Cambodia REDD+ Feasibility Survey
Final Report
Summary and Project Idea Note (PIN)

2013. 11

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KOREA FOREST SERVICE

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I. Introduction

Since climate change has become an inherently important global issue, reducing emissions from deforestation and forest degradation in developing countries (REDD+) has gathered international awareness as a key issue in the Post-2012 discussions. In this regard, now is the time for the Republic of Korea to strengthen its role in the forest sector to actively address climate change and conduct activities to obtain carbon credits. The Korea Forest Service (KFS) has secured a friendly environment for the implementation of REDD+ activities through continuous forest cooperation with the Government of Indonesia. This study aims to conduct a feasibility study (FS) on Cambodia for its high REDD+ carbon credit potential and suggest a model to secure REDD+ carbon credits in Cambodia upon mutual agreement of the two countries.

II. Analysis of Methodology

In order to conduct the feasibility study (FS) of the REDD+ Project, a concrete methodology is in need for the assessment process. This feasibility study (FS) has selected the most applicable methodology as the VM0007 amongst the 4 types of VCS REDD+ methodology through analysis, based on the fact that a number of preparations are carried out in accordance with the Verified Carbon Standard (VCS) methodology in the voluntary carbon market and that the trading of carbon credits are in effect.

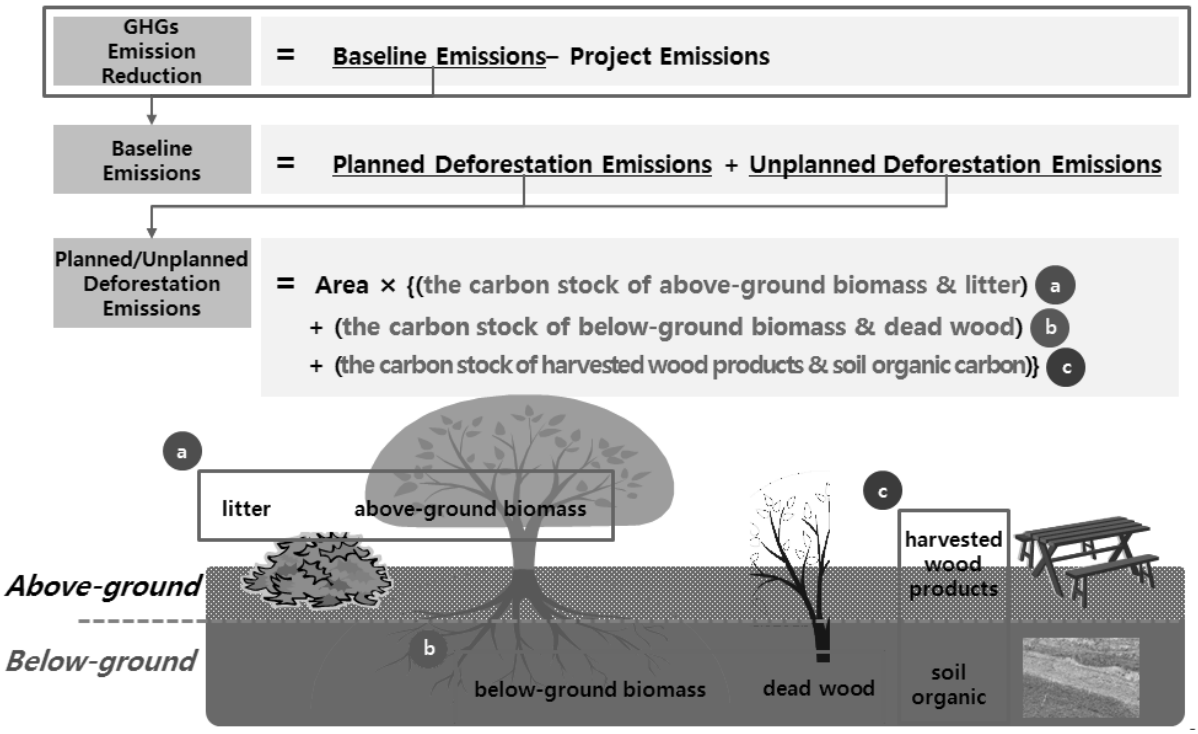
1. Selection

Prior to evaluating the REDD+ Project in Cambodia, this study has selectively analyzed the carbon market and methodology that will be used for the Project assessment. Even though the REDD+ Project has been considered as the new climate regime since 2012 the consensus amongst nations have not come to a conclusion to move on from the voluntary carbon market. Therefore, the aim is to adapt the voluntary carbon market utilizing the VCS carbon off-set policy which is the most frequent in the voluntary market.

There are 4 types of REDD+ methodology suggested by the VCS. The 4 types of methodology have selected application range amongst unplanned deforestation, planned deforestation, and forest degradation.

2. GHGs Emission Reduction Accounting Process

The GHGs emission reduction accounting process suggested by the VM0007 methodology is as follows. (See Figure 1) The GHGs emission reduction is determined by the planned/unplanned deforestation carbon stock and the variable used in the reduction accounting process can be classified into a) the carbon stock of above-ground biomass & litter and its area; b) the carbon stock of below - ground biomass & dead wood and its square area; c) the carbon stock of harvested wood products (HWPs) & soil organic carbon and its area. Moreover, these variables can be reclassified into area, carbon stock of above-ground and below-ground biomass, litter, dead wood, HWPs, and soil organic carbon.

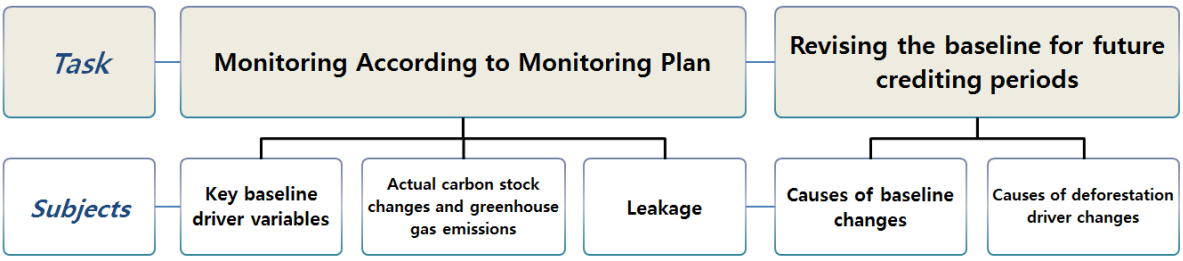


[Figure 1] GHGs Emission Reduction Accounting Process

3. Monitoring Method

A. Monitoring

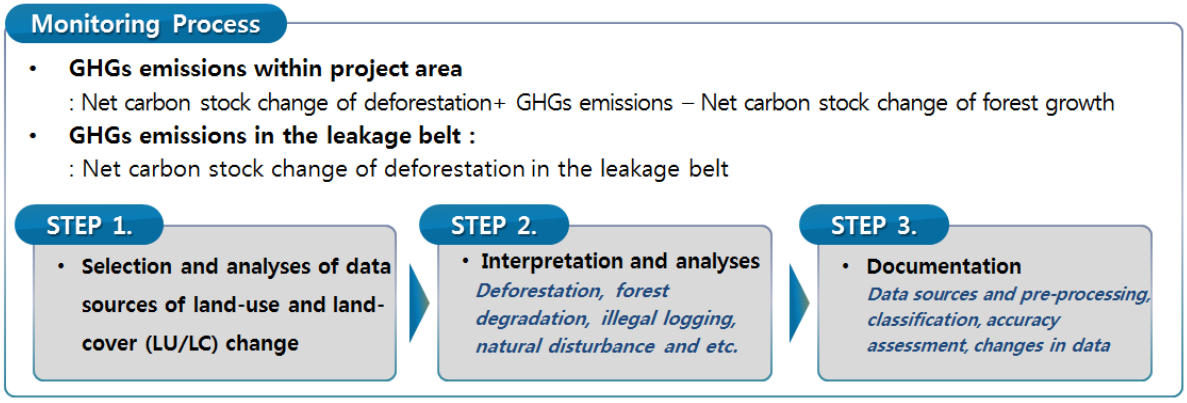
The monitoring in accordance with the VM0007 methodology is largely divided into monitoring by planning and monitoring for revising the baseline once in every 10 years. (See Figure 2)



[Figure 2] Monitoring Task and its Subjects

B. Monitoring Process

The monitoring process is divided into 3 steps. (See Figure 3) The first step is to select and analyze the data source on land use and land use change. The second step is to analyze the monitoring data of deforestation, forest degradation, and illegal logging, etc. The last step is to conduct an accurate evaluation on the analyzed data, calculate the GHGs emission reduction, and complete the monitoring process by documentation.



[Figure 3] Monitoring Process

III. Forest Policy and Methodology Analysis

In order to verify the implementation foundation of the REDD+ Project in Cambodia, a survey was conducted on the basic factors such as law and regulation, policy, REDD+ implementation status, drivers of deforestation and forest degradation, etc.

Based on the analysis of legislation such as Forest Law, Environmental Protection Law, Land Law, etc.; policies such as National Forest Programme, UN-REDD Programme, etc.; and REDD+ implementation status & drivers of deforestation and forest degradation; Cambodia is ready for the implementation of REDD+ projects in terms of national foundation.

1. Law and Regulation Analysis

The conclusion of the law and regulation analysis (on Forest Law, Environmental Protection & Natural Resources Management Law, and Land Law/Land Acquisition Act, etc.) is that the legal basis of Cambodia is sufficient for the implementation of REDD+ projects.

The Forest Law is the main foundation law for the implementation of REDD+ projects that promote sustainable forest management; encourages the establishment of the forest management plan to protect the forest in accordance with the detailed provisions; and prohibits collecting forest products and byproducts in the forests.

The Environmental Protection & Natural Resources Management Law determines the protection area and notifies it to the relevant ministries. This in particular indicates that the implementation of REDD+ projects for Core Zones regarding the additionality may be difficult. However, if the deforestation has already occurred in a Core Zone, the additionality authentication is possible. Therefore, it is critical to identify in advance whether the Project area is included as the Core Zone.

The Land Law/ Land Acquisition Act state that the national government and public bureau holds the ownership of the forests as public property. Also, more than 90% of the forests in Cambodia are classified as national forests. Hence, there is no anticipated difficulty in the utilization of forests for the implementation of REDD+ projects and organization of stakeholders regarding the distribution of carbon credits.

2. Policy Analysis

In the case of policy, the National Forest Programme and UN-REDD Programme were selected as the subjects for analysis. The National Forest Programme was established by the Government of Cambodia as a national plan to suggest implementation method and action plan for sustainable forest management, GHGs emissions reduction through REDD+ implementation, and livelihood improvement of Indigenous Peoples and other forest-dependent communities.

The UN-REDD Programme is the United Nations collaborative initiative on REDD that supports REDD+ processes and promotes the involvement of all stakeholders in REDD+ implementation, establishment of the REDD+ project foundations such as the forest carbon inventory, development of the REDD+ Project Road Map, and other contents in Table 1.

Component	Contents	Roadmap Section
Component 1	National REDD+ Readiness Management arrangements and stakeholder consultation.	Sections 1 and 2
Component 2	National capacity-building towards development of the REDD+ strategy and implementation framework	Sections 3 and 4
Component 3	Subnational REDD+ capacity-building and demonstration	Subnational activities found in Sections 2-6
Component 4	Support to development of the Monitoring system	Sections 5 and 6

[Table 1] UN-REDD+ Programme Configuration in Cambodia

Therefore, this survey concludes that the forest policy in Cambodia is ready for its implementation of REDD+ projects due to the level of foundations built in accordance with the National Forest Programme and UN-REDD Programme.

3. REDD Case Study

There are several on-going REDD+ projects in Cambodia. First, the Oddar Meanchey Project has been currently registered at VCS and the Seima Project is at the feasibility evaluation step. Moreover, there are other Projects that have completed its feasibility study such as Prey Long, Northern Plain, and Southern Cardamom, etc. However, since the projects of Semia, Prey Long, and Northern Plain are located near the candidate project area of this Project, it is important to identify the geographical boundaries of each project.

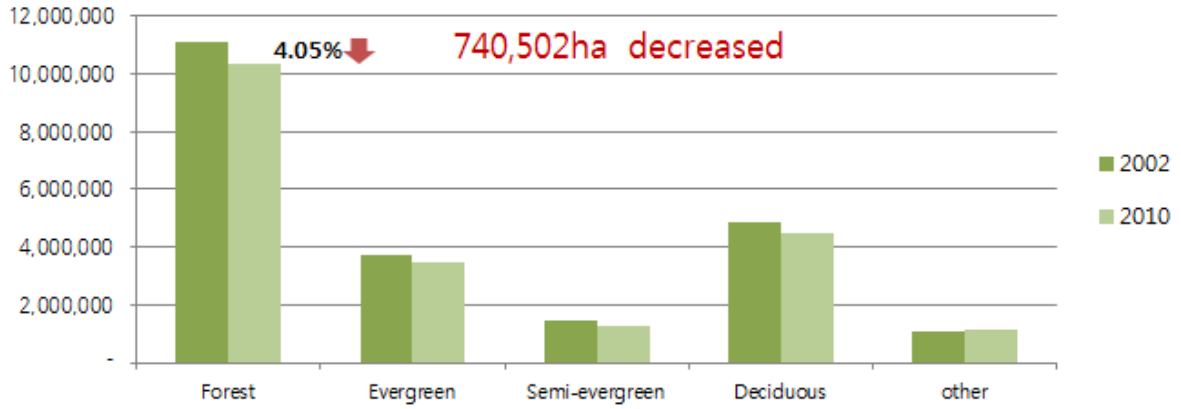
Project Name	Project Region	Status	Project Area(ha)	Stakeholders		Financial Support
				Institute	Role	
Oddar Meanchey Community Forestry REDD Project	Oddar Meanchey	REDD registered (VCS)	56,050	Forestry Administration of Cambodia		Denmark, UK, Newzeland, USA
				PACT	Operation	
				Children's Development Association	Education	
				Terra Global Capital	PDD writing	
				Clinton Climate Initiative	Technical Assistance	
Prey Long Forest under transition to protected forest	Prey Long	Feasibility study completed	400,000	Forestry Administration of Cambodia		Japan (BOCM)
				JICA	Funding	
				CI Foundation Japan	Operation	
				Kyushu University	Inventory Survey	
				University of Hyogo	Educational Manual	
Seima Protection Forest	Seima Protected Forest	Feasibility study completed	187,000	Forestry Administration of Cambodia		-
				WCS	Operation	
Southern Cardamom REDD+ Project	Cardamom Mountain	Feasibility study completed	465,839	Wildlife Alliance	Operation	-
				ONF International	PDD writing	

[Table 2] REDD+ Project Implementation in Cambodia

4. Analysis on Drivers of Deforestation

A. Current Status of Forests in Cambodia

The total forest cover of Cambodia is 18,160,670ha, which is 62.7% of the total land area of Cambodia. Studies show that Cambodia has lost 740,502ha of forest cover from 2002 to 2010, due to deforestation and forest degradation. (See Figure 4)



[Figure 4] A Comparison of Deforestation Area in Cambodia

B. Drivers of Deforestation

The drivers of deforestation and forest degradation are classified into planned deforestation and unplanned deforestation. The drivers of planned deforestation are subcategorized into Economic Land Concession (ELC), road construction, and mine development.

Economic Land Concession (ELC) has been issued to a total of 118 companies regarding 1,190,000ha of forest land by May 2012. The road construction mainly consists of highway construction and the deforestation near the construction site of the Asian Highway is especially increasing. In the case of mine development, there has been 8 concessions issued to metal mines and 24 issued to non-metal mines, but illegal mining activities are also being practiced at the same time.

The main driver of unplanned deforestation is illegal logging. The illegal logging can be also divided into 2 categories: slash-and-burn agriculture practiced by the indigenous people to obtain fuel & maintain livelihoods and illegal logging performed with the purpose of smuggling the harvested wood to neighboring countries.

Due to the fact that wood is the most popular fuel source (fuel wood utilization is more than 85%) and most people are slash-and-burn farmers in Cambodia, the spreading of deforestation is inevitable. In addition, due to the renovation of highways, proliferation of illegal logging for smuggling is also becoming a social problem.

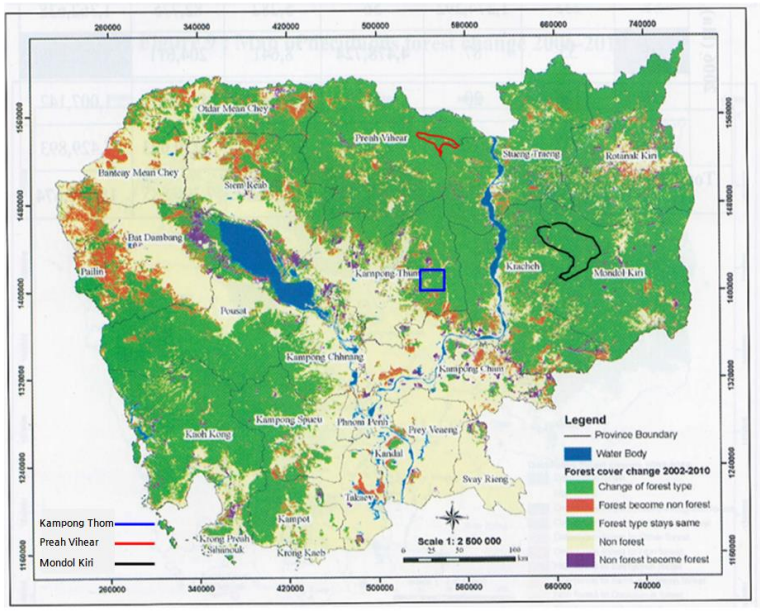
IV. Feasibility Study on the Candidate Project Area

The feasibility study(FS) of the candidate REDD+ Project area have been conducted on the drivers of deforestation, REDD+ case studies, forest management status, and forest classification & deforestation rate .

According to the FS, the Kampong Thom candidate project area is adjacent to the Prey Long Project area of CI Japan. Also, the Preah Vihear and Mondolkiri candidate project area overlap with the projects in Northern Plain and Seima conducted by WCS. Therefore, a consultation or discussion regarding the project area, reference area, and boundary delineation is necessary in all three candidate project areas with the other project managing organizations.

1. Feasibility Study Content

The FS was conducted in 3 different regions of Cambodia: Kampong Thom, Preah Vihear, and Mondolkiri.



[Figure 5] Map of the Candidate Project Area

For the Kampong Thom and Preah Vihear candidate project area, a satellite imagery analysis and a field study of interviews and sampling survey was conducted. For the remaining Mondolkiri candidate project area, the evaluation was made based upon the Project Design Document of another project carried out in the same area.

The contents of the FS includes the governance to determine the potential of implementation of REDD+ projects; drivers of deforestation, deforestation area, and carbon removal to examine the GHGs emission reduction potential; and REDD+ case study to detect the redundancy of project area or reference area.

Standard	Review contens
Governance	• Resident's participation
Potential For GHG Mitigation	• Deforestation rate • Reduction potential - More than minimum reduction (0.84tCO2/yr·ha) of registered VCS REDD+ projects
Stakeholder	• Economic Land Concession issues in candidate project area • Geographical boundaries surrounding REDD+ projects

[Figure 6] Feasibility Study Contents of the Candidate Project Area

A. Sample Survey Standards

Taking the total forest cover and forest type under consideration, Kampong Thom candidate project area and the Preah Vihear candidate project area were each concluded to have 6 and 10 sampling points for the sampling survey.

The number of sampling points (plots of land) for the sampling survey was concluded as 6 for the Kampong Thom candidate project area and 10 for the Preah Vihear candidate project area, taking the total forest cover and forest type under consideration. The sampling points were classified into wood, (large pole, middle pole, small pole) dead wood, litter, and soil. The details are as Table 3.

Classification	Survey	Methods
Large pole plots (dominate trees)	Large pole (DBH≥50)	Set the standard of DBH of large pole plots in consideration of tree species, DBH measurement, stand density and distribution of the trees within the sample plots.
Middle pole plots	Middle pole (50cm> DBH ≥10cm)	Set the standard of middle pole plots as trees larger than 5cm of DBH and taller than 1.5m of height in consideration of the stand density and distribution of the trees within the sample plots, but not install the small pole plots.
Small pole plots	Small pole (DBH <10cm)	
Dead wood plots	Dead wood	Survey the volume and decay class of stump and log woody debris.
Litter plots	Litter	Collect the litter samples 3 times by using litter frame and put the samples in the plastic bags to avoiding anti-moisture. Do not collect the litter samples in the sample plots which are relatively at low level of litter contents.
Soil plots	Soil	Collect the soil samples 3 times by using a soil sampler and put the soil samples in every 10cm using plastic bags to avoiding anti-moisture

[Table 3] Feasibility Study Subjects within Sampling Point

2. The Kampong Thom Candidate Project Area

A. Current Status of Forest Management

Since the Kampong Thom Province has established its own forest management plan and a Community forest by voluntary consent of the indigenous community, the Forest Management System in the Kampong Thom candidate project area is considered to be sufficient for the implementation of the REDD+ Project.

B. Drivers of Deforestation

The main driver of deforestation in the Kampong Thom candidate project area was identified as the unplanned deforestation caused by the indigenous people and their livelihoods. In particular, the population has increased by 120% from 1998 to 2008, resulting in the spread of deforestation.

Region	1998년	2008년
Turn Ring	2,191	5,668
Sochet	1,572	2,779
BoengLvea	2,408	7,573
Kraya	5,510	9,636
Total	11,681	25,656
Rate		120%

[Table 4] Population Change in the Kampong Thom Area

C. Forest Classification and Deforestation Rate

The satellite imagery analysis of the Kampong Thom candidate project area **based on** the Landsat imagery has detected a decrease in the forest of evergreen by 6.19% and 17.90% of other forests.

The sampling survey of the Kampong Thom candidate project area has measured the carbon stock from 100 trees of 6 plots, 122 soil samples, and 1,066g of litter samples. As a result, the estimated measure of carbon stock in the evergreen forest was 181 tC/ha, other forests as 48.3 tC/ha, and grassland as 66.5 tC/ha.

D. GHGs Emission Reduction Potential

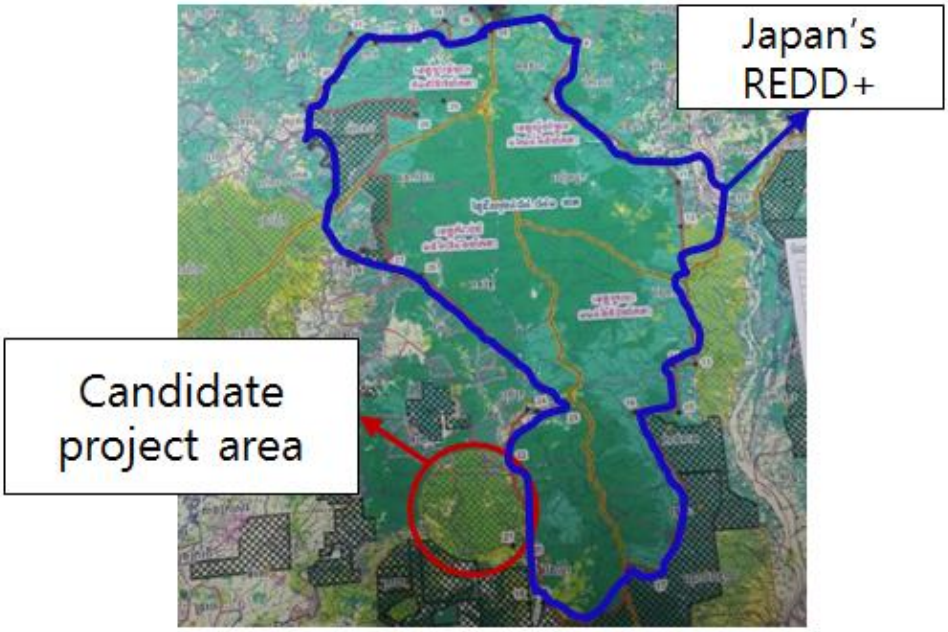
The project activities in the Kampong Thom candidate project area is divided into 3 major activities: providing support for forest protection activities, training, and livelihoods of the indigenous people. The project scenario is to reduce deforestation by 30% through REDD+ project implementation, when assuming that deforestation will occur in the same rate as in the past 11 years for the next 30 years. The GHGs emission reduction potential will be estimate of 3,853,670 tCO_2e, according to the premise.

The Project budget comes to an estimate of 1,831,547,955 KRW based on the average monthly income per household and population growth and the carbon credit benefits comes to an estimate of

18,225,932,265 KRW. Therefore, the FS shows that there are no problems in terms of the economic efficiency.

E. REDD+ Case Study

It has been revealed through the FS that the Prey Long Project area, conducted by Conservation International Japan (CI Japan), is adjacent to the Kampong Thom candidate project area. Therefore, a discussion over the project area, reference area, and boundary delineation is necessary to avoid conflict of interest.



[Figure 7] Comparison between Kampong Thom Area and Prey Long Area

F. Study Results

In terms of governance, the Kampong Thom candidate project area has a relatively high-efficient forest management system. In terms of forest cover and deforestation area, it has a slightly higher deforestation rate compared to the national deforestation rate of Cambodia. In terms of GHGs emission reduction potential, the Kampong Thom candidate project area has 4 times more than the minimum GHGs emission reduction of the REDD+ projects registered at VCS. However, since it is neighboring the Prey Long REDD+ Project Area, there is a possibility of facing a conflict of interest regarding the reference area and so on. Therefore, a discussion over the boundary delineation with the authorities of CI Japan is inevitable.

Standard	Status
Governance	• Forest management association which is composed of voluntary participated people is being operated.
Potential For GHG Mitigation	• Deforestation rate(2.48%/yr) is higher than Cambodia's national deforestation rate(0.45%/yr). • Potential reduction is evaluated as 3.39 tCO2/yr· ha and it is 4 times more than minimum potential reduction(0.84tCO2/yr· ha) of the registered projects at VCS.
Stakeholder	• It is beneficial to REDD+ projects because there is no region where ELC was issued in candidate project area. • It is neighboring the project and reference area of Prey long REDD+ project of CI Japan and they are not determined yet. - It is inevitable to discuss the boundary delineation with CI Japan

[Figure 8] Kampong Thom Candidate Project Area Review

3. The Preah Vihear Candidate Project Area

A. Current Status of Forest Management

The forest management system of the Preah Vihear candidate project area follows a national policy named the NFP Programme. However, the forest management system seems weaker than the Kampong Thom candidate project area, since the forest protection association established by the participation of the indigenous community is still under configuration.

B. Drivers of Deforestation

The drivers of deforestation for the Preah Vihear candidate project area was identified as both the planned and unplanned deforestation. In the case of unplanned deforestation, there is more than the illegal logging caused by indigenous people and their livelihoods. The increase of illegal logging practiced by outsiders is operating as the main driver of unplanned deforestation. In the case of planned deforestation, the Economic Land Concession (ELC) has been issued to a total of 8,959ha for rubber plantation and Agricultural Complex, which overlaps with the candidate project area by 10%. Moreover, there is a Resource Protection Zone within the candidate project area that provides the sandstones used for the repair work of the Temple of Angkor Wat. Therefore, in order to promote the implementation of REDD+ projects, the negotiations regarding the Economic Land Concession (ELC) and Resource Protection Zone must be set as a priority.

C. Forest Classification and Deforestation Rate

The satellite imagery analysis of the Preah Vihear candidate project was conducted based on the Landsat imagery of 2003 and 2012. The results have shown a total decrease of 7,719ha (14.70%) of forest area within the candidate project area. Although there has been a significant decrease in semi-evergreen forests, 90% of the deforestation area of semi-evergreen forests has transferred into deciduous forests and this fact must be taken under careful consideration when establishing the project scenario.

The sampling survey of the Preah Vihear candidate project area has measured the carbon stock from 166 trees of 10 plots, 108 soil samples, and 538g of litter samples. As a result, the estimated measure of carbon stock in the semi-evergreen forest was 307.7 tC/ha, deciduous forests as 112.9 tC/ha, and wetland as25.9 tC/ha.

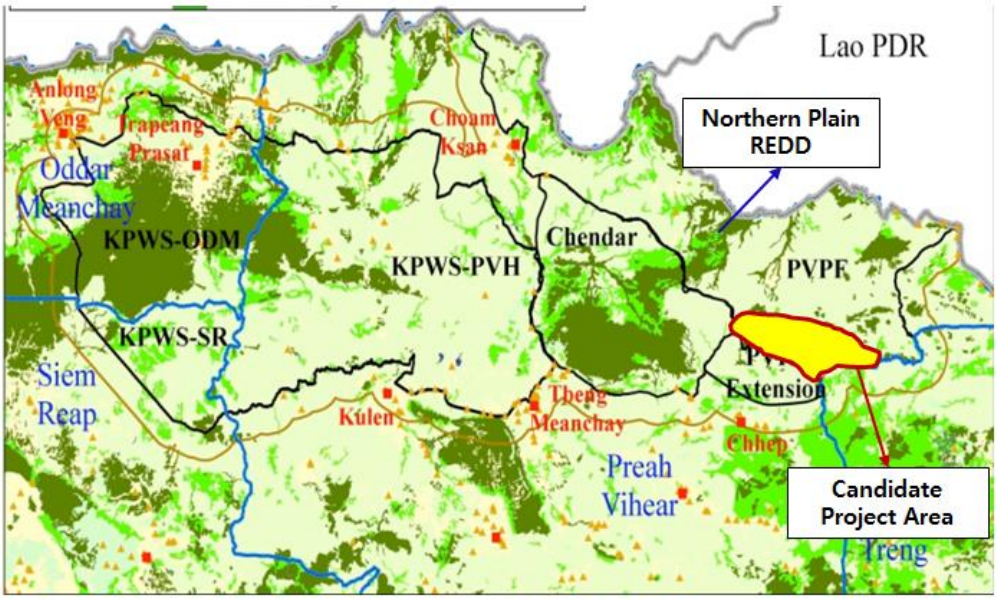
D. GHGs Emission Reduction Potential

The demonstration activities in the Preah Vihear candidate project area is divided into 2 major activities: supporting the forest protection activities and providing training. The project scenario is to reduce deforestation by 30% through REDD+ project implementation, when assuming that deforestation will occur in the same rate as in the past 11 years for the next 30 years. The GHGs emission reduction potential will be an estimate of 4,325,326 tCO_2e, according to the premise.

The Project budget comes to an estimate in between 170 million to KRW 5.2 billion KRW based on the average monthly income per household and population growth and the carbon credit benefits comes to an estimate of 20.4 billion KRW. Therefore, the FS shows that there are no problems in terms of the economic efficiency.

E. REDD+ Case Study

It has been revealed through the FS that the Northen Plain REDD+ Project area; conducted by the Forestry Administration of Cambodia, Ministry of Environment of Cambodia, and Wildlife Conservation Society (WCS); is adjacent to the Preah Vihear candidate project area. Therefore, a discussion over the project area, reference area, and boundary delineation is necessary to avoid conflict of interest.



[Figure 9] REDD+ Implementation Status in Neighboring Area of Preah Vihear

F. Study Results

In terms of governance, the Preah Vihear candidate project area has a relatively high-efficient forest management system. In terms of forest cover and deforestation area, it has a slightly higher deforestation rate compared to the national deforestation rate of Cambodia. In terms of GHGs emission reduction potential, the GHGs emission reduction amount of the candidate project area is positioned in the top 20% amongst the registered VCS REDD+ projects. However, since the Preah Vihear candidate project area overlaps with the Northern Plain REDD+ Project Area by 70%, difficulty in the implementation of the REDD+ Project is anticipated.

Standard	Status
Governance	• Forest management association which is composed of voluntary participated people is being operated.
Potential For GHG Mitigation	• Deforestation rate(1.97%/yr) is higher than Cambodia's national deforestation rate(0.45%/yr). • Potential reduction is evaluated as 11.67 tCO2/yr· ha and it positioned in the top 20% amongst the registered VCS REDD+ project.
Stakeholder	• There are companies given ELC in candidate project area • It is overlaping with Northern Plain REDD+ project area by 70%.

[Figure 10] Preah Vihear Candidate Project Area Review

4. The Mondolkiri Candidate Project Area

The FS for the Mondolkiri candidate project area was conducted through literature survey and estimated the approximate numbers of deforestation area and carbon stock.

A. Drivers of Deforestation

The Mondolkiri candidate project area used to be referred as one of the last unexplored frontiers in Cambodia, however, road development along side with the development in agriculture and tourism has resulted in massive deforestation. Still, the FS has concluded that the deforestation is mainly concentrated in the southern part of Mondolkiri Province and has less impact on the candidate project area which is located in the northwestern part of the Province.

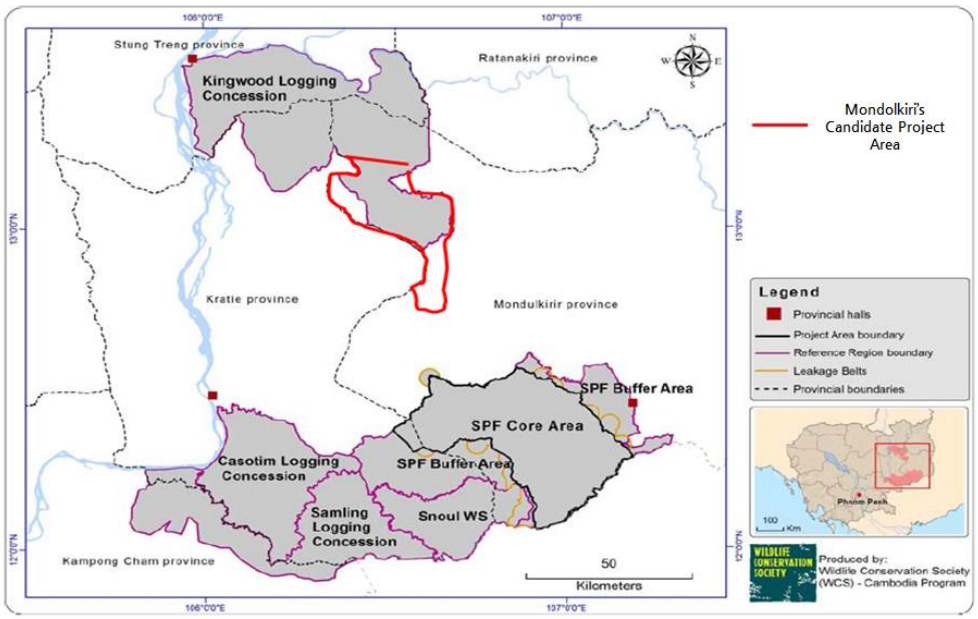
B. Forest Classification and Deforestation Rate

Since the sampling survey and satellite imagery analysis was not conducted on the Mondolkiri candidate project area, the carbon stock and GHGs emission reduction was estimated based on the Seima REDD+ Project Design Document. The results shows that the Mondolkiri candidate project area is consisted of a pure deciduous forest and has 151 tC/ha of carbon stock. The deforestation area was concluded as an estimate of 2,270ha by applying the national deforestation rate of deciduous forests in Cambodia.

C. REDD+ Case Study

According to the results of the FS, WCS
Therefore, a discussion over the project area, reference area, and boundary delineation is necessary to avoid conflict of interest.

The FS has discovered that the implementation of a REDD+ Project by WCS is currently under validation in the Seima area. According to the Project Design Document of the on-going Seima Project, the reference area overlaps by 70% with the Seima candidate project area proposed by the Korea Forest Service.



[Figure 11] REDD+ Implementation Status in Neighboring Area of Mondolkiri

D. Study Results

In terms of GHGs emission reduction, the Mondolkiri candidate project area does not reach 1/2 the amount of the minimum GHGs emission reduction registered as VCS REDD+ projects. Moreover, since the reference area overlaps with the Semia REDD+ Project that is currently under validation, difficulty is anticipated in the implementation of REDD+ projects.

Standard	Status
Governance	• Unknown(Excluded in the survey)
Potential For GHG Mitigation	•Potential reduction is evaluated as 0.37 tCO2/yr· ha and it does not reach ½ the amount of the minimum reduction (0.84tCO2/yr·ha) registered as VCS REDD+ proejcts.
Stakeholder	• There are companies given ELC in candidate project area. • It is overlaping with Seima REDD+ project of WCS

[Figure 12] Mondolkiri Candidate Project Area Review

V. Conclusion and Suggestions

A feasibility study (FS) was conducted on the 3 candidate project areas (Kampong Thom, Preah Vihear, and Mondolkiri) recommended by the Forestry Administration of Cambodia to promote the implementation of REDD+ projects in Cambodia. The FS was carried out through a literature survey, a satellite imagery analysis, and a field study of interviews and sampling surveys to study the governance, GHGs emission reduction potential, and stakeholders.

First, the FS concluded that the Kampong Thom candidate project area has high-efficiency for governance, forest management system, and GHGs emission reduction potential. However, since it is neighboring the Prey Long REDD+ Project Area, a discussion regarding the reference area and boundary delineation to avoid conflict of interests is inevitable.

Second, the Preah Vihear candidate project area was also concluded to have high-efficiency for governance, forest management system, and GHGs emission reduction potential. However, the candidate project area overlaps with the Northern Plain REDD+ Project and also need to discuss the boundary delineation.

Lastly, for the Mondolkiri candidate project area, the FS only conducted the surveys on GHGs emission reduction potential and stakeholders, due to the limited amount of time in the research schedule. However the results are not optimistic, since the project area does not even reach 1/2 the amount of the minimum GHGs emission reduction registered as VCS REDD+ projects and the reference area overlaps with the Semia REDD+ Project that is currently under validation.

In conclusion, difficulty is anticipated for the implementation in the Mondolkiri candidate project area, but for the Kampong Thom and Preah Vihear candidate project area it seems that the negotiations on boundary delineation maybe possible regarding the implementation stage of the on-going REDD+ projects. Therefore, in order to take action in the implementation of REDD+ projects in the Kampong Thom and Preah Vihear candidate project areas, planning a negotiation with CI Japan and WCS through the Forestry Administration of Cambodia is inevitable.

Project Idea Note (PIN)

Summary

The proposed project area, a total of 25,639ha, is located in the eastern forest of the Kampong Thom Province. The main driver of deforestation and degradation in the project area is unplanned deforestation caused by Indigenous People for their livelihoods. Therefore the project activities were examined and designed to support the livelihood of the Indigenous People. The carbon stock based on the land cover type in the project area appeared to be 181.0tC for evergreen forests, 48.3tC for other forests, and 66.5tC for grasslands. The deforestation and degradation area land change over the past 11 years (2003-2013) in project area, turned out to be a total of 9,545ha based on the Change Matrix.

The project scenario is to reduce deforestation by 30% through REDD+ project implementation, assuming that deforestation will occur in the same rate as in the past 11 years for the next 30 years. According to the VM0007 methodology, the amount of GHGs emission produced from the project land area change appeared to be an estimate of 2,898,593tCO_2eq and the GHGs emission reduction potential appeared to be an estimate of 3,853,670tCO_2eq, if the deforestation area reduced by 30% in the next 30 years as expected.

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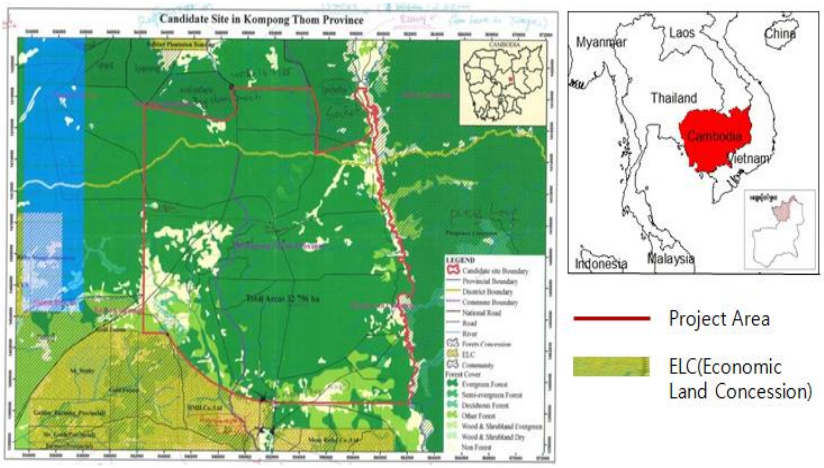
1. Project Overview

1.1 Project Location

Kampong Thom Province is an administrative division located in the central area of Cambodia. As the second largest province by area in Cambodia, the total area is 1,244,764ha and the forest area accounts for approximately 52% (656,057ha). The proposed project area of 25,639ha is located in the eastern forests of Kampong Thom Province and is mostly consisted of evergreen forests (89%, 22,849ha).



[Figure 1] Project Area in Kampong Thom

1.2 Project Participants

- Forestry Administration of Cambodia: Responsible for the operation of REDD+ projects
- Korea Forest Service: Responsible for the financial support of REDD+ project activities, VCS registration, and monitoring.

2. Development of Project Activities

2.1 Drivers of Deforestation and Forest Degradation

The main driver of deforestation in the Kampong Thom candidate project area was identified as the unplanned deforestation of illegal logging caused by the indigenous people and their livelihoods.

- Small-scale Agriculture

  Most residents in the candidate project area tend to rely on a small-scale agriculture. More specifically, slash-and-burn agriculture has always been the main farming method for the indigenous people and is increasing by the year. Rubber plantation was popular in the early years, but nowadays banana and mango farms are on the rise.

- Construction of Infrastructure

  The construction of social infrastructure, such as housing construction utilizing wood, has increased due to population growth in the candidate project area by 120% in 2008 compared to 1998.

- Illegal logging

  Illegal logging for smuggling harvested wood is frequently practiced, since there is a wide distribution of trees with high commercial valuable in the forests of Kampong Thom.

2.2 Project Demonstration Activities

Since the main driver of deforestation in the Kampong Thom candidate project area is illegal logging caused by the indigenous people and their livelihoods, the project activities are designed and reviewed to support the indigenous community.

[Figure 2] Drivers of Deforestation in the Project Area

- Livelihood Support of Residents/Indigenous People
  1. Prevent deforestation caused by indigenous people and their livelihoods through activities such as providing cash, high-efficiency stoves, and high-quality seeds, etc.
- Forest Protection Activities Support
  2. Support forest protection activities through a variety of means such as marking the border; initiating access control using tractors; establishing the inspection system and conducting periodic inspection; and installing wireless communication equipment, etc.

- Education/Training
  3. Provide continuous education/training on forest protection to the indigenous community of the project area.

3. Law, Regulation, and Policy Compliance

The institutional foundation in Cambodia to promote the implementation of REDD+ projects is well equipped. Relevant laws include Law on Forestry, Law on Environmental Protection and Natural Resource Management, and Law on Land. Relevant policies are the National Forest Programme (NFP) and UN-REDD program.

Law on Forestry defines the forest use and forest management system with the aim of sustainable forest management. Law on Environmental Protection and Natural Resource Management is to notify the relevant departments if the conservation and management of forest has not been operated. Law on Land defines that the national government and public bureau holds the ownership of the forests as public property.

The NFP suggests implementation methods and action plans for sustainable forest management, GHGs emissions reduction, and livelihood improvement of Indigenous Peoples and other forest-dependent communities. The UN-REDD program, with the aim of building a foundation of REDD+, has developed a roadmap for the implementation of national REDD+ projects.

4. Carbon Stock

4.1. Forest Carbon Survey Methodology

In order to evaluate the carbon stock in the project area, VCS methodology VM0007 "REDD Methodology Modules" was applied in this survey.

In VM0007, above-ground biomass, below-ground biomass, dead-wood, litter, soil organic, and wood products are presented for evaluating the carbon stocks. However, wood products were excluded in this survey.

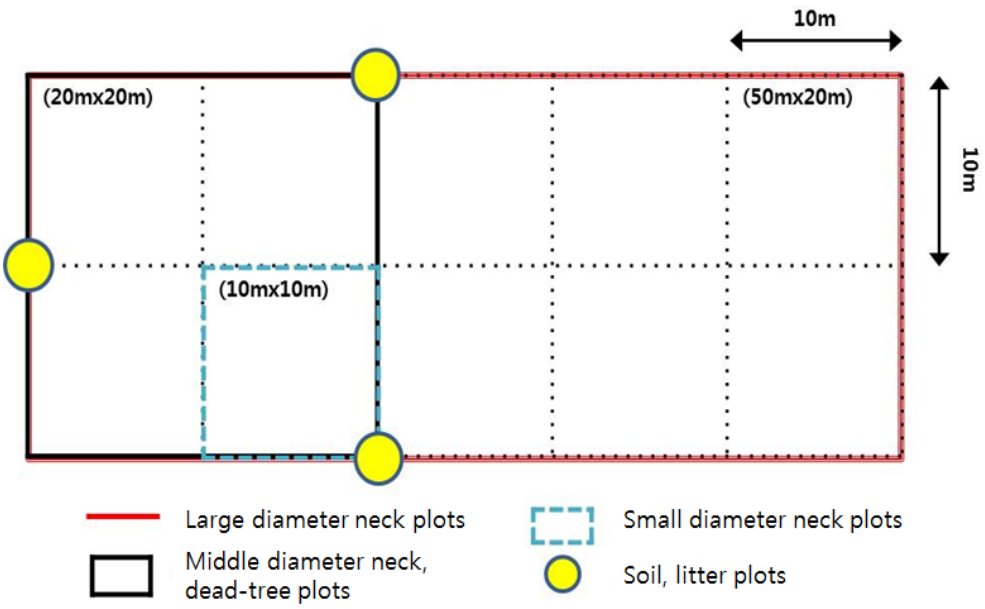
Carbon pool	Condition	Result
aboveground biomass	required	Included
belowground biomass	required	Included
dead-wood	conditional	Included
Litter	selective	Included
soil organic	selective	Included
wood products	conditional	Excluded

[Table 1] Determination of Forest Carbon Pools

The survey of forest carbon was carried along the IPCC Good Practice Guidelines for Land Use, Land-Use Change, and Forestry (Penman et al., 2003) and VCS methodology VM0007.

In order to distinguish the land cover type, images of Landsat 8 of current and Landsat 7 of the past 10 years in spatial resolution of 30m were compared and analyzed.

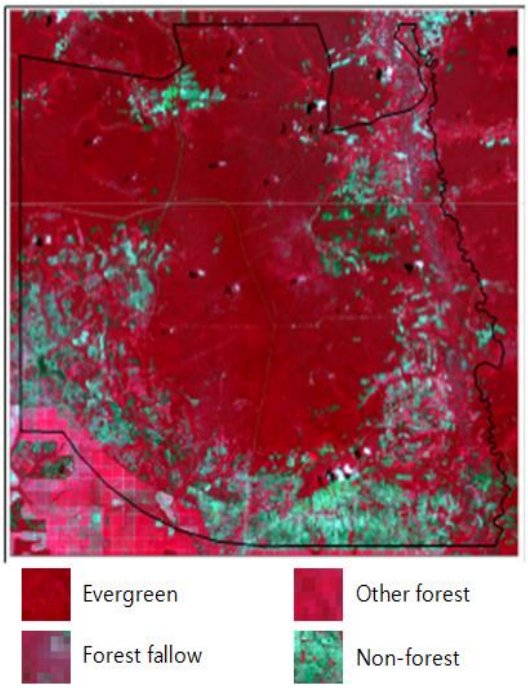
After determining the type of land cover, in order to investigate the carbon stocks a total 100 pieces of trees were measured by the selected sample areas; a total of six each for two evergreen forests, other forests, and grasslands with the exception of the non-forest areas were examined.



[Figure 3] Sampling Point Configurations

4.2 Results

Based on the analysis of satellite imagery, the land cover type of the project area appears in four types: evergreen forests, other forests, grasslands, and non-forest. Land cover type boundary is as follows.



[Figure 4] Land Cover Type

Land cover type	2013	Ratio
Evergreen	22,849	57%
Other forest	2,790	7%
Grassland	5,086	13%
Non-forest	9,105	23%
Total	39,830	100%

[Table 2] Land Cover Area and Component Ratio of the Project Area

Carbon stocks in the project area was shown as 181.0tC/ha, 48.3tC/ha, and 66.5tC/ha in each evergreen forests, other forests, grasslands. More specifically, carbon stocks of forest trees of evergreen forests accounted for 50.3%, and carbon stocks of trees of grassland and other forests accounted for 27.3%.

Carbon stocks in dead trees in each land cover type is estimated to be 4.5tC/ha in evergreen forests, and 2.2tC/ha in other forests. In the survey of sampling points, the carbon stocks in other forest were not calculated, because there were no discovered dead-trees. Carbon stocks of litter, was estimated to be 2.4tC/ha in other forests, 2.8tC/ha in the evergreen forests. Grasslands were excluded from the survey, since the organic layer was not clearly visible.

Land cover type	Forest carbon stock(tC/ha)				
	all forest	dead tree	litter	soil	total
Evergreen forest	148.8	4.5	2.1	25.5	181.0
Other forest	23.2	0.0	2.8	22.3	48.3
Grasslands	47.8	2.2	0.0	16.4	66.5

[Table 3] Forest Carbon Stock in Each Land Cover Type

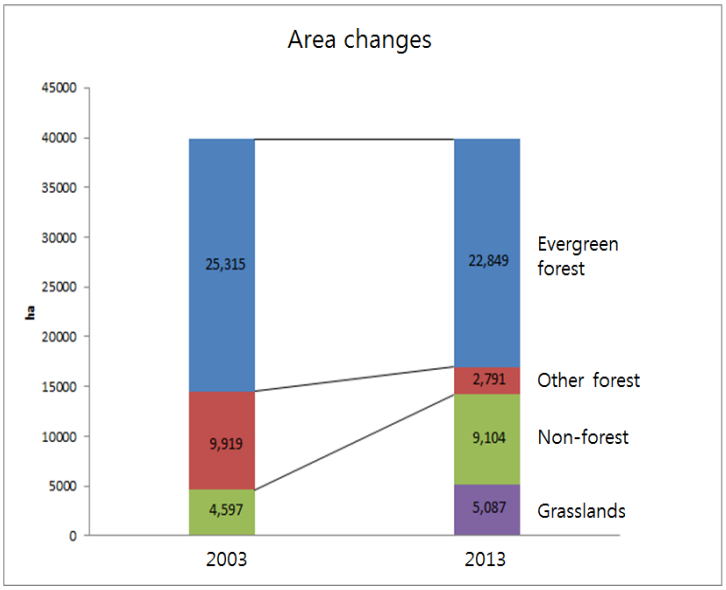
5. Estimated Emission Reduction/ GHGs Emission Reduction

5.1 Baseline Scenario

The project scenario is to reduce deforestation by 30% through REDD+ project implementation, assuming that deforestation will occur in the same rate as in the past 11 years for the next 30 years.

5.2 Calculation of deforestation and degradation area

For the calculation of forest area, non-forest area and forest area were classified based on the IPCC guideline. The area of deforestation and degradation was calculated using the Change Matrix. The total deforestation area in project area over the past 11 years (2003~2013) turned out to be 9,594 ha which is about 27% of the total project area.



[Table 5] Area Changes

As a result of the Change Matrix that took into account of the possibility of the non-forests becoming forests, the deforestation area for the evergreen forests was 4,859ha and other forests was 4,735ha. If deforestation occurs in the same pace for the next 30 years, the estimated deforestation area is expected to be 13,252ha for evergreen forests and 12,914ha for other forests. However, since the currently remaining other forest area is 2,790ha, it is safe to assume that additional deforestation and forest degradation occurred in the other forest area more than its 2,790ha will occur in the evergreen forests.

year	**2013**					**(unit: ha)**
2003	Land cover type	evergreen	other-forest	Non-forest	Grasslands	Total
	evergreen	18,990	1,037	3,773	1,515	25,315
	other forest	3,430	1,194	3,263	2,032	9,919
	Non-forest	429	560	2,068	1,540	4,597
	Total	22,849	2,790	9,104	5,087	

[Table 4] Kampong Thom Change Matrix

year	2013 (unit: ha)					Deforested area	
2003	Land cover type	evergreen	other-forest	Non-forest	Grasslands	Past 11 years	Next 30 years
	evergreen			3,773	1,515	4,859	13,252
	other forest			3,263	2,032	4,735	12,914
	Non-forest	429	560				

[Table 5] Deforestation Area Change over the Past 11 Years and Estimated Change in the Next 30 Years

5.3 Calculation of Estimated Emission Reduction

The accounting process of the GHGs emission followed the 'Standard Approach of the Past' based on the VM0007 methodology. The GHGs emission produced in the past 11 years due to the project area change appeared to be an estimate of 2,898,593 tCO_2eq.

Forest type	Areas of 2003 (ha)	Areas of 2013 (ha)	Greenhouse gases absorption(tCO_2eq)	Greenhouse gases emission (tCO_2eq)
Evergreen forest	25,314	22,849	664	1,636,760
Other forest	9,919	2,790	177	1,261,833
Total				2,898,593

[Table 6] Estimated Emission reduction of Greenhouse Gases (2003~2013)

Since it was assumed that additional deforestation and forest degradation occurred in the other forest area more than its 2,790ha will occur in the evergreen forests, the anticipated deforestation area of the evergreen forest in the next 30 years is 22,849ha. If the deforestation area is reduced by 30% due to the project activities, the anticipated GHGs emission reductions in the evergreen forests appears to be 3,359,840 tCO_2 eq and 493,830 tCO_2eq in other forests. Therefore, the total amount of GHGs emission reduction the Kampong Thom area will be an estimate of 3,853,670 tCO_2 eq, which is equivalent to an estimate of 128,456 tCO_2 per year when converted into annual GHGs emission reductions.

Land cover type	Deforestation Area(11yrs) (ha)	Deforestation Area(30yrs) (ha)	Avoiding Deforestation Area(ha)	CO_2 Stock (tCO_2e)	Emission Reduction (tCO_2e)
Evergreen forest	4,859	22,849	5,060	664	3,359,840
other forest	4,735	2,790	2,790	177	493,830
Total					3,853,670

[Table 7] Estimated Emission Reductions

6. Barrier Analysis

6.1. Conflict of Interest

Since CI Japan is preparing a REDD+ project in the neighboring region, the boundary delineation may be an issue. Even if the reference area is set within the project area, there is still a possibility of the reference area overlapping with the reference area of CI Japan and resulting in a conflict of interest. Therefore, the coordination by the Forestry Administration of Cambodia on boundary delineation in between the Project areas is necessary