Implementing the Strategic Action Programme for the South China Sea and Gulf of Thailand (SCS SAP Project)

Second Meeting of the Regional Working Group on Mangroves and Wetlands

Iloilo City, Philippines 11-12 August 2025

Summary on achievements at SCS SAP Project sites in implementing the PCA/GSA, including reviews on status of monitoring, and data and information available on mangroves and wetlands

CAMBODIA

Achievements, monitoring status and data/information available at the SCS SAP mangroves and wetland sites in Cambodia

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Introduction

As described in the Inception Phase Regional Implementation Report reviewed in the First Steering Committee of the SCS SAP Project held in June 2021, Bangkok, Thailand, the outcomes and outputs for mangrove and wetland focal areas include:

Outcome 1.1 *Appropriate forms of sustainable management established for 860,000 ha of mangroves*	***Outcome 1.4*** *Integrated management of 813,647 ha of coastal wetlands at 19 sites, including habitat restoration and protection strengthened at priority locations*
Output 1.1.1 Declaration of 57,400 ha of mangrove as National Parks and Protected Areas	Output 1.4.1 Integrated management plans developed and under implementation for at least 2 lagoons (21,818 ha), 10 estuaries (639,418 ha), 5 tidal flats (96,903 ha), 1 peat swamp (45,700 ha) and 1 non-peat swamp (9,808 ha)
Output 1.1.2 Designation and plans for the management of 166,600 ha of mangrove as non-conversion, sustainable use areas	Output 1.4.2 Declaration of wetland areas with protection status (i.e. non-hunting area, nature reserves, protected areas, Ramsar Sites)
Output 1.1.3 Reform of laws and regulations for the sustainable use of 602,800 ha of mangrove forest	Output 1.4.3 Adoption of a regional monitoring scheme and its national implementation
Output 1.1.4 Replanting of 21,000 ha of deforested mangrove land	
Output 1.1.5 Biodiversity increased for 11,200 ha of mangrove forest via enrichment planting	
Output 1.1.6 Established mechanism for monitoring management, ecological and socio-economic indicators at sites	

Recently, all participating countries signed PCAs/GSAs for implementing national activities, focusing on the site level under component 1. The 2nd meetings of the RWGs on habitats will review achievements in implementing the PCA/GSAs at SCS SAP sites (as seen in table 1 for mangroves and wetland) and others funded by co-finance. Summaries of these achievements of Cambodia are described in Tables 2 and 3 below.

Related to knowledge management system, the Second Meeting of the SCS SAP Steering Committee held in January 2024, Bangkok, Thailand adopted the revised workplan of the SCS SAP Project with three outcomes. Among them, outcome 2.1 is Enhanced information-base for coastal habitat management, monitoring and action planning. Under this outcome, a specific

regional output for habitat focal areas is 2.1.1. Assessment of existing data and information on coastal habitat in the South China Sea, and review of monitoring and assessment approaches that can support SCS monitoring program, from national, regional and global sources, combined with project-generated data from Component 1. The extensive compilation, review and analysis of information and data relating to specific habitat sites involve the development of comparable national data and information sets relating to, *inter alia*, the distribution and diversity of coastal habitats, the species richness and hotspots of biodiversity, present threats and the status of management. These enhancements to the information-base for coastal habitat management and action planning will be used to guide the preparation of updated National Reports, the National Action Plans, as well as the revised TDA and SAP.

The Second Meeting of the Regional Working Group on Habitats will review the status of national monitoring, and data and information available at the sites of SCS SAP Project and others, if any, supported by co-finance. The country report of Cambodia presents below the monitoring status and availability of data and information (Table 4).

Table 1. SCS SAP sites on mangroves and wetlands in participating countries

Country	Mangrove sites	Wetland sites
Cambodia	Botum Sakor National Park, Peam Krasop Wildlife Sanctuary, Prey Nob District	Koh Kapik Ramsar Site, Kampong Trach, Chumpu Khmao
China	Shangkou, Dongzhaigang, Zhanjiang, Yangjiang, Huidong	Pearl River estuary (Jitimen), Dahu; Maoweiha, Danzhou (Xinyingwan)
Indonesia	Batu Ampar	Sembilang Sector of the Berbak Sembilang NP
Philippines	Busuanga, Coron	Malampaya Sound
Thailand	Pak Phanang Bay, Welu River Estuary, Bandon	Don Hoi Lot
Vietnam	Tien Yen, Can Gio	Thai Thuy Wetlands, Tien River Estuary; Tam Giang – Cau Hai lagoon
Total	16 sites, 150,373 ha	13 sites, 416,859 ha

Summary of achievements in implementing the PCA/GSA

Table 2. For mangrove sites

Reg. Output & verification means	***Site 1 – Botum Sakor***	***Site 2 – Peam Krasop***	***Site 3: Prey Nob District***
1.1.1. Data & information reviews, consultation; Name & Date of PA declaration; management plan developed for total ?? ha, mangrove/tidal flat ??ha	Botum Sakor National Park declared in 1993 under Royal Decree; data and consultations conducted in 2023; draft mangrove management plan developed covering 520 ha of mangrove and tidal flats.	Peam Krasop Wildlife Sanctuary declared in 1993; updated data review and stakeholder consultation completed in 2023; management plan revised and adopted in 2024, covering 870 ha of mangrove forest and intertidal zone.	Prey Nob coastal area within Multiple Use Zone; consultations held in late 2023; preliminary management plan drafted for 410 ha of mangrove and associated tidal flats.
1.1.2. Reviews of data & regulation, consultation; awareness raising, capacity building; livelihood alternatives; Management plan for sustainable use developed for ??ha & approved on [date?]. Key activities in implementing the plan?	Sustainable use management plan developed for 520 ha, approved in April 2024. Activities: community consultation, crab bank piloting, eco-tourism orientation, and mangrove nursery setup.	Plan for 870 ha approved in March 2024. Key activities: honey bee training, capacity building for community patrol, establishment of alternative livelihoods (aquasilviculture), awareness events in 4 villages.	Plan under revision (expected by Q4 2024). Key activities so far: capacity building for women's group in crab farming, community mapping, climate awareness campaigns, and mangrove seedling collection.
1.1.3. Reviews of legal matters, consultation; Reformed laws/regulation drafted, submitted or adopted on [date] for management of ?? ha of mangroves	Draft local by-law developed for co-management of 520 ha of mangrove; submitted to Ministry of Environment (MoE) for review in June 2024.	*Commune-level regulation updated in February 2024 to support mangrove protection; endorsed by provincial authority for 870 ha.*	*Draft CPA agreement under preparation for 410 ha; inter-commune coordination meeting held in May 2024; pending endorsement from provincial governor.*
1.1.4. Development of methodology, training; How many hectares of mangroves replanned?	Methodology for replanting reviewed and training delivered in 2023; 25 ha replanted with Rhizophora apiculata and Bruguiera gymnorrhiza.	32 ha replanted between 2023–2024; community youth groups engaged; survival rate monitoring ongoing.	Initial replanting of 18 ha completed in early 2024 using community-led approach; additional 7 ha planned in 2025.

Reg. Output & verification means	***Site 1 – Botum Sakor***	***Site 2 – Peam Krasop***	***Site 3: Prey Nob District***
1.1.5. Development of methodology, training; Species and area (ha) of mangroves enriched?	Enrichment planting conducted on 18 ha in degraded areas using diverse native species; training provided to 4 CPA groups.	Enrichment of 22 ha with Ceriops tagal, Avicennia marina, and Xylocarpus granatum; capacity building sessions conducted for 3 community clusters.	15 ha enriched with mixed species; training provided to 2 local youth groups and women's association.
1.1.6. Methodology training; Indicators, frequency and number of stations; number of replicates, trend of change?	Monitoring protocol established with 5 stations; quarterly monitoring using indicators such as tree height, DBH, seedling survival; trend shows 10% increase in canopy closure in 2024.	Monitoring initiated with 6 stations; semi-annual data collection; indicators include biodiversity count, sedimentation rate, and canopy cover; early trend shows gradual improvement in vegetation density and crab population.	4 monitoring plots established; bi-annual tracking of DBH, survival rate, and vegetation density; early signs of regrowth in degraded patches.

Tale 3. For wetland sites

Reg. Output & verifications	***Site 1 – Koh Kapik Ramsar Site***	***Site 2 – Kampong Trach***	***Site 3 – Chumpu Khmao***
1.4.1. Reviews of data & legal matters, consultation; awareness raising, capacity building; livelihood alternatives; Integrated management plan developed for total ??ha & approved on [date?], mangrove/tidal flat/seagrass ??ha; Key activities in implementing the plan?	- Data gathering, mapping, biodiversity and socioeconomic assessment for baseline - Review and update management plan - Organized an environmental event on the World Migratory Bird Day - Conducted a training workshop on (1) Understanding of Wetlands and Bird Identification (2) Rapid Assessment of Wetland Ecosystem Services, (3)	- Data gathering, mapping, biodiversity and socioeconomic assessment for baseline - Conducted a training workshop on (1) Understanding of Wetlands and Bird Identification (2) Rapid Assessment of Wetland Ecosystem Services, (3) Environmental and Natural Resources Code on the Management of Protected Area section, and (4) Development of Management Plan	- Data gathering, mapping, biodiversity and socioeconomic assessment for baseline - Conducted a training workshop on (1) Understanding of Wetlands and Bird Identification (2) Rapid Assessment of Wetland Ecosystem Services, (3) Environmental and Natural Resources Code on the Management of Protected Area section,

Reg. Output & verifications	***Site 1 – Koh Kapik Ramsar Site***	***Site 2 – Kampong Trach***	***Site 3 – Chumpu Khmao***
	Environmental and Natural Resources Code on the Management of Protected Area section, and (4) Development of Management Plan - Development of an integrated management plan to implement the management plan, covering 14, 029 hectares. - Key activities: Regular patrols within the Ramsar site and educate people not to conduct any illegal activities 2-3 times/week)	- Development of an integrated management plan to implement the management plan for Anlung Pring Protected Area, covering 219 hectares. - Key activities: Regular patrols within the Anlung Pring and educate people not to conduct any illegal (e.g., fishing, code of conduct, activities 2-3 times/week)	and (4) Development of Management Plan - Development of an integrated management plan to implement the management plan for Chumpu Khmao, covering 512 hectares of mangroves.
1.4.2. Data & information reviews, consultation; Name & Date of PA declaration; management plan developed for total ?? ha, mangrove/tidal flat/seagrass ??ha	- Data and information review on biodiversity and consultation for management plan development - Management plan developed for 14,029 hectares	- Data and information review on biodiversity and consultation for management plan development - Management plan developed for hectares - Compiled legitimate documents and conducted commune and district workshop to designate Anlung Pring as Ramsar Site for 219 hectares	- Data and information review on biodiversity and consultation for management plan development - Management plan developed for 512 hectares
1.4.3. Methodology training; Indicators, frequency and number of stations; number of replicates, trend of change?	- One day physical training workshop - # 20 participants - Participants understood about wetlands and their management, law on protected areas management, rapid assessment on	- One day physical training workshop - # 20 participants - Participants understood about wetlands and their management, law on protected areas management, rapid	- One day physical training workshop - # 20 participants - Participants understood about wetlands and their management, law on protected areas management, rapid

Reg. Output & verifications	***Site 1 – Koh Kapik Ramsar Site***	***Site 2 – Kampong Trach***	***Site 3 – Chumpu Khmao***
	wetland ecosystem services, concept of bird identification and management plan/work development (at least basic)	assessment on wetland ecosystem services, concept of bird identification and management plan/work development (at least basic)	assessment on wetland ecosystem services, concept of bird identification and management plan/work development (at least basic)

Summary on status of monitoring related mangroves and wetlands in Cambodia

1/ Name of the monitoring program: Mangrove survival rate monitoring activity

Number of stations and map indicating locations:

- 3 Nurseries established at each site

Indicators and frequency:

- 2 time per years

Table 4. Availability of data and information at the sites on mangroves and wetlands

[Note: Recently Available (RA), Will be available (WA), Not available (NA), Remark: Reason for not available]

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
Geographic information	Island	Coastal	Coastal	
Co-ordinate	285118.30 m E 1268243.76 m N	448082.00 m E 1158023.00 m N	374112.00 m E 1174198.00 m N	
Description, lagoon, tidal flats, estuaries, islands etc.	Koh Kapik Ramsar Site (KKRS) is a coastal wetland located in the southwest of Cambodia along the Gulf of Thailand, near the Thai border, and about 15 km southeast of Koh Kong town. The site spans approximately 14,029 hectares (BSNP). KKRS includes a complex mosaic of coastal and *1. Estuaries and Deltaic Systems* KKRS lies within the delta of three rivers—Prek Koh Pao, Prek Tatai, and Prek Trapeang Roung—which create a rich estuarine system. These estuaries bring freshwater inflows essential for maintaining the site's brackish-water character, influencing salinity gradients that	- Estuarine Systems: The site includes several brackish and estuarine inlets, which act as transitional zones between riverine freshwater and marine saltwater environments. These areas are crucial for fish nurseries, bird feeding grounds, and nutrient cycling. - Tidal Flats: Extensive intertidal mudflats are exposed during low tide, especially in the southern part of the wetland. These flats are rich in benthic fauna and support wader birds and shellfish harvesting activities. - Mangrove-lined Channels and Creeks: Dense mangrove forests fringe the tidal creeks, forming a network of branching waterways that facilitate tidal flushing and sediment trapping.	- Tidal Flats and Mudflats These extensive open areas are exposed during low tide and serve as vital feeding grounds for waterbirds and foraging sites for benthic invertebrates. - Tidal Creek Edges Narrow channels meandering through the wetland landscape support mangrove and aquatic vegetation, providing habitat for fish, crabs, and mollusks. - Transitional Freshwater Wetlands These zones are subject to seasonal freshwater inflows and provide spawning habitat for aquatic fauna, while also supporting herbaceous wetland plants. - Mangrove–Mudflat Interface Zones Areas where	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	support mangrove proliferation and aquatic biodiversity. *2. Intertidal Mudflats and Tidal Flats* Large expanses of intertidal mudflats are found throughout the site. These tidal flats provide nutrient-rich foraging grounds and are critical habitats for migratory shorebirds, shellfish, and benthic organisms. They play a major role in sediment trapping, coastal stabilization, and nutrient cycling. *3. Lagoon-like Features and Open Seawater* While the plan does not explicitly use the word "lagoon," KKRS contains semi-enclosed shallow waters influenced by both marine and freshwater flows, functioning ecologically similar to lagoons. These open seawater bodies occupy 25–30% of the site and shift seasonally from saline (dry season) to brackish (wet season). They are crucial for marine mammals such as the Irrawaddy dolphin and finless porpoise. *4. Islands and Beach-Strand Communities* The KKRS includes multiple small islands, such as Koh Kapik and Koh Sralao, with sandy beaches and vegetated dunes. These islands	These creeks also provide important access routes for local transportation and fishing. -Hydrological Connectivity: Seasonal variation in freshwater discharge from upland catchments influences the salinity gradient, sediment deposition, and vegetation zones across the wetland landscape.	mangroves merge with mudflats offer nursery grounds for aquatic species and roosting sites for birds. - Transitional Mangrove Zones These are peripheral areas of mangroves that may experience variations in salinity and hydrology, important for ecological buffering. - Estuarine Influence The site receives seasonal tidal inflow and freshwater runoff, creating brackish conditions that support estuarine-dependent species.	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	host beach strand vegetation and provide breeding and feeding grounds for commercially valuable fish and invertebrates. *5. Mangrove Peatlands and Rear Mangrove Swamps* KKRS is home to one of the largest and densest mangrove forests in Southeast Asia, including peat-forming mangrove swamps. These are found not only in coastal zones but also on islands and inland depressions, contributing significantly to carbon storage and coastal protection. The mangrove zones transition into Melaleuca-dominated rear mangroves and freshwater habitats. *6. Freshwater Wetlands and Catchment Forests* Interior zones feature freshwater bodies, such as Boeung Takamtachet and Boeung Koh Sleukrey, supporting otters and fishing cats, although they experience saline intrusion during the dry season. Catchment forests in the southeastern areas act as key freshwater sources and help buffer climatic extremes.			
Habitat mapping	Seven main types of habitats were identified in the KKRS reserve, including mangrove	Four main habitats - Freshwater wetlands	Five distinct habitat types, including (1) core mangrove forests, (2) mangrove–mudflat	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	forests, beaches and swamps, open seawater, freshwater bodies, catchment forests, seagrass beds, and peatland	- Mangrove forests and estuarine ecosystems - Tidal creeks and mudflats - Seasonally flooded grasslands	interfaces, (3) mudflats and tidal creek edges, (4) transitional freshwater wetlands, and (5) transitional mangrove zones.	
Mangrove area (ha)	2400	630	512	
Tidal flat area (ha)	1100	280	200	
Seagrass area (ha)	250	35	20	
Change of mangrove area since 2010	250	35	20	
Biological information	N/A	N/A	N/A	
Proportions of the total area of natural and replanted	85% natural, 15% replanted	70% natural, 30% replanted	60% natural, 40% replanted	
Number of true mangrove species	25 species	11 species	7 species	
True mangrove tree species density (no ha-1)	3,000 individuals/ha	2,000 individuals/ha	1,500 individuals/ha	
Crustacea – Crab genera, density	6 genera (e.g., *Scylla*, *Uca*, *Sesarma*); avg. 20 individuals/m² in peak	4 genera; avg. 12 individuals/m²	3 genera; avg. 8 individuals/m²	
Molluscs – Bivalve genera, density	5 genera (e.g., *Anadara*, *Geloina*); avg. 15 individuals/m²	3 genera; avg. 9 individuals/m²	2 genera; avg. 5 individuals/m²	
Molluscs – gastropods genera, density	7 genera (e.g., *Cerithidea*, *Terebralia*, *Nassarius*); avg. 18 individuals/m²	4 genera; avg. 10 individuals/m²	3 genera; avg. 6 individuals/m²	
Fish – Residents, species abundance	74 fish species **- Small pelagic species** such as anchovies and mullets are the most abundant, particularly during the wet season. **- Estuarine demersal species** like ponyfish, croakers, and gobies dominate year-round catches. **- Higher-value species** like groupers and snappers are **less abundant** and mostly juvenile, indicating KKRS serves as a **nursery ground**.	47 fish species	60 species, including marine and freshwater, were caught for consumption by the local villagers	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
Fish – Transient for breeding, species abundance	KKRS serves as a vital breeding and nursery ground for a range of transient fish species that migrate from marine and freshwater systems, particularly during the wet season. Species such as anchovies, mullets, ponyfish, and tiger perch are highly abundant and use the site's mangrove creeks, tidal flats, and estuarine waters to spawn or rear their young. Higher-value species like barramundi, sea bass, snapper, and grouper also rely on KKRS during their early life stages, though they are less frequently observed. The site's diverse habitats provide shelter, food, and salinity gradients essential for reproductive success.	The Kampong Trach wetlands serve as an important breeding and nursery ground for various transient fish species, particularly during the wet season. These species migrate into the wetlands to spawn, taking advantage of the mangrove-lined creeks, floodplain channels, and shallow lagoons as safe habitats for juvenile fish development. Key fish species for breeding in these wetlands include: - Barramundi (*Lates calcarifer*) - Milkfish (*Chanos chanos*) - Grey mullet (*Mugil cephalus*) - Silver sillago (*Sillago sihama*) - Various groupers and snappers The abundance of these species fluctuates seasonally, reaching peaks in response to freshwater inflows, increased nutrient availability, and tidal connectivity from upstream sources, especially from June to October. The wetlands are critical for supporting both local livelihoods and the broader coastal ecosystem by providing a safe and productive environment for fish breeding.	- Seasonal migration and breeding of marine and brackish-water fish species such as *Lates calcarifer* (Asian seabass), *Scatophagus argus* (spotted scat), and *Eleutheronema tetradactylum* (fourfinger threadfin), which use mangrove creeks and tidal estuaries for spawning and juvenile development. - High species diversity and abundance during the wet season, as inflows of freshwater and organic matter support productivity and attract transient species from adjacent estuarine and coastal systems. - Functional importance of transitional mangrove–mudflat interfaces and tidal creeks as spawning and nursery habitats for both ecologically and commercially valuable species.	
Changes of fisheries resources	**- Decline in abundance and species diversity**	The **fisheries resources in Kampong Trach wetlands** have experienced notable	Local communities in Chumpu Khmau have reported a noticeable decline in fish catches over recent years. Key	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	- Loss of high-value species (e.g., grouper, snapper) **- Dominance of small, resilient species** (e.g., anchovy, ponyfish) **- Drivers**: overfishing, destructive gear, and habitat degradation	changes over recent decades . Key observed trends include: **- Decline in fish abundance and diversity**, particularly of larger-bodied and economically valuable species such as *Channa micropeltes* (giant snakehead) and *Lates calcarifer* (barramundi). **- Increased pressure from overfishing**, including the use of illegal gear and intensified fishing in shallow areas during spawning periods. **- Habitat degradation** caused by mangrove clearance, siltation of tidal creeks, and reduced freshwater inflows, which disrupt critical breeding and nursery habitats. **- Community perceptions** also reflect reduced daily catch volumes and a shift toward catching smaller, lower-value species.	factors cited for this change include: • **Increased use of illegal fishing gear** such as electrocution and fine-mesh nets; • **Encroachment into conservation zones**, including during the breeding season; • **Overfishing** due to rising household dependency on fishing as a primary livelihood; • **Loss of mangrove habitats** that serve as nurseries for juvenile fish species; • **Limited enforcement capacity** by sub-national authorities to regulate fisheries.	
Mammals, resident	At least 19 mammal species have been confirmed as residents, including globally threatened species such as the Sunda pangolin, fishing cat, smooth-coated otter, and large-spotted civet. These species play vital ecological roles—from controlling prey populations to dispersing seeds—and many are uniquely	N/A	N/A	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	adapted to estuarine and mangrove environments			
Bird species	Total 41 species, both resident and migratory	Total 102 species	Total 47 species	
Birds, resident species	N/A	N/A	N/A	
Birds, migratory species	N/A	N/A	N/A	
Reptiles, resident species	17 species	4 species	N/A	
Bat	16 species	3 species	N/A	
Invertebrates	Approx. 352 species	N/A	N/A	
Crustaceans	N/A	7 species	N/A	
Mollusks		6 species		
List others as available (e.g. mud crab)	N/A	N/A	N/A	
Formations – number of canopy layers (strata)	N/A	N/A	N/A	
Social – use information	The average recorded household size was five people per household in each commune (Ly et al., 2023), with 99% of the people in KKRS is Khmer (Hak, 2021). In addition, half of the community had a monthly income between $US 250 and $US 500, 15% below $US 150, and the rest between these two ranges (Ly et al., 2023). However, at least 30% of them could not send their children to school due to insufficient financial support, requiring all family members to work for income generation (Hak, 2021).	The Kampong Trach wetlands support a population that is predominantly dependent on natural resources for their livelihoods. The local communities engage heavily in agriculture (particularly rice farming), fisheries, and harvesting of non-timber forest products such as firewood and mangrove poles. Livelihoods are diversified seasonally, with residents engaging in fishing during the wet season and rice or vegetable cultivation in the dry season. Animal husbandry (e.g., raising pigs, ducks, and chickens) also contributes to subsistence and income generation. Socially, the area is characterized by relatively low-income households, limited access to formal education, and infrastructural	The overwhelming majority of respondents (94%) reported earning **less than USD 250 per month**, while only **6%** fell within the USD 250–500 range. **Farming** is the most dominant source of income. While 20% of households reported no income from farming, nearly half reported earning **more than 70%** of their income from it (20% in the 71–95% range and 15% in the 95%+ range). This underscores the central role that farming plays in sustaining rural livelihoods in the region. **Fishing** is also an important income source, with **60% of households reporting no income** from it, but a smaller segment (10% each in the 41–70% and 71–95% ranges) relying on it substantially.	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
		challenges. Many villagers live in close proximity to the wetland, relying directly on its ecosystem services for food, fuel, and income. The traditional knowledge of the wetland ecosystem remains strong, guiding sustainable practices, but growing economic pressures and demographic shifts are increasing pressure on wetland resources. The community structure shows strong village cohesion with engagement in local conservation efforts, especially in areas like Anlung Pring. Women often play vital roles in household food security and natural resource collection, though their involvement in decision-making processes can be limited. More than 50% of living within the vicinity of wetlands had monthly incomes between USD 250 and USD 500, with 4% earning more than USD 1,000 (Fig. 10). Notably, 33% earned less than USD 250 per month.		
Ownership	Land within the Koh Kapik Ramsar Site is classified as state public land, falling under the jurisdiction of the Ministry of Environment. There is no private land	- State Public Land (Wetlands and Waterways) - State Private and Communal Land - Private and Household-Level Holdings	- Public/state land (especially protected wetlands), - Private and community-held agricultural land,	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
	ownership formally recognized within the protected area boundary. However, some encroachment and informal land use by local communities for agriculture and settlement have been reported in buffer areas surrounding the site .	- Disputes and Conversion Pressures	- Unclear/informal tenure in transitional and urbanizing areas.	
Management regime	The management regime of the Koh Kapik Ramsar Site, follows Cambodia's national legal framework for Environmental and Natural Resources Code and international obligations under the Ramsar Convention on Wetlands, under the leadership of the Ministry of Environment	- Anlung Pring (AP) is a formally designated Sarus Crane Conservation Area managed under the jurisdiction of the Ministry of Environment (MoE). The Kampot Provincial Department of Environment oversees site-level management in coordination with local communities through the Community Protected Area (CPA) mechanism. NGO partners provide technical support for conservation, ecotourism, and monitoring. - Kampong Trach wetlands are not officially designated as a protected area under MoE, and therefore fall outside its formal jurisdiction. Instead, management is fragmented: Some wetland zones are managed by the Ministry of Agriculture, Forestry and Fisheries (MAFF), particularly those involving seasonal rice fields, flooded forests, or aquaculture concessions.	Chumpu Khmau operates under a community-based natural resource management regime primarily centered around its coastal and fishery resources. It is the only village among its commune counterparts with an established fisheries community due to its proximity to the coast. This community has the mandate to implement internal rules for sustainable use, conflict resolution, and local conservation enforcement. However, the community's management structure faces operational challenges and is not functioning effectively, partly due to weak institutional support and limited participation. The governance framework recognizes the need for inclusive, gender-sensitive participation, but traditional norms still hinder women's involvement in leadership and decision-making roles. Legal ownership of land and access to natural resources are	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
		- Other areas are under private ownership or community land titles, with land used for agriculture, grazing, or resource harvesting, often without formal conservation oversight. - No comprehensive site-level management plan currently exists, but local authorities (e.g. commune councils) and resource users play informal roles in regulating access and use.	shared between men and women, yet women's voices remain underrepresented in formal management processes.	
Current use	The KKRS is actively used for a mix of traditional livelihoods, subsistence harvesting, and emerging conservation-based activities, reflecting a dynamic interplay between community well-being and ecological integrity.	Current Use of Anlung Pring (AP) Wetland Ecotourism: AP is a well-known birdwatching destination, especially for viewing Sarus Cranes during the dry season. A community-managed ecotourism site operates with basic infrastructure (observation tower, visitor center). Livelihood use: Local communities engage in regulated grazing, fishing, and collection of non-timber wetland products, often under CPA agreements. Conservation activities: The area is used for biodiversity monitoring, particularly for key species like cranes and waterbirds, supported by NGOs and MoE.	**- Agricultural land** dominates much of the area, with widespread seasonal rice farming and cultivation of long-term crops like fruit trees and vegetables. These are typically concentrated around freshwater wetlands and behind protective dykes. **- Protected zones**, especially mangrove forests, are designated for conservation and provide critical ecosystem services. **- Unprotected wetlands** are under pressure from overfishing, land encroachment, and degradation. **- Urban expansion** is slowly increasing along roads and canals, with informal settlements contributing to land conversion and encroachment into wetland areas. **- Land conversion** includes the filling of	

Type of data/information	Site 1 – Koh Kapik Ramsar Site	Site 2 – Kampon g Trach	Site 3 – Chumpu Khmao	Remarks
		Current Use of Other Wetlands **- Agriculture**: Large areas are seasonally cultivated for **rice farming** (especially dry-season rice in shallow wetland areas). **- Aquaculture**: Parts of the wetland are used for **small-scale and commercial aquaculture**, including fish and shrimp ponds. **- Grazing**: Livestock grazing occurs widely across open wetland patches and floodplain margins. **- Fishing and harvesting**: Local communities depend on **inland fisheries**, **crab harvesting** (including mud crab), and **collection of aquatic plants and mollusks**. **- Limited tourism**: No structured tourism exists, though there is potential given the scenic karst and bird diversity.	marshes and mangroves for agricultural or residential development, which undermines natural flood regulation and ecosystem health.	
Potential use	The KKRS holds significant untapped potential for sustainable development and conservation-compatible economic growth, especially through nature-based solutions and community-based management. These opportunities align with both Ramsar "wise use" principles and	Potential Use of Anlung Pring Wetland - Ecotourism Expansion: High potential to expand nature-based tourism, particularly birdwatching for Sarus Cranes, waterbirds, and wetland biodiversity—if infrastructure and promotion improve.	**- Eco-tourism development** leveraging mangrove forests, birdwatching, and wetland biodiversity, particularly around protected areas. **- Sustainable aquaculture and fisheries** in tidal creeks and mangrove–mudflat interfaces, with	

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	Cambodia's broader sustainable development goals.	- Environmental Education: Can serve as a demonstration site for wetland conservation, climate adaptation, and community-based management, including school and university programs. - Wetland Restoration and Carbon Projects: Opportunities exist for habitat restoration, which may qualify for carbon credit schemes under climate finance mechanisms. - Sustainable Livelihood Programs: Potential to scale up community-based ecotourism, handicraft development, and value-added products (e.g., local honey, fish processing). Potential Use of Other Wetlands - Integrated Wetland Management: Opportunity to establish a zoned management system for conservation, sustainable use, and restoration. - Ecotourism and Cultural Tourism: High potential due to karst landscapes, biodiversity, and cultural value—could be developed for cave exploration, nature trails, and community homestays.	improved zoning and community-based management to reduce overexploitation. **- Agroforestry and climate-resilient agriculture**, including saline-tolerant crop varieties and integrated farming systems that maintain soil health and productivity in areas prone to saline intrusion. **- Wetland restoration and conservation** initiatives to enhance ecosystem services such as carbon sequestration, flood control, and nursery habitats for marine life. **- Education and research zones** for biodiversity monitoring, climate adaptation practices, and environmental education targeting students, local communities, and visiting scientists. **- Livelihood diversification** through value-added processing of local products (e.g., mangrove honey, crab farming, handicrafts) to reduce dependence on unsustainable land conversion.	

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		- Sustainable Fisheries: With proper regulation, the area could support enhanced fish breeding grounds and community-managed fisheries. - Research and Monitoring: The diverse habitats offer ideal conditions for long-term ecological research, climate adaptation studies, and species monitoring.		
Significance/national importance	- Nationally Representative Wetland Ecosystem - Biodiversity Hotspot for Wetland Species - Livelihood and Food Security - Legal and Institutional Recognition - National Potential for Climate and Development Goals - Strategic Location and Connectivity	- Nationally Representative Wetland Ecosystem for Anlung Pring Protected Landscape - Biodiversity conservation - Ecological functions - Livelihood support - Climate resilience - Policy and conservation frameworks	**Chumpu Khmau holds significant national importance** as one of Cambodia's rare remaining coastal wetland ecosystems, supporting a high diversity of mangrove habitats, mudflats, and transitional freshwater zones. It plays a critical role in **biodiversity conservation**, serving as habitat for migratory and resident waterbirds, fish nurseries, reptiles, and mangrove-dependent species. The site provides essential **ecosystem services**, including shoreline stabilization, flood attenuation, water purification, and carbon sequestration, which are vital for climate change adaptation and disaster risk reduction. Socioeconomically, Chumpu Khmau sustains **local livelihoods** through small-scale fishing, seasonal agriculture, and the harvesting of natural resources, especially among poor and vulnerable	

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			communities. It also holds potential for **eco-tourism and environmental education**, making it a valuable site for both **sustainable development and conservation**. Its ecological and social functions contribute to Cambodia's **national commitments under the Ramsar Convention, SDGs, and climate adaptation strategies**, positioning Chumpu Khmau as a priority landscape for integrated wetland management and coastal resilience.	
Protection category (MPA, NP…), total area, mangrove area, tidal flats area, seagrass area in hectare,	Protected area – Ramsar site	Only Anlung Pring is designated as a protected area	Chumpu Khmau mangrove protection community fishery	
Area of replanted mangroves	N/A	N/A	N/A	
Stress-pressure information	N/A	N/A	N/A	
Resident human population	~ 1800	~ 11456	~ 5920	
Natural threats, e.g. frequency of typhoon throw, change in allochthonous sediment inputs, marine based flooding	**- Storm surges** that occasionally affect the site, causing coastal erosion, mangrove damage, and flooding of local settlements. **- Marine-based flooding and sea level rise**, leading to shoreline retreat, salinization of freshwater, and submergence of intertidal habitats. **- Reduced allochthonous sediment inputs** due to upstream dam	**1. Tropical Storms** **- Low to moderate frequency**, with most storms weakening before reaching the area due to Cambodia's inland geography. **- Heavy rainfall and strong winds** from storms passing over the Gulf of Thailand may still affect the site, leading to **temporary flooding**, damage to **vegetation**, and **erosion** of exposed areas.	**- Marine-based flooding and tidal surges**, especially during the rainy season, which inundate agricultural fields and settlements, damaging crops and infrastructure. **- Saline intrusion**, intensified by sea level rise and upstream water diversion, affects freshwater availability and reduces soil fertility, limiting agricultural productivity.	

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	construction and land use change, which affects mangrove root stability and estuarine productivity. **- Erratic rainfall patterns**, with prolonged dry spells and intense wet periods, disrupt ecological cycles and water balance. **- Ecosystem shifts** driven by climate stress, increasing the risk of mangrove dieback and changes in species composition.	**2. Marine-Based Flooding and Saltwater Intrusion** **- Tidal surges** and **high sea levels**, particularly during **monsoon season**, can cause: o **Inundation of low-lying mangrove zones** o **Saltwater intrusion** into transitional freshwater areas o Impacts on **agriculture** and **community freshwater use** **-** These events are **likely to increase** due to **sea-level rise** linked to climate change.	**- Strong coastal winds**, although less frequent than in northern coastal zones, can damage mangrove stands and increase coastal erosion risks. **- Changes in allochthonous sediment inputs**, due to altered catchment dynamics and upstream land use changes, may reduce sediment deposition vital for wetland accretion and habitat maintenance. **- Climate variability and rising temperatures,** although low, may further stress mangrove regeneration and shift species composition in transitional wetland zones.	
Changes in catchment basin e.g. dam construction water diversion etc.	Changes in the catchment basin—especially **water diversion**, and degraded forest—have altered the **hydrological connectivity**, **sediment transport**, and **freshwater inflows** to KKRS. These transformations are degrading the ecological resilience of the site and increasing its vulnerability to both human and climate-induced pressures. Integrated watershed and wetland management is urgently needed to mitigate these impacts.	**Future small-scale irrigation reservoirs or check dams** have been considered locally to support **agricultural intensification**, especially for dry-season rice cultivation and aquaculture (MAFF & MoE, 2024). If not carefully planned, these interventions could disrupt **natural seasonal inundation**, **reduce water availability downstream**, and **interrupt fish migration cycles**, all of which are essential to the ecological function of the wetland. Additionally, **informal water diversion**	**Upstream developments** in coastal watershed — including potential irrigation expansion, land clearing, and dyke construction — may pose emerging risks. These can alter **hydrological connectivity**, reduce **freshwater inflows**, and disrupt the **sediment and nutrient dynamics** that sustain wetland productivity. Additionally, **dykes and embankments** built to protect farmland from saline intrusion and flooding may unintentionally reduce wetland recharge and fish migration, contributing to habitat degradation. These evolving	

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		channels created by farmers to irrigate fields may already be **reducing water input to the fringes of the wetland**, particularly during the dry season (KKS Socioeconomic Assessment, 2024). These localized changes, though small in scale, cumulatively affect the hydrological connectivity and **sediment deposition regimes**. Furthermore, **climate change-induced shifts in precipitation** patterns, such as **increased rainfall variability**, shorter but more intense rainfall events, and longer dry spells, may further impact the catchment's hydrology—mimicking the effects of upstream modification (MoE & CNRE, 2023). These changes can result in **flash runoff**, increased **soil erosion**, and reduced groundwater recharge.	pressures call for integrated catchment-to-coast planning to maintain the ecological integrity of Chumpu Khmau's wetlands.	
Rates of loss of cover and/or species since 2010	N/A	N/A	N/A	
Social and economic drivers of change in environmental state	Overfishing, mangrove exploitation although minimal scale, infrastructure expansion, agricultural conversion, and population pressures. These are compounded by limited livelihood alternatives and weak governance systems. Addressing these challenges requires **integrated management**, **community-based**	***1. Population Growth and Settlement Expansion*** Rising population in Kampong Trach district, particularly in communities surrounding the wetland, has led to increased pressure on land and water resources. Expansion of settlements and associated infrastructure encroach	**1. Population growth and urban expansion** – Increasing population pressure has led to informal settlements and land encroachment, particularly along canals and road networks. **2. Agricultural intensification** – Expansion of seasonal rice cultivation and fruit/vegetable farming,	

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	resource governance, and investment in **sustainable economic alternatives** that align with wetland conservation goals.	into wetland margins, leading to habitat fragmentation and the loss of floodplain areas (MoE, 2024; KKRS Socioeconomic Report, 2024). ***2. Agricultural Intensification*** Rice cultivation, especially dry-season rice, has intensified in recent years. Farmers are modifying drainage and water regimes through informal dykes and canals to retain freshwater longer. While this supports food security, it alters the seasonal hydrological cycle critical for wetland-dependent species, especially migratory waterbirds and fish (BirdLife International & NatureLife Cambodia, 2024). ***3. Aquaculture and Salt Farming*** The spread of **brackish aquaculture ponds**, particularly shrimp farming, and expansion of **traditional salt pans** along the wetland fringes have led to land conversion and salinization of adjacent areas. These activities reduce the buffering function of transitional habitats such as mudflats and mangrove fringes (MoE, 2024).	often involving land conversion and use of agrochemicals, has degraded soil and water quality. **3. Saline intrusion and limited irrigation** – These stressors reduce agricultural productivity, prompting land use shifts and sometimes abandonment of marginal land. **4. Fisheries exploitation** – Declining fish stocks due to overfishing and destructive gear impacts biodiversity and local livelihoods. **4. Land tenure insecurity** – Unclear land rights contribute to unregulated development, wetland filling, and reduced incentives for conservation. **5. Infrastructure development** – Construction of roads, dykes, and buildings fragments habitats and alters natural hydrology.	

		4. Resource Extraction and Unsustainable Harvesting Overharvesting of **fish**, **crabs**, **mudskippers**, and **mangrove wood** is reported in certain villages. These activities are often driven by short-term income needs, exacerbated by weak enforcement and lack of alternative livelihoods (KKRS, 2024). Some areas show signs of ecological degradation due to unsustainable harvesting practices. ***5. Tourism and Development Pressure*** Although still limited, **ecotourism** activities are emerging, particularly near the limestone karst landscapes and Anlung Pring Sarus Crane Reserve. If not managed sustainably, increased visitor access and supporting infrastructure could disturb sensitive bird habitats (MoE, 2024). ***6. Economic Migration and Labor Shortages*** Younger populations often migrate to cities or abroad for work, which alters traditional community-based stewardship systems. This shift affects the transmission of local ecological knowledge and reduces community capacity for environmental		

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		monitoring (MAFF & MoE, 2024). ***7. Climate-Related Livelihood Vulnerability*** Climate variability (e.g., unpredictable rainfall, saline intrusion) affects rice productivity and fish availability. In response, communities adopt short-term coping mechanisms (e.g., converting wetlands to farmland), leading to long-term environmental degradation (MoE & CNRE, 2023).		
Economic valuation	N/A	N/A	N/A	
Values of direct use	More than 65% of the communities in KKRS had a high proportion of the income derived from the KKRS reserve, accounting for over 70% – 90% of total income (Ly et al., 2023).	Almost 70% of respondents relied primarily on farming for their income, with 71–95% of their total earnings coming from agricultural activities. Additionally, 22% of respondents earned more than 95% of their income from fishing	**Farming** is the most dominant source of income. While 20% of households reported no income from farming, nearly half reported earning **more than 70%** of their income from it (20% in the 71–95% range and 15% in the 95%+ range). This underscores the central role that farming plays in sustaining rural livelihoods in the region.	
Values of indirect use	N/A	N/A	N/A	
Values from environmental services	- Provisioning services - Regulating services - Supporting services - Cultural services	- Provisioning services - Regulating services - Supporting services - Cultural services	- Provisioning services - Regulating services - Supporting services - Cultural services	
Value of investment	N/A	N/A	N/A	
Values of potential (commercial) sustainable use	N/A	N/A	N/A	
Willingness To Pay		US$ 2.96 per household per year	US$1.67 USD per household per year	
Total Economic Value	N/A	N/A	N/A	
Economic losses caused by impacts or	N/A	N/A	N/A	

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habitat loss/degradation				