THE SOUTHERN CARDAMOM REDD+ PROJECT

Document Prepared by Wildlife Works

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Project Lifetime	01 January 2015 – 31 December 2044; 30-year lifetime
GHG Accounting Period	01 January 2015 – 31 December 2044; 30-year lifetime
History of CCB Status	This is the CCB Project validation
Gold Level Criteria	Gold Level Criteria: Climate and Biodiversity. The SCRP aims to generate exceptional benefits in the areas of climate and biodiversity under both the Verified Carbon Standard (VCS) and Climate, Community and Biodiversity (CCB) standards. **Climate**: The Project will prevent the emission of an average of 3,580,834 tonnes CO_2e annually by avoiding deforestation and forest degradation. This will be achieved largely by training on improved agricultural methods, creating alternative income sources, creating new jobs and employment opportunities, and supporting improved environmental law enforcement across the landscape. Community members and project stakeholders were consulted during this period to determine the Project's expected benefits, costs and risks to them, and to identify the indicators to be used to measure these impacts. An initial biodiversity assessment was

	performed within and a long-term biodiversity monitoring plan was established across the entire Project Area. Project activities include training on improved agricultural methods, eco-tourism programs, direct Project employment and strengthening of community organizations. These activities are focused on providing new income generating opportunities, apart from traditional ones, which resulted in resource extraction from the Project area. With a more diversified local economy, less reliant on small-scale agriculture resulting in extraction of natural resources, communities will be able to better adapt to the probable effects of climate change. **Biodiversity**: The Project will protect critical habitat for 17 endangered and critically endangered species. This includes the Asian Elephant, the Sun Bear, Pileated gibbon, and the Hairy-nosed Otter. The primary Project activity is the protection of forests within the Project area, which will also serve to protect the native habitat of these species from fragmentation and destruction. With the protection of their habitat, they will be better protected from both anthropogenic and natural threats, such as poaching, human-wildlife conflict and drought. A significant Project activity that is already fully implemented and providing significant biodiversity benefits is a security and law enforcement program. This activity supports a team of 98 rangers and a 25-person community anti-poaching unit that patrol the Project area working to stop illegal activity. Other Project activities include training on improved agricultural methods, support for Eco-Tourism and participatory land use planning. These activities are aimed at reducing the primary drivers of deforestation that threaten the Project area, and therefore the Project's biodiversity. Further detail on climate, community and biodiversity benefits generated by the Project to date can be found in Sections 1, Section 3, Section 4 and Section 5 of this document.
Expected Verification Schedule	This is a joint validation/verification. The first verification was completed concurrently with this validation.

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1 SUMMARY OF PROJECT BENEFITS

This section highlights some of this project's important benefits. Section 1.1 (Unique Project Benefits) should be aligned with a project's causal model and is specific to this project. Section 1.2 (Standardized Benefit Metrics) is the same quantifiable information for all CCB projects. This section does not replace the development of a project-specific causal model or the monitoring and reporting of all associated project-specific impacts (positive and negative) that are described in Sections 2-5 of this document.

1.1 Unique Project Benefits

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) **Training on Agricultural Methods and Intensification:** Using the tenets of conservation agriculture, particularly increased cover cropping, zero tillage and an emphasis on soil health and moisture retention, the project aims to increase yields on existing farms and decrease dependence on the clearing of additional land for new field. Additionally, the Project will build and support produce storage facilities and value-added technologies to take advantage of market price fluctuations and aid in achieving high sale prices.	2.1.11
2) **Improve Health Facilities and Care:** Proceeds from the Project will be used to enhance the delivery of health care through increased support to health care workers, hiring of additional health care employees and improvements of facilities such as rainwater collection, solar systems, sanitation and support for outreach (hand washing stands at local schools, etc.)	2.1.11
3) **Community-based Eco-Tourism Development:** Proceeds from the Project will be used to facilitate the participatory process of community engagement, capacity building in hospitality, accounting, English, computers, and nature guiding. Developing ecotourism infrastructure that could include trails, night camps, guesthouses, homestays, visitor center, and equipment such as mountain bikes, kayaks, and camping gear.	2.1.11
4) **Community Scholarship Fund:** Proceeds from the project will be used to create a fund for scholarships (for middle and tertiary education) for students from any of the 29 communities in the Project Zone. An independent committee will be formed to ensure fair and equitable distribution of scholarships, this activity will directly address a key driver of poverty in the Project Zone – a lack of accessibility to higher educations.	2.1.11

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission reductions or removals	Net estimated emission removals in the project area, measured against the without-project scenario	Not Applicable	
	Net estimated emission reductions in the project area, measured against the without-project scenario	107,425,020	3.2.4 .12
Forest[1] cover	For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	442,821	3.1.4 .3.5
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	Not Applicable	
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices are expected to occur as a result of project activities, measured against the without-project scenario	Not Applicable	
	Number of hectares of non-forest land in which improved land management practices are expected to occurred as a result of project activities, measured against the without-project scenario	Not Applicable	

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)

[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)

[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)

[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	About 25% = 4,000	4.2.1 4.4.1
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	At least 1/3 = 1,200	4.2.1 4.4.1
Employment	Total number of people expected to be employed in project activities,[5] expressed as number of full-time employees[6]	About 200	4.2.1 4.4.1
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	At least 1/4 = 50	4.2.1 4.4.1
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	Entire Project Zone: 16,000 in 3,800 families	4.2.1 4.4.1
	Number of women expected to have improved livelihoods or income generated as a result of project activities	About 50% of the population	4.2.1 4.4.1
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	Entire Project Zone: 16,000 in 3,800 families	4.2.1 4.4.1

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.

[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	About 50% of the population	4.2.1 4.4.1
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	About 25% of the population (ages 12-24) = 4,000	4.2.1 4.4.1
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	Between 45-50% of the above are girls	4.2.1 4.4.1
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Data not available	4.2.1 4.4.1
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Data not available	4.2.1 4.4.1
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	Entire Project Zone: 16,000 in 3,800 families	4.2.1 4.4.1
	Number of women whose well-being is expected to improve as a result of project activities	About 50% of the population	4.2.1 4.4.1

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	442,821 ha	4.4.1 5.4.1
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	All 17 Critically Endangered or Endangered species occurring in the project area.	5.4.1

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

The Southern Cardamom REDD+ Project (SCRP) is an initiative designed to promote climate change mitigation and adaptation, maintain biodiversity and create alternative livelihoods under the United Nations scheme of Reducing Emissions from Deforestation and forest Degradation (REDD+). The 445,339 ha SCRP encompasses parts of Southern Cardamom National Park and Tatai Wildlife Sanctuary and will protect a critical part of the Cardamom Mountains Rainforest Ecoregion – one of the 200 most important locations for biodiversity conservation on the planet. The SCRP is part of the Indo-Burma Hotspot, one of the world's 34 biodiversity hotspots, and is a critical watershed for the Gulf of Thailand, with a mosaic of habitats from dense evergreen and pine forests on its ridge tops to lowland melaleuca wetlands, flooded grasslands, lakes and coastal mangroves in its lowlands. This mosaic of habitat supports at least 52 species of IUCN Threatened birds, mammals, and reptiles including Siamese crocodile and one of Cambodia's two viable populations of Asian elephant. The landscape has also been identified by the Royal Government of Cambodia as an opportunity for tiger reintroduction.

[9] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species

[10] Per IUCN's Red List of Threatened Species

[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

More specifically, the SCRP has 20 major waterways that feed 3,800 villages in over 6 provinces. The Project will directly support the livelihoods of 21 villages in nine communes around the perimeter of the project area. These communities represent approximately 2,475 families and 10,550 individuals. Wildlife Alliance has been assisting the government in the management of the Cardamom Rainforest Landscape since 2002.

Despite its global importance, uncontrolled small-scale land conversion of forest to agricultural land by migrants and conversion to agro-industrial plantations by the private sector make the Southern Cardamom region one of most threatened forest landscapes in South East Asia. Rural communities depend on small-scale agricultural production to support their livelihood. A lack of sufficient employment opportunities for the growing rural population combined with a lack of knowledge regarding improved agricultural techniques drive the local population to clear forests for cultivating commercial crops.

In response to the threats to the Southern Cardamom landscape, Wildlife Alliance with the Ministry of Environment (MOE), decided to create the SCRP. The protection of the SCRP will be achieved by continuing and intensifying patrolling of the Project Area, as well as by providing additional project activities to the communities that are designed to mitigate the drivers of deforestation. Two important project activities are agricultural intensification and community-based ecotourism. These will help create greater financial security in the communities, and therefore less need to perform unsustainable resource extraction from the Project Area. A fund will also be provided to support scholarships for children from project communities in order to directly address one of the critical drivers of deforestation identified during stakeholder workshops (i.e. low education rates and limited opportunities for post-primary school education). This fund will be available for community members from an additional 8 villages in four communes in addition to those directly benefiting from the project.

The Project's climate benefits include the average annual avoided emission of 3,580,834 t CO_2e, for a total of 11,947,133 t CO_2e during this first monitoring period. The Project will generate substantial community and biodiversity co-benefits. New and sustainable livelihood opportunities, such as direct employment, alternative income generating activities (IGAs) and initiatives to stimulate investment in businesses will be designed to reduce pressure on the environment while significantly increasing community well-being. Additional programs will address food security, improve health and education facilities, as well as raise environmental awareness. Biodiversity co-benefits will be achieved through greater protection of the ecosystem predominantly by means of increased security and improved monitoring. The Project will also be protecting critical habitat for significant populations of many IUCN listed species, including Asian elephant, Asiatic black bear, sun bear, large spotted civet, clouded leopard, and dhole, as well as the critically endangered reptiles Siamese crocodile and Southern river terrapin.

2.1.2 Project Scale

Project Scale	
Project	
Large project	X

2.1.3 Project Proponent (G1.1)

Organization name	**Royal Government of Cambodia, Ministry of Environment**
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2.1.4 Other Entities Involved in the Project

Organization name	**Wildlife Alliance** Role: Partner to MOE in the implementation of SCRP Responsibility: Forest Protection and Community Livelihood Activity Implementation
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2.1.5 Physical Parameters (G1.3)

PDR.5 Credible documentation demonstrating control of the project area, or documentation that the provisos listed in the case of less than 80% project control at the time of validation delineated in section 5.1 of the methodology are met.

Table 1: Project Area Extent Boundaries

Extent Boundary	Location (Easting, Northing UTM Zone 48N)
Northern Extent GPS Point	275375.34 m E, 1325396.78 m N
Eastern Extent GPS Point	394814.98 m E, 1267579.35 m N
Southern Extent GPS Point	326489.87 m, 1238701.74 m N
Western Extent GPS Point	297403.96 m E, 1269075.36 m N

Topography

Three forces created the geologic patterns of Cambodia – ancient volcanic activity created its mountains, an ancient ocean laid sandstone deposits, and the action of its major drainages (the Mekong and Tonle Sap rivers) created alluvial plains and deposits (Cutter, 2014; McDonald, 2004).

The SCRP project area is located in Cambodia's southwestern highlands that are primarily Mesozoic sandstone formations laid down by the ancient ocean that is a predecessor to the Gulf of Thailand, within which there are localized areas of rhyodacite and basalt volcanic lava flows (Douglas, 2005). The Project area is typified by a hilly evergreen forest ranging from 10m a.s.l along the coastal plain to 980 m a.s.l. on the boundaries with Phnom Samkos Wildlife Sanctuary. The project area's higher forests are the catchment for the adjoining Gulf of Thailand and include seven watersheds that drain into the Koh Kong estuary, one of Southeast Asia's largest remaining intact mangrove ecosystem (Russell, 1987).

Soils

The ancient ocean along the southeast coast of Cambodia created siltstone-sandstone deposits within the project area (White and Oberthür, 1995). The weathering of these relatively young deposits has produced azonal soils or soils without well-developed profile characteristics. The montane slopes, which are a majority of the project area, are comprised of acid lithosols, a low fertility soil type that is not good for agriculture. In the riverbeds, there are brown alluvial soils, alluvial lithosoils and alumisoils, that are moderately fertile. In the center of the project area there are two small volcanic deposits, that are

comprised of latosols and plinthite podzols soils, which are highly fertile and prime locations for agriculture (Crocker, 1962; Sanchez et al., 1982).

Climate, precipitation and hydrology

The Asian monsoon is a principle climatic feature of Cambodia. Because of its location on the Southeast Asian peninsula, Cambodia is at the transition between the South and East Asian monsoon, as a result it receives rain from the South China Sea and Indian Ocean. Because of the monsoonal climatic pattern, there are two seasons during the year, the wet season, from May – November, and the dry season the rest of the year (Zhang et al., 2005). It is cooler during the wet season and hotter during the dry season, with an average annual temperature of 28° C, an average maximum temperature that exceeds 40° C in April and an average minimum temperature of 17° C in January (Heng, 2015). The topography of the Cardamom mountains influences the regional distribution of rain. The SCRP is a precipitation "hotspot" due to it being adjacent to the Gulf of Thailand and receives the highest rainfall of mainland Southeast Asia. The average annual rainfall is between 2500 - 4000 mm per year (Zhang et al., 2005). The SCRP's seven watersheds are of strategic national development because of their hydropower potential and support of freshwater and coastal fisheries. (Killeen, 2012). Its rainfall produces 11 rivers that flow into the Gulf of Thailand supporting 155 km of coastal fisheries and the largest intact mangrove representation in the Indo-Burmese Peninsula (Botum Sakor, Peam Krasop and Dong Peng Protected Areas), called the Coastal Cardamom.

Vegetation and Forest Type

The Project Area is the entire southern section of the Cardamom Mountains. This section of the Cardamom Mountains receives some of the highest precipitation on mainland Southeast Asia and the degree of precipitation with soil type influences vegetation. As a general practice, forests of Cambodia are characterized on the basis of leaf behavior, for example as evergreen, semi-evergreen and dry-deciduous forests. The combination of high rainfall and sandy soils on the majority of the project area supports tropical evergreen rainforest with small sections of semi-evergreen forest on the volcanic deposits, deciduous forest in the drier sites with sandy soil, and Melaleuca forest along the brackish waterways (Corlett, 2005). These five vegetation types are further described in the Table 2 below. All of the vegetation types included in Table 2 are covered by a single management type, that of conservation. Although two of the vegetation types included in this table are in the Project Area but not included in the PAA, namely Riparian Melaleuca Forest and Scrubland, they are still covered under the same management type as the others. Therefore, 100% of each area of the vegetation types included in the Project Area are covered in the management type of conservation.

Table 2: Vegetation Types of the Southern Cardamom REDD+ Project. Adapted from Lecompre et al. (1951) Dy Phon (1982) and Kaury-Lechion and Curfat (1998).

Vegetation Type	Characteristics
Evergreen Forest (Tropical Moist Broadleaf Forest) (405,865 ha)	This is the dominant forest type of the project area and is dominated by Dipterpocarps – Phdiek (*Anisoptera costata),* Chheutal bankuoy (*Dipterocarpus costatu*), Koki Khsach (*Hopea pierrei*), Koki msav (*Hopea ordorata*), and Koki Phnom (*Shorea hypochra*).
Deciduous Dipterocarp Forest (Tropical Dry Broadleaf Forest) (21,982 ha)	This type of forest is similar to the dry seasonal forest found in dryer climates Indochina. Trees are relatively short (3-12 m), with mainly drought tolerant species with small leaves and thick barks. Dry deciduous forests form a transition to natural grassland, which are found on the very dry sandy sites. These forests are also dominated by Dipterocarps, with the four most abundant species being Meranti (*Shorea siamensis*), Phchoek (*Shorea obtuse*), Tbeng (*Dipterocarpus obtusifolius*), and Klong (*Dipterocarpus tuberculatus*).
Riparian Melaleuca Forest (13,898 ha)	This forest type occurs near rivers and streams, periodically inundated and remaining moist during the dry season. It is dominated by *Melaleuca leucadendron*.
Scrubland (10,249 ha)	This forest is a transition type to tall evergreen forest, and often with similar species composition, yet trees are significantly smaller.
Semi-Evergreen Forest (2,043 ha)	This forest type occurs near rivers and streams, periodically inundated and remaining moist during the dry season.

2.1.6 Social Parameters (G1.3)

Communities and main settlements

There is a total of 29 communities in the Southern Cardamom REDD+ Project Zone, with a total of 3,841 families and a population of 16,319. They are distributed over 13 Communes as shown below in Table 3.

Land uses and economic activities

Households in the Project Zone derive their livelihoods from agriculture, eco-tourism, the collection of Non-Timber Forest Products (NTFPs), logging and hunting (Killeen, 2012). The main source for food security in the Project Zone is cultivated rice production. Farming therefore requires the greatest amount of the local population's time and represents the vast majority of their labor practice. Dominant activities are rice paddy cultivation, livestock raising and livestock products and services. Livestock is raised free range without vaccination and consists of poultry, ducks, pigs, cows, or buffalo, the latter two mostly raised for sale (Nesbitt, 1997).

Farming activities (rice, long and short rotation crops, vegetables, livestock and fishing) are the main occupation for 64% of the population in Koh Kong province. For 26 per cent of those farmers, rice cultivation is the main occupation. For communities inside the Project Zone, 100% of families are engaged in farming activities (rice, long and short rotation crops, vegetables, livestock and fishing) for 32% of whom cultivation is the main occupation.

In Koh Kong Province, there are two widespread types of rice farming: sedentary and *Chamkar* rice practices. In sedentary farming, patches of forest are cleared permanently. *Chamkar* rice farming is a slash and burn type of agriculture where a piece of forest is burnt and cleared during the dry season and planted at the beginning of the rainy one. The plot is then cultivated for 2-3 years before the soil is deprived of nutrients. Villagers subsequently shift their farming sites to other unconverted forest areas. *Chamkar* rice practices therefore lead to deforestation and topsoil loss, which is caused by heavy monsoon rains washing away the top fertile layer, no longer held in place by the forest root system. Soil nutrients are then further depleted through the rice crop cultivation that lowers the soil Ph. Deforestation, topsoil loss and soil acidification lead to soil erosion and degradation of natural resources in the area.

Several rice cultivation factoids have been observed in Koh Kong province:

- About 96% of rice fields are cultivated during wet season, among which 82% are rain-fed lowland rice, i.e. lowland grassy plains with clayey soils where rice is cultivated only during wet season due to rainfall and/or water surface runoff. Different rice varieties are grown, depending on specific local traditions and water depth. In Koh Kong province, most lowland rain fed rice is early- or medium-duration rice (Nesbitt, 1997). Rice productivity in Cambodia is the lowest in Asia. This is mainly due to the low productivity of all rainfall-dependent rice ecosystems. In 1990, the average yields of early- and medium-duration rain fed lowland rice were respectively 1.59 t ha-1 and 1.42 t ha-1 (Javier, 1997). Following CDB 2009, the average yield of wet lowland rice (without distinction of irrigated and rain fed) was 1.76 t ha-1.
- About 10% of the cultivated wet season rice fields (9.93% of the total rice fields) are rain-fed upland rice. This agricultural system can be found in montane and hilly zones with poor sandy soils characterized by low Ph and a slash-and-burn culture. Also named Chamkar rice (srouchamcar), upland rain-fed rice is cultivated for 2-3 years before farmers shift to a new area (Javier, 1997). Because the soil is so poor, and fertilizers are almost never used (CDB, 2009 and Javier, 1997), grain yields decline with continuous cropping, causing the slash-and-burn farmers to move to a new area. Another reason why shifting cultivation areas are abandoned after 2-3 years of rice cropping is the increased weed invasion. Drought is also a problem in rain fed upland areas. Severe drought at the early growth stages can devastate the crop. In addition, once Imperata grass has invaded old rice sites, it is almost impossible to cultivate rice again because of the depth of the grass root network, which makes it extremely difficult to remove. Following CDB 2009, average yields for upland rice is lower than for lowland rice fields (1.60 t ha-1). This low average might be a cause of the decreasing yield in upland fields over years. During the first year of cultivation, it is however frequent to find up to 1.8 t ha-1 yields (Javier, 1997). Notwithstanding the fact that Chamkar farmers regularly move to new areas, the upland rain fed rice farming is more land consuming than its lowland counterpart.

Ethnic groups and migration

Based on the 2012 Cambodian Population Census, there are 17 ethno-linguistically differentiated indigenous community groups, located across 15 provinces. Geographically, indigenous communities in Cambodia have historically inhabited upland and forested areas. Their locations follow the biodiversity corridors of, and natural boundaries between, Cambodia, Vietnam, Thailand and Laos. There are five peoples that inhabit the SCRP, the Samre, Cham, Thai, Khmer and potentially Chong. As is the case in Cambodia, the majority of the Project Zone is inhabited by Khmer, followed by Thai, Cham, Chong and Samre. The Samre and Chong originally spoke a different dialect of the Pearic language, but their descendants in the Project Zone no longer speak their ancestral tongue (Schliesinger 2015). The Samre are a small group of 150 inhabitants that live in Dai Tum Ngiep village of Trapaeng Rung district. The village is divided by the Anlong River and the majority of villagers have a boat and rely on the river to maintain their livelihood (Schliesinger 2015).

There are differing reports as to whether the ethnic group in the Areng Valley, which calls itself Chong, is Chong (Schliesinger 2015). Media outlets reporting on the environmental conservation efforts of the Areng Valley people state that they call themselves Chong (Ford, 2018; Davidson, 2015; Mam, 2014). According to these reports, approximately 1,300 members of the ethnic Chong inhabit the village of Chhay Ariang, and their ancestors have lived in the area for centuries.

The Cham are an ethnic group of Austronesian origin in Southeast Asia. Cham were accomplished mariners and migrated via Borneo to mainland Southeast Asia 4,000 BP. Their population is centered in Kampong Cham province in Cambodia and Phan Rang, Ho Chi Minh City and An Giang Province in southern Vietnam. An interesting note is that the Cham in Cambodia are Muslim but their counterparts in Vietnam are Hindu. The Cham inhabit roadside villages along national road 48 along the southern border of the SCRP.

Post-Conflict Population expansion

In 2008, there were approximately 13,400,000 people living in Cambodia. This figure reached approximately 14,680,000 inhabitants in 2008 (National Institute of Statistics, 2013). That represents an annual national growth rate of 1.83%. Within Koh Kong province, total population was 122,263 in 2013 with a population density of less than 20 persons/km². growth rate of .8% between 2008 and 2013. There was a large increase in population growth from 1998 – 2008 the growth rate was .12, one of the lowest in Cambodia, and increased eightfold to .80 from2008 – 2013, one of the largest increases in Cambodia during this period.

Poverty

According to the Asian Development Bank (2014), the poverty line in rural Cambodia was $25.69/month per capita or $308.28/year per capita. In 2014, 25% of the rural population of Cambodia lived below this poverty line. Based on the national socio-economic survey (2016), rural households increased their income 14% from 2014 to 2015 but they are also holding more debt to support themselves and the majority of the debt is owed to banks. Mountainous regions of Cambodia suffer the highest rates of poverty and the remote villages of the Cardamom mountains are no exception. The further villages are from Koh Kong town or major roads the higher the rate of poverty (Killeen, 2012). Most households in the mountains derive their livelihood from illegal logging and firewood cutting (National Institute of Statistics, 2016). The northern, more remote villages of the Project Zone have 20% – 40% incidence of poverty. Whereas, the southern villages along national route 48 and close to Koh Kong town have a less than 20% incidence of poverty (Haslett et al., 2013).

Food security

The United Nation's World Food Program conducted a comprehensive study of food security in Cambodia in 2008 titled "Comprehensive Food Security and Vulnerability Analysis: Cambodia" (CFSVA: Cambodia). The CFSVA determined that 12.5 percent of the households in rural Cambodia are food insecure. Rural areas are more affected by food insecurity than urban areas as more than 90 percent of the food insecure households currently live in rural areas.

In 2013, using socio-economic survey and CFSVA data, WFP conducted a small area estimation of poverty and nutrition using statistical and geographic modelling to determine more accurately to the commune level the location of poverty and nutrition. The northern, more remote villages of the Project Zone had a higher incidence of food insecurity. Whereas, the southern villages along national route 48 and close to Koh Kong town had a lower incidence of poverty (Haslett et al., 2013).

Public Health

The Cambodian public health system needed to be completely rebuilt after the Khmer Rouge regime. There were no doctors or nurses, and all health care facilities were degraded. In the last decade it has been rebuilt and, now, the Directorate General of Health oversees health service delivery in Cambodia. Currently, the Cambodian health care system includes provincial health departments (24) and health operational districts (81) (Annear et al., 2015). Within the operational districts the Directorate operates health centers that cover 10,000 – 20,000 people and provide a minimum package of activities that consist of preventative and basic services (Annear et al., 2015).

In Koh Kong province there are 10 health centers and 2 regional hospitals. The communes of the SCRP are serviced by 4 health centers and two regional hospitals, one in Koh Kong and another in Sre Ambel. These centers have a total of 18 nurses and 12 doctors that attend to over 60,000 people (RGC 2004). Koh Kong hospital has the largest staff that services the main population center. This center has 75% of the health care providers in the province but the center is within traveling distance of less than half of the province's population. The rest of the province and communities adjacent to the SCRP are serviced by 3 doctors and 7 nurses most of which are on the eastern border of the SCRP in Sre Ambel (Ministry of Health, 2013). Health Centers in the SCRP provide outpatient consultation, antenatal care, delivery and inpatient services. The outreach services include vaccines for children and necessary medications for villagers. One of the common occurrences in the SCRP is that nurses hired to work at the local health center are not paid a living wage and they open private clinics. Thus, villagers end up using these private services to meet their healthcare needs.

Education

Educational background plays an essential role and can greatly affect the implementation and impacts for projects like the SCRP with a strong emphasis on training and capacity building in rural communities. Understanding the educational background of community members in SCRP target sites can help to design appropriate training materials and activities which contribute to the capacity development of community members and forest committee members and enhance community enterprise development to improve community livelihoods. Equally important, education levels (and lack of basic skills like literacy and numeracy) can influence and affect community-based forest management. According to the 2015 Socioeconomic survey, 77% of the population of the SCRP are literate or numerate (National Institute of Statistics. 2016).

2.1.7 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2)

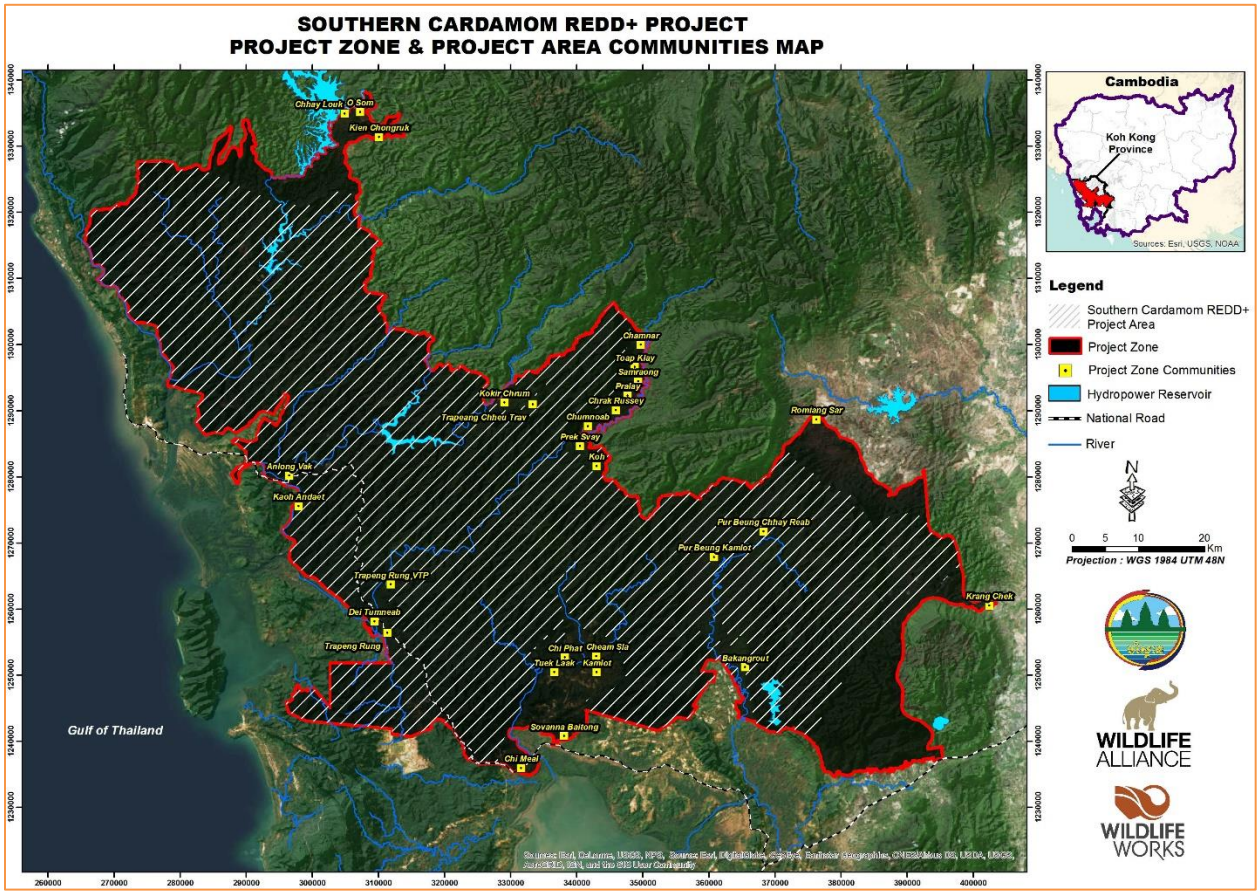


Figure 1: The SCRP Project Zone

2.1.8 Stakeholder Identification (G1.5)

Wildlife Alliance has been working on protection of the southern portion of the Cardamom mountain range for the past decade. At the initiation of their conservation efforts they first conducted a spatial analysis of the region to understand the location of all of the communities that were adjacent to the area they were committed to protecting. Next, they conducted a participatory rural appraisal with each community. During this process, Wildlife Alliance worked with a suite of government agencies including the ministry of environment, ministry of agriculture, forest and fisheries, as well as with local district and provincial government offices thus developing a more in-depth understanding of all other stakeholders in the region.

A major point of contention in Cambodia has been land tenure rights. In 2012, following the adoption of *Order 01BB on Measures for Strengthening and Increasing the Effectiveness of the Management of Economic Land Concessions*, Prime Minister Hun Sen announced that, in support of the order, he would launch a campaign to survey land and issue titles to people living on state land, including forestland, ELCs, and forest concessions. In total, more than 3.8 million titles have been issued and more than a

million hectares of land have been cut from state land and reclassified according to the MLMUPC (2018). In Koh Kong province, Wildlife Alliance worked with directive 01 staff members to ensure that all land titles were given to communities and that boundaries of protected forest were clearly drawn. Through the initial analysis and support of Order 1, Wildlife Alliance was able to determine the communities, community groups and other stakeholders in the SCRP.

To enable a participatory stakeholder analysis including identification of and further analysis into potential impacts of the project on different community groups, two Social Impact Assessment (SIA) workshops were held with key community, governmental and other leaders in the ministry of environment meeting hall, Koh Kong Town, Koh Kong Province:

- The first workshop, held August 15 – 17, 2017 had 39 participants from 15 villages, mostly located in the western and northern communities. Those villages were (1) Chumnoab, (2) Chrak Russei, (3) Pralay, (4) Samroang, (5) Top Khlei, (6) Chamnar, (7) Koh, (8) Prek Savy, (9) Koki Chrum, (10) Trapeang Chheu Trav, (11) Trapeang Rung, (12) Dei Tun Neap, (13) O'Som, (14) Chhay Louk, (15) Kean Chhung Ruk
- The second workshop, held August 23 – 25, 2017 had 34 participants from 18 villages, mostly located in the eastern communities. Those villages were (1) Koh Andeth, (2) Anlong Vak, (3) Andong Teuk, (4) Pnhi Mean, (5) Chi Phat, (6) Teuk Laak, (7) Kamlot, (8) Choam Sla, (9) Por Boeun, (10) Kamlot, (11) Bak Angrut, (12) Phreah Angkeo, (13) Thnong, (14) Prolean, (15) Sovanna Baitong, (16) Chambak, (17) Romean Sar, (18) Roleak.

Workshop participants (73 in total) consisted of representatives of local administration (Commune council members, village chief or deputy), village elders, local community leaders, indigenous, women and youth representatives from various locations within the Project Zone. Wildlife Alliance's experience and local government authorities engaged during the FPIC process (see Section 2.3) were instrumental in guiding the selection of the workshop participants. Please refer to Section 2.1.6 for a list of Project Zone communities as well Figure 2 below.

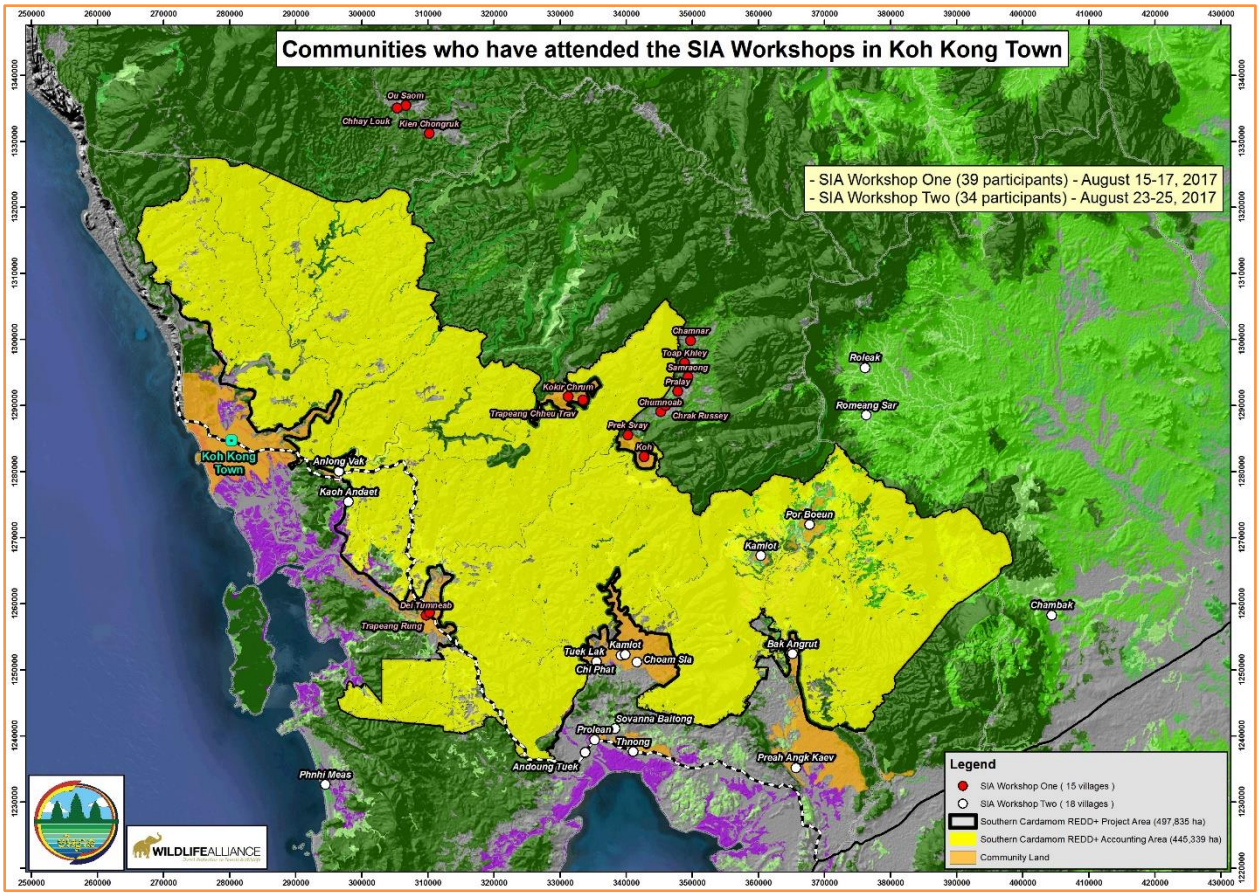


Figure 2: Communities represented at the SIA workshops.

The SIA workshop started with an evaluation of the Background Conditions in the Project Area, including an identification of key problems that the REDD+ project needs to address, termed herein as Focal Issues. Focal issues are existing problems or challenges that should be addressed to ensure Project success. They are social or biodiversity related factors that need to be addressed for project success, or factors that if the project does not address, project success is threatened. The workshops settled on three priority Focal Issues for the SCRP:

1. Forest destruction and land encroachment
2. Wildlife poaching
3. Poor community livelihoods

After establishing the fundamental issues that the project should focus on to achieve the overarching REDD+ goals, the SIA workshop then delved deeper into these Focal Issues in order to establish the causal logic leading to the problems, and produced a Problem Flow Diagram (also termed Conceptual Model – see Section 4.1.4) for each of the Focal Issues. Based on these PFDs, the participants then undertook a stakeholder analysis to establish who is likely to be impacted or otherwise drives the key factors contributing to the focal problems. They also projected what would happen to these key factors in the absence of the project (Without-project scenario – see Section 4.1.4), and, based on this, established strategic entry points and opportunities for the Project.

For each of the Focal Issues, the stakeholder identification and analysis started with the working group members brainstorming to list all the people or groups who might have an influence over or be impacted by the project, both positively and negatively. This also included discussions of how these people and groups drive or are impacted by the current situation, and how the REDD+ carbon project would impact them. They also discussed stakeholders living outside the project area who could be indirectly impacted by the project. To enable a thorough and comprehensive exercise, this was done for all the Focal Issues separately (Table 4) then merged.

Lastly, the expert knowledge of the Project Proponent, the Project partner WA and Government records were used to identify any additional project stakeholders who were not identified during the SIA workshops.

2.1.9 Stakeholder Descriptions (G1.6, G1.13)

Twenty-nine of the 88 communities bordering the SCRP with a total of about 3,841 families with a population of 16,319 were selected to define the Project Zone (Table 3). They were identified by the Project partner WA as most associated with natural resource use and forest loss within the Project Accounting Area (PAA), and thus are most likely to be positively impacted by the project activities. All of them are adjacent to the Project Area, and while the community members have tenure to private land outside of the Project Area, they also have some customary use rights within the Project Area and are therefore critical to the success of the SCRP. Consequently, as the Project Zone, they are also the areas where project activities that directly affect land and associated resources, including activities such as those related to provision of alternate livelihoods and community development, shall be implemented.

Table 3: Communities included in the Project Zone for the SCRP

Nº	Commune	Village	Total # families	Total population
1	Kandoal	Sovana Baitong	252	1074
2	Dang Peng	Pur Beung Kamlot‡	268	1112
3		Pur Beung Chhay Reab‡		
4		Bakangrout	299	1632
5	Chi Phat	Chi Phat	203	796
6		Tuek Laak	107	406
7		Cheam Sla	143	561
8		Kamlot	178	762
9	Osom	O'som	90	507
10		Chhay Louk	223	565
11		Kien Chongruk	119	492
12	Tasal	Romiang Sar	52	222

13	Chambak	Chambak	107	673
14	Pralay	Chamnar	52	190
15		Pralay	72	244
16		Samraong	38	216
17		Toap Khley	32	113
18	Chumnoab	Chumnoab	47	213
19		Chrak Ruessy	49	175
20	Thmor Donpove	Koh	55	218
21		Prey Svay	89	374
22	Angdoung Teuk	Chi Meal	242	1171
23	Tatai Khmrom	Kaoh Andaet	109	464
24		Anlong Vak	181	715
25	Trapeng Rung	Dei Tumneab‡	161	639
26		Dei Tumneab VTP‡		
27		Trapeang Rung	271	1166
28	Ruessey Chrum	Kokir Chrum	237	936
29		Trapeang Chheu Trav	165	683
	Total		**3,841**	**16,319**

‡*These communities are currently considered distinct but were combined during the previous census*

The following list of other stakeholders was derived from the stakeholder analysis performed during the SIA workshops (see details for selection and inclusion rationale in Table 4 below).

Stakeholders benefiting from status quo

1. Poachers
2. Immigrants
3. Land speculators
4. Loggers
5. Timber traders
6. Non-timber forest product collectors
7. Workers/job-seekers
8. Wildlife traders and Middlemen
9. Restaurant owners
10. Wildlife consumers

11. Corrupted officials
12. Microfinances and money lenders/creditors
13. Employers

Stakeholders adversely affected by status quo

1. Community in general including both present and future generations
2. Government and Local authorities
3. Youth & Women
4. Workers/job-seekers
5. Borrowers/debtors

Table 4**:** Results from the stakeholder analysis exercise during the SIA Workshops in the SCRP

a) Focal Issue: Forest destruction and land encroachment

Direct Factor	Who benefits	How do they benefit	Who loses	How they lose
Forest land grabbing	• Poachers • Immigrants • Land speculators	• Buy and re-sale land at higher price • Grab forest land and claim ownership	• Local communities • Future generations • Local authorities	• No more forest left • No chance to see, study, understand and get benefit from standing forest • Face climate change and natural disasters • No legal land ownership • Unable to collect tax from land use
Illegal logging	• Loggers • Timber traders & Middlemen • Non-timber forest product collectors • Workers	• Logging and sell timber • Illegal buying and selling of timber • Illegal collect NTFP with no restriction • Making money by working for loggers or timber traders	• Whole communities • Government • Future generations	• Forest loss • Lost potential for eco-tourism development • Lost motivation to join conservation activities

b) Focal Issue: Wildlife poaching

Direct Factor	Who benefits	How do they benefit	Who loses	How they lose

High demand in wildlife part and bush-meat	• Poachers • Wildlife traders • Restaurant owners • Middlemen • Sellers of equipment for making snares • Wildlife consumers • Corrupted officials	• Selling of wildlife, parts and bush-meat • Trading wildlife • Serve bush-meat to customers • Selling snare making equipment to poachers • Consuming wildlife • Illegal taxation from wildlife poachers, middlemen and traders	• Communities • Government • Young and next generation	• People lost motivation to do legal works which are not financially well awarded as poaching • Loose potential for eco-tourism development • Loose chance to see, study, understand and get benefit from live wildlife living in the wild. •
Illegal easy un-controlled access into protected area forest	• Poachers	• Easy to poach and to putting snares	• Communities • Government • Young and next generation	• Loss of wildlife
Lack of wildlife habitat	• Poachers	• Buying and selling of wildlife	• Communities • Government • Young and next generation	• Human-wildlife conflict • Loose potential for eco-tourism development

c) Focal Issue: Poor livelihoods

Direct Factor	Who benefits	How do they benefit	Who loses	How they lose
High living cost	• No one		• Local community as whole	• Spend a lot of money to go to distant health posts and schools • Living in poor health condition • No education • High infant mortality rate • Lack of education, skill and job
Low income	• Microfinances • Money lenders • Rich people • Poachers • Loggers	• Get interest from loan • Labor exploitation • Have cheap labor	• Workers • Borrowers • Local community	• Hard work with disproportionately low income • Pay high speculative interest for money lenders

	• Illegal traders • Land speculators	• Buy land at cheap price		• Being exploited by rich and illegal business people • Become landless because land is sold for money at cheap price

2.1.10 Sectoral Scope and Project Type

The SCRP falls under the VCS sectoral scope 14: – Agriculture. Forestry, and Other Land Uses (AFOLU), under the category Reduced Emissions from Deforestation and Degradation (REDD). Specifically, the project falls under the REDD+ category Avoided Unplanned Deforestation (AUD). The project is eligible under this category by the definitions provided in the VCS AFOLU Requirements version 3.5 published 19 October 2016 by virtue of the fact that it prevents emissions that would have otherwise taken place through unplanned deforestation.

The SCRP is not a grouped project.

2.1.11 Project Activities and Theory of Change (G1.8)

Project Activities

Based on the Problem Flow Diagrams developed for each of the three Focal Issues identified (see Section 4.1.4), several strategic project entry points were discussed during the SIA workshops and agreed upon as the most likely strategies/activities to address root causes of the problems. These would thus constitute the project activities for the SCRP that if implemented would follow the theory of change logic developed in the Results Chains (Figure 3) to lead to the desired outcomes. These proposed project activities were further enriched by the knowledge and experience of the project partner WA, who has been engaging with local communities in this landscape for the last decade to identify their needs. As such, the project communities have been variously engaged in designing these Project activities.

While the Project partner WA has been successful in implementing some of these activities, the effectiveness and scope of their implementation has been limited by a lack of sustained funding. Therefore, the Project Partner WA deems it most effective that the SCRP maintains and expands these on-going project activities. Supporting these operations will be the most direct way to deliver benefits to the communities in a timely fashion. It is envisioned that several new activities, directly supporting the sustainability of the REDD+ Project while simultaneously providing alternative means to the local communities, will also be possible with carbon revenue. Specific existing activities and envisioned new activities are described below, followed by detailed Results Chains (Figure 3) and a description of the key activity areas that will serve as a framework for activity implementation. The SCRP project is in the country of Cambodia, which is implementing a jurisdictional REDD+ program. Therefore, all of the project activities listed below are located in a jurisdiction that will be included within the national REDD+ jurisdictional program.

1. **Training on Agricultural Methods and Intensification**: The Project has provided technical assistance, equipment, and community agricultural development to

communities. It will continue this work with the primary goal of providing alternatives to such destructive practices as slash and burn agriculture and unsustainable planting and harvesting techniques. These practices often fail and require vast amounts of land. Using the tenets of conservation agriculture, particularly increased cover cropping, zero tillage and an emphasis on soil health and moisture retention, the project aims to increase yields on existing farms and decrease dependence on the clearing of additional land for new field. Additionally, the Project will build and support produce storage facilities and value-added technologies to take advantage of market price fluctuations and aid in achieving high sale prices.

2. **Improve Health Facilities and Care:** Proceeds from the Project will be used to enhance the delivery of health care through increased support to health care workers, hiring of additional health care employees and improvements of facilities such as rainwater collection, solar systems, sanitation and support for outreach (hand washing stands at local schools, etc.).

3. **Community-based Eco-Tourism Development:** Proceeds from the Project will be used to facilitate the participatory process of community engagement, capacity building in hospitality, accounting, English, computers, and nature guiding. Developing ecotourism infrastructure that could include trails, night camps, guesthouses, homestays, visitor center, and equipment such as mountain bikes, kayaks, and camping gear.

4. **Micro-finance:** The Project has utilized a revolving micro-finance fund and family savings system to support access to capital and markets. It will continue to use such approaches and other best practices in micro-finance such as micro-loans, micro-insurance and other small and medium enterprise development practices, thus providing more sustainable and valuable alternatives to current destructive forest practices.

5. **Participatory Land Use Planning:** Unsecure land use rights and ineffective land use in the project induces deforestation in the project area. Local farmers feel unsafe to control their current agricultural land, and outsiders/immigrant come to the project area start clearing forestland especially in the protected area and permanent forest estate. Outsiders/immigrant often perceive that protected areas or permanent forest reserves are open to long-term use. To thwart this problem, the SCRP will strengthen land tenure security by supporting the create and distribution of land titles. The SCRP will work closely with local authorities, community members, and relevant provincial departments to implement this program.

6. **Strengthening Community Organizations:** The project will support capacity building for community groups and institutions directly involved in the management of natural resources for improved Community Protected Area (CPA) organization and functioning. It will help to train local stakeholders in natural resource governance, land tenure and land rights, responsibilities, forest and fuelwood management and natural resource management education. This will include providing locations for meetings, materials, travel support, bringing in experts on specific subjects (such as conservation agriculture) and other logistical and organizational support.

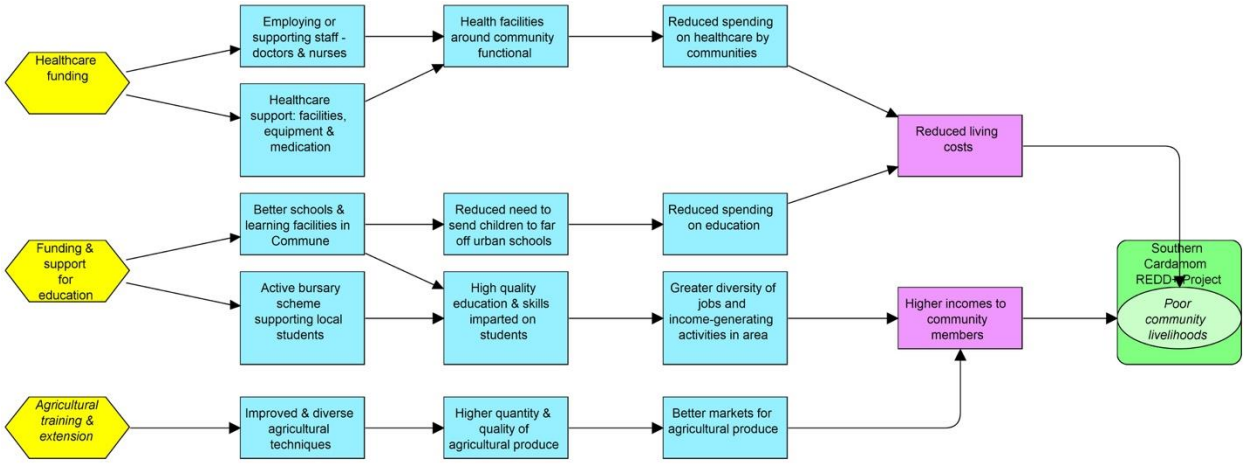
7. **Enhanced Security and Law Enforcement:** Although a current ranger/community member force exists, its scope and scale are currently inadequate to address the threats to the Project Area landscape. Proceeds from the REDD+ Project will be used to directly hire and train additional rangers/community members, focusing on conservation principles and biodiversity monitoring. To increase motivation, the existing performance incentive program will be enhanced. The current ranger/community member force suffers from inadequate equipment and training. The Project will provide invaluable support to this vital program.

8. **Sensitization and Awareness Raising:** The project will have a dedicated outreach department that will use diverse means to educate and sensitise the communities about the environment and conservation in general, but also on the SCRP in particular, its goals and how they are involved. This will be in the form of continuous FPIC programme for the project's lifetime.

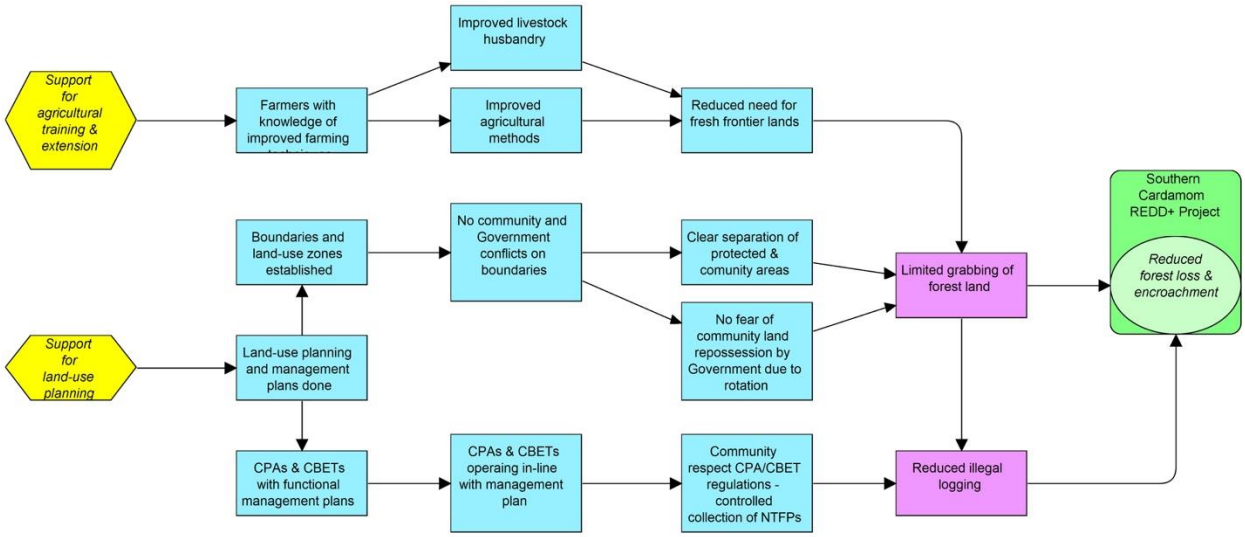
9. **Education Improvement:** Proceeds from the project will be used to improve education standards in these communities through increased support to schools, hiring of additional teachers, improvement of education infrastructure (buildings and/or other equipment), and a dedicated school bursary scheme.

10. **Direct Employment and Training on Income Generating Activities (IGAs):** One important use of the revenue from the carbon credit sales will be directly employing personnel to run the project at different capacities. As far as will be possible, most hires will be directly from the communities in the Project Zone.

a) Focal Issue 1: Improved Livelihoods



b) Focal Issue 2: Forest destruction and land encroachment



c) Focal Issue 3: Wildlife poaching

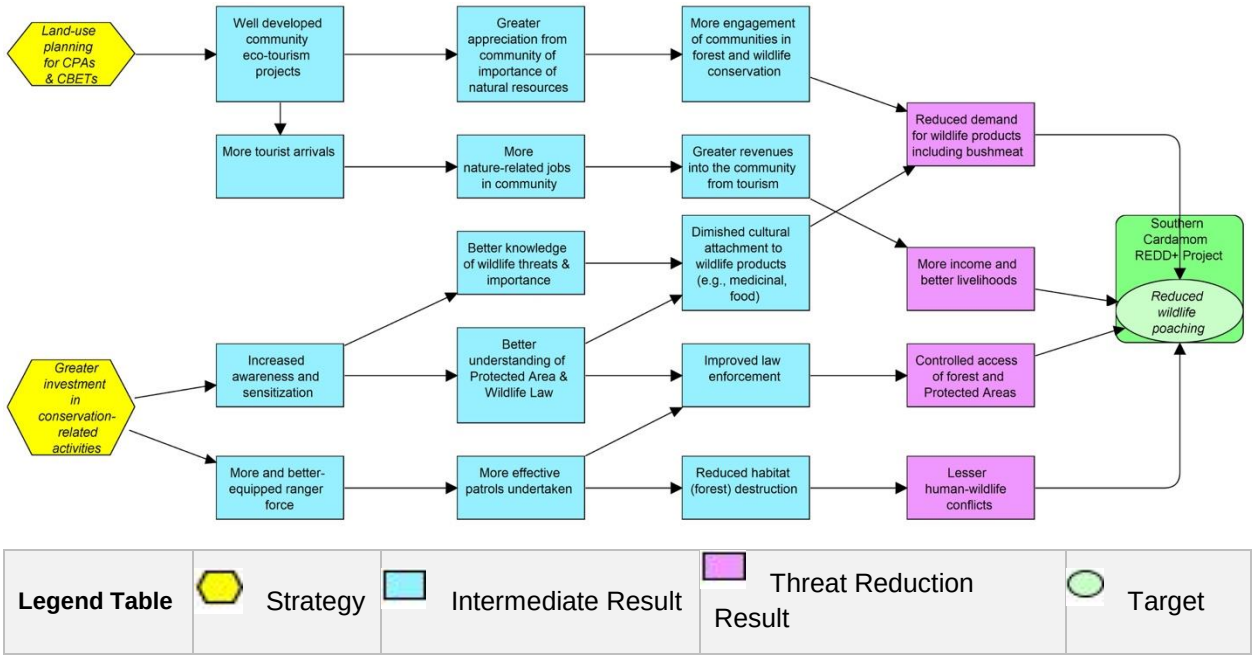


Figure 3: Results Chains underlining the theory of change logic for the three Focal Issues identified during community SIA workshops for the SCRP

Table 5: The SCRP project activities and their expected positive impacts towards the three primary activity areas.

Activity Area 1: Poor Community Livelihoods

Defined Activities
Training on income generating activities (IGAs) and direct employment
Micro-finance implementation
Improving health facilities and care
Strengthening community organization and specific promotion of female education
Support teacher salaries and bursaries for students
Expected positive impacts
Reduced dependence on extractive forest resources
Increased employment and income from legal IGAs
Increase in stability of income flow
Reduced risks through livelihood diversification
Improved community well-being
More access to education

Activity Area 2: Forest Destruction and Land Encroachment

Defined Activities
Employment of a larger ranger force and increasing their motivation
Training on income generating activities (IGAs) and direct employment
Increasing environmental awareness
Strengthening community organization
Training and support for sustainable eco-charcoal techniques

Training on agricultural methods and intensification
Expected positive impacts
Reduced dependence on extractive resources
Enhanced ecosystem integrity and ability to provide for wildlife
Ensured maintenance of ecosystem services
Stabilization of water flow and quality for downstream producers
Increase in perception/ recognition of the value of forests resources

Activity Area 3: Wildlife Poaching

Defined Areas
Employment of a larger ranger force and increasing their motivation
Raising environmental awareness
Training on IGAs and direct employment
Strengthening community organization, esp. female involvement and empowerment
Training on agricultural methods
Tree planting and habitat restoration
Expected positive impacts
Reduced poaching activities and associated impacts
The safeguarding of High Conservation Value Species
Enhanced ecosystem integrity and ability to provide for wildlife
Increase in perception/ recognition of the value of forests and wildlife

2.1.12 Sustainable Development

The Southern Cardamom REDD+ Project will touch upon seven sustainable development themes that the Royal Government of Cambodia has committed to attaining (Royal Government of Cambodia – Ministry of Environment, 2012). These themes and the provisions for reporting and monitoring are listed below.

Economic Growth and Development

Project stakeholders benefit from employment in the Project and from livelihood enhancement activities. These activities will work to improve local incomes and create the foundation for a low-carbon economy. The Project will last 30 years and will employ local stakeholders in a variety of ways including forest protection, supporting project activities, improved agricultural yield from agricultural intensification, and as well as livelihood enhancement from community-based eco-tourism.

Poverty and Equity

One of the goals of the RGC is to lower poverty levels in rural areas. The SCRP will support poverty reduction by generating employment and supporting an increase in household incomes. The SCRP will work with impoverished communities and focus on providing employment and livelihood support to the neediest community members. There is one indigenous community in Chhay Arieng within the Project Zone, where a community-based ecotourism program is under development. In addition, women were consulted and are included in all Project activities.

Education

A critical component of creating economic development and stopping poverty is improving education. During the SBIA, there were two types of educational support that were requested by local leaders, agricultural education and primary and secondary education. The goal of agricultural education will be to support farmers in increasing yields and conducting more sustainable farming. The SCRP plans to support primary and secondary education by supplementing teacher salaries and providing bursaries for local students to offset the cost of education to marginalized families.

Sustainable Forest and Land Use

The SCRP will support RGC's goal of maintaining forest cover at 60% by protecting 465,000 ha of forest, improving law enforcement, as well as supporting the development and improving management of community protected areas. It will also continue to conduct concerted action to halt illegal logging and deforestation.

Climate Change

REDD+ represents one the key components of RGC's climate change mitigation strategy. The SCRP will reduce forest emissions by approximately 3,307,701 tonnes CO_2e/yr.

Agriculture and Food Security

The RGC's focus for developing sustainable agriculture is on increased yields and providing manufacturing facilities to process products so that local farmers can move up the supply chain. The SCRP will meet the goal of increased yields by providing local farmers with training in better crop management and improved farming techniques.

All of Cambodia's sustainable development themes mentioned above including economic growth and development, poverty and equity, education, sustainable forest and land-use, climate change, and agriculture and food security, will be monitored and reported through the VCS and CCB monitoring, reporting and verification system at a minimum of every 5 years.

2.1.13 Implementation Schedule (G1.9)

PDR.9 A timeline including the first anticipated monitoring period showing when project activities will be implemented.

Table 6: The Implementation schedule for the Southern Cardamom REDD+ Project, showing key dates and milestones for the Project.

Date	Milestone(s) in the project's development and implementation
2002 - Present	Forest Protection: WA began supporting law enforcement activities in the Southern Cardamoms in 2002. This includes working with the RGC to develop a law enforcement strategy for the landscape and providing financial and technical support for all law enforcement operations. Two fully-equipped ranger stations were implemented in 2002. As of, 2017, WA has been operating nine.
2003-present	Land-use Planning: WA has worked with the RGC and provincial, district, and commune authorities since 2003 to develop clear spatial land-use plans for the Southern Cardamom. This includes securing community land tenure across 11 communities, thereby helping to ensure community rights and assisting in the management of legal agricultural land.
2004 - Present	Community Development: WA conducted a participatory rural appraisal (PRA) in the Project Zone, creating community agricultural programs for 200 families in 2004 and establishing community-based ecotourism in Chi Pat in 2008. This activity has expanded to a second cluster of 8 villages (Chay Areng) in 2017.
2010 - 2012	REDD+ Project Exploration: ONFI and WA conduct preliminary carbon stock assessment, VCS draft pd writing
April 2012 - August 2012	REDD+ Feasibility: WWC conducts a REDD+ feasibility study for the Southern Cardamom REDD+ Project
1 January 2015	Project start date

2015 – Present	Project Implementation: Attract investors and gain government approval for the Project – continue forest protection and community development activities
January 2017 – May 2017	Project carbon stock measurement
July 2017 – August 2017	Proxy Area carbon stock measurement
December 2017 – January 2018	Leakage Area Assessment
April 2018	Project Validation and Verification
May 2018	Project Registration

2.1.14 Project Start Date

PDR.6 The Project Start Date.

The project start date for the SCRP is 01 January 2015. Wildlife Alliance commenced REDD+ activities prior to this date. However, the SCRP elects to start the Project after the national FREL historic reference period end date to prepare for nesting into the national REDD+ Program (see Figure 4 below).

2.1.15 Benefits Assessment and Crediting Period (G1.9)

PDR.7 The project crediting period start date and length.

The project lifetime will be 30 years commencing from the Project start date of 01 January 2015 and an end date of 31 December 2044. The crediting (GHG accounting) period will be the same 30 years as the lifetime of the project.

PDR.8 The dates for mandatory baseline reevaluation after the project start date.

Per the VCS guidelines, a mandatory baseline re-evaluation is to be executed at a minimum of every 10 years after the project start. Therefore, there will be a mandatory baseline re-evaluation on or before 01 January 2024 and on or 01 January 2034.

PDR.10 A timeline for anticipated subsequent monitoring periods.

The following diagram depicts the proposed SCRP validation and verification timeline.

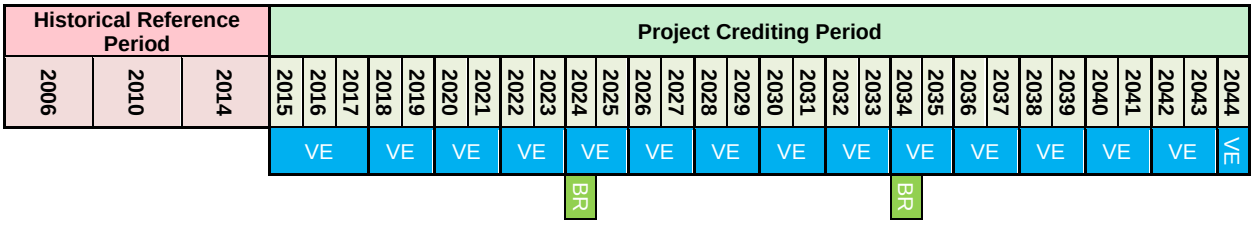


Figure 4: Estimated Project verification and baseline re-evaluation timeline (VE= verification event; BR= baseline re-evaluation).

2.1.16 Differences in Assessment/Project Crediting Periods (G1.9)

The GHG emissions accounting, climate adaptive capacity and resilience, community, and/or biodiversity assessment periods are identical for the SCRP.

2.1.17 Estimated GHG Emission Reductions or Removals

Year	Estimated GHG emission reductions or removals (tCO_2e)
2015	3,982,378
2016	3,982,378
2017	3,982,378
2018	3,536,218
2019	3,536,218
2020	3,536,218
2021	3,536,218
2022	3,536,218
2023	3,536,218
2024	3,536,218
2025	3,536,218
2026	3,536,218
2027	3,536,218
2028	3,536,218
2029	3,536,218
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2032	3,536,218
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2035	3,536,218
2036	3,536,218
2037	3,536,218

2038	3,536,218
2039	3,536,218
2040	3,536,218
2041	3,536,218
2042	3,536,218
2043	3,536,218
2044	3,536,218
Total estimated ERs	107,425,020
Total number of crediting years	30
Average annual ERs	3,580,834

2.1.18 Risks to the Project (G1.10)

2.1.18.1 Human induced risks

1. Slash and Burn / Unsustainable Agriculture

   The greatest human induced risk to the Project's benefits is continued deforestation. The Project Zone is undergoing large pressures for new agricultural land from both the expanding population and ongoing immigration into the area. Therefore, slash and burn agriculture is a primary risk to the SCRP benefits and thus the Project's sustainability.

   Mitigation for this risk is through the Project Activities, mainly in the form of increased protection of the Project Area, creation of new income generating activities and through the promotion of improved agricultural methods as described in Section 2.1.11.

2. Charcoal Production and Illegal Logging

   Within the Project Area there are extractive activities, including the production of charcoal and illegal logging. These are additional threats of deforestation and degradation in the SCRP Project Area and pose a significant risk to the Project's climate benefits. Law enforcement and community members patrol the Project Area permanently and attempt to halt such activities. It has been recognized, however, that these law enforcement units are limited because of the size of the Project area. The SCRP therefore provides financial, political and human capacity support to maintain and enhance law enforcement. This is achieved by employing more rangers, increasing ranger motivation and providing rangers with more equipment, training and technology

3. Anthropogenic Fires

   Another human induced threat is frequent fires; these can occur multiple times a year in the area. Many are set intentionally with the goal of clearing trees and brush for agriculture, or some may be the unintentional result of illegal activity, such as charcoal production. SCRP staff monitor the Project Area for the occurrence of fire, and work to reduce the risk of fire. In addition, the Project aims to reduce illegal incursions of people into the Project Area, thus mitigating anthropogenic fire

potential. Furthermore, the Project Proponent will monitor fire events and other potential contributions to reversals as part of their annual monitoring efforts and is required to report on and account for any major loss of carbon in the Project Area. It is the goal of the Project to work with communities to understand the value of the forest, thus decreasing their willingness to destroy their forest resources, as they begin to realize tangible carbon benefits.

2.1.18.2 Natural Risks

The region in which the Project is located is not generally susceptible to severe or destructive natural events. The primary types of natural events that could occur would be geologic events, pests or disease, flooding or fire. The area is not prone to any geologic activity and poses little to no risk to the Project. As the Project Area is a native and biodiverse ecosystem the risk from pests or disease that result in significant emissions reversal is low. The primary mitigation for this risk is to maintain the forest and ensure through monitoring that the trees and ecosystem remain healthy and intact. There can be minor seasonal flooding from the annual monsoons. However, the species of this area are all adapted to the hydrological cycles and are not liable to monsoonal flooding. The Project Area is mountainous and there is a medium risk of erosion or landslides. Due to the Project activities that protect forests the risk of erosion or landslides is minimized. The risk of fire has the most potential to cause damage to the forests of the Project Area. However, the risk of significant emissions reversal is low. The evergreen and semi-evergreen forest types are of a dense, evergreen, moist forest type that is not prone to forest fires. There have been no catastrophic fires in forests of this type in this region. Therefore, natural events have low risks to the Project's benefits.

2.1.18.3 Political Risks

In all countries, there exists a slight risk of shifting legislation or the potential of new policies that could potentially affect natural resource management and/or land tenure. There have been cases in Cambodia where the RGC has allowed protected forest lands to be cleared for agricultural or development purposes. That said, the likelihood of such changes occurring is considered to be extremely small, especially given that the Project Area is currently under government ownership and under protective status (It is both a national park and wildlife sanctuary). As a highly visible international REDD+ project, the likelihood that the RGC would allow the SCRP Project Area to be converted is low. Additionally, as the intent is to nest this Project into a future jurisdictional/national program, the Project's visibility will only increase as well as its importance to the RGC.

2.1.18.4 Policy risks

1. Risk of reversal

Risk of project reversal due to community opposition is considered minimal, as they have openly and widely been consulted through numerous outreach and information-sharing meetings throughout project development. As a project governance policy, all stakeholders are always able to seek further information or air grievances if desired. The Project will continue to engage the surrounding communities, provide education and support for community social services, and improved livelihood opportunities.

All these factors build and enhance community support for the project and make them authentic stakeholders, thereby reducing the risk of opposition to the project and its goals.

2. Insufficient Revenues

   The majority of REDD+ credits are currently sold on the voluntary market, posing a risk to recurring, sustainable income flow. If credits are not sold, there will be no revenue, and thus no monetary support for the Project over its 30-year lifetime, save initial investment. Nevertheless, the Project Proponent believes that the Project will be successful in attracting sufficient buyers of carbon credits. The Project has been developed as a cooperative effort between Wildlife Alliance and the Ministry of Environment, it is one of the largest projects in Southeast Asia, making it an attractive Project to the greater Southeast Asian region. In addition, it is a vital forest resource to Cambodia, and is a critical watershed for the Gulf of Thailand, an important part of Cambodia's economy because of its contributions via hydroelectricity, tourism, and fisheries. The intention of the Project Proponent is to nest the Project into the potential future Cambodian jurisdictional/national REDD+ scheme. In the future, this will allow for the sale of larger credit volumes, on a recurring, sustainable basis, to sovereign nations and large multi-national buyers in the international market created by the Paris Accord. Therefore, the Project Proponent believes that the risk of insufficient revenues to the Project's benefits is low.

2.1.19 Benefit Permanence (G1.11)

Southern Cardamom REDD+ Project activities are all designed to enhance the CCB benefits beyond the Project's Lifetime. Community activities are designed to transform local economies over the life of the Project. In this regard, the focus of the SCRP is developing local business and income-generating activities that are critical components of a long-term low carbon economy. Project activities that meet this overarching objective focus on education, sustainable agriculture, community-based ecotourism and sustainable management of natural resources. These activities will reduce the necessity for community members to deforest and degrade the Project Area. During the Project Lifetime, this will be achieved, for example, by improving education by training farmers in sustainable agriculture, as well as creating long-term eco-tourism programs. These activities are outlined in more detail in Section 2.1.11.

2.1.20 Financial Sustainability (G1.12)

The Project Proponent is the Royal Government of Cambodia Ministry of Environment, which is a government supported administrative unit. The development of the Project has mainly been supported by funding from Wildlife Alliance and the Barbara Delano Foundation. Additionally, the Ministry of Environment receives an annual budget support from the central government. The Project Proponent and funder are also supported by Wildlife Works in the development of the Project. Wildlife Works is experienced at marketing and sales of REDD+ credits on the global market. It has used this applied experience to make conservative estimates for expected annual credit sales for the SCRP.

Moreover, the Project Proponent, Wildlife Alliance and Wildlife Works' combined REDD+ project development experience (5 total successful prior VCS/CCB validated & verified projects) contributed to the creation of a detailed financial model for the development and management of the SCRP. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through the end of the crediting period. The Project Proponent has already received grants to fund to project design and start-up costs. Documents supporting these investments can be produced to the project auditor for inspection.

2.1.21 Grouped Projects

The SCRP is not a grouped project.

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Land Use Scenarios without the Project (G2.1)

According to the social impact assessment, the potential range of the “without-project” land-use scenarios is varied depending on the stakeholder. In order to analyze these scenarios, we first created an exhaustive list of focal issues, and then, through voting and group discussion, prioritized three focal issues without the project. Without the Project the land-use scenarios that were determined to lead to deforestation were a lack of modern agricultural technique, a need for land for livestock, un-controlled migration, land speculation, land tenure disputes, and mismanagement of community protected areas. The drivers of these scenarios are illegal logging, land allocation through Order 01, small scale land conversion, community protected areas, and fuel and deadwood collection.

The identified baseline scenario for the SCRP is conversion of native ecosystems from a natural forested landcover to a non-forest or agricultural state. The baseline scenario outlined in the VCS Additionality Tool of Section 3.1.5 demonstrates that the Project Accounting Area would be converted to subsistence agricultural. Please refer to Section 3.1.4 and 3.1.5 for more details.

2.2.2 Most-Likely Scenario Justification (G2.1)

PDR.18 A list of the agents and drivers of conversion, including quantitative descriptions of agent mobilities.

Table 7: The agents and drivers of deforestation in Koh Kong Province. Adapted from Delux, 2015 and Hort, 2018.

Agents of Deforestation	Drivers of deforestation in Koh Kong Province						Agent Mobility
Drivers or factors effect deforestation and forest degradation	**ELC**	**SLC & Directive001**	**CPA**	**Small scale land conversion**	**Illegal logging**	**Fuel & dead wood collection**	
Community members (insiders)			x	X	x	X	Generally limited by hand tractor 5-10 km / day. If on motorcycle can be 20-50 km / day
Local Authority: Provincial governor District governor Commune Chief	x	x	x	X			If on motorcycle can be 20-50 km / day. If utilizing a vehicle can be up to 100-500 km / day
In-migrant and Outsider: Landless household Forest land speculator Poor households		x	x	X	x	X	Generally limited by hand tractor 5-10 km / day
Private: Economic Land Concessionaire Powerful and rich land owner Local middleman (local timber and land trader)	x	x		X	x		If utilizing a vehicle can be up to 100-500 km /day

PDR.19 A narrative describing the agents and drivers of conversion.

The primary agents of deforestation for the SCRP are local communities, in-migrants and outsiders. This refers to individuals or a group of people who live in the project zone as well as move or come to Koh Kong Province and the SCRP project zone with the aim to claim land either legally or illegally. It was

agreed among the SIA workshop participants that there are three classes of agents (please see the detailed description of the classes of this agent below under PDR.20), local communities, land speculators, and middleman, and that these agents are predominantly responsible for deforestation in the SCRP Project Area.

The drivers of deforestation are predominantly a high demand for new agricultural and cash crop land in the SCRP Project Area, and throughout Koh Kong Province in general. The population in the Province and the area around the Project has significantly increased over the last 15 years. This is from both in-migration and also an increase in child birth rates. Currently, there are low education rates in the area, due to the need for children to work on the families' farms during the day, perpetuating the cycle of poverty and deforestation. Additional drivers of deforestation include illegal logging, fuel gathering and to a lesser extent charcoal production.

PDR.20 Descriptions of agents and drivers including any useful statistics and their sources.

In the SIA workshop that was held with project stakeholders the participants classified the agents and drivers of deforestation as local community members protecting land for agricultural and livestock-use, in-migrants and outsiders who are coming to the Project Area into three categories:

1. **Local Communities:** This includes households residing in the project zone that use slash and burn agricultural techniques, actively clear lands for livestock, and work to protect agricultural land from becoming a part of either community or government protected areas.
2. **In-Migrants:** This includes households who have never previously owned land, households that have sold their land to third parties, and households whose land was destroyed by flooding. These households come to the Project Area and clear plots of forest land for the building of houses and for agricultural plots. Generally, it is observed they then gain title to the deforested land and settle in the area permanently.
3. **Outsiders:** These are individuals or groups of individuals who immigrate to the Project Area and illegally clear forest land for individual property. After clearing land they construct simple buildings and plant agricultural crops to legitimize their land claim. They will then sell the land to another party, mainly wealthy people who live in the cities or provincial towns. The land speculator will then look for new forest area where they will repeat the process. Generally, these people are not landless households and they will not settle in the area permanently. A second type of outsider is a middleman, who comes to the Project Area to purchase plots of land from the land speculators. They then sell these land plots to landless households or to wealthy or powerful people who are live the cities, or provincial towns.

2.2.3 Community and Biodiversity Additionality (G2.2)

According to the social and biodiversity impact assessment, benefits to communities and biodiversity in the absence of the Project would be limited. There are multiple protected areas throughout Cambodia, including Phnom Aural National Park, Phnom Samkos Wildlife Sanctuary, Roneaum Daum Sam Wildlife Sanctuary, and Kulen Promtep National Park, that are examples of what the project area would be like without the Project. Most of these areas were declared protected areas in 1993, while the Khmer Rouge still occupied large portions of forestland in the country, including the Cardamom mountains. Even with the support of international NGOs most of these areas lost 30% or more of their forest cover over the last

20 years (Pech, 2017). This was partially because of government resettlement schemes that directed poor families to protected areas, such as in Roneaum Duam Sam, where there is no forest left.

In the without-project scenario, there has been a push by the government for resettlement adjacent to protected areas, but the government doesn't provide resources to benefit communities and biodiversity. There has been a lack of community development initiatives around protected areas which leads to the destruction rather than protection of natural resources (ICEM, 2003). This leads to significant financial, technical and institutional barriers to implementation of project activities such as income generation, agricultural training and forest and biodiversity protection.

The identified without project scenario for both communities and biodiversity are described in more detail in Section 4.1.4 and 5.1.3 respectively. Please refer to Section 4.1.4 and 5.1.3 for more details.

2.2.4 Benefits to be used as Offsets (G2.2)

The SCRP is not claiming any other offsets or credits from the community or biodiversity benefits produced by the Project.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

- The Project Office and Project Sub-Office maintains a full printed version of the PD in English for public viewing.
- The executive summary has been translated into Khmer is posted in public places in communities throughout the Project Zone.
- The full PD version and the executive summary of the PD in English and Khmer version are made available on the project webpage (http:// https://www.wildlifealliance.org/) and official Wildlife Alliance Facebook page.

2.3.2 Dissemination of Summary Project Documents (G3.1)

- The executive summary has been translated into Khmer and is posted in public places in communities throughout the Project Zone.
- The full PD version and the executive summary of the PD in English and Khmer version are made available on the project webpage (http:// https://www.wildlifealliance.org/) and official Wildlife Alliance Facebook page. Additional project information will be relayed through this page.
- In addition to the executive summary, a poster/flyer in Khmer advertising the Project, and providing a contact email address was posted in communities.
- A poster/notice in Khmer advertising the public comment period, and the validation field visit was posted in communities throughout the Project Zone. It included details on how a comment to the CCB can be made.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Information regarding the Southern Cardamom REDD+ project was communicated through a series of community meetings that took place in a culturally-appropriate setting. Meetings were conducted by appointed FPIC officers and were called at public locations or usual places of gathering, such as houses of commune chiefs or village chiefs, pagodas and schools. The existing network of WA contacts across the Project Zone, particularly local government officials, were used to publicize the FPIC events and ensure representative community participation. In addition, two of the FPIC officers were from Project Zone communities and thus used their extensive networks to publicize the events. It is common in Cambodia to provide drinking water and snack at formal meetings and some sort of supports for travelling and this custom was also adhered to at these community consultations. The FPIC officers used posters to explain the concept of REDD+, climate change, project activities and conflict resolutions and bring across the project's anticipated benefits as well as costs and risks. An open discussion and Q & A session followed, which often revolved around land tenure, customary use of timber and non-timber forest products, costs and benefits as well as risks and their concern about implementation of the Southern Cardamom REDD+ Project. All meetings were conducted in the Khmer language, ensuring that the information was communicated to and understood by all attendees.

2.3.4 Community Costs, Risks, and Benefits (G3.2)

The SCRP has been designed through engagement of relevant communities and stakeholders and has involved them in decision-making and implementation from the outset. Collaboration amongst the Project Partners with the goal of initiating a carbon-crediting scheme began in 2012. The role of the Project Partners is central to the SCRP, due to their relationship with the communities. These communities are already familiar with the Project Partners and open communication channels were established prior to the start of the Project's design phase. The SCRP builds on these structures, which makes it possible to disseminate information to the communities in a quick and timely manner as well as to encourage their involvement in the Project. During the last year, Project Partners have conducted a Social and Biodiversity Impact Assessment (SBIA) and suite of community meetings focused on Free Prior and Informed Consent (FPIC). These meetings were the basis for which Project costs, risks and benefits to communities have been communicated.

A Project Sub-Office was established in the Koh Kong MoE office branch in late 2017, and a REDD+ office was created. This office serves as an information hub for SCRP and is open to all community members and stakeholders who wiah to gain information about the Project and/or submit comments or grievances. The primary communication method to stakeholders and communities is through the Project Partner's existing channels of communication to the respective communities in their area. Meetings were mainly announced through phone calls or by informing the leader of a specific community group (women's groups, youth groups, etc.) in a timely fashion, who in turn would communicate the information to the members of that group.

Project Partners have been kept up to date with regular communication and dissemination of project documentation. Community members are encouraged to visit these headquarters where they have full access to any such material. The Project Office constructed seven sign-boards that were installed at strategic points around the Project Zone for posting of project information. The SBIA community meetings took place August 15-17 and August 23-25, 2017 in the MoE offices, Koh Kong province. In addition,

community FPIC meetings took place in two phases between August and October 2017 (24 meetings) and December 2017 and March 2018 (27 meetings). In total for the FPIC process 51 meetings were held attended by over 2,500 community members from the Project Zone. Significant time was given between the initial SBIA stakeholder consultation and the time that any formal decision-making was expected. Details of the SBIA consultation and all FPIC meetings including the dates, locations and number of attendants, are provided in the Section 2.3.7.

2.3.5 Information to Stakeholders on Validation and Verification Process (G3.3)

- The executive summary has been translated into Khmer and is posted in public places in communities throughout the Project Zone.
- The full PD version and the executive summary of the PD in English and Khmer version are made available on the project webpage (http:// https://www.wildlifealliance.org/) and official Wildlife Alliance Facebook page.
- In addition to the executive summary, a poster/flyer in Khmer advertising the Project, and providing a contact email address was posted in communities.
- A poster/notice in Khmer advertising the public comment period, and the validation field visit was posted in communities throughout the Project Zone. It included details on how a comment to the CCB can be made.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

The Project partner WA has actively communicated to community members and stakeholders about the start of the Public Comment Period and the methods with which they can submit comments on the Project as well as how to view full project documentation. This was accomplished by communicating the Project - Public Comment Period and Validation field visit dates to previously identified stakeholders, community leaders, leaders of the faith communities and public officials. They were then requested to pass that information onto their communities.

The Project partner WA will arrange for community meetings with all stakeholders during the validation and verification site visit. During these meetings the auditor will be able to independently ask questions of all stakeholders regarding FPIC and SIA consultations.

2.3.7 Stakeholder Consultations (G3.4)

The process of Community and Stakeholder identification was conducted through a series of key informant/expert interviews, workshop discussions, an analysis of rights and a literature review. Through these methods it was possible to obtain a well-informed and comprehensive understanding of all communities and community groups in the Project Zone. Consultations with each group were integral to the Project design, in particular during the SIA training and workshops with the Project partner WA, local government officials and local community decision makers.

The SIA training and workshop utilized the theory of change logic to hypothesize how the SCRP intends to achieve its objectives. In other words, through the SIA training and workshop the Project partner WA, local government officials and key community leaders created a roadmap of how the SCRP plans to get

from Point A (project activities) to Point Z (project impacts). First the participants created a Project Vision Statemen. Secondly, they identified and prioritized the Project's focal issues, from which they created a problem statement and vision statement for each focal issue. With these problem and vision statements they created a problem flow and results chain diagram for each focal issue. Next the participants conducted a risk analysis and negative impact assessment for each focal issue, and finally a theory of change statement. Once these items were created for each issue, a list of mitigating activities and indicators were created for the life of the Project. This process, described above, demonstrates how key community members and project stakeholders were involved in every step of the Project's design process.

Key informants

Key informants are of value for providing inside information of the area and its communities because they have been based in the area for decades, and therefore possess substantial local knowledge and experience. Key informants consulted include:

- Mr. Jeff Silverman: REDD+ Technical Advisor of the Wildlife Conservation Society (WCS) and who has been working in the area of REDD+ for more than 10 years. Jeff has been presented his successful experience in providing technical expert to the successful Seima REDD+ Project in Cambodia.
- Mr. Hort Sokun: Rainforest Technical Manager of the Wildlife Alliance (WA) and who has been working in the Southern Cardamom since 2001. Sokun has conducted community development activities with all Project stakeholders.
- Mr. Chhun Delux: Chief of Forest and Climate Change Office at the Forestry Administration, Mr. Chhun Delux, one of the most experienced REDD+ practitioners in the Royal Government of Cambodia, provides his technical expertise as forest policy and community engagement expert to the SCRP.

Table 8: Key informant interviews conducted during Project development.

Key Informant	Position	Date
Mr. Jeff Silverman	REDD+ Technical Advisor	2/14/17
Mr. Hort Sokun	Southern Cardamom Community Engagement Specialist	2/18/17
Mr. Chhun Delux	Chief Forest and Climate Change Office	2/18/17

Focus group discussion at SBIA training

SBIA workshops were held from August 15-17 and August 23-25, 2017 at the MOE district office in Koh Kong. A total number of 73 local government staff and local decision makers from the SCRP attended. During this workshop, discussion focused on the agents and drivers of deforestation, as well as on the community and community groups. Through the expert knowledge provided by the local government

officers and decision makers in these discussions, a comprehensive list of the categories of people expected to be affected by the project were identified. This provided valuable background information for subsequent investigations and research.

Analysis of rights

An analysis of user rights helped provide a straightforward insight into which communities, community groups and stakeholders are present in the area. The analysis focused on customary rights and ownership to the land. The Project Area is comprised of government owned protected areas, but communities have rights to communal land which is present in the Project Zone. This process aided in identifying communities and stakeholders. This analysis was carried out using expert knowledge and also drew on Wildlife Works' experience in additional REDD+ Project development.

Literature review

To provide a listing of all potential stakeholders in the SCRP a comprehensive review of the literature, including academic papers, published reports and any available open-source Internet resources was completed. This process provided further insight into local dynamics, cultural migration, and historic government land policy. These resources provided both specific information on local stakeholders in the project and general guidance for identifying and describing stakeholders in REDD+ projects.

Identified community groups and stakeholders

Through the process listed above, community groups and stakeholders have been identified in the project. Table 9 outlines their current impact on the land, the effects of the project on these activities and the relationship with other stakeholders. This allows the Southern Cardamom REDD+ Project to understand the complexities within the social structure and generates insight into potential conflict areas. This in turn informs where exceptional care is needed and helps to target project activities more directly.

Table 9: The Stakeholders in the Southern Cardamom REDD+ Project.

Stakeholder or stakeholder sub-group	Current impact/ activities in landscape	Effect of project on their activities	Relationship with other stakeholders (Partnership/conflict)
Project Zone Communities: conducting legal agriculture, NTFP collection	Legal cultivation inside the Project Zone; NTFP collection from inside the Project Area	No expansion of agricultural land into the Project Area; support for value chain addition for NTFP production	Potential conflict with Landless-migrants due to land incursions; potential conflict with local authorities over illegal land allocation to forest land speculators
Project Zone Communities: ecotourism service providers	Providing community-based ecotourism services in a sub-set of Project Zone communities	Further support and expansion of community-based ecotourism	Partnership with MOE and local authorities for implementing legal ecotourism

(current and potential)			
Charcoal producers	Extraction of wood for charcoal making, often from protected Project Area	Prohibition of charcoal making in the Project Area, loss of income generating activities, increased law enforcement and potential prosecution	Conflict between charcoal burners and MOE and rangers if illegally trespassing into Protected Forest.
Women	Limited legal economic opportunities in many Project Zone communities so involved in illegal wildlife trade.	Providing greater economic opportunities and training particularly through Community Based Ecotourism	Partnership with MOE and local authorities for implementing project activities. Potential conflict with 'traditional' men if some gender roles challenged
Youth	Limited legal economic opportunities in many Project Zone communities so involved in illegal wildlife and timber trade.	Providing greater economic and scholarship opportunities through project activities and Community Education Fund	Partnership with MOE and local authorities for implementing project activities.
Commercial hunters	Intrusion into Protected Project Area for, killing of wildlife,	Greater law enforcement and abatement of hunting activities, persecution.	Potential conflict between hunters and MOE and ranger teams
Wildlife and Timber Traders	Middle men facilitating the purchase and transportation of illegal harvested timber and wildlife from protected forest within the Project Area	Stronger law enforcement increases risks and reduces rewards for illegal wildlife and timber trade	Potential conflict with MOE and ranger teams

Forest Land Speculators	Illegal clearing protected forest within the Project Area (in collusion with local authority) for future sales	Increased law enforcement reducing ability to illegal clear and sell land	Potential conflict between land speculators and MOE and ranger teams
Landless – Migrants	Living on land without secure land titles, often practicing subsistence agriculture. Often employed by land speculators to clear land	Cooperation to engage in agricultural training activities, though legal titles needed	Potential conflict between landless and rightful landowners, such as the RGC.
Local authority (district and commune, villages)	Provide intervention and assistance for land titling and sales	Cooperation with MOE to ensure protection and sustainable use of forest and forestland security. Regulate ecotourism	Differences with MOE on extent of land which can be sold to forest land speculators. Potential conflict with MOE as obtaining benefits from illegal activity in Project Zone.
Police and military	Cooperate with MOE to crack down on forest illegal activities	Secure maintenance of forest resource	Potential conflicts with loggers and land grabbers. Potential conflict with MOE as obtaining benefits from illegal activity in Project Zone.

Stakeholder Involvement

FPIC Activities

Information regarding the SCRP was communicated through a series of community meetings that took place in a culturally-appropriate setting. Meetings were conducted by appointed FPIC officers, and were called at public locations, such as village public buildings and schools. It is common in Cambodia to provide tea and a snack at formal meetings, and this custom was also adhered to at these community consultations. The FPIC officers used posters to explain the concept of REDD+, climate change, project activities and conflict resolutions and bring across the project's anticipated benefits as well as costs and risks. An open discussion and question time followed, which often revolved around costs and benefits as well as risks and their concern with regard to implementation of the SCRP. FPIC officers presented in Khmer. This ensured that the information was communicated to and understood by the whole audience.

The Initial Round One Community FPIC meetings took place from August to October 2017. 24 meetings were held within the round. During that period, a half day meeting was held in each targeted village. Significant time was given between the initial consultation and the second round of consultations. From December 19, 2017 to March 2, 2018, an additional 27 meetings in Round Two were held in 27 of the 29 targeted villages. At this Second Round, one full day was allotted to each targeted village with a half day meeting and a half day posting and disseminating awareness materials.

Round Three FPIC meetings have been planned for a period from March 5-29, 2018. Meetings will be conducted only at 14 targeted villages that have the lowest number of participants to the first 2 round meetings.

Details of all FPIC meetings of Round 1 and Round 2 including the dates, locations and number of attendants, are provided in Table 10. Considerable time was allowed between the initial consultation and the time that any formal decision-making was expected.

Table 10: Location, date and attendance of FPIC meetings.

Location	Commune	District	Date	Place	Participants Total	Female
First Consultation						
Chumnoab	Chumnoab	Thmor Bang	1-Aug-17	Villager's house	21	10
Chrak Russey	Chumnoab	Thmor Bang	1-Aug-17	Public school	30	16
Pralay	Pralay	Thmor Bang	2-Aug-17	Village Chief's house	42	19
Samraong	Pralay	Thmor Bang	2-Aug-17	Village Chief's house	30	13
Toap Khlay	Pralay	Thmor Bang	3-Aug-17	Commune Chief's house	30	13
Chamnar	Pralay	Thmor Bang	3-Aug-17	Public school	33	19
Koh	Thmor Donpov	Thmor Bang	4-Aug-17	Pagoda	55	30
Prek Svay	Thmor Donpov	Thmor Bang	4-Aug-17	Commune Hall	58	31

Location	Commune	District	Date	Place	Participants Total	Female
Kokir Chrum	Ruessey Chrum	Thmor Bang	6-Aug-17	District Hall	128	53
Pur Beung Chhay Reab	Dang Peng	Sre Ambel	7-Sep-17	Public school	131	54
Pur Beung Kamlot	Dang Peng	Sre Ambel	7-Sep-17	Pagoda	95	54
Bakangrout	Dang Peng	Sre Ambel	9-Sep-17	Public school	54	17
Kandoal	Kandoal	Botum Sakor	12-Sep-17	Pagoda	93	46
Chi Meal	Angdoung Teuk	Botum Sakor	13-Sep-17	Commune Hall	36	9
Chi Phat	Chi Phat	Thmor Bang	13-Sep-17	Commune Hall	146	94
Veal Taphou	Trapeng Rung	Koh Kong	14-Sep-17	Community Hall	51	21
Trapeang Rung	Trapeng Rung	Koh Kong	14-Sep-17	Public school	38	26
Anlong Vak	Tatai Krom	Koh Kong	15-Sep-17	Pagoda	90	58
O'som	O'som	Veal Veng	27-Sep-17	Community Hall	75	26
Kien Chongruk	O'som	Veal Veng	27-Sep-17	Public school	40	15
Romiang Sar	Tasal	Aural	3-Oct-17	Community Hall	54	26
Taing Bampong-Roleak	Tasal	Aural	3-Oct-17	Community Hall	44	30

Location	Commune	District	Date	Place	Participants Total	Female
Dei Tumneab	Trapeng Rung	Koh Kong	4-Oct-17	Pagoda	29	16
Krang Chek	Chambak	Phnom Sruoch	5-Oct-17	Pagoda	53	29
First Consultation Sub-Total					1456	725
Second Consultation						
Chamnar	Pralay	Thmor Bang	19-Dec-17	Public school	38	24
Toap Khlay	Pralay	Thmor Bang	20-Dec-17	Commune Chief's house	24	10
Samraong	Pralay	Thmor Bang	21-Dec-17	Public school	36	20
Pralay	Pralay	Thmor Bang	22-Dec-17	Village Chief's house	47	30
Chrak Russey	Chumnoab	Thmor Bang	23-Dec-17	Village Chief's house	28	15
Chumnoab	Chumnoab	Thmor Bang	23-Dec-17	Villager's house	22	10
Koh	Thmor Donpov	Thmor Bang	25-Dec-17	Pagoda	41	20
Prek Svay	Thmor Donpov	Thmor Bang	25-Dec-17	Commune Hall	42	23
Kokir Chrum	Ruessey Chrum	Thmor Bang	27-Dec-17	Pagoda	39	19
O'som	O'som	Veal Veng	17-Jan-18	Community Hall	36	15

Location	Commune	District	Date	Place	Participants Total	Female
Kien Chongruk	O'som	Veal Veng	18-Jan-18	Public school	62	34
Romiang Sar	Tasal	Aural	24-Jan-18	Community Hall	52	30
Taing Bampong-Roleak	Tasal	Aural	25-Jan-18	Community Hall	59	31
Krang Chek	Chambak	Phnom Sruoch	26-Jan-18	Pagoda	64	49
Sovann Baitong	Kandoal	Botum Sakor	30-Jan-18	Public school	126	78
Chi Meal	Angdoung Teuk	Botum Sakor	31-Jan-18	Commune Hall	37	25
Chorm Sla	Chi Phat	Thmor Bang	1-Feb-18	Community Hall	46	32
Kamlot	Chi Phat	Thmor Bang	2-Feb-18	Village Chief's house	57	31
Teuk Laak	Chi Phat	Thmor Bang	2-Feb-18	Pagoda	18	4
Veal Taphou	Trapeng Rung	Koh Kong	7-Feb-18	Community Hall	29	9
Trapeang Rung	Trapeng Rung	Koh Kong	8-Feb-18	Public school	27	17
Dei Tumneab	Trapeng Rung	Koh Kong	9-Feb-18	Pagoda	26	10
Anlong Vak	Tatai Krom	Koh Kong	22-Feb-18	Pagoda	21	14
Kaoh Andaet	Tatai Krom	Koh Kong	23-Feb-18	Pagoda	33	17

Location	Commune	District	Date	Place	Participants Total	Female
Pur Beung	Dang Peng	Sre Ambel	27-Feb-18	Public school	73	39
Kamlot	Dang Peng	Sre Ambel	28-Feb-18	Pagoda	47	22
Bakangrout	Dang Peng	Sre Ambel	2-Mar-18			
Second Consultation Sub-total					1130	628
TOTAL CONSULTATION					2586	1353

2.3.8 Continued Consultation and Adaptive Management (G3.4)

The adaptive management plan for the Southern Cardamom REDD+ Project is outlined in section 4.4.1. Please refer to this section for a detailed explanation on the iterative processes the SCRP will use throughout the life of the Project.

2.3.9 Stakeholder Consultation Channels (G3.5)

The Project has held a significant number of community meetings and workshops during the project development process. Section 2.1.8 and 2.3.3 lists the community meetings and workshops that were held for all Project stakeholders. A complete report of the SBIA workshops and community meetings, including pictures and meeting results have been provided to the validator.

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

In order to ensure effective participation of SCRP communities it was important to hold meetings and workshops during time periods where stakeholders could attend. As such, all meetings and workshops were held during the day and at times when other work did not interfere with full community participation. Invitations were extended to community leaders, local government officials and commune leaders within a respectful timeframe and in such a manner that each stakeholder could respond. This included via written invitations, and phone calls. All communication was conducted in Khmer, a language every participant speaks, thus enabling participants to fully understand enabling their full participation.

2.3.11 Anti-Discrimination Assurance (G3.7)

The SCRP is committed to fair treatment and equal opportunity for all Project stakeholders, community members and employees. The Project, nor any agent of the Project, will discriminate against any person for any reason, including, but not limited to, gender, religion, nationality, tribe, or sexual identity. The Project has established an equal opportunity policy that ensures that the Project will not engage in or be complicit in any form of discrimination. The SCRP is committed to providing a workplace and programs that are safe and free from all sexual harassment or unwelcome sexual advances. The Project has drafted a document outlining a sexual harassment policy, defining sexual harassment and describing the recourse that any employee who feels that they have suffered sexual harassment should take.

Additionally, the Project has established a grievance system that will provide all Project employees, stakeholders, community members and participants to have a recourse method in the event that any discriminatory actions or sexual harassment does occur.

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

The SCRP strives to minimize the possibility of conflicts and grievances by maintaining close linkages between and working proactively with communities and stakeholders throughout the Project Zone. The Project additionally has an open-door policy, encouraging community members, stakeholders and employees to visit the Project Office and Project Sub-Office, which is located at the Ministry of Environment branch office in Koh Kong town and Community Based Ecotourism offices in Chi Phat and Areng, and discuss any issues or feedback directly with project staff. The Southern Cardamom REDD Facebook Page (https://www.facebook.com/WildlifeAllianceREDD/) also allows comments and feedback which are followed up upon by project staff. Facebook is an insidious presence across Cambodia and used by many rural and forest communities as the main source of information and news. A project phone number has also been disseminated to communities.

If conflicts or grievances arise, the SCRP has a feedback and grievance redress policy and process, the purpose of which is to provide an efficient, fair and accessible mechanism for resolving complaints and conflicts, and ensure that the process is transparent and comprehensive. The SCRP feedback and grievance redress process has been publicized to communities and a copy provided to the project validator.

The full grievance policy has been submitted to the validator and is available to anyone upon request. In summary, community members and project stakeholders are encouraged to submit grievances, comments or feedback to the Project Office through several channels, with all communication methods receiving the same level of response. The primary method for communication will be through the Project Office or Sub-office which is located at the Ministry of Environment branch office in Koh Kong town, the MOE Ranger stations, which are located throughout the Project Zone and the Community Based Ecotourism offices in Chi Phat and Areng.

Two types of issues accounted for in the grievance process include:

- Issues or conflict between the community or other project stakeholder and MoE, and
- Concerns regarding project employee rights, work practices, and employee safety raised by MOE or WA employees or contractors.

This procedure applies to the MOE/WA and activities under the SCRP. If a Project Stakeholder(s) has a complaint or grievance, the first step should be taken up with a commune chief as soon as possible after the occurrence. The complainant could communicate this verbally or in writing to their nearest Ranger post. In 2017 there were eight ranger posts spread out around the Project Zone. In addition, the MOE/WA has published an email address, phone number, and Facebook page that project stakeholders can use to make comments or voice grievances.

This grievance policy is outlined in the document “Southern Cardamom REDD+ Project Grievance Redress Mechanism.” This grievance process was described in general at community meetings, and the document has been provided to key locations in the Project Zone. In addition, a summary of the

grievance policy was translated to Khmer and posted on the Project information boards located in the Project Zone.

In summary, once the commune chief has received a grievance, through any of the described channels, they are required to respond to the aggrieved person(s) within 7 working days. The commune will maintain full records of all grievances received, communications made between the commune chief and the aggrieved person(s), and the agreed resolutions. If the commune chief and the aggrieved person(s) cannot resolve the grievance to a mutually satisfactory manner, the aggrieved person(s) may raise complaints and grievances to the Provincial Project Committee (PPC) or its members either verbally or in writing (using Complaints and Grievances Form provided). At his level, the MOE/WA Project Management Unit (PMU) is obliged to (1) record every complaint and keep track of the status, and (2) keep complaints and grievances confidential unless otherwise directed by the aggrieved person (s). If there is reason to believe that the PPC will not provide an objective review of the concern, the matter may be taken up directly to PBC further review and decision-making. The PPC has to respond complaint within 7 working days since the date of the complaint has been submitted.

The PMU will maintain a record book of all grievances received and their resolutions, which can be viewed upon request from project stakeholders or auditors. The PMU will update and present the record of recorded cases to the PBC during the annual PBC meeting.

2.3.13 Accessibility of the Feedback and Grievance Redress Procedure (G3.8)

Please see Section 2.3.12 for an explanation of how accessibility of the feedback and grievance redress procedure is publicized and made publicly available.

2.3.14 Worker Training (G3.9)

The SCRP considers local employment a priority and local sourcing is strongly encouraged at all levels of the Project, from casual workers up to management positions. The SCRP recognizes that local hiring, especially women, marginalized and vulnerable community members, is a major benefit to the implementation and operation of the Project due to the knowledge and familiarity local people possess of the landscape, its communities and its biodiversity. Their involvement will also ensure the sustainability and continuity of the Project throughout the Project's Lifetime and beyond. Currently, 471 families have been trained in ecotourism management and hospitality and guiding skills in Chi Phat and Chay Arieng. While 200 families have been trained in sustainable agriculture techniques. In addition, 97 forest rangers have been trained in law enforcement, health and safety, patrolling, and legal skills whilst 24 community members from the Project Zone have been trained in biomass inventory for the Carbon plots.

The Project is designed to focus on the employment and training of local people, with a focus on women as well as marginalized and vulnerable community members, in order to increase local participation in the Project as well as build local capacity, knowledge and a robust skills base. This will include hiring local community members as community rangers to monitor their community forests for illegal activities, with special attention to the hiring of women and/or vulnerable and marginalized community members where appropriate. The SCRP will advertise open positions broadly, with special attention to the recruitment of villagers and youth who live in the Project Zone. Women will also be highly encouraged to apply for the positions. A policy of providing priority in the hiring process will be given to women who are qualified and willing to commit to a period of work with the Project. However, as the tradition and culture of Cambodia

may limit women from traveling far away from their home or staying in the field for extended periods of time with other men there are some challenges to the recruitment of female employees. In addition, in the Cambodian traditional family structure women are responsible for caring for their children, which may restrict their ability and willingness to travel away from their home villages for work.

MOE/WA will train local community members in the latest monitoring techniques, data collection methods, and laws to conduct effective enforcement. Training will be conducted on an ad-hoc basis as turnover happens to the community-rangers to maintain a pool of trained local rangers. Local community members will also be hired and trained to support and manage other activities including IGAs, agricultural intensification, and biodiversity monitoring. In all positions, informal training will apply for each position and local community members will have priority on being hired.

The primary training of the sampling team occurred January 17th through 23rd 2017. The training was conducted by WWC team members Jeremy Freund, VP of Carbon Development, and Brian Williams, Director of Asia. All members of the plot sampling team and several key project management staff, including Thomas Grey and Romica Grosu of WA, were present for this training. The training consisted of both classroom and field components and included the training in the biomass sampling and proxy area sampling SOPs, general field procedures, methods for proper equipment use, and field safety procedures. Further training and technical support was provided to the field sampling team specifically on the biomass plot sampling process via email and phone calls. A second field-based training of the plot sampling team by WWC's Brian William on December 2nd through 3rd, 2017. All members of the plot sampling team and several key project management staff, including Thomas Grey and Romica Grosu of WA, were present for this training This training focused on the leakage plot measurement SOPs and field equipment use. Additionally, as with the biomass lot sampling process, with the other field sampling throughout the project development process WWC provided on-going technical support to the plot sampling team on ad-hoc basis through email and telephone calls when questions arose, or additional expertise was required.

Educating communities and employees in different areas related to the carbon project will also be on-going. Capacity building on aspects revolving around carbon measurement, accounting, climate change and carbon offsets will continue to take place in the form of meetings, workshops or training days. To date the primary training on REDD+ project management has been focused on WA staff and management based in Koh Kong town. It is anticipated that future training will no longer be needed external by experts but will be carried out by locally sourced employees who were trained in the initial stages of the Project.

2.3.15 Community Employment Opportunities (G3.10)

The SCRP has developed an Equal Opportunity Policy, which has been provided to the validator for review. Based on this policy future SCRP job positions will be openly advertised through the Project Office within the Project Zone. The Project has the responsibility for the fair treatment of all, representation for all Project Zone groups, and encouraging diversity within project staff and management. SCRP policy stresses equal opportunity for all groups, including members of ethnic minorities, various socio-economic groups, genders and sexual orientations, for all employment positions and for inclusion in REDD+ program activities. The selection of potential employees is held on a democratic and neutral basis, providing equal opportunity to all applicants. The SCRP operates a strict non-discrimination policy such that women and vulnerable groups of people will receive equal chances regardless of the type of work.

Job applicants are selected for an interview based on their skills and experience required for the advertised positions. The Project Office will be closely involved during the selection process in conjunction with a committee from the Project Office and the Head of the relevant department for which the vacancy is advertised. Employment vacancies are publicly advertised through the same channels that other project news is publicized, such as through posters at villages and sign boards. Successful candidates are selected in a democratic, non-discriminatory manner in accordance with the Project's equal opportunity policy. Preference is given to applicants who live in the local communities in the case where two applicants show the same capacity for a given position whereas one is local and the other one not. Unsuccessful candidates are provided with an explanation for why they were not selected in order to assist them to improve if there is another vacancy in the future.

All capacity building activities in the local communities in the Project Zone will be open to all villagers, including women and vulnerable populations. As such, it is important that their capacity and skills are strengthened equally as the men. These trainings will not be limited solely to climate change and the REDD+ project, but a wide range of subjects which will ensure the successful implementation of the SCRP. This includes agricultural training and other technical skills to improve the livelihood of their families and community including English language, cooking, and hospitality training for Community Based Ecotourism service providers. An assessment of the needs for capacity building with the forestry community members and other stakeholders in the project zone will be conducted with their participation and consultation to identify their priorities and needs.

The SCRP will enact a policy on staff turnover where employee contracts will ask them to inform the Project at least two months before their resignation from their position. Announcement of recruitment for new staff will then be made at least two months before their final work date. This will allow them to have sufficient time for training and on the work and activities of the position, and to learn any lessons learned related to the position and the SCRP. A training session will be conducted with the participation of the new staff member, to introduce the Project, and the officers responsible for each project components will present the work and activities that they are responsible for.

A project management structure has been developed with clear lines of communication between project staff to ensure direct communication and solidarity. New staff will be informed of this structure so that they will have good communication for which to ask for information, knowledge and experience of the project staff to improve their performance.

2.3.16 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

The Labor Law, 1997, amended 2007

This law provides regulations on the relationship between employees and employers, and the socio-legal rights and obligations resulting from a labor relationship. All people engaged in work in Cambodia, including Cambodian citizens and foreign nationals, are subject to the regulations of the Labor Law (Peng et al., 2012).

In addition to the Labor Law Cambodia there are several international legal standards that cover labor rights in Cambodia, this includes 13 International Labor Organization conventions that Cambodia has ratified (Peng et al. 2012). Also, there are many government labor regulations, including royal decrees, sub-decrees, prakas, decisions, circulars, and notices that have been issued by the Royal Government of Cambodia, and particularly by the Ministry of Labor and Vocational Training. The Project Proponent and

Project partner WA will ensure that any relevant international convention or government regulation is fully followed.

2.3.17 Occupational Safety Assessment (G3.12)

The SCRP abides by all relevant Cambodian worker's rights laws and regulations. Workers will be informed about their rights at the point of their employment during the employee orientation. Additionally, as described in the Health and Safety plan, during the employee orientation workers will be informed about the potential safety risks of their job and of methods to mitigate the risks. A hard copy of the relevant laws will be kept at the Project Office and any worker is free to consult these any time during working hours.

The SCRP ensures that workers' health and safety are protected to the best of the Project's ability always and across all sites. Risks are identified, mitigation strategies produced, and appropriate measures adopted to minimize any risks.

Given the nature of the Project and its geographical surroundings, it is recognized that certain occupations inherently present a risk to the health and safety of workers, in particular occupations that require spending long periods walking in difficult environments. These include, though not exclusively, plot samplers and forest protection rangers, who are faced with challenging terrain as well as the risk of encountering illegal logger, illegal forest land clearer, and wildlife hunter. In addition, forest fires may also pose a safety risk if they spread rapidly and unexpectedly. The Project has created a comprehensive Health and Safety Plan that ensures that all workers' health and safety is protected, and that all workers are fully informed about workplace risks and safe practices to mitigate those risks. These include training in safe working practices, first aid training for some staff members as well as the enforcement of requirements for safe handling of equipment and other materials. This Health and Safety Plan additionally provides a comprehensive list of the measures that will be taken to inform employees of their rights, to assign roles and responsibilities to supervisors and workers and provide a safe workplace culture. This document will be revisited regularly and revised as needed to ensure that it contains current information and includes all job categories and potential risks. A copy of the plan has been provided to the verifier and will be kept at the Project Office and be readily available for any consultation. In addition, SCRP will set up Health and Safety Fund, the will be sourced from the contribution from the sale of SCRP credit. The fund will be used to compensate project workers for an accident during their working hours/work mission. The SCRP will ensure a detailed orientation of newly recruited employees so that they are fully aware of their rights as well as responsibilities. All law enforcement rangers and full-time WA project staff will be provided with full health and life insurance.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

2.4.1.1 Project Proponent

Organization name	**The Royal Government of Cambodia, Ministry of Environment**
Contact person	H.E. Dr. Choup Paris
Title	Deputy Secretary General, National Council for Sustainable Development
Address	#48 Samdach Preah Sihanouk Boulevard, Phnom Penh, Cambodia
Telephone	(+855) 17 31 33 66
Email	paris.ncgg@gmail.com

2.4.1.2 Project Partners

Organization name	**Wildlife Alliance**
Role in the project	Project Implementation
Contact person	Dr. Thomas Gray
Title	Director of Science
Address	No. 86, Street 123 Toultompong I Precinct Chamcamon District Phnom Penh, Cambodia
Telephone	+855-23-211-604
Email	gray@wildlifealliance.org

Organization name	**Wildlife Works Carbon**
Role in the project	Project Development and Credit Sales
Contact person	Brian Williams
Title	Director of Asia
Address	242 Redwood Highway, Mill Valley CA 94941
Telephone	+1.415.331.8081
Email	brian@wildlifeworks.com

The Royal Government of Cambodia's Ministry of Environment is the lead agency for the SCRP and has authority to manage all protected areas in Cambodia. The project area is comprised of parts of Tatai Wildlife Sanctuary, Southern Cardamom National Park, and Botum Sakor National Park all of which are under the purview of MOE. MOE's role in the project is oversight of the Project as one of four RGC pilot

REDD+ projects. It has final say on Project design and implementation such that it meshes with the existing national REDD+ strategy including the FREL, NFI, and SES.

Wildlife Alliance is a leader in forest and biodiversity protection and community engagement. In partnership with the Royal Government of Cambodia, they have managed the Southern Cardamom for the last 15 years. Their role is project development and implementation. They coordinate project operations with all stakeholders.

Wildlife Works Carbon is one of the leaders in REDD+ Project development. It has staff experienced in REDD+ Project design and implementation. It created and currently manages the first REDD+ Project under the VCS standard. It has the skills to support all REDD+ activities, remote sensing, biomass sampling, biodiversity sampling, project management and forest protection.

The team of the MOE, Wildlife Alliance, and Wildlife Works Carbon, have developed complimentary roles for the smooth design and implementation of the SCRP

2.4.2 Required Technical Skills (G4.2)

The key technical skills required to implement the SCRP are an understanding of the science of remote sensing, biomass sampling, and conservation biology, experience implementing community and livelihood development programs, effective forest protection enforcement and monitoring and overall project management.

The Royal Government of Cambodia's MOE is the lead agency in protected area management and biodiversity conservation. Its staff is trained in project management, the science of remote sensing, biomass sampling and conservation biology. They have the human resources to support these areas of the SCRP.

Wildlife Alliance is a leader in forest and biodiversity protection as well as community development. Its staff is highly trained in project management, the science of remote sensing, biomass sampling and conservation biology. They have the human resources to support these areas of the SCRP.

Wildlife Works Carbon is one of the leaders in REDD+ Project development. It has staff experienced in REDD+ Project design and implementation. It created and currently manages the first REDD+ Project under the VCS standard. It has the skills to support all REDD+ activities, remote sensing, biomass sampling, biodiversity sampling, project management and forest protection.

The team of the MOE, Wildlife Alliance and Wildlife Works Carbon, has the skills and resources to successfully implement the SCRP.

2.4.3 Management Team Experience (G4.2)

Project Management Leads

Dr. Tom Gray – Director of Science – Wildlife Alliance – SCRP Project Lead

Dr. Tom Gray is a conservation biologist based in South East Asia since 2005. Graduate of the University of East Anglia he first came to Cambodia to undertake PhD work on the conservation and ecology of Bengal Florican in the Tonle Sap grasslands. He subsequently led the species and protected area work of WWF Greater Mekong managing conservation research projects and mentoring local students in

Cambodia, Laos, Thailand, Vietnam, and Myanmar. He joined Wildlife Alliance in June 2016. He has authored more than 40 peer-reviewed publications on the status and conservation needs of the regions threatened mammals and birds and is a member of the IUCN Species Survival Commission.

Mr. Brian Williams – Director of Asia – Wildlife Works Carbon – SCRP Project Lead

Mr. Brian Williams is an experienced conservationist that has been working in Asia since 1997. With a master's in Environmental Studies from San José State University, Mr. Williams founded Red Panda Network, an organization dedicated to protecting red panda in the wild. He transferred lessons learned from this experience into the development and management of REDD+ projects in India, Cambodia, Indonesia, and Nepal.

In addition to these managers there is a strong Project team with a wealth of land management and carbon project experience that will support project management and implementation.

Wildlife Alliance

Mr. Romica Grosu – GIS/Monitoring Manager – Wildlife Alliance – SCRP Monitoring Manager

A former French Legioner, Mr. Grosu supports carbon monitoring and forest protection. Mr. Grosu has 14 years' experience working in the Southern Cardamom and understands how to work with local communities. He understands the need for following protocols and how to implement protocols with community members.

Mr. Sokun Hort – Community Engagement Manager – Wildlife Alliance – SCRP Community Engagement lead

Having worked for WA in the Southern Cardamom since 2001 Mr. Hort understand the nuances of local communities and government officials. He will be supporting all community engagement activities for the SCRP.

Wildlife Works

Mr. Jeremy Freund – VP Carbon Development – Wildlife Works Carbon – SCRP MRV

Mr. Freund is a global leader in REDD+ project and program development with over 10 years' experience in international conservation. He co-wrote VCS methodology VM0009, one of the first and most widely used VCS REDD+ methodologies. He has led Wildlife Works in the most validations and verification under the VCS/CCB standard and will lead SCRP monitoring, reporting and verification efforts. Mr. Freund has a B.S. in Aerospace Engineering from CU Boulder and a Masters in Geography from UC Santa Barbara where he focused on remote sensing for agriculture and food security.

Mr. Simon Bird – Director of Forest Science – Wildlife Works Carbon - SCRP MRV

Simon has been working in the forest ecology and environmental conservation industry for over 10 years. Simon has a B.S. in Environmental Science and a M.S. in Soil Science from the University of Vermont. Simon works in the Carbon Development department at Wildlife Works Carbon's San Francisco California office. There, he assists with the development of REDD+ projects, including validation and verification and monitoring, reporting and verification (MRV) for existing REDD+ projects. Simon's duties include overseeing biomass sampling methods and protocols, forest modeling, and technical writing and reporting for both the VCS and CCB standards. Simon has additionally participated in the revision process of VCS REDD methodology VM0009.

2.4.4 Project Management Partnerships/Team Development (G4.2)

All relevant project management experience is present in the current SCRP partners.

2.4.5 Financial Health of Implementing Organization(s) (G4.3)

The Project Proponent is the Royal Government of Cambodia's Ministry of Environment, which is a government supported administrative unit. The development of the Project has been primarily supported by fundraising from Wildlife Alliance. Additionally, MOE receives an annual budget support from the central government. The Project Proponent is also supported by Wildlife Works in the development of the Project. Wildlife Works is experienced at marketing and sales of REDD+ credits in the global market. It has used this applied experience to make conservative estimates for expected annual credit sales for the SCRP.

Moreover, the Project Proponent, Project partner WA and Wildlife Works' combined REDD+ project development experience (5 successful prior VCS/CCB validated & verified projects) contributed to the creation of a detailed financial model for the development and management of the SCRP. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through the end of the crediting period. The Project partner WA has already received grants to fund project design and start-up costs. Documents supporting these investments will be produced for the project auditor to review.

2.4.6 Avoidance of Corruption and Other Unethical Behavior (G4.3)

To provide avoidance of corruption, a separate limited liability corporation has been created by MOE and WA to manage the funds of the Project. This company, called the Cardamom Carbon Company (CCC), is based in the United States and under the management authority of Wildlife Alliance. There are two agreements, the CCC Agency of Delegation Agreement and Southern Cardamom Project Agreement, that outline project benefit sharing and ensure transparent financial transactions of the Project. These documents were shared with the validator.

2.4.7 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

Some information required by the VCS and/or CCB standards is confidential or sensitive in nature and cannot be released publicly by the Royal Government of Cambodia. This information has been supplied freely to the VVB as annexes to this PD document but will not be included in the public version. All efforts have been made by the Project Proponent to make as much information freely available to the public as possible. All necessary supporting information shall be provided to the validator but may not be distributed publicly.

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

Land use

Please refer to Section 2.1.6 for a description of land use within the Project Zone.

Customary and Legal Property Rights

Within the Project Zone there are several land use and tenure systems, which are recognized in both customary and statutory rights regimes. Below is an overview of statutory property rights in Cambodia.

The Land Law of 2002 classifies the various types of property and ownership rights in Cambodia: (i) State Public Property, (ii) State Private Property, and (ii) Private property:

1. **State Public Property:** According to the Articles 15 & 16 of this law, State Public Property is land held by the State which carries a public interest use. State Public Property includes properties of a natural origin, such as the Permanent Forest Reserve. State Public Property cannot be sold or transferred to other legal entities, although it may be subject to rights of occupancy or use that are temporary in nature (such as a logging concession in the Permanent Forest Reserve).
2. **State Private Property:** Under Article 17, State Private Property is land that is owned by the State or public entities that do not have a public interest use (i.e. owned by the state or public entity but does not fit the definition of State Public Property as mentioned above). In addition, State Private Property can be described as excess or idle land that is held by the State or public entities. State Private Property may be sold or transferred to other legal entities, such as use for social or economic land concessions.
3. **Private Property**: Private property is property owned by natural persons or legal entities other than the State or public entities. Private property can be owned by individuals, collectives or business organizations/associations.

The Project Zone is composed of the three property types listed above. The entirety of the Project Area is State Public Property comprised of protected areas managed by the Ministry of the Environment. Parts of the Project Zone outside the Project Area are both state private and private property. The state private property in the Project Zone includes social and economic land concessions. Private Property in the Project Zone comprises land legally allocated to community members (some of which has been sold to land speculators and outsiders).

2.5.2 Recognition of Property Rights (G5.1)

Under Order 01 all land in the Project Zone has been titled and all property clearly delineated. As such, the project works with communities to clarify property zones and demarcate boundaries between separate property types. This is an important Project activity that avoid land tenure conflicts.

2.5.3 Free, Prior and Informed Consent (G5.2)

The project will not encroach uninvited on private property, community property or government property. Tenure of the Project Area is outlined in Section 2.5.9. Furthermore, section 2.3.7. outlines the comprehensive procedure of FPIC activities which ensures that all stakeholders and communities are consulted.

2.5.4 Property Rights Protection (G5.3)

The Project does not require involuntary removal or relocation of communities or any activities important for their livelihood and culture.

2.5.5 Illegal Activity Identification (G5.4)

The Project Area is comprised of parts of three protected areas under the jurisdiction of the MOE, and as such, once zoned, the Core and Conservation Zones of these protected areas are protected from deforestation activities. Under the Cambodian Protected Area Law, these zones should be protected from resource extraction or conversion to other land uses. However, these activities commonly occur anyway within protected areas, including illegal logging, charcoal production, poaching for meat, and rampant conversion of forestland through slash and burn to agricultural land. These activities are all illegal under current law, and despite the MOE's best efforts at controlling them to date, they are still widely and openly occurring.

All the above-listed illegal activities would have negative effects on the SCRP's climate and biodiversity goals. The SCRP has included expanding the ranger force, strengthening community organizations, agricultural intensification, microfinance, strengthening forest land use planning and secure forest land tenure, eco-charcoal and income generating activities in the project design to mitigate these illegal activities. This will include firstly increased protection in the Project Area, and enforcement of the boundary against illegal incursions. Additionally, increased efforts to confiscate chainsaws and other logging equipment being used illegally within the Project Area will reduce the illegal activity. The strengthening of community organizations will give local organizations the ability to protect community lands and stop the flow of migrants into the Project Area. By conducting training on agricultural intensification, providing micro-finance, and supporting local businesses, the SCRP's goal is to generate alternative income to abate illegal activities within the Project Area. Accordingly, income diversification should shift the local economy over time toward sustainable land use.

2.5.6 Ongoing Disputes (G5.5)

There are some minor conflicts or disputes in the SCRP Project Zone between the communities. Some communities have had minor conflicts or disputes over the land, territory or resources in the Project Area during the last 20 years, all based on uncertain land tenure rights. This has been especially true in the project community of Teuk Laak. Additionally, illegal land clearing and intrusion by outsides has, and continues to, occur causing some levels of conflicts between specific local individuals and MOE.

The Project has committed to working with these communities to identify the boundaries of their lands, and to assist them in acquiring official tenure to them. One of the Project Activities (Section 2.1.11) that has been implemented is specifically targeted at helping these communities do this. These activities are designed to enable communities to gain the evidence needed to prove ownership of their lands and gain tenure, therefore there is no potential for the project to prejudice any decision or outcome of a dispute through its activities. As the determination of land tenure and resolution of any disputes over tenure is made by the relevant RGC land registry ministry in accordance with national and local laws.

2.5.7 National and Local Laws (G5.6)

The SCRP meets all local, national and international laws that are relevant to this project. These laws include the aforementioned Employment laws, as well the additional laws outlined below.

Law on Environmental Protection and Natural Resources Management (1996)

The Objective of this law is to protect and upgrade the environment quality and public health by means of prevention, reduction and control of pollution; to assess the environmental impacts of all proposed projects prior to the issuance of decision by the Royal Government; to ensure the rational and sustainable preservation, development, management and the use of the natural resources of the Kingdom of Cambodia; to encourage and provide possibility to public to participate in the protection of environment and the management of the natural resources.

The mechanism for implementing this law is through the National Environmental Plan.

The Land Law (2002)

The Land Law classifies the different types of property and ownership rights in Cambodia: (1) State Public Property, (2) State Private Property, and (3) Private property:

1. State Public Property: According to the Articles 15 & 16 of this law, State Public Property is land held by the State which carries a public interest use. State Public Property includes properties of a natural origin, such as the Permanent Forest Reserve. State Public Property cannot be sold or transferred to other legal entities, although it may be subject to rights of occupancy or use that are temporary in nature (such as a logging concession in the Permanent Forest Reserve).
2. State Private Property: Under Article 17, State Private Property is land that is owned by the State or public entities that do not have a public interest use (i.e. owned by the state or public entity, but does not fit the definition of State Public Property as mentioned above). In addition, State Private Property can be described as excess or idle land that is held by the State or public entities. State Private Property may actually be sold or transferred to other legal entities, such as use for social or economic land concessions.
3. Private Property: Private property is property owned by natural persons or legal entities other than the State or public entities. Private property can be owned by individuals, collectives or business organizations/associations.

The Forestry Law (2002)

The Forestry Law is an important sector-specific law that defines the management framework for harvesting, use, development, conservation, and protection of forests in Cambodia. It aims to ensure sustainable forest management and customary user rights of forest resources for indigenous and local communities. Reaffirming the Constitution, the Forestry Law provides that all forests (referred to as the Permanent Forest Estate), belong to the State, noting that there is currently a lack of proper demarcation of Cambodia's forest estate. The Permanent Forest Estate is divided as follows:

Permanent Forest Reserves are State Public Property and fall under the jurisdiction of the Forestry Administration (FA) which is housed the Ministry of Agriculture, Forestry and Fisheries (MAFF). According to the Forestry Law, the Permanent Forest Estate is defined as all forested land within the Kingdom of

Cambodia. Generally, all categories of forests fall within the definition of the Permanent Forest Reserves - including forests that occur on private lands, flooded forests, wetland forests and mangrove forests. However, while all these forests are under the jurisdiction of the FA, wetland and mangrove forests outside the Protected Areas (PA) are under the jurisdiction of the Fisheries Administration (FA) of the MAFF. Permanent Forest Reserves consist of three sub-categories:

1. Production Forests,
2. Protection Forests and
3. Conversion Forests. Production Forests are forests that are managed primarily for the sustainable production of timber and non-timber forest products. In these forests, protection is a secondary objective.

The Production Forests include Forest Concessions and Community Forests. Areas under Production Forests include those forests where harvesting is permitted (e.g. annual bidding coupes for domestic wood supply), degraded forests, forests to be rehabilitated, and forests reserved for regeneration or plantation. The government may grant an area of production forest, not under use, to a forest concession through public bidding consistent with the National Forest Management Plan and after consultation with concerned ministries, local authorities and communities. However, from January 2002, the RGC issued a Declaration on the Suspension of Forest Concession Logging in the country. Community forests are forests owned by the state that have been allocated to communities under a 15-year renewable agreement. The primary goal of community forests is to protect and rehabilitate forests and to enhance the sustainable use of forest resources by local communities.

Private Forests are those that are individually owned, and these forests are managed by the owners for a range of benefits. The owners have the free will to utilize these forests the way they deem fit and in addition, forest carbon in private forests belongs to the owners. Land within the Permanent Forest Estate can also be zoned as a Protected Area. Protected Areas fall under the jurisdiction of the Ministry of Environment (MOE); applicable law includes the Protected Area Act 2008 and the Environmental Protection and Natural Resource Management Law 1996.

Protected Area Law (2008)

Provides the Ministry of Environment the authority to manage all protected areas in Cambodia. It lists the type of protected areas under MOE's purview as:

1. National Park
2. Wildlife sanctuary
3. Protected landscape
4. Multiple use area
5. Ramsar site
6. Biosphere reserve
7. Natural heritage site
8. Marine park

It also states that protected areas shall be defined by a sub-decree, the process by which protected areas can be created or altered. This law also defines which activities are permitted in the various zones of the Protected Area:

1. Core Zone
2. Conservation Zone
3. Sustainable Use Zone
4. Community Zone.

The entirety of the Project Area will be within Core and Conservation Zones under this law.

The Cambodian Community Forestry Sub-Decree (2003)

The National Forestry Program aims to register 1000 community forestry groups nationally and cover two million hectares by 2030. To achieve this target the government adopted various guidelines and policies to support the development of community forests such as the community forestry sub-decree, community forestry guideline, and national community forestry program.

Declaration on Classification and List of Wildlife Species NO: 020 PR.MAFF (2007)

This declaration lists and classifies all wild species in Cambodia. The decree groups species into three main categories, endangered, rare and common. The decree also declares that all wild species are technically owned by the State and are protected under this provision.

Code of Criminal Procedure adopted by COM

The purpose of the criminal code is to define the rule of law in Cambodia. It distinguishes what is a criminal and civil action and set the rule of law in Cambodia. The Project Proponent uses it to enforce protection of forests in the SCRP.

2.5.8 Approvals (G5.7)

The Project Proponent of the SCRP is the Royal Government of Cambodia Ministry of Environment. The Project Area is comprised completely of Southern Cardamom National Park, Botum Sakor National Park, and Tatai Wildlife Sanctuary that are under the jurisdiction of the MOE. Approval by the traditional authorities in these communities for the project has been granted through the FPIC process, please refer to section 2.5.1 for details on that process.

2.5.9 Project Ownership (G5.8)

State-owned Forest Land

The SCRP accounting area (PAA), which will generate credits at the project start date, is State owned land, under the mandate of the Ministry of Environment (MOE) in accordance with the Protected Area Law of 2008. It is comprised of three protected areas: Botum Sakor National Park, Southern Cardamom National Park, and Tatai Wildlife Sanctuary. They were all formally designated as a part of the Permanent Forest Estate in 1994.

Botum Sakor National Park

Of the three protected areas, Botum Sakor National Park is the oldest and was established by a government regulation ('prakas') on June 3, 1994 (No. 1033 1994) signed by the Minister of Environment. It has been a National Park since and the Nature Conservation Department was the government body responsible for managing it. This department has since been renamed to the General Department of Administration for Nature Conservation and Protection (GDANCP). The sub-decree has eight objectives, which are listed below:

1. Prohibit the construction of the sawmills, charcoal ovens, brick kilns, tile kilns, limestone ovens, and tobacco ovens in the protected natural areas.
2. Prohibit the hunt or the placement of hunting traps, the fishing of mammals, amphibians, reptiles and aquatic animals of tusks, bones, feathers, horns, leathers and blood.
3. Prohibit the deforestation for land use in the protected natural areas.
4. Prohibit the exploitation of minerals and the use of explosives in the protected natural areas.
5. Prohibit the bringing of the domestic animals such as dogs into the protected natural areas.
6. Prohibit water pollution activities such as the use of explosives, poisons, chemicals, electricity and dumping waste into the water surface or onto the land.
7. Prohibit the use of machineries and heavy cars, which could cause smoke, pollution, and use of microphones, which could cause noise pollut5ion in the protected natural areas.
8. Allow research and experiments in the protected natural areas shall be approved by the Secretariat of Environment.

Tatai Wildlife Sanctuary

Southern Cardamom Protected Forest was first made a conservation area in 2004 by a government regulation ('prakas') that was signed by the Minister of Agriculture, Forestry and Fisheries. The land status of the area was reclassified to Protection Forest on October 6, 2004 by the endorsement of a sub-decree (No. 65) by the Council of Ministers and Prime Minister Samdech Hun Sen, thus enhancing its conservation status. This legal action created the Southern Cardamom Protection Forest and reaffirmed MAFF, through the FA, as the government body responsible for managing it. This Sub-Decree established a forest protected area for biodiversity conservation, protection of an elephant corridor and a wildlife rehabilitation center in Koh Kong province and aims to:

9. Protect and conserve plants and wildlife, especially endangered and critically endangered wildlife species
10. Protect the elephant corridor in the southwest of Cambodia
11. Rehabilitate wildlife
12. Maintain natural balance in forests which are habitat and breeding ground for wildlife
13. Conduct scientific and technical study to develop and conserve watershed and biodiversity
14. Prevent erosion, flood, land fertility, regularity of water resource, and water quality
15. Raise educational awareness and develop local community to participate in poverty reduction of people
16. Participate in maintaining cultural and scientific heritage and develop eco-tourism in the area

In April, 2016, Southern Cardamom Protected Forest was transferred to the jurisdiction of the Ministry of Environment by the Sub-Decree 69. Then on May 9, 2016 Southern Cardamom Protected Forest was changed to Tatai Wildlife Sanctuary by the Sub-Decree No. 80 signed by the Minister of the Environment. The sub-decree has three objectives:

1. Ensure the protection of wildlife habitat and ecosystems, and to ensure the necessary conditions for any type of fauna, flora and biodiversity.

2. Provide natural products and services for sustainable uses of natural resources

3. Promote the participations of local communities as well as public in contribution to management and conservation of biodiversity and natural resources in the areas.

Southern Cardamom National Park

The area that is now Southern Cardamom National Park was formerly production forest under the jurisdiction of the Ministry of Agriculture, Forestry and Fisheries. In April, 2016, the SCNP area was transferred to the jurisdiction of Ministry of Environment by the Sub-Decree 69. Then on May 9, 2016, Southern Cardamom National Park was declared through Sub-Decree No. 89 signed by the Minister of the Environment. The sub-decree has three objectives:

1. Ensure the protection of wildlife habitat and ecosystems, and to ensure the necessary conditions for any type of fauna, flora and biodiversity.

2. Provide natural products and services for sustainable uses of natural resources

3. Promote the participations of local communities as well as public in contribution to management and conservation of biodiversity and natural resources in the areas.

The sub-decrees described in the above sections demonstrate title/right of use for the Ministry of Environment to develop and manage a REDD+ project within Botum Sakor National Park, Southern Cardamom National Park and Tatai Wildlife Sanctuary on behalf of the RGC as the land is government-owned.

2.5.10 Management of Double Counting Risk (G5.9)

The SCRP will also be validated under the Climate, Community, and Biodiversity (CCB) standards (Third Edition, Gold Level). The Project will not be seeking to generate any other form of environmental or social credit.

2.5.11 Emissions Trading Programs and Other Binding Limits

The SCRP is not subject to any additional emission trading programs or other binding limits. The SCRP is being developed under the VCS and CCB standards. There are not currently any jurisdictional or sub-jurisdictional GHG emission reduction programs in Cambodia.

2.5.12 Other Forms of Environmental Credit

The SCRP will also be validated under the Climate, Community, and Biodiversity (CCB) standards (Third Edition, Gold Level). The SCRP has not sought or received any other form of GHG-related environmental credit.

2.5.13 Participation under Other GHG Programs

This is the first and only application for the SCRP to a GHG credit program.

2.5.14 Projects Rejected by Other GHG Programs

The SCRP has neither applied nor been rejected by any other GHG program.

2.5.15 Double Counting (G5.9)

The SCRP is not subject to any additional emission trading programs or other binding limits. The SCRP is being developed under the VCS and CCB standards. The VCS standard requires that all carbon credits (VCUs) generated by the project are listed on a third-party registry and are tracked from the time of initial verification until their eventual retirement. Unique serial numbers will be generated for each tonne of CO_2e that remains sequestered under this protocol and issued as VCUs, so as to ensure that no credits can be sold more than once (double-counted). This project area will not be involved with any other projects developed under another voluntary or regulatory carbon offset protocol.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology

The methodology used for the SCRP was the VCS methodology VM0009 Methodology for Avoided Ecosystem Conversion, v3.0. This methodology quantifies greenhouse gas emission reductions generated from avoiding either planned or unplanned (or both) deforestation as well as protection from native grassland conversion as initiated by a variety of agents and drivers. For the assessment of additionality, the Project also uses the VCS "Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities," VT0001 Version 3.0. The VCS "AFOLU Non-Permanence Risk Tool," V3.3 was used to determine the Project's non-permanence risk and project buffer withholding rate. In addition, the VCS Tool VMD 0037 Global Commodity Leakage Module: Production Approach (LM-P), V1.0 4 February 2014. This tool was utilized for the determination of market leakage resulting from the Project.

3.1.2 Applicability of Methodology

PDR.1 For each applicability condition, a statement of whether it applies to the project. If the applicability condition does not apply to the project, justification for this conclusion.

PDR.2 Where applicability conditions apply, credible evidence in the forms of analysis, documentation or third-party reports to satisfy the condition.

1. *This methodology was developed for avoiding land use conversion of forest and native grassland ecosystems. The drivers and agents of conversion in the baseline scenario must be consistent with those described in section 6 of this methodology and the end land use in the baseline*

scenario is non-forest or converted native grassland. Accordingly, the project activity must be Avoided Planned Deforestation (APD) or Avoided Unplanned Deforestation and/or Degradation (AUDD) for forested project accounting areas and Avoided Planned Conversion (APC) or Avoiding Unplanned Conversion (AUC) for grassland project accounting areas.

VM0009 version 3.0 "Methodology for Avoided Ecosystem Conversion" is applicable to the SCRP as the baseline scenario includes agents of deforestation who carry out native ecosystem-clearing activities that result in land use conversion to a non-forest state. The Project partner WA has documented considerable evidence indicating that the principle driver of conversion is agriculture, and that substantial portions of the reference region have already undergone such conversion. In addition, agricultural conversion is already present in the Project Zone. The primary agents of conversion are the predominantly agriculturalist communities that live adjacent the Project Area. Secondary agents are new immigrants and forest land speculators This conversion to agricultural land use is an unplanned native ecosystem conversion, and therefore falls under the VCS AUDD baseline type.

2. *All project accounting areas must have been in an unconverted state (i.e., forest or native grassland) for at least 10 years prior to the project start date, according to the following:*

    a. *Land in all forested project accounting areas has qualified as forest on average across the project accounting areas as defined by FAO 2010 or as defined by the residing Designated National Authority (DNA) for the project country for a minimum of 10 years prior to the project start date.*

All land within the PAA has been native tropical moist evergreen, semi-evergreen or deciduous forest for at least 10 years prior to the project start date, and in actuality for a decade before that. Additionally, this forest has been a native primary forest in its current state since recorded times. This was verified using the 2003 landcover dataset produced by MOE from historic Landsat imagery, which shows all of the PA to be forest cover. An analysis of canopy cover was performed to ensure that it met Cambodia's minimum requirements of canopy coverage and height on average across all forest strata. The definition of forest as set by the Cambodia Forest Administration, who is the designated national authority (DNA) established by the FAO, is for a minimum area of 0.5 hectares with 10% or greater canopy cover, with a minimum canopy height of 5 m (Forestry Administration, 2013).

    b. *Land in all grassland project accounting areas has qualified as native grassland or shrub land for a minimum of 10 years prior to the project start date.*

This project does not contain a grassland project accounting area. This application condition is not applicable to the Project.

3. *For project accounting areas of baseline type U (unplanned), a conversion threat must exist for each project accounting area as demonstrated by one of the following two options:*

    a. *Imminent conversion as predicted by a survey (see definition of imminent conversion). Moderate risk is defined as when more than 60% of respondents predict the end land use identified in the baseline scenario. The survey must meet the requirements of Appendix E.*

    OR

b. *As of the project start date, some point within 2 kilometers of the perimeter of the project accounting area has been converted to the end land use identified in the baseline scenario (Broadbent et al., 2008).*

There is considerable evidence of native ecosystem conversion within 2 km of the perimeter of the Project Accounting Area. These points have all been converted to agricultural, which was identified as the primary baseline activity. Additionally, there was some ecosystem conversion to agriculture inside of the Project Area. Please see the Project Area map presented in Figure 5 which shows areas of deforestation around the perimeter of the PAA.

4. *In the case of baseline type F-U1, at least 25% of the project area boundary is within 120 meters of deforestation and at least 25% of the project area boundary is adjacent to the reference area (see VM0009 Methodology section 6.3).*

The Project Accounting Area has a baseline type of F-U3. This application condition is not applicable to the Project

5. *In the case of baseline type G-U1, at least 25% of the project area boundary is adjacent to the reference area (see section 6.3).*

This project does not contain a grassland project accounting area. This application condition is not applicable to the Project.

6. *In the case of baseline type F-U2, at least 25% of the project area boundary is within 120 meters of deforestation (see section 6.3).*

The Project Accounting Area has a baseline type of F-U3. This application condition is not applicable to the Project.

7. *The project accounting area(s) must not contain peat soil.*

The Project Accounting Area does not contain any areas of peat soil. Please refer to Appendix A for a map showing the soil types present in the Project Area.

This map shows the soil types for the PAA and lists the soil types by name. The soil types included in the PAA are:

1) Acid Lithosol
2) Alluvial Lithosol
3) Alumisol
4) Basic Lithosol
5) Coastal Complex
6) Cultural hydromorphic
7) Grey hydromorphic
8) Latosol
9) Planosol
10) Plinthite podzol
11) Red-yellow podzol

Peat soils are generally classified in the Histosol category, as this is the category for organic soils that have greater than 20-30% organic matter by weight. Peat is additionally a type of histosol that is

characterized by being completely water logged and having an extremely low oxidation potential resulted in the accumulation of undecomposed plant matter.

There are several soils in the Project Area that fall into the hydromorphic soil category, which are soils that developed under the presence and influence of a high amount of water, but that does not infer nor imply in any way that the soil would be a peat soil. Lithosol refers generally to a young soil that is thin, meaning shallow bedrock and podzols are well developed soils that show some aspects of the factors of formation, most likely rivers here. The auditor has been provided with a document that lists the soils and some background. This document is based on the same soil dataset as the soil layer in the Project Map.

8. *For each project accounting area, a reference area can be delineated for each baseline type in the baseline scenario that meets the requirements, including the minimum size requirement, of section 6.8.1 of the VM0009 methodology.*

The national FREL of Cambodia was used for the SCRP as allowed under section 6 of the VM0009 methodology. Please refer to Section 3.1.4.3.1 regarding the selection of the reference area. In the section referenced there is the results of the spatial analysis demonstrating that the Reference Area contained as much forest as the Project Accounting Area at the onset of the historic reference period.

9. *As of the project start date, historic imagery of the Reference Area(s) exists with sufficient coverage to meet the requirements of section 6.8.4 of the VM0009 methodology.*

The national FREL of Cambodia was used for the SCRP as allowed under section 6 of the VM0009 methodology. Please refer to Section 3.1.4.3.3 regarding the reference area.

10. *Project activities are planned or implemented to mitigate ecosystem conversion by addressing the agents and drivers of conversion as described in section 8.3.1 of the methodology VM0009.*

The Project design includes a number of activities that will result in a reduction in ecosystem conversion. These activities are all designed to address the identified agents and drivers of conversion as documented in this document. Please refer to section 2.1.11 for a description of these activities.

11. *The Project Proponent has access to the activity-shifting leakage area(s) and proxy area(s) to implement monitoring (see sections 8.3.2.1 and 6.4) or has access to monitoring data from these areas for every monitoring event.*

The Project Proponent has full access to activity-shifting leakage area and proxy area. This is demonstrated by the collection of data on the post-conversion residual carbon stock from the Proxy Area. Additionally, the activity-shifting leakage area for the Project has also been fully delineated and the baseline data was collected, demonstrating that it is fully accessible by project staff.

12. *If logging is included in the baseline scenario and a market-effects leakage area is required per section 8.3, then the Project Proponent has access to (or monitoring data from) the market-effects leakage area if measurement is needed (see section 8.3.3).*

The SCRP does include small-scale illegal logging in the baseline scenario, however a market leakage area is not required per the requirements of the VCC methodology VM0009 section 8.3.3. This is due to the fact that the logging which occurs in the Project's baseline is small-scale in nature and is to supply local needs, with only a small amount sold in local markets (Hayes et al., 2015). Therefore, the likely result of the Project would not affect the market supply of the wood commodity but be more like a subsistence activity and shifted to the next available area and be consider activity-shifting leakage. As the

reduction in the supply of wood from the Project Area will not result in a change to market commodity for timber in Cambodia. A market leakage deduction has been calculated utilizing the VCS Production Approach market leakage tool (See Section 3.2.3.2 and 3.2.4.12).

13. *This methodology is applicable to all geographies, however if SOC is a selected carbon pool and the default value from section 6.19.2 is selected then the project must be located in a tropical ecosystem.*

Soil organic carbon is not an included carbon pool in the SCRP. This application condition is not applicable to the Project. However, the SCRP Project Area is located in a tropical ecosystem.

14. *If livestock are being grazed within the project area in the project scenario, there must be no manure management taking place, as emissions from N_2O as a result of manure management are not quantified or addressed in this methodology.*

There may be small areas of animal grazing within the Project Area by local communities. These livestock grazing activities are not a component of the project, nor are they a project activity. There will be no manure management of any type occurring on in the Project Area.

15. *Project activities must not result in significant GHG emissions. All GHG emissions from project activities must be shown to be de minimis (see section 8.3.1 of the methodology VM0009).*

All project activities in the SCRP will not result in any significant GHG emissions. The project activities have been designed to be low carbon in nature and do not include any industrial scale agricultural, large uses of fertilizer or other industrial type activity that may result in GHG emissions above the de minimis level.

PDR.3 Definition of forest used by the project proponent and its source.

Table 11: Definition of Forest for Cambodia (Forestry Administration, 2013).

Forest Definition	
Minimum Crown Cover (%)	10
Minimum Land Area (ha)	0.5
Minimum Tree Height (m)	5

3.1.3 Project Boundary

PDR.11 A list of the greenhouse gases considered.

Carbon dioxide (CO_2) was determined to be the primary source of greenhouse gas emissions in the project, given the threat of deforestation from the drivers listed in the baseline scenario. Methane (CH_4) and nitrous oxide (N_2O) are conservatively excluded from the project.

Source		Gas	Included?	Justification/Explanation
Baseline	Source 1	CO_2	Yes	Major pool considered in the baseline scenario
		CH_4	No	Conservatively excluded
		N_2O	No	Conservatively excluded.
		Other	No	No other GHG gases
	Source 2	CO_2	N/A	N/A
		CH_4	N/A	N/A
		N_2O	N/A	N/A
		Other	N/A	N/A
Project	Source 1	CO_2	Yes	Major pool considered in the project scenario
		CH_4	No	Conservatively excluded
		N_2O	No	Conservatively excluded.
		Other	No	No other GHG gases
	Source 2	CO_2	N/A	N/A
		CH_4	N/A	N/A
		N_2O	N/A	N/A
		Other	N/A	N/A

3.1.3.1 Selected Carbon Pools

PDR.12 A list of the selected carbon pools and evidence for the conservative exclusion of any optional pools.

Table 12: Selected carbon pools in the Project Accounting Area (REDD+ baseline type).

Pool		Required	Included in Project	Justification
AGMT	Above-ground merchantable tree	Yes, if baseline scenario or project activity(ies) include the harvest of long-lived wood products. Otherwise, accounting for this carbon pool is not required	No	No commercial tree harvesting or production of long-lived wood products included in baseline
AGOT	Above-ground other (non-merchantable) tree	Yes	Yes	Major pool considered

AGNT	Above-ground non-tree	Yes, if the baseline scenario includes perennial tree crops. Otherwise, accounting for this carbon pool is optional.	Yes	Major pool considered
BGMT	Below-ground merchantable tree	Optional	No	No commercial tree harvesting or production of long-lived wood products included in baseline
BGOT	Below-ground other (non-merchantable) tree	Optional	Yes	Major pool considered
BGNT	Below-ground non-tree	Optional	Yes	Major pool considered
LTR	Litter	No	No	Conservatively excluded
DW	Dead wood	Yes, if AGMT is selected	No	Conservatively excluded
SD	Standing dead wood	Optional	No	Conservatively excluded
LD	Lying dead wood	Optional	No	Conservatively excluded
SOC	Soil organic carbon	Optional	No	Conservatively excluded
WP	Long-lived wood products	Yes, if AGMT is selected	No	Conservatively excluded

Several optional carbon pools have been conservatively excluded from the Project's baseline, as is shown in Table 12. The exclusion of these optional carbon pools is conservative in all cases, as their exclusion from the project will result in fewer emission reductions. Section 8.4.7 of the methodology VM0009 states that ex-ante estimates are required to demonstrate that the exclusion of a carbon pool is conservative only if a carbon pool is expected to increase in the baseline scenario. The carbon pools which have been excluded, including AGMT, BGMT, SD, LD, and SOC will all decrease under the baseline scenario, which is detailed in Section 3.1.4. The Project's baseline scenario is the complete conversion of the forest to non-forest, with most if not all above-ground living and dead carbon pools being removed, and additionally the below ground and soil carbon pools being reduced through the resulting agricultural activities. AGMT, BGMT, SD, LD and SOC carbon pools were excluded additionally to ensure that the SCRP's included carbon pools are consistent with those used in the RGC's FRL program.

3.1.3.2 Delineating the Project Accounting Areas

PDR.22 A digital (GIS-based) map of the project accounting areas, including aerial or satellite imagery showing that they are forested as of the project start date and 10 years prior to the project start date.

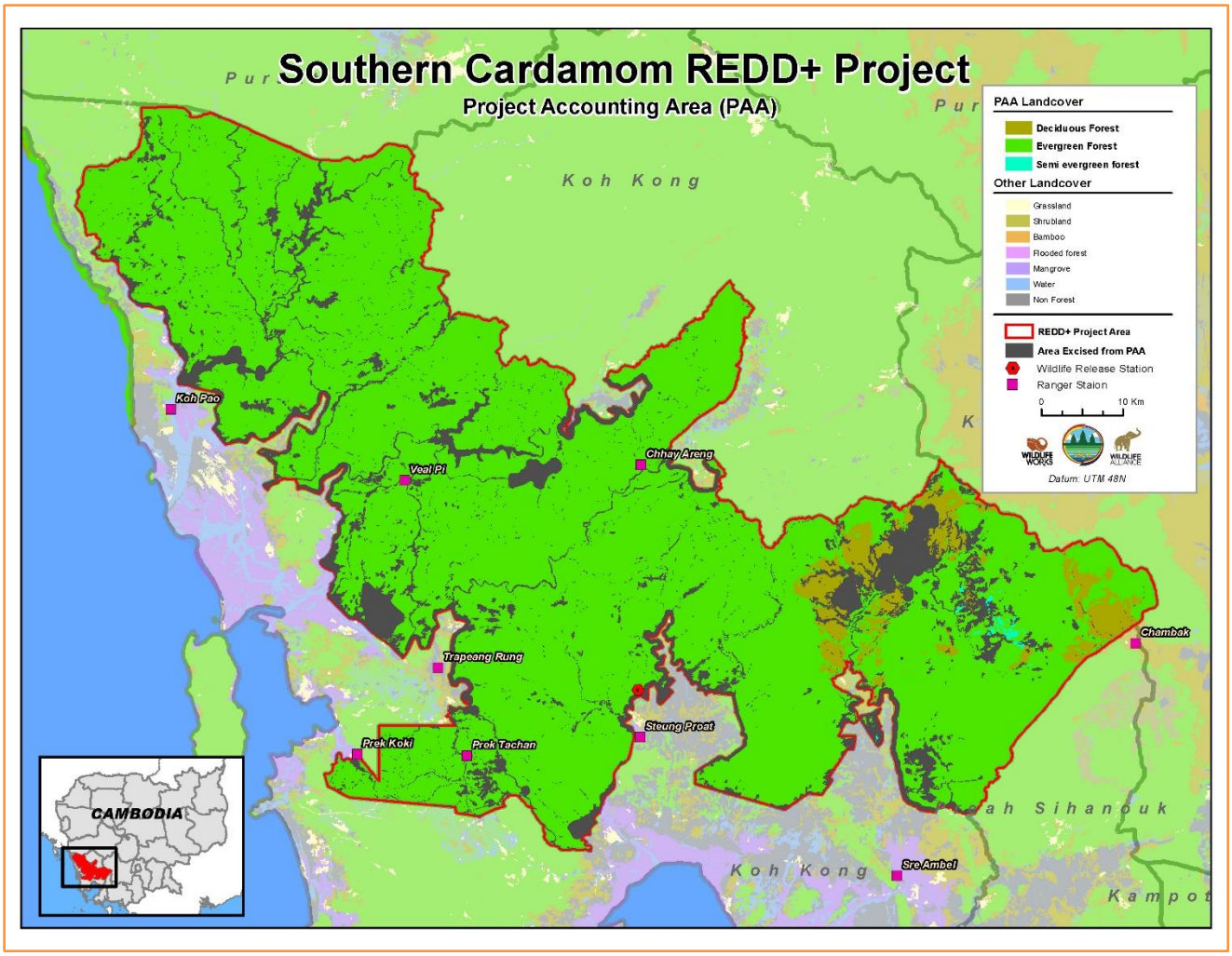
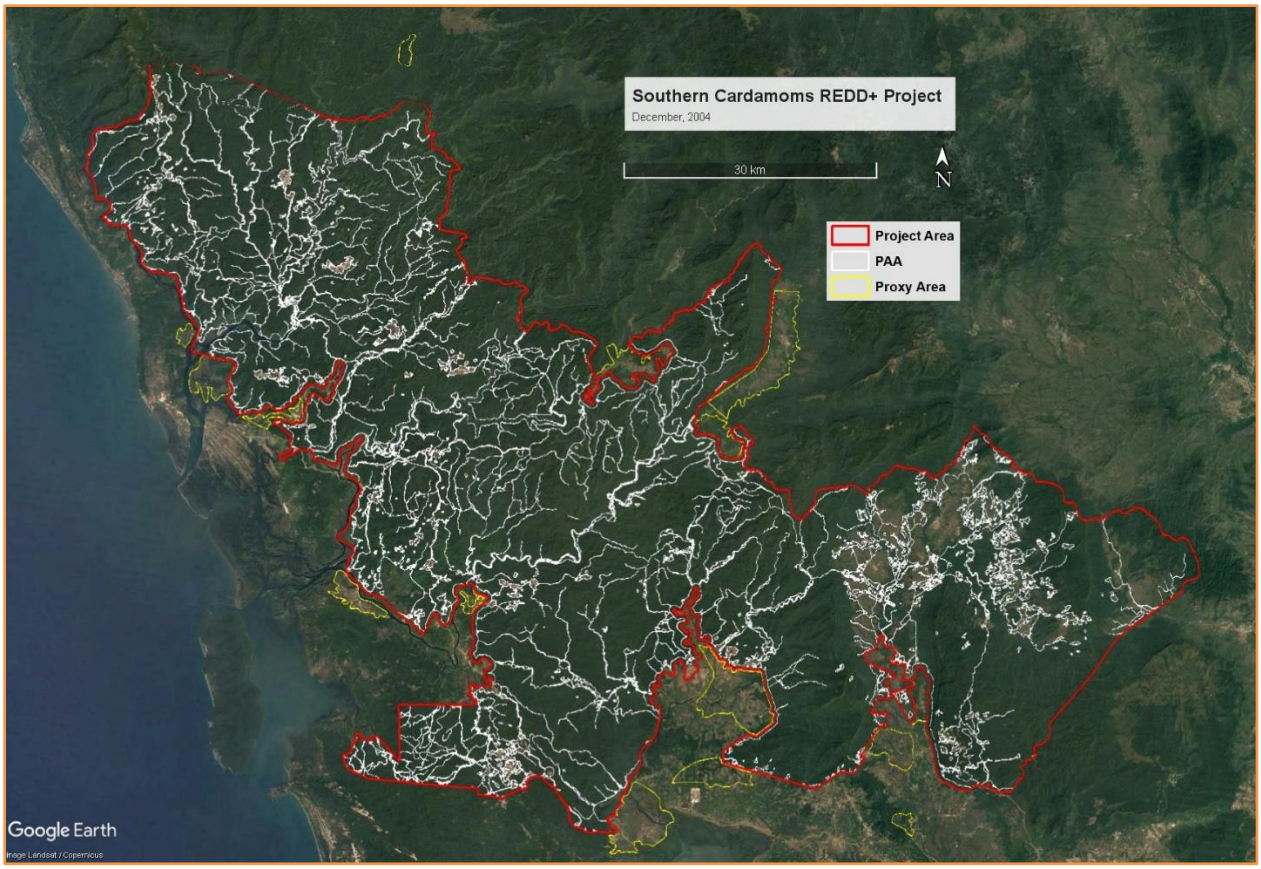


Figure 5: The Project Area and Project Accounting Area (PAA). Excised Areas are regions inside the Project Area that have been previously converted, and therefore removed from GHG accounting.


Southern Cardamoms REDD+ Project
December, 2004
30 km
N
Project Area
PAA
Proxy Area
Google Earth
Image Landsat / Copernicus

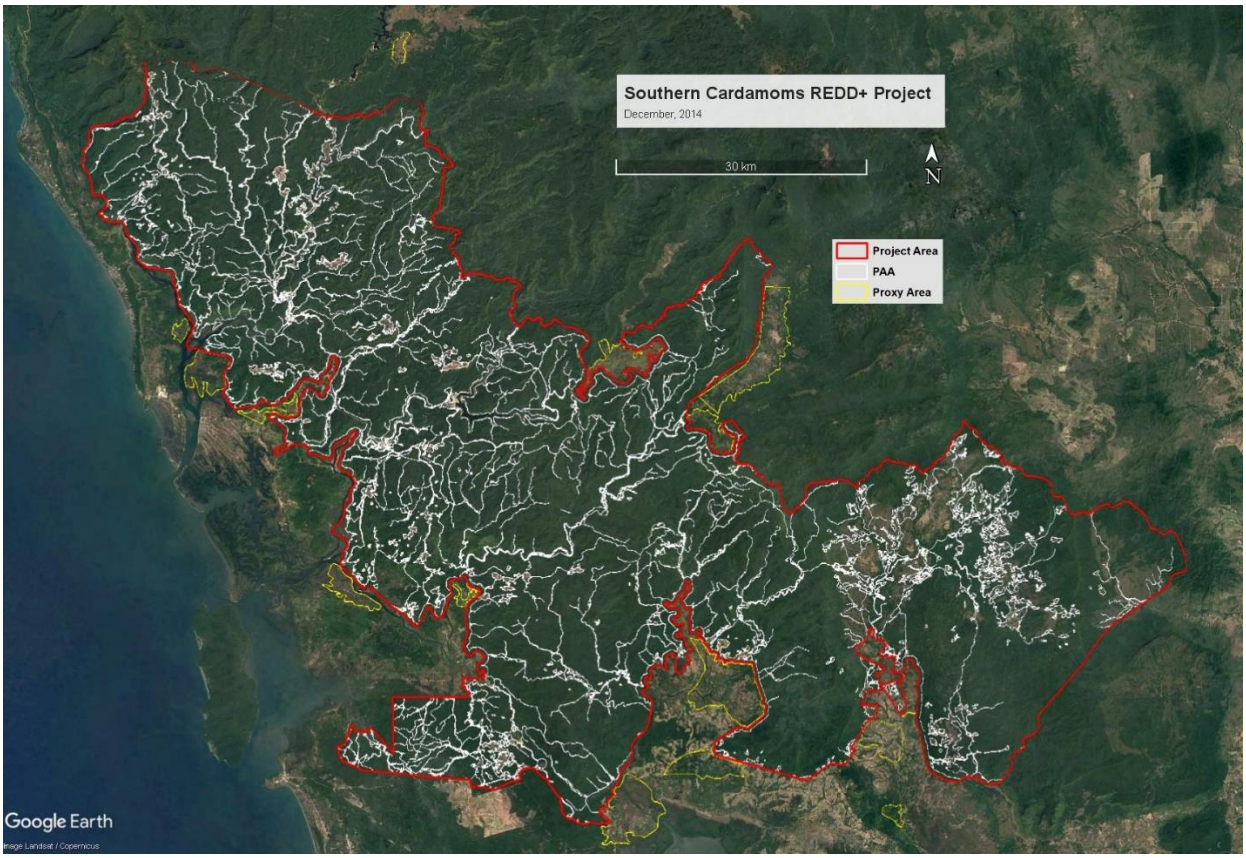


Figure 6: The Project Area, with landcover data indicating forest cover in December, 2004 (above) and in December, 2014 (below), demonstrating compliance with PDR.22: the PA was forested at least 10 years prior to the Project start date and as of the Project start date.

PDR.23 Justify the project accounting areas using the identified agents and drivers of conversion, constraints to conversion, and attributes listed above in the methodology VM0009 section 6.2.

There is a single Project Accounting Area in the Project Area, comprised of the Southern Cardamom National Park and Tatai Wildlife Sanctuary that is located within Koh Kong province together with a small portion of Botum Sakor National Park. This PAA was additionally defined by the land cover in the area, as identified from MOE-provided remote sensing imagery. After excising areas identified as settlements, agriculture, surface water or any other non-forest land cover from the PAA, with the remaining forested PAA area was stratified by land cover. Forest inventory data was then used to confirm that all PAA strata met the Cambodian definition of forest.

High resolution imagery was used to identify any PAA areas that showed evidence of conversion to settlements or agriculture. A 0.5 km buffer was placed around those communities located inside the PA at the Project start date to allow for future expansion and provide additional ecosystem resources for these communities close to the PAA.

The PAA is fully contained within the reference area, and easily accessed by the identified agents and drivers of conversion. Minimal conversion occurred historically in the national park, but has been scarce due to protection efforts by Wildlife Alliance.

3.1.4 Baseline Scenario

PDR.17 Show that the identified baseline type is the most plausible baseline scenario identified in section 7 of the Methodology.

The baseline scenario as identified as the conversion of native ecosystems from a natural forested state to a non-forest (agricultural) state. The baseline scenario outlined in the VCS Additionality Tool in Section 3.1.5 demonstrates that the entire PAA would be been converted to subsistence agriculture in the absence of the SCRP. Please refer to Section 3.1.5, 'VCS Additionality Tool' for more details.

3.1.4.1 Baseline Types

3.1.4.1.1 Project Accounting Area

PDR.30 If Type F-U1 is selected, a spatial analysis of the project area showing that at least 25% of the perimeter is within 120 meters of deforestation that occurred within 10 years prior to the project start date and showing that the reference area is adjacent to at least 25% of the project area.

As the national FREL has been applied to the SCRP, this PDR is not applicable.

PDR.32 If Types F-U1, F-U2 or F-U3 is selected, a spatial analysis of the project area showing that it is within 120 meters of deforestation that occurred within 10 years prior to the project start date.

Perimeter analysis was performed per VM0009 and VCS AFOLU Guidance. The percentage deforestation occurring 10 years prior to the Project start date and within 120 m of the PA boundary was calculated as 13.76%. The SCRP as therefore determined to be of type F-U3 (Avoided Unplanned Deforestation, that meets the VCS definition of a Mosaic or Frontier Deforestation Pattern and that Features an Adjacent Reference Area). Figure 7 below indicates the results of the perimeter analysis, including deforestation between the years 2006-2014.

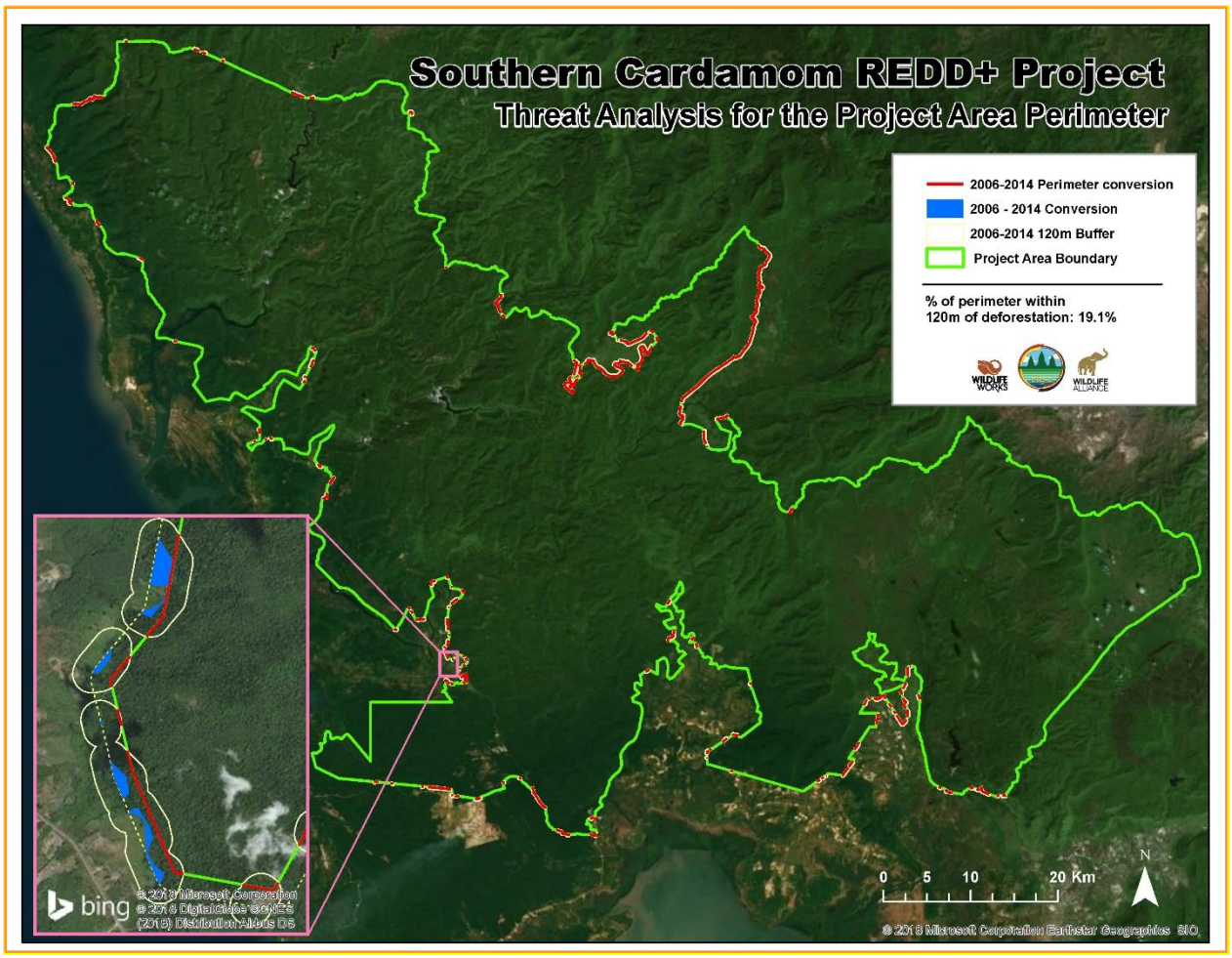


Figure 7: Deforestation analysis for the Project Area perimeter

3.1.4.2 Delineating Proxy Areas

PDR.35 A map of the Proxy Area's delineated boundaries.

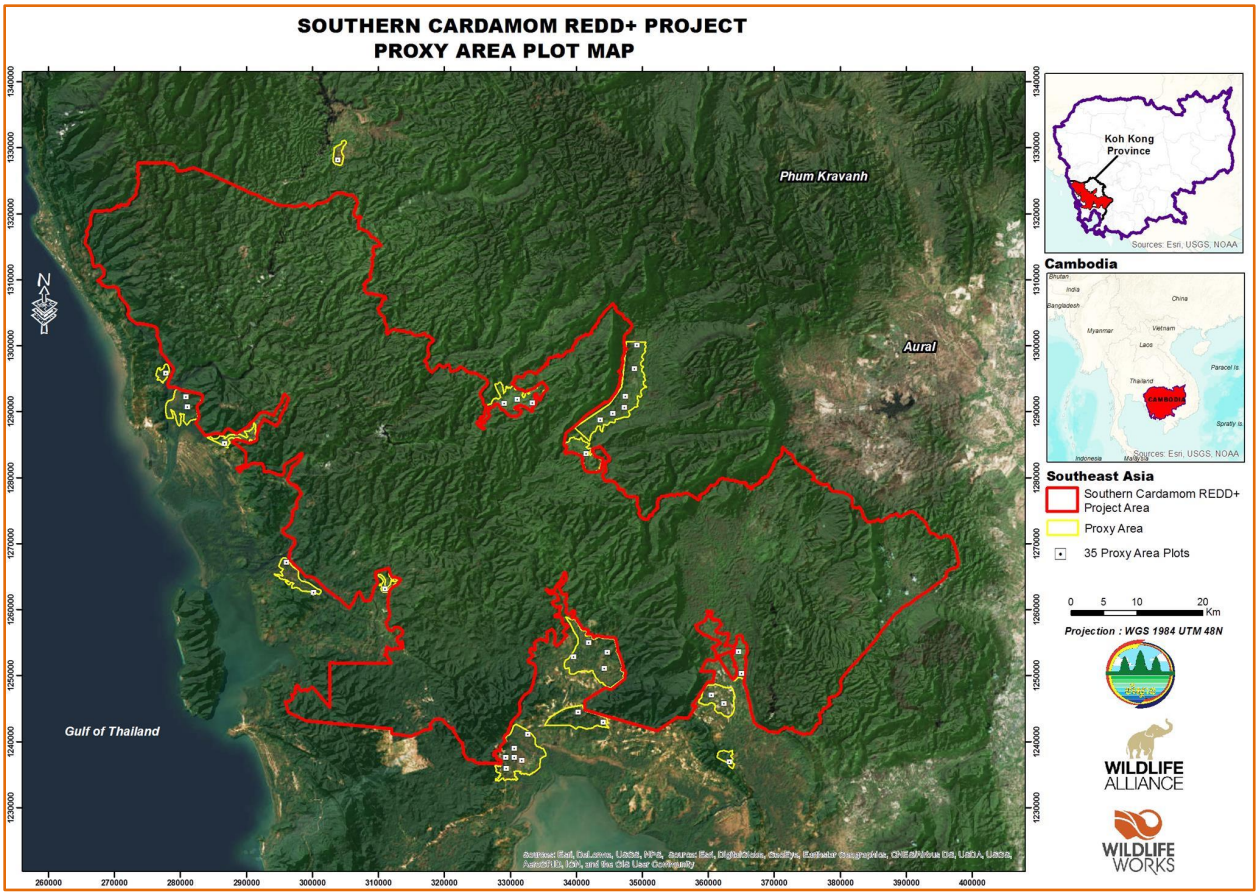


Figure 8: Proxy Area and Proxy Area biomass plot locations

PDR.36 Maps or other evidence that the proxy area's site characteristics and landscape configuration is similar to its respective Project Accounting Area, including:

a. Vegetation;

Please see Appendix C: Proxy Area Maps 'Map of the Proxy Area Landcover." The Proxy Area landcover shown in the referenced map meets all of the Proxy Area requirements of the methodology VM0009. Additionally, please see Figure 6 which shows the Project Area at the Project Start date and at a point 10 years prior to the start date over a base map of high-resolution satellite imagery. Although an outline of the Proxy Area is not shown in this map, the area can be viewed immediately adjacent of the Project Area's western boundary, and it can be seen that in the map 10 years prior to Project Start Date the Proxy Area vegetation cover was very similar to that which is observed.

b. Climatic conditions (e.g. mean temperature, rainfall, etc.);

Please refer to Section 2.1.5. The referred section describes the climatic conditions, including temperature and precipitation, present in the general region where the Project Area is located. As the Proxy Area is located immediately adjacent to the Project Area as shown in Figure 8 and has very similar topography, slope and aspect, as seen in Appendix C, the climatic conditions present in the Proxy Area are nearly identical to those in the Project Area.

c. Topographic constraints to conversion (slope, aspect, elevation);

Please see Appendix C 'Map of the Proxy Area Topographic Maps.'

d. Land use and/or land cover;

Please see Appendix C 'Map of the Proxy Area Landuse.'

e. Soil map (if available) or other soil information;

Please see Appendix C 'Map of the Proxy Area Soil Class.'

f. Applicable infrastructure (e.g. water ways, roads, railroad, airports, provision of electricity, and other access points); and

Please see Appendix C 'Map of the Proxy Area Infrastructure.'

g. Ownership/tenure boundaries that influence conversion (e.g. government holdings, private holdings and reserves).

Please see Appendix C: Proxy Area Maps to view the maps listed above.

PDR.37 A narrative describing the rationale for selection of proxy area boundaries, including the proxy area's similarity to the corresponding project accounting area with respect to vegetation, soil and climatic conditions.

The Proxy Area was chosen for its accurate representation of the most likely "end state" of the baseline scenario that was identified for the Project Area. Local expertise suggested that the chosen area, adjacent to the Project Area is emblematic of the Project Area, and of the types of land use on deforested areas that are typical to this region. The Proxy Area is also required by VM0009 v3.0 to be accessible to the Project Proponent, providing the ability to install permanent plots that can be re-visited for carbon stock monitoring over the lifetime of the project. The Proxy Area delineated for the SCRP meets this requirement. The Proxy Area was delineated using land use / land cover data, to identify areas classified as agricultural. The boundaries of the Proxy Area were then confirmed to be correct using high-resolution imagery and in-situ verification.

PDR.38 Results of a spatial analysis to demonstrate the proxy area is converted, on average, as of the project start date.

Please see a map demonstrating that the proxy area has all been converted to an agricultural land use as of the project start date in Appendix C.

PDR.123 Summary of sampling procedures for the proxy areas, with a copy of a sampling protocol used to carry out measurements.

The procedures used for locating and sampling the Proxy Area sample plots are found in the document Annex 8 – 'Standard Operating Procedure Cardamoms - Proxy Area v1.2_20180905'. The sampling procedure used is the same as that used for the biomass sample plots. The plot locations are randomly placed within the Proxy Area. The sample design is a nested circular plot, with a 15 m radius circle in which all trees are measured, and an inner 5 m sample plot where shrubs are measured. In the 15 m radius plot all trees over 10 cm DBH are measured and recorded. In the 5 m shrub plot, all woody shrubs are classified into 3 size categories and counted. The only difference between the sampling procedures

used in measuring the Project Area versus the Proxy Area is procedures used in determining the sample plot location and the inclusion in the Proxy Area SOP of a decision tree for the sampling team to move the sample plot location. This is due to the importance of ensuring the Proxy Area plot location is characteristic of the Project's baseline scenario, as well as the possibility of additional restrictions and access difficulty in the Proxy Area. Proxy Area sample plot locations are shown above in Figure 8.

3.1.4.3 Estimating the Reference Level

Jurisdictional Reference Level

The SCRP elects to invoke the option in VM0009 v3.0, section 6 which allows for the use of a jurisdictional baseline that has been established and applicable to the project activity. The Royal Government of Cambodia submitted a Forest Reference Level (FRL) under the UNFCCC Framework in July 2016 (MoE, 2016). The Cambodian Ministry of Environment has indicated that national FRL will apply to all RGC approved REDD+ Project, of which the SCRP is one (agreement signed between Wildlife Alliance and MoE January 2017) and is therefore directly applicable to the project activity of avoiding deforestation in the Project Area.

The national FRL is calculated over above-ground and below-ground carbon pools and presents average net total annual CO_2e emissions and removals (tCO_2e / yr). It was calculated by the Ministry of Environment (MoE) using the IPCC 2006 guidelines approach by utilizing 1. activity data (A) and 2. emission factors (EF) to achieve the FRL.

Activity data (historical deforestation) was calculated using a detailed, robust remote sensing approach with average individual map accuracy of 79.5% (MOE, 2016). However, because the national forest inventory (NFI) for Cambodia is not yet complete, RGC substituted temporary emission factors from a literature review for the national UNFCCC FRL submission. RGC has indicated that they will eventually integrate biomass data from approved REDD+ projects as part of the NFI to lower the relatively high coefficients of variation for EFs found in the various literature sources (MoE, 2016) and is in fact currently partnering with SCRP field crews to facilitate project-level biomass data integration into the NFI. Due to the completeness and relatively high accuracy of the activity data and the fact that RGC will ultimately utilize project-level plot data to calculate EFs, the reference level applied to the SCRP is calculated using project-level EFs (based on SCRP forest inventory) in conjunction with the national activity data.

Proportional Allocation of the Reference Level

An equitable approach for allocation of the national FRL, which distributes incentive proportionally according to remaining forested area, has been used for the SCRP, thus tying stakeholder emission reduction incentive directly to the FRL on a spatial basis. This approach effectively makes the FRL a surrogate for stakeholder benefit eligibility and maximizes performance potential. The Proportional Reference Level Allocation Method is fully described in a concept note recently presented to the RGC (Wildlife Works, 2017) and has been presented to RCG for inclusion in Cambodia's national REDD+ Program.

The proportional allocation approach is appropriate for countries such as Cambodia where remaining forest is distributed non-uniformly. The national FRL is allocated to remaining forests within each REDD+ Project according to the ratio of the Project's PAA to the country's remaining forested area.

3.1.4.3.1 Delineating the Reference Area

PDR.40 A map of the delineated boundaries, demonstrating that the reference area was held by the identified baseline agent or agents and does not include the project area.

As stated above, the SCRP uses the national UNFCCC FRL activity data (deforestation rate) and project-level emission factors. The SCRP reference area is therefore defined synonymously with the national FRL area: e.g. the country of Cambodia. As stated above, the proportional allocation approach is utilized to ensure fair and equitable benefit distribution. The proportional allocation approach entails the scaling of the national FRL to the Project level based on its proportion of the forested area of the country of Cambodia. The reference area selected for the SCRP is shown in Figure 9 below.

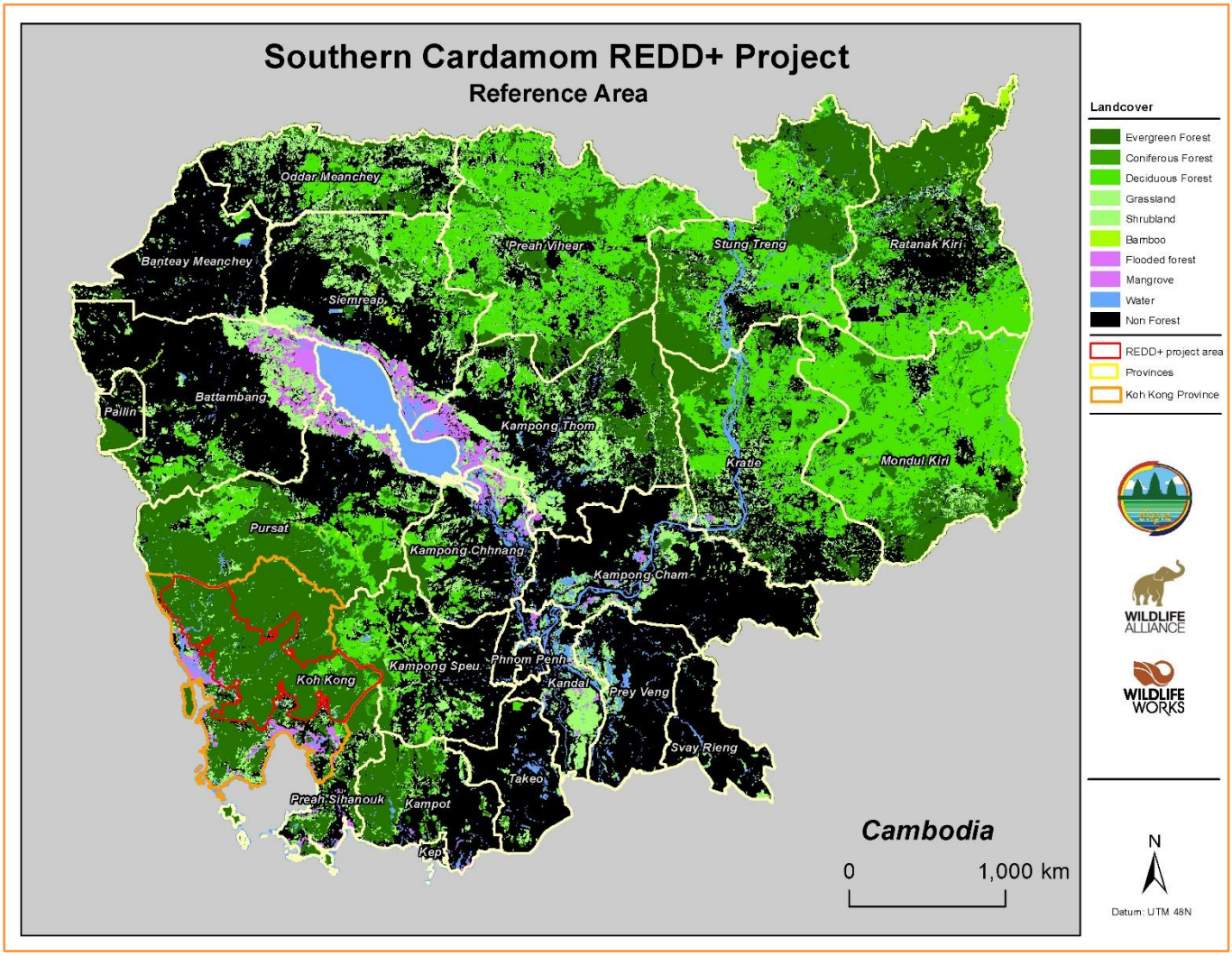


Figure 9: The SCRP reference area in relation to the Project Area.

The reference area fully contains the REDD+ Project Area. It therefore contains the same agents of conversion that were identified in the baseline scenario. As the SCRP uses a jurisdictional reference

level, the criteria of PDR.40 requiring that the reference area does not include the Project Area does not apply.

PDR.41 Results of a spatial analysis to demonstrate the reference area had as much forest or native grassland as the project area at some point in time during the historic reference period.

Based on a spatial analysis of the MoE 2015 Land Cover dataset, the reference area (country of Cambodia) contains more forest (7,557,582 ha) than the REDD+ PAA (442,821 ha). Figure 10 below depicts the results of this analysis. Numerical results are shown below in Table 13. VM0009 requires that this criterion is met “at some point within the historical reference period”.

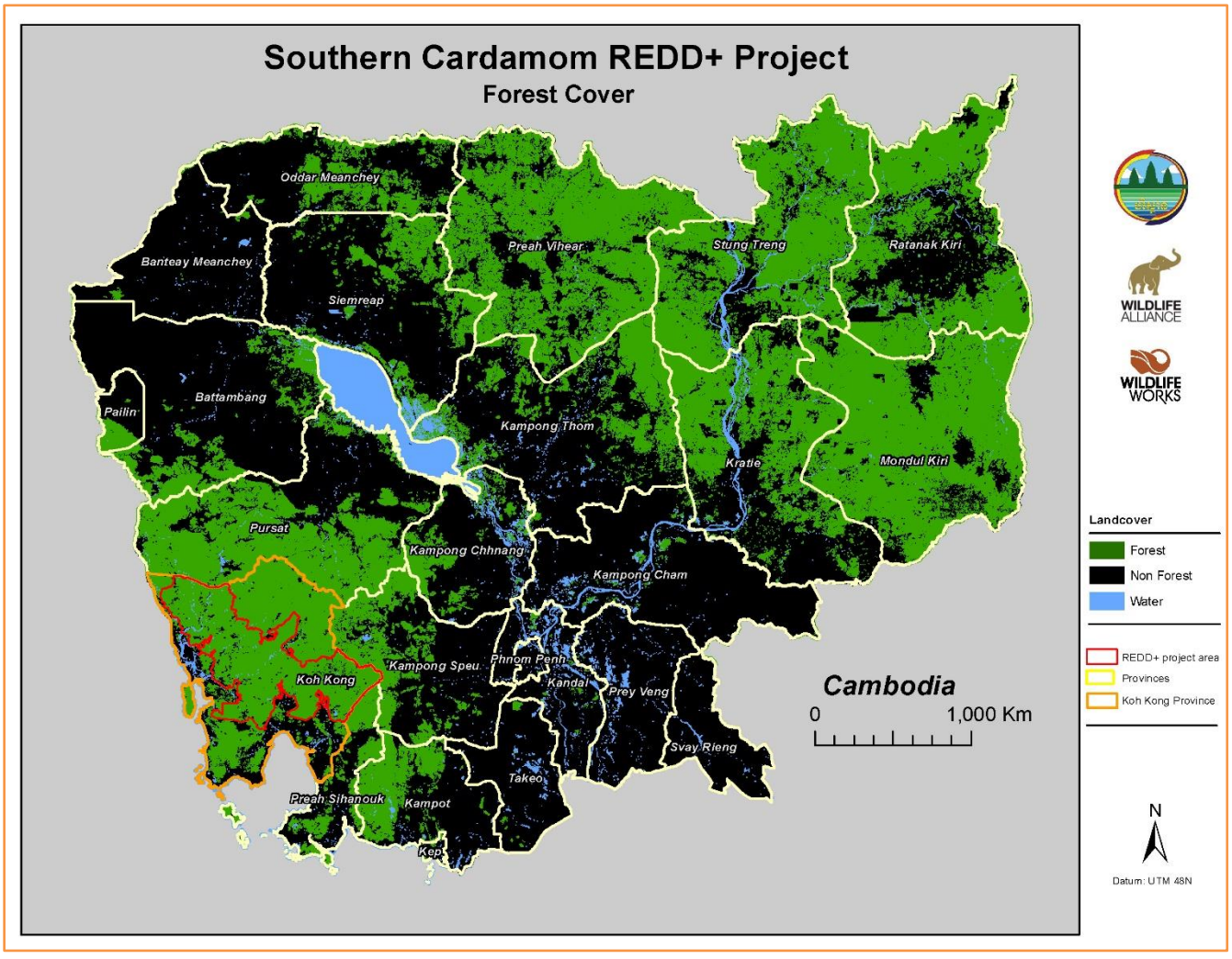


Figure 10: Forest cover in the reference area in 2015.

Table 13: Results of spatial forest analysis to demonstrate validity of the reference area (Data source: MoE 2015)

Land Cover Strata	PAA area (ha)	Reference area forested area (ha)	Reference area % of PAA
Bamboo	-	67,947.7	
Coniferous Forest	718.7	6,996.1	
Deciduous Forest	17,792.63	3,371,607.9	
Evergreen Forest	424,359.49	3,728,398.8	
Flooded forest	-	308,649.1	
Mangrove	-	73,982.5	
Grand Total	**442,870.85**	**7,557,582.0**	**1706%**

PDR.42 Evidence that the management practices of the baseline agents in the reference area are similar to those that would have been applied to the Project Accounting Area or areas in the baseline.

The Project Area is located entirely within the reference area and contains a similar cultural mix and socio-economic factors (Please refer to Section 3.1.5 the VCS Additionality Tool for more details). Having been successfully protected, the Project Area is one of the last contiguous forest blocks remaining in the region. The same factors that have led to significant deforestation throughout Cambodia during the Project's reference period still present a heavy threat to the Project.

PDR.43 A description of the rationale for selection of reference area boundaries.

As stated above, because the national FRL was selected, the reference area for the SCRP is therefore defined as synonymous with the national FRL area: the country of Cambodia.

PDR.44 The documentation required in the Reference Area selection requirements that the selected reference area meets the Reference Area Selection Requirements.

Because the reference area is synonymous with the Kingdom of Cambodia, a sovereign entity, it is assumed to be inherently justified and reference area selection criteria is not required. This PDR is therefore not applicable.

3.1.4.3.2 Defining the Historic Reference Period

PDR.48 Established reference period boundaries.

The reference period for the Cambodian national FRL is a 9-year period between 2006 and 2014 inclusive (MoE, 2016).

PDR.49 A list of available historic imagery for the reference area.

According to the national FRL submission, 3 epochs were used to calculate historical deforestation %, 2006, 2010 and 2014. Landsat legacy imagery were used for the 2006 epochs, while Landsat 8 imagery was used for the 2014 map (see MoE, 2016 for detail). A detailed list of images may be acquired from MoE.

PDR.50 A timeline of important events as they relate to the agents and drivers of conversion.

Deforestation in Cambodia has occurred as a result of economic development that the government has had little capacity to enforce (MoE, 2016). The REDD+ Roadmap identified a series of direct drivers, including clearance for agriculture, settlement expansion, infrastructure development, illegal logging, and unsustainable harvesting of wood fuel, alongside a large set of indirect factors related to the socioeconomic environment and governance conditions both within and outside the forestry sector (Forestry Administration, 2010). A dramatic increase deforestation since 2010 is likely a consequence of an increase in forestland conversion, timber harvesting and agricultural expansion for cash crops. Forest disturbance resulting from the expansion of monoculture plantations for rubber has been statistically linked to international market price fluctuations, with the past few years seeing higher market prices and consequentially exceptionally high disturbance rates (Grogan, Pflugmacher, Hostert, Kennedy, & Fensholt, 2015).

PDR.51 Narrative rationale for the selection of the reference period.

3.1.4.3.3 Reference Level Imagery

PDR.52 A map of the reference area showing the area of "double-coverage".

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.53 Quantification of "double coverage"(greater than 90%).

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.54 A line plot of the historic image dates to confirm stationarity.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.55 Evidence that all image pixels are not more than 30m x 30m.

All of the imagery used for the analysis of the historic reference period is from the Landsat program, which features a spatial resolution of 30mx30m (MoE, 2016).

PDR56 Empirical evidence that imagery is registered to within 10% RMSE, on average.

The national FRL submission (MoE, 2016) describes the image Pre-processing procedure for development of activity data (deforestation rate) as shown below in Figure 11:

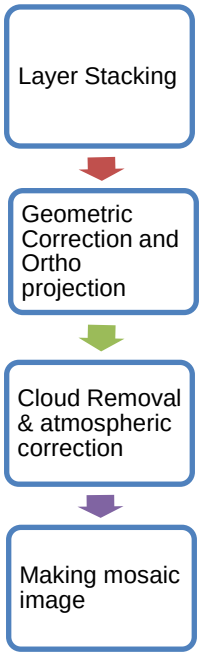


Figure 11: FRL Image Pre-processing

PDR.57 The sample size.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.58 A map of the Reference Area showing the sample point locations.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

3.1.4.3.4 Minimization of Uncertainty

PDR.63 A protocol for interpreting land cover state from imagery, which must include guidance for interpreting the following:

a. **Discerning conversion features using shape, texture and context in the reference area landscape**
b. **Addressing seasonal variation of vegetation (phenology) within imagery**
c. **Identifying and addressing the characteristics of specific landscape configurations (i.e. mosaic forest, grassland, etc.)**

The national FRL submission describes the image interpretation process in detail that includes:

- Establishment of a global land cover class hierarchy scheme
- Comparison and melding of the 2014 map classification scheme and interpretation protocol with those for the 2006 and 2010 maps
- Re-establishment of the forest definition

- Re-stratification of 2006 and 2010 maps to match the global land cover class hierarchy
- Use of external imagery such as FAO maps and Google Earth as reference
- An amelioration process involving identification of "unlikely" temporal land cover transitions and subsequent modification of maps.

Further detail describing the quality assurance and consistency procedures employed can be found in the national FRL submission document (MoE, 2016).

Table 14 depicts the final land cover class hierarchy used for the image interpretation process.

Table 14: National FRL Land Cover Class Hierarchy (MoE, 2016)

No	Forest/Non-Forest	IPCC Land-use Category	No	National Land-Use Categories	FRL Classes (Initial FRL)	IPCC Category
1	**Forest**	Forest	1	Evergreen forest	Evergreen forest	Forest Land
			2	Semi-evergreen Forest	Semi-evergreen Forest	Forest Land
			3	Deciduous forest	Deciduous forest	Forest Land
			4	Pine trees	Pine forest	Forest Land
			5	Pine plantation	Pine plantation	Forest Land
			6	Tree plantation	Tree plantation	Forest Land
			7	Mangrove forest	Mangrove	Forest Land
			8	Rear mangrove	Rear Mangrove	Forest Land
			9	Forest regrowth	Forest regrowth	Forest Land
			10	Flooded forest	Flooded forest	Forest Land
			11	Bamboo	Bamboo	Forest Land
2	**Non-Forest**	Crop land	12	Rubber plantation	Non-forest	Cropland
			13	Oil palm		Cropland
			14	Paddy field		Cropland
			15	Crop Land		Cropland
3		Grassland	16	Grassland		Grassland
			17	Wood shrub		Other Land
4		Wetlands	18	Water		Wetland
5		Settlements	19	Built-up area		Settlement
			20	Village		Settlement
6		Other	21	Rock		Other Land
			22	Sand		Other Land

PDR.64 The results of an independent check of the interpretation.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.65 Evidence that systematic errors, if any, from the independent check of the interpretation were corrected.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

3.1.4.3.5 Reference Level

As described above, activity data results from the national FRL submission (MoE, 2016) were used in conjunction with emission factors calculated from carbon stock data collected within the Project Area. The proportional allocation method was then used to apply the reference level to the SCRP Project Accounting Area. Table 15 lists the emission factors used and Table 16 shows the calculation of the SCRP reference level

Table 15: Emission Factors used for the SCRP reference level calculation

SCRP land cover stratum	Area (ha)	Average Stock (tCO_2e/ha)
Evergreen Forest	425,078	431.2
Deciduous Forest	17,793	285.5
Proxy Area	27,717.7	1.6
Emission Factors (tCO2e/ha)		
Evergreen Forest		429.6
Deciduous Forest		283.8
SCRP area-weighted mean Emission Factor		423.7

Table 16: Reference Level calculation for SCRP

Description	Value
Cambodia area (ha) ‡	18,160,674
Cambodia forested area in 2014 (ha)‡	8,518,173
Cambodian National deforestation % (2006 - 2014) ‡	21.40%
Southern Cardamom REDD+ PAA (ha)	442,871
Cambodia FRL scaled to SCRP REDD+ PAA (% of Cambodia forest 2014) (tCO2e/yr)	4,461,598

‡from MoE, 2016

3.1.4.3.6 Estimating Uncertainty

A detailed assessment of accuracy was performed on the activity data model for the national FRL submission.

Separate accuracy assessments were carried out for each of the land cover maps, summarized as follows:

Accuracy assessment of the original 2006 and 2010 forest assessment maps was performed by Geographic Resource Analysis & Science A/S (GRAS). The report was compiled as Accuracy Assessment Report (draft final). Overall accuracy of the five classes – Evergreen Forest, Semi-evergreen forest, Deciduous Forest, Other Forest and Non-Forest, was **74% for the 2006 map** and **85% for the 2010 map**.

New accuracy assessments of the upgraded 2006 map and 2010 map was performed after the completion of the amelioration process described above. For the accuracy assessment of 2014 map, the total number of reference points was calculated using (Congalton & Green, 2009) and distributed for each class proportional to class area. Overall accuracy of the 22 land cover classes was **81.23% with a kappa value of 79.49% for the 2014 map.**

Full confusion matrices are available in MoE, 2016.

Cambodia is currently undertaking an accuracy assessment of change of land use change data between 2006 and 2010, and between 2010 and 2014. The results are expected to be made available as part of future FRL submissions.

PDR.66 The estimated uncertainty σ_{EM} from [F.13] and statistical summaries from model fitting software, if available.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.67 Reference to uncertainty calculations.

As stated above, Congalton & Green, 2009 was used to estimate accuracy for each of the maps:

2006 map

See Geographic Resource Analysis & Science A/S (GRAS), 2007.

2010 and 2014 map

The number of accuracy assessment points was determined using Congalton & Green, 2009:

$$n = B/4b^{\wedge 2}$$

where

Confidence level (95%)	α	0.05
Number of class	κ	22
upper (α/κ) x 100th percentile of the χ2 distribution with 1 degree of freedom	B	9.3151
Desired precision	b	5% (0.05)

hence

2010 map: n = B/4b^2 = 9.3151 / 4 x (0.05)^2 = 932

MoE decided to use 1233 assessment points for the 2010 map due to an adjustment of points per land cover class. For the 2014 map, the same adjustment procedure was used for a total of 1252 assessment points (MoE, 2016).

PDR.78 The project shift parameter γ as the number of days between the beginning of the historical reference period and the project start date.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

PDR.79 The parameter q as the number of days between the onset of degradation and the beginning of conversion.

This PDR is not applicable because a jurisdictional reference level has been applied to the SCRP.

3.1.4.4 Baseline Scenario for Selected Carbon Pools

PDR.39 A qualitative description of the baseline scenario for each selected carbon pool.

3.1.4.4.1 Project Accounting Area

Above-ground other tree (AGOT): The above-ground portion of the tree carbon pool is assumed to be completely removed from the forest ecosystem during the conversion process for the baseline scenario. The trees in this pool are assumed to have immediate loss to CO_2e emissions, with no wood used for long-lived wood products. Conversion of this pool is carried out either in-situ via combustion or by removal and direct combustion for fuel wood. Any residual AGOT biomass that remains following conversion by the agents is determined using data collected from biomass sample plot measurement in the Proxy Area.

Above-ground non-tree (AGNT): The AGNT pool is assumed to be completely removed from the forest ecosystem during the conversion process for the baseline scenario. Plants and shrubs in this pool are assumed to have immediate loss to CO_2e emissions, with no portion going to long-lived products. As this pool is comprised of generally low-density and small woody material, it is assumed in the baseline scenario that biomass from this pool is either combusted in-situ or entirely cleared and left to decay. This decay occurs very quickly due to the ecosystem climate and physical characteristics of the material. Any residual biomass from the AGNT pool that remains after conversion by the agents is determined using data collected from biomass sample plot measurement in the Proxy Area.

Below-ground other tree (BGOT): The below-ground component of the tree carbon pool is assumed to be minimally impacted by the activities of the agents of deforestation. Emission from this pool are determined using a root:shoot ratio of 0.4 (the IPCC default) of below-ground to above-ground biomass.

3.1.5 Additionality

Step 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity.

a) Identify realistic and credible alternative land-use scenarios to the proposed REDD+ project activity.

i. Continuation of the pre-project land use;

The entirety of the Project Area is gazzetted as a protected area (Southern Cardamom National Park, Tatai Wildlife Sanctuary, and Botom Sakur National Park), and therefore has formal protection against deforestation. The national park designation was made in large part due to the efforts of the Project Partner, Wildlife Alliance (WA). WA has been operating in the Project Area for over 10 years, and their efforts in forest protection and community engagement are the primary reasons that the Project Area is still forested. Although the Project Area has been designated as a protected area, the MOE is unable to fund forest protection activities, supply needed equipment or the training needed to successfully conserve the forested areas under their jurisdiction. WA's funding, training, and logistical and managerial support has been instrumental in the protection of the Project Area. Wildlife Alliance's existing activities include enforcement of forest boundaries and reduction of illegal logging and forestland clearing activities as well as community-based eco-tourism and agriculture programs. Therefore, the pre-project land use was primarily that of a donor and grant-funded conservation, with the majority of the funding coming from a single donor.

Despite this, threats to the forest have been seen to be steady or even be increasing. According to enforcement data collected by Wildlife Alliance since 2002, all of the unplanned drivers of deforestation that lead to the creation of new land for farming are present in the SCRP; this includes land encroachment, illegal logging, illegal camps, forest fires, and charcoal kilns (SCRP Enforcement Data 2002 TO DATE-2017_Updated Feb 2018). For example, in 2017 alone, there were 57 land encroachments, 438 illegal camps, 711 m^3 of timber confiscated, 448 chainsaws confiscated, 89 charcoal kilns, 2 sawmills, and 17 forest fires. The drivers of deforestation are still present because of the opportunity cost of the most profitable alternative land-use, mixed vegetable farm, is 652% more profitable than if the forests of the SCRP are left standing.

There is a decrease in funding for WA's conservation efforts. Since 2002, WA's conservation and protection activities have been sustained by a single major funding source, with smaller amounts coming from grants, income or other sources. WA's major source of funds has been depleted, and they are no longer able to financially support the Project activity without new funding sources, such as carbon revenue. It is certain, based on the amount of consistent threat observed since 2002, that without new sources of revenue there will be an increase in illegal logging and conversion of the forest area into agricultural land.

ii. Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project;

Conservation is a widespread practice in Cambodia, with conservation sites run by the Government and non-governmental organizations (NGOs) alike. However, many of them are under much less threat than the Southern Cardamom ecosystem or receive additional funding from governments or donors. They generally do not have access to financial returns from project activities. Wildlife Alliance, a project partner in the SCRP, has been performing conservation activities within the project boundary since 2002. Furthermore, the area has not historically attracted significant attention from conservation NGOs, and donor funding has been unsustainable and inconsistent over the long term, which has limited the expansion Project activities to the scale required to stop ecosystem conversion. There is no other sustainable source of funding available at the scale required to support the necessary protection activities outside of VCS AFOLU program. Therefore, while this scenario is plausible, we do not believe it is credible. Funds from the sale of emissions reductions garnered by the REDD+ Project will be instrumental

in the development of an independent, long-term sustainable revenue stream. This will in turn support Project activities that protect the Project Area and expand WA's reach to additional communities.

iii. Activities like the proposed Project activity on at least part of the land within the project boundary of the proposed VCS AFOLU project at a rate from legal requirements;

The entirety of the Project Area is owned by the Royal Government of Cambodia and administered by the RGC's Ministry of Environment, the Project Proponent. The land within the Project Area is under legal protection with a legal requirement to perform activities similar to the proposed project activities, i.e. conserve the forest and protect it from deforestation and degradation activities. Prior to the declaration of the Southern Cardamom National Park in May 2016, the majority of the Project Area was non-protected permanent forest reserve managed by the Forestry Administration. And while much of the wider Southern Cardamom Landscape, and the rest of the Project Zone, has been protected under national legislation and managed for conservation purposes over a longer period it has still undergone significant forest degradation and deforestation over the last 10 years. This is largely due to a lack of funding for MOE and Forestry Administration, who used to manage the site, limiting their ability to enforce the forest boundaries and patrol the areas to stop the unsustainable activities that lead to forest degradation and deforestation. The primary source of revenue for the protection of the forest has been Wildlife Alliance's funding and the general budget allocation of the Ministry of Environment through the national budget. All areas under the Ministry of Environment's jurisdiction (>6,000,000 hectares of Protected Areas plus additional Conservation Corridors, Souter et al. 2016) must compete for the limited funds available to support their protection, leaving most underfunded.

PDR.99 A list of alternative land use scenarios to the project

iv. Below is a list of the potential alternative land-use scenarios that have been identified for the Project Area. These differ from the pre-project land use and are based on identified deforestation agents and drivers.

- Slash and burn agriculture
- Illegal logging
- Smallholder agroforestry
- Smallholder farming

The drivers of deforestation are still present because of the opportunity cost of the most profitable alternative land-use, mixed vegetable farming, is 652% more profitable than if the forests of the SCRP are left standing. This analysis was conducted as part of the non-permanence risk report opportunity cost assessment.

Sub-step 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The scenarios listed above that were found to be credible (i and iii) are consistent under enforced applicable laws and regulations. These However, both do include elements (illegal logging and forest land conversion) which are not consistent with the laws and regulations of protected areas. Scenario iv is additionally comprised of 4 alternative land use scenarios that are not consistent with mandatory applicable legislation, which requires conservation of the Project Area as natural forest. However, despite being illegal, these land use scenarios are consistent with common practice for this region and for

Cambodia at large. Local expert knowledge, historical satellite imagery and WA's enforcement data document that these illegal activities have been commonly occurring in the regions around the Project Area, despite being illegal, especially in the time before WA began their activities in the area.

Forest degradation and deforestation are major threats to all land units in the Project Area, despite the presence of official legal protection. In addition to slash and burn agriculture, tree harvesting for firewood and timber from state-owned lands are illegal under Cambodian Law. There is considerable evidence that the boundaries of many Cambodian forested areas and protected areas are not enforced, and furthermore that there is a substantial amount of uncontrolled access into protected areas that leads to their conversion (i.e. Seima Protection Forest REDD+ Monitoring and Implementation Report; http://database.v-c-s.org/sites/v-c-s.org/files/CCB_IMP_REP_C0047_29Apr16.pdf). This gap in enforcement is largely caused by a lack of funding, limiting MOE's ability to patrol the forested area with enough frequency and efficacy to deter forest conversion activities, as detailed in the above section Sub-Step 1a. An analysis of the land cover / land use in Koh Kong province, in which the Project Area is located, showed that greater than 40% of the land area has been converted to agriculture or for development. This study showed that conversion to agriculture is a prevalent scenario in this area, and further demonstrates that land use laws and regulations are systematically ignored.

Even though some of the above listed land use scenarios, none of the above have been removed from consideration even though some are not in compliance with applicable laws and regulations. As discussed above, there is a general and systematic lack of enforcement of these applicable laws and regulations regarding the conservation of forests in Cambodia.

Sub-step 1c. Selection of the baseline scenario:

PDR.100 Justification for the selected baseline scenario. This justification can include expert knowledge, results from the participatory rural appraisal and ex-ante estimates of avoided emissions

VM0009, 'Methodology for Avoided Ecosystem Conversion' v3 provides a step-wise approach for selecting the most plausible baseline scenario. For the SCRP, this was determined to be slash and burn agriculture. This is a result of the fact that with the lack of grant and donor funding, the pre-project conservation efforts would not be plausible. Thus, in the absence of REDD+ funding, WA would be unable to maintain their current level of financial, logistical and managerial support to the protection of the forest in the Project Area. There is continual evidence of encroachment into the Project Area, demonstrating the level of threat. That there has not been more significant loss of the project area over the last 15 years to deforestation and forest degradation is primarily due to the work of Wildlife Alliance. The surrounding areas, including additional protected areas, have seen significant levels of ecosystem conversion from forest to agriculture, demonstrating that slash and burn agriculture is the primary driver of unplanned ecosystem conversion in this region, and it therefore the identified scenario that would occur in the absence of a REDD+ project.

Step 2. Investment analysis

PDR.101 An investment or barriers analysis proving that the project is not the most economical option.

Sub-step 2a. Determine appropriate analysis method

The SCRP, a VCS AFOLU project, generates no financial or economic benefits other than VCS-related income derived from the sale of carbon credits. Therefore, simple cost analysis (Option I) applies.

Sub-step 2b. Apply simple cost analysis

The proposed project activities are not revenue-generating (other than VCS-related carbon income) and the physical protection of the Project Area and provision of deforestation mitigation activities are projected to cost the Project Proponent and Project partner WA an average of $5,150,000 USD per annum. There exists no significant income from other Project Activities or other sources from the land to offset these costs. In the absence of active protection, both physical, and that created by collaborating with the communities to create new economic alternatives, it is evident that the land in the Project Area would be cleared aggressively for subsistence agricultural and land speculation purposes. This is observed throughout the Project Zone currently. Slash and burn subsistence agriculture faces no economic barriers and is therefore clearly identified as the most likely land use in the baseline (without-project) scenario.

Step 4. Common Practice Analysis

PDR.102 A common practice analysis including a list of project activities and the drivers of conversion that they address.

While some of the Project Activities in the SCRP have been attempted, or in some cases implemented by the Project partner WA in portions of the Project Area (notably forest patrols and protection, Community Based Ecotourism, and agricultural intensification), they were funded by WA. Wildlife Alliance's forest protection activities have been extremely successful at protecting the Project Area. However, the cost of the activities are unsustainable for Wildlife Alliance to continue in the absence of a new, consistent source of funding. The SCRP aims to utilize the revenue from emission reduction sales to provide a sustainable, consistent source of funding with which to maintain WA's protection activities and increase the number and size of project activities and their geographic influence. The SCRP will operate Project activities throughout the entirety of the Project Zone, and work to engage communities and address the agents and drivers of deforestation and degradation across this incredibly important landscape. It is common practice to protect forests in Cambodia, and to provide sustainable development support for rural Cambodian communities, but that common practice is typically funded by governments or donor agencies, and not by financial return from Project activities. There are 3 existing REDD+ projects in Cambodia; two are operating on lands under the jurisdiction of the Forestry Administration and operated by the FA (Oddar Meanchey REDD+ Project and the Tumring REDD+ Project), and the third is under the jurisdiction of MoE and operated by MoOE (Reduced Emissions from Deforestation and Degradation in Keo Seima Wildlife Sanctuary). However, these projects represent a distant minority of the forested land in Cambodia, and are still in the early stages of their operation. In the case of the SCRP, the funding provided by VER sales will be used to continue a proven and successful forest protection program with a sustainable source of funding, and provide viable economic alternatives for local communities, reducing their need for unsustainable extraction of natural resources.

PDR.103 Evident compliance with the minimum requirements of the aforementioned VCS tool. This evidence may be the same as the evidence provided to meet reporting requirements listed in section 4.

The Project Proponent has demonstrated that the project complies with the applicability conditions of the methodology (see Section 3.1). Further, the Project Proponent has demonstrated that the SCRP complies with all applicable local and national laws (see Section 2.5). Finally, the method for determining the

baseline scenario (described in section 3.1.4) is consistent with that prescribed in VM0009 methodology version 3.0. Thus, the Project Proponent has fully complied with the minimum requirements of the VCS demonstration of Project additionality.

3.1.6 Methodology Deviations

Activity-Shifting Leakage Area

The SCRP deviates from VM0009 v3.0, Section 8.3.2.1 "Delineating the Activity-Shifting Leakage Area". The delineation of the Activity-Shifting Leakage Area utilized the MOE forest cover 2015 map as its primary landcover map. However, the map contained certain areas of "no-data" in areas of non-forest, which were filled in with the MOE 2010 forest cover map. In performing spot checks, we noticed some small areas that were determined to have been converted between 2010 and 2015 that cannot be delineated using said maps. The activity-shifting leakage area therefore does not technically conform to the criteria in the first paragraph of VM0009 v3.0, Section 8.3.2.1, which states "As of the project start date, the activity-shifting leakage area must be entirely unconverted (ie, in a forest or native grassland state) …". The activity-shifting leakage area has been delineated to include these small identified areas of conversion, thus deviating from the criteria stated in Section 8.3.2.1 and, by extension, PDR.108, which requires proof that the activity-shifting leakage area is in an "entirely non-converted state".

The activity-shifting leakage area's purpose is to provide a boundary for the placement of leakage plots. The plots are required to be in unconverted areas. If a leakage plot is found to fall in a converted area, presumably due to an error in the land cover classification used to delineate the activity-shifting leakage area (errors of omission or commission are common in remote sensing, and no land cover map is 100% accurate), that plot is moved in a spatially random manner to an area that is unconverted. Small errors in land cover identification in the activity-shifting leakage area is therefore inconsequential to the calculation of emissions from activity-shifting leakage and, by extension, the deviation will not negatively impact the conservativeness of the quantification of GHG emission reductions or removals.

The deviation relates only to the activity-shifting leakage area, represented by $\boldsymbol{A}_{ASL}$, a variable available at validation. The deviation does not relate to any other part of the methodology, VM0009 v3.0.

Market Leakage Determination

The SCRP deviates from the VCS module VM0037 "Global Commodity Leakage Module: Production Approach" in several ways. These deviations have no material impact on the market leakage calculation. The first two deviations concern section 5.1.2. Due to limited data availability, a single year of baseline commodity yields have been used in place of an average of the annual commodity yield from each year of the historical reference period. While the single yield value used for each commodity may not be fully representative of the entire historical reference period, it is the best available data source for an accurate and applicable commodity yield. This is considered conservative, as the commodity yield value both determines the total quantity in tonnes of the commodity displaced by the project and the area of forest elsewhere in the country required to replace the displaced commodity production. Therefore, the actual value used for commodities yield has a negligible effect on the final quantification of market leakage from the Project.

For the commodity yield data on saw-logs, the yield has been presented in units of m^3/ha, instead of the units of t/ha as required by the module. This is a more standard presentation of a saw-log yield, and there

is no quantitative impact on the calculation of leakage by this deviation. Additionally, in the determination of the yield for saw-logs, no growth rate for the yield was used. This was done because the yield for saw logs would not be expected to increase over time, as these are naturally occurring forests with no active management. Therefore, there is no effect of improved methods or technology which would lead to an increase in yields. These deviations have little to no effect on calculation of emissions from market leakage, as the module calculates leakage from commodities. As stated above with the commodity yield data, for the saw-log commodity, the same yield value is used to determine the total quantity of the commodity displaced and to then determine the amount of area required to replace the lost supply. Therefore, despite using these alternative units for the yield, the end calculation is mathematically identical as it would be if yield was converted from m^3/ha to tonnes/ha.

Lastly, in section 5.4, the module states that where a monitoring period covers multiple years, equation 14 should be employed for each year included in the period. We calculated a single leakage value that encompassed the 3 monitoring period years. This deviation has no quantitative impact, and only deviates from the quantification method, where the parameter t in the market leakage module was set to the full monitoring period, calculating 1 value for market leakage covering the 3-year monitoring period. The module requires calculation of market leakage independently for each year in the monitoring period and then to sum the results. These two methods result in mathematically the same result if the exact same time period is used for each method.

Given the fact that the deviations described above are either immaterial to or have no impact on the quantitative market leakage results, the deviation can by extension be shown to have no effect on the conservativeness of the calculation of emissions from market leakage. The deviation relates only to the criteria and procedures for the monitoring or measurement of market leakage, represented by $E_{L\,ME}^{[m]}$, one of the parameters monitored and calculated via equation [F.51]. The deviation does not relate to any other part of the methodology, VM0009 v3.0, or the market leakage module VMD0037.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

As described above in Section 3.1.4.3, a jurisdictional reference level was calculated using national FRL activity data and project-level emission factors. The justification for this choice is also described above in Section 3.1.4.3. The method applied uses the emissions calculation approach for forest conversion stated in the IPCC 2006 guidelines, which multiplies activity data (A) by emission factors (EF) to achieve the FRL.

FRL = Activity Data (A) × Emission Factor (EF)

3.2.1.1 Calculating Baseline Emissions from Biomass

Historical emission estimates were developed based on the national FRL activity data from 2006 to 2014. Annual CO2 Emissions and Removals (tCO2e / year) are calculated by the following equation;

$$\Delta C_B = \frac{(C\ t_2\ -\ C\ t_1)}{(\ t_2\ -\ \ t_1)}$$

$$\Delta CO_2 = \Delta C_B \times \frac{44}{12}$$

where;

ΔC_B = annual change in carbon stocks in biomass (the sum of above-ground and below-ground biomass) in land remaining in the same category (e.g., Forest Land Remaining Forest Land), tonnes C yr-1

$C\ t_2$ = total carbon in biomass for each land sub-category at time t_2 ; tonnes C $C\ t_1$= total carbon in biomass for each land sub-category at time t_1; tonnes C $C\ t$ (Total Emission) = Activity Data (A) × Emission Factor (EF)

44/12: Molecular weight ratio of carbon dioxide to carbon (IPCC, 2006)

3.2.1.2 Calculating Carbon Not Decayed in DW

The SCRP does not include planned forest harvesting in the baseline scenario. Therefore, the deadwood carbon pool has been conservatively excluded from Project carbon accounting.

3.2.1.3 Calculating Carbon Not Decayed in BGB

The SCRP applied a jurisdictional reference level. A BGB decay model therefore does not apply.

3.2.2 Project Emissions

3.2.2.1 Calculating Emissions from Changes in Project Stocks

PDR.122 Summary of sampling procedures for the project accounting areas, with a copy of a sampling protocol used to carry out measurements.

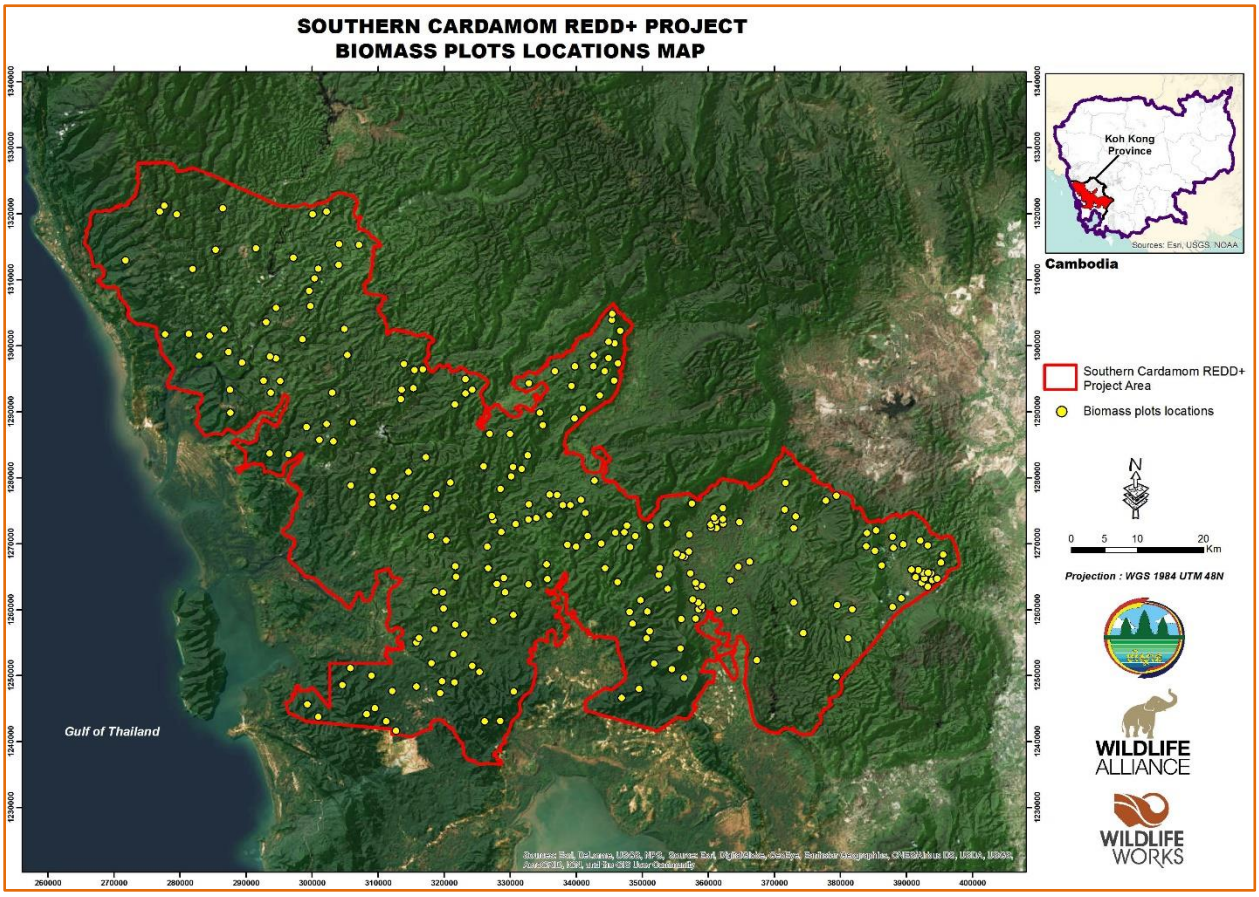
To accurately estimate the biomass in the Project Area, a *stratification analysis* is done based on the different land cover types present. Random sample plots are generated for and placed within each of the strata to account for variance within each stratum. The number of sample plots needed to meet the uncertainty and error requirements of the VM0009 are determined using equation [B.2]. The UTM coordinates associated with the plots are generated using a geo-referenced map and then distributed to the field crews. Extra plots are often generated for each stratum in the event that some of the original plots are not accessible due to slope, terrain, rivers, landslides, ravines and other such environmental issues.

Sampling procedures are described in detail in the document 'Standard Operating Procedure Cardamoms - Forest Inventory v2_20180628', provided as Annex 5 with this document. While this document has been provided to the auditor for review, it is not publicly available due to the proprietary knowledge within. A summary of the procedures is provided as follows:

A nested circular sample plot design was used for the SCRP. The larger plot has a radius of 15 m and the smaller a radius of 5 m. Trees are measured in the larger plot and shrubs in the smaller. The minimum diameter for considering an individual plant as a tree for the SCRP is 10 cm diameter measured at 1.3 m above the ground (DBH). All smaller woody plants are considered shrubs.

The SOP provides a checklist for plot sample teams to ensure full preparedness before initiating any work. Sample teams then navigate to the coordinates of the plot center using a GPS device. If the team is establishing a new sample plot, then a monument is to be driven into the ground to permanently mark the plot center. If the team is remeasuring an existing plot than the center monument must be found. The

SOP describes several methods to help discover the monument. Sample plot teams must navigate to the original plot center coordinates as provided by project management, there are only a few instances for team safety or other reasons in which a team may move a plot center or abandon a plot location, this process is described in detail in the SOP. The sample plot locations for the SCRP are shown in Figure 12



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Once the plot center has been established, all shrubs within the 5 m plot must be counted. Shrubs are counted in 3 size ranges, small, medium and large. The SOP describes these classifications in detail. Next, all trees are measured within the 15 m large plot. The primary measurement taken for each tree is diameter at breast height (DBH), which is defined as 1.3 m above ground. Due to environmental constraints on tree morphology, the DBH location may be moved up or down on the tree bole. The SOP provides a detailed decision tree to help determine DBH measurement height. Standing dead trees and lying dead trees are both excluded from measurement. All tree measurements are recorded on site on the data collection sheet. The team leader is responsible for quality assurance of tree measurements and data recording and must monitor and check the work of the team as needed.

100% of the Biomass plots must be re-measured every five years. Biomass plot locations are depicted below in Figure 12. The procedures used for locating and sampling biomass sample plots can be found in Annex 5 – 'Standard Operating Procedure Cardamoms - Forest Inventory v2_20180628'. Changes in project carbon stocks are calculated as the difference in project stocks in each stratum between the current and prior monitoring periods, as determined from in-situ measurement of biomass plots:

$$A_{PAA}\left(c_P^{[m-1]} - c_P^{[m]}\right)$$

Carbon stocks that are lost to burning, wood products, and leakage are accounted for using the procedures and equations listed below.

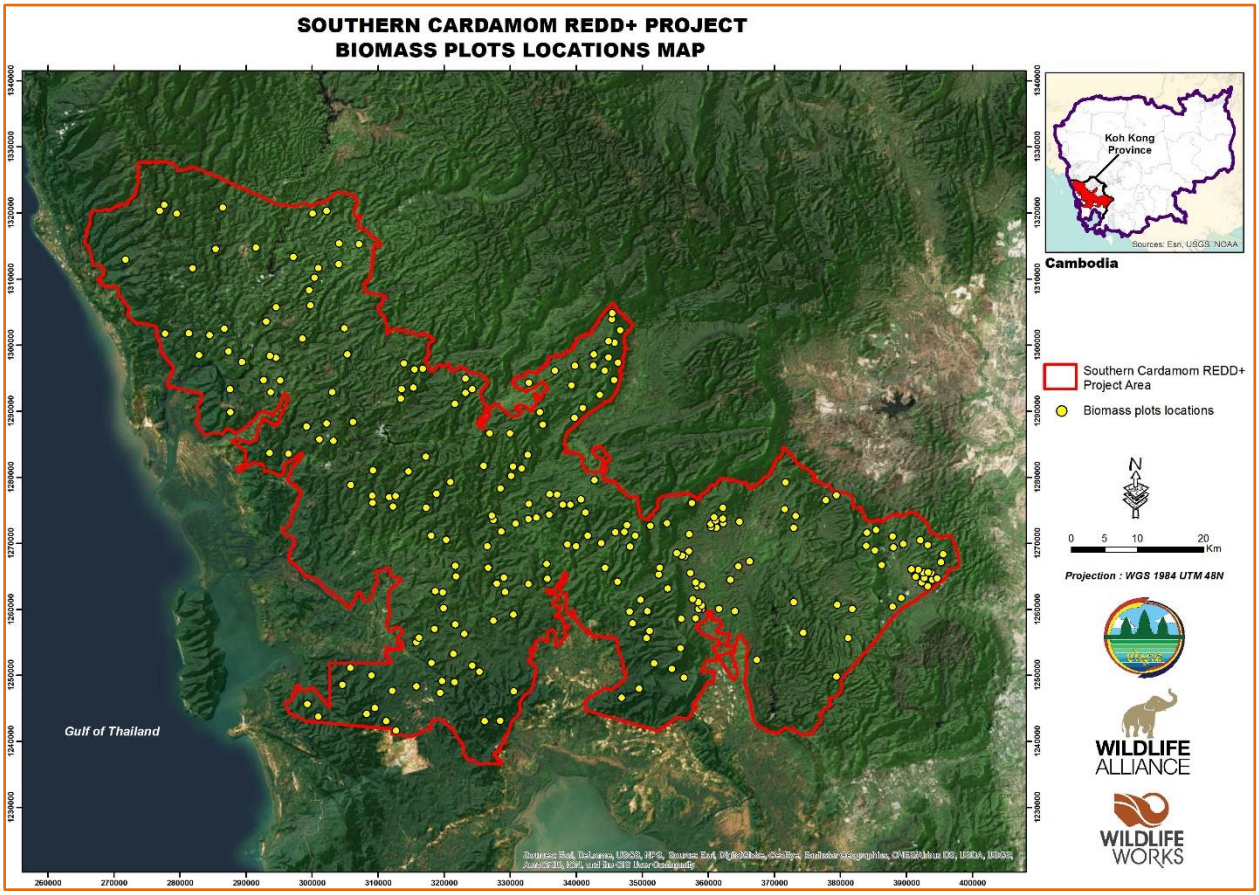


Figure 12 Biomass sample plot locations in the Southern Cardamom REDD+ Project

3.2.2.2 Calculating Emissions from Burning

Currently, no planned project activities involve the burning of biomass burning in any manner. As such, emissions from burning are not included in carbon accounting. However, if future project activities should include this emission type, project emissions from burning of biomass shall be calculated using equation [F.42] in VM0009 methodology v3.0.

3.2.3 Leakage

PDR.104 A list of project activities designed to mitigate leakage.

Risk of Project leakage will be minimized by several Project activities designed to provide improved agricultural methods and yields, diversification of and implementation of new income generating activities.

These activities will reduce the potential risk of conversion shifting to areas outside of the Project Area. For a comprehensive and detailed list of all Project Activities please refer to Section 2.1.11. A brief overview of the significant Project Activities is provided below:

Table 17: Brief Overview of leakage mitigation strategies in the Southern Cardamom REDD+ Project.

Leakage Management Activity	Description
Improved and Intensified Agriculture	Training will be provided to the communities on the methods and best practices involved in conservation agriculture. This program will aim to increase yields on existing farms and decrease the rate of land conversion. It will also build and support produce storage facilities and value-added technologies to take advantage of market price fluctuations and aid in achieving high sale prices.
Employment of a Ranger Force	This Project will hire and equip a ranger force that provides direct protection of the land from conversion. This force acts as a deterrent to the conversion of the project area but also a powerful outreach tool to the local communities, providing assistance with wildlife issues and information.
Tree Nurseries	The Project will establish multiple tree nurseries in key locations. The nurseries buy seedlings from community members who participate in an out-growing scheme. The seedlings are nurtured in greenhouses, before being planted in degraded areas and on area farms.
Education	The Project will provide several programs to improve the access to and quality of education for youth in the communities. This includes providing school bursaries and scholarships and the construction of actual school buildings.
Alternative-Income Generation	The Project has several programs to help develop new income generating activities for members of the communities in the Project Area. This includes a variety of individual activities such as promoting and supporting beekeeping, crafts and jewelry, and
Micro-finance schemes	The Project will use best-practice in micro-finance to enhance community member's access to capital and markets. This will include micro-loans, micro insurance and other small and medium development practices (SME).
Eco-Charcoal Training	Wildlife Works will utilize its extensive experience in the establishment and operation of an eco-charcoal program to train local community members. These community members will then be supported in the establishment of their own eco-charcoal programs.

3.2.3.1 Activity-Shifting Leakage

3.2.3.1.1 Delineation of Activity-Shifting Leakage Area

PDR.105 A map of the delineated boundaries.

Activity shifting leakage, as described in detail by PDR 107 below, is measured in the activity shifting leakage area, which is shown below:

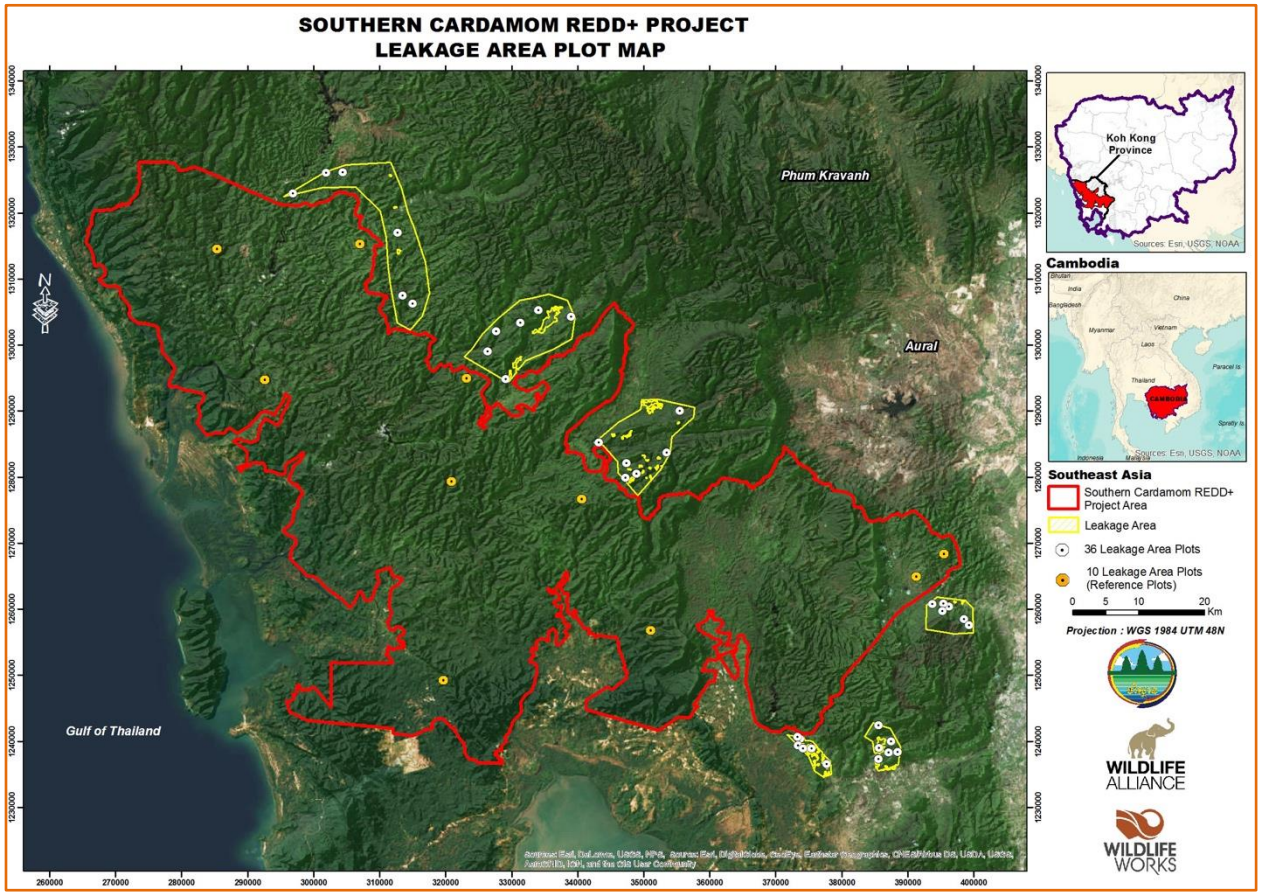


Figure 13: The leakage area for the Southern Cardamom REDD+ Project is shown. The leakage area sample plot locations are also shown.

PDR.106 Maps of the landscape configuration, including:

a. Topography (elevation, slope, aspect);

Please see Appendix D. 'Map of Activity-Shifting Leakage Areas Landscape Configuration'. The map of the leakage area in this appendix depicts a digital elevation map of the leakage areas (DEM), a map of the leakage areas slopes' and a map of the leakage areas' aspects.

b. Recent land use and land cover (either a thematic map created by the project proponent or publicly available map);

Please see Appendix D. 'Map of Activity-Shifting Leakage Areas Land cover and Soil class'.

c. Access points;

Please see Appendix D. 'Map of Activity-Shifting Leakage Area's Infrastructure' for a map of the primary points of access for the Leakage Areas.

d. Soil class maps (if available);

Please see Appendix D. 'Map of Activity-Shifting Leakage Areas Land cover and Soil class'.

e. Locations of important markets;

Please see Appendix D. 'Map of Activity-Shifting Leakage Area's Infrastructure' for a map of the important markets in the Leakage Areas.

f. Locations of important resources like waterways or roads; and

Please see Appendix D. 'Map of Activity-Shifting Leakage Area's Infrastructure' for a map of important resources in the Leakage Areas.

g. Land ownership/tenure boundaries.

Please see Appendix D. 'Map of Activity Shifting Leakage Area's Infrastructure' for a map of the landownership/land tenure boundaries in the Leakage Areas.

PDR.107 A narrative describing the rationale for selection of activity-shifting leakage area boundaries. If the activity-shifting leakage area is smaller than the project accounting area or cannot be defined, justification for the size of the area. If foreign agents have been identified as an agent of conversion, justification that they are unlikely to shift their activities outside the activity-shifting leakage area.

Areas near the Project Area were examined using recent high-resolution imagery from Google Earth and Bing Maps. The closest appropriate regions to the Project Area that met VCS activity shifting leakage area requirements were selected. In the interest of conservativeness, it was confirmed that the identified leakage areas were as readily accessible as the Project Area to the agents of conversion and also of similar land tenure. This is to ensure that any conversion that is potentially displaced from the Project Area is captured through the sampling of the activity-shifting leakage area. A land cover stratification was then used to confirm that the selected activity-shifting leakage area contains as much forest as the PAA. It was additionally confirmed, using geospatial analysis, that the leakage areas are similar to the Project Area in landscape configuration such as elevation, slope and proximity to infrastructure and settlements.

PDR.108 Results of a spatial analysis to demonstrate the activity-shifting leakage area is entirely in a non-converted state (e.g. forested or native grassland) as of the project start date.

The leakage area for the PAA was selected to include only areas that are currently forested. The MOE land cover dataset from 2014 was first used to select areas that met the criteria for the leakage area. More recent medium and high-resolution imagery was then utilized to confirm that the leakage area does not contain any areas of conversion. Please refer to Appendix D for maps demonstrating and cover within the selected leakage areas.

PDR.109 Results of a spatial analysis to demonstrate the activity-shifting leakage area is no larger than the project accounting area.

Areas of both the leakage area and PAA were calculated in GIS, and the leakage area is confirmed to be less than that of the PAA. The leakage area is 43,883 ha, while the Project Accounting Area is 442,871 ha.

Table 18: Results of spatial analysis to demonstrate validity of the leakage areas

Activity shifting leakage area	Leakage area (ha)	PAA (ha)
Forest	43,883	442,870.85

3.2.3.1.2 The Leakage Emissions Model

Activity shifting leakage is estimated by empirical, in-situ observation of sample points in the activity shifting leakage areas for evidence of conversion and forest degradation. They are used to estimate the cumulative emissions from activity shifting leakage for each monitoring period per equations [F.46] and [F.47] from VM0009 v3.0 using the Leakage Emissions Model (LEM). The LEM is normally parameterized using equations [F.48] and [F.49], utilizing the ($\boldsymbol{\alpha}$, $\boldsymbol{\beta}$ and $\boldsymbol{\theta}$) parameters from the BEM (VM0009 section 6.8). This is done when the BEM is applied at the Project level. Because the SCRP uses a nationally submitted FREL, starting at the second monitoring period. $\boldsymbol{\alpha}$, $\boldsymbol{\beta}$ and $\boldsymbol{\theta}$ shall be calculated with the nationally determined activity data (deforestation rate) substituted into the BEM model, thus allowing for the calculation of activity-shifting leakage for future monitoring periods.

3.2.3.1.3 Sampling Conversion and Forest Degradation to Build the Leakage Model

PDR.124 Summary of sampling procedures for the activity-shifting leakage areas, with a copy of a sampling protocol used to carry out measurements.

Forest degradation is sampled in the activity shifting leakage area by empirical, in-situ observation of sample plots. The sample design utilized is a simple random sample of 36 leakage area plots activity shifting leakage areas. Please see Figure 13 for a delineation of the leakage area and the locations of the plots. The procedures used for locating and sampling the activity shifting leakage Areas are found in Annex 7 – 'Standard Operating Procedure_Densiometer Forest Leakage v4_02112016'.

The goal of sampling leakage plots is to collect unbiased and statistically accurate data on forest degradation corresponding to leakage surrounding a REDD+ project. The SCRP utilizes a leakage sampling SOP that is designed for dense humid forests and is in accordance with the VCS methodology VM0009. The SOP utilizes randomly located, large sized plots with sampling across the area of the plot will capture the incidences of degradation typical to dense humid forest.

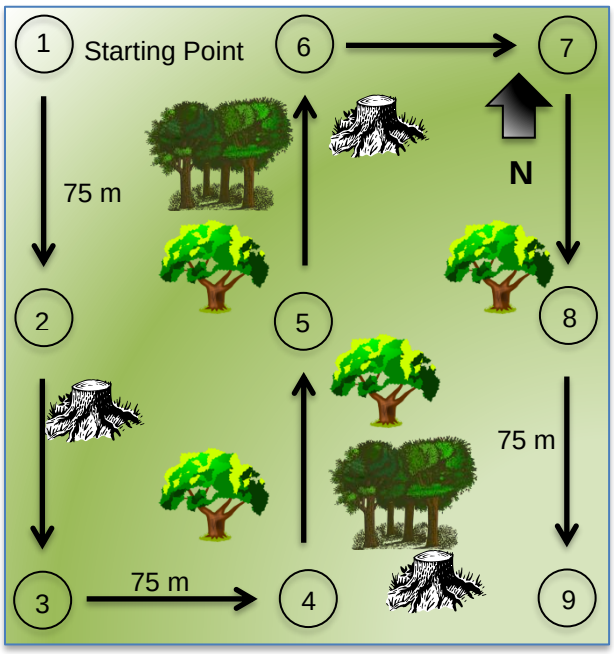


Figure 14: Diagram of the leakage plot, showing transects and sample locations where densiometer readings will be taken.

The leakage sampling team is provided by the project management with a randomly generated GPS coordinate for each leakage plot. The GPS point given is the northwest corner of an approximately 2.25 ha square plot (150m x 150m). The plot sample data sheet contains the coordinates of nine points within the leakage plot. Please see Figure 14 for a diagram of the leakage plot. The leakage sample team will use their GPS device to navigate to each of the nine points for data collection. Forest canopy cover is measured at each of the nine points using a densiometer and recorded as the percentage of canopy coverage using the instructions in section 2 and 3 of the SOP. This process involves observing each of the 24 grid squares on the densiometer, and mentally subdividing each grid cell on the densiometer into four smaller points, and then counting the number of points in which canopy openings are visible. This results in a count of the number of points out a total of 96 points in which light is more predominate than tree canopy. This number is then corrected to 100% by multiplying by 1.04, to give a percent of canopy cover.

Leakage plots are observed a priori to confirm that each plot begins in a non-converted state and that its location is appropriate with respect to the agents and drivers in the project baseline scenario. The leakage plots are then re-measured at each monitoring event. The plots are not marked in anyway so that they cannot be targeted to corrupt or skew the leakage emissions estimation. A decrease in the measured tree canopy cover at rate greater than that predicted by the leakage model is assumed to be the result of leakage from the Project Area. The leakage model is discussed in sections 3.2.3.1.2 and 3.2.3.1.4.

3.2.3.1.4 Fitting the Leakage Model

The Leakage Emissions Model is dictated by the VCS methodology VM0009 v3 equation [F.48] for the Forest PAA. This model estimates cumulative carbon emissions from activity shifting leakage based on the conversion parameters α, and β and field measurements in the leakage areas.

Where equation [F.48] is:

$$LEM_F(c_P, c_B, p_{L\,DEG}, t, x) = p_{L\,DEG}^{[m]} A_{AS}(c_P - c_B) - \frac{A_{AS}(c_P - c_B)}{1 + e^{\ln\left(\frac{1}{p_{L\,DEG}^{[m=0]}} - 1\right) - \beta t - \boldsymbol{\theta}(\boldsymbol{x}_0 - \boldsymbol{x})^T}}$$

The parameter $p_{L\,DEG}^{[m]}$ is estimated at least once every five years from measurements taken in-situ within the PAA Leakage area. The Standard Operating Procedure (SOP) used for estimating these parameters is given in Annex 7 - 'Standard Operating Procedure_Densiometer Forest Leakage v4_02112016'.

3.2.3.2 Market Leakage

Market leakage can occur if a project reduces the supply of market goods, such as timber, relative to the baseline. As described in Section 2.1.1, the most likely baseline scenario is conversion of forest to agriculture. This agriculture is primarily subsistence, with little production remaining beyond household consumption. Food security is a serious issue, as discussed in Section 4.1.1, in the Project Zone. Without the Project, there would be increasing demand for land and continued low productivity of agricultural production, crop failures from droughts, fluctuation of crop price and few alternatives for income generating activities available to local communities. Given that the agents and drivers generally practice commercial farming, the Project may result in a net reduction in agricultural production. The VCS Tool, VMD0037 Global Commodity Leakage Module: Production Approach (LM-P) was used to determine the market effects leakage resulting from the SCRP. This tool estimates the amount of commodity production potentially impacted by the Project and calculates a global commodity leakage deduction expressed as a percentage. The tool uses the area of the Project and common crops grown in the region and the stock of harvestable timber present to estimate a potential forgone commodity production caused by the Project Activity. The Tool achieves this by using the planted area of the primary agricultural crops in the jurisdiction in which the Project Area is located and the timber stock present in the Project Area in relation to the quantity of timber produced nationally to determine the potential of forgone production that may cause an increased supply elsewhere in the country through the deforestation of land. This tool was parameterized using a *variety of data sources.* This includes Project information included in this report for Project Area and carbon stocks. Public data sources were used to determine the total area of forest and agricultural land in Cambodia, primary crops in Koh Kong province, their yield, and the total area in which these crops are planted within Koh Kong province, and nationally. Data on the primary crops grown in Koh Kong province, and the total area planted of these crops Koh Kong province and nationally was obtained from The Census of Agriculture in Cambodia 2013 (NIS, 2015). The crop yield values for the primary crops grown in Koh Kong province were obtained from the report Cambodian Agriculture in Transition: Opportunities and Risks (World Bank, 2015). The quantity of timber in the Project Area was determined from the Project's forest inventory. Values for the volume of timber harvested in Cambodia were obtained from the FAO Forest Resource Assessment for Cambodia and FAOSTAT (FAO, 2015 and FAOSTAT, 2018).

3.2.4 Net GHG Emission Reductions and Removals

The process used to calculate the net GHG emission reductions resulting from the SCRP project activity is described below. Please see section 3.3.1 and 0 for a description of each parameter listed below and its value.

3.2.4.1 Quantification of project carbon stocks

At each monitoring event following the first, the Project's carbon stock is reassessed according to the guidance of VM0009 v3, which requires that all biomass plots are remeasured a minimum of once every five years. The Project plans to remeasure a subset of biomass plots at each monitoring event, pro-rated such that at the end of each five-year period, 100% have been remeasured. Carbon stock for the PAA is calculated using equation [F.17] from the methodology.

$$C_{p\,BM}^{[m]} = \sum_{b \in \mathcal{B}} C_{p\,b}^{[m]}$$

This equation is used for each of the selected carbon pools for the project.

3.2.4.2 Quantification of carbon stocks for the baseline scenario

The carbon stock for the proxy area is then calculated using equation [F.18] from the methodology VM0009 v3.0.

$$C_{B\,BM}^{[m]} = \sum_{b \in \mathcal{B}} C_{B\,b}^{[m]}$$

This equation is used for each of the selected carbon pools for the project.

3.2.4.3 Quantifying Baseline Emissions

As the SCRP is utilizing a jurisdictional reference level, the BEM as described in section 8.1.1. in the VCS methodology VM0009 v3.0 was not utilized for the quantification of baseline emissions. The SCRP quantified the baseline emission reductions for the Project's single PAA using the following equations and procedures.

To calculate the Project's baseline emission reductions, the process described in section 3.2.1 was utilized. The SCRP has a U3 baseline type and would otherwise be required to use equation [F.21]. However, as Cambodia's national FREL was used to calculate the baseline, that equation is not being used. Annual baseline emission reductions are calculated as follows:

$$E_{\mathrm{B\,BM}}^{[m]} = RL \cdot \left(\left(c_{p\,BM}^{[m]} - c_{B\,BM}^{[m]}\right) \cdot A_{PAA}\right) \cdot \left(\frac{t^{[m]} - t^{[m-1]}}{365}\right)$$

where

RL = The national Cambodian deforestation rate per year (%/yr)

$c_{p\,BM}^{[m]}$ = Average project carbon stock in biomass at the end of the current monitoring period (tCO2e/ha)

$c_{B\,BM}^{[m]}$ = Average baseline carbon stock in biomass at the end of the current monitoring period (tCO2e/ha)

A_{PAA} = Area of the Project Accounting Area (ha)

$t^{[m]}$ = Current monitoring period end date (days)

$t^{[m-1]}$ = Current monitoring period start date (days)

An example calculation follows:

$$E_{\mathrm{B\,BM}}^{[m]} = 2.38\%/yr \cdot \left(\left(425.31\frac{tCO2e}{ha} - 1.6\frac{tCO2e}{ha}\right) \cdot 442{,}871\ ha\right) \cdot (3\ yrs)$$

$$E_{B\,BM}^{[m]} = 13{,}384{,}794\ t\ CO_2e$$

Equation [F.16] from VM0009 v3.0 was used to determine cumulative baseline emissions for the monitoring period.

$$E_{\mathrm{B}}^{[m]} = E_{\mathrm{B\,BM}}^{[m]} + E_{\mathrm{B\,SOC}}^{[m]} - C_{B\,SOC}^{[m]} - C_{B\,BGB}^{[m]} - C_{B\,DW}^{[m]} - C_{B\,WP}^{[m]}$$

where

$E_{B\,BM}^{[m]}$ = Cumulative baseline emissions from biomass (tCO_2e)

$E_{B\,SOC}^{[m]}$ = Cumulative emissions from soil organic carbon (tCO_2e)

$C_{B\,SOC}^{[m]}$ = Carbon not decayed in soil organic carbon (SOC) at the end of the current monitoring period (tCO_2e)

$C_{B\,BGB}^{[m]}$ = Carbon not decayed in belowground biomass (BGB) at the end of the current monitoring period (tCO_2e)

$C_{B\,DW}^{[m]}$ = Carbon not decayed in deadwood (DW) at the end of the current monitoring period (tCO_2e)

$C_{B\,WP}^{[m]}$ = Carbon not decayed in long-lived wood products (WP) at the end of the current monitoring period (tCO_2e)

An example calculation follows:

$$E_{B}^{[m]} = (13{,}384{,}794 + 0 - 0 - 0 - 0 - 0)tCO2e = 13{,}384{,}794\ tCO2e$$

Baseline emissions for the current monitoring period (i.e. net change in carbon stock) are then calculated according to equation [F.15]

$$E_{B\,\Delta}^{[m]} = E_{B}^{[m]} - E_{B}^{[m-1]}$$

the results of which are passed to the risk of reversal tool to determine the buffer contribution.

An example calculation follows:

$$E_{B\,\Delta}^{[m1]} = (13{,}384{,}794 - 0)tCO2e = 13{,}384{,}794\ tCO2e$$

As the soil organic carbon pool, deadwood and wood products are not included as carbon pools in the SCRP, these parameters are set to zero in the above equation. Additionally, as decay models are not

required to be used for the SCRP in order to conform to the carbon pools and carbon accounting in the FREL, those parameters are also set to zero in the above equation. The annual total baseline emissions are therefore equal to the baseline emissions from biomass.

3.2.4.4 Determining Reversals or Project Emission

A Project reversal can occur if during any monitoring period throughout the project crediting period, quantified gross emission reductions (GERs) are negative (as a result of a carbon stock loss). The procedure for identifying Project reversals within the SCRP meets all VCS procedures and requirements as listed in the VCS methodology VM0009 v3. Please refer to Annex 6 – 'Disturbance Monitoring Standard Operating Procedure' for a detailed description of the monitoring methods proposed to identify any potential significant conversion events within the Project Area, and subsequently quantify emissions from any potential Project disturbance / reversal.

3.2.4.5 Determining Reversals as a Result of Baseline Re-evaluation

If a reversal occurs due to a baseline re-evaluation, the Project Proponent shall document the cause of reversal, quantify the emissions from the reversal and supply all supporting data for the in the respective monitoring report, following all guidance and requirements from section 8.4.2.1 in the VCS methodology VM0009 v3.0.

NERs are calculated for the Project Accounting Area for each monitoring event.

3.2.4.6 Determining Leakage Deductions

Leakage resulting from the project activity, including market and activity-shifting leakage, is quantified using the methods and equations included in section 3.2.3. Equation [F.45] is then used to determine the cumulative emissions from leakage, both market and activity-shifting.

$$E_{\mathrm{L}}^{[m]} = E_{\mathrm{L\,ASF}}^{[m]} + E_{\mathrm{L\,ASG}}^{[m]} + E_{\mathrm{L\,L\,ME}}^{[m]}$$

The SCRP does not include a grassland stratum or PAA, therefore the term $E_{\mathrm{L\,ASG}}^{[m]}$has been set to zero. Equation [F.44] is then used to determine the total emissions from leakage for the current monitoring period.

$$E_{\mathrm{L}\,\Delta}^{[m]} = E_{\mathrm{L}}^{[m]} - E_{\mathrm{L}}^{[m-1]}$$

3.2.4.7 Determining Deductions for Uncertainty

A potential confidence deduction is determined from NERs, based on a linear combination of the weighted standard errors associated with estimates from baseline emission models and carbon stock measurements from the Project Area and Proxy Area. Equation [F.57] from the methodology VCS VM0009 v3.0 is used to calculate the confidence deduction, if any, to be applied to Project NERs. Confidence deductions are documented for each monitoring event for each PAA.

$$E_{U}^{[m]} = E_{B\,\Delta}^{[m]} \left[\frac{1.64}{E_{B\,\Delta}^{[m]} + A_{PAA} c_{P}^{[m]} + A_{PX} c_{B}^{[m]}} \sqrt{\left(U_{EM}^{[M]}\right)^2 + \left(U_{P}^{[m]}\right)^2 + \left(U_{B}^{[m]}\right)^2} - 0.15 \right]$$

where:

$c_P^{[m]}$ is total measured carbon stock in the project accounting area;

$c_B^{[m]}$ is total proxy area carbon stock;

$\boldsymbol{E_{B\,\Delta}^{[m]}}$ is total baseline emissions;

$\boldsymbol{U_{EM}^{[M]}}$ is the total uncertainty for the baseline emissions model (BEM), set to zero;

$\boldsymbol{U_B^{[m]}}$ is the total uncertainty in the proxy area;

$\boldsymbol{U_P^{[m]}}$ is the total uncertainty in the project accounting area;

A_{PAA} is the area of the project accounting area

A_{PX} is the area of the proxy area.

An example calculation follows:

$$E_U^{[m1]} = 13{,}384{,}794\ tCO2e \left[\frac{1.64}{13{,}384{,}794\ tCO2e + 442{,}871\ ha \cdot 425.31 \frac{tCO2e}{ha} + 27{,}717.7\ ha \cdot 1.61\ tCO2e/ha} \sqrt{(0)^2 + (6{,}759{,}396\ tCO2e)^2 + (30{,}921\ tCO2e)^2} - 0.15 \right] = 0$$

3.2.4.8 Quantifying Gross Emission Reductions for the PAA

Gross emission reductions are calculated for the single PAA in the SCRP using equation [F.53].

$$E_{\Delta\,\mathrm{GER}}^{[m]} = E_{\mathrm{B}\,\Delta}^{[m]} + E_{\mathrm{P}\,\Delta}^{[m]} - E_{\mathrm{L}\,\Delta}^{[m]} - E_{\mathrm{U}}^{[m]}$$

An example calculation follows:

$$E_{\Delta\,GER}^{[m1]} = 13{,}384{,}794\ tCO2e + 0 - 99{,}181\ tCO2e - 0 = 13{,}285{,}613\ tCO2e$$

Equation [F.54] is then used to calculate the cumulative GERs to date.

$$E_{\mathrm{GER}}^{[m]} = \sum_{i \in M} E_{\Delta\,\mathrm{GER}}^{[i]}$$

An example calculation follows:

$$E_{\mathrm{GER}}^{[m]} = 13{,}285{,}613\ tCO2e - 0 = 13{,}285{,}613\ tCO2e$$

3.2.4.9 Determining Buffer Account Allocation

The quantity of NERs to be allocated to the VCS buffer account is determined at each monitoring event for the Project using the VCS AFOLU Tool for Non-Permanence Risk and Buffer Determination. The Project Proponent used this tool to assess all relevant risks to the SCRP from natural, economic and management sources. It was determined that the overall risk level is moderate. Many risks can be

minimized through the efficacy of Project Activities, community outreach, involvement in Project design and operation and experienced management. The collective group of the Project Proponent, project partner and supporting organizations combined have extensive experience in the design and operation of REDD+ projects and Jurisdictional REDD+ approaches. These experiences will be drawn upon to mitigate potential risks to the SCRP throughout the Project's lifetime.

Non-permanence risk assessment for the SCRP was performed using the VCS Non-Permanence Risk Tool v3.2 and Risk Report Calculation Tool v3.0. Please refer to Annex 16 – 'Non-Permanence Risk Tool'.

3.2.4.10 Quantifying Net Emission Reductions for the PAA

Annual net emission reductions (NERs) for the Project are calculated for each PAA by subtracting the VCS buffer pool allocation from the GERs using equation [F.55] from the methodology VM0009 v3.0.

$$E_{\Delta\, NER}^{[m]} = E_{\Delta\, GER}^{[m]} - E_{BA}^{[m]}$$

An example calculation follows:

$$E_{\Delta\, NER}^{[m1]} = 13{,}285{,}613\ tCO2e - 1{,}338{,}479\ tCO2e = 11{,}947{,}133\ tCO2e$$

3.2.4.11 Quantifying Net Emission Reductions Across PAAs

There is only a single PAA in the SCRP. NERs are calculated for this PAA, and this is the same as the total NERs for the Project, for each monitoring period.

To calculate the cumulative NERs to date, equation [F.56].

$$E_{\mathrm{NER}}^{[m]} = \sum_{i \in M} E_{\Delta\, \mathrm{NER}}^{[i]}$$

An example calculation follows:

$$E_{\mathrm{NER}}^{[m1]} = 11{,}947{,}133\ tCO2e$$

3.2.4.12 Ex-Ante Estimation of NERs (CL2.2)

Ex-Ante NERs are calculated for the Project Accounting Area according to the guidance and process detailed in various sections above. Please refer to Annex 12 – 'NER Worksheet-Forest PAA' detailed NER calculations. The Ex-Ante NERs presented here are based on an initial ecosystem inventory performed on the two PAAs. All parameter values have been identified at the time of validation. Ex-ante estimates for NERs are assumed to be conservative, as they fail to consider additional emission reductions due to forest growth within the Project Accounting Areas or further degradation within the proxy area(s).

In the case when *ex-ante* estimates are used to prove the significance of emissions sources or estimate the quantity of NERs over the project crediting period, the project description must include the following:

PDR. 118 The projected avoided baseline emissions, project emissions and leakage for each monitoring period and vintage year over the lifetime of the project.

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
2015	4,461,598	0	33,060	3,982,378
2016	4,461,598	0	33,060	3,982,378
2017	4,461,598	0	33,060	3,982,378
2018	4,461,598	0	479,220	3,536,218
2019	4,461,598	0	479,220	3,536,218
2020	4,461,598	0	479,220	3,536,218
2021	4,461,598	0	479,220	3,536,218
2022	4,461,598	0	479,220	3,536,218
2023	4,461,598	0	479,220	3,536,218
2024	4,461,598	0	479,220	3,536,218
2025	4,461,598	0	479,220	3,536,218
2026	4,461,598	0	479,220	3,536,218
2027	4,461,598	0	479,220	3,536,218
2028	4,461,598	0	479,220	3,536,218
2029	4,461,598	0	479,220	3,536,218
2030	4,461,598	0	479,220	3,536,218
2031	4,461,598	0	479,220	3,536,218
2032	4,461,598	0	479,220	3,536,218
2033	4,461,598	0	479,220	3,536,218
2034	4,461,598	0	479,220	3,536,218
2035	4,461,598	0	479,220	3,536,218
2036	4,461,598	0	479,220	3,536,218
2037	4,461,598	0	479,220	3,536,218
2038	4,461,598	0	479,220	3,536,218
2039	4,461,598	0	479,220	3,536,218
2040	4,461,598	0	479,220	3,536,218
2041	4,461,598	0	479,220	3,536,218
2042	4,461,598	0	479,220	3,536,218
2043	4,461,598	0	479,220	3,536,218

2044	4,461,598	0	479,220	3,536,218
Total	133,847,938	0	13,038,124	107,425,020

PDR.119 A narrative description of sources used to estimate the leakage rate and demonstration that the estimated rate is conservative.

Activity shifting leakage areas for the Project Accounting Area were delineated as part of the Project development process. All Project activities detailed in the above sections are designed to mitigate potential Project leakage. The Project Proponent contends that there will be little to no leakage associated with the Project, due to their extensive prior experience working with communities and project stakeholders to mitigate leakage. However, in the absence of actual measurements of potential leakage or any precedent in this area for the estimation of ex-ante leakage emissions, a conservative estimate of an 10% annual leakage rate has been applied for the purposes of ex-ante NER estimates. This estimate Is derived based on the extensive REDD+ experience of Wildlife Works. They utilized their Kasigau Corridor Phase I and II REDD+ Projects, which have both been in operation for over 8 years and verified 4 time as examples of potential leakage from Projects. Although these projects are located in Africa, and have very different ecosystems and community social dynamics, they provide the best examples of a successfully operated REDD+ project available. The SCRP additionally has been designed in a similar manner as the Kasigau Corridor Projects. These projects have continually enjoyed leakage rates under 10%. We conclude that that an 10% Ex-ante estimate for activity-shifting leakage represents a fair and conservative estimate for the SCRP.

The market leakage rate was determined using the process described in Section 3.2.3.2. This was done in accordance with the methodology VM0009 and VCS guidance using the VCS tool VMD0037 Global Commodity Leakage Module: Production Approach (LM-P). This tool uses the planted area of the primary agricultural crops in the jurisdiction in which the Project Area is located and potential volume of timber that would have been cut to estimate potential emissions from the market leakage of those crops and timber. Public data sources were used to determine the primary crops in Koh Kong province, their yield, and the total area in which these crops are planted within Koh Kong province, and nationally. Public data sources were also used to determine the total timber production in Cambodia and forest area, while the volume of timber in the PA was determined from the Project's forest inventory. Data on the primary crops grown in Koh Kong province, and the total area planted of these crops in Koh Kong province and nationally was obtained from The Census of Agriculture in Cambodia 2013 (NIS, 2015). The crop yield values for the primary crops grown in Koh Kong province were obtained from the report Cambodian Agriculture in Transition: Opportunities and Risks (World Bank, 2015). The quantity of timber in the Project Area was determined from the Project's forest inventory. Values for the volume of timber harvested in Cambodia were obtained from the FAO Forest Resource Assessment for Cambodia and FAOSTAT (FAO, 2015 and FAOSTAT, 2018).

The VCS tool calculates a leakage deduction as a percent for a Project based on the procedures and inputs cited above. For this tool public sources of data or values measured in the Project Area were utilized for all inputs, providing a high degree of accuracy in this analysis. Where an input was unknown, conservative estimates were always used. The conservative assumptions that were made are that 100% of the Project Area would be converted to agriculture and 100% of the trees in the Project would be harvested for timber in the baseline scenario. Additionally, to calculate the volume of standing timber in

the Project Area, due to limitations in the data available, it was assumed that 100% of the estimated height of the tree was harvestable timber and that the bole did not contain any taper.

The market leakage deduction calculated by this tool is 0.74%. We believe that this is an accurate estimate of market leakage calculated by an approved VCS tool using Cambodia and Project specific parameters, and therefore meets the principles of conservatism.

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

PDR.121 The value for each variable in the Methodology VM0009 Appendix G

Data Unit / Parameter:	**RL**
Data unit:	%
Description:	The annual reference deforestation rate for Cambodia
Source of data:	Reference area and historic reference period
Value applied:	2.38
Justification of choice of data or description of measurement methods and procedures applied:	Data source is the Royal Government of Cambodia Ministry of Environment submission to the UNFCCC technical committee (Ministry of Environment, 2016)
Purpose of Data:	Determination of baseline scenario
Any comment:	Based on Cambodian national forest reference emission level (FREL) data.

Data Unit / Parameter:	α
Data unit:	unitless
Description:	Effect of time on the cumulative proportion of conversion over time for the Project Accounting Area
Source of data:	Reference area and historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not Used

Data Unit / Parameter:	β
Data unit:	unitless
Description:	Effect of time on the cumulative proportion of conversion over time for the Project Accounting Area

Source of data:	Reference area and historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not Used

Data Unit / Parameter:	γ
Data unit:	days
Description:	Time shift from beginning of historic reference period to project start date
Source of data:	Historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not Used

Data Unit / Parameter:	θ
Data unit:	unitless
Description:	Effect of certain covariates on the cumulative proportion of conversion over time
Source of data:	Reference area and historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	λ_{soc}
Data unit:	proportion (unitless)
Description:	Exponential soil carbon decay parameter
Source of data:	Value from the literature. Davidson, E., and Ackerman, I. 1993. Changes in soil carbon inventories following cultivation of previously untilled soils. Biogeochemistry, 20(3), 161-193.
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	Soil Carbon is not an included carbon pool.
Purpose of Data:	Determination of baseline emissions
Any comment:	Parameter not Used

Data Unit / Parameter:	$\widehat{\sigma}_{EM}$
Data unit:	standard deviation (unitless)
Description:	The estimated standard deviation of the state observations used to fit the logistic function for the Project Accounting Area BEM
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	As the BEM is not used for the determination of the baseline scenario this parameter cannot be calculated.
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not Used

Data Unit / Parameter:	$\mathcal{B}$
Data unit:	set
Description:	The set of all selected carbon pools in biomass. Is a subset of $\mathcal{C}$
Source of data:	PD
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	$\mathcal{C}$
Data unit:	set
Description:	The set of all selected carbon pools
Source of data:	Monitoring records
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{I}$
Data unit:	set
Description:	The set of all observations of conversion. When superscripted with a monitoring period, the conversion observations are taken for leakage analysis.
Source of data:	Remote sensing image interpretation or field observations in the leakage area.
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of baseline emissions
Any comment:	Parameter not Used as the BEM is not used, and leakage monitoring does not utilize remote sensing methods.

Data Unit / Parameter:	$\mathcal{M}$
Data unit:	set
Description:	The set of all monitoring periods
Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{T}$
Data unit:	ha
Description:	The set of all species/categories of livestock

Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	A_{PAA}
Data unit:	ha
Description:	Area of Project Accounting Area
Source of data:	GIS analysis prior to sampling
Value applied:	442,870.85
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	A_{PX}
Data unit:	ha
Description:	Area of proxy area for the Project Accounting Area
Source of data:	GIS analysis prior to sampling
Value applied:	27,717.7
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	A_{ASL}

Data unit:	ha
Description:	Area of the Activity-Shifting Leakage Area
Source of data:	GIS / remote sensing analysis prior to sampling
Value applied:	43,883
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedure "Annex 07 - Standard Operating Procedure_Densiometer Forest Leakage v4_02112016". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Boundary for placement of activity-shifting leakage plots
Any comment:	Immaterial to measurement of emissions from activity-shifting leakage.

Data Unit / Parameter:	$c_{L\,p}$
Data unit:	tCO_2e/ha
Description:	Carbon stocks in project leakage area
Source of data:	Leakage area sampling
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Calculation of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	$f_{LS\,i}$
Data unit:	kg CH_4 $head^{-1}$ yr^{-1}
Description:	Emission factor for the defined livestock population, i
Source of data:	IPCC default values
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Obtained directly from IPCC default values
Purpose of Data:	Determination of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	m
Data unit:	tCO_2e/ha
Description:	Average carbon in merchantable trees cut each year as a result of legally-sanctioned commercial logging
Source of data:	Timber harvest plans or measurement of carbon stocks in merchantable trees in the Project Accounting Area.
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the two data sources if both are available
Purpose of Data:	Determination of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	n_d
Data unit:	unitless
Description:	Number of spatial points in the Forest Project Accounting Area reference area
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Parameter not used as BEM was not used.
Any comment:	Parameter not used

Data Unit / Parameter:	o_i
Data unit:	unitless
Description:	State observation for the i^{th} sample point in the Project Accounting Area reference area
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of baseline emissions
Any comment:	Parameter not used as BEM was not used.

Data Unit / Parameter:	p_{LME}
Data unit:	unitless
Description:	Portion of leakage related to market

Source of data:	VCS methodology VM0009 Section 8.3.3
Value applied:	0.189
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Calculation of leakage
Any comment:	

Data Unit / Parameter:	q
Data unit:	days
Description:	Lag between start of degradation and conversion
Source of data:	Expert knowledge, results from the PRA or reports from peer-reviewed literature
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	$r_{CF\,b}$
Data unit:	unitless
Description:	Carbon fraction of biomass for burned wood or herbaceous material b
Source of data:	Literature estimates or direct measurement
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	No burning of wood or herbaceous material in project
Purpose of Data:	Calculation of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	r_{RS}
Data unit:	unitless
Description:	Expansion factor for above-ground biomass to below-ground biomass (root/shoot ratio)

Source of data:	IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land, Table 4.4
Value applied:	0.37
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value for Tropical rainforest
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	r_U
Data unit:	unitless
Description:	Onset proportion of conversion immediately adjacent to project area
Source of data:	GIS analysis and image interpretation
Value applied:	19.06%
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.17 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	t
Data unit:	days
Description:	Time since project start date
Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used.

Data Unit / Parameter:	t_i
Data unit:	days
Description:	The point in time of the observation made at point i
Source of data:	Remote sensing image interpretation
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	t_{PA}
Data unit:	days
Description:	Time prior to the Project Start Date when the primary agent began commercial logging in the Project Accounting Area.
Source of data:	Harvest plans prepared for the Project Accounting Area, or by public record
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	t_m
Data unit:	days
Description:	Length of project or logging in baseline scenario
Source of data:	PD
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	t_{PL}
Data unit:	days
Description:	Length of project crediting period
Source of data:	PD
Value applied:	10,957
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.

Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	t_{PAI}
Data unit:	days
Description:	Number of days after the project start date for the start of a project activity instance in a grouped project
Source of data:	PD
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	w_i
Data unit:	unitless
Description:	weight applied to the i^{th} sample point in the Project Accounting Area reference area
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	x
Data unit:	unitless
Description:	Covariate values
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the data sources if both are available
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	x_i

Data unit:	geographic coordinates
Description:	Latitude of the i^{th} sample point
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	$\boldsymbol{x_o}$
Data unit:	unitless
Description:	Covariate values as of the project start date
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the data sources if both are available
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	$\boldsymbol{x_{SA}}$
Data unit:	unitless
Description:	Covariate values as of the arrival of the secondary agents
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the data sources if both are available
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	$\boldsymbol{y_i}$
Data unit:	geographic coordinates
Description:	Longitude of the i^{th} sample point
Source of data:	Remote sensing image interpretation
Value applied:	N/A

Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	$y_{j,t}$
Data unit:	tonne / ha
Description:	Yield for non-aromatic rice
Source of data:	Literature
Value applied:	3.117
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	$y_{j,t}$
Data unit:	tonne / ha
Description:	Yield for maize
Source of data:	Cambodian Agriculture in Transition: Opportunities and Risks. Economic and Sector Work, Report no 96308-KH
Value applied:	4.414
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	$y_{j,t}$
Data unit:	tonne / ha
Description:	Yield for pumpkins (value for vegetables used)
Source of data:	Cambodian Agriculture in Transition: Opportunities and Risks. Economic and Sector Work, Report no 96308-KH
Value applied:	7.597
Justification of choice of data or description of	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was

measurement methods and procedures applied:	responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	$y_{j,t}$
Data unit:	m^3 / ha
Description:	Yield for sawlogs
Source of data:	Forest Degradation in Cambodia: An Assessment of Monitoring Options in the Central Cardamom Protected Forest. Halperin and Turner (2013)
Value applied:	525
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	$\boldsymbol{H}$
Data unit:	Number
Description:	Number of historical reference years
Source of data:	Jurisdictional program description or based on data availability
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied:	The project's historical reference period is 2006-2014. The commodity yield data sources were limited to that of 2012 and 2013. Justification of the accuracy and conservativeness of this data has been provided to the auditor.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	r_j
Data unit:	%
Description:	Annual percent increase in yield
Source of data:	VCS VMD0037 Global Commodity Leakage Module: Production Approach
Value applied:	2.5

Justification of choice of data or description of measurement methods and procedures applied:	This parameter is the default value for the annual percent increase in yield for a country. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	PD_j
Data unit:	%
Description:	Percent of area where deforestation was avoided that would have been used for production of non-aromatic rice
Source of data:	Census of Agriculture in Cambodia 2013, National Institute of Statistics, Ministry of Planning in Collaboration with Ministry of Agriculture, Forestry and Fisheries
Value applied:	95
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	PD_j
Data unit:	%
Description:	Percent of area where deforestation was avoided that would have been used for production of maize
Source of data:	Census of Agriculture in Cambodia 2013, National Institute of Statistics, Ministry of Planning in Collaboration with Ministry of Agriculture, Forestry and Fisheries
Value applied:	3
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	PD_j
Data unit:	%
Description:	Percent of area where deforestation was avoided that would have been used for production of pumpkins
Source of data:	Census of Agriculture in Cambodia 2013, National Institute of Statistics, Ministry of Planning in Collaboration with Ministry of Agriculture, Forestry and Fisheries
Value applied:	2
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the World Bank and Royal Government of Cambodia. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	PD_j
Data unit:	%
Description:	Percent of area where deforestation was avoided that would have been used for production of sawlogs
Source of data:	Conservative estimate based on expert knowledge
Value applied:	100
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using a conservative estimate based on the expert knowledge of the Project partners. Wildlife Works was responsible for gathering this parameter from the literature. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	$\boldsymbol{IS}$
Data unit:	%
Description:	Proportion of leakage resulting in increased supply outside the jurisdiction
Source of data:	VCS Global Leakage Module VMD0037 Default value
Value applied:	75

Justification of choice of data or description of measurement methods and procedures applied:	This parameter is the default value as required by the VCS Global Leakage module VMD0037. For background information on the default value see Appendix 2.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	NL
Data unit:	%
Description:	Proportion of increased supply coming from new land brought into production
Source of data:	VCS Global Leakage Module VMD0037 Default value
Value applied:	40
Justification of choice of data or description of measurement methods and procedures applied:	This parameter is the default value as required by the VCS Global Leakage module VMD0037. For background information on the default value see Appendix 2.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	NLD
Data unit:	%
Description:	Proportion of new land brought into agricultural production resulting in deforestation
Source of data:	VCS Global Leakage Module VMD0037 Default value
Value applied:	100
Justification of choice of data or description of measurement methods and procedures applied:	This parameter is the default value as required by the VCS Global Leakage module VMD0037. For background information on the default value see Appendix 2.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	d_d
Data unit:	ha
Description:	Cambodia area of deforestation 2006-2014
Source of data:	Data source is the Royal Government of Cambodia Ministry of Environment submission to the UNFCCC technical committee (Ministry of Environment, 2016)
Value applied:	2,319,087
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the Royal Government of Cambodia. Wildlife Works was responsible for the measurement. All measurements were made during 2017

	and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	g_d
Data unit:	ha
Description:	Global deforestation 2006-2014
Source of data:	FAOSTAT, Food and Agriculture Organization
Value applied:	93,666,489.50
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the FAO Stat data service. Wildlife Works was responsible for gathering this parameter from the online database. All measurements were made from the period 1961 to 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	d_{cs}
Data unit:	Tonnes C
Description:	Cambodia at-risk Carbon stock
Source of data:	Data source is the Royal Government of Cambodia Ministry of Environment submission to the UNFCCC technical committee (Ministry of Environment, 2016)
Value applied:	193,796,061.55
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the Royal Government of Cambodia. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	g_{cs}
Data unit:	Tonnes C
Description:	Global at-risk Carbon stock
Source of data:	FAOSTAT, Food and Agriculture Organization
Value applied:	8,273,299,406.45
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was calculated using data from the FAO Stat data service. Wildlife Works was responsible for gathering this parameter from the online database. All measurements were made from the period 1961 to 2018. Accuracy level achieved is good, and is associated with the quality of the

Purpose of Data:	Calculation of Leakage
Any comment:	

Data Unit / Parameter:	R_d
Data unit:	ha
Description:	Cambodia area in other REDD+ Projects
Source of data:	The relevant Project Documents for each REDD+ project
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of Leakage
Any comment:	Parameter not used, conservative default from VMD0037 used

Data Unit / Parameter:	R_{cs}
Data unit:	Tonnes C
Description:	Cambodia carbon stock in other REDD+ Projects
Source of data:	The relevant Project Documents for each REDD+ project
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of Leakage
Any comment:	Parameter not used, conservative default from VMD0037 used

3.3.2 Data and Parameters Monitored

Data Unit / Parameter:	$\mathcal{W}^{[m]}$
Data unit:	set
Description:	The set of all burned wood or herbaceous material
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	$A_{B\,\Delta\,PAA}^{[m]}$
Data unit:	ha
Description:	Area of avoided conversion
Source of data:	Generated from equation
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.3.3.4
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	Equation [F.52]
Any comment:	Parameter not used as BEM was not used

Data Unit / Parameter:	$A_{P\,1}^{[m=0]}$
Data unit:	ha
Description:	Area of Project Accounting Area stratum 1 prior to first verification event – Evergreen Forest
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the limits of Arc GIS software and quality of the shapefiles.
Frequency of monitoring/recording:	First monitoring period

Value applied:	425,078
Monitoring equipment:	Computer with ArcGIS software
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of data:	Calculation of baseline emissions
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$A_{P\,2}^{[m=0]}$
Data unit:	ha
Description:	Area of Project Accounting Area stratum 2 prior to first verification event – Deciduous Forest
Source of data:	GIS analysis prior to sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 section 6.2. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the limits of Arc GIS software and quality of the shapefiles.
Frequency of monitoring/recording:	First monitoring period
Value applied:	17,793
Monitoring equipment:	Computer with ArcGIS software
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 and the VCS standard. This includes a review of the GIS products and visual assessments of the accuracy of the shapefiles.
Purpose of data:	Calculation of baseline emissions
Calculation method:	GIS analysis
Any comment:	

Data Unit / Parameter:	$B_b^{[m]}$
Data unit:	tonnes
Description:	Biomass in burned wood or herbaceous material b
Source of data:	Measurements of biomass
Description of measurement methods	Scale

and procedures to be applied:	
Frequency of monitoring/recording:	Every monitoring period
Value applied:	
Monitoring equipment:	Equipment list in Annex 1
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Summation
Any comment:	Parameter not Used, no biomass burning in project

Data Unit / Parameter:	$c_B^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline carbon stocks at the end of the current monitoring period for the Project Accounting Area
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Section 6.4 and Appendix B.4 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1.61
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [B.33]

Any comment:	

Data Unit / Parameter:	$C_{B\,BGB}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in BGB at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every monitoring period
Value applied:	
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.32]
Any comment:	Parameter not included as decay models are not used to align with the FREL carbon accounting methods.

Data Unit / Parameter:	$C_{B\,DW}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in DW at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Section 8.1.6
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records

Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.36]
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{B\,SOC}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in SOC at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.5
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Subtraction
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{B\,WP}^{[m]}$
Data unit:	tCO_2e
Description:	Carbon not decayed in WP at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix C
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [C.1]
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{B\,AGMT}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline carbon stocks in above-ground merchantable trees at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Appendix B.2.1
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Weighted per ha average
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{B\,BGMT}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline carbon stocks in below-ground merchantable trees at the end of the current monitoring period
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Appendix B.2.1
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A

Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Weighted per ha average
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{P\,AGMT}^{[m=0]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in above-ground merchantable trees at project start
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Appendix B.2.1
Frequency of monitoring/recording:	At project start
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Summation across plots
Any comment:	Carbon pool not included

Data Unit / Parameter:	$C_{P\,BGMT}^{[m=0]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in below-ground merchantable trees at project start
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Appendix B.2.3
Frequency of monitoring/recording:	At project start

Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Summation across plots
Any comment:	Carbon pool not included

Data Unit / Parameter:	$c_{B\,b}^{[m]}$
Data unit:	tCO_2e / ha
Description:	Baseline scenario average carbon stock in selected carbon pools
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Baseline revision
Value applied:	See Annex 11 – Carbon Inventory – Proxy Area
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [B.33] and [B.34]
Any comment:	

Data Unit / Parameter:	$c_{B\,BM}^{[m]}$
Data unit:	tCO_2e / ha

Description:	Baseline carbon stocks in biomass at the end of the current monitoring period for the Project Accounting Area
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.1.1.1 and Appendix B.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1.61
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.18]
Any comment:	

Data Unit / Parameter:	$C_{B\,SOC}^{[m]}$
Data unit:	tCO_2e/ha
Description:	Baseline soil carbon stocks at the end of the current monitoring period for the Forest Project Accounting Area
Source of data:	Proxy area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 v3 Appendix B.2.6
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.32]
Any comment:	Carbon pool not included in project

Data Unit / Parameter:	$c_P^{[m]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks at the end of the current monitoring period for the Forest Project Accounting Area
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	425.31
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure 1 v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [B.33] and [B.34]
Any comment:	

Data Unit / Parameter:	$c_P^{[m-1]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks at the beginning of the current monitoring period

Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	425.31
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [B.33] and [B.34]
Any comment:	

Data Unit / Parameter:	$c_P^{[m=0]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks prior to first verification event for the Project Accounting Area
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.

Frequency of monitoring/recording:	Every monitoring period
Value applied:	425.31
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [B.33] and [B.34]
Any comment:	

Data Unit / Parameter:	$c_{P\,1\,BM}^{[m=0]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks in biomass in Project Accounting Area stratum 1 at project start – Evergreen Forest
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	431.45
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.23]

Any comment:	

Data Unit / Parameter:	$C_{P\ 2\ BM}^{[m=0]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks in biomass in the Project Accounting Area stratum 2 at project start – Deciduous Forest
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	285.38
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.23]
Any comment:	

Data Unit / Parameter:	$C_{P\ AGMT}^{[m=0]}$
Data unit:	tCO_2e / ha
Description:	Project carbon stocks in above-ground merchantable trees prior to first verification event
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix B.2

Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Average of plot measurements in a given stratum
Any comment:	Carbon pool not included

Data Unit / Parameter:	$c_{P\,BM}^{[m=0]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in biomass prior to first verification event
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	188,359,161.76
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.17]
Any comment:	

Data Unit / Parameter:	$c_{P\,b}^{[m]}$

Data unit:	tCO_2e / ha
Description:	Average carbon in biomass in the project accounting area
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	425.31
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [B.33] and [B.34]
Any comment:	

Data Unit / Parameter:	$C_{P\,SOC}^{[m=0]}$
Data unit:	tCO_2e/ha
Description:	Project soil carbon stocks prior to first verification event in the Forest Project Accounting Area
Source of data:	Project Accounting Area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix B.2.6
Frequency of monitoring/recording:	At Project Start
Value applied:	
Monitoring equipment:	Equipment list in Annex 18

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	Average of plot measurements in a given stratum
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$C_{P\Delta WP}^{[m]}$
Data unit:	tCO_2e
Description:	Project carbon stocks in wood products at the end of the current monitoring period
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix C
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [C.2]
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$E_{\Delta GER}^{[m]}$
Data unit:	tCO_2e
Description:	GERs for the current monitoring period
Source of data:	Equation [F.53]
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.4.1 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and

	2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	13,285,613
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of GER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.53]
Any comment:	

Data Unit / Parameter:	$E_{\Delta GER}^{[i]}$
Data unit:	tCO_2e
Description:	GERs for monitoring period i
Source of data:	Equation [F.53], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.4.1 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	13,285,613
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of GER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions

Calculation method:	Equation [F.53]
Any comment:	

Data Unit / Parameter:	$E_{\Delta NER}^{[i]}$
Data unit:	tCO_2e
Description:	NERs for monitoring period i
Source of data:	Equation [F.55], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.4.3 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	prior monitoring period
Value applied:	11,947,133
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of NER calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.55]
Any comment:	

Data Unit / Parameter:	$E_B^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions at the end of the current monitoring period
Source of data:	Equation [F.16], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.1 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms

	- Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	13,384,794
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.16]
Any comment:	

Data Unit / Parameter:	$E_B^{[m-1]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions at the beginning of the current monitoring period
Source of data:	Equation [F.16], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.1 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Prior monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations,

	monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.16]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta}^{[m]}$
Data unit:	tCO_2e
Description:	Change in baseline emissions
Source of data:	Equation [F.15], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.1 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	13,384,794
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.15]
Any comment:	

Data Unit / Parameter:	$E_{B\,\Delta\,BGB}^{[i]}$
Data unit:	tCO_2e
Description:	Change in baseline emissions from below-ground biomass during monitoring period i
Source of data:	Monitoring the proxy area

Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix B.2.3
Frequency of monitoring/recording:	Already Monitored
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.31]
Any comment:	Parameter not used as BGB decay models are not used.

Data Unit / Parameter:	$E_{B\,\Delta\,DW}^{[i]}$
Data unit:	tCO_2e
Description:	Baseline emissions from dead wood in monitoring period i
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Appendix B.2.4 and B.2.5
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.34]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,\Delta\,SOC}^{[m]}$
Data unit:	tCO2e
Description:	Baseline change in emissions from soil carbon
Source of data:	Measurements in the proxy area

Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.2.1, 8.1.2.2, 8.1.2.3 and Appendix B.2.6
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.26]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,\Delta\,SOC}^{[i]}$
Data unit:	tCO_2e
Description:	Baseline emissions from soil carbon in monitoring period i
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.2.1, 8.1.2.2, 8.1.2.3 and Appendix B.2.6
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.26]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,AGMT}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from above-ground commercial trees at the end of the current monitoring period

Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.6.1, 8.1.6.2, 8.1.6.3
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.37]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,BGB}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from below-ground biomass at the end of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.4
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.30]
Any comment:	Parameter not used as BGB decay models are not used

Data Unit / Parameter:	$E_{B\,BGB}^{[m-1]}$
Data unit:	tCO_2e

Description:	Cumulative baseline emissions from below-ground biomass at the beginning of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.4
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.30]
Any comment:	Parameter not used as BGB decay models are not used

Data Unit / Parameter:	$E_{B\,BM}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from biomass at the end of the current monitoring period
Source of data:	Equation [F.19], measurements in the PAA and Proxy Area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.1, 8.1.1.5.1 This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.1.1 and 8.1.1.5.1, and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Frequency of monitoring/recording:	13,384,794
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure

	Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.19]
Any comment:	

Data Unit / Parameter:	$E_{B\,DW}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from dead wood at the end of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.3
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.34]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,DW}^{[m-1]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from dead wood at the beginning of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.3
Frequency of monitoring/recording:	N/A

Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.34]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,SOC}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from soil carbon at the end of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.2.1, 8.1.2.2, 8.1.2.3
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.27]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{B\,SOC}^{[m-1]}$
Data unit:	tCO_2e
Description:	Cumulative baseline emissions from soil carbon at the end of the current monitoring period
Source of data:	Measurements in the proxy area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.2.1, 8.1.2.2, 8.1.2.3

Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.27]
Any comment:	Parameter not used as carbon pool is not included

Data Unit / Parameter:	$E_{BA}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative emissions allocated to the buffer account at the end of the current monitoring period
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.4.4 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1,338,479
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Multiplication
Any comment:	

Data Unit / Parameter:	$E_{L}^{[m]}$

Data unit:	tCO_2e
Description:	Cumulative emissions from leakage at the end of the current monitoring period
Source of data:	Measurements in the leakage area(s) and calculations
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3, the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage" or the VCS tool Global Commodity Leakage Module: Production Approach VMD0037. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	99,181
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured for comparison to initial sampling.
Purpose of data:	Calculation of leakage
Calculation method:	Equation [F.45]
Any comment:	

Data Unit / Parameter:	$E_L^{[m-1]}$
Data unit:	tCO_2e
Description:	Cumulative emissions from leakage at the beginning of the current monitoring period
Source of data:	Measurements in the leakage area(s) and calculations
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3, the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage" or the VCS tool Global Commodity Leakage Module: Production Approach VMD0037.

	Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Already monitored
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured for comparison to initial sampling.
Purpose of data:	Calculation of leakage
Calculation method:	Equation [F.45]
Any comment:	

Data Unit / Parameter:	$E_{L\Delta}^{[m]}$
Data unit:	tCO_2e
Description:	Change in emissions due to leakage
Source of data:	Measurements in the leakage area(s) and calculations
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3, the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage" or the VCS tool Global Commodity Leakage Module: Production Approach VMD0037. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	99,181
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured

	for comparison to initial sampling. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Purpose of data:	Calculation of leakage
Calculation method:	Equation [F.44]
Any comment:	

Data Unit / Parameter:	$E_{L\,AS\,F}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative emissions from activity-shifting leakage at the end of the current monitoring period
Source of data:	Measurements in the activity-shifting leakage area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3 and the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3 and the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018.
Purpose of data:	Calculation of leakage
Calculation method:	Equation [F.46]
Any comment:	

Data Unit / Parameter:	$E_{L\,ME}^{[m]}$
Data unit:	tCO_2e

Description:	Cumulative emissions from market leakage at the end of the current monitoring period
Source of data:	Global Commodity Leakage Module: Production Approach VMD0037
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.3, the SCRP's standard operating procedure "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage" or the VCS tool Global Commodity Leakage Module: Production Approach VMD0037. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	99,181
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations and monitoring records.
Purpose of data:	Calculation of leakage
Calculation method:	Equation [F.51]
Any comment:	

Data Unit / Parameter:	$E_{P\Delta}^{[m]}$
Data unit:	tCO_2e
Description:	Change in project emissions
Source of data:	Monitoring records for Forest Fire, Burning, logging, wood products, and natural disturbance events
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and

	2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of project emissions
Calculation method:	Equation [F.41]
Any comment:	

Data Unit / Parameter:	$E_{P\,\Delta BRN}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative project emissions due to burning at the end of the current monitoring period
Source of data:	Monitoring plots in the project
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 section 8.2.2 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations,

	monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of project emissions
Calculation method:	Equation [F.42]
Any comment:	

Data Unit / Parameter:	$E_{P\Delta LS}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative project emissions due to livestock grazing within the project area.
Source of data:	Monitoring in the project area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.2.4
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	Equation [F.43]
Any comment:	No livestock grazing in project area

Data Unit / Parameter:	$E_{P\Delta SF}^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative project emissions due to the use of synthetic fertilizers within the project area.
Source of data:	Monitoring in the project area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.2.5
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A

Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	CDM A/R methodological tool Estimation of direct and indirect (e.g. leaching and runoff) nitrous oxide emission from nitrogen fertilization
Any comment:	No synthetic fertilizer is used in project area

Data Unit / Parameter:	$E_U^{[m]}$
Data unit:	tCO_2e
Description:	Cumulative confidence deduction at the end of the current monitoring period
Source of data:	Equation [F.57]
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Section 8.4.1.1 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.57]
Any comment:	

Data Unit / Parameter:	$n_{LS\,i}$
Data unit:	count

Description:	The number of head of livestock species/ category i in the project area
Source of data:	Monitoring in the project area
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.2.4
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Use of literature or expert knowledge
Any comment:	Parameter not used

Data Unit / Parameter:	$p_{L\,DEG}^{[m]}$
Data unit:	proportion (unitless)
Description:	Portion of leakage due to degradation in forest at the end of the current monitoring period
Source of data:	Monitoring in the leakage area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Section 8.3.2.3 and B2.9, and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for

	errors and 5% of plots being remeasured and compared to initial sample.
Purpose of data:	Calculation of leakage
Calculation method:	Summation across leakage plots
Any comment:	

Data Unit / Parameter:	$p_{L\,DEG}^{[m=0]}$
Data unit:	tCO_2e
Description:	proportion (unitless)
Source of data:	Portion of leakage due to degradation prior to first verification event
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Section 8.3.2.3 and B2.9, and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms – Densiometer Forest Leakage". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	At project start
Value applied:	0
Monitoring equipment:	Equipment list in Annex 18
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample.
Purpose of data:	Calculation of leakage
Calculation method:	Summation across leakage plots
Any comment:	

Data Unit / Parameter:	$p_{SL}^{[m]}$
Data unit:	proportion (unitless)
Description:	Proportion of AGMT that is not merchantable and goes into slash estimated from inventory
Source of data:	Estimated from inventory

Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 8.1.6.3
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Conservatively used volume of a cone
Any comment:	Parameter not used, no commercial logging in project area

Data Unit / Parameter:	$t^{[i-1]}$
Data unit:	days
Description:	Time from project start date to beginning of monitoring period i
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Subtraction
Any comment:	

Data Unit / Parameter:	$t^{[m]}$
Data unit:	days
Description:	Time from project start date to end of current monitoring period
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1095
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure Cardamoms v1.6" This includes a review of calculations, monitoring records for errors.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Subtraction
Any comment:	

Data Unit / Parameter:	$t^{[m-1]}$
Data unit:	days
Description:	Time from project start date to beginning of current monitoring period
Source of data:	Monitoring records
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.2 and the SCRP's standard operating procedures. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	0

Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, “QA_QC Procedure Cardamoms v1.6” This includes a review of calculations, monitoring records for errors.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Subtraction
Any comment:	

Data Unit / Parameter:	$U_B^{[m]}$
Data unit:	tCO_2e / ha
Description:	Total uncertainty in proxy area carbon stock estimate
Source of data:	Equation [B.34] and field measurements in the Proxy Area
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP’s standard operating procedures “Standard Operating Procedure Cardamoms - Forest Inventory” and “Standard Operating Procedure Cardamoms – Proxy Area”. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	1.06
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, “QA_QC Procedure Cardamoms v1.6” This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [B.34]
Any comment:	

Data Unit / Parameter:	$U_{EM}^{[M]}$
Data unit:	tCO_2e

Description:	Total uncertainty in Baseline Emissions Models for the Project Accounting Area
Source of data:	N/A
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 6.8.10
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.14]
Any comment:	Parameter not used as BEM not used

Data Unit / Parameter:	$U_P^{[m]}$
Data unit:	tCO_2e / ha
Description:	Total uncertainty in the Project Accounting Area carbon stock estimate
Source of data:	Equation [B.34] and field measurements in the PAA
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v3 Appendix B.1.5 and the SCRP's standard operating procedures "Standard Operating Procedure Cardamoms - Forest Inventory" and "Standard Operating Procedure Cardamoms – Proxy Area". Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the field measurements and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	15.18
Monitoring equipment:	N/A
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 section B.5 and are outlined in the document, "QA_QC Procedure

	Cardamoms v1.6" This includes a review of monitoring records for errors and 5% of plots being remeasured and compared to initial sample with a t-test.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [B.34]
Any comment:	

Data Unit / Parameter:	$wc_{Pi}^{[m=o]}$
Data unit:	tCO_2e
Description:	Weighted average carbon stocks for biomass or SOC in the project for the set of selected strata
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Inventory or GIS
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	Parameter is not used

Data Unit / Parameter:	$x^{[m]}$
Data unit:	varies
Description:	Covariate values
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Description of measurement methods and procedures to be applied:	N/A

Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	d_t
Data unit:	ha
Description:	Area of avoided deforestation for monitoring period.
Source of data:	Data source is the Royal Government of Cambodia Ministry of Environment submission to the UNFCCC technical committee (Ministry of Environment, 2016)
Description of measurement methods and procedures to be applied:	This parameter was calculated using data from the Royal Government of Cambodia. Wildlife Works was responsible for the measurement. All measurements were made during 2017 and 2018. Accuracy level achieved is good, and is associated with the quality of the underlying data and calculations.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	31,590
Monitoring equipment:	Computer
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 and the VCS standard. This includes a review of the calculations and data used.
Purpose of data:	Calculation of leakage
Calculation method:	equation
Any comment:	

Data Unit / Parameter:	LM
Data unit:	tonnes
Description:	Leakage mitigation achieved by the jurisdictional program in terms of production of a given commodity

Source of data:	Agricultural production data from leakage mitigation projects implemented by the jurisdictional program or data on the reduction in the production demanded as generated by the jurisdictional program.
Description of measurement methods and procedures to be applied:	A jurisdictional program should measure the volume of production through agricultural records.
Frequency of monitoring/recording:	The data may be monitored once at the end of the monitoring period but should be reported on an annual basis.
Value applied:	0
Monitoring equipment:	Computer
QA/QC procedures to be applied:	QAQC procedures are in line with the requirements of VM0009 v3 and the VCS standard. This includes a review of the calculations and data used.
Purpose of data:	measurement
Calculation method:	Value from literature
Any comment:	Leakage mitigation is conservatively excluded

3.3.3 Monitoring Plan

A plan has been developed to monitor the SCRP's impact on its climate related objectives, namely the reduction in the emissions of CO_2e by reducing deforestation in the Project Area. The primary objective of the monitoring plan is to ensure accurate estimates of carbon stocks and carbon emission reductions from the REDD+ project over the crediting period of the project. The climate monitoring plan includes three primary monitoring activities that will be performed throughout the lifetime of the SCRP. These activities, and their frequency are shown in Table 19.

Table 19: The three primary monitoring activities, the frequency that they will be performed and the method to be used.

Activity	Frequency	Method
Forest Patrols and Perimeter Observation	Monthly	Patrol team inspects perimeter of project area on the ground and via helicopter
Plot Measurements	Bi-annually	Sampling teams visit a portion of plots in project and proxy areas
Identification of significant disturbance	At least annually	Periodic inspection of aerial imagery or videography, with ground inspection when necessary

Descriptions of these monitoring activities are described in Annex 3 – Climate Monitoring Plan. In addition to these three primary project monitoring activities several additional monitoring activities will happen at informal frequencies during the Project Partners' general operations. This includes regular forest ranger patrols through the Project Area, and outreaches to the communities. These additional monitoring activities will serve to identify many instances of encroachment or tree harvesting that may occur in the Project Area. The monitoring plan is meant as a guide to maintain consistency during monitoring, and also includes training and internal audit procedures for quality control. It is meant as a working document to be revised as needed during the course of the project. When revisions are necessary they should be noted as monitoring deviations in the subsequent monitoring report prepared for a VCS and CCB verification event.

3.3.4 Dissemination of Monitoring Plan and Results (CL4.2)

The Project partner WA will have the climate monitoring plan available for public review at the Project Office. The full results of the initial climate monitoring are included in this project document, which is being made publicly available in the Project Zone. Additionally, a project document summary has been written and provided to communities throughout the Project Zone in English and Khmer. This project document and the project document summary have additionally been posted to Wildlife Alliance's Facebook page and on the CCB website (http://www.vcsprojectdatabase.org) for public review and comment.

3.4 Optional Criterion: Climate Change Adaptation Benefits

3.4.1 Regional Climate Change Scenarios (GL1.1)

The Royal Government of Cambodia National Strategic Development Plan Update 2009-2013 (NSDP) listed the current climate change projections and the anticipated implications of these changes (NCCC, 2013). Temperature is expected to increase, especially at lower altitudes, with the mean monthly temperature expected to increase between 0.013° C and 0.036° C per year by 2099. It is expected that mean annual rainfall will generally increase for Cambodia, with an increase seen in seasonal rainfall

between June and August in the northwest of the country, but a decreasing trend in rainfall for the northeast. Cambodia is additionally a coastal country, so the projected increases in sea level will result in the permanent inundation of approximately 25,000 ha of coastal lands within 90 years.

The implications of these climate change scenarios show significant effects on communities and therefore land use. One major impact would be a drastic decline in agricultural productivity. Each 1° C rise in the minimum (night) temperature in the dry season could result in a 10% reduction in rice grain yield. Additionally, as only 7-8% of the total agricultural production area is irrigated, Cambodia will struggle to meet the increasing food needs of the growing population considering the expected increases in droughts. Despite this expected increase in droughts, there is additionally an expected increase in flooding from the projected increases in seasonal rainfall. These floods will result in economic losses.

In the absence of the SCRP, more people will be driven to increase their agricultural lands or move to new agricultural lands to make up for lower yields or decreased soil fertility. Additionally, people may need new sources of income, increasing the unsustainable extraction of resources from the Project Area. These would all increase deforestation in the Project Area.

3.4.2 Climate Change Impacts (GL1.2)

Due to uncertainties inherent in any climate change model, it is difficult to predict precise impacts of climate change on the landscapes and the communities. Nevertheless, given the above scenario, we assume a number of risks to the climate, community and biodiversity benefits, which are outlined below. Several mitigation methods are suggested.

Increased temperatures and risk of drought. This will have an impact on food security and water availability for both communities and wildlife. It will therefore be necessary to increase resilience in the community and landscape. This could be achieved, for example, by training communities in climate-smart agriculture. Droughts will put stress on the vegetation of the Project Zone. However, as this is an Avoided Deforestation project, with no climate benefits being claimed for net carbon stock increase from year to year in the with-Project scenario, we do not anticipate any negative impacts on the emissions benefits of this Project. Afforestation and reforestation projects would definitely face the risk of lower carbon stock increases if rainfall levels were further reduced as climate change continues. However, for this reason, for any tree planting activities SCRP will utilize solely indigenous species that are adapted to local climatic conditions, and which will increase the chance of survival.

Low capacity of local population to adapt to more extreme weather patterns. Climate change studies are in accord that the people to be affected most by climate change will typically be the poorest and most vulnerable communities who may have little information about impending hazards and are often the least capable of rebuilding their lives and livelihoods after having suffered a setback. The many communities in the SCRP Project Zone meet the definitions of poor and vulnerable, and therefore it is a great risk to community benefits if they fail to adapt to climate change induced stress, such as more frequent droughts, less available food sources and grazing for livestock, water scarcity, and increased incidence of disease. It is a primary project priority to build capacity, diversify income generating activities and create a more sustainable income flow. This will allow local communities to build resilience to more extreme weather patterns.

A high degree of uncertainty is associated with predicting the effects of climate change on biodiversity. However, it is thought that climate change could have an impact on biodiversity and related species

distributions. On a continent-wide scale, biodiversity of indigenous plants and animals in Asia, and more specifically Southeast Asia, is likely to be affected by all the major environmental changes from climate change. These include changes in ambient air temperature, rainfall and air vapor pressure deficit (which combine to cause altered water balance), rainfall variability and atmospheric CO_2. The IUCN rates climate change as one of the top five threats to biodiversity (IUCN, retrieved on 15 February 2014). These impacts could include changes in timing of life cycles, such as blooming and migration; changes in species distribution and abundance; changes in morphology and reproduction of organisms; and changes in ecosystem processes such as species interactions (IPCC, 2007). The primary manner in which climate change impacts to the project's biodiversity benefits can be mitigated is through active protection measures, ensuring landscape connectivity, healthy populations, diverse and increasing access to water sources.

3.4.3 Measures Needed and Designed for Adaptation (GL1.3)

Table 20: Project climate change adaptation Benefits

Climate change risks	Potential effects	Potential mitigative/adaptive strategies
More intense and longer droughts	Low land productivity or complete crop failure, less pasture for livestock and wildlife, more severe fires	Reduce dependence on livestock and land through alternative IGAs, promote cultivation of drought resistant crops, improve storage facilities and management of crops, water harvesting and water storage, raise awareness of danger of fires,
Increased flood risk	Destruction of agricultural crops and development	Conservation of the forest in the Project Area will increase water eco-system services, reducing flood risk. Improved agricultural techniques will help crops survive flooding.
Low capacity of local populations to adapt to frequent natural disasters	Increase in periods of food insecurity, potential increase in disease and deaths with continuing very low health standards, potential for increasing inter-community conflict	Increase support of local institutional structures including the norms and rules of governance to help develop adaptive strategies, increase literacy levels, diversification of livelihood activities and income generation projects, involve women to a greater degree in decision making processes, increase general participation in decision making at the local level
Decreased biodiversity, loss of forest cover to drought, temperature change	Reduction in species, more species at risk	Help to maintain intact and interconnected ecosystems through protection of ecosystems, ensure landscape connectivity to allow migration, regeneration activities using indigenous, drought-resistant trees

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CM1.1)

Communities, ethnic groups and demography

The SCRP Project Zone comprises of 29 communities bordering the project area, with a total of about 3,841 families with a population of 16,319. Based on the last national census, there are five peoples that inhabit the SCRP, the Samre, Cham, Thai, Khmer and Chong. Most of the Project area is inhabited by Khmer. The Samre and Chong originally spoke the same Pearic language, but their descendants in the Project Area no longer speak their ancestral tongue (Schliesinger 2015). The Samre are a small group of 150 inhabitants that live in Dai Tum Ngiep village of Trapaeng Rung district. The village is divided by the Anlong River and the majority of villagers have boat and rely on the river to maintain their livelihood (Schliesinger 2015).

There are differing reports as to whether the ethnic group in the Areng Valley, which calls itself to be Chong, is Chong (Schliesinger 2015). Media outlets reporting on the environmental conservation efforts of the Areng Valley people state that they call themselves Chong (Ford, 2018; Davidson, 2015; Mam, 2014). According to these reports, approximately 1,300 members of the ethnic Chong inhabit the northern village of Chhay Ariang, and their ancestors have lived in the area for centuries.

The Cham are an ethnic group of Austronesian origin in Southeast Asia. Cham were accomplished mariners and migrated via Borneo to mainland Southeast Asia 4,000 BP. Their population is centered in Kampong Cham province in Cambodia and Phan Rang, Ho Chi Minh City and An Giang Province in southern Vietnam. The Cham inhabit roadside villages along national road 48 along the southern border of the SCRP.

In general, most of the communities included in the Project Zone are relatively homogenous as they are all forest communities. According to the Asian Development Bank (2014), the poverty line in rural Cambodia was $25.69/month per capita, and 25% of the rural population lived below this poverty line. Based on the national socio-economic survey (2016), rural households increased their income 14% from 2014 to 2015 but they are also holding more debt to support themselves and the majority of the debt is owed to banks. Mountainous regions of Cambodia suffer the highest rates of poverty and the remote villages of the Cardamom mountains are no exception. The further villages are from Koh Kong town or major roads the higher the rate of poverty (Killeen, 2012). Most households in the mountains derive their livelihood from agriculture and its related sub-sectors, as well as illegal logging and firewood cutting (National Institute of Statistics, 2016). Manufacturing is varied but is not very extensive and is mostly conducted on a small-scale and informal basis. The service sector is heavily concentrated in trading activities and catering-related services.

On education, male literacy rates are considerably higher than those of females, and higher in urban areas compared to rural areas. According to the 2015 Socioeconomic survey, 77% of the population in rural Cambodia are literate or numerate (National Institute of Statistics. 2016), with men (83%) being higher than women (71%). About two-thirds of the economically active persons in the area are males; unemployment rates have been found to be higher for females.

According to a United Nation's World Food Program 2008 study on food security in Cambodia, about 12.5 percent of the households in rural Cambodia are food insecure. Based on the 2015 national socio-economic census, the proportion of households with access to improved water sources (mainly piped water or water from tubed/piped borehole) which may be considered comparatively safer, was 52% for rural areas of Cambodia. On health, most of communities adjacent to the SCRP are serviced by 3 doctors and 7 nurses most of which are on the eastern border of the SCRP in Sre Ambel (Ministry of Health, 2013). Health Centers in the SCRP provide outpatient consultation, antenatal care, delivery and inpatient services.

According to the Cambodia Socio-Economic Survey of 2015, the vast majority (92%) of rural households used firewood (86%) or charcoal (6%) as main fuel for cooking, with the proportion of households using charcoal (14%) and LPG (56%) being higher in urban areas. Most of households in the area use kerosene lamps for lighting, with less than a half of households having access to electricity.

Based on the 2013 inter-censal survey of Cambodia, the number of migrants, i.e., those who had their previous residence outside the place of enumeration, stood at 23%. Most of the migrants had moved from other areas within the same province (55%) while about 42% had move from another province. About half of the migrants said they had changed their residence because their "family moved" e.g., due to transfer of workplace, while about a half said they were "in search of employment".

4.1.2 Interactions between Communities and Community Groups (CM1.1)

There were two categories of community groups identified as key stakeholders in the SIA workshops having contrasting relationships with the SCRP. On the one hand, there are those directly exploiting forests and other natural resources including poachers, illegal loggers, and NTFP collectors. Also included here are the secondary users to whom the first group sells these items including end-users (like restaurants) and middlemen. Other groups in this category are those that indirectly benefit by taking advantage of the situation, including corrupt government officials receiving bribes to allow these illegal activities to happen, local community members who gain some form of employment e.g., as loggers, exploitative employers paying low wages, and micro-lenders lending at exorbitant interest rates.

On the other hand, there are those who stand to lose due to the activities by groups in the first category. They include the community in general losing access to or suffering diminished quality of many ecosystem goods and services – now or in the future. Additionally, the Government and Local Authorities also lose out on potential tax and other income from resource exploitation in their areas of jurisdiction. Finally, are workers (including immigrants) who are unable to negotiate good terms due to the nature of the jobs while credit seekers suffer the high interest rates. This is likely to affect the youth and women most adversely, as they have been found to have higher unemployment rates than men in this area.

4.1.3 High Conservation Values (CM1.2)

High Conservation Value	Fisheries regulation
Qualifying Attribute	Provides fresh water to mangrove forest in Peam Krasop Wildlife Sanctuary, and Dang Peng Multiple Use Zone critical nurseries for the region's fisheries

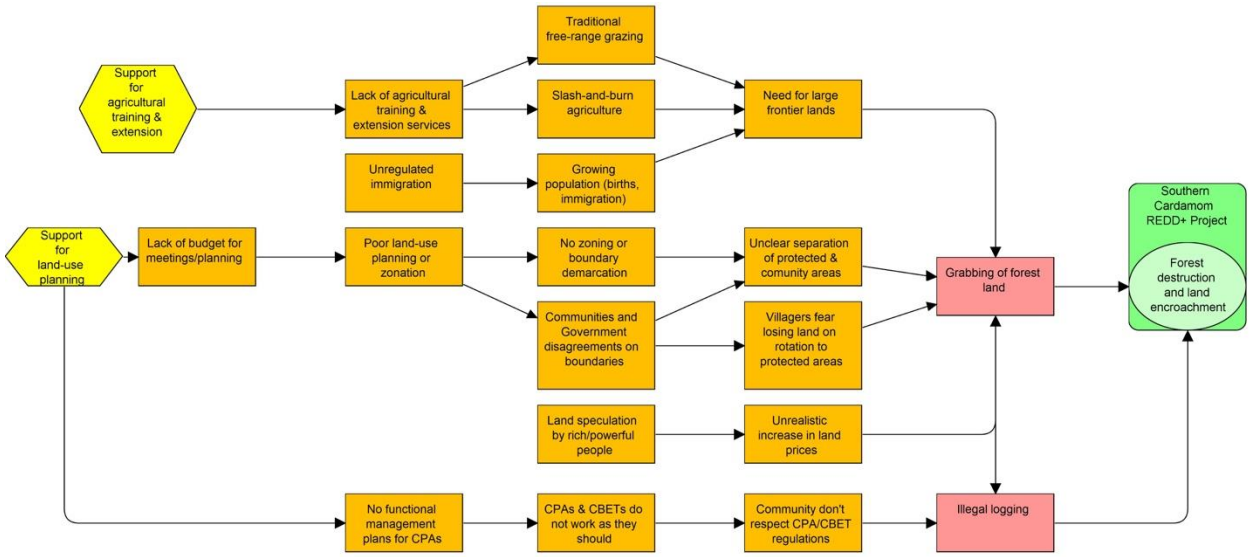
Focal Area	Major waterways within SCRP flowing into Peam Krasop and Dang Peng bays.

High Conservation Value	Water provision (hydrological services)
Qualifying Attribute	Provides a major source of water for many of the 88 villages in Koh Kong Province
Focal Area	The Project Area's at least 20 waterways

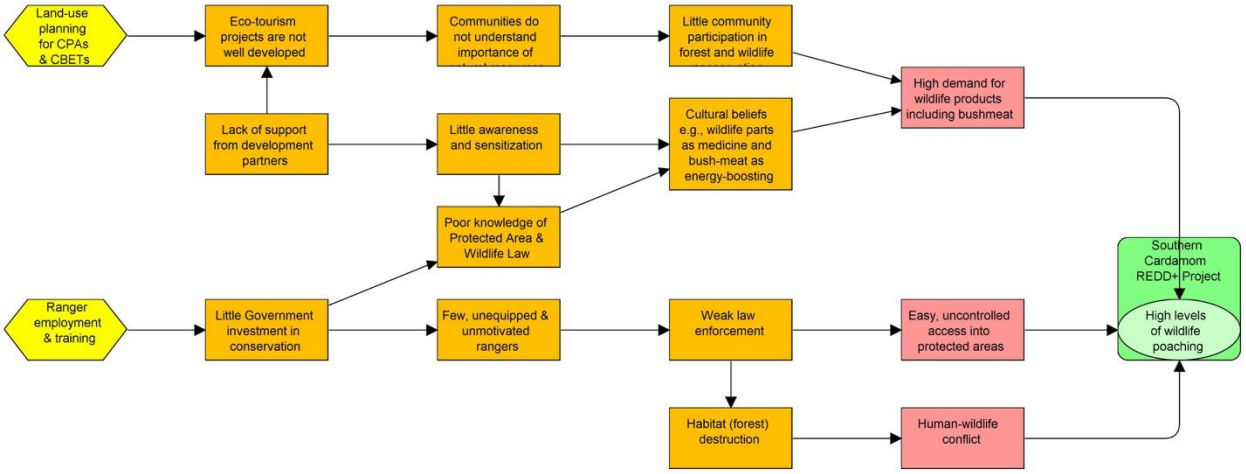
4.1.4 Without-Project Scenario: Community (CM1.3)

During the SBIA community workshop, after the working groups had identified and prioritized the Focal Issues, they then analyzed them further to establish the causal logic leading to the problems and produced a Problem Flow Diagram (also termed Conceptual Model) for each of the Focal Issues (Figure 15). A Problem Flow Diagram (PFD) is a situation analysis of the issue that represents stakeholders' understanding of what drives the existence of the focal issue; it identifies economic, political, institutional, social and/or cultural factors that contribute to existence of the issue.

a) Forest destruction and land encroachment



b) Wildlife poaching



c) Poor community livelihoods

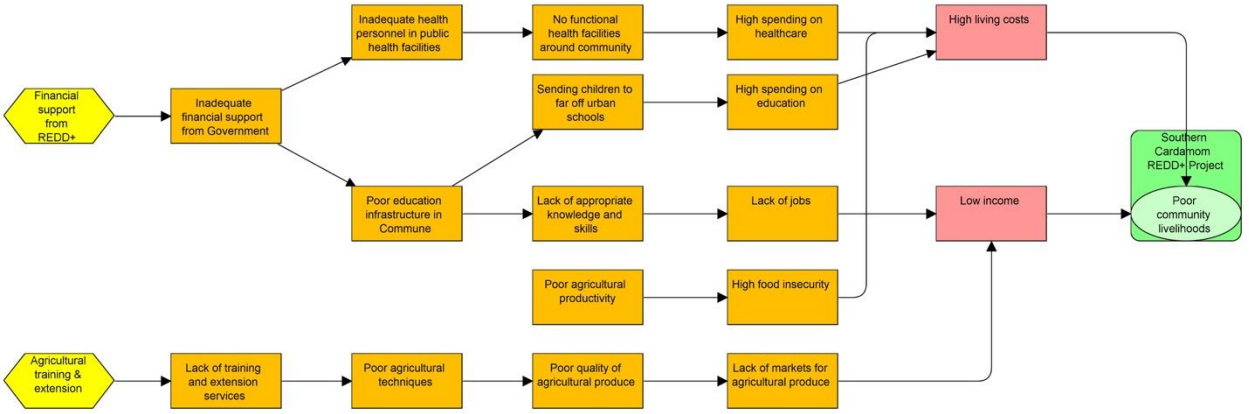


Figure 15: Problem Flow diagrams produced for the Focal Issues during the SIA community workshops in the SCRP

Next, the work groups projected what would happen with the major direct threats (in pink on the PFDs) identified for each Focal Issue in the short-to-medium term (5-10 yrs.) in the absence of the REDD+ project (Table KK).

Table 21: Future without-project projections of the key contributing factors to the Focal Issues identified during the SCRP SIA community workshops

a. Forest destruction and land encroachment

Focal issue aspect	5-10 years	What will drive the change
Forest land grabbing	Worsen	• High cost of land: due to increase in number of newcomers/land speculators to the area, demand in land will increase and people will sell land at higher price. • High rate of unemployment: people with no permanent job will encroach further inside the forest either for slash and burnt agriculture or for land grabbing for sale or for both. • Rich and powerful land speculators: speculators hire poor unemployed villagers to clear forest and grab land and sell the land to them at low price. Land speculators never have to face the laws since they are not the ones who clear the forest but the poor. Land speculators make a lot of money from re-selling land. • No clear forest boundaries delineated: local people just cut as much forest and they can then plant on the land with short-term crops then falsely claim working on the land for longer than 5 years, the length that required for legal land ownership recognition. • Low capacity of land management agencies: due to lack of equipment and capacity, most local land management agencies are not able to recognize if an encroached forest land is an old plantation or land is inside protected area or in community area. Thus, they cannot build case against illegal forest land grabbers.
Illegal logging	Worsen	• Increased demand in timber: not much timber left elsewhere in the Cambodia but the Cardamoms. Real Estate development is expending very fast in some main towns/cities in the country thus demand in timber will be in fast increase. • Logging become more lucrative: since the demand in timber is higher, loggers can sell timber at very good price and make big money out of illegal logging business. • Bribery, corruption and no action taken by authorities and other stakeholders: corrupted officials rarely take action to stop illegal logging or illegal transport of timber as long as they get bribe from the loggers or logging truck drivers.

		• Loggers build good roads inside protected area so they can cut more trees deeper inside forest where they can find further good timber to cut • No alternative product to replace timber – plywood production or fast growing plantation do not attraction people's attention since price of timber is fairly cheap comparing to bamboo or plywood

b. Wildlife poaching

Focal issue aspect	5-10 years	What will drive the change
High demand in wildlife parts and bush-meat	Worsen	• High demand in wildlife, parts and bush-meat by local restaurants: since bush-meat become scarce in most places in Cambodia, many tourists go to the Cardamoms not only for recreational purposes but to eat bush-meat thus motivate poachers to work harder and catch and kill as many wildlife as possible • High demand in wildlife, parts and bush-meat by restaurants anywhere else: mostly by restaurants in big tourism cities such as Phnom Penh, Sihanoukville and Siem Reap. • Demand in wildlife for export to Vietnam and others neighboring countries: big and small shipments of wild meat were often encountered by competent agents when crossing the country border to Vietnam and to neighboring countries • Wildlife parts and wild meat are so popular by Chinese and the number of Chinese visiting/staying/living in Cambodia is in good incline. • New poachers come from elsewhere to poach in the Southern Cardamom – not many wildlife left in other forests, so poachers will precipitately come to the Southern Cardamom where they still have some wildlife to poach • Growing poacher-middlemen-trader networking: when the business of wildlife poaching/trading is going well, more people will involve and get benefit from it thus networks will be formed, get bigger and become better in many ways, physically, financially, tactically and logistically

Illegal easy un-controlled access into protected area forest	Worsen	• Forest destruction: the cutting and burning of forest makes the forest become less dense, and make it more easily accessible by people, especially by poachers • Trails inside the forest: trails make poachers get inside the forest easier than going across naturally dense forest • More snares brought in the forest: the more passages make across forest, forest will become more damaged and become more open and easier to put snares
Lack of wildlife habitat	Worsen	• Forest land encroachment: as forest land is cleared and grab, forest is converted into agriculture, residential land or other type of land use thus wildlife has smaller habitat to live inside • Forest fires for hunting: poachers burn forest for hunting purposes. When wildlife come to cleared area where forest is all burnt out, they are become more visible which is easier for poachers to spot and kill/catch them. Furthermore, some wildlife is attracted by the smell of forest freshly burnt ashes. • Weak law enforcement: rangers of limited working capacity, not sufficiently well equipped and well-motivated with limited financial support cannot provide effective protection to the forest.

c. Poor community livelihoods

Focal issue aspect	5-10 years	What will drive the change
High living cost	Remain unchanged	• No nearby functioning health post: so people need to seek health care services at distant bigger towns thus need to spend money on travelling, food and accommodation. • Lack of teacher in commune: so children have to go far-away schools so parents have to cover big expense to send children to school.
Low income	Remain unchanged	• Lack of education and skill – with no education, villagers do not have ability to take better paid jobs or to create family/small business • Lack of agriculture technique – without proper technique, people's crop become less productive

		with mediocre quality thus less competitive in markets • Population growth – when number of people increase and resources remain the same, resources become scarce

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

The major project activities can be grouped into the following ten areas (see details in Section 2.1.11). All the community-focused activities which the project plans to implement were identified during SIA community workshops described earlier (see Section 2.1.6). Most of these are designed to help create greater awareness, capacity and financial security in the communities, reducing the need to undertake unsustainable resource extraction from the Project Area. They include:

1. Direct employment, and job creation through alternative income-generating activities
2. Participatory land-use planning: will lay the basis for land demarcation and land tenure security
3. Strengthening community organizations for management of natural resources
4. Community based eco-tourism initiatives
5. Stimulating investment and micro-credit (microfinance) schemes
6. Sensitization and awareness raising
7. Enhanced security and law enforcement
8. Health improvement through employment of medical staff or provision of supplies
9. Education improvement through employment of teachers, bursary schemes, and infrastructure
10. Improvement and intensification of agriculture including training and market access.

Theory of Change Statements

Based on the extensive experience of the Project partner WA in working on biodiversity conservation and community projects in the SCRP landscape, a literature review, and from information obtained from the SIA workshops held, we applied the theory of change approach to justify our project rationale and to produce indicators for the CCB monitoring plan. The theory of change is a hypothesis about how a project intends to achieve its stated objectives, or a roadmap of how it plans to get from project activities to project impacts (Richards & Panfil, 2011). As such, we developed a theory of change for each of the three Focal Issues (see details in the Result Chains under Section 2.1.11).

The assumptions we make about the cause-and-effect relationships were made explicit in the Result Chain diagrams developed by community members during the SIA workshops, from which the theories of change statements are based. Indicators were developed for key results and assumptions; monitoring of assumptions was included to enable us identify points of deviation early enough. In other words, the

indicators outlined in the Monitoring Plan (see Section 4.4) will enable measuring progress towards achieving the desired project activity outcomes and impacts from project activities and strategies.

- **Focal Issue 1**: ***Poor Community Livelihoods***: IF there are adequate and functional health facilities, IF education is improved through better facilities and access through bursary schemes, and IF there is improved food security from sustainable intensified agriculture, THEN the communities will have higher incomes and improved livelihoods.
- **Focal Issue 2: *Forest Destruction and Land Encroachment***: IF participatory land use planning is conducted and land tenure security strengthened, IF immigration and land allocations are strictly controlled, and IF the Community Protected Area (CPA) is developed following proper processes, THEN land grabbing, illegal logging and NTFP collection will be strictly controlled and the forest well preserved.
- **Focal Issue 3**: ***Wildlife Poaching***: IF community-based eco-tourism is developed, IF the sensitization and awareness-raising is conducted among communities around the project area, and IF security and law enforcement are strengthened, THEN the both poaching and demand in wildlife and bush-meat will decline as will habitat loss, thereby leading to improved wildlife populations in the SCRP.

Improved Livelihoods

Anticipated impacts for specific stakeholder groups

Community Group	Community in general – present and future
Impact(s)	Enhanced ecosystem goods and services and improved livelihoods through better education, health and food security
Type of Benefit/Cost/Risk	Predicted direct benefit
Change in Well-being	Potentially major improvement in livelihoods including education, health and food security

Community Group	Government & Local Authorities
Impact(s)	Better execution of their mandate, revenue collection and improved relations with the citizens
Type of Benefit/Cost/Risk	Predicted direct benefit
Change in Well-being	Potentially moderate gains in revenue but major gains in community relations

Community Group	Youth and women
Impact(s)	Availability of jobs, alternative IGAs and education
Type of Benefit/Cost/Risk	Predicted direct benefit
Change in Well-being	Potentially major impact on youth and women groups

Community Group	Poachers and illegal loggers
Impact(s)	Reduced income
Type of Benefit/Cost/Risk	Predicted direct cost
Change in Well-being	Potentially significant loss of livelihood sources

Community Group	Immigrants
Impact(s)	Fewer opportunities to gain access to free or cheap land and natural resources
Type of Benefit/Cost/Risk	Predicted indirect cost
Change in Well-being	Potentially moderate impact on their well-being and ability to sustain themselves in the new areas

Community Group	Traders and middlemen (including employers & lenders)
Impact(s)	Reduced profits due to increased costs of goods or services
Type of Benefit/Cost/Risk	Predicted indirect cost
Change in Well-being	Potentially minor to moderate reduction in profits

4.2.2 Negative Community Impact Mitigation (CM2.2)

Three main community groups are predicted to suffer potential costs from implementation of project activities. The SCRP will mitigate for these negative impacts as follows:

- ***Poachers and illegal loggers***: although these are illegal activities for the large part, those genuinely undertaking them for basic livelihood support will be offered or considered for direct employment when job opportunities arise e.g., as eco-guards. Nonetheless, they will also enjoy the other general community benefits like access to community educational grants schemes, improved health access and agricultural training to help move them away from illegal activities.

- ***Traders, middlemen and employers***: while this group might see diminished profits in the short term, we believe they will enjoy greater stability in the long-term from conducting legitimate business, reduced run-ins with the law, employees and community, and overall greater social capital and license to operate in the area.
- ***Immigrants***: similar to the traders above, this group might suffer some costs in the short term through increased scrutiny and fewer chances for accessing 'free' land and jobs, but will also gain from greater stability by being recognized and accepted as legitimate members in the community once they come in through legal avenues.

4.2.3 Net Positive Community Well-Being (CM2.3, GL1.4)

Comparison between the 'Without Project' and 'With Project' scenario

- ***Focal Issue 1: Poor Community Livelihoods***: The direct threats to poor community livelihoods were shown to be: i) low farm yields, and ii) low income. In the absence of the project, these are expected to worsen and thereby increase poverty and livelihood vulnerability. The Result Chain Diagram (Section 2.1.11) details the theory of change logic and depicts how the SCRP aims to reduce poverty and improve overall livelihoods over the project's lifetime.
- ***Focal Issue 2: Forest Destruction and Land Encroachment***: The direct threats to forest destruction and land encroachment are: i) forest clearing for agricultural and settlement, ii) commercial logging for timber and wood products, and iii) illegal logging. In the absence of the project, these are expected to worsen and thereby leading to forest loss and diminishment of associated ecosystem services to the communities. The Result Chain Diagram (Section 2.1.11) details the theory of change logic and depicts how the SCRP aims to curb forest loss improve overall livelihoods over the project's lifetime through enhanced ecosystem services.
- ***Focal Issue 3: Wildlife Poaching***: The direct threats to wildlife poaching problem are i) high demand for wildlife parts ii) illegal, uncontrolled access to forest and iii) illegal logging. In the absence of the project, these are expected to worsen and thereby lead to wildlife declines and poor eco-tourism. The Result Chain Diagram (Section 2.1.11) details the theory of change logic and depicts how the SCRP aims to reduce demand and supply of wildlife and forest products, leading to sustainable use and eco-tourism development for improved livelihoods over the project's lifetime.

Moreover, as demonstrated under Section 4.2.2 above, all the potential costs or negative impacts from implementing the proposed project activities can be mitigated for (e.g., for poachers) or are either short term or affecting a minor segment of the communities in the SCRP Project Zone. Consequently, the anticipated net well-being impacts are overwhelmingly positive given the proportion of the population potentially impacted, the magnitude of the impacts and their long-term nature.

4.2.4 High Conservation Values Protected (CM2.4)

- ***HCV on areas meeting the basic needs of local communities*****:** HCV identified under this category is fisheries regulation services from waterways emanating from the SCRP forests. Conservation of these forests – hence services – is the main priority of the SCRP
- ***HCV on provision of critical ecosystem services*****:** HCVs under this category include forests critical to water catchment. Again, conservation of these services is the main priority of the SCRP,

and activities are designed to ensure greater protection. This inherently provides positive effects on these high conservation values, and no negative effects are anticipated because of the project.

The SCRP will monitor for negative impacts on HCVs.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

The Southern Cardamom watershed is important for the fisheries of the Gulf of Thailand as it provides fresh water to the largest contiguous mangrove forest left in the Gulf, Peam Krasop Wildlife Sanctuary, which is a critical nursery for the region's fisheries. The wider Cardamom Landscape provides food for large areas of Thailand and Cambodia, and supports regional climate. The Cardamom Mountain Range is also the source of at least 20 major waterways that feed 3,800 villages in over 6 provinces, including all 88 villages near the SCRP, including those that are not included in the Project Zone as Project Communities (see Section 2.1.6). All these communities stand to benefit directly from implementation of the SCRP.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

There are no negative impacts on other stakeholders, and therefore no mitigations are required. This section is not applicable.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

As there are no negative impacts on other stakeholders, the impacts described in Section 4.3.1 are the net impacts on other Stakeholders.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The selection of appropriate indicators is invaluable to the impact assessment process, as they respond to the basic question: "what should be measured to show that the claimed net social benefits are real and additional?" (Richards & Panfil 2011). An ideal indicator from the perspective of showing attribution is one that measures an 'intermediate state' or assumption between an output and outcome or an outcome and an impact, clearly showing progress along a causal chain. Again, our theory of change logic in the Result Chain diagrams (see Section 2.1.11) provided us with a good basis for selecting indicators that factor in attribution. We selected a total of 49 indicators for monitoring the social impacts of the SCRP, including 19 Output, 26 Outcome and 4 Impact indicators (Table 22).

We then decided on the best sampling methods to use to collect these data, keeping in mind the need to achieve acceptable levels accuracy, precision and cost effectiveness whilst retaining transparency and simplicity. From this, a monitoring plan was designed to collect information on the identified indicators. The SCRP shall use two major data sources for the selected indicators: Internal reporting systems and Household-level surveys. In addition, Focal Group Discussions during SIA workshops will be used to

validate findings and obtain any further information/clarification, while Government departments will be visited for secondary data and general community statistics. In-house reporting will mainly collect input and output indicators (and some outcome too), while the other methods will mainly assess outcome and impact indicators.

Social Impact Assessment: Monitoring Plan

Table 22: The SCRP Social impact assessment monitoring plan

Focal Issue	Key results	SMART Objective	Indicator Code	Indicator	Indicator type	Data collection method	Who?	When?	Where?
Forest destruction and land encroachment	**Decrease in illegal logging**	By 2027, reduce the number of illegal logging incidents by half in the SCRP	SIA001	# of land use planning meetings held with participation and support from local authorities	Output	Internal report	Community Outreach	Bi-annually	Project Zone
			SIA002	# participants in land use planning meetings	Output	Internal report	Community Outreach	Bi-annually	Project Zone
			SIA004	Volume of timber and logs confiscated by SCRP patrol rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA005	# of chainsaws confiscated from loggers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA006	# of illegal kilns and bags of charcoal confiscated by SCRP patrol rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area

			SIA007	# of legal cases submitted against forest criminals by SCRP patrol rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
	Decrease in encroachment and land-grabbing	By 2027, have 2 CPAs in the REDD+ Project Zone zoned and demarcated	SIA008	# of demarcation posts installed zoning forest and community areas	Outcome	Internal report	Community Outreach	Annually	Project Zone
			SIA009	# of land use maps (including CPAs) created and made available to community	Outcome	Internal report	Community Outreach	Annually	Project Zone
			SIA011	# of forest fires in the SCRP extinguished by SCRP rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA012	# of illegal fences and signs removed by SCRP rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA013	# of illegal settlements (houses) and forest camps built inside the SCRP project area and	Outcome	Internal report	Security	Quarterly	Project Accounting Area

				removed by SCRP rangers					
			SIA014	# of land encroachment cases stopped by SCRP rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA015	# ha of forest within the SCRP cleared for cultivation or settlement	Impact	RS/GIS survey	Biodiversity Monitoring	Annually	Project Accounting Area
Wildlife poaching	Greater community participation in eco-tourism activities	By 2027, 25% more families join the two existing eco-tourism communities in Chi Phat and Stung Chhay Areng	SIA016	# of families participating in eco-tourism activities	Output	Household survey	Social Monitoring	Annually	Project Zone
			SIA017	# of trained tour guides	Output	Facilities' records	Community Outreach	Annually	Project Zone
			SIA018	# of tourism service providers	Output	Facilities' records	Community Outreach	Annually	Project Zone

			SIA019	# tourism promotion initiatives undertaken	Output	Internal report	Community Outreach	Annually	Koh Kong Province
			SIA020	# of tourists visiting the community eco-tourism facilities	Outcome	Facilities' records	Community Outreach	Annually	Project Zone
			SIA021	Amount of revenue accruing from eco-tourism activities in the area	Impact	Facilities' records	Community Outreach	Annually	Project Zone
	Greater appreciation and awareness of wildlife benefits	By 2022, 25% more community members demonstrate greater appreciation for wildlife and conservation	SIA022	# of awareness and sensitization meetings	Output	Internal report	Community Outreach	Bi-annually	Project Zone
			SIA023	# of community members attending awareness and sensitization meetings	Output	Internal report	Community Outreach	Bi-annually	Project Zone
			SIA024	# households with greater awareness	Outcome	Household survey	Social Monitoring	Annually	Project Zone

				about importance or conservation					
	Increase in wildlife populations including HCVs	By 2027, reduce the number of wildlife poaching incidents by half in the SCRP	SIA025	# of rangers employed	Output	Internal report	Human Resource	Annually	Project Zone
			SIA026	# and type of equipment provided including ranger outposts	Output	Internal report	Operations	Annually	Project Accounting Area
			SIA027	# patrols undertaken, including coverage and distances	Output	Patrol records	Security	Quarterly	Project Accounting Area
			SIA028	# of vehicles and home-made guns removed confiscated by SCRP forest rangers	Outcome	Internal report	Security	Quarterly	Project Accounting Area
			SIA029	# of snares removed from the SCRP Project Area	Outcome	Internal report	Security	Quarterly	Project Accounting Area

			SIA031	# and species of wildlife killed or confiscated from poachers	Impact	Internal report	Security	Quarterly	Project Accounting Area
Poor community livelihoods	Reduced cost of living	By 2027, 25% of community members with direct livelihood benefits from the SCRP	SIA032	# schools constructed, repaired or equipped	Output	Internal report	Operations	Annually	Project Zone
			SIA033	# teachers employed	Output	Internal report	Human Resource	Annually	Project Zone
			SIA034	Amount of money allocated to bursary schemes	Output	Internal report	Accounts	Annually	Project Zone
			SIA035	# students benefiting from bursary schemes	Outcome	Internal report	Community Outreach	Annually	Project Zone
			SIA036	% of students not in school due to school fees	Outcome	Household survey	Social Monitoring	Annually	Project Zone
			SIA037	# health facilities build or equipped	Output	Internal report	Operations	Annually	Project Zone

			SIA038	# health workers employed	Output	Internal report	Human Resource	Annually	Project Zone
			SIA039	% community members benefiting from SCRP-related health schemes	Outcome	Household survey	Social Monitoring	Annually	Project Zone
			SIA040	# of functional schools in each Commune	Outcome	Government records	Social Monitoring	Annually	Koh Kong Province
			SIA041	Teacher:student ratio in SCRP supported schools	Outcome	Government records	Social Monitoring	Annually	Project Zone
			SIA042	# of functional health facilities in each Commune	Outcome	Government records	Social Monitoring	Annually	Koh Kong Province
			SIA043	Nurse/Doctor:population ration in Project Zone	Outcome	Government records	Social Monitoring	Annually	Project Zone
	Higher income levels	By 2027, 10% of community members earning income directly from the SCRP and	SIA044	# of people directly employed by the SCRP	Output	Internal report	Human Resource	Annually	Project Zone

		associated activities							
			SIA045	# community members who have accessed the microfinance scheme	Output	Scheme's records	Accounts	Annually	Project Zone
			SIA046	# of people who have established IGAs through SCRP assistance	Outcome	Scheme's records	Community Outreach	Annually	Project Zone
			SIA047	# community members who have undergone agricultural training	Output	Internal report	Community Outreach	Annually	Project Zone
			SIA048	# agricultural demonstration plots established in the community areas	Outcome	Internal report	Community Outreach	Annually	Project Zone
			SIA049	% increase in yields and sales in local and external markets	Impact	Household survey	Social Monitoring	Annually	Project Zone

4.4.1.1 Development of Community HCV Monitoring Plan (CM4.2.).

High Conservation Values (Section 4.1.3) are both linked to water provisioning from the waterways within SCRP which are maintained by good forest cover. As such, both are adequately captured in the Forest Destruction and Land Encroachment Focal Issue in the Monitoring Plan above.

4.4.2 Monitoring Plan Dissemination (CM4.3)

The SCRP will disseminate the monitoring plan and the results of the monitoring within 12 months of validation. These documents will be made publicly available on the internet on CCB and VCS websites and linked to Wildlife Alliance website too. They will also be communicated to the communities and other stakeholders (including the Government and Local Authorities) using diverse media including presentations, reports, brochures and orally during community awareness and sensitization meetings, and annual SIA workshops.

4.5 Optional Criterion: Exceptional Community Benefits

The SCRP is not seeking exceptional community benefits.

4.5.1 Exceptional Community Criteria (GL2.1)

4.5.2 Short-term and Long-term Community Benefits (GL2.2)

4.5.3 Community Participation Risks (GL2.3)

4.5.4 Marginalized and/or Vulnerable Community Groups (GL2.4)

4.5.5 Net Impacts on Women (GL2.5)

4.5.6 Benefit Sharing Mechanisms (GL2.6)

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

4.5.8 Governance and Implementation Structures (GL2.8)

4.5.9 Smallholders/Community Members Capacity Development (GL2.9)

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

The Cardamom Mountains region form part of the Indo-Burma biodiversity hotspot (Myers et al. 2000) and is a ridge-to-reef conservation landscape comprising 18,000 km^2 of largely contiguous forest cover. The landscape forms a Global 200 Ecoregion (Cardamom Mountains Rain Forests), a secondary

Endemic Bird Area (i.e. an area containing at least one restricted-range endemic bird species) and was listed as a Level I Tiger Conservation Unit by Wikramanayake et al. (1998). The length of the Cardamom Range is approximately 300 kilometers. It is separated from the nearest other rainforest by the vast, dry Khorat Plateau in central Thailand to the north and east and by the Gulf of Thailand in the west.

Location and general description

The mountain range rises from sea level to more than 1500m to intercept and extract the moisture from the monsoon winds. The orientation of their topography along the Gulf of Thailand produces unusually wet conditions of 3000-4000mm annual rainfall on the southwestern slopes of these ranges; only a short dry season occurs. These ranges rise rapidly from the coast, leaving only a narrow coastal plain. They gently grade down into the interior lowlands to the north and northeast. Upper elevation areas above about 900 meters in the Cardamom and Elephant Mountains contain a distinct montane forest community. These forests are structured with dense evergreen tree canopies reaching up to 30 meters in height.

Biodiversity features

The Cardamom Mountains rainforests are amongst the most significant landscapes for biodiversity conservation in mainland South East Asia. The landscape supports numerous endemic bird (e,g, *Garrulax ferrarius*), amphibian (e.g. *Chiromantis samkosensis*), reptile (e.g. *Cnemaspis neangthy*), and plant species (e.g. *Nepenthes holdenii*). While the largest megafauna has either been extirpated (i.e. tiger *Panthera tigris*, rhinoceros *Dicerorhinus / Rhinoceros* spp.) or heavily impacted by historic hunting (i.e. Asian elephant *Elephas maximus*, gaur *Bos gaurus*) populations of smaller carnivores (e.g. dhole *Cuon alpinus*, mainland clouded leopard *Neofelis nebulosa*, Malayan sun bear *Helarctos malayanus*, greater hog badger *Arctonyx collaris*, large-spotted civet *Viverra megaspila*) are significant (Gray et al. 2017) and the landscape supports the largest global population of the Endangered pileated gibbon (*Hylobates pileatus*). A minimum of 35 IUCN Threatened species of bird (9), mammal (18), and reptile (8) occur within the Project Zone with globally significant populations of at least 11 and regionally (Cambodia, Laos, and Vietnam) significant populations of 18.

The elephant population in the Cardamom and Elephant ranges, though heavily impacted by hunting during the late 20th and early 21st centuries, is one of only two in Cambodia with >40 individuals.

Significant reptiles include Siamese crocodile *Crocodylus siamensis* and southern river terrapin *Batagar affinis* – both species are globally critically endangered and have confirmed breeding populations within the Project Zone. In 2009, FFI helped to identify 35 pure-bred Siamese crocodiles in a local wildlife rescue center and has since developed the first conservation breeding program in the country – a vital source of genetic diversity for the reintroduction of the species into new areas. In 2012, the Cambodian Crocodile Conservation Project launched a program to release pure-bred individuals back into the wild in suitable sites in the Cardamom Mountains, under the National Siamese Crocodile Reintroduction and Reinforcement Action Plan.

Five dominant vegetation types are present in the greater SCRP Project Area, while Evergreen Forest and Deciduous Forest are present in the SCRP Project Accounting Area:

- *Evergreen Forest* (Tropical Moist Broadleaf Forest) (405,865 ha): The main forest type in the Project Area and is dominated by Dipterpocarps – Phdiek (*Anisoptera costata*), Chheutal

bankuoy (*Dipterocarpus costatu*), Koki Khsach (*Hopea pierrei*), Koki msav (*Hopea ordorata*), and Koki Phnom (*Shorea hypochra*).

- *Deciduous Forest* (Tropical Dry Broadleaf Forest) (21,982 ha): This type of forest is similar to the dry seasonal forest found in dryer climates Indochina. Trees are relatively short (3-12 m), with mainly drought tolerant species with small leaves and thick barks. Dry deciduous forests form a transition to natural grassland, which are found on the very dry sandy sites. These forests are also dominated by Dipterocarps, with the four most abundant species being Meranti (*Shorea siamensis*), Phchoek (*Shorea obtuse*), Tbeng (*Dipterocarpus obtusifolius*), and Klong (*Dipterocarpus tuberculatus*).
- *Riparian Melaleuca Forest* (13,898 ha): This forest type occurs near rivers and streams, periodically inundated and remaining moist during the dry season. It is dominated by *Melaleuca leucadendron.*
- *Scrubland* (10,249 ha): This forest is a transition type to tall evergreen forest, and often with similar species composition, yet trees are significantly smaller.
- *Semi-Evergreen Forest* (2,043 ha): This forest type occurs near rivers and streams, periodically inundated and remaining moist during the dry season.

Types of threats

Poor law enforcement

Despite some level of formal protection, very few reserves in the region have effective management and workforces; they are essentially “paper parks”. Several are now under threat from illegal logging operations and from adjacent concessions that encroach on the unprotected protected areas. The wildlife trade has also resulted in widespread hunting throughout Cambodia, taking a heavy toll on endangered wildlife populations. The widespread presence of anti-personnel land mines continues to pose severe threat to both wildlife and humans.

Habitat reduction, degradation and fragmentation

Besides loss of forest which leads to habitat loss and fragmentation, for some of the water-dependent species like the crocodile, factors causing loss of habitat include: conversion of wetlands for agriculture, use of chemical fertilizers and pesticides in rice production, and an increase in the population of cattle in the landscape. Moreover, many river systems, including those in protected areas, have hydroelectric power dams approved or planned, which are likely to cause the loss of wetlands plus altered flooding cycles. Moreover, when populations fall to extremely small levels dependent on highly isolated habitats, as is the case for *C. siamensis*, they become too fragmented leading to both reduced reproduction (due to the difficulty of locating mates), and genetic problems from inbreeding.

Exploitation and fragmentation

Illegal poaching for meat and wildlife trade is still an important threat in these forests. For instance, capture of wild crocodiles for skins and to stock commercial crocodile farms remains an ongoing threat, as well as incidental capture/drowning in fishing nets and traps. Snares are perhaps the biggest threat to the Project Areas globally significant mammal diversity with WA supported forest rangers removing 21,589 in 2017. These indiscriminate killers have caused significant declines in many threatened species throughout South East Asia (Gray et al. 2017).

From the Biodiversity Impact Assessment workshop held for the proposed SCRP (See Section 5.1.3), the leading threats identified across the greater SCRP landscape were:

- Human-elephant conflict
- Land encroachment and illegal construction inside Protected Areas
- Social and economic land concessions
- Poaching and wildlife trade
- Unsustainable hydropower production
- Illegal logging
- Pollution, e.g. from construction and agricultural waste
- Mining

5.1.2 High Conservation Values (B1.2)

The entirety of the SCRP Project Area is of High Conservation Value. The 35 species listed below in Table 26 all make their home in the Project Area and are significant for those species as follows:

Globally significant – The Project Area is one of ~10 most important sites globally for the species listed;

Regionally significant – The Project Area is within one of ~10 most important sites in Indochina [Sensu Cambodia, Lao PDR, Vietnam) for the species listed;

Nationally significant – The Project Area is one of ~10 most important sites in Cambodia for the listed species.

Additionally, both the Evergreen and Deciduous Dipterocarp Forests were recognized as HCV habitats and ecosystems during the BIA workshop (described in Section 5.1.3) as they harbor these species under threat, but also because they perform critical ecological functions, namely:

- ***Water provision and hydrological cycle regulation***: The monsoon rains fall heaviest on the Cardamom Mountains' plateau, which is the source of several nationally significant rivers, some flowing into the Tonle Sap Lake and others into the Gulf of Thailand supporting agriculture and aquaculture.
- ***Fisheries regulation***: especially as the backbone to the fisheries and aquatic life in the wider landscape.
- ***Corridor function***: connects several protected areas in the region including Phnom Samkos, Peam Krasop, Phnom Aural and Tatai Wildlife Sanctuaries, Central Cardamom, Botum Sakor Kirirom and Bokor National Parks (Gray et al. 2016).

5.1.3 Without-project Scenario: Biodiversity (B1.3)

A Biodiversity Impact Assessment (BIA) workshop was held in Phnom Penh on 31st October and 1st November 2017 to develop the monitoring plan based on a theory of change logic for the SCRP following CCB Guidelines. A total of 20 participants were involved representing both national and central

Government (13), conservation non-governmental organizations (5), and academia (2) (Table 23). All participants had some prior experience of conducting biodiversity research work or executing environmental conservation projects within the SCRP landscape.

Table 23: Participants to the SCRP BIA workshop and the institutions they represented

Stakeholder	Institution	# Representatives
Royal Government of Cambodia	General Department for Administration of Nature Conservation, Ministry of Environment	7
	Department for Education and Awareness, Ministry of Environment	1
	Department for Communities, Ministry of Environment	1
	Department for GIS and REDD+, Ministry of Environment	2
	Provincial Department of the Environment, Koh Kong Province	2
Conservation NGOs	Fauna and Flora International	1
	Conservation International	1
	Wildlife Alliance	3
Academia	Cambodian Fishing Cat Project	1
	Conservation Ecology Program, King Mongkutt University, Thailand	1

Focal issues

The BIA workshop started with an evaluation of the Background Conditions in the Project Area, including an identification of most important biodiversity and key threats, which enabled an examination of the main biodiversity-related problems that the REDD+ project needs to address, termed herein as **Focal Issues**. Focal issues are existing problems or challenges that should be addressed to ensure Project success. Here, they refer to biodiversity related factors that need to be addressed for project success, or factors that if the project does not address, project success is threatened. The workshop settled on three priority Focal Issues for the SCRP:

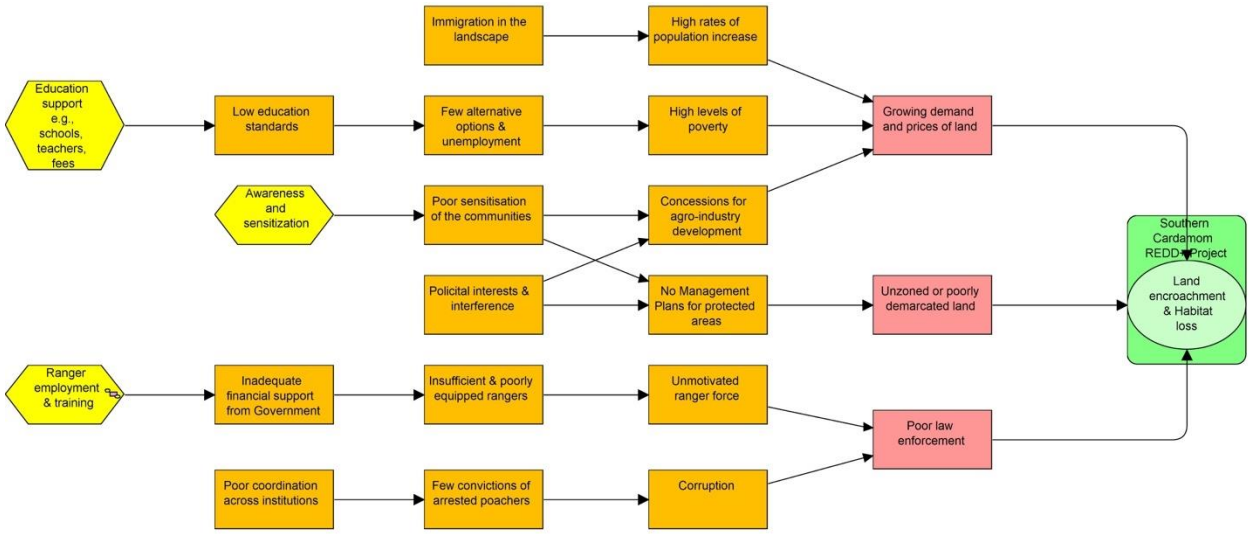
1. *Land encroachment and habitat loss*: Protected area and forested land is illegally converted to other land uses due to land-grabbing by middle men and powerful people, often through persuading poor people through payment to clear forest for them

2. *Wildlife poaching and trade*: Low rates of detection, capture, and prosecution of poachers, and high price of wildlife meat due to high demand from consumers, combined with low awareness and lack of alternative livelihoods for local people, leads to high reward with minimal risk for poaching
3. *Illegal logging*: Population growth and poverty with limited alternative livelihoods mean people are motivated to obtain income from illegal logging and timber trade, abetted by poor law enforcement and high timber value due to high demand.

Problem Flow Diagrams

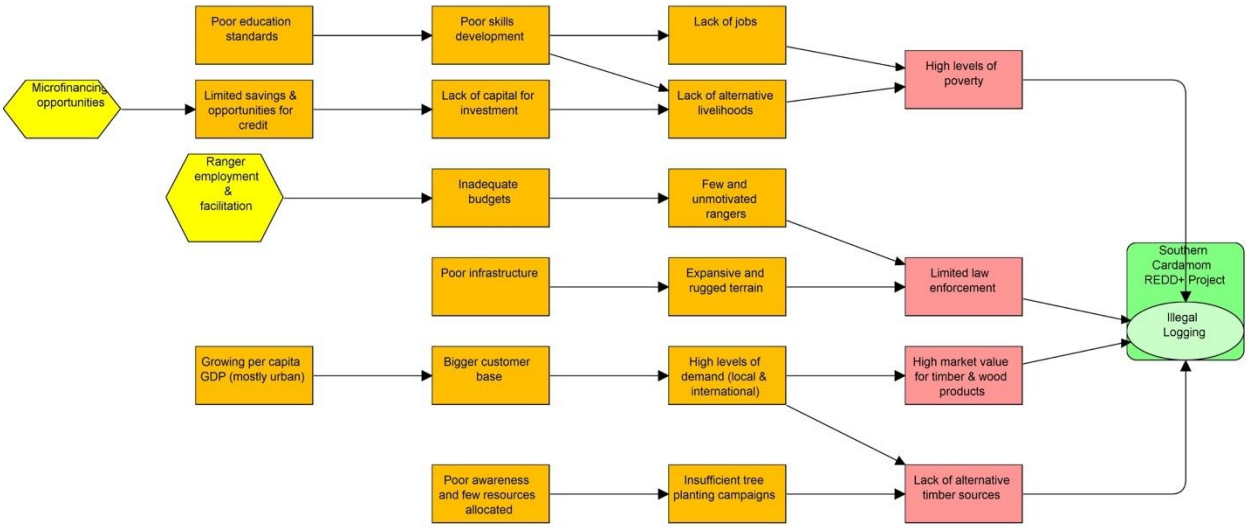
After establishing the fundamental issues that the project should focus on to achieve the overarching REDD+ goals, the BIA workshop then delved deeper into these Focal Issues to establish the causal logic leading to the problems, and produced a Problem Flow Diagram (also termed Conceptual Model) for each of the Focal Issues (Figure 16). A Problem Flow Diagram (PFD) is a situation analysis of the issue that represents stakeholders' understanding of what drives the existence of the focal issue; it identifies economic, political, institutional, social and/or cultural factors that contribute to existence of the issue.

a) Land encroachment



b) Wildlife poaching and trade

c) Illegal logging



Legend Table	Strategy	Contributing Factor	Direct Threat	Target

Figure 16: Problem Flow diagrams produced for the Focal Issues during the BIA workshop for the SCRP

Without-project projections

Next, the workshop participants projected what would happen with the major direct threats (in pink on the PFDs) identified for each Focal Issue in the short-to-medium term (5-10 yrs.) in the absence of the REDD+ project (Table 24).

Table 24: Future without-project projections of the key contributing factors to the Focal Issues identified during the SCRP BIA workshop

a. Land encroachment and habitat loss

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?
Poor law enforcement	Worsen	• Fewer rangers on patrol – fewer patrols conducted • Less budget for law enforcement implementation • Lack of capacity for implementing effective law enforcement • Less trust from international communities • Increased corruption
No Zoning or Protected Area Demarcation	Worsen	Increase pressures due to population growth and other drivers of deforestation and limited government budget support.
Demand for land and increasing land price	Worsen	• Population growth • Need for land for Industrial agriculture product (rubber, cassava, cashew) • Economic Development

b. Wildlife poaching and trade

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?
High economic rewards for poaching	Worsen	• Increasing demand from increasing number of consumers • Lack of alternative livelihoods
Low risk of being prosecuted	Worsen	• Fewer poachers are detected and arrested due to poor law enforcement • Increased corruption
Lack of awareness of biodiversity value	Worsen	Lack of consistent and informative awareness and sensitization campaigns delivered by Government or NGOs

c. Illegal logging

Direct Factor	In 5-10 years, will condition improve, worsen, or remain unchanged?	What will drive the change?
Poor law enforcement	Worsen	• Fewer rangers on patrol – fewer patrols conducted • Less budget for law enforcement implementation • Lack of capacity for implementing effective law enforcement • Less trust from international communities Increased corruption
Poverty	Worsen	• Population increase • Poor agriculture techniques • Unemployment and lack of alternative livelihoods
High demand for timber (both local and international)	Worsen	• Population growth leading increase in demand • Income of people increase lead to demand timber • High price of timber

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

Based on the Problem Flow Diagrams developed for each of the three Focal Issues (see Section 5.1.3), several strategic project entry points were discussed and agreed upon during the BIA workshop, as the most likely strategies/activities to address root causes of the problems identified – these would mainly address the issues or factors projected in the preceding section as likely to get worse in the absence of the SCRP. These would thus constitute the project activities that if implemented would follow the theory of change logic developed in the Results Chains (see Figure 17) to lead to the desired outcomes. They include:

1. Enhance security and law enforcement: this could be achieved through increasing number, capacity and welfare (motivation) of rangers to enhance effectiveness of patrols and ensuing judicial action
2. Land Use Planning and Zoning: this includes creating buffer zones and Community Protected Areas, creating or enhancing protection of critical wildlife habitat and corridors across the SCRP
3. Capacity building of local communities: this would focus on provision of seed capital, alternative livelihoods and income-generating activities, plus agricultural training including effective livestock husbandry

4. Greater awareness and sensitization: this could focus on land tenure and land-use issues in the region, as well as importance and avenues for participating in biodiversity conservation including discouraging dependence on wildlife meat and timber for furniture needs

These strategies seek to build on and expand the Project partner WA's successful three-pronged conservation approach in this landscape: systematic ranger patrols to stop forest clearing and wildlife poaching, profitable alternative livelihoods with local communities so they no longer needed to depend on harvesting the forest and its wildlife, and persistent sensitization and advocacy.

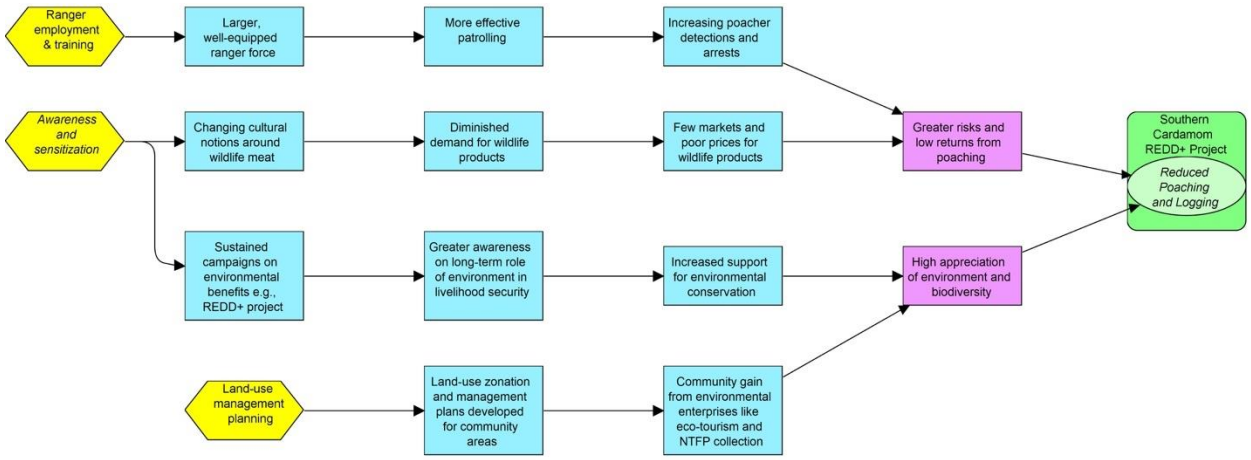
Theory of Change Statements

Based on the extensive experience of the Project partner WA in working on biodiversity conservation and community projects in the SCRP landscape, a literature review, and from information obtained from the BIA workshop, we applied the theory of change approach to substantiate our project rationale and to produce indicators for the CCB monitoring plan. A theory of change is a hypothesis about how a project intends to achieve its stated objectives, or a roadmap of how it plans to get from project activities to project impacts (Richards & Panfil, 2011). As such, we developed a theory of change for each of the three major project activity areas identified: Security and law enforcement, Alternative livelihoods, and Awareness and sensitization.

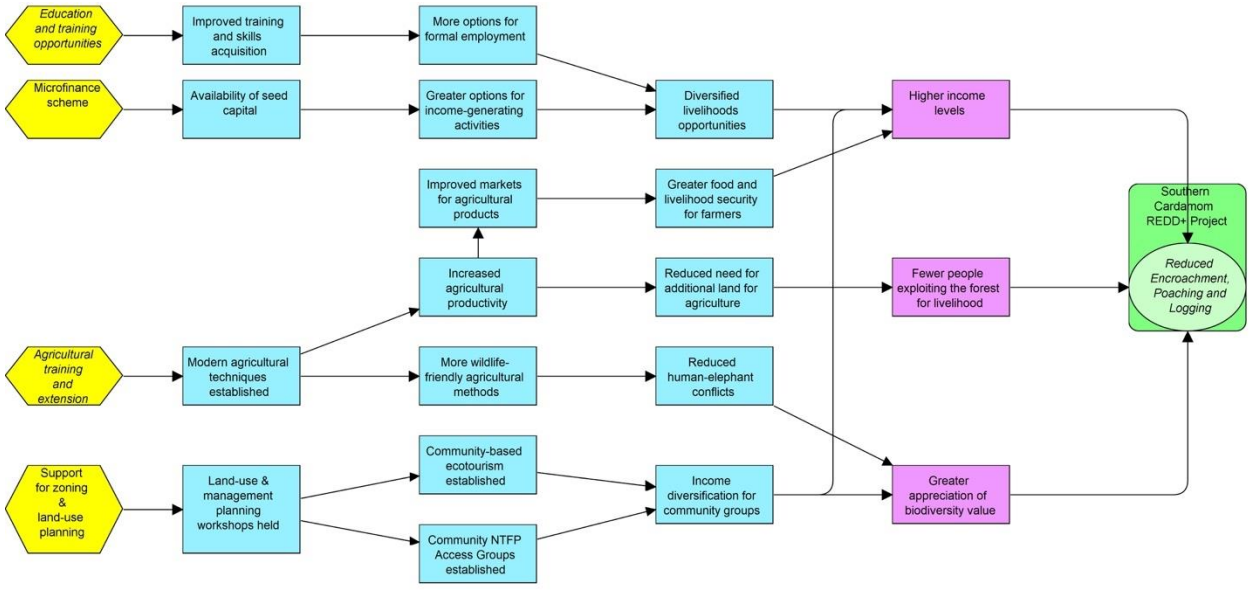
The assumptions we make about the cause-and-effect relationships were made explicit in the Result Chain diagrams (Figure 17) developed by during the BIA workshop, from which the theories of change statements are based. Indicators were developed for key results and assumptions; monitoring of assumptions was included to enable us identify points of deviation early enough. In other words, the indicators outlined in the Monitoring Plan (see Section 5.4) will enable measuring progress towards achieving the desired project activity outcomes and impacts from project activities and strategies.

- ***Activity Area 1: Security and Law Enforcement***: IF budget is increased, IF number of rangers increase and capacity of rangers and managers is improved, IF there more patrols by well-motivated and equipped rangers, and IF relationships with prosecutors and the courts is improved THEN there will be increased numbers of arrests and prosecutions leading to reduced levels of logging, land encroachment, and poaching
- ***Activity Area 2: Alternative Livelihoods***: IF community-based ecotourism and community NTFP groups are established, IF the local community is trained on modern agricultural techniques THEN there will be increased income to local communities and fewer people relying on direct access to the forest for their livelihoods, leading to reduced levels of logging, land encroachment, and poaching
- ***Activity Area 3: Awareness and Sensitization***: IF there is a change in cultural behaviour of wildlife consumers, and IF there is increased knowledge and appreciation of biodiversity amongst local communities, THEN there will be reduced poaching and more people will be participating in conservation.

a) Awareness, Education & Training



b) Alternative Livelihoods



c) Ranger employment & training

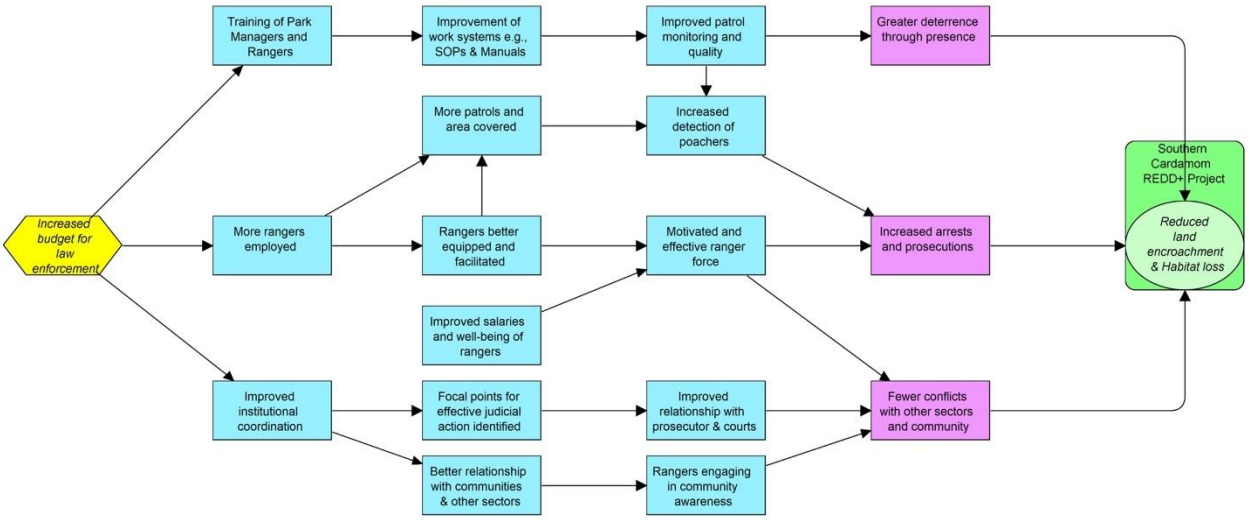


Figure 17: Results Chain diagrams produced for the Focal Issues during the BIA workshop for the SCRP

Change in Biodiversity	Asian elephant
Estimated Change	Consistent or increasing Asian elephant sightings and reduced incidences of poaching.
Justification of Change	The most likely without-project scenario would include increasing poaching and fewer sightings across the SCRP (see Gray et al. 2016). This is a result of the predicted increased deforestation in the baseline, resulting in forest fragmentation and reduced forest area. This would lead to easier access by humans into the forest area, leading to poaching, and reducing the elephant habitat area.

Change in Biodiversity	Reduction in pressure (threats)
Estimated Change	Positive direct change
Justification of Change	Several of the Project Activities are designed to result in a reduction in the amount of deforestation pressure on the forests of the Project Area. This includes:

	Security and enforcement: Setting up new ranger stations and recruiting and equipping additional rangers. Providing training to the ranger teams and further supported through strengthening of legal procedures through the judiciary system. Demarcation and land-use zoning: Working on zoning and demarcation of land for local communities, so that they can claim enough land for permanent agriculture or other livelihoods. Wildlife Rapid Rescue Team: WRRT is a close-knit team of government-led officers who are putting their life on the line to save wild animals from cruel suffering and death. WRRT has the authority to investigate and crack down on wildlife crime in Cambodia. Wildlife Alliance provides animal husbandry (and rehabilitation), technical assistance for investigations, and financial support, with two staff dedicated full time to the unit.

5.2.2 Mitigation Measures (B2.3)

None of the project activities is expected to have any negative impacts on biodiversity, including any of the area's HCVs. On the contrary, they are specifically designed to improve the status of the forest and habitat, as well as reduce any direct threats on wildlife from poaching. The level of uncertainty and risk associated with these activities is very low based on the Project partner's decade-long experience with conservation in this landscape, thus we the precautionary principle was not explicitly applied here.

5.2.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

Comparison of without-project and with-project scenarios

Based on the situation and without-project analyses (Section 5.1.3), most of the Direct Factors across the three Focal Issues were projected as being likely to worsen in the absence of the SCRP, including:

1. Limited law enforcement
2. Demand for land and increasing land prices
3. High economic reward for poaching wildlife
4. Minimal risk of being prosecuted for poaching wildlife
5. Lack of understanding or capacity to show appreciation for biodiversity value
6. High demand for timber (both local and international).

Thus, the project activities planned under Section 5.2.2 will result in clear biodiversity benefits compared to a without-project scenario where all these key factors get worse.

Gold Level for climate change adaptation benefits

The tropical monsoon climate in Cambodia is characterized by two major seasons: May to October monsoon season has heavy rains, high humidity and strong winds, while November to April is the dry season, with little rain, low humidity and not much wind. While modelling climate impacts is complex and difficult to do with any precision, it is clear is that the climate in Cambodia will be increasingly variable and that the impacts of climate change will be evident primarily through extremes in the water resource sector, which will have significant implications for other sectors (Johnston et al. 2010). According to the Cambodian Ministry of the Environment, the direct impacts of climate change will be reflected in changes to the natural rainfall pattern, higher temperatures and the rising sea level, which result in flooding or drought. The direct impacts of climate change – rising temperatures, changing rainfall patterns and sea level rise – generate secondary effects on ecosystems and natural resources (MoE 2002, 2006).

Cambodia's forests will also be affected by climate change impacts. The likely increase in temperature has the potential to change the extent and composition of forests, such as a decrease in wet forests and an increase in moist forests (MRC 2010). Changes to forest composition may lead to changing availability of forest resources for rural livelihoods. Shifting seasons and rainfall patterns may lead to reduced forest productivity and increased risk of forest fires, while mangrove forests in coastal zones may be submerged by rising sea levels. Collectively, these effects could lead to the degradation and/or loss of forests, leading to decreased income security for forest-dependent communities.

Similarly, wildlife dependent on these forest and aquatic habitats would be adversely affected by these changes. Thus, the project directly helps the biodiversity by both mitigating for these effects by reducing emissions, but also adapt to these anticipated changes by maintaining some habitats in good condition for these species, including corridors that make it possible for the wide-ranging species to move in case of drastic changes.

5.2.4 High Conservation Values Protected (B2.4)

Three forms of biodiversity-related HCVs were identified above (Section 5.1.2) for the SCRP.

- Wildlife under threat, i.e., on the IUCN Red List
- Threatened ecosystems – both forests and wetlands
- Critical ecological functions – mainly corridor and watershed services.

By protecting the Southern Cardamom Forest Landscape, the SCRP will be directly protecting vital wildlife habitats, safeguarding critical water resources and maintaining landscape connectivity by keeping the corridor intact and unfragmented. As such, all the high conservation values (at the species, ecosystem or functional levels) will be much better in the 'With Project' versus 'Without Project' scenario for the reasons noted above (Section 5.2.3).

5.2.5 Species Used (B2.5)

All Project Activities that include any planting or reforestation within the Project Zone shall utilize native or naturalized tree/plant species that will be nurtured in nurseries on-site. No non-native species will be used in the Project Accounting Area. All agricultural areas in the landscape have been excised from the Project Accounting Area *a priori*.

5.2.6 Invasive Species (B2.5)

See Section 5.2.5 above.

5.2.7 Impacts of Non-native Species (B2.6)

See Section 5.2.5 above.

5.2.8 GMO Exclusion (B2.7)

No GMOs will be used both within the Project Accounting Area and Project Zone.

5.2.9 Inputs Justification (B2.8)

No inputs such as any fertilizers, chemical pesticides, biological control agents are intended to be used for the Project.

Planned agricultural training for higher yields and better sustainability under the SCRP will be based on climate-smart methods. As indicated under Section 5.2.3, farmers in this region are likely to face seasonal challenges of potential droughts in the dry season and floods due to heavy rains in the wet season. Furthermore, rainfall patterns have been shifting, with longer droughts, short rainy seasons and occasional flash floods. The adverse impacts of these climatic changes include increased risk of poor yields or even crop failure, and greater incidence of pest and diseases.

To enable farmers to adapt to climate change, we will undertake site-specific assessments to identify suitable agricultural production technologies and practices, taking into consideration the local social, economic, and environmental conditions. The Climate Smart Agriculture (CSA) approach we use concentrates on low greenhouse gas emissions as well as pro-poor and market driven climate resilient agriculture. At the farmer level, we will use technological interventions like tarpaulin lined ponds and raised bed gardens, to help farmers to respond to drought and floods respectively. These technologies would allow farmers to prolong the production cycle, diversify production and increase yields, leading to increased household food security and incomes and boosting their resilience to climate change.

5.2.10 Waste Products (B2.9)

The main wastes anticipated from implementation of this project are from construction activities e.g., classrooms, health facilities and any other infrastructure. For any such activity, we will adhere to the national regulations and guidelines, as stipulated under the established Environmental and Social Impact Assessment process.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

There is little chance of having significant negative biodiversity impacts outside the Project Zone for two reasons. Firstly, the sources of threat to biodiversity are mainly local and they are unlikely to be transferred outside the Project Zone (e.g. fuel wood collection and subsistence poaching) since

neighboring forests are either protected or under the jurisdiction of other communities. Secondly, commercial poaching threats related to wildlife trade or concessionary logging, which could be transferred further, are guided by existing Cambodian legislation and hence unlikely to be simply moved elsewhere solely because of implementation the SCRP.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

As there are no anticipated negative offsite impacts to biodiversity, evaluation of unmitigated offsite impacts is not applicable.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

Indicators are important in impact assessment because they respond to the basic question “what should be measured to show that the claimed net social benefits are real and additional?” (Richards & Panfil 2011) An ideal indicator from the perspective of showing attribution is one that measures an ‘intermediate state’ or assumption between an output and outcome or an outcome and an impact, clearly showing progress along a causal chain (Richards & Panfil, 2011). Thus, we used our theory of change logic in the Result Chain diagrams (section 5.2.1) as the basis for selecting indicators that factor in attribution. We then decided on the best sampling methods to use to collect these data to acceptable levels accuracy, precision and cost effectiveness whilst retaining transparency and simplicity. From this, a Monitoring Plan was developed to guide data collection.

Further, the indicators will be analyzed based on the Pressure-State-Response framework, which also relies on a causal-chain logic, where threats negatively impact the status/condition of biodiversity, while responses or project interventions reduce pressure. Most Response indicators can be grouped under: Habitat improvement; Security enhancement; and Improvement of community livelihoods efforts. Pressure indicators fall under: Human population size and dynamics; Human-wildlife conflict (HWC); and Incidences including poaching, grazing, encroachment, charcoal and firewood collection amongst others. Finally, State indicators are grouped into three categories: wildlife (including species presence, diversity, distribution and movement); vegetation and land-use (including changes in various vegetation/habitat types, encroachment and fire). Most of the response and pressure indicators correspond to the social indicators developed in the community monitoring plan (See section 4.4.1), and so data collection follows the protocols outlined therein. On top, we determined 12 indicators not part of the social indicator set, also classified into three categories: Output 4; Outcome 4; and Impact 4 (Table 25). For these new indicators, two main strategies will be used to obtain the data: In-house reporting and Government records, mostly for output and outcome indicators, and surveys for most impact indicators. We envision three main aspects of state indicators to measure, each with a distinct set of monitoring protocols:

Wildlife: wildlife surveys and monitoring for all species – with a focus on HCVs – will be done using several methods: ranger patrols, camera traps, fecal-DNA analysis, and information from any independent research projects in the area

Vegetation and land-use: carbon plot monitoring plots and remote sensing (based on LANDSAT imagery) and GIS techniques (see section 0).

Biodiversity Impact Assessment: Monitoring Plan

Table 25: Project biodiversity impact assessment for monitoring plan.

Focal Issue	Key results	SMART Objective	Indicator Code	Indicator	Indicator type	Data collection method	Who?	When?	Where?
Forest destruction and land encroachment	*Decrease in illegal logging*	*By 2027, reduce the number of illegal logging incidents by half in the SCRP*		*Seven indicators included in the SIA Monitoring Plan*					
	Decrease in encroachment and land-grabbing	*By 2022, two CPA are created, registered at MoE and their NTFPs can access markets*		*Eight related indicators included in the SIA Monitoring Plan*					
			BIA003	# and types of NTFPs sold in markets	Impact	CPA records	Community outreach	Annually	Project Zone
			BIA004	Amount of revenue accruing from NTFP sales from the area	Impact	CPA records	Community outreach	Annually	Project Zone

Wildlife poaching	*Greater community participation in eco-tourism activities*	*By 2022 >2000 tourists visit CBET sites established and registered by MOE and MOT*		*Six indicators included in the SIA Monitoring Plan*					
	Greater appreciation and awareness of wildlife benefits	*By 2022, 25% more community members demonstrate greater appreciation for wildlife and conservation*		*Three related indicators included in the SIA Monitoring Plan*					
			BIA005	# conservation-friendly groups or curricula created or developed	Output	Internal reports	Community outreach	Annually	Project Zone
			BIA006	% families engaging in illegal wildlife trade through selling wildlife meat products	Impact	Household survey	Social monitoring	Annually	Project Zone
	Increase in wildlife populations	*By 2027, reduce the number of wildlife poaching*		*Seven related indicators included in the SIA Monitoring Plan*					

	including HCVs	*incidents by half in the SCRP*							
			BIA007	# ranger training sessions undertaken	Output	Internal reports	Security	Bi-annually	Project Area
			BIA008	# ranger exchange programs undertaken	Output	Internal reports	HR & Security	Bi-annually	Project Area
			BIA009	# rangers trained or involved in exchange programs	Output	Internal reports	HR & Security	Bi-annually	Project Area
			BIA010	# poacher cases resulting in convictions	Outcome	Government records	Security	Annually	Project Area
			BIA011	Presence, Abundance and Distribution of key HCVs	Impact	Patrols, Camera traps & Indirect e.g., Fecal	Biodiversity monitoring	Annually	Project Area
Poor community livelihoods	*Reduced cost of living*	*By 2027, 10% of community members with direct livelihood benefits from the SCRP*		*12 indicators included in the SIA Monitoring Plan*					

	Higher income levels	*By 2027, 10% of community members earning income directly from the SCRP and associated activities*		*Six related indicators included in the SIA Monitoring Plan*					
			BIA012	Amount of investment leveraged from external sources including Government and private sector for financing community ventures	Outcome	Internal reports	Accounts	Annually	Project Zone

5.4.1.1 Development of a plan for assessing the effectiveness of measures to maintain or enhance biodiversity HCVs (B4.2.).

Biodiversity HCVs, such as critically endangered species, key threatened ecosystems and ecosystem services, biome, corridor function, are captured in the Monitoring Plan above.

5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The SCRP will disseminate the biodiversity monitoring plan and the results of the monitoring within 12 months of validation. These documents will be made publicly available on the internet on CCB and VCS websites and linked to Wildlife Alliance website too. They will also be communicated to the communities and other stakeholders (including the Government and Local Authorities) using diverse media including presentations, reports, brochures and orally during community awareness and sensitization meetings, and annual SIA workshops.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

This project is seeking Exceptional Biodiversity Benefits based on the presence of IUCN Red Listed species and critical ecological functions.

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

THE SCRP meets the criteria for high conservation priority status. Please refer to Table 26 below for HCV species listing and their associated IUCN statuses.

Table 26 IUCN Endangered status of species in the SCRP Project Area

Aves (Birds)		
Sarus Crane *Grus antigone*	VU	National
Asian wooly neck *Ciconia episcopus*	VU	Regional
Masked finfoot Heliopais personatus	EN	Regional
Lesser Adjutant Leptopilos javanicus	VU	National
Great Slaty Woodpecker Mulleripicus pulverulentus	VU	National
Milky Stork Mycteria cinerea	EN	Regional
Green peafowl Pavo muticus	EN	Global
Giant ibis Thaumatibis gigantea	CR	Global
White-eared night heron Gorsachius magnificus	EN	Global

Mammalia (Mammals)		
Binturong Arctis binturong	VU	National
Greater hog badger Arctonyx collaris	VU	Global
Hog deer Axis porcinis	EN	Global
Gaur Bos gaurus	VU	Regional
Dhole Cuon alpinus	EN	Regional
Asian elephant Elephas maximus	EN	Regional
Sun bear Helarctos malayanus	VU	Global
Pileated gibbon Hylobates pileatus	EN	Global
Hairy-nosed Otter Lutra sumatrana	EN	Regional
Smooth-coated Otter Lutrogale perspicillata	VU	Regional
Northern Pig-tailed Macaque Macaca leonina	VU	Regional
Mainland clouded leopard Neofelis nebulosa	VU	Regional
Sambar Rusa unicolor	VU	Regional
Sunda Pangolin Manis javonica	CR	Regional
Bengal slow loris Nycticebus bengalensis	VU	Regional
Indochinese lutung Trachypithecus germaini	EN	Global
Asiatic Black Bear Ursus thibetanus	VU	National
Large-spotted civet Viverra megaspilla	EN	Global
Reptilia (reptiles)		
Asiatic Softshell Turtle Amyda cartilaginea	VU	Regional
Southern river terrapin Batagar affinis	CR	Global

Siamese crocodile Crocodylus siamensis	CR	Global
Southeast Asian Box Turtle Cuora amboinensis	VU	Regional
Yellow-headed Temple Turtle Heosemys annandalii	EN	Regional
King cobra Ophiophagus hannah	VU	National
Burmese python Python bivittatus	VU	Regional
Elongated tortoise Indotestudo elongata	EN	Regional

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

As mentioned in section 5.1.1, this landscape is poorly studied and apart from a few scattered studies, no comprehensive work has been undertaken to estimate the abundance of endangered wildlife. As such, apart from some signs of species recovery in specific areas (e.g., see Daltry et al. 2000, 2003; Gray et al. 2016) it is not possible at present to either provide current numbers or trends, and consequently, estimates for the end of the project.

However, based on a pressure-response-state framework (see Section 5.4.1) general without-project trends are possible to project, mainly potentially declining due to a combination of habitat loss, habitat fragmentation and poaching largely for the illegal wildlife trade (including animals caught as by-catch in snares; Gray et al. 2017). Given the currently poor or limited levels of law enforcement across the landscape, coupled with minimal livelihood and job opportunities for the local communities, loss of critical forest and wetland habitats is likely to continue without the SCRP intervention, whether from community encroachment or economic/social land concessions. Coupled with the associated logging and poaching activities, this is likely to lead to a reduction in most, if not all, of these threatened species.

Given this likely scenario, the proposed activities under our theory of change (Section 5.2.1) will lead to an improved status for most of the threatened species. As detailed in Section 5.2.4, critical ecological functions (e.g., watershed, fisheries and corridor) will also be conserved and improved, thereby providing additional benefits for the endangered biodiversity.

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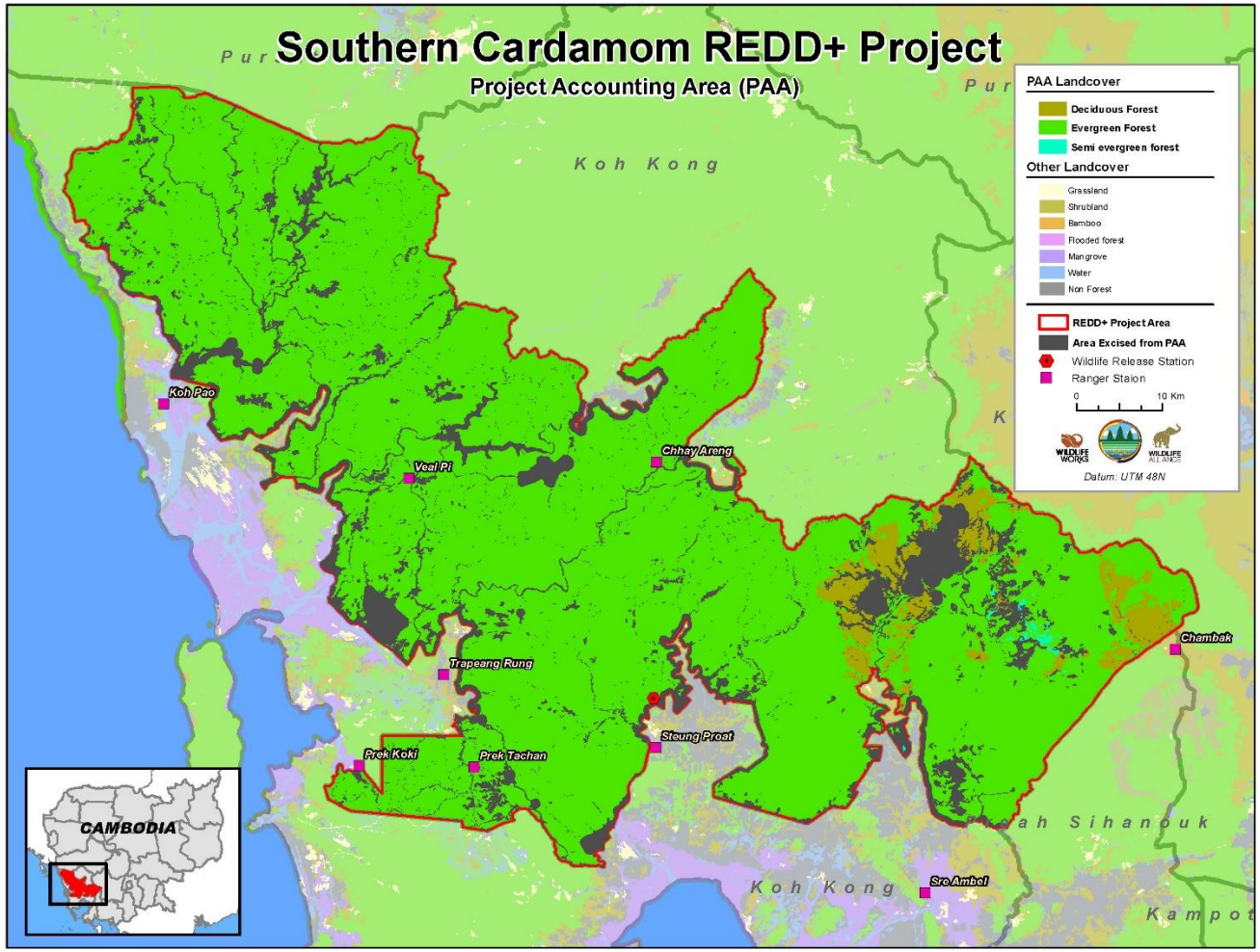
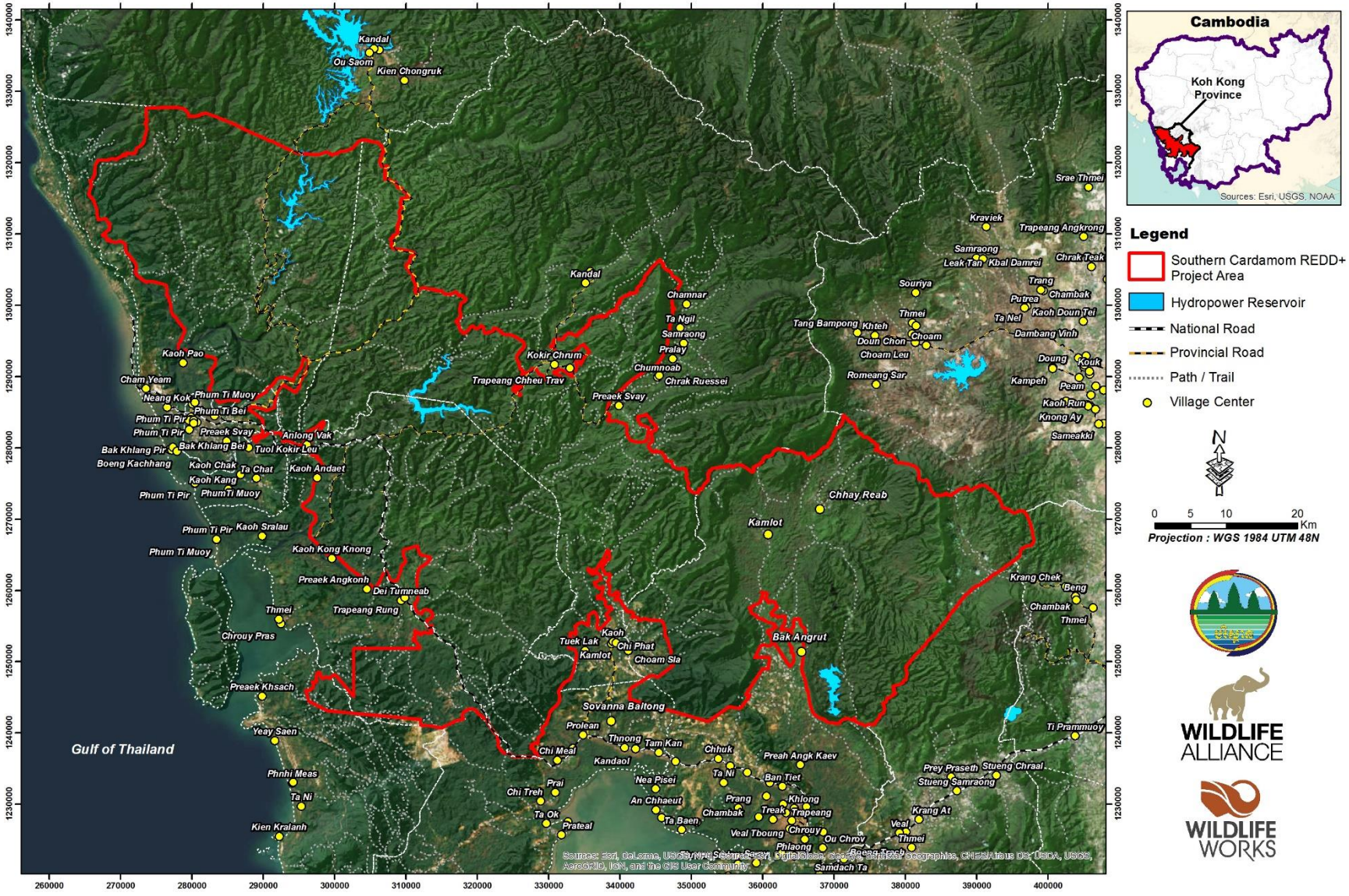
APPENDICES

Appendix A: Project Area Maps



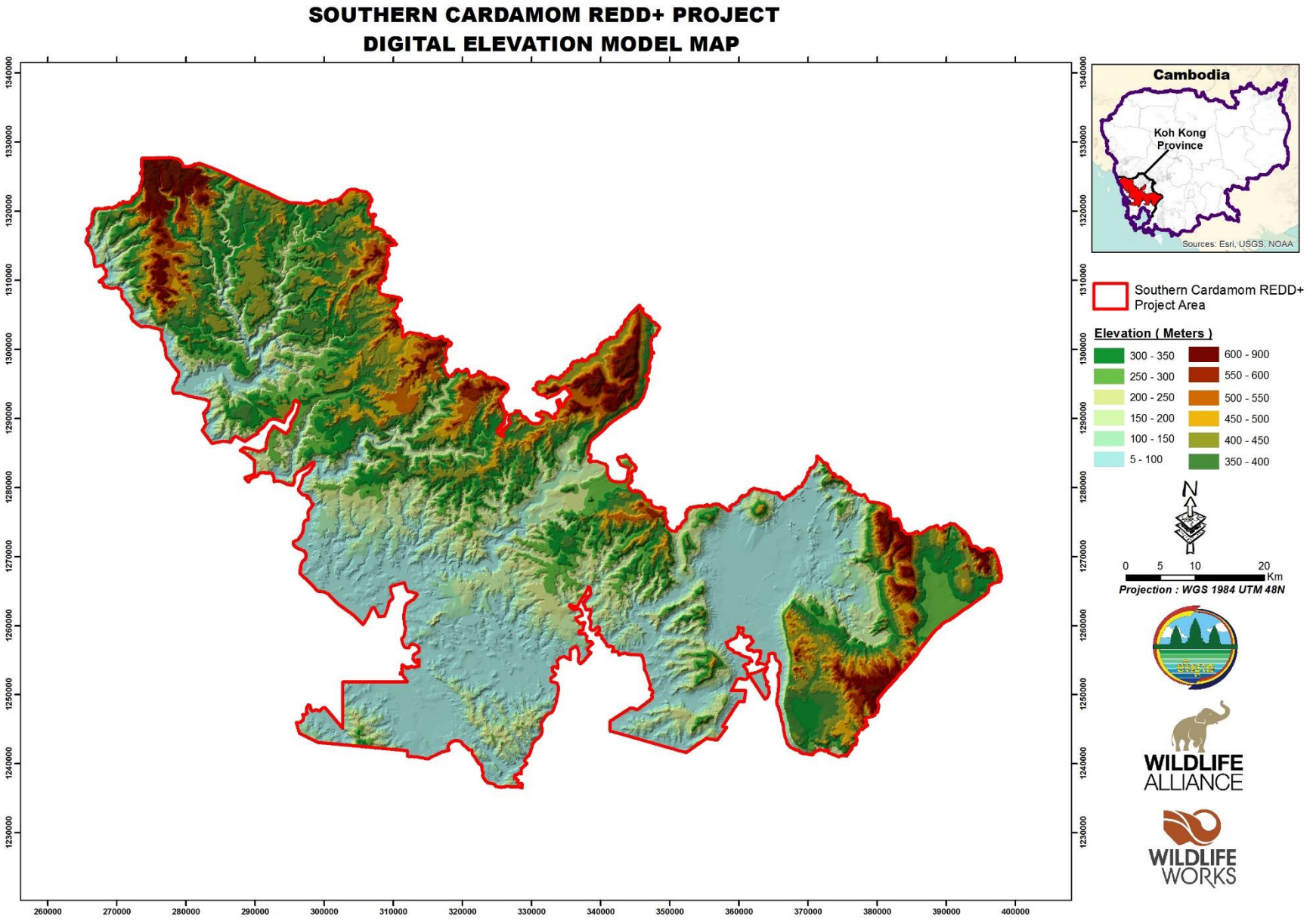
SOUTHERN CARDAMOM REDD+ PROJECT
PROJECT AREA INFRASTUCTURE MAP



SOUTHERN CARDAMOM REDD+ PROJECT
RIVERS AND STREAMS MAP

WILDLIFE ALLIANCE

WILDLIFE WORKS


SOUTHERN CARDAMOM REDD+ PROJECT
DIGITAL ELEVATION MODEL MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Elevation (Meters)
300 - 350
250 - 300
200 - 250
150 - 200
100 - 150
5 - 100
600 - 900
550 - 600
500 - 550
450 - 500
400 - 450
350 - 400
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
270000
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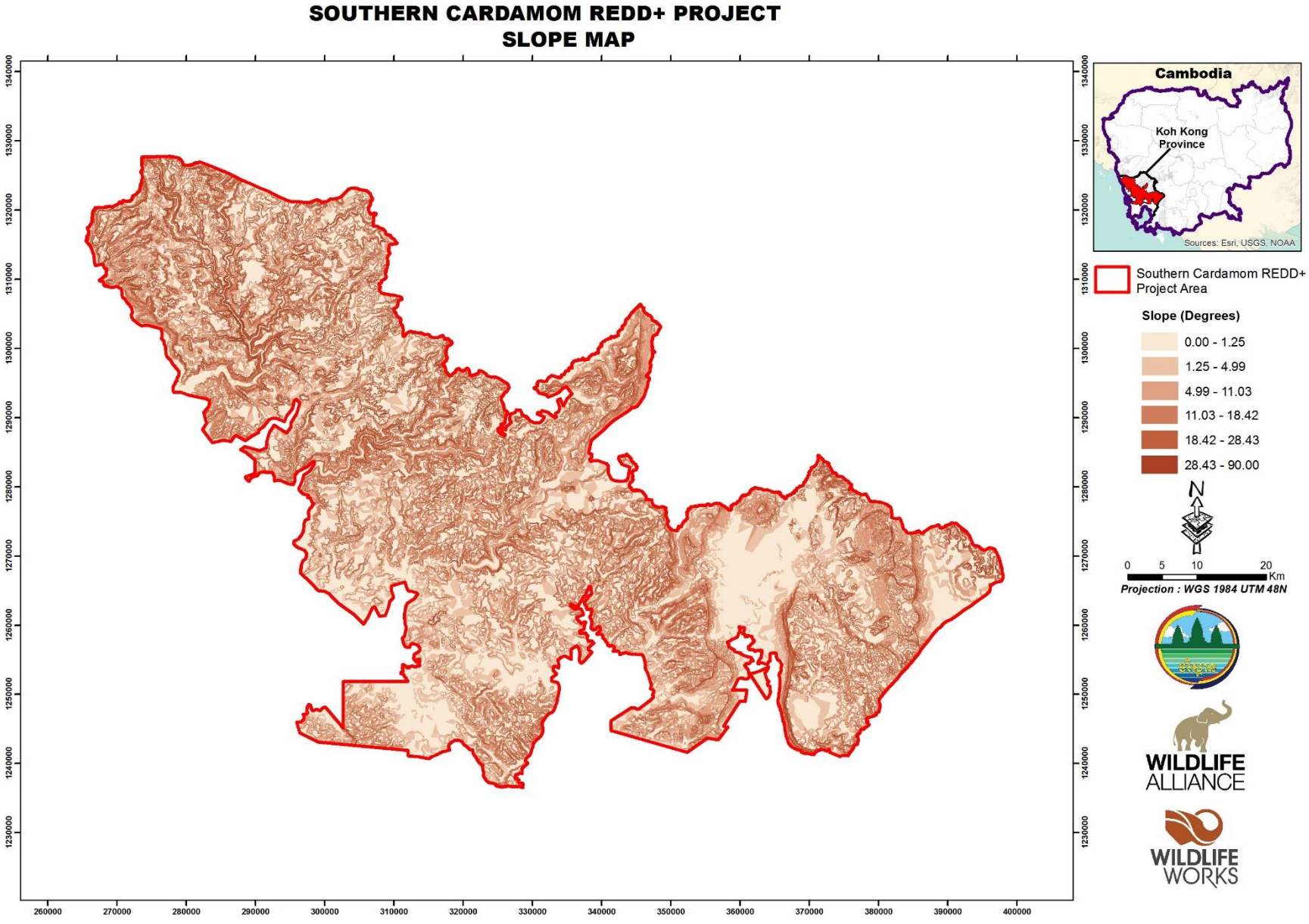
370000
380000
390000
400000


SOUTHERN CARDAMOM REDD+ PROJECT
SLOPE MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Slope (Degrees)
0.00 - 1.25
1.25 - 4.99
4.99 - 11.03
11.03 - 18.42
18.42 - 28.43
28.43 - 90.00
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
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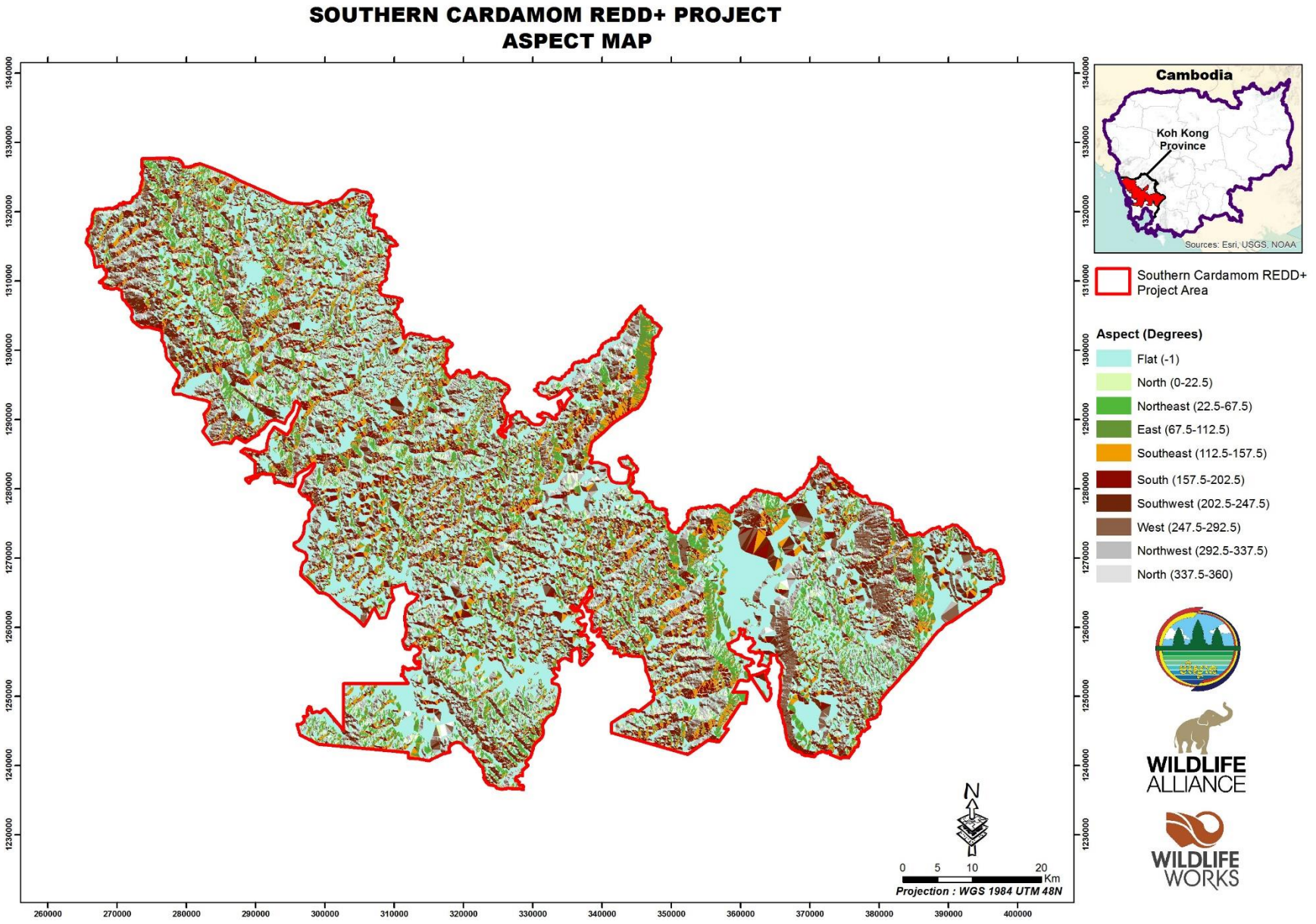
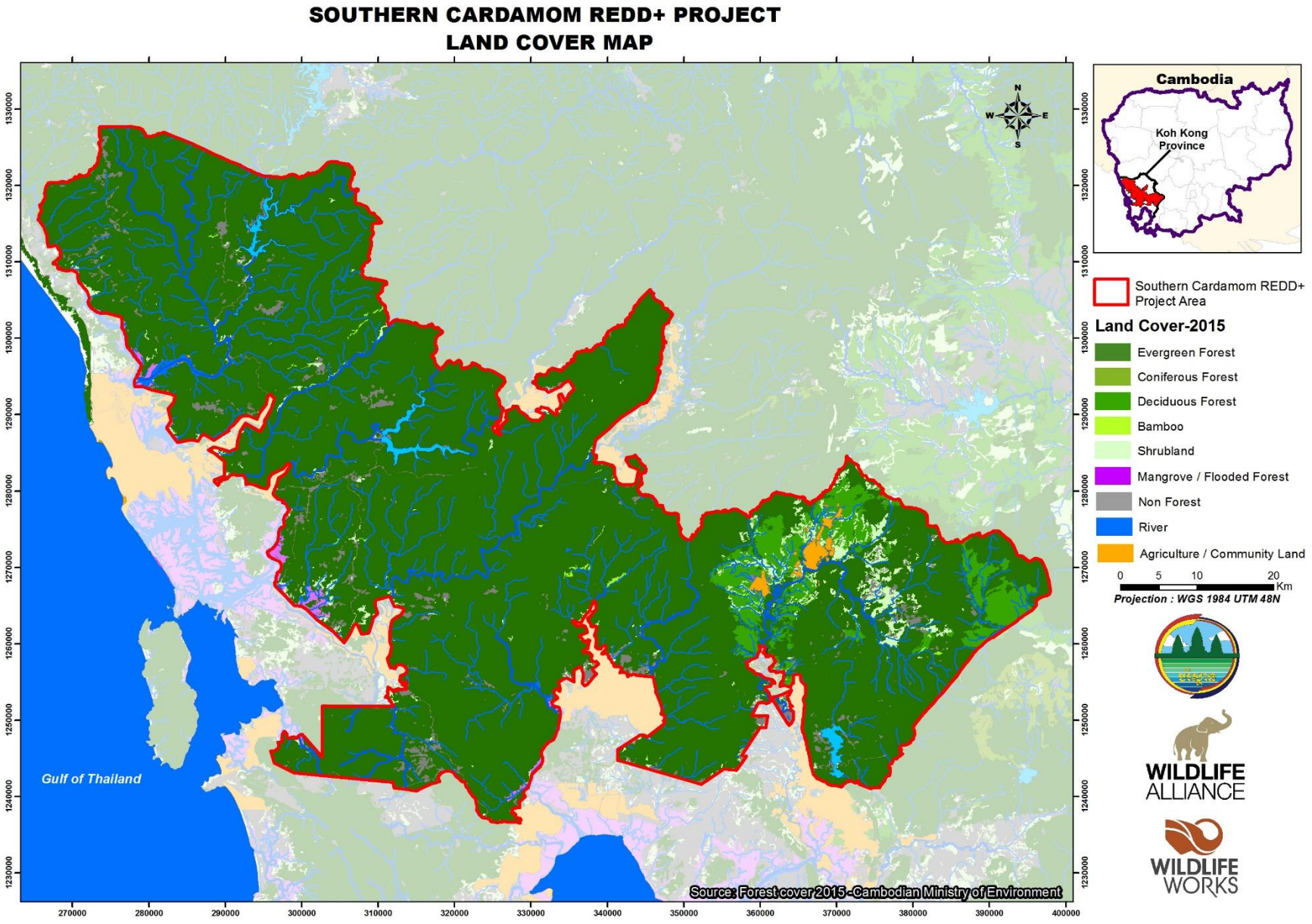
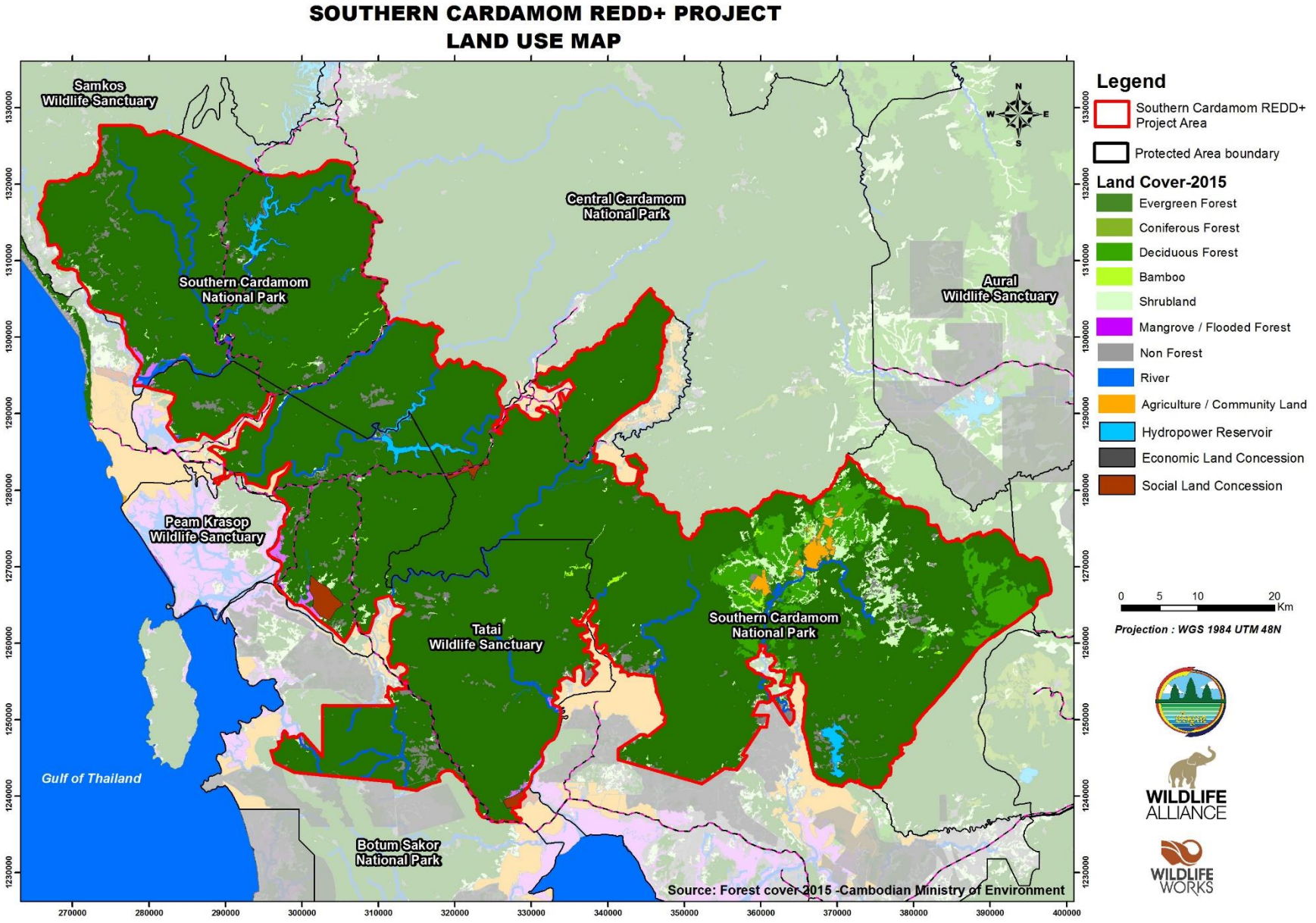
400000

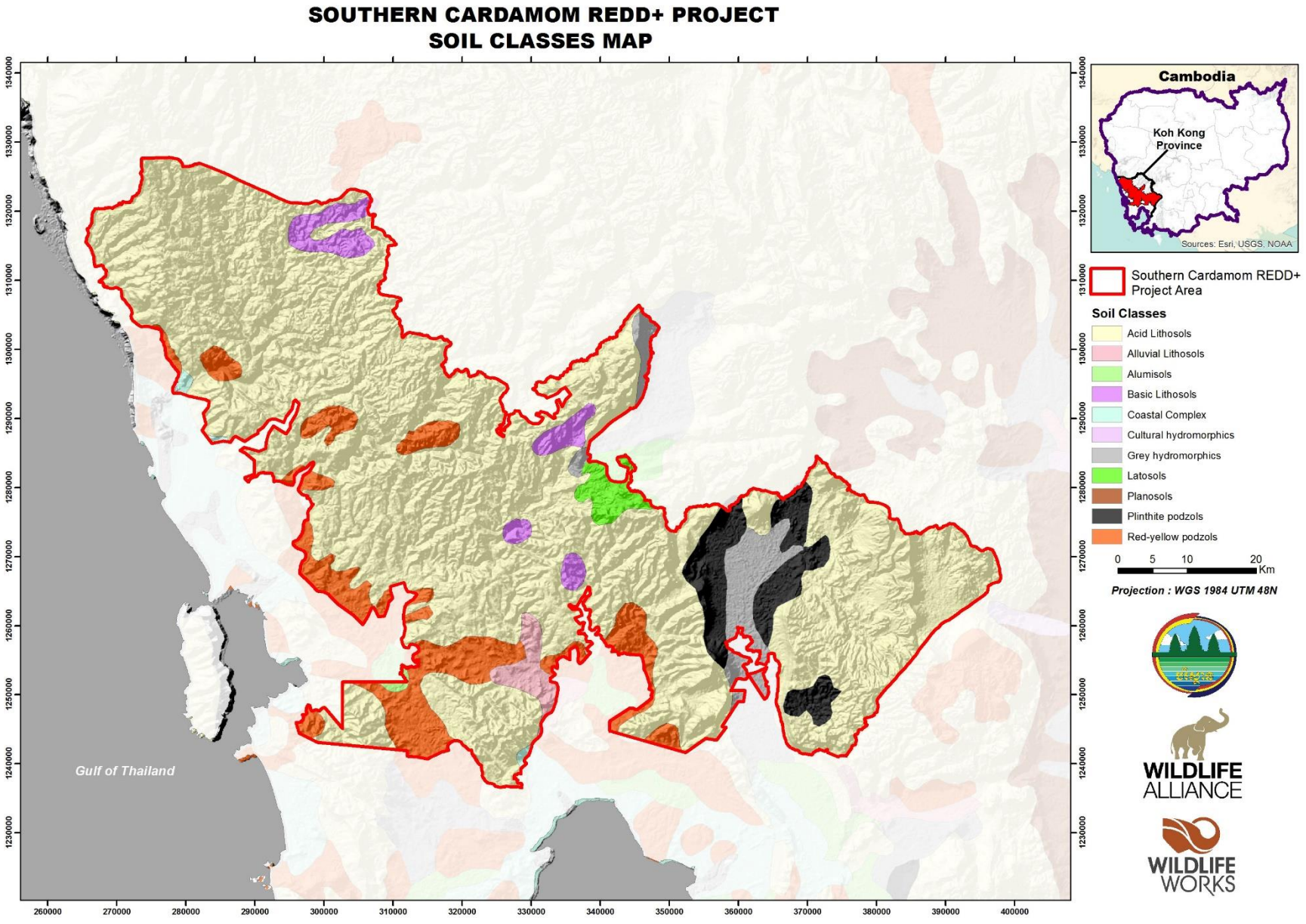


WILDLIFE ALLIANCE

WILDLIFE WORKS


SOUTHERN CARDAMOM REDD+ PROJECT
LAND COVER MAP
Cambodia
Koh Kong Province
Southern Cardamom REDD+ Project Area
Land Cover-2015
Evergreen Forest
Coniferous Forest
Deciduous Forest
Bamboo
Shrubland
Mangrove / Flooded Forest
Non Forest
River
Agriculture / Community Land
0 5 10 20 Km
Projection : WGS 1984 UTM 48N
Gulf of Thailand
Source: Forest cover 2015 -Cambodian Ministry of Environment
WILDLIFE ALLIANCE
WILDLIFE WORKS

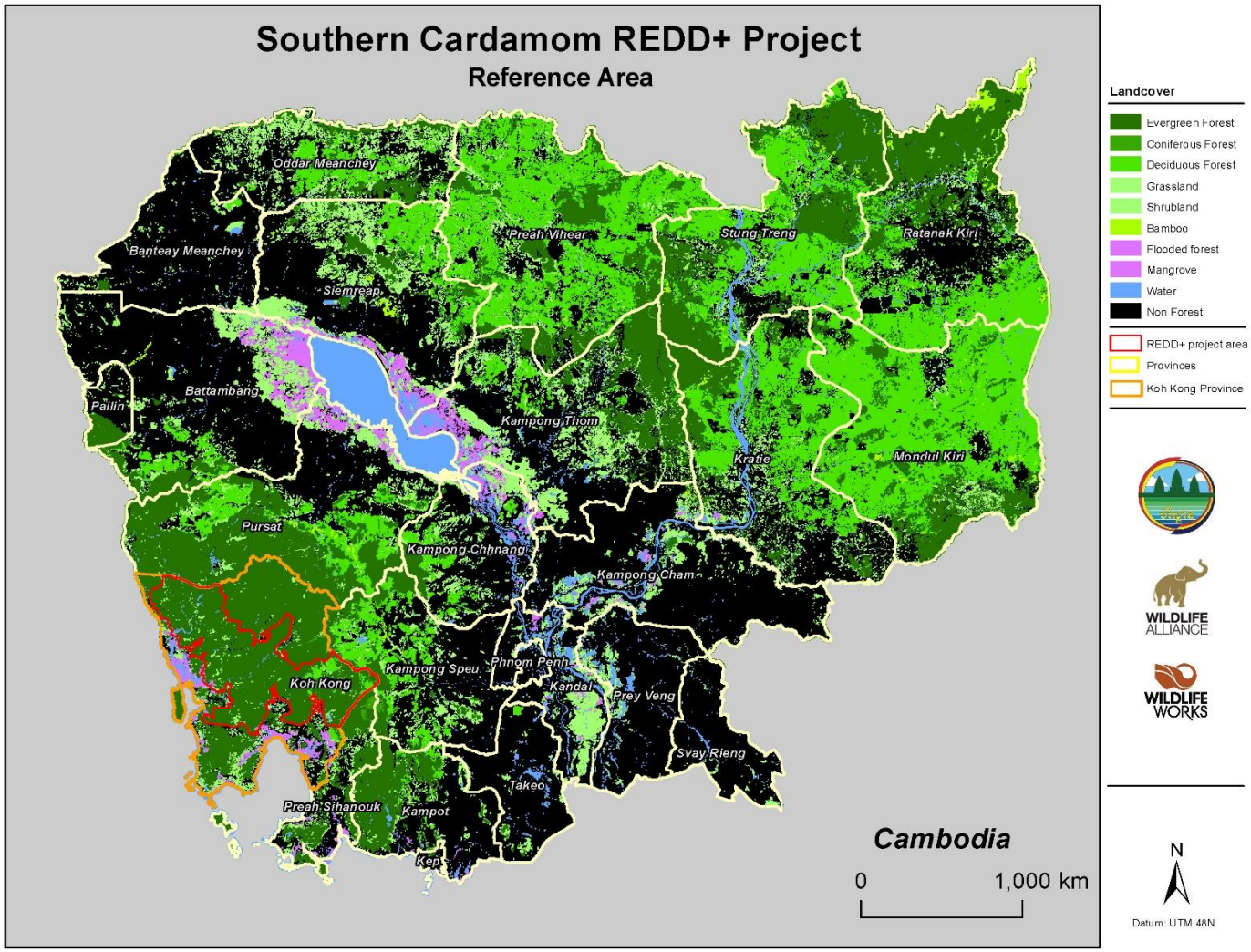

SOUTHERN CARDAMOM REDD+ PROJECT
LAND USE MAP
Samkos Wildlife Sanctuary
Central Cardamom National Park
Southern Cardamom National Park
Aural Wildlife Sanctuary
Peam Krasop Wildlife Sanctuary
Tatai Wildlife Sanctuary
Southern Cardamom National Park
Gulf of Thailand
Botum Sakor National Park
Source: Forest cover 2015 -Cambodian Ministry of Environment
Legend
Southern Cardamom REDD+ Project Area
Protected Area boundary
Land Cover-2015
Evergreen Forest
Coniferous Forest
Deciduous Forest
Bamboo
Shrubland
Mangrove / Flooded Forest
Non Forest
River
Agriculture / Community Land
Hydropower Reservoir
Economic Land Concession
Social Land Concession
0 5 10 20 Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS

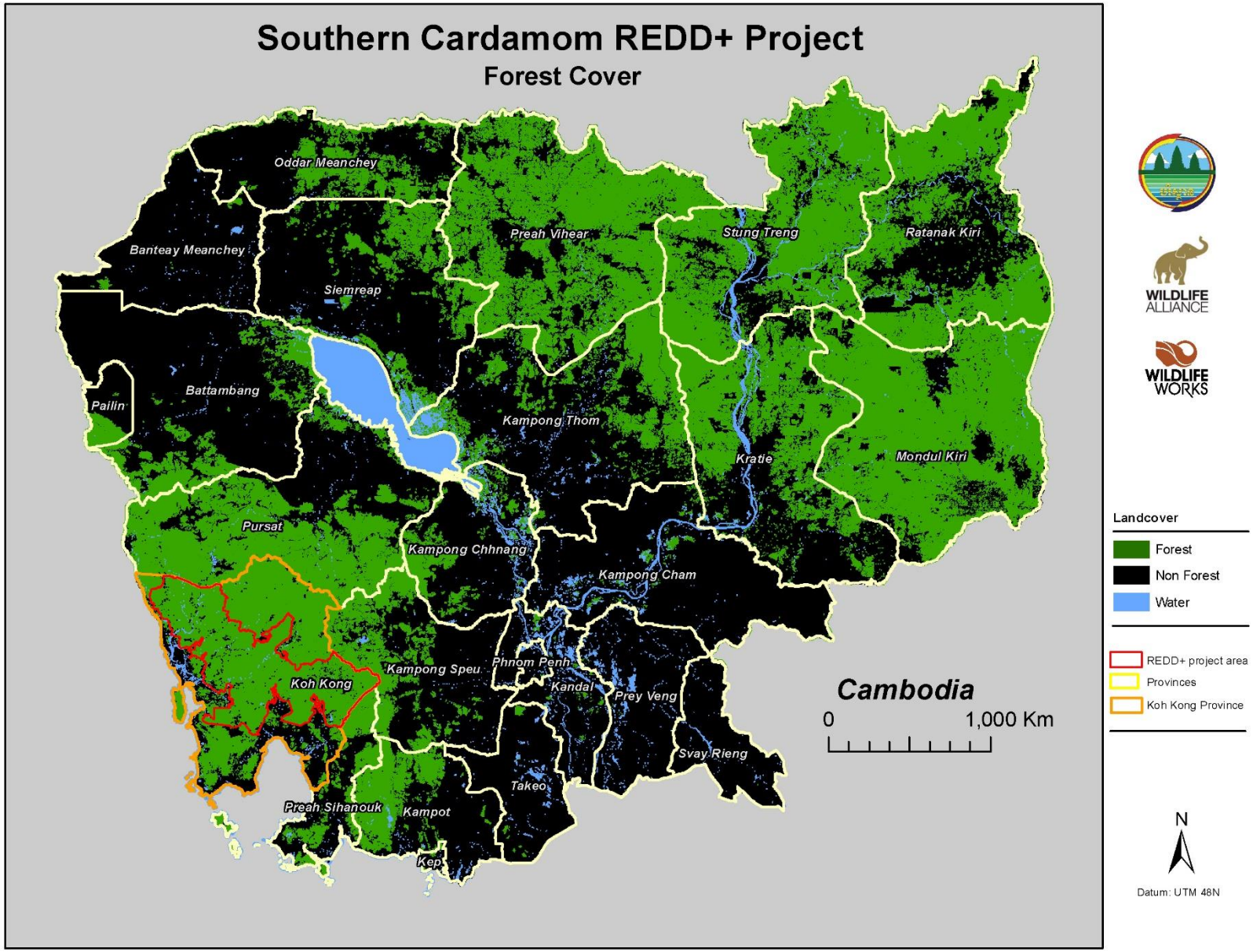


WILDLIFE ALLIANCE

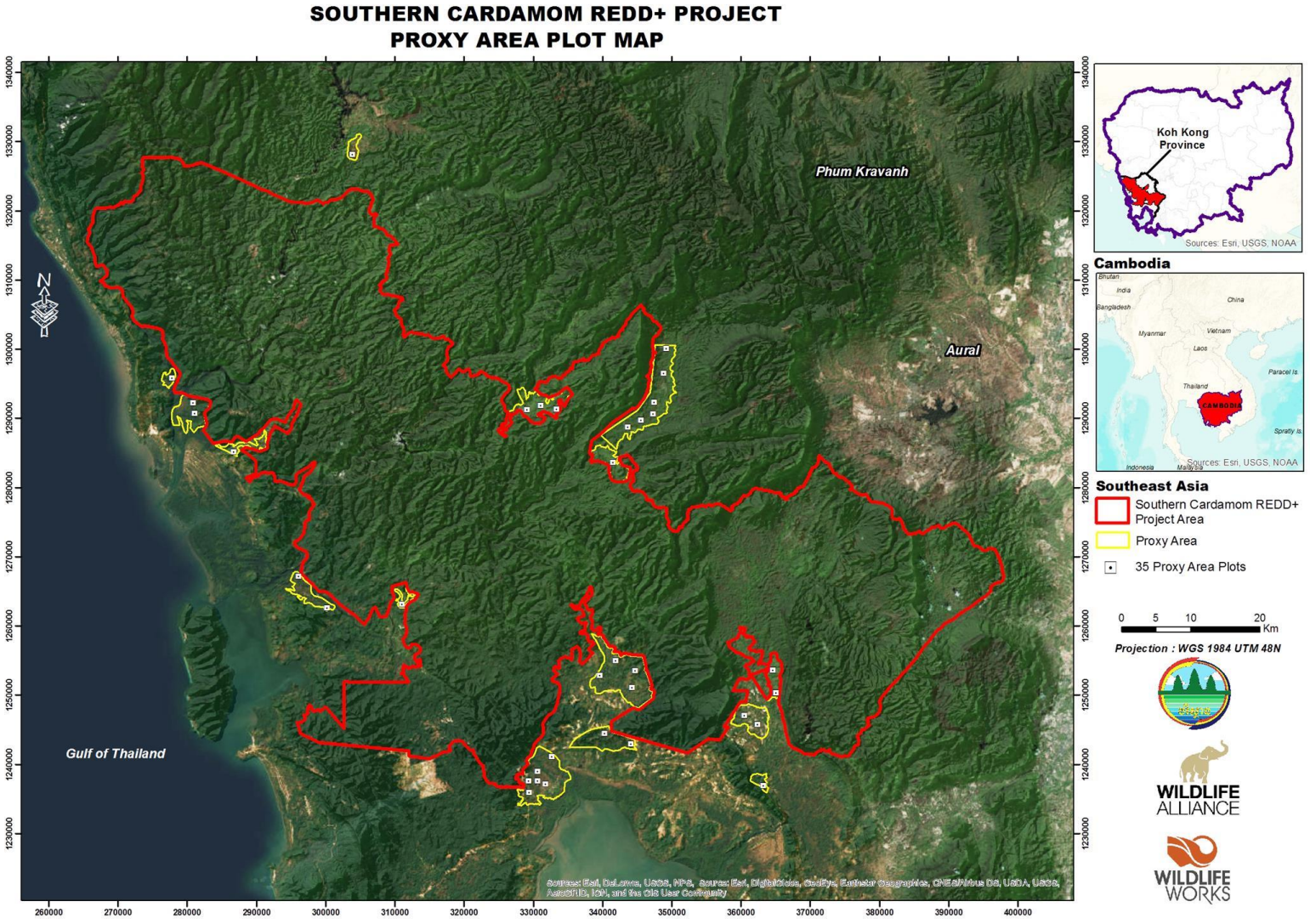
WILDLIFE WORKS

Appendix B: Reference Area Maps

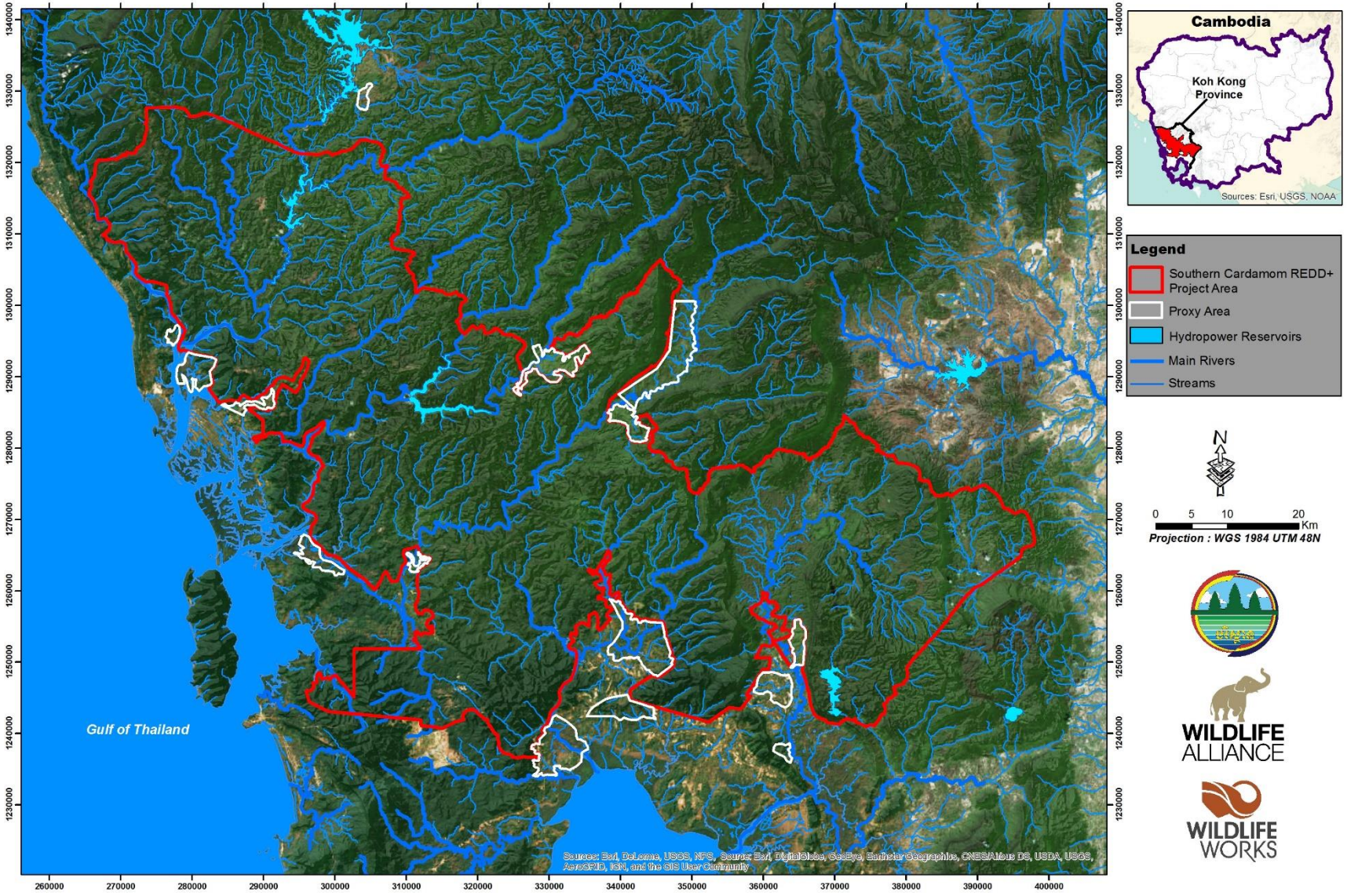



Southern Cardamom REDD+ Project
Forest Cover
Oddar Meanchey
Banteay Meanchey
Siemreap
Preah Vihear
Stung Treng
Ratanak Kiri
Battambang
Pailin
Kampong Thom
Kratie
Mondul Kiri
Pursat
Kampong Chhnang
Kampong Cham
Kampong Speu
Phnom Penh
Koh Kong
Kandal
Prey Veng
Svay Rieng
Takeo
Preah Sihanouk
Kampot
Kep
Cambodia
0
1,000 Km
WILDLIFE ALLIANCE
WILDLIFE WORKS
Landcover
Forest
Non Forest
Water
REDD+ project area
Provinces
Koh Kong Province
N
Datum: UTM 48N

Appendix C: Proxy Area Maps

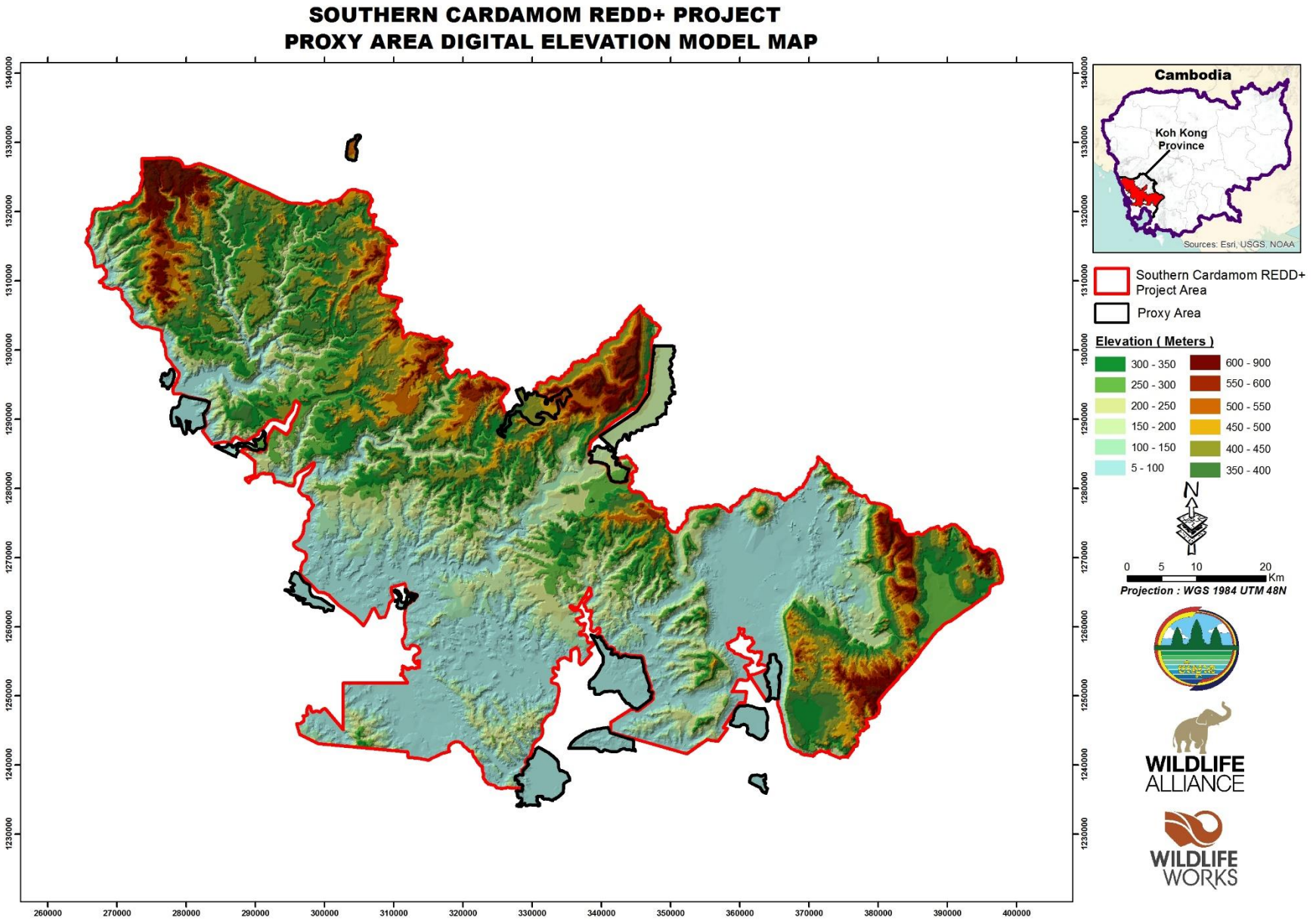


SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA RIVERS AND STREAMS MAP



WILDLIFE ALLIANCE

WILDLIFE WORKS


SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA DIGITAL ELEVATION MODEL MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Proxy Area
Elevation (Meters)
300 - 350
250 - 300
200 - 250
150 - 200
100 - 150
5 - 100
600 - 900
550 - 600
500 - 550
450 - 500
400 - 450
350 - 400
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
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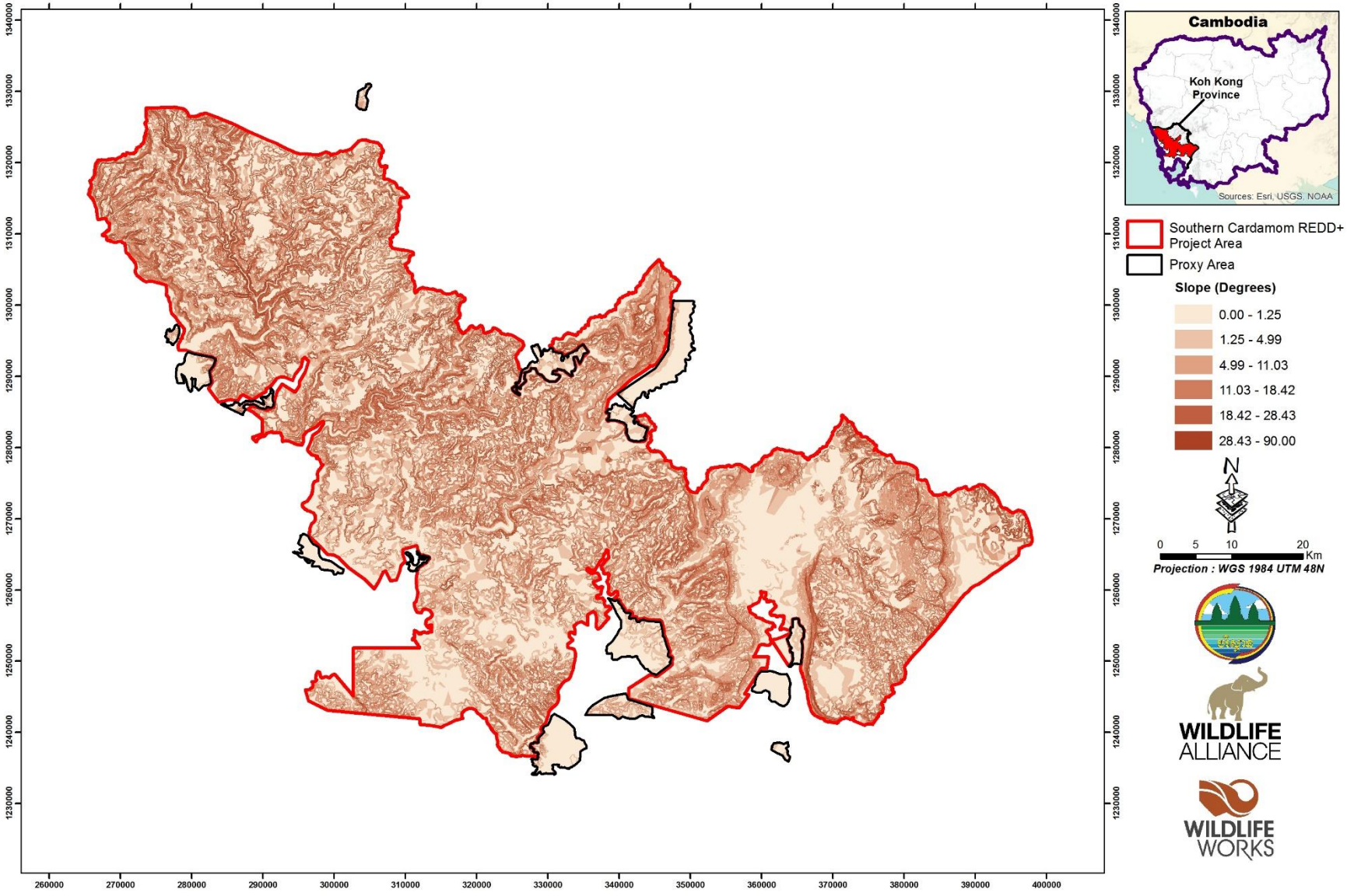
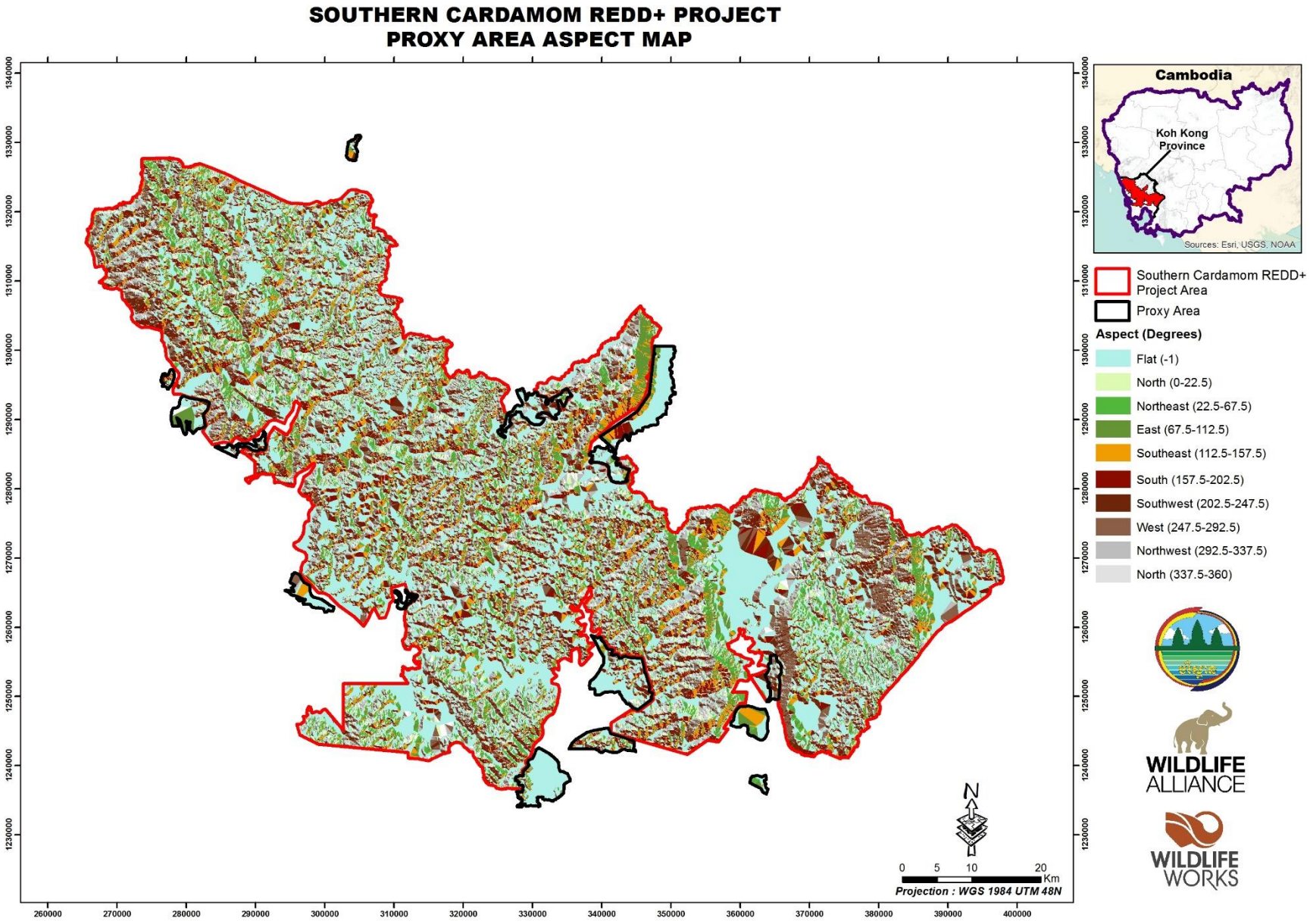
370000
380000
390000
400000

SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA SLOPE MAP

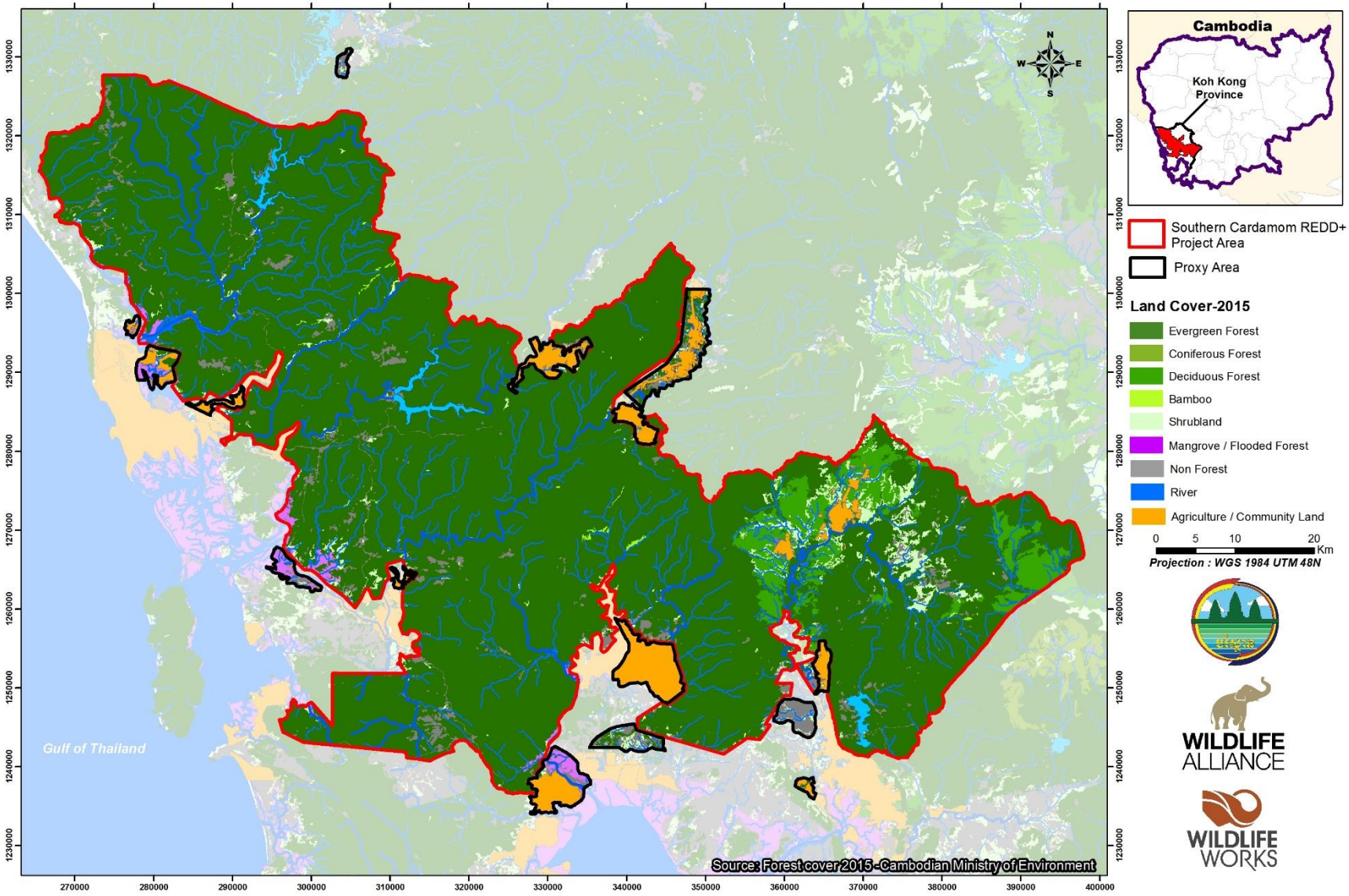




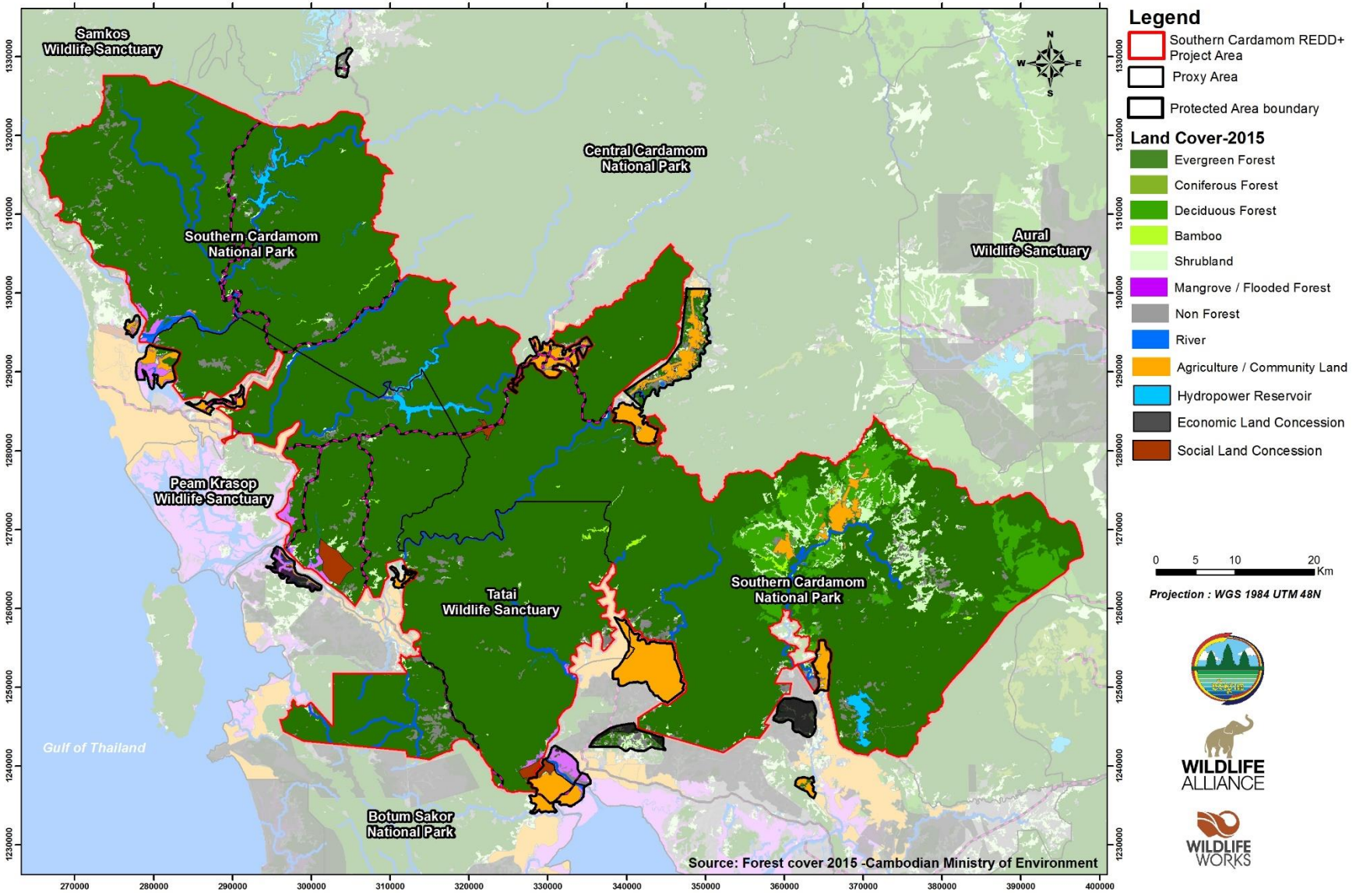
WILDLIFE ALLIANCE

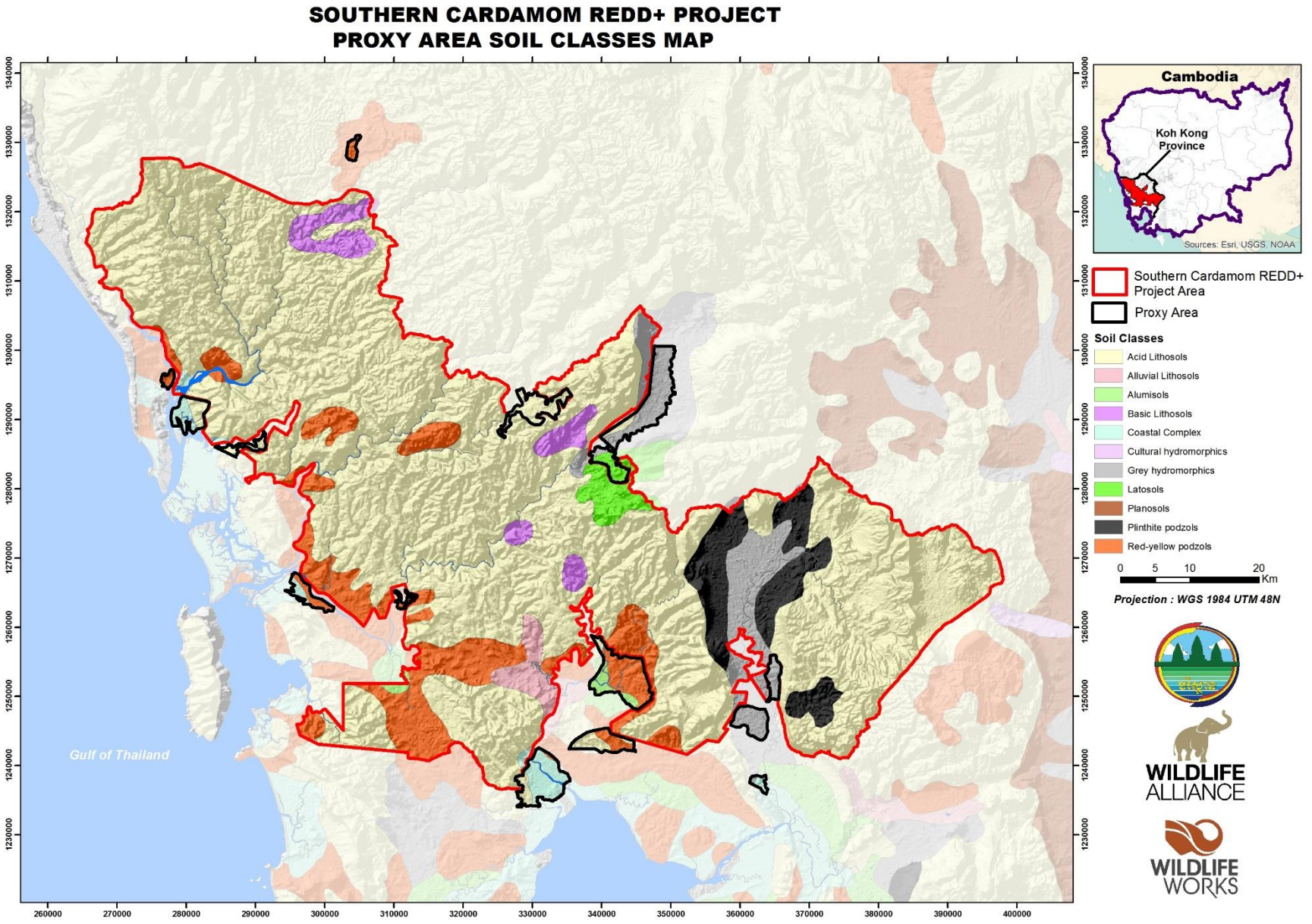
WILDLIFE WORKS

SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA LAND COVER MAP

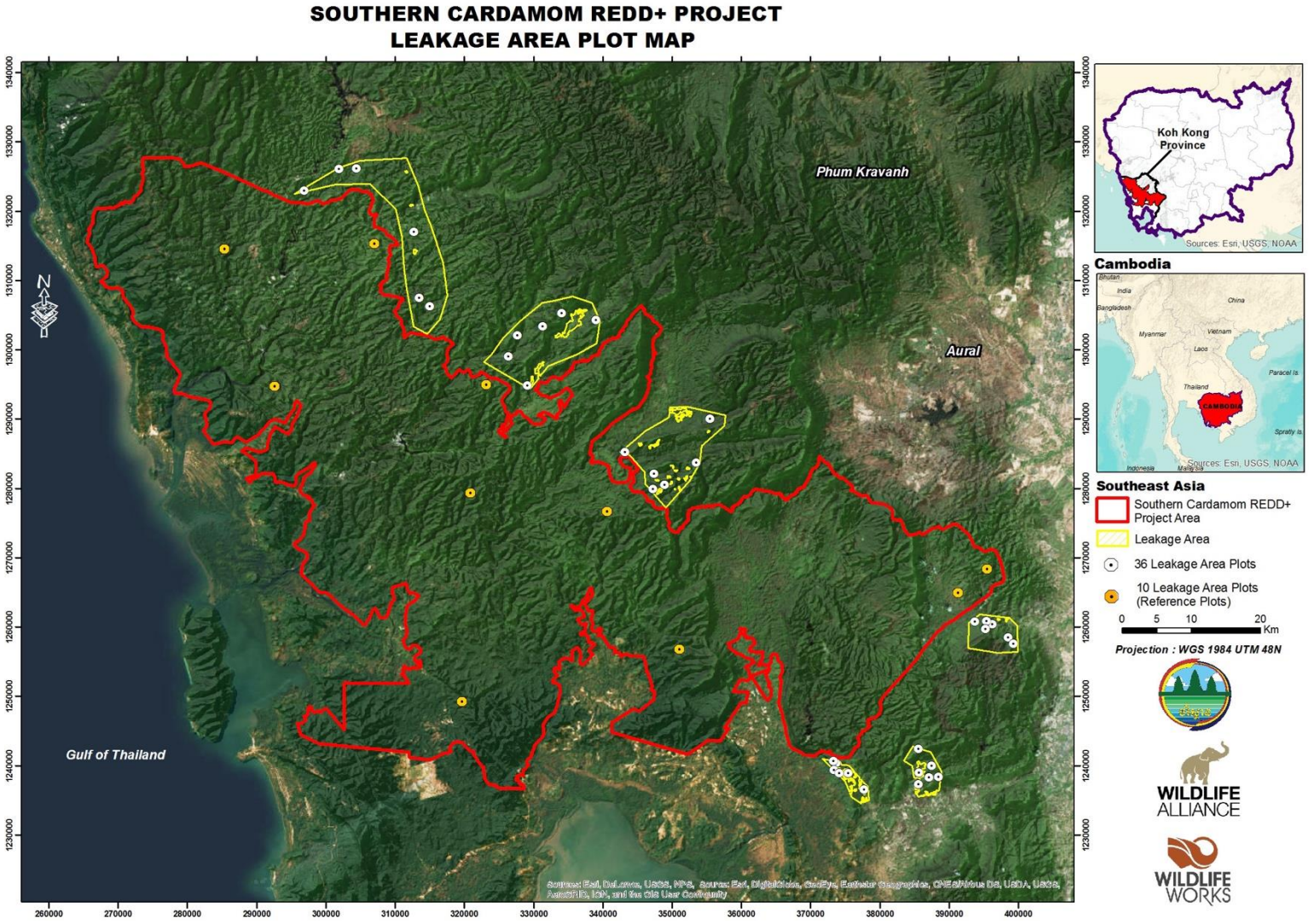


SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA LAND USE MAP

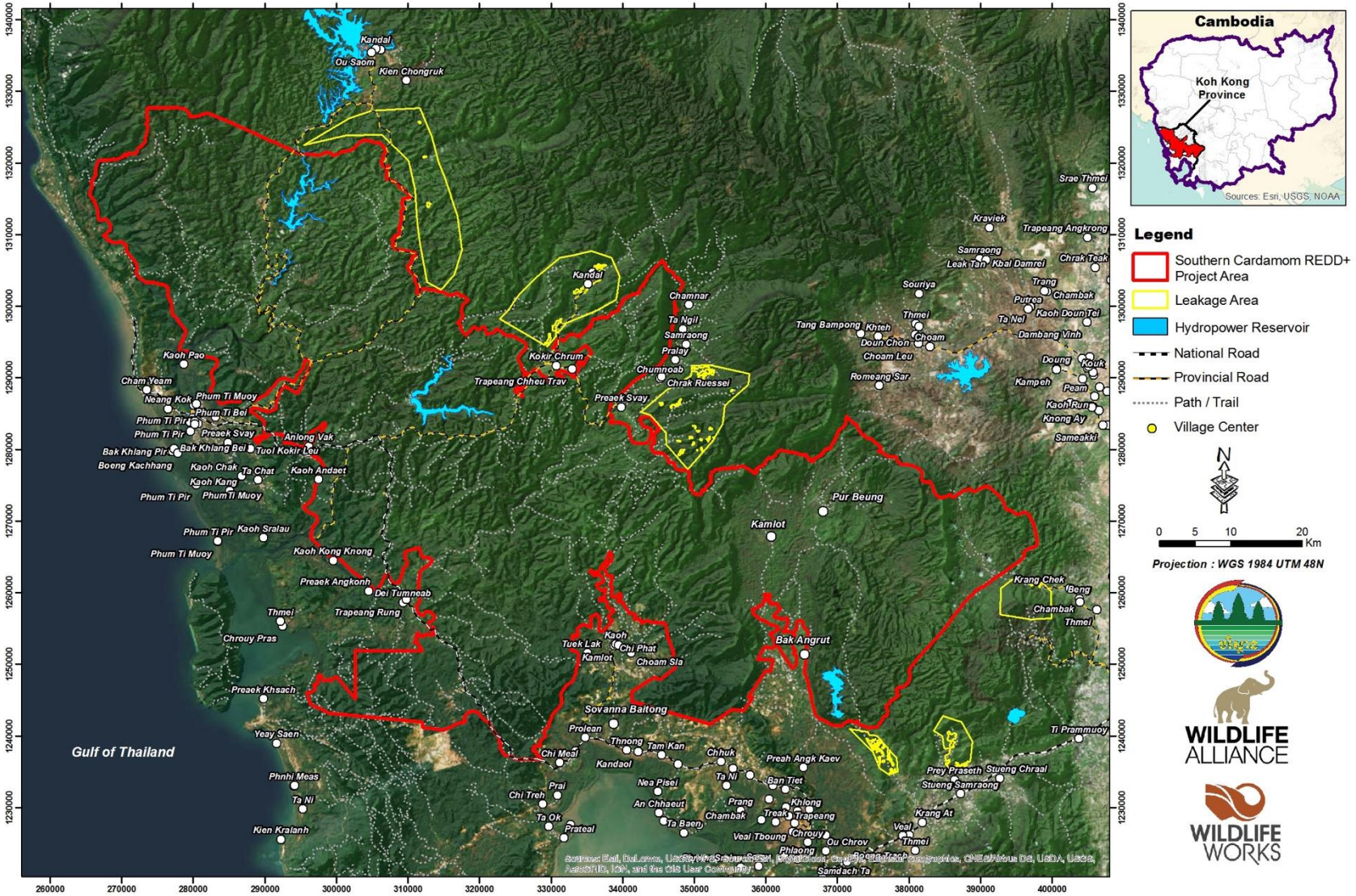



SOUTHERN CARDAMOM REDD+ PROJECT
PROXY AREA SOIL CLASSES MAP
Gulf of Thailand
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Proxy Area
Soil Classes
Acid Lithosols
Alluvial Lithosols
Alumisols
Basic Lithosols
Coastal Complex
Cultural hydromorphics
Grey hydromorphics
Latosols
Planosols
Plinthite podzols
Red-yellow podzols
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS

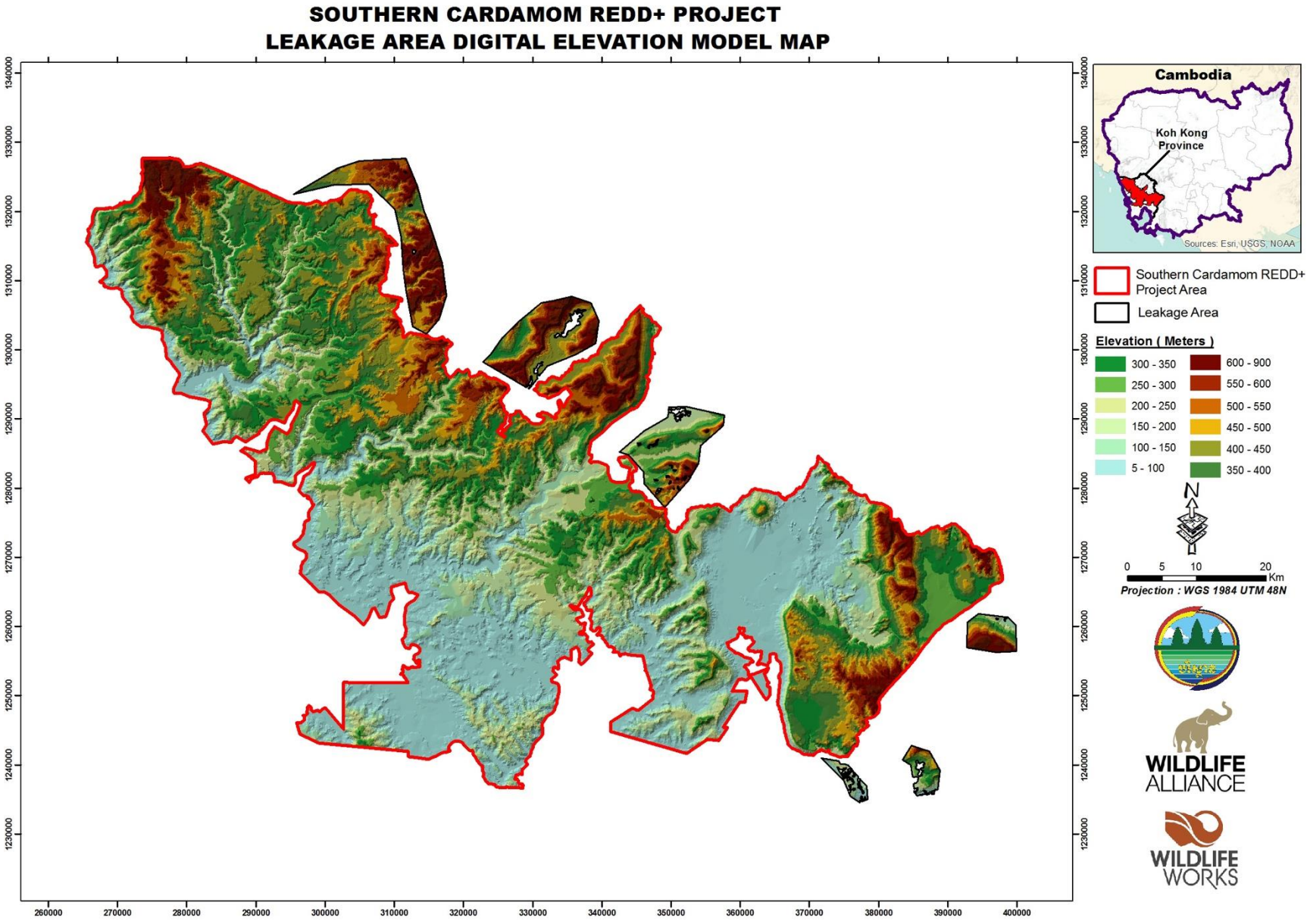
Appendix D: Leakage Area Maps

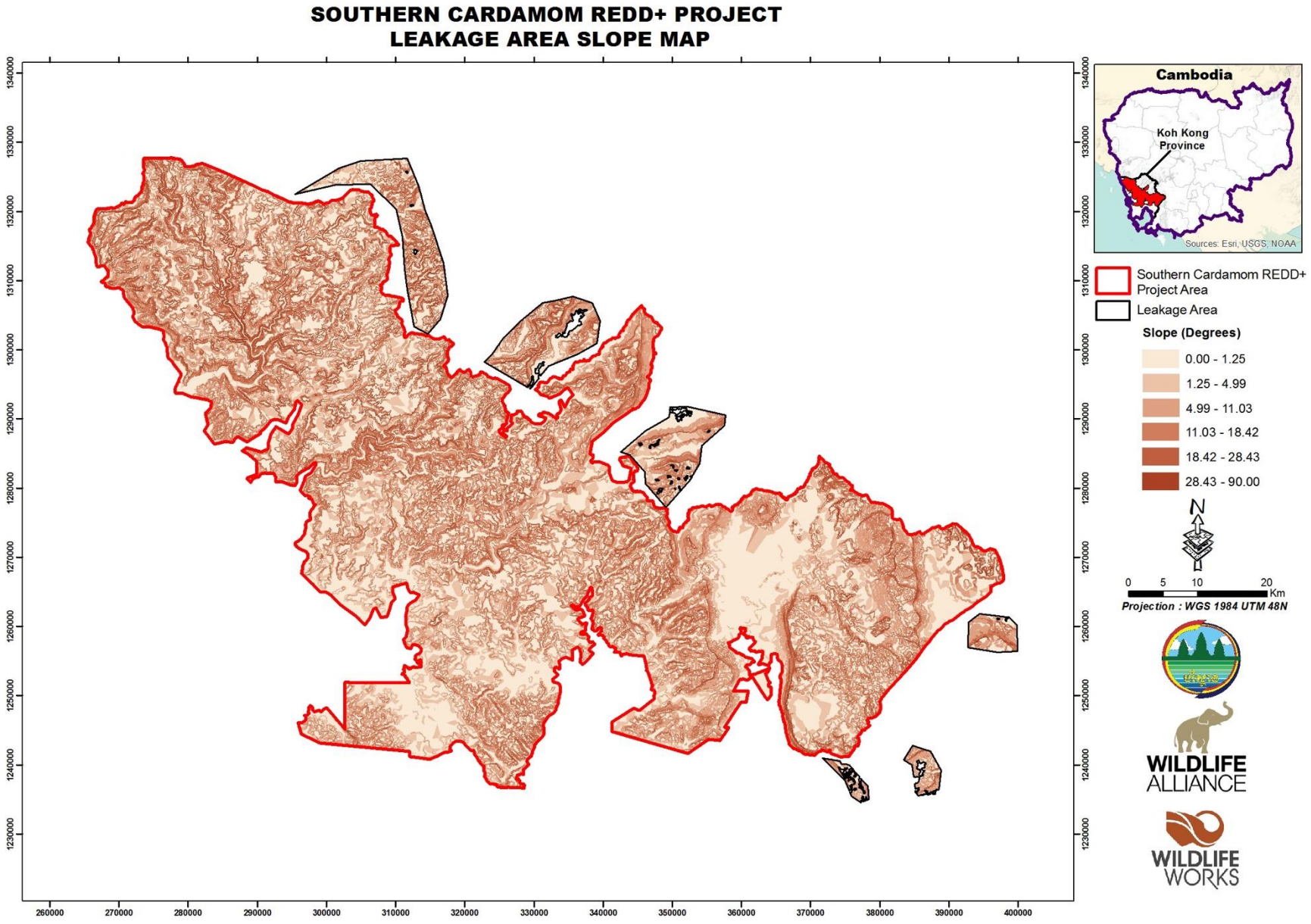


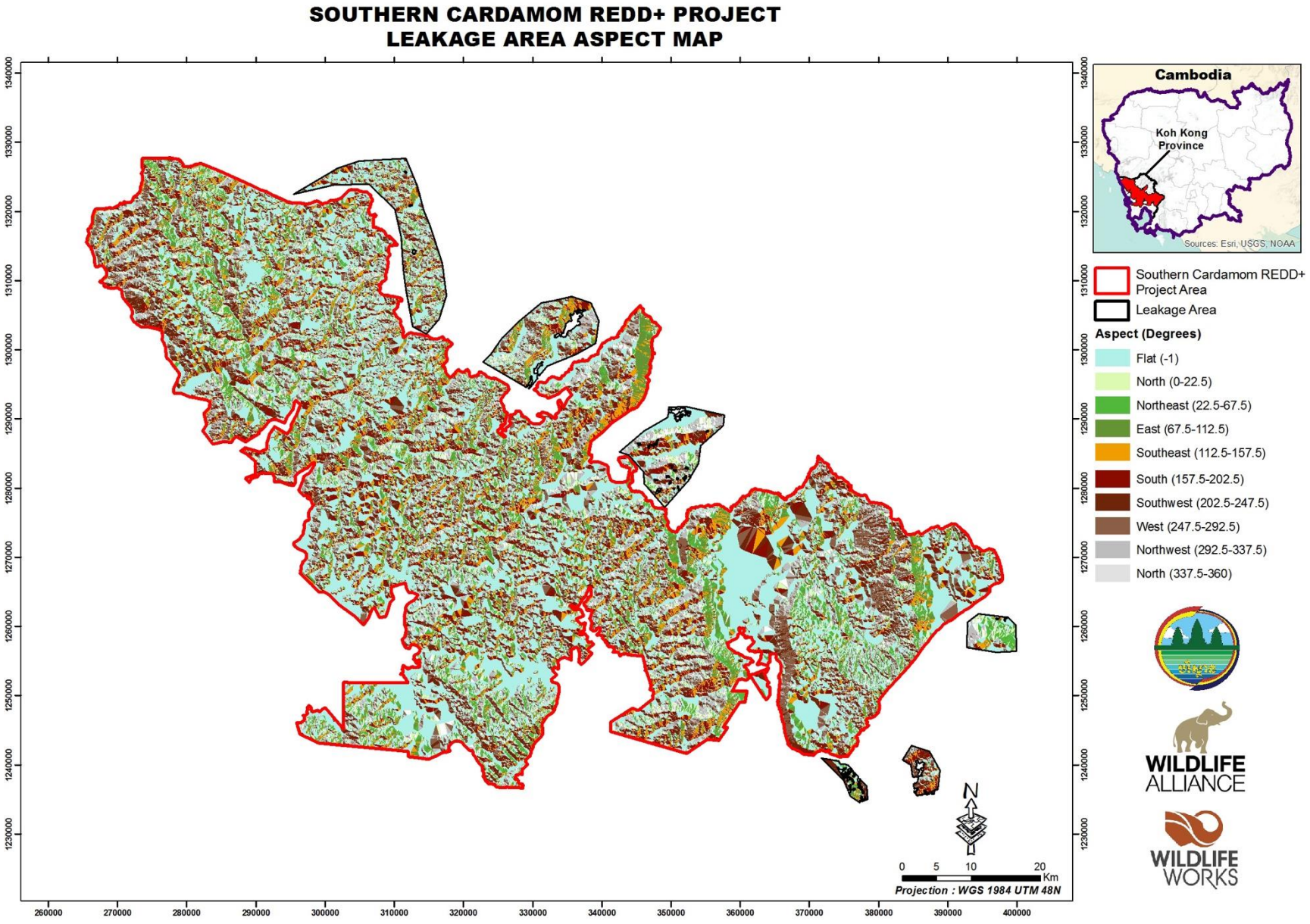
SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA INFASTRUCTURE MAP



SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA RIVERS AND STREAMS MAP


SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA DIGITAL ELEVATION MODEL MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Leakage Area
Elevation (Meters)
300 - 350
250 - 300
200 - 250
150 - 200
100 - 150
5 - 100
600 - 900
550 - 600
500 - 550
450 - 500
400 - 450
350 - 400
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
270000
280000
290000
300000
310000
320000
330000
340000
350000
360000
370000
380000
390000
400000


SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA SLOPE MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Leakage Area
Slope (Degrees)
0.00 - 1.25
1.25 - 4.99
4.99 - 11.03
11.03 - 18.42
18.42 - 28.43
28.43 - 90.00
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
270000
280000
290000
300000
310000
320000
330000
340000
350000
360000
370000
380000
390000
400000


SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA ASPECT MAP
Cambodia
Koh Kong Province
Sources: Esri, USGS, NOAA
Southern Cardamom REDD+ Project Area
Leakage Area
Aspect (Degrees)
Flat (-1)
North (0-22.5)
Northeast (22.5-67.5)
East (67.5-112.5)
Southeast (112.5-157.5)
South (157.5-202.5)
Southwest (202.5-247.5)
West (247.5-292.5)
Northwest (292.5-337.5)
North (337.5-360)
N
0 5 10 20
Km
Projection : WGS 1984 UTM 48N
1340000
1330000
1320000
1310000
1300000
1290000
1280000
1270000
1260000
1250000
1240000
1230000
260000
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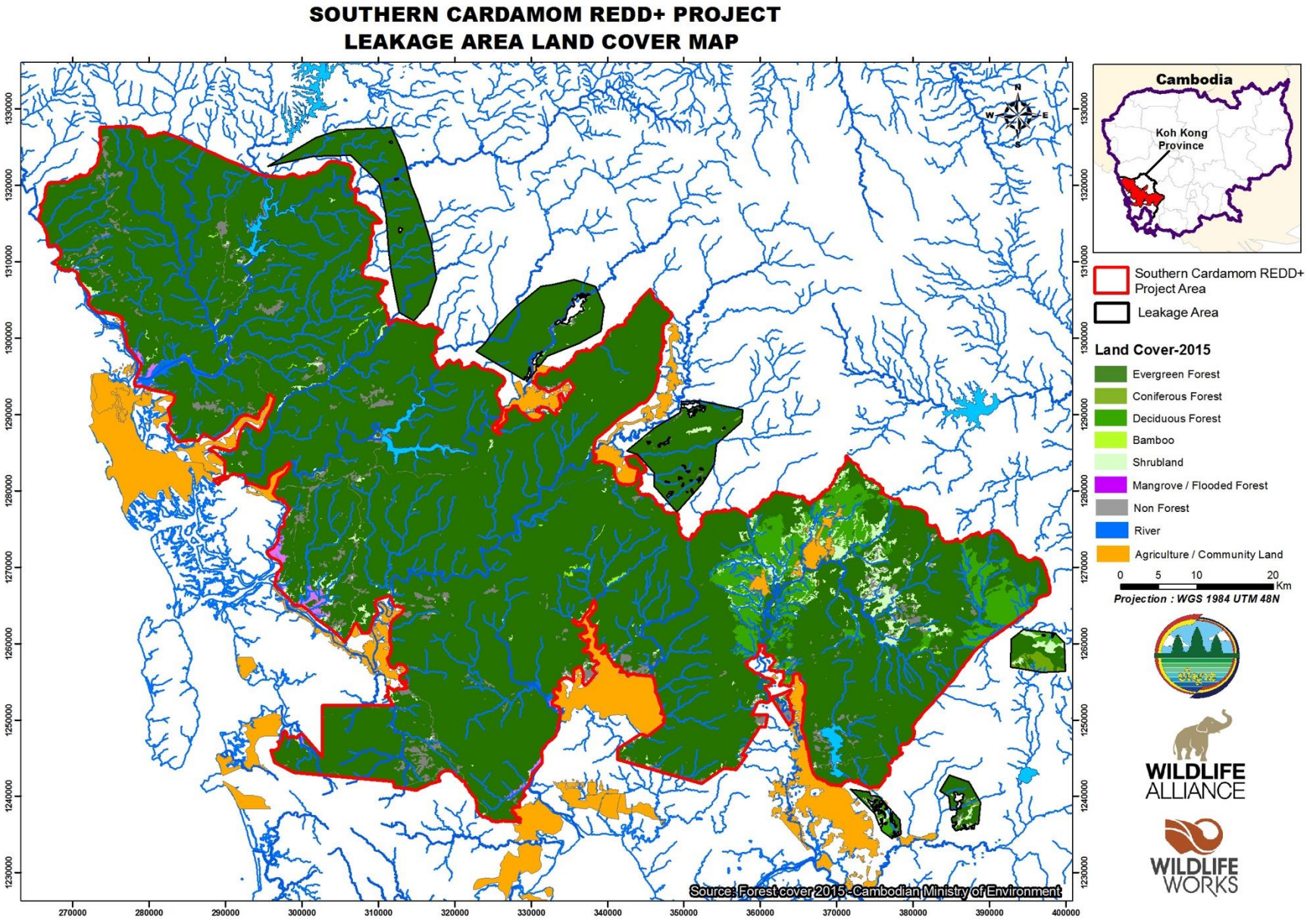
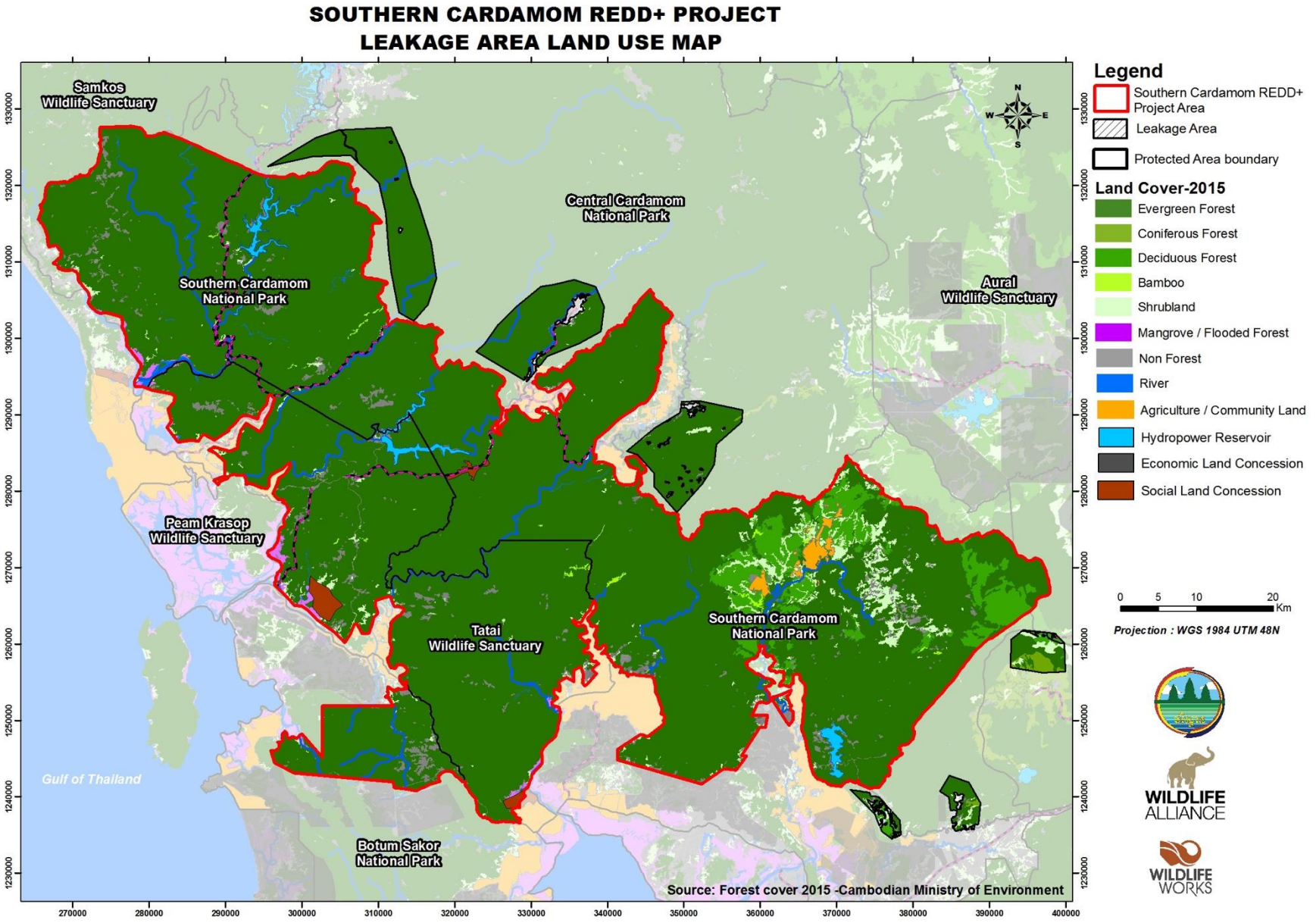
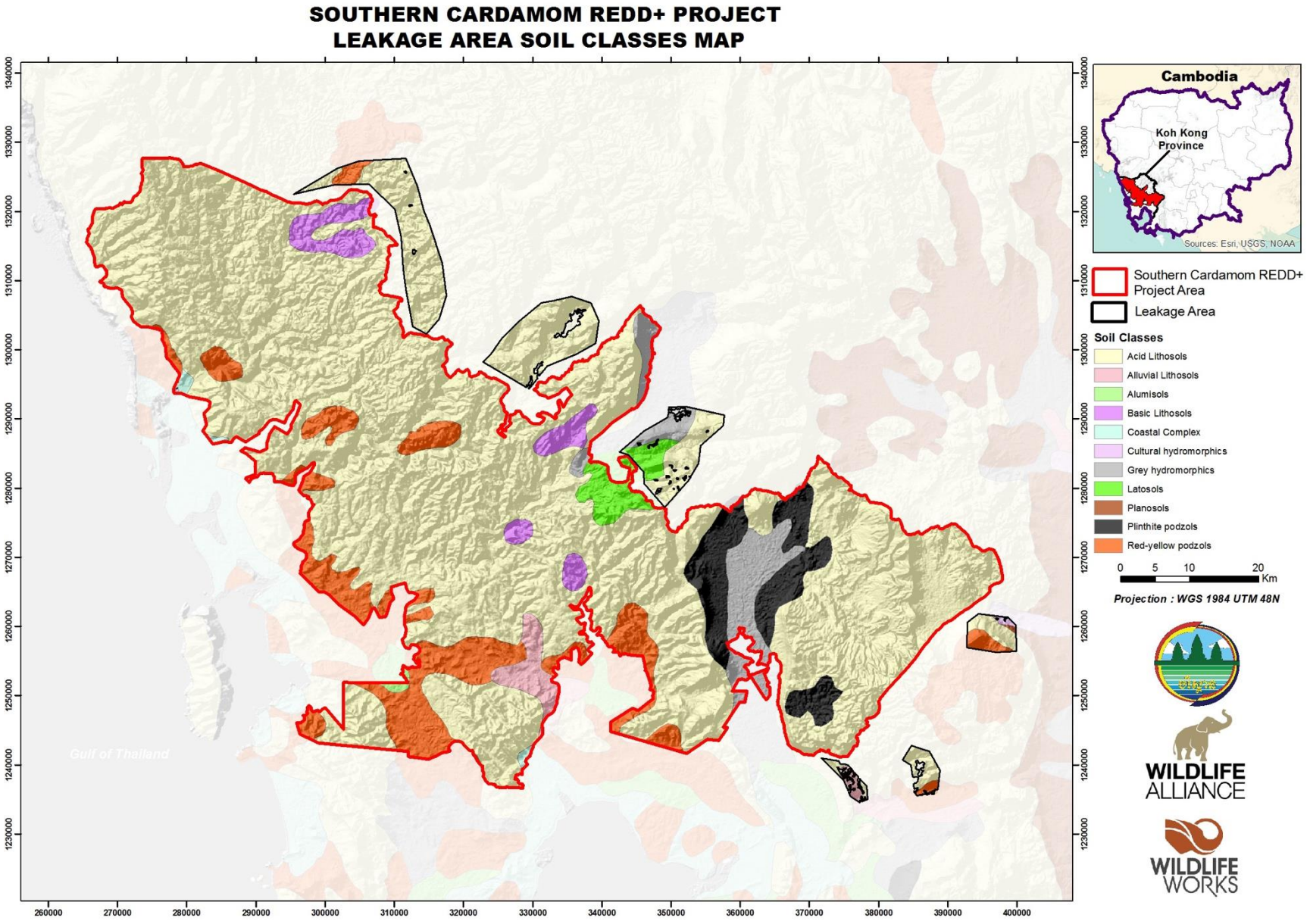
370000
380000
390000
400000


SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA LAND COVER MAP
Cambodia
Koh Kong Province
Southern Cardamom REDD+ Project Area
Leakage Area
Land Cover-2015
Evergreen Forest
Coniferous Forest
Deciduous Forest
Bamboo
Shrubland
Mangrove / Flooded Forest
Non Forest
River
Agriculture / Community Land
0 5 10 20 Km
Projection : WGS 1984 UTM 48N
Source: Forest cover 2015 -Cambodian Ministry of Environment
270000 280000 290000 300000 310000 320000 330000 340000 350000 360000 370000 380000 390000 400000
1330000 1320000 1310000 1300000 1290000 1280000 1270000 1260000 1250000 1240000 1230000
WILDLIFE ALLIANCE
WILDLIFE WORKS


SOUTHERN CARDAMOM REDD+ PROJECT
LEAKAGE AREA LAND USE MAP
Samkos Wildlife Sanctuary
Central Cardamom National Park
Southern Cardamom National Park
Aural Wildlife Sanctuary
Peam Krasop Wildlife Sanctuary
Tatai Wildlife Sanctuary
Southern Cardamom National Park
Botum Sakor National Park
Gulf of Thailand
Source: Forest cover 2015 -Cambodian Ministry of Environment
Legend
Southern Cardamom REDD+ Project Area
Leakage Area
Protected Area boundary
Land Cover-2015
Evergreen Forest
Coniferous Forest
Deciduous Forest
Bamboo
Shrubland
Mangrove / Flooded Forest
Non Forest
River
Agriculture / Community Land
Hydropower Reservoir
Economic Land Concession
Social Land Concession
0 5 10 20 Km
Projection : WGS 1984 UTM 48N
WILDLIFE ALLIANCE
WILDLIFE WORKS



WILDLIFE ALLIANCE

WILDLIFE WORKS