection Management • Forest management station • Silviculture station
Village	• Silviculture Operation Office	• Forest supervisor

Source (Park, Lee, & Lee, 2013)

4.4.3. Lessons Learned

Degradation of forest lands in the DPRK is due to many factors including population growth and conversion to farmland, increase of fuel wood consumption, forest fire and damage by noxious insects, repeated natural disasters and economic hardship in the 1990s (Lee & Park, 2011, p. 152). The central government of the DPRK has recognized the situation seriously, thus implemented policies and legislations designed to conserve land resources and promote its sustainable use. They also have been developed partnership with international agencies such as United Nations Convention on Combat Desertification (UNCCD), implemented the National Action Plan 2005-2009 to combat land degradation in the DPRK (Lee & Park, 2011, p. 153). But there exists many gaps between the plan and practice, such as lack of database and information, weakness in legislation and guidelines, lack of advanced knowledge, insufficient financial resources and technical capabilities, and the effectcs of the geographic and climte change (Lee & Park, 2011, p. 155). In addition, in order to rehabilitate degraded forests, the people have to gain the security through economic recovery. This is the only way to decrease the dependence on forests for sustaining their life, for example, illegal logging for food and firewood.

Chapter 5. Discussions

5.1. Lessons Learned from China, Vietnam and the ROK

- **Highest Levels' Attention and Support**

China, Vietnam, and the ROK generally have in common and which supported their forest rehabilitation. Above all, major changes started from the highest levels of government realizing the importance of forest. Government started to establish rules in forest conservation and shifted major policies in land tenure reform. In China, the massive damage resulted from devastating floods in 1998 that associated with deforestation, the Central government initiated 'SLCP' along with implementing series of legislation. In Vietnam, deforestation resulted from increasing scarcity of wood for a growing timber industry along with economic transition. Since there economy is critically dependent on the watershed services provided by forest, the value of forest has been strongly promoted by the central government through large-scale projects to forest rehabilitation. In the ROK, the scarcity of fuel wood among rural people caused by excessive and massive cutting during the colonization and the Korean War. It has also resulted in many social and environmental problem, the central government established state-led forest rehabilitation projects in the late 1960s and early 1970s, instigated by the President. As explained above, the highest levels of government recognized the value of domestic forests, the environmental and economic problems that caused by deforestation and forest degradation. Increased education, training, and scientific

research and development contribute to more sustainable approach. Raising awareness of functions of forests as protectors of watersheds that feed agricultural and urban areas and role in biodiversity conservation has been actively promoted by government. Besides, forests tend to take on greater national cultural and spiritual meaning.

- **Land and Forest Tenure Reform**

In China, decollectivized agriculture in the late 1970s and early 1980s, the HRS along with forest tenure reform was introduced. The HRS is a village based communal land tenure system that farmers are contracted land use rights but not rights to the land itself. The core idea is "whoever plants maintains and benefits" (as cited in Kolinjivadi & Sunderland, 2012, p. 10), timber markets were opened to allow communities to negotiate sales and purchases of wood (Gregersen H. , Lakany, Bailey, & White, 2011, p. 9). In Vietnam, the Forest Land Allocation has been fully implemented by central government, the rights of use of lands were renewable, transferable, and inheritable, land was essentially privatized. In the ROK, different from China and Vietnam, the portion of private forests were way higher than public forest, therefore the central government encouraged the private owners to rehabilitate their forest with the law of 'Proxy Execution'. Land owners have a choice either reforest and rehabilitate their forest themselves or let their land be rehabilitated and managed by VFAs in exchange for a percentage of the output. Due to Major shifts in policies in terms of forest tenure reform, intensified its reform and

the establishment of various forms of forest dwellers' uses of the forest rights were important role in motivating participation.

- **Enhancing International Cooperation along with Demonstration Activities**

For the sustainability of reforestation policy, special forestry fund was established which supported both cash and in-kind to rural households. In China, a number of bilateral and multilateral donor agencies also committed to provide financial aid or environmental loans to China since the 1990s. In Vietnam, the central government was enthusiastically seeking international community to support for forest rehabilitation. The special partnership has been established with international partners as a means of cooperation in the forest sector, it has played a significant role in implementing the policy and capacity building. In the ROK, they received international financial assistance that provided food as wages for both reforestation and erosion control project. The ROK also received techniques for forest conservation; it has contributed to the progress in the country's capacity building on forest management.

- **Establishing a Special Forestry Fund**

Special Forestry Fund has been established in all countries. Case in China, they established 'Eco-compensation fund' for project implementation besides central government allocated higher portion of budget in forestry field during the implementation period. Vietnam also launched 5MHRP Fund through Forest Sector

Support Partnership in cooperation with international donor society; it helps to sustain the program while implementing the policy. In Korea, special forestry fund has been established in National budget system, it is circulated not only for implementing forest rehabilitation by central government but also providing loan for individual foresters. The budget short for the fuel-wood project was to be solved by special assignment out of the reserve funds (Lee K.-J. , 2013, p. 73).

- **Planting Appropriate Species along with Capacity Building**

Type of species and techniques must be chosen carefully taking into account each case based on the regional character; climate conditions, local needs and marketability in the region must be considered. This can be achieved by the establishment of a land use database; it will serve as an important tool for making an overall rehabilitation plan as well as implementing in practice. Institutional capacity must be strengthened and professionals trained to provide technical assistance along with transferring advanced technology and knowledge.

- **Ensuring the Economic Compensation and Incentive**

Sharing the vision of short and long-term benefits with local people and encouraging participation for forest rehabilitation will promote more active involvement in the program. Clear guidelines along with relevant legal binding should be developed on the basis of each local situation (Lee & Park, 2011, p. 171).

5.2. Further Implications to the DPRK

The DPRK has shown efforts in forest conservation. They have enacted forest law in 1992, and also established the Ten-Year Reforestation Plan in 2001. However, despite the numerous policies installed to solve severe deforestation, the real problems in their governance are not effectively organized. To overcome the situation, there are several implications from the case studies that might spark causes for change.

First, the starting point of change should be from the highest level of government and their amount of attention placed in forest conservation. Fortunately, Kim Jong Eun has mentioned the importance of forest in his speech last year and has consequently announced a plan to increase forest cover within 10 years.

Second, the DPRK needs to acknowledge that international assistance is the most important tool to create an incentive-based reforestation policy. Given the situation of declining financial resources, national, regional, and international cooperation needs to be strengthened. International cooperation along with demonstration activities is expected to facilitate and strengthen institutional capacity building besides transferring advanced technology and knowledge (Lee & Park, 2011, p. 155).

Third, to motivate local people, the DPRK government should introduce clear and secure legal binding rules for land tenure. Reasonable settlement of land tenure rights is a key for successful rehabilitation projects, including clarity and security of long-term ownership and the rights of harvest from forest products.

Fourth, forest governance in the DPRK is inefficiently organized as of now, calling for immediate improvement. Considering, they boast a well-established and systemized forestry organization structure connecting the central government to local levels, they may apply this advantage to the best method possible.

Fifth, incentives should be delivered in both cash and in-kind. Grain subsidy will help reduce the cruel role of famine to the people.

Sixth, the government should plant more appropriate species according to regional characteristics. Type of species and techniques must be chosen carefully taking into account each case based on the regional character; climate conditions, local needs and marketability in the region must be considered. In the ROK, for example, Japanese larch, Korean white pine, and pitch pine were planted for restoration of burned forest areas. Pitch pine, Siberian alder and firma alder were planted to prevent erosion, and black locust was recovered to proper stands with continued management (Lee & Park, 2011, p. 144). Seventh, in order to rehabilitate degraded forests, several fundamental problems must be solved in the early stages of the plan. Considering the life of people in the DPRK highly dependent on forests for food and fuel wood, a solution is needed to help explore efficient fuel wood production or find alternative energy sources. In addition to this, international assistance needs to be ensuring food safety and security for the people while implementing forest rehabilitation.

Chapter 6. Conclusion

Forest rehabilitation acted as significant roles under the diversified socio-economic and natural conditions in many Asian countries. In particular, China, Vietnam and the ROK have experienced dramatic forest land use changes driven by different socio-economic and political developments, from deforestation and forest degradation to reforestation and ecological restoration (Lee & Park, 2011, p. 170). They've also currently received global attention for the incentive-based reforestation policy, what the central governments call eco-compensation or PES. Considering that PES is regarded as cost-effective means to improve environment by rewarding people for their efforts by providing ecosystem services of value to human societies, it has great potential to solve deforestation problem when practiced.

This study specifically examined the institutional settings of each country's PES policy. Different from current studies of PES, which is mainly focused on its own payment mechanism, this study reviewed the flows of policy implementation. Inputs include the contextual factors and their effects to action arena including actor and action situation.

By conducting comparison through the IAD framework, many lessons have been found. Lessons learned regarding market instrument to forest conservation will provide a practical guidance to those who urgently need forest rehabilitation, in particular the DPRK, which records a high degree of deforestation.

First, development of feasible ecological compensation policy is needed for the DPRK. Payments should be designed in realistic transactions and should be locally

negotiated, and based on realistic ecosystem services' values and opportunity costs of forest communities. Second, the DPRK must note that long-term tenure ensures more responsibility of people on their land. Third, backed by strong political will, voluntary public participation could be mobilized. There needs to be a promotion in public awareness on environmental issues, so that the government can increase performance and efficiency of forest rehabilitation project. Fourth, the DPRK urgently needs to seek international aid to support their reforestation program. The DPRK should consider establishing the forest support partnership as a means of seeking international aid. Finally, the DPRK needs to understand that capacity building and technology transfer are both important components of policy implementation. Last but not least, the DPRK should avoid becoming a 'deforestation exporter' during the reforestation period. For example, China and Vietnam are known to illegally import logged timber while they also take effort to conserve their own nature. This type of activity is labeled as 'deforestation exporter.'

The ROK has experience in successfully restoring its forests which had been on the verge of desertification and has turned around degraded forest lands into green forests (Park C. , 2012, p. 142). This experience doubled with financial assistance from international societies will offer an important role in forest rehabilitation in the DPRK. Since the two Koreas share the same peninsular, the ROK has been directly affected by the degradation of forests in the DPRK. Therefore, it is important that the authorities of the two Koreas start cooperating with each other now rather than waiting until after reunification (Park C. , 2012, p. 162). There are some laws from

the two Koreas regarding the reforestation project. In the ROK, the laws related to the reforestation project in the DPRK are the Inter-Korean Exchange and Cooperation Act, the development of the Inter-Korean Relations Act, and the Framework Act on Forestry (Lee H.-w. , 2012, p. 132). There are three laws in the DPRK related to reforestation project, such as the Inter-Korean Economic Cooperation Act, Forest Law in 1992, and Environmental Protection Law (Lee H.-w. , 2012, p. 133). These legal binding documents will play a vital role in forest rehabilitation in the DPRK.

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Abstract (Korean)

중국, 베트남, 남한의 산림환경서비스지불제 비교분석 : 북한 산림 황폐화 복원에 주는 함의

소속 서울대학교 산림환경학과
성명 최가영

산림은 목재공급이라는 경제적 기능 이외에도 생물다양선 보전, 수원함양, 탄소저장, 경관보전, 휴양기능 등 다양한 환경서비스를 제공한다. 그러나 이는 공유재의 특성을 가지고 있어 무분별한 자원의 남용을 야기하고 이로 인해 산림 훼손 및 생물다양성 감소, 수토유실, 경관훼손 등 다양한 환경문제와 이를 둘러싼 이해당사자들간의 갈등 등 많은 사회문제를 초래하고 있는 것이 사실이다. '산림환경 서비스지불제(PES)'란 이와 같은 부정적인 외부효과를 내부화하여 문제를 해결 하고자 하는 시장기반의 접근 방법으로서 서비스 수혜자가 공급자의 보전 노력에 경제적 보상(지불)을 하는 것으로 정의될 수 있다.

이에 본 연구는 1990 년대 이후 더욱 심각해지고 있는 북한의 산림 황폐화 복원의 새로운 방안으로서의 PES 도입을 모색해보고자 하였다. 이를 위해 중국의 대표적인 PES 사례인 퇴경환림환초사업(Sloping Land Conversion Program), 베트남의 Five Million Hectare 산림복원사업 (Five Million Hectare Reforestation Program), 남한의 1970 년대 치산녹화 사업을 비교 분석 하였다. 물론 현재의 PES 정의에 비추어 볼 때 남한의 치산녹화 경험을 PES 사례로 정의하기에는 어려움이 있으나 당시 정책을 추진하는 데 있어 다양한 경제적 보상 기제가 제공되었다는 점에 있어 본 연구에서는 이를 PES 사례로 간주하고자 한다.

그러나 본 연구는 중국과 베트남이 과거 사회주의계획경제체제에서 시장경제체제의 전환을 모색한 체제전환국 이라는 점, 남한은 치산녹화기 박정희 전 대통령이 강력한 리더십으로 계획경제를 추구하였으나 기반은

시장경제체제였다는 점, 북한은 아직까지도 사회주의 계획경제체제를 표방한다는 점에서 서로를 비교하는 데 한계점을 가지고 있다. 하지만 중국과 베트남, 남한 모두 산림복원을 위해 시장 기제를 도입하였고, 강력한 정부의 리더십으로 정책이 추진되었다는 점에 있어 현재 북한 산림 황폐화 복원에의 정책적 함의를 모색해볼 수 있을 것이다.

각 국가의 사례분석을 위해 본 연구에서는 제도분석틀 (Institutional Analysis and Development Framework)을 활용하였다. 제도분석틀은 사회현상을 이해하기 위해 필요한 요소로 물리적 속성 (Physical Condition), 규칙(Rules in use), 공동체 속성(Attributes of Community), 행위자(Actor), 행동의 장(Action Situation) 등 다섯 가지의 항목을 제시하고 있다. 제도분석틀은 특정의 행위상황에서 행위자들의 결과에 영향을 미치는 물리적 속성과 규칙에 의해 부과된 제약, 각 공동체의 속성 등을 모두 고려하여 결과를 파악한다. 이를 통해 각각의 속성들이 자연적, 사회적 맥락과 어떻게 연결되어 있는지를 알 수 있고 서로의 유인구조가 무엇인지를 보다 구체적으로 파악할 수 있으며, 이는 사회현상의 효율적인 설명과 예측을 가능하게 한다. 본 연구에서는 PES 에 맞게 선행연구를 바탕으로 각 속성의 요인을 보다 세분화 하여 분석에 활용하였다.

세 국가의 사례분석을 통해 많은 공통점과 차이점이 발견되었으며 이를 종합하면 다음과 같다. 첫째, PES 도입은 국가 지도층의 산림에 대한 인식변화에서부터 시작되었다는 것이다. 강력한 지도자의 의지 아래, 국가 지도층에서 산림보전의 중요성을 인식하고 이를 보전하기 위해 다양한 법과 제도 개혁을 추진하는 데서 PES 가 도입되고 실행될 수 있었다. 특히 모든 산림을 국가가 소유하는 중국과 베트남의 경우에는 산림의 이용권에 대한 권리를 강화함으로써 국민들의 보다 적극적인 사업참여를 이끌어 낼 수 있었다. 둘째, 국제사회와의 협력을 통해 보다 효율적으로 사업을 추진하였다. 중국은 환경개발협력위원회를 두어 선진 해외사례를 적극적으로 연구할 뿐만 아니라 이를 실제적인 정책추진에

반영하였고 베트남은 산림분야지원 파트너십 구축을 통해 국제사회의 지속적인 재정지원을 이끌어 냈다. 남한 역시 UN 기구의 원조를 통해 물적 지원 뿐만 아니라 기술 지원 등을 통해 역량강화를 꾀할 수 있었다. 셋째, 산림복원을 위한 특별기금을 조직하여 산림복원사업이 지속적으로 추진될 수 있게 하였다. 넷째, 현금 뿐만 아니라 곡물, 묘목, 거주지 이전 지원 등 보상기제를 다양화하여 보다 적극적인 국민들의 참여를 이끌어 냈다.

북한 역시 최근 들어 산림 황폐화 복원을 위해 산림법 개정, 산림관련 조직 개편, 10 개년 산림복원 정책 추진 등 많은 노력을 기울이고 있다. 그러나 여러 정치·사회적 환경으로 인해 이러한 노력들이 효과적으로 운영되고 있지 않은 것이 사실이다. 따라서 북한 산림황폐화 복원을 위해서는 보다 적극적인 국제사회와의 협력과 공조를 통한 정책추진이 요구되고 있다. 남한은 이미 성공적으로 산림을 복원한 경험을 가지고 있기 때문에, 북한에 우리의 치산녹화 노하우(Know-how)를 이전하는 것을 넘어서 국제사회에 북한의 문제를 적극적으로 알려 보다 많은 지원과 협력을 이끌어내야 한다. 이를 위해서는 현존하는 법·제도 이외에도 보다 현실적인 제도구축이 뒷받침 되어야 하며, 이는 현재 북한이 가진 다양한 환경 및 사회문제 해결의 시발점이 될 수 있을 것이다.

주제어 : 산림환경서비스지불제, 산림황폐화복원, 제도분석틀, 북한
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