COMDEKS Phase IV Country Programme Strategy
Restoring Landscapes in Stung Siem Reap Watershed Areas

Siem Reap Province, Cambodia

January 2025

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List of Acronym

CBD	Convention on Biological Diversity
CBO	Community-based Organization
CF	Community Forestry
CFi	Community Fisheries
COMDEKS	The Community Development and Knowledge Management for the Satoyama Initiatives
CPA	Community Protected Areas
CPM	Control Performance Monitoring
CPS	Country Programme Strategy
CSO	Civil Society Organization
GEF	Global Environmental Facilities
GIS	Geographic Information System
GTZ	German Technical Cooperation Agency
IPCC	Intergovernmental Panel on Climate Change
IPSI	International Partnership for the Satoyama Initiative
KM	Knowledge Management
MAFF	Ministry of Agriculture, Forestry and Fisheries
MISTI	Ministry of Industry, Science, Technology and Innovation
MLMUC	Ministry of Land Management, Urban Planning and Construction
MOE	Ministry of Environment
MOEJ	Ministry of the Environment of Japan
MOI	Ministry of Interior
MOME	Ministry of Mine and Energy
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resource and Meteorology
MPWT	Ministry of Public Work and Transport
MRC	Mekong River Commission
MRD	Ministry of Rural Development

NBSAP	National Biodiversity Strategies and Action Plans
NGO	Non-Governmental Organization
NSC	National Steering Committee
OP8	The eighth Operational Phase
PA	Protected Areas
SEPLS	Socio-Ecological Production Landscapes and Seascapes
SGP	Small Grants Programme
UCP	Upgraded Country Programme
UNDP	United Nations Development Programme
UNU-IAS	United Nations University Institute for the Advanced Study of Sustainability

Executive Summary

The Community Development and Knowledge Management for the Satoyama Initiative (COMDEKS) was launched in 2011 as a flagship program of the Satoyama Initiative, a global effort to promote sustainable use of natural resources in landscapes and seascapes with local communities. The strategy aims to restore natural resource degradation in the watershed through community-based projects that promote biodiversity conservation, ecosystem restoration, and sustainable development at local level. The program strategy uses the resilient indicators to assess the Socio-ecological production landscape/seascape and identify the unique challenges and opportunities for restoration, conservation and sustainable livelihood enhancement of the surrounding communities.

The development of this COMDEKS-4 Country Programme Landscape Strategy was prepared by a team of Specialists from Master of Science in Climate Change Program and Faculty of Development Studies, Royal University of Phnom Penh, with a contract of UNDP GEF SGP. The COMDEKS-4 focuses on restoring, conserving and promoting landscapes in the Stung Siem Reap Watershed Areas of Siem Reap Province, Cambodia. The Stung Siem Reap watershed is located in Northwestern Cambodia and covers an area of approximately 361,900 hectares. The landscape of the Stung Siem Reap watershed is very socio-ecologically diverse. For appropriate interventions throughout the watershed, the socio-ecological zoning is applied - taking into account topography, rainfall pattern, soil types, land use, forest cover change, and statutory land tenure systems variables - using a Geographic Information System (GIS) to capture heterogeneity of the target area. Based on the COMDEKS guidelines, the six zones identified include (1) Tonle Sap flood plain, (2) Rice plain, (3) Agro-archeological complex, (4) Agro-forest mosaic, (5) Upland agriculture, and (6) Phnom Kulen National Park.

The COMDEKS project in Cambodia will focus on four main outcomes:

- Degraded biodiversity and ecosystem services are restored through multi-functional land-use systems.
- Livelihoods of people in the landscapes are improved through developing ecologically sound and community-owned income-generating activities.
- An ecologically sound agricultural production system in the target landscape is strengthened to increase crop yield and productivity sustainably.
- Robust governance systems are established and strengthened for effective participatory decision-making at the landscape level.

An assessment was conducted to explore problems and potential opportunities as well as measures the level of resilience indicators in the Socio-Ecological Production landscape and Seascapes (SEPLS) at the target site. The most important problem for zone 1 is the decline in fish catch that can be attributed to illegal fishing, destruction of flooded forest, chemical pollution from farming and settlement areas, and the increase of fishers. Although zones 2 and 3 face the same problem of low rice yield, this problem is playing out in different contexts. In zone 2 the problem is attributed to low fertility of farmland and lack of water storage system while in zone 3 the problem is further reinforced by restriction of access to agricultural land (the APSARA National Authority managed zone). In zones 4 and 5, the problem is a sharp decline of forest cover and low agricultural productivity. There is a community forestry scheme in both zones to cope with the problem of forest restoration and conservation. The problem of low agricultural productivity is found in zone 6 due to the fact that restriction on farming land expansion is imposed by the protected area authority as it is located immediately inside Phnom Kulen National Park.

To deal with the increasing threats and challenges on Stung Siem Reap Watershed Areas, it is suggested that the grant projects be implemented in one-time phases that all communities located in the upstream, midstream, and downstream areas could be applied for small-grant at the same time. Priority projects should be given based on the degree of restoration and conservation of degraded landscape, and on complementary with existing initiatives of government, development partners and private sector, while supporting the local livelihoods in the context of climate change. The project will be monitored and evaluated on two levels: at the program/landscape level and at the individual project level.

Knowledge management is a main component of the program strategy and should be integrated with OP8 CPS. It is expected that documentation of best practices for the various thematic issues of landscape management will be disseminated. The documentation process will occur at the project level since specific lessons can be generated at the implementation level. Different multimedia tools will be used, such as short videos, policy briefs, newsletters or e-newsletters, which are produced periodically and shared with key stakeholders. Analytical case studies written at the end of each project implementation, policy briefs, and video documentation will also be produced.

1. Introduction

The COMDEKS programme was launched in 2011 as a flagship programme of the Satoyama Initiative- a global effort to promote sustainable use of natural resources in landscapes and seascapes with local communities. The first two phases of COMDEKS, funded by the Japan Biodiversity Fund (JBF) at the Secretariat of the Convention on Biological Diversity (CBD), were implemented from 2011 to 2018 by the UNDP through the GEF Small Grants Programme (SGP), in partnership with the Ministry of the Environment of Japan, the CBD Secretariat, and the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS).

These working landscapes and seascapes, known as socio-ecological production landscapes and seascapes (SEPLS), include many uses, from farming and fishing to forestry. Their productivity and resilience are central to the economic well-being and cultural identity of communities who depend on them throughout the world.

The COMDEKS programme provides small-scale finance- delivered through the GEF SGP directly to local communities, Indigenous Peoples and civil society to implement locally led projects that enhance livelihoods and well-being, conserve biodiversity, address climate change, and support local cultures and traditional practices. In this way, COMDEKS activities not only contribute to the ecological resilience of SEPLS, but also strengthen the social and economic resilience of communities within these areas. By enhancing governance and participatory decision-making processes in local communities, COMDEKS offers a critical pathway for humans to effectively manage natural resources and live in greater harmony with nature. The programme also collects and disseminates knowledge and experiences from successful local initiatives to facilitate broader adoption by other communities throughout the world.

Initiated in 2020, COMDEKS Phase 3 expanded on the results of previous phases by examining options for the institutional and financial sustainability of SEPLS. Ten countries from Phases 1 and 2 were selected to participate in Phase 3 which focused on strengthening knowledge, sharing experiences, and disseminating best practices and lessons learned on SEPLS. Phase 3 focused on the consolidation of COMDEKS' experiences, implementing policy dialogues, and providing inputs towards the development of the post-2020 Global Biodiversity Framework (GBF), under negotiation at the CBD from 2020-2022.

At the CBD COP15 in Montreal, December 2022, the Ministry of Environment of Japan, Keidanren Committee on Nature Conservation, UNDP and other partners announced the launch COMDEKS Phase 4. This phase aims to further expand and ensure sustainability and sound biodiversity management, governance and sustainable livelihood activities with local communities in SEPLS. It will be implemented in 15 countries over the period 2023 to 2027.

Phase 4 will seek to catalyse and drive integrated local actions and provide concrete contributions to the implementation of the Kunming-Montreal Global Biodiversity Framework, and will focus on GBF targets related to conservation, restoration and sustainable use of biodiversity. COMDEKS Phase 4 will also contribute and support implementation of National Biodiversity Strategies and Action Plans at the country level, through locally led initiatives.

COMDEKS Phase 4 also aligns to UNDP's Nature Pledge which will advance three interconnected shifts (value, economic and finance, and policy and practice) to transform global systems to meet vital targets to protect and restore the planet, eradicate poverty, reduce gender and other inequalities, protect human rights, and accelerate overall progress on the SDGs.

COMDEKS Phase 4 Goal: to further expand and ensure sustainable biodiversity management, enhanced governance and livelihood activities with local communities in socio-ecological production landscapes and seascapes.

Component 1: grant making to civil society and community-based organizations to support sustainable landscape and seascape management.

Component 2: knowledge management for capacity building, replication, and up-scaling.

The development of this COMDEKS-4 Country Programme Landscape Strategy for Cambodia was prepared by a team of Specialists from Master of Science in Climate Change Program and Faculty of Development Studies, Royal University of Phnom Penh, with a funding support from UNDP GEF SGP.

For Cambodia, the COMDEKS-4 is largely based on the experiences of COMDEKS-1 in Stung Siem Reap watershed areas, National strategies and priorities like NBSAP, National Protected Area Strategic Management Framework (2015), the National Protected Area Strategic Management Plan (2017-2031), local community Development Strategic Plan 2024-2028, and Circular Strategy on the Environmental Sector (2023-2028). Moreover, the COMDEKS-4 aligns with other development partners like USAID, GIZ; and especially UNDP Cambodia Country Programme Document (2024-2028).

The landscape of Stung Siem Reap Watershed Areas was selected for this phase because it smoothly aligns with the national priorities and UNDP and development partners' initiatives. The area has distinguished importance of nature power for socio-ecological conservation and protection like Angkor Wat complex and its communities. The watershed areas administratively cover 10 districts, 66 communes, and 470 villages in Siem Reap province. Because of rapid socio-economic development and population growth, the watershed has faced considerable challenges and threats which include decline of fishery resources, low agricultural productivity, decline of forest cover, losses of biodiversity and ecosystem services, increase of water pollution and solid waste, and climate change. In this regard, COMDEKS-4 strategy aims at restoring and enhancing the biodiversity and ecosystem services in the watershed by supporting the community led projects in four priority areas such as 1) Degraded biodiversity and ecosystem services are restored through multi-functional land-use systems, 2) Livelihoods of people in the landscapes are improved through developing ecologically sound and community-owned income-generating activities, 3) An ecologically sound agricultural production system in the target landscape is strengthened to increase crop yield and productivity sustainably, and 4) Robust governance systems are established and strengthened for effective participatory decision-making at the landscape level.

2. Priority Area

2.1 The context of development in Siem Reap province, and national priorities (Biodiversity, NRM, ecosystem restoration, ecotourism, local community development strategic plan, etc.)

The Phase 4 project will focus primarily on supporting and coordinating concrete actions at the grassroots level by providing small-scale finance for local community-led projects within given priority landscapes and seascapes, to achieve landscape/seascape-scale impacts in developing countries. The Project reviewed, analyzed, and codified the results of these on-the-ground actions to disseminate lessons, which can then be used for replication and upscaling in other parts of the world. The COMDEKS Phase 4 consists of two main components such as 1) **Component 1: Sustainable landscape and seascape management and restoration through grant-making to civil society and community-based organizations, by using the GEF Small Grants Programme (SGP),** by leveraging GEF and other financial resources, and 2) Component 2: Knowledge Management for capacity development, replication, and up-scaling Successful practices, methods and systems of landscape and seascape management will be identified by COMDEKS for replication, up-scaling and mainstreaming. Collecting, analyzing and managing information from the implementation of community-based projects and other sources is essential to identify best practices and lessons for dissemination to other communities, other programmes, and other organizations and institutions.

Siem Reap province is home to the world-famous historic temple of Angkor Wat. The province has one of the highest poverty rates in Cambodia. In contrast, it attracts by far the largest number of the country's international tourists and a growing number of domestic tourists. Many people around Siem Reap town benefit from the economic impact of the rapid growth in the tourism industry. The distribution of such benefits is, however, somewhat uneven. People benefit more from employment in the construction, services and handicraft sectors than in the agricultural sector, though more than 80% of families are primarily involved in cropping, livestock, fishing or forestry. Those with better education and/or financial resources can acquire better-paying jobs. At the same time, those from poorer households tend to end up working in lower-income jobs. In either case, it appears that people are increasingly abandoning farming in favour of waged employment in the tourism sector. In areas further from the city, individual household members are migrating to the city to work in the construction and services sector. In areas closer to the city, some entire households are abandoning farming by selling land and moving into secondary and tertiary employment. Thus, we can observe a shift in the structure of employment away from the primary sector in the direction of the secondary and tertiary sectors, accompanied by a shift in the ownership of land resources in and around Siem Reap away from small scale farmers in the direction of developers in the tourism sector and other emerging industries.

2.2 Identification of the landscape(s)

More than 55% of the global population live in urban areas by 2018 (Wahba-Tadros et al., 2020). In developed nations like Europe and the United States, the urban landscape has taken place up to 80% of the total population (Haase et al., 2014). In addition, the urban population in Asia takes some 50% while the urban population in Latin American countries takes up more than 90% of their population (Wahba-Tadros et al., 2020; Haase et al., 2014). The urban population contributes to the world economy by up to 80 percent of goods and services. The urban area is an agglomeration of trade, education, civilization, technology, and politics. The growth of urban area consumes space, resources, and energy which leads to changes in urban ecosystem function and provision of goods and services to urban dwellers (Middleton and Krawanchid, 2014; Qiandong and Xin, 2022). Socioeconomics is a core structure for cities and urban

development (Accius and Joo, 2019). Socioeconomics has influenced the so-called urban socio-ecology which composes of the natural environment, society, and the important roles of cities in fostering human well-being (Roggema, 2020; Haase et al., 2014). Because climate change has advanced from year to year, significant impacts have been seriously spelled out in urban areas of the world, and these caused great losses and damages on urban socioeconomics and related sectors (Wahba-Tadros et al., 2020; Sar, 2017). However, the economic activities of each nation have contributed to varied levels of carbon and other greenhouse gas emissions (IPCC, 2019).

The socio-ecological landscape selected for the implementation of COMDEKS is the Stung Siem Reap watershed area. This landscape is located in Northwestern Cambodia in the province of Siem Reap, home to the world-famous historic temple of Angkor Wat. It covers an area of 361,900 hectares and extends from the mountain range of Phnom Kulen to the Tonle Sap Lake (figure 1). The elevations in the upstream area of Phnom Kulen reach 500 m above sea level, whereas the town of Siem Reap in the downstream area is located only at 15 m above sea level. The watershed areas administratively cover 10 districts, 66 communes, and 470 villages.

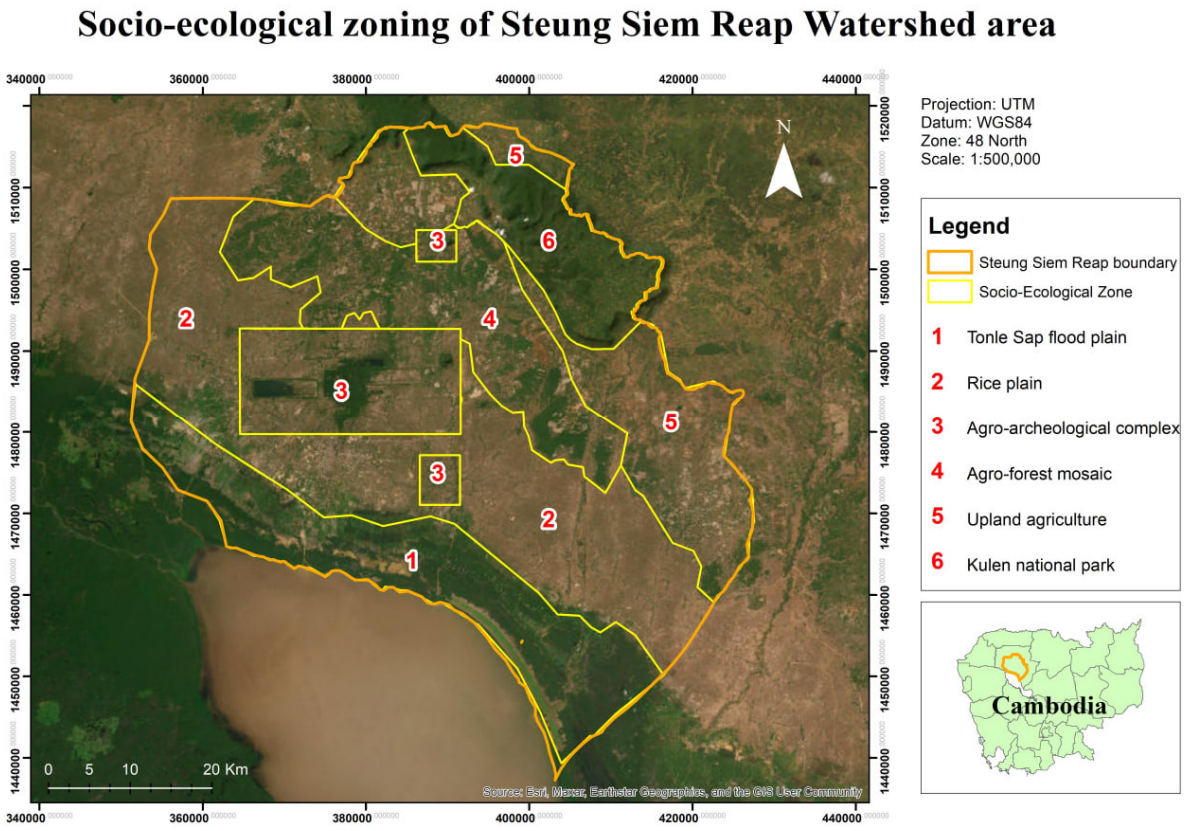


Figure 1: Map of Socio-Ecological Zones of Stung Riem Reap Watershed Area
Source: COMDEKS-1 and GIS data from SERVIR-Mekong, 2024 (https://servir.adpc.net/).

Based population census data in 2019, Siem Reap province has the total population of 1,014,234 persons (about 6.5% of Cambodia population), while Phnom Penh had the highest population with 2,281,951 (14.7 %), followed by neighbouring Kandal with a population of 1,201,581 (7.7%); Prey Veng, 1,057,720 (6.8%). Below table indicates that in 2023, Krong Siem Reap is considered as biggest populated area among the

five locations inside the Stung Siem Reap Watershed, followed by Puok and Chi Kraeng Districts. Within this baseline information, MOP (2023)[1] conducted a district population projection and found that the population will be increased up to 315,313 people in 2023 (Krong Siem Reap), following by increasing 163,477 (Puok) and 161,998 (Chi Kraeng).

Table 1: Projected Population by Districts Located inside Stung Siem Reap Watershed

Districts	**Total Population Projection**		
	2023	2025	2030
Puok	145,826	150,818	163,477
Siem Reap	279,343	290,125	315,313
Prasat Bakong	86,603	89,674	97,251
Soutr Nikom	127,040	131,173	141,906
Chi Kraeng	145,874	150,258	161,998
Angkor Thum	32,701	33,925	37,134
Banteay Srei	47,253	49,035	53,543
Svay Leu	44,536	46,120	50,250
Varin	47,733	49,553	54,254
Angkor Chum	63,020	65,225	70,975

Source: MoP (2023)

2.3 Capturing natural resource diversity and livelihoods in the Stung Siem Reap Watershed area

The landscape of the Stung Siem Reap watershed is highly diverse (see annex 1). This watershed is subdivided into four topographical zones (see annex 1 for details), with the downstream plain being seasonally flooded due to the reversal of Tonle Sap Lake water. Generally, the downstream plain has an elevation below or around 3 m, while the highest elevations are found in Phnom Kulen National Park at approximately 500 m above sea level. These topographical differences result in soils that reflect the geological setup, topography, and the interaction between surface water and groundwater.

Annexes 2-4 present data on land use changes in Stung Siem Reap as maps, highlighting significant transformations. Local communities have adapted their use of land and natural resources to this diverse landscape, with household farming (mainly rice) being predominant on agricultural land. These maps also illustrate forest cover changes for the years 2000, 2010, and 2023, overlaid with district and commune boundaries. Various land uses are shown, including rice fields, crop plantations, cropland, flooded forests, evergreen and deciduous forests, shrubs, and urban areas. Notably, significant changes occurred from 2000 to 2010, with substantial conversion of deciduous forests to crop plantations. From 2010 to 2023, the most significant change in the Stung Siem Reap watershed was the conversion of deciduous forests to cropland, with additional transitions from deciduous forests to rice fields.

The Stung Siem Reap watershed features seven types of soils: Acid Lithosols, Alluvial Lithosols, Cultural Hydromorphics, Grey Hydromorphics, Lacustrine Alluvial Soils, Plinthite Podzols, and Red-Yellow Podzols (annex 5). Public land tenure arrangements are diverse, including three main protected areas: Phnom

[1] https://www.nis.gov.kh/nis/Population%20Projection/Cambodia_District_Population_Projection_2020-2023.pdf

Kulen National Park, the Angkor Wat Protected Landscape, and the Tonle Sap Biosphere Reserve. Natural resource management is primarily conducted through co-management schemes between communities and relevant government administrations (mainly MoE and MAFF), encompassing community forestry, community fisheries, and community-protected areas in the Phnom Kulen National Park (Annex 7).

To address the watershed's ecological and social diversity, a socio-ecological zoning exercise was performed using geographic information systems (GIS) (see Figures 1 and 3). This exercise aimed to differentiate the watershed into six specific socio-ecological zones, with relatively homogeneous relationships between land/natural resources, local communities, and management practices. The criteria and methodology used to develop these zones followed the COMDEKS guidelines (Resilient indicators) and COMDEKS Phase 1 Strategy. Below are summaries of each zone.

- Zone 1: Tonle Sap Plain – Features varied land uses and is seasonally flooded by the Tonle Sap River. It includes grasslands, shrublands, forests, ponds, lakes, and important fishing grounds managed mainly through community fisheries schemes and deep-water rice plots.
- Zone 2: Agricultural Plain – Primarily used for rain-fed rice production, with low levels of agricultural intensification and crop diversification, mainly managed through household farming. More intensive commercial agriculture is practiced where water storage infrastructure is available.
- Zone 3: Agricultural and Forest Areas around Angkor Wat Protected Landscape – This zone surrounds the archaeological park of Angkor Wat, where family farming is predominant, but overall management is under the APSARA National Authority.
- Zone 4: Agriculture-Forest Mosaic Area – Characterized by highly fragmented forests due to recent deforestation, with remaining forests managed through community forestry schemes.
- Zone 5: Upland Agricultural Area – In the last decade, forest cover has been entirely cleared and replaced with upland cropping systems (rice and other annual and perennial crops like casava, cashew, mango).
- Zone 6: Phnom Kulen National Park (national Protected Areas)—This area is managed by the Ministry of Environment and partly in co-management with local communities (Community Protected Areas—CPA). Community based activities like ecotourism, subsistent farming such as rice, cashew, casava and mango farming carried out by household level who has settled down before creation of national park, are allowed in this area.

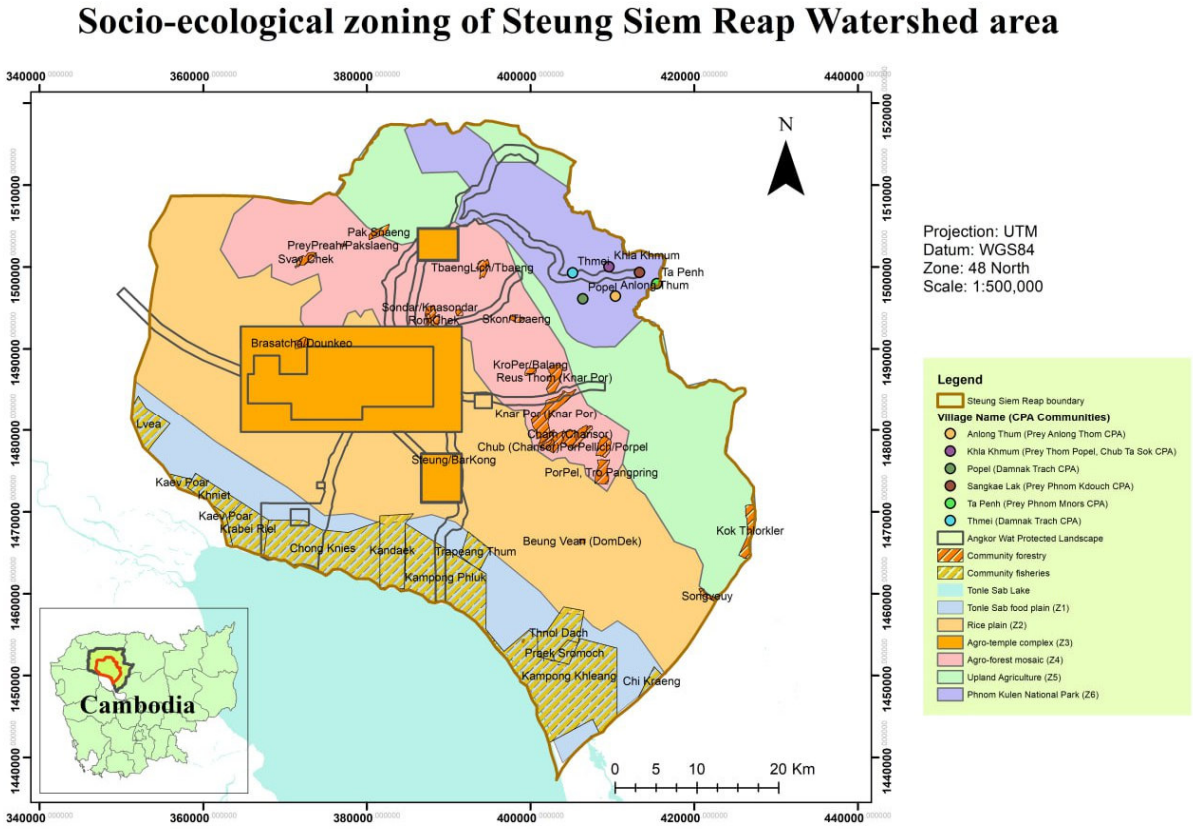


Figure 2: Zoning of Stung Siem Reap Watershed Area

2.4 Forest cover and land use cover changes

Based on the assessment of satellite images of forest cover and land use for 2000, 2010, and 2023 acquired from SERVIR-Mekong 2024 (https://servir.adpc.net/), the natural resources in Stung Siem Reap Watershed Areas have been under severe threats. Forest cover has been changed to various types of land uses, such as farmland, settlement areas, and rural infrastructure (See maps of forest cover and land use cover changes).

2.5 Rationales for the selection of the Stung Siem Reap watershed area

An assessment of the issues and potential opportunities within the target landscape was conducted in the field using COMDEKS 1 strategy, and various methods like COMDEKS Resilient Indicators, Key Informant Interview, and GIS. We selected six zones based on the distinct characteristics of the watershed: Zone 1 (Tonle Sap Plain), Zone 2 (Agricultural Plain), Zone 3 (Agricultural and Forest Area around Angkor Wat), Zone 4 (Agriculture-Forest Mosaic Area), Zone 5 (Upland Agricultural Area), and Zone 6 (Phnom Kulen National Park), where the relationships between land/natural resources, local communities, and management practices are relatively homogeneous. The team organized participatory rural appraisals (PRAs) by using COMDEKS Resilient Indicator guidelines in each zone, covering 2 CFi in Zone 1, 2 CF in Zone 2, 2 CF in Zone 3, 2 CF in Zone 4, 1 CPA in Zone 5, and 1 CPA in Zone 6.

Resource mapping exercises, seasonal calendars, and problem/solution analysis were used to complement the set of resilience indicators in Socio-Ecological Production Landscape and Seascapes (SEPLS), developed by IPSI (International Partnership for the Satoyama Initiative) members Diversity International and UNU-IAS. These indicators helped measure and understand the resilience of target landscapes, the data sets were consolidated for each socio-ecological zone. Finally, a workshop took place in Siem Reap to present the findings and generate discussion with other stakeholders (local authorities and technical institutions) about strengths, weaknesses, opportunities, and resource management challenges in each socio-ecological zone. The data sets were complemented with secondary information available through statistical commune databases. The results from the baseline assessment of the target landscape are summarized below for each socio-ecological zone.

Stung Siem Reap watershed was selected as the target landscape for the COMDEKS-4 Country Program Strategy in Cambodia for various reasons as in the following:

- Addressing the issues of natural resource degradation (deforestation, river sand excavation, disturbance of hydrological regimes, water pollution), the provincial authorities established 2004 a pilot watershed management program, under the auspices of the Cambodian National Working Group on Watershed Management supported by the Mekong River Commission (MRC) and the GTZ. Additionally, several surveys were conducted to design a sustainable watershed management plan with functioning institutions, but clear guidance and incentives are missing to implement concrete actions. COMDEKS Cambodia envisions providing effective support to this initiative through concrete community-based actions at the community level.
- Environmental Significance: The watershed is crucial for maintaining the ecological balance of the region, including wetlands in Angkor Wat Protected Landscape and the Tonle Sap Lake, a vital source of food and livelihoods for millions of people. It also supports biodiversity hotspots and contributes to the water volumes of Tonle Sap and flow of the Mekong River.
- Socio-geographic Diversity: The unique and exceptionally socio-cultural landscape for Cambodia, this watershed encompasses a wide range of ecosystems, including mountains, forests, wetlands, agricultural lands, ancient complex, and human settlement areas, offering opportunities for diverse conservation and development interventions, which support the national economic growth of Cambodia.
- Socioeconomic Importance: The watershed area is home to a significant population that relies on natural resources for their livelihoods, including agriculture, fisheries, forestry, and ecotourism. Sustainable management of the watershed is essential for ensuring the well-being and livelihoods of these communities. This watershed is one of the international and national tourism destination priorities which support the national economic development.
- Cultural Heritage: The area encompasses the Angkor Wat temple complex, a UNESCO World Heritage Site, and other important cultural and historical sites within the watershed areas like Banteay Srey temples. Protecting the watershed is crucial for preserving these cultural treasures for the future generations of Cambodia as well as the world.
- Existing initiatives: Existing initiatives and on-going conservation projects by development partners as well as RGC in the selected landscape, such as OP8, UNDP and GEF projects, CPA, CFi, CF programs and watershed management plans, were already underway in the area, providing a foundation for further collaboration and development.
- Additionally, the selection Stung Siem Reap watershed as the target landscape area for COMDEKS activities is well aligned with the themes prioritized in the Cambodian GEF-Small Grant Programme (GEF-SGP) Country Programme Strategy and Cambodia Priority Strategies. COMDEKS is in line with the biodiversity component (one of the five themes highlighted in the Country

Programme Strategy). Geographically, the Stung Siem Reap watershed is located in the northern plains, one of the "biodiversity hot spots" specified in the Cambodian GEF-SGP Country Programme Strategy.

3. Situational Analysis: Challenges, gaps and opportunities from previous phases of COMDEKS

3.1 Zone 1

It is under flooded plain area of Tonle Sap Lake, covering flooded forest, wetlands, fishponds and rice field. Most households combine farming and fishing activities as their main occupations and source of income. According to the commune database statistics, the percentage per commune of household primarily involved in agriculture and natural resources management is above 90%. The percentage of households involved in any service sector is more important in communes closer to Siem Reap town. Cropping usually takes place before and after the high floods (August-October), in the dry season. More than 60% of the agricultural land is cultivated during the dry season with a yield between 2.5 to 3 T/ha. The yield of rainy season rice is slightly lower (2-2.5 T/ha). An important number of people living on agriculture (40-50%) actually owns less than one hectare per family, which is an indication of complicated land access. Fishing in receding ponds mostly takes place from October to May. The fishing areas are managed by Fisheries Administration through its local Fisheries Cantonment, which oversees the demarcation of specific fishing grounds and approve fishing regulations. There are 12 community fisheries across the zone, covering a total area of 60,000 hectares. Access to school and health facilities is very problematic and poverty is widespread in the area. The heterogeneity of the landscape is an important dimension of this zone and people are traditionally involved in a wide variety of resource management activities across the plain. For instance, at the edge of the agricultural zone, the flood plain is characterized by continually changing land-use patterns ranging from rice cultivation, cattle grazing on grasslands, fuel wood, and non-timber forest products collected on shrub lands.

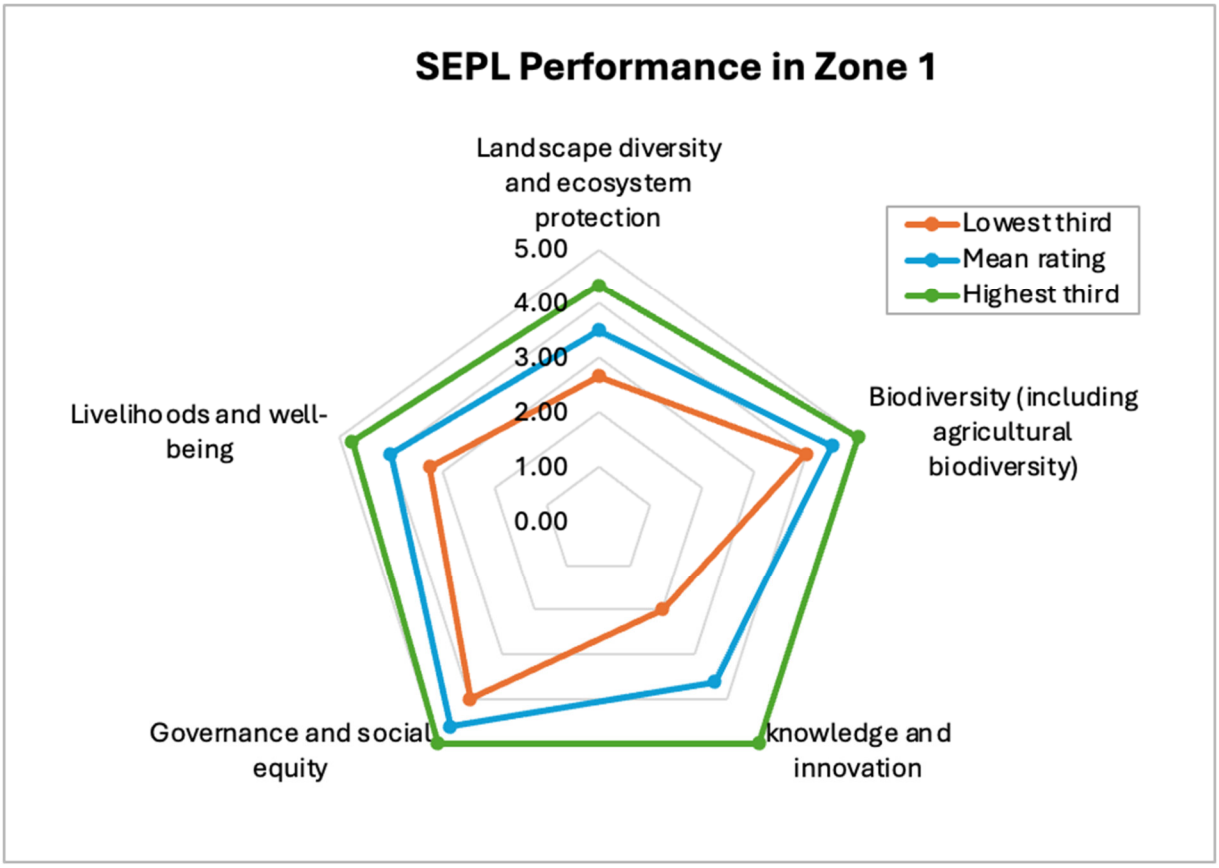


Figure 4. SEPL Performance by resilient indicators in Zone 1

This land is managed through a variety of practices such as the use of fire control, ploughing, fallowing, or grazing to maintain the fertility of the agro-ecosystem and ensure a flexible and diverse supply of natural products. Maintaining the multi-functional aspect of agro-ecosystems is therefore crucial for local livelihoods. For example, different rice cropping systems are adopted at each water depth while including aquatic biodiversity. The grass is used as fodder for the cattle, which generate a significant portion of the farming income portfolio, and the shrubs are important for the energy supply of households. However, the area is sensitive to natural and man-made disasters. Modern agricultural practices and the intensification of fishing practices coupled with the modernization of fishing gear have put pressure on these floodplain ecosystems. Also, local governance gaps and illegal fishing activities are a significant threat perceived by all stakeholders. People feel that the protection of the natural resources is limited.

The most critical problem the local population faces are the decline of the fish catch. This is a human as well as an ecological issue attributed to the increase of inappropriate fishing gear coupled with the growing number of fishers, the destruction of flooded forests, which are an important spawning ground for the fish, the use of illegal fishing gear, and the use of fertilizers which pollute water run-off. Although community fisheries have managed to reduce the prevalence of illegal fishing activities, the problems still persists because there is little alternative for livelihoods of local communities.

GIS-based zoning divided the watershed into six socio-ecological zones, each with relatively homogeneous land use, natural resources, community dynamics, and management practices (see Figure 1). This Zone 1

covers five districts: Pook, Siem Reap, Prasat Bakong, Soutr Nikom, Chi Kraeng districts, and 23 Communes. The area covered by Zone 1 is 631 km² and includes 12 community fisheries.

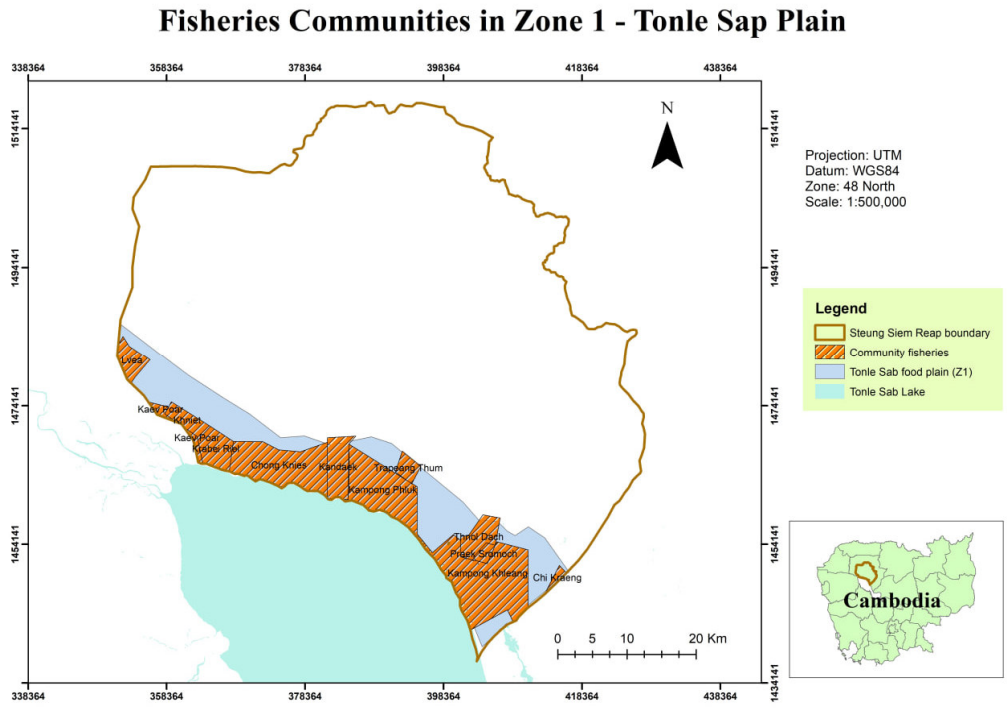


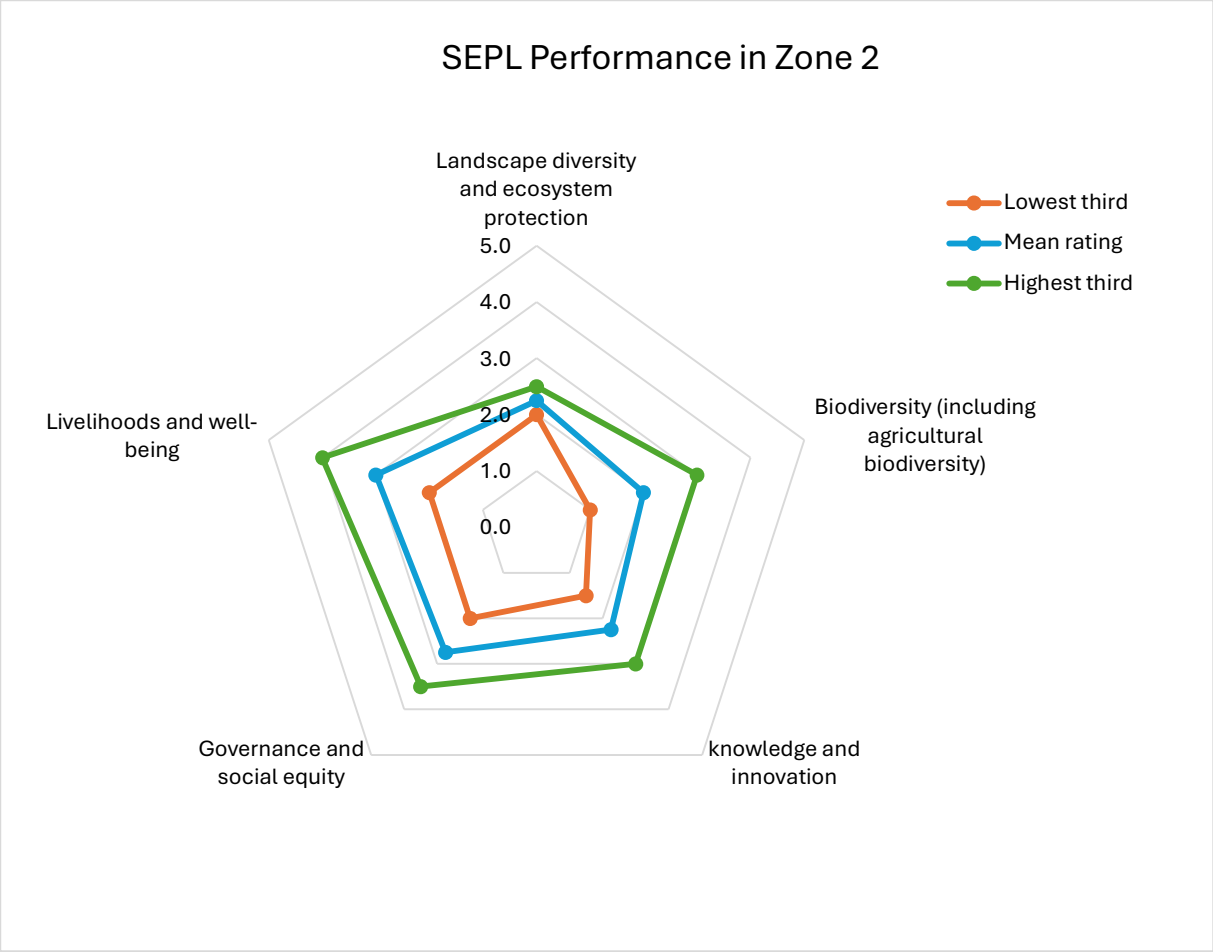
Figure 5. Fisheries Communities in Zone 1 – Tonle Sap Plain

Table 1. Names of Community Fisheries in Zone 1 – Tonle Sap Plain

No.	Name	Land Size (Ha)	Commune	District	Province
1	Kandaek	2,747	Kandaek	Prasat Bakong	Siem Reap
2	Chong Knies	7,338	Chong Knies	Krong Siem Reab	Siem Reap
3	Khniet	1,439	Khnat	Puok	Siem Reap
4	Krabei Riel	2,599	Krabei Riel	Puok	Siem Reap
5	Kaev Poar	6,134	Kaev Poar	Puok	Siem Reap
6	Lvea	5,381	Lvea	Puok	Siem Reap
7	Chi Kraeng	11,586	Chi Kraeng	Chi Kraeng	Siem Reap
8	Thnol Dach	2,134	Dan Run	Soutr Nikom	Siem Reap
9	Praek Sromoch	574	Kampong Khleang	Soutr Nikom	Siem Reap
10	Kampong Khleang	19,796	Kampong Khleang	Soutr Nikom	Siem Reap
11	Trapeang Thum	919	Trapeang Thum	Prasat Bakong	Siem Reap
12	Kampong Phluk	12,033	Kampong Phluk	Prasat Bakong	Siem Reap

3.2 Zones 2 and 3

Zones 2 and 3 are inhabited by farmers primarily involved in rain-fed rice production (usually more than 90% per commune but with a lower percentage in communes connected to Siem Reap town). The rice areas cultivated during the season represents less than 5% of the total rice cultivated area, while rainy season rice yields are not significantly different from the dry season cultivation (2 T/ha on average). Landlessness is significant amongst farmers (7% of the population involved in agriculture) and access to land is problematic as 49% of households involved in cropping on average owns less than one hectare. Water management infrastructure such as irrigation and drainage systems are not well developed, so double yearly harvests are uncommon. Although agriculture keeps people busy during the rainy season, unemployment is widespread during the dry season. Poverty remains a concern, though access to health and education is relatively better off thanks to the nearby city and better transportation infrastructure. In terms of resilient indicators for landscape diversity and ecosystem protection, knowledge and innovation have relatively low rating for these two zones. Therefore, project interventions need to have high consideration to support the local communities.



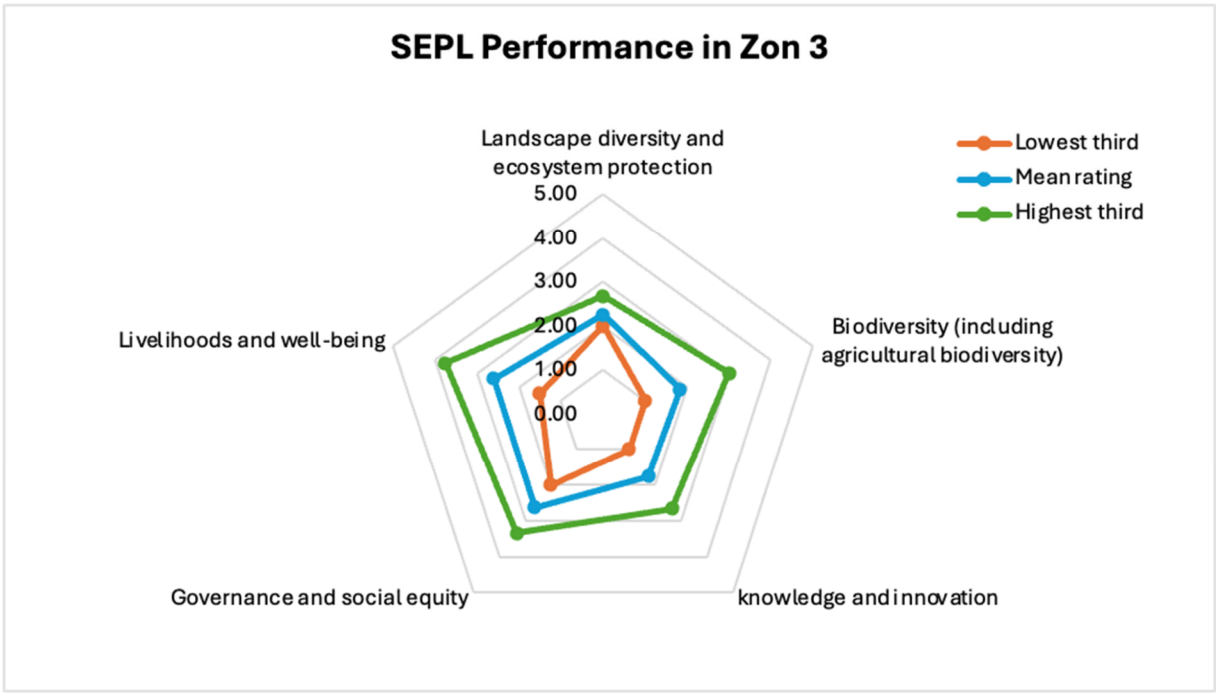


Figure 6. SEPL Performance by resilient indicators in Zones 2 and 3

The key problem identified by local communities is the low rice yield, aproblem attributed to low soil fertility and the lack of water storage systems.Also, agricultural diversification is limited.Despite the very high demand for vegetables from the tourism sector, most vegetables consumed in restaurants are imported from neighboring countries. The poor coordination between markets and production is paradoxically a key issue in this region, which has recently undergone a touristic decrease due to COVID-19 and the world economy slowdown. Integrated livestock cropping systems are rare, and crop production is mainly achieved using chemical fertilizers and pesticides. Generally, practices favoring agro-ecological principles are not followed. Agriculture is important for food security but it is not sufficient to meet employment needs. People are obliged to look for off-farm or non-farm job opportunities. Though the conditions of labor markets do not offer long-term security, there is an increasing number ofnon-farming jobs and the opportunity cost of doing farming is high. For this reason, farmers usually opt for quick and expeditious agricultural practices that produce relatively highyields, but are harmful to the environment and endanger biodiversity because of using chemical fertilizers, pesticide/herbicide, and imported rice seeds. If rainwater could be stored, stakeholders perceived that there could be greater potential for integrated farming systems on land located closer to village compounds. In Zone 3, problems for landscape diversity and ecosystem protection, knowledge and innovation, agricultural biodiversity used for livelihood enhancement are similar to those in Zone 2 (see RADAR diagram). However, the context in which agriculture and livestock activities are undertaken is somewhat different because the area comprises the archeological park of Angkor Wat, under the overall management and responsibility of the APSARA National Authority. The clearing of forestland to expand agricultural land holding is forbidden by APSARA, which creates tensions with local communities.

Zone 2 covers 8 districts namely Puok, Siem Reap, Prasat Bakong, Soutr Nikom, Chi Kraeng, Angkor Chum, Angkor Thum, Banteay Srei district, and 44 Communes. This Zone 2 covers an area of 1,100 km² and includes only 3 Community Forestry namely, Porpel, Beung Vean (DomDek), and Songveuy.

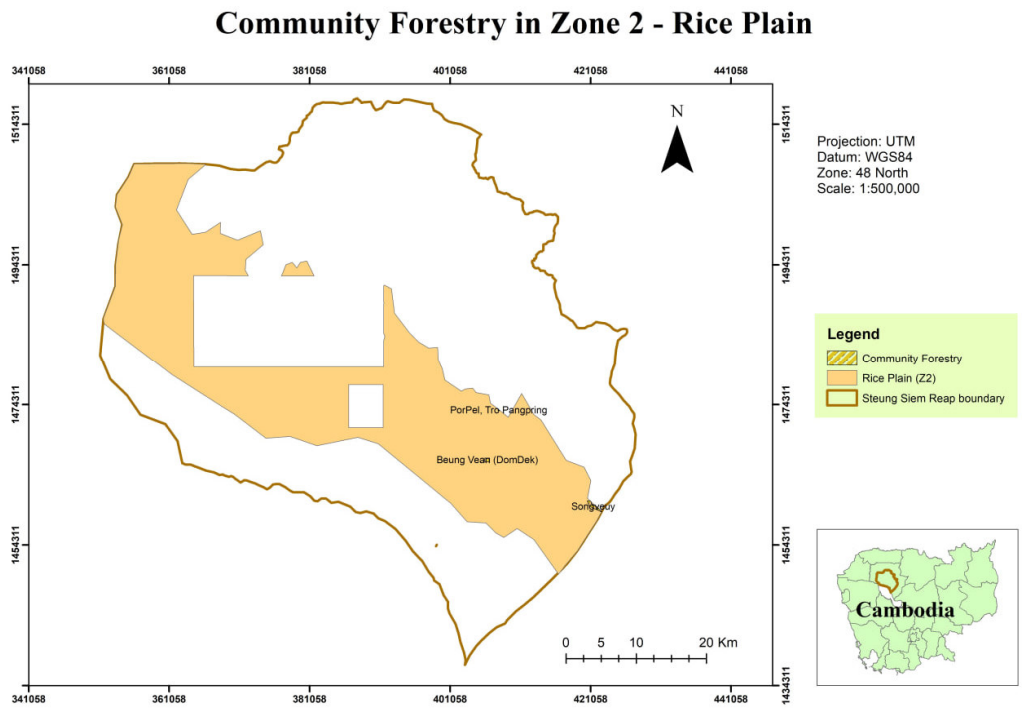


Figure 7. Community Forestry in Zone 2 – Rice Plain

Table 2: Names of Community Forestry in Zone 2 – Agricultural Plain

No.	Community Name	Land Size (Ha)	Commune	District	Province
1	PorPel	409	Popel	Sout Nikom	Siem Reap
2	Beung Vean (DomDek)	172	Doun Kaev	Puok	Siem Reap
3	Songveuy	112	SangVaeuy	Chi Kreng	Siem Reap

While Zone 3 composes of 5 districts namely Puok, Siem Reap, Prasat Bakong, Angkor Thum, Banteay Srei districts, and 18 Communes in total. The Zone 3 covers an area of 403 km² and has only 3 Community Forestry namely, Brasatcha/Dounkeo, Steung/BarKong, and Rom Chek Communities.

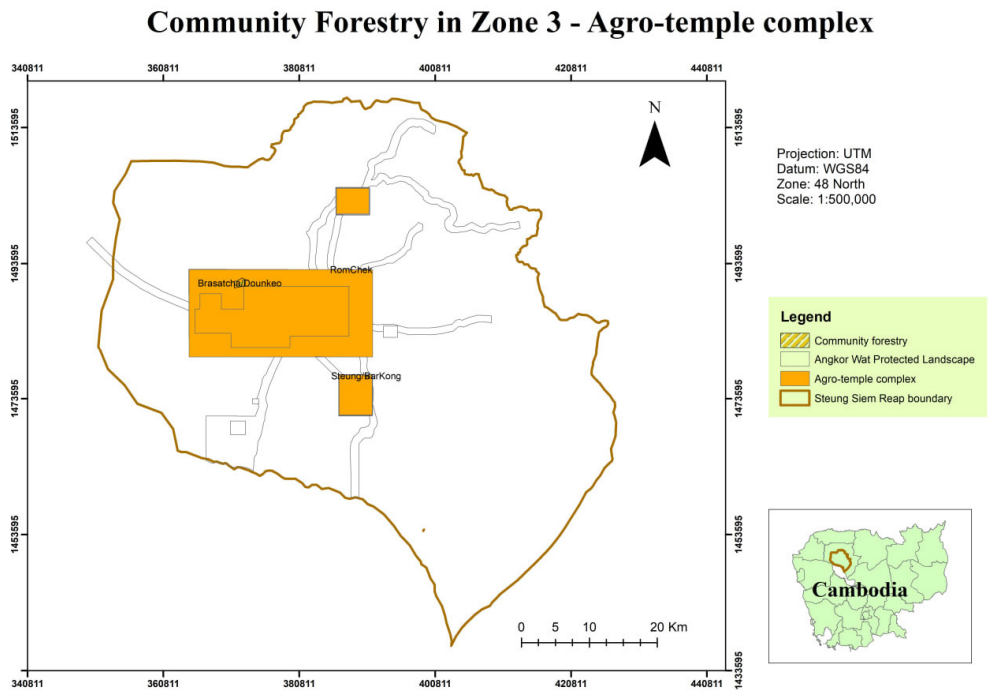


Figure 8. Community Forestry in Zone 3 – Agro – temple complex

Table 3: Names of Community Forestry in Zone 3 – Agricultural and Forest Area around Angkor Wat Complex

No.	Community Name	Land Size (Ha)	Commune	District	Province
1	Brasatcha/Dounkeo	172	Doun Kaev	Puok	Siem Reap
2	Steung/BarKong	10	Bakong	Prasat Bakong	Siem Reap
3	Rom Chek	330	Rumchek	Banteay Srey	Siem Reap

3.3 Zones 4 and 5

Zone 4 is a mosaic of cropping areas and forest patches. The inhabitants of these areas are mainly involved in rainy season cropping activities (94% on average in zone 4, but with a higher number of households involved in Chamcar (upland cropping) rather than in rice farming) but also depend on the forest resources to meet their livelihood needs. Access to land is even more problematic than in zone 1-2-3, with a higher prevalence of landlessness amongst the farming population (28% on average). There are serious factors limiting agricultural production, so off-farm wage and salary jobs are an important, secondary source of occupations for most people.

In this region, agriculture suffers from a lack of water because of limited rainfall, lack of water storage capacity, and low water retention in soil. The soil fertility of the arenosols is low; therefore, the potential for agricultural development is also low. The biophysical resource degradation, driven by land clearance for farmland and settlement, illegal logging and demographic increases, has worsened in recent years. Powerful and influential people organize illegal logging and land grabbing. Poor farmers are hired to clear the forests but are also engaged directly in illegal logging to expand their agricultural plot holding. Some of the depleted areas have been converted into orchards or annual crop plots, while others remain fallow

and will change into shrub or grassland. In a context where social and economic power greatly influences the management of forest resources, law enforcement has been minimal.

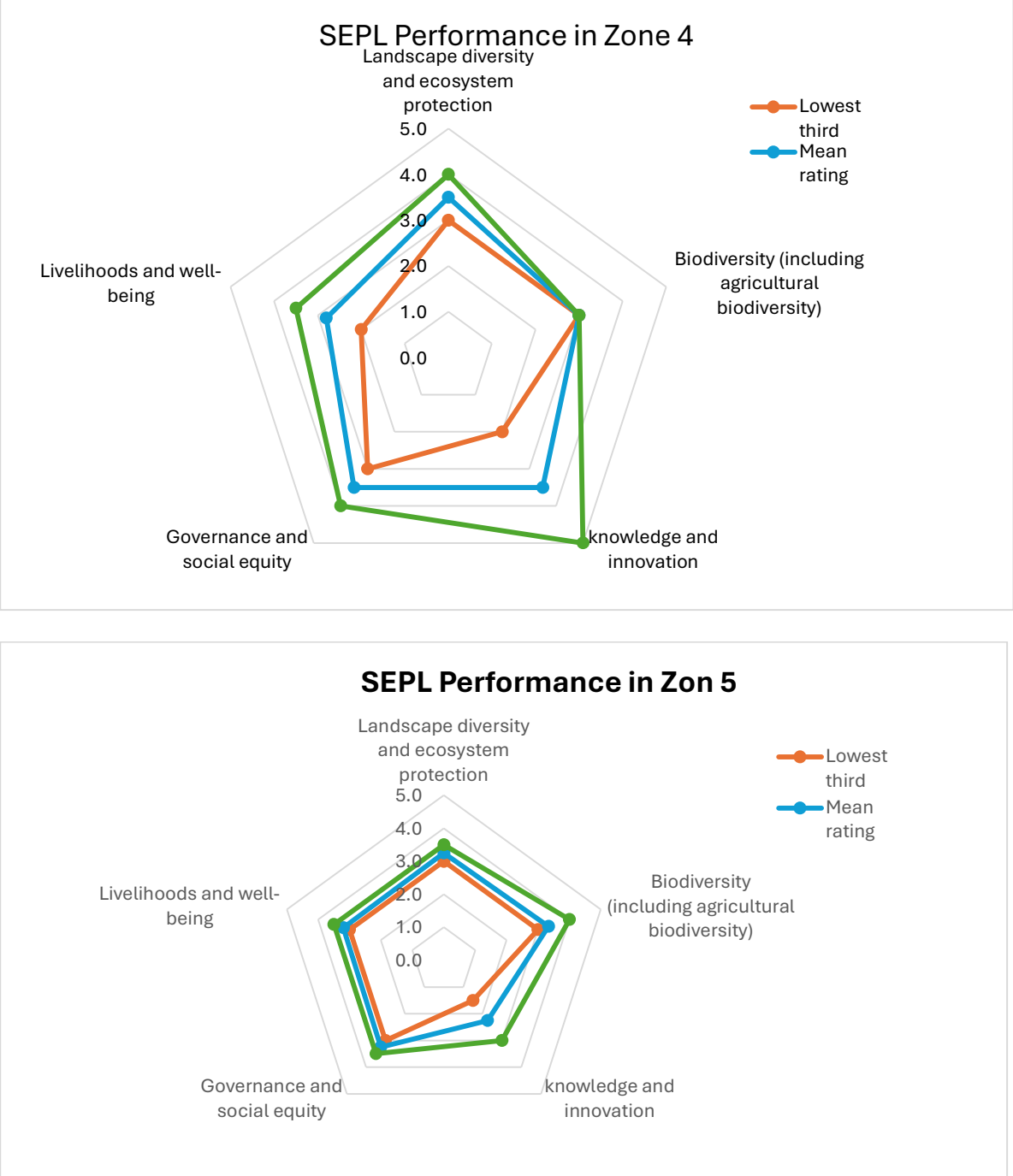


Figure 9. SEPL Performance by resilient indicators in Zones 4 and 5

However, local communities have protected some forest areas under a community forestry agreement. Local management groups have started to develop regulations and management plans for these community entitlements and there has been increasing cooperation between local communities, forestry

administration, and development partners. Community forestry areas are considered multi-functional areas which are not necessarily restricted exclusively to production and sylviculture activities but could potentially encompass other forms of landscape management. In this respect, people feel there is a high potential to reinforce and integrate community forestry management schemes with other generating income-generating activities such as agro-forestry and eco-tourism. Zone 4 has 21 community forestry schemes recognized by Prakas since 2007; covering a total land area of 6,900 hectares.

In zone 5, the household socio-economic situation is not essentially different than in zone 4. A very large majority of households (91% on average) are primarily involved in cropping activities, with forest resources being less significant in the income portfolio. Dry season agriculture is marginal while the rainy season rice yields 2.5 t/ha in the zone. The agricultural problems faced by local communities are quite similar to those in Zone 4; lack of water and low soil fertility are the key issues. However, deforestation has been more extensive in this zone and the area is basically now a large upland cropping area. The establishment of community forestry has little effectiveness to halt the deforestation rate, but there is little forest left that can be seen inside the Community Forestry Areas.

This area (zone 4) covers seven districts—Puok, Siem Reap, Prasat Bakong, Angkor Chum, Angkor Thum, Soutr Nikom, and Banteay Srei—encompassing a total of 20 communes. Zone 4 spans an area of 586 km² and includes 21 Community Forestry (see Table 4 for details).

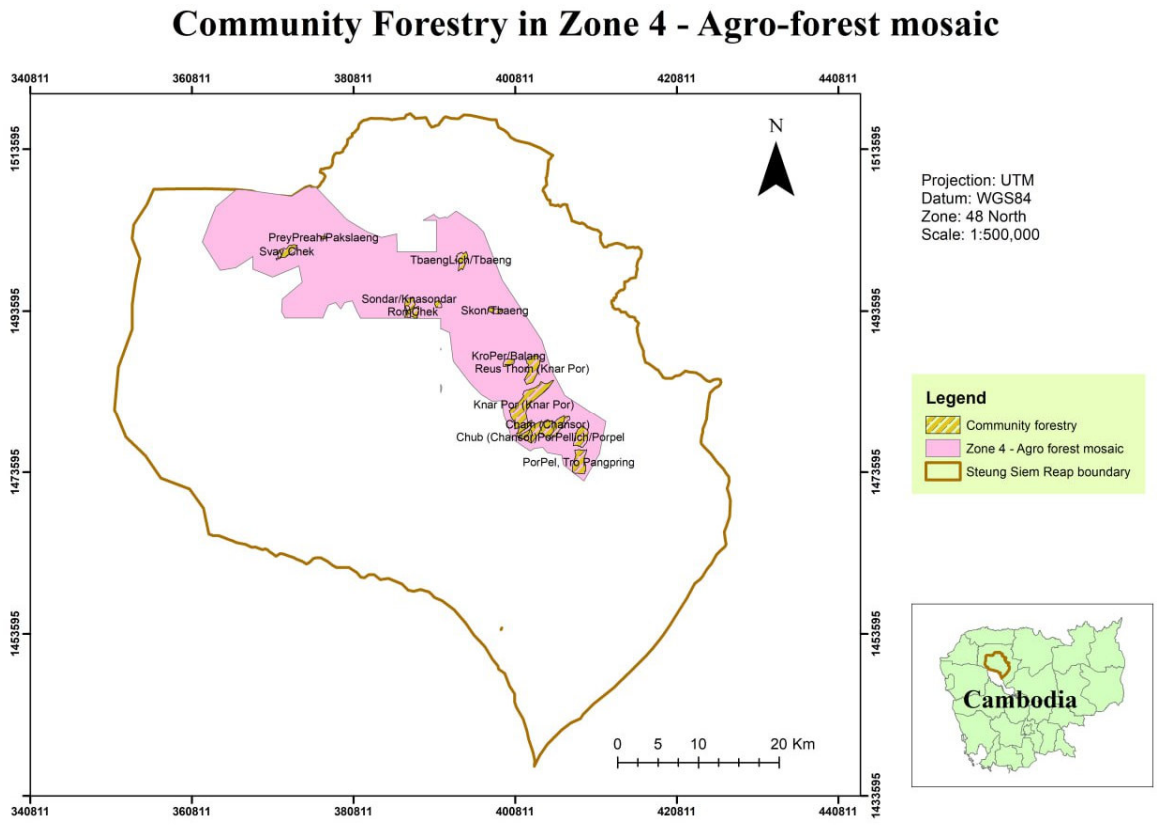


Figure 10. Community Forestry in Zone 4 – Agro-forest mosaic

Table 4: Names of Community Forestry in Zone 4 – Agriculture-Forest Mosaic Area

No.	Community Name	Size (Ha)	Commune	District	Province
1	Reus Thom (Knar Por)	445	Khnar Pou	Sout Nikom	Siem Reap
2	TbaengLich/Tbaeng	210	Tbaeng	Banteay Srey	Siem Reap
3	PorPellich/Porpel	330	Popel	Sout Nikom	Siem Reap
4	PorPel, Tro Pangpring	409	Popel	Sout Nikom	Siem Reap
5	KroPer/Balang	99	Ballangk	Prasat Bakong	Siem Reap
6	Skon/Tbaeng	87	Tbaeng	Banteay Srey	Siem Reap
7	Treal Pong (PorPel)	61	Popel	Sout Nikom	Siem Reap
8	PreyPreah/Pakslaeng	16	Peak Snaeng	Angkor Thum	Siem Reap
9	Chansorcherng (Chansor)	84	Chan Sar	Sout Nikom	Siem Reap
10	Svay Chek	232	Svay Chek	Angkor Thum	Siem Reap
11	Kok Terng (Chansor)	271	Chan Sar	Sout Nikom	Siem Reap
12	RomChek	330	Rumchek	Banteay Srey	Siem Reap
13	Roveang Tatom	59	Rumchek	Banteay Srey	Siem Reap
14	Cham (Chansor)	225	Chan Sar	Sout Nikom	Siem Reap
15	Chub (Chansor)	203	Chan Sar	Sout Nikom	Siem Reap
16	Chbarler (Chansor)	78	Chan Sar	Sout Nikom	Siem Reap
17	Thnol (Chansor)	63	Chan Sar	Sout Nikom	Siem Reap
18	Chansortbong (Chansor)	94	Chan Sar	Sout Nikom	Siem Reap
19	Knar Por (Knar Por)	1,022	Khnar Pou	Sout Nikom	Siem Reap
20	Sondar/Khnasondar	427	Khnar Sanday	Banteay Srey	Siem Reap

Zone 5 covers six districts—Angkor Thum, Banteay Srei, Varin, Svay Leu, Soutr Nikom, and Chi Kraeng—encompassing a total of 22 communes. Zone 5 spans over an area of 571 km² and includes two Community Forestry schemes and three CPA located in Boeng Per and Phnom Thnoat Phnom Pork Wildlife Sanctuaries (see Table 5 for details).

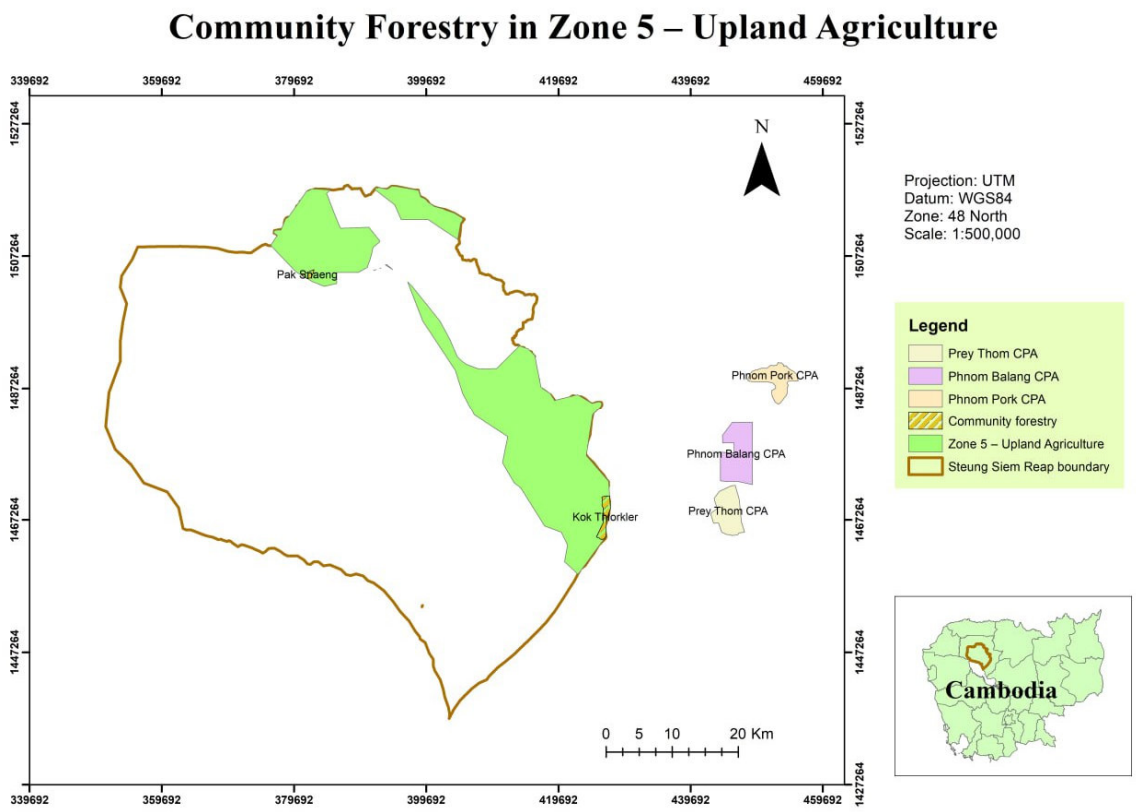


Figure 11. Community Forestry and Community Protected Areas in Zone 5 – Upland Agriculture

Table 5: Names of Community Forestry and CPA in Zone 5 – Upland Agricultural Area

No.	Community Name	Land Size (Ha)	Commune	District	Province
1	Pak Snaeng	207	Peak Snaeng	Angkor Thum	Siem Reap
2	Kok Thlorkler	2,086	Kouk Thlok Leu	Chi Kreng	Siem Reap
3	Phnom Balang	3,800	Khvav	Chi Kreng	Siem Reap
4	Prey Thom	2,440	Pongro Leu	Chi Kreng	Siem Reap
5	Phnom Pork	2,113	Khvav	Chi Kreng	Siem Reap

Note: Communities 1 and 2 are Community Forestry. Communities 3 and 4 are CPA in Boeng Per Wildlife Sanctuary, and Community 5 is also CPA in Phnom Thnoat Phnom Pork Wildlife Sanctuary.

3.4 Zone 6

This zone, known as Phnom Kulen National Park, covers three districts—Varin, Soutr Nikom, and Svay Leu—and encompasses nine communes. Zone 6 spans an area of approximately 319 km². People residing within Phnom Kulen National Park consider themselves farmers (99% according to the commune database). They are engaged in a rain-fed agriculture system involving both rice and non-rice (Chamar) production. Timber and non-timber forest resource collection are central to their livelihoods. Access to farmland is limited to certain zones of the protected area. People are allowed to do cultivation on their existing farmlands (before the creation of the National Park). They are not permitted to expand their farmland or plantation in this zone. The entire zone is a protected area under the overall management of the Ministry ofEnvironment. Specific rules and regulations are defined for the area and are enforced by the governmental rangers. There are 7 CPA schemes (Table 6 for details) recognized by the Ministry of

Environment, covering a total land area size of more than 14,000 hectares. Changkran Roy CPA was formerly established as CF, and it was recently converted to CPA as its forest area is merged into Phnom Kulen National Park under MOE. Since establishment, several CPAs have prepared the management plans with support from NGOs and development partners, and some others have been under processing due to limited funding support. The CPA follows similar co-management principles as the community forestry schemes. The CPA is considered a multi-functional area that is not restricted exclusively to protection, with the possibility of integrating forest management with other income-generating activities such as agroforestry. The area is also an important tourist destination, which represents potential for further development.

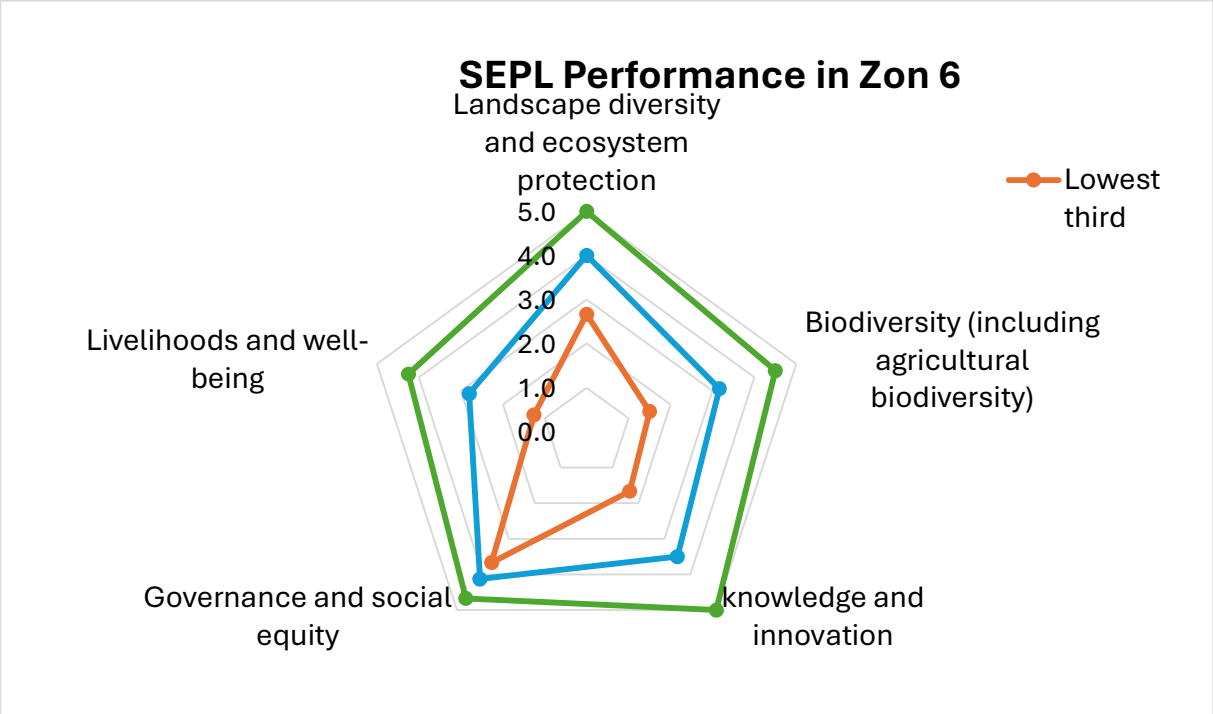


Figure 12. SEPL Performance by resilient indicators in Zone 6

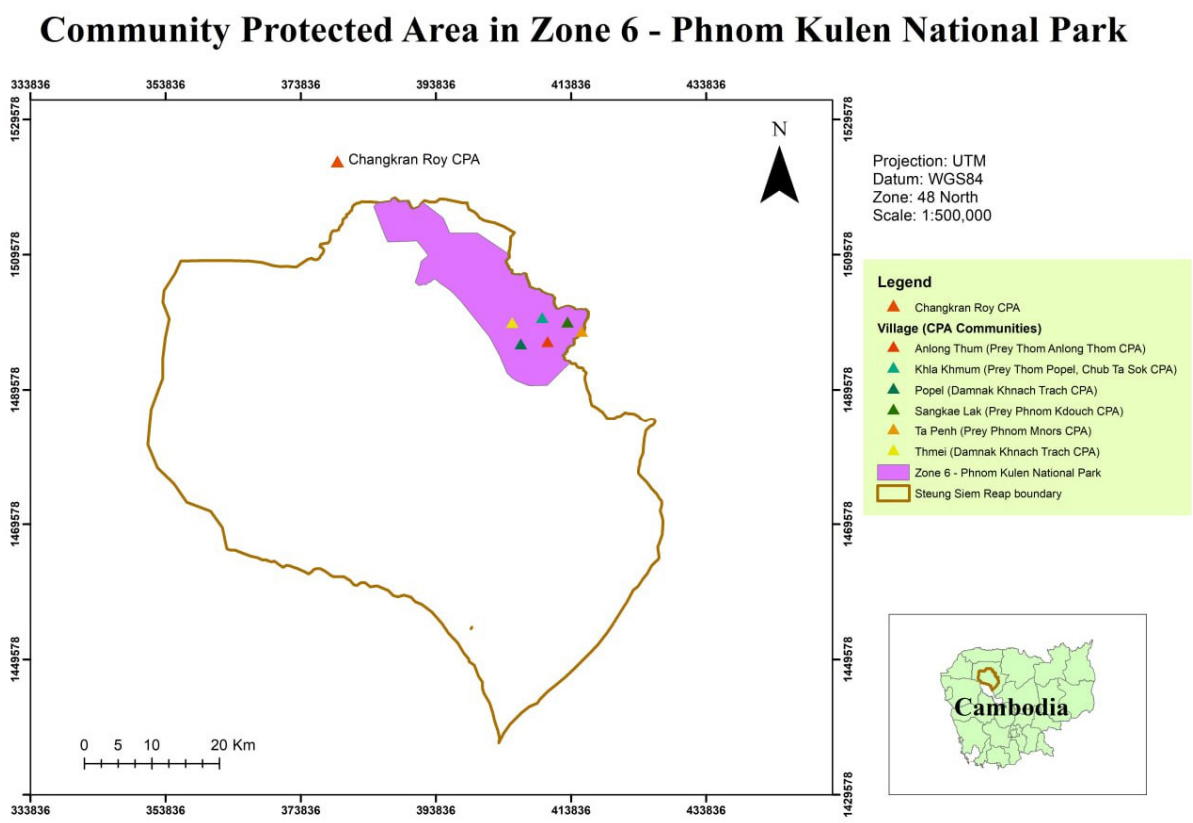


Figure 13. Community Protected Area in Zone 6 – Phnom Kulen National Park

Table 6: Names of CPA Communities in Zone 6 – Phnom Kulen National Park and Boeng Per Wildlife Sanctuary

No.	Community Name	Land Size (Ha)	Commune	District	Province
1	Damnak Khnach Trach	2,832	Pongro kraom	Chi Kreng	Siem Reap
2	Prey Phnom Kdouch	101	Khnang Phnom	Svay Leu	Siem Reap
3	Prey Thom Anlong Thom	365	Khnang Phnom	Svay Leu	Siem Reap
4	Prey Thom Popel	798	Khnang Phnom	Svay Leu	Siem Reap
5	Chub Ta Sok	359	Khnang Phnom	Svay Leu	Siem Reap
6	Prey Phnom Mnors	92	Khnang Phnom	Svay Leu	Siem Reap
7	Changkran Roy	9,544	Lvea Kraing, Srenoy, Svay Sar	Varin	Siem Reap

Note: CPA 1 is located in Boeng Per Wildlife Sanctuary

4. Landscape management and Restoration Strategies

4.1 Institutional Analysis

Stung Siem Reap Watershed Areas are located within Siem Reap province. The natural resources as well as land are managed by several key government ministries like MOE, MAFF, APSARA National Authority, that have direct management and control over the resources in the watershed. For instance, Protected Areas like Phnom Kulen National Park is under direct control and management of MoE, and its line subnational unit (Department of Environment and Ranger Office). Forest areas outside the Protected

Areas including CF and CFi are under direct management of MAFF through its line subnational unit like Department of Agriculture, Forestry and Fisheries (consisting of Forestry Cantonment and Fisheries Cantonment). While other ministries like Ministry of Land Management, Urban Planning and Construction (MLMUPC); Ministry of Water Resource and Meteorology (MOWRAM); Ministry of Mine and Energy (MOME); Ministry of Industry, Science, Technology and Innovation (MISTI); Ministry of Rural Development (MRD); and Ministry of Public Work and Transport (MPWT); have the roles and responsibilities to support the key ministries over the development within the watershed. The Ministry of Interior has direct control over administrative affairs of sub-national government units like provincial, district and commune levels. These have engaged day-to-day administration activities at grassroots level, especially commune with local communities. The sustainability of the COMDEKS projects should be integrated with annual plans of MoE, MAFF, and commune development and investment plans because the subnational governments and commune have direct authority to local resources and development. And the COMDEKS projects should be well coordinated with subnational governments (MOE, MAFF) and commune councils.

4.2 Legal Framework

The watershed areas are managed under many laws and regulations which are aligned with regional and international instruments, conventions and treaties. But laws and regulations directly related to management and conservation of natural resources, biodiversity and ecosystems include: Code of Environment and Natural Resources (2023), Protected Areas Law (2008), Forestry Law (2002), Fisheries Law (2006), Land Law (2001), Land on Water Resource Management (2007), Law on Mineral Resource Management and Exploitation (2001). In addition, this COMDEKS-4 strategy supports the national related policies and strategies which directly link to: CBD National Biodiversity Strategy and Action Plan (NBSAP 2016), Pentagonal Strategy Phase I (2024-2028), Cambodia Climate Change Strategic Plan 2014-2023, National Strategic Development Plan (NSDP) 2024-2028, National Protected Area Strategic Management Framework (2015), Circular Economy Strategy and Action Plan 2021, Circular Strategy for Environmental Sector (2023-2028), Local Community Development Strategic Plan (2024-2028), Agricultural Sector Master Plan 2030 (2020), Agriculture Sector Strategic Development Plan 2019–2023 (2020), Master Plan for Crop Production in Cambodia to 2030 (2016), Sub-degree on Contract Farming (2011), Strategic Planning Framework for Livestock Development 2016–2025 (2015), National Agricultural Development Policy 2022-2030 (2022), Cambodia's Updated Nationally Determined Contribution (2020), National Policy on Rural Electrification by Renewable Energy (2007), National Action Program to combat land degradation/desertification 2018-2027 (2018), and many others. Therefore, these laws, regulations and strategies strongly support the implementation of this COMDEKS CPS. At the watershed level, this strategy also aligns with and supports two subnational priority Plan and Program for Siem Reap province: 1) the recently developed and adopted Tourism Development Master Plan for Siem Reap 2021-2035 supports the commitment of RGC that considers "Tourism as Green Gold", contributing towards socio-economic development, national cultural promotion, and effective environmental protection. And 2) Preah Jayavarman-Norodom National Park Management Program "Phnom Kulen" (2018-2027) focuses on the protection of remaining forest resources, development of cultural heritage, expansion and enhancement of livelihood options in local communities, strengthening institutional capacity for protection, cooperation with a vision for the sustainable management of natural and cultural heritage in Phnom Kulen National Park aims to reduce forest loss and degradation.

4.3 The vision

The vision for Stung Siem Reap Watershed Landscapes Programme Strategy is to "maintainand restore functional socio-ecological production landscapes to preserve biodiversity, improve local livelihood, and enhance ecological and institutional landscape connectivity." This vision will be met through community-

based activities at the landscape level based on the integration of local cultural knowledge and scientific technology with respect to adaptive, collaborative management principles.

4.4 The outcome, indicator and typology of community-based projects

The landscapes program strategy for the Stung Siem Reap watershed area seeks to produce four main outcomes in respect to biodiversity conservation, livelihood enhancement, agricultural production system, and institutional structure. The following section presents four outcomes with descriptions of potential community projects that could be implemented in the specific socio-ecological zones to achieve them.

Outcome 1) Degraded biodiversity and ecosystem services are restored through multi-functional land use systems: The response will include efforts to protect natural resources within the socio-ecological zones while increasing ecosystem services. The following projects are considered viable to be implemented:

- Reforestation and tree nursery development, including flooded forest in areas under Community Protected Areas (CPA), Community Forestry and Community Fisheries (CFi) schemes and through private plantation (Zones 1, 5, 6).
- Promotion of multipurpose trees and plantations on private forest lands (zones 4, 5,6)
- Supporting the integration of CPA and CF and grazing areas into Communal land Use Plans (Zones 4, 5).
- Development of forest corridors to connect CF areas (Zones 4, 5).
- Supporting management of flooded forests and shrubland and integrating these into commune land use planning (Zones 1, 2).
- Supporting the stabilization and consolidation of riverbanks by planting appropriate species of trees (Zones 1, 2, 4, 5,6).

Outcome 2) Livelihoods of people in the landscape are improved through the development of ecologically sound and community-owned income generating activities: The response will include efforts to address the lack of farmer-to-market linkages while enhancing income opportunities for local people, the following projects could be potentially supported:

- Promotion of bee-keeping activities and strengthening existing bee keeping association with support of access to market (Zones 4, 5, 6).
- Promotion of ecotourism activities, including providing skill training on tour guide, hospitality, cooking, homestay, and traditional performance, etc. (Zones 1, 4, 5, 6)
- Supporting the improvement of handicraft production, including providing skill training on harvest, design, production, packaging, labelling, marketing and sale (Zones 1, 4, 5, 6).
- Promoting farmer associations and public-private partnership to connect the products to markets with assistance of the private sector (Zones 1, 2, 4, 5).

Outcome 3) An ecologically sound agricultural production system in the target landscape is strengthened to increase crop yield and productivity sustainably. The response will include efforts to reinforce eco-friendly farming and cropping methods to increase soil and crop productivity and maintain and enhance livestock production. The potential projects supporting this outcome could include:

- Promoting the production and use of organic farming practices including compost, forest humus, green manure, and liquid slurry (Zones 2, 4).

- Promoting the application of climate smart agriculture practices while enhancing production, including agroforestry, and integrated farming, entailing changes in transplantationtechniques combined with better weed and water control, and use of green manure/cover crops in order to reduce the chemical fertilizers and herbicide and pesticide (Zones 2, 4, 5).
- Promotion of hedge rows with fast-growing and N-fixing trees/shrub (Zones 2, 4, 5).
- Producing rainwater storage systems by restoring wetlands, canals, check dams, or household ponds/tanks, etc. (Zones 5, 6).
- Introducing Bio-digesters by promoting household animal husbandry within CPA and CF areas (Zones 4, 5, 6).

Outcome 4) Robust governance systems are established and strengthened for effective participatory decision-making at the landscape level. Efforts to ensure efficient coordination of community conservation activities could include:

- Strengthening the existing Community-Based Organizations within Stung Siem Reap Watershed Areas, including CF, CFi, and CPA; and enforcing their management plans, including update of committee members and providing proper skills on organizational management systems (Zones 1, 2, 4, 5, 6)
- Supporting the integration of CFi, CF, CPA into communal land use planning (CLUP) and into Commune Development Plan (CDP) and Commune Investment Programmes (CIP). The watershed management approach may be integrated into District and provincial Development Plans as well (Zones 1, 2, 4, 5, 6).
- Establishing a network or federation of CPA, CF and CFi within the watershed areas and linking to national platform (Zones 1, 2, 4, 5, 6).

Outcome	Indicator
Degraded biodiversity ecosystem and services are restored through multi-functional land use systems	Areas (15,000 ha) degraded ecosystem are managed under sustainable multi-functional land use system.
Livelihoods of people in the landscapes are improved throughthe development of ecologically sound and community owned income generating activities	Number of new income generations activities/measures, that are biologically and culturally practical, being implemented Percentage increase in income from project activities.
The ecologically sound agricultural production system is strengthened to sustainable increase of crop yield and productivity	Areas (3,000 ha) of agricultural land is put into sound ecological production system Percentage increase in yield of major crops due to project activities

Robust governance system are established and strengthened	At least 20 community-based organizations established and strengthened with a mandate in conservation and development in the target landscape 10 CPA development plans being developed which integrate landscape management perspectives.

5. Proposed Strategic Phasing of the Implementation of the Landscape Strategy

The target area for the COMDEKS country landscape strategy program is the Stung Siem Reap watershed. The area overlaps in multiple districts ranging from upland areas of the Phnom Kulen mountain range to the flooded flat plain of Tonle Sap Lake. To ensure the effective management of the target landscape, the watershed has been divided into three sub-areas based on the waterway systems of the three rivers in the area. The sub-areas are characterized as upstream, midstream and downstream based on watershed management perspectives. During the landscape-wide baseline assessment, the landscape was further subdivided into six socio-ecological zones to avoid a "one size fits all" landscape strategy and instead, ensure that landscape management decisions adapt and respect the heterogeneity of the entire watershed system. Given the possibility of grant support and similar extent of the area and the variety of functions of the watershed system, interventions should be prioritized only in one-time phase for the whole Stung Siem Reap Watershed.

6. Monitoring and Evaluation Plan

It is recommended that monitoring and evaluation be performed on two levels: at the program/landscape level and at the individual project level. At the program/landscape level, performance indicators will be used to guide monitoring and evaluation exercises, while progress will be measured by evaluating the actual status of landscape performance against the baseline assessment results.

Country Programme Landscape Level Indicators: SEPL Indicators measured during the baseline assessment will be monitored on an annual basis. A final assessment of SEPL indicators will take place at a workshop financed by a grant. This will serve as a finalevaluation of the Country Programme Landscape Strategy. The monitoring reporting conducted by the country GEF-SGP Secretariat will be completed at each of the two *strategic stages* semi-annually. Outcomes and results of monitoring and evaluation need to be integrated in the second strategic stage planning process. Monitoringand evaluation of the strategic stage will also be carried out by the GEF-SGP secretariat, which will be responsible for reporting and updating proposed revisions of the strategic programme to the NSC (National Steering Committee) for their approval.

At the project level, outcomes and indicators will be developed specifically for the project and in the context of the approved Country Programme Landscape Strategy. The project indicators will be aligned and contribute to the overall outcomes of the program strategy. In particular, each project will identify the specific landscape strategy outcome to which it is contributing and will monitor the corresponding indicators. Progress toward achieving project outcomes will be monitored regularly through a small grant progress report. The following standard monitoring and evaluation for projects should be applied:

- **Ex-ante Visits:** The project team should undertake ex-ante visits on a risky basis to grant-requesting organizations upon grant approval by the NSC and prior to the signature of the Memorandum of Agreement between UNDP and the grantee.
- **Field monitoring visits:** Every project should be visited at least twice in its lifetime, once upon receipt of the first progress report from beneficiary organizations and second during the following year. NSC members with relevant technical expertise in project-related areas may join the CPM (Control Performance Monitoring) during these visits, as appropriate.
- **Progress reports:** Beneficiary organizations should submit quarterly progress reports to the National Coordinator (NC) along with a financial report. The grantee should also submit a forecast of resources needed in the following period as a requirement for the disbursement of the next installments.
- **Final project evaluation report:** Beneficiary organizations should submit a final report summarizing landscape-level benefits and other results achieved outputsproduced, and lessons learned. The final report should also include a final financial statement.
- **Project-Level Indicators: Each project will identify the specific landscape strategy outcome to which it is contributing and will** contribute and monitor the corresponding indicators. Progress towards the outcome will be updated using the grantee's progress reports. Additionally, the individual project will have an indicator system aligned with GEF SGP's OP8 system of indicators.

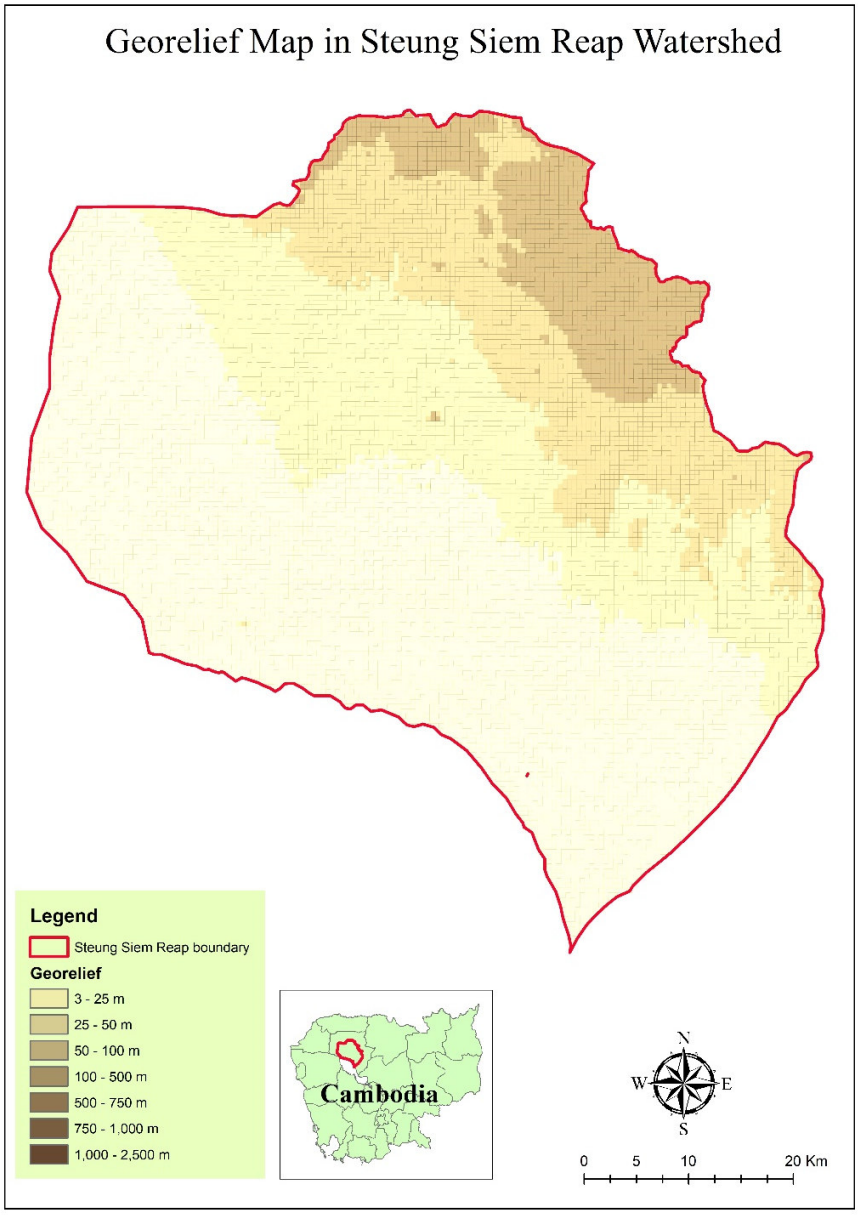
7. Knowledge Management Plan

In response to the learning and sharing aspects of the COMDEKS project, knowledge management is a main component of the program strategy. It is expected that documentation of the best practices for the various thematic issues of landscape management will be disseminated. The documentation process will occur at the project level since specific lessons can be generated at the implementation level. Different multimedia tools will be used, such as newsletters or e-newsletters, which are produced periodically and shared with key stakeholders. Analytical case studies written at the end of each project implementation, policy briefs, and video documentation will also be produced.

Each community-based project should allocate an amount for KM (Knowledge Management) activities, and clearly identify the type of knowledge management products that will be produced. In addition to program reflection workshops (mid-term or final stakeholder workshop), the GEF Small Grant Program Secretariat in Cambodia will organize dissemination events to ensure lessons learned are effectively communicated to a range of audiences including the National Steering Committee members, government and NGOs to promote upscale of best practices and influence on national and subnational policies and strategies. The UNDP SGP webpage will be used to post updates on issues or progress related to program implementation, as well as specific articles or case studies.

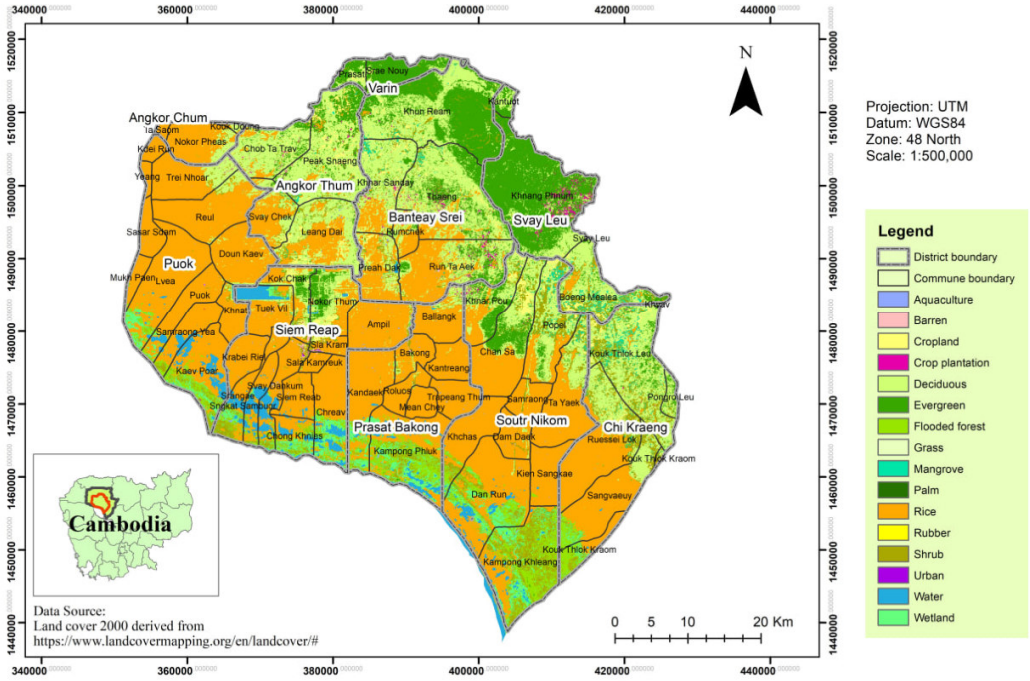
Annexes

Annex 1: Georelief Map in Stung Siem Reap Watershed Areas



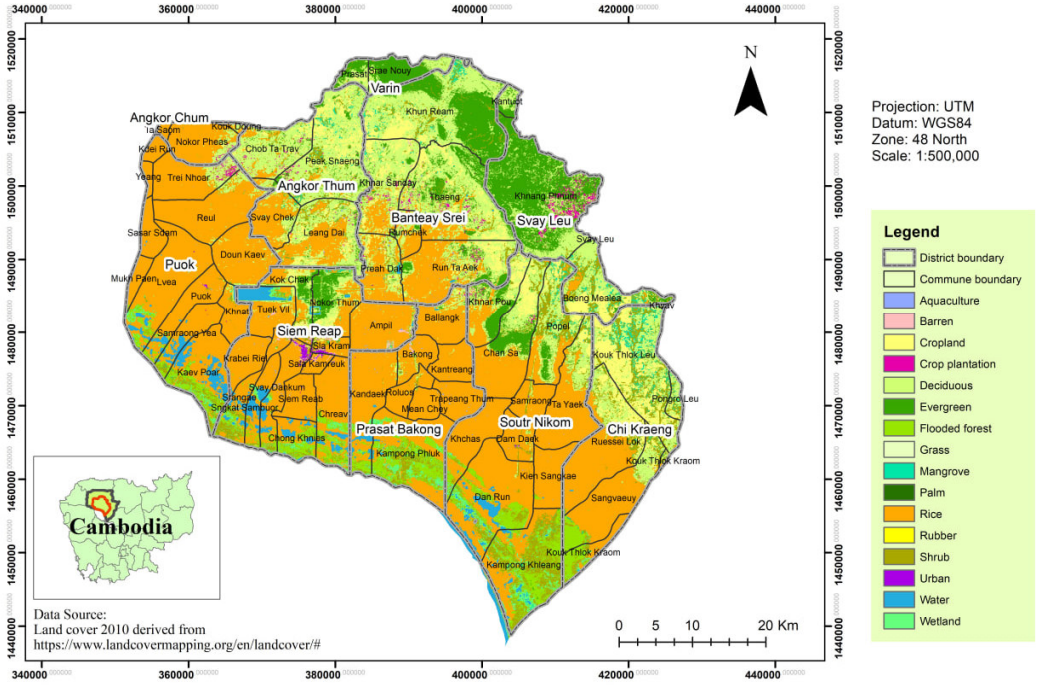
Annex 2

Land Cover Map in Steung Siem Reap Watershed Area 2000



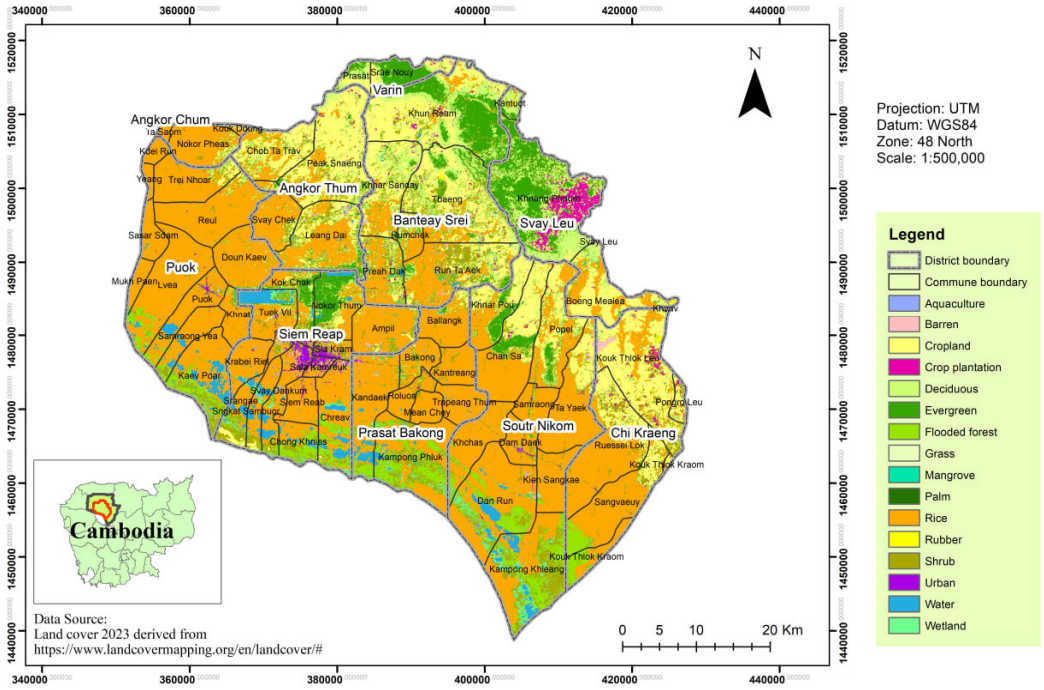
Annex 3

Land Cover Map in Steung Siem Reap Watershed Area 2010



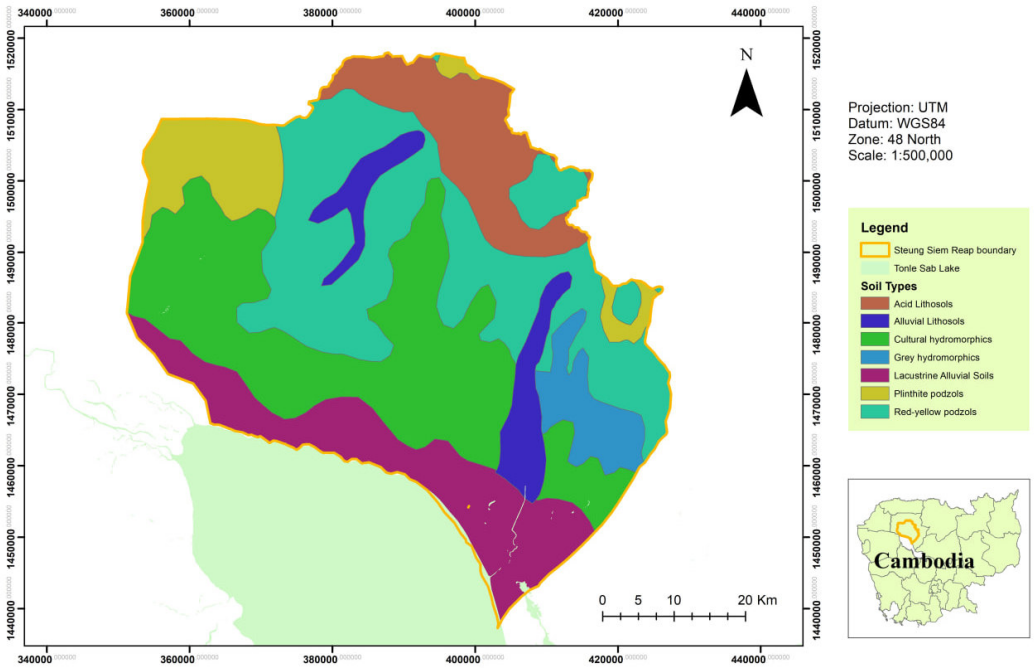
Annex 4

Land Cover Map in Steung Siem Reap Watershed Area 2023



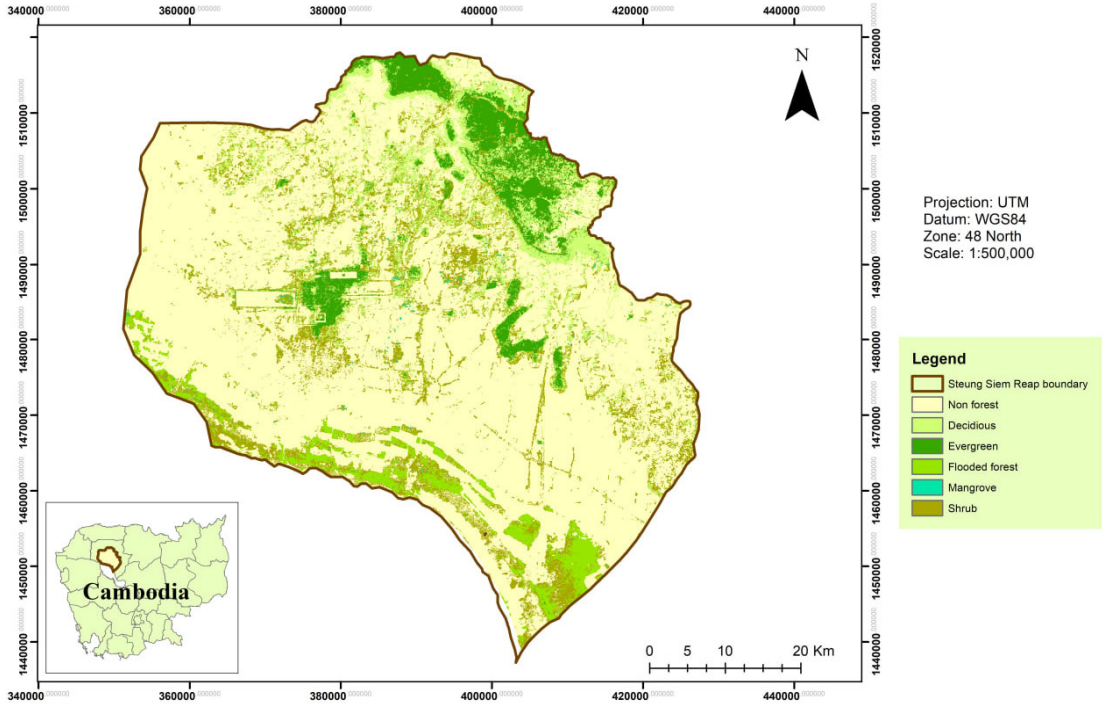
Annex 5

Soil Types in Steung Siem Reap Watershed area (Crocker, 1962)



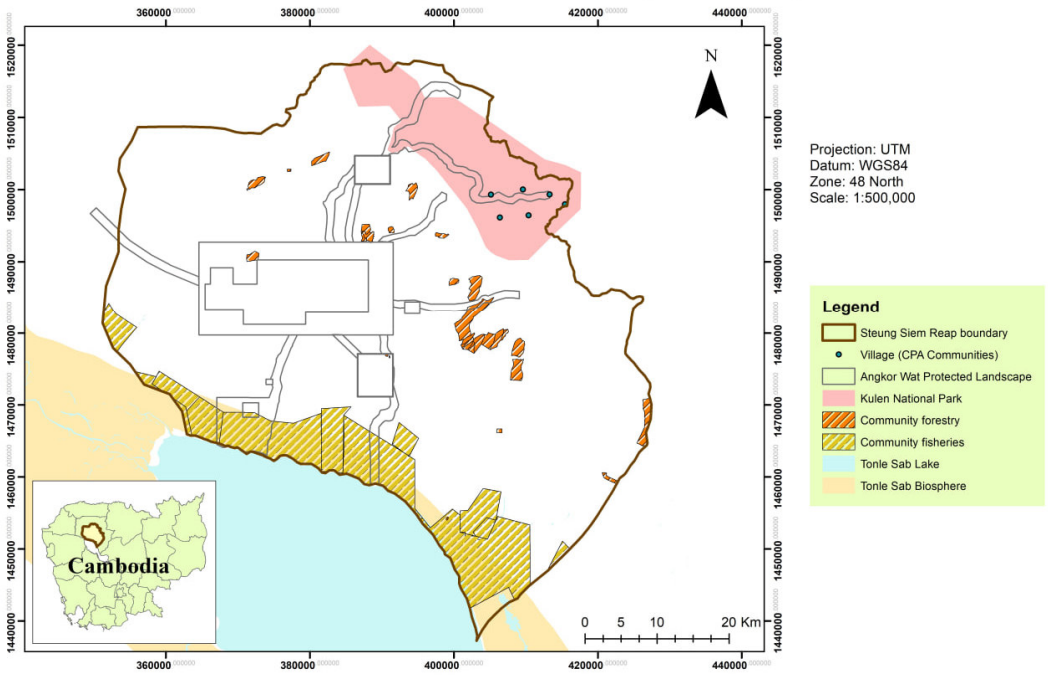
Annex 6

Forest Cover and Types in Steung Siem Reap Watershed area 2023



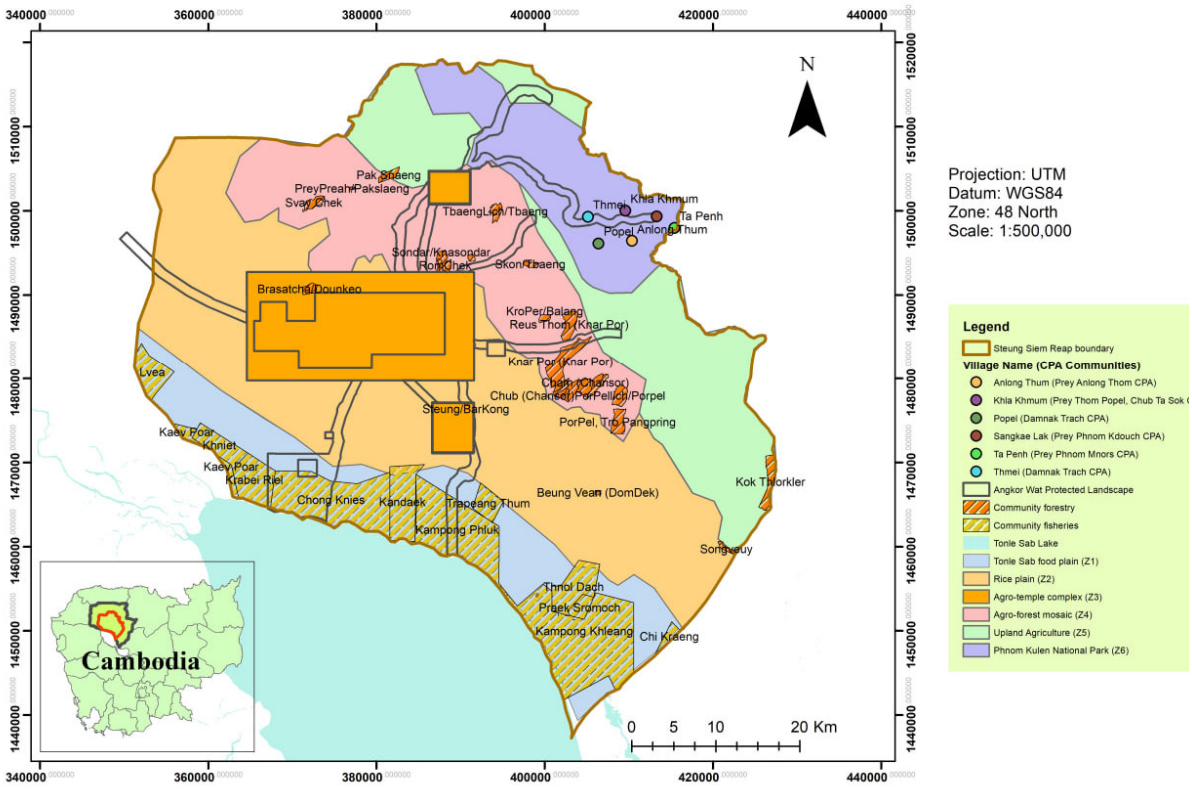
Annex 7

Main State Land Tenure Arangemens in Steung Siem Reap Watershed Area



Annex 8

Socio-ecological zoning of Steung Siem Reap Watershed area



Annex 9

	Ecology	Land Use	Forest Cover Change	Vegetation	Land Tenure
Zone 1 Tonle Sap Flood Plain	Flat downstream area Flooded by Tonle Sap High fertility (Lacustrine Alluvial Soils)	Flood plain: mosaic of flooded/dry grass, shrubs, forest with fishing grounds and [deepwater] rice field	Increase and decrease of flooded forest	Important flooded forest tree species Important fish species	Community fisheries Cancelled fishing lot Community-based ecotourism
Zone 2 Rice plain	Flat downstream area (non-flooded) by Tonle Sap Soil of medium fertility (Cultural hydromorphone) but some parts also poor fertility (Red-yellow podzols)	Paddies with rice production (one harvest per year), proximity agriculture (gardening and intensive rice production close to the village)		Common fish species in rice field Aquaculture	Household farming with farmer association and institutionalize the market relationship with the private sector
Zone 3 Agroarcheological park	Flat downstream area Low fertility (arenosols)	Paddies with rice production (one harvest per year) Forest Archeological park	Reforestation	[Mostly] Evergreen vegetation	Household farming Management by Appsara authorities (regulatory land zoning)
Zone 4 agricultural mosaic area	Flat downstream area Slightly undulating mid-stream Mostly low fertility (arenosols)	Mosaic Forest cropping (upland crop), village (with forest dominant)	Deforestation leading to fragmentation of forest cover	Mixed evergreen and dry deciduous forest	Household farming Community Forestry Urban investors
Zone 5 upland agriculture zone	Slightly undulating mid-stream	Upland crop Agriculture/village (barely any forest cover)	Deforestation leading to complete destruction of	Originally evergreen and semi-	Household farming, large chamcar

	Slightly undulating up-stream Low fertility (arenosols)		forest canopy (and upland crop)	evergreen vegetation	
Zone 6 Phnom Kulen National Park	Plateau + steep escarpments Low fertility (arenosols, leptosols)	Forest + upland chamcar Caves	Limited deforestation	Evergreen and semi-evergreen vegetation	National Park (Protected Area) CPA and Community-based tourism