



Tourism Sector Resource Use and Visitors Survey in Laamu Atoll



Ministry of Tourism and Environment



ENDhERI



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PREPARED BY:



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Abbreviations

BESS	Battery Energy Storage Systems
ENDhERI	Enhancing National Development through Environmentally Resilient Islands
ERA	Environment Regulatory Authority
ES	Ecosystem Services (ES)
ESA	Environmentally Sensitive Areas (ESA)
GEF	Global Environment Facility (GEF)
LPG	Liquified Petroleum Gas (LPG)
MBS	Maldives Bureau of Statistics
MMA	Managed Marine Area
MNU	Maldives National University
MoFP	Ministry of Finance and Planning
MoTE	Ministry of Tourism and Environment
MPA	Marine Protected Areas (MPAs)
MRR	Maldives Resilience Reefs
MUI	Maldives Underwater Initiative (MUI)
MVS	Maldives Visitor Survey (MVS)
NbS	Nature-based Solutions
NC	Natural Capital
NCA	Natural Capital Accounting
NGOs	Non-Governmental Organizations
O&M	Operation and Maintenance
PA	Protected Areas
PV	Photo-Voltaic (PV)
RO	Reverse Osmosis
RTL	Raajje Transport Link
SEEA	System of Environmental-Economic Accounting
SF-MST	Statistical Framework for Measuring the Sustainability of Tourism
STP	Sewage Treatment Plant
TGST	Tourism sector GST (TGST)
TVET	Technical and Vocational Education Training Authority
UN	United Nations
UNEP	United Nations Environment Programme
UNWTO	World Tourism Organization
USD	United States Dollars
VIA	Velana International Airport (VIA)
VMC	Visit Maldives Corporation

Executive Summary

This is the report of the Resource Use Survey and Visitor Survey carried out in Laamu Atoll under the Enhancing National Development through Environmentally Resilient Islands (ENDhERI) project, a national initiative funded by the Global Environment Facility (GEF) and supported by the United Nations Environment Programme (UNEP). The project strengthens reef protection, enhances ecosystem resilience, and promotes Green Growth in the Maldives.

The Ministry of Tourism and Environment (MoTE) conducted the surveys to assess how tourism depends on and impacts biodiversity and marine natural capital. The findings highlight tourism's reliance on healthy reef systems, identify pressures from current practices, and outline risks to both ecosystems and businesses. The results will inform sustainable development scenarios, guide policy and planning, and support more resilient and responsible tourism in Laamu Atoll and beyond.

Natural Capital (NC) and Ecosystem Services (ES) are the ecological foundations of human well-being, yet they are often undervalued in policy and management despite their critical role in sustaining economies and societies (Costanza, 2020; Guerry et al., 2015). Tourism, the backbone of the Maldivian economy, is especially dependent on healthy reef systems and marine ecosystems that provide cultural, provisioning, and regulating services. Degradation of these services directly threatens both ecosystem resilience and the long-term viability of the tourism industry. Frameworks such as Daly's principles of sustainable scale, fair distribution, and efficient allocation (1992) highlight the urgent need to balance ecological limits with equitable and efficient resource use.

In Laamu Atoll, the Government of Maldives is piloting the System of Environmental-Economic Accounting (SEEA) to integrate ecological value into national accounts, while the Statistical Framework for Measuring the Sustainability of Tourism (SF-MST) offers a structured approach to assess environmental, economic, and social dimensions of tourism (UNWTO, 2023; United Nations, 2024). Together, these frameworks provide the foundation for evidence-based policy and sustainable tourism planning. The Resource Use and Visitor Surveys in Laamu Atoll build on this foundation by identifying how tourism depends on and impacts natural capital. Their findings will help align local tourism practices with national sustainable development strategies, ensuring that economic growth supports, rather than undermines, ecosystem resilience.

Tourism in Laamu Atoll runs on natural capital. Coral reefs, seagrass meadows, mangroves, beaches, and clear lagoons provide the ecosystem services—coastal protection, habitats, recreation and aesthetic value—that make the Maldives globally competitive. Yet these assets face rising pressure from coastal construction, erosion control, fuel and water demand, waste, and concentrated use at popular sites. To keep growth within ecological limits, the Government of Maldives is piloting Natural Capital Accounting (NCA) through the United Nations (UN) SEEA and applying the UNWTO SF-MST. Together, these frameworks translate ecosystem condition and services into decision-ready metrics across the economic, environmental, and social dimensions—allowing policy makers to weigh trade-offs, price externalities, and align tourism with Marine Managed Area (MMA)/Biosphere Reserve management and protected-area objectives in Laamu.

The Laamu Visitor Survey and Resource Use Survey operationalize this approach. They generate the first atoll-level baselines on visitor motivations and behaviors, site use and ecosystem interactions, and establishment-level footprints for energy, water, wastewater, solid waste, and employment—along with spending, value added, and investments in nature-based solutions. These data fill critical research gaps, quantify dependencies and risks, and identify practical levers for action: resource-efficiency standards, visitor-site management and carrying-capacity rules, coastal and reef restoration priorities, fiscal and regulatory incentives (e.g., Green Tax use), and community benefit pathways. The surveys provide the evidence base to embed sustainability in day-to-day operations and long-term planning, advancing Green Growth, climate resilience, and biodiversity conservation in Laamu—and offering a scalable model for the Maldives.

The **Resource Use Survey** quantified the operational footprint of Laamu Atoll's tourism sector and its interaction with ecosystems, producing SEEA- and SF-MST-aligned indicators for energy, water,

waste, wastewater, ecosystem interactions, finance, and employment. A structured, fillable-PDF instrument was sent to the same four establishments; returns were requested as 2024 annual totals sourced from utility logs, plant records, POS/finance and Human Resource systems. CDE Consulting provided guidance and follow-ups, applied unit and range checks, reconciled energy-water balances, and ensured confidentiality; all reporting is aggregated at the atoll level. Outputs include comparable intensities (e.g., kWh, litres, m³ and kg per guest-night), activity counts and values for dive/excursion sites, and expenditure on coastal/climate measures—enabling robust ecological-footprint and natural-capital accounting. Non-response from some establishments limits coverage, but the dataset establishes the first policy-ready baseline to target resource-efficiency standards, waste and wastewater upgrades, and nature-based solutions in Laamu Atoll.

The **Visitor Survey** measured how tourism demand in Laamu depends on and affects natural capital. Using a mixed-methods questionnaire structured around three sections—visitor profile, behaviour/preferences, and sustainability attitudes—the survey captured both quantitative indicators and qualitative insights on ecosystem use, spending, and willingness to support conservation. The sampling frame covered guests staying in four registered establishments (418 beds), with proportional allocation by bed capacity and a pragmatic target of 300 responses. For data quality and response rates, surveys were administered in-establishment (not at the airport) using iPads with JotForm at checkout, following pilot testing and instrument streamlining. Fieldwork ran from 22 April to 30 June 2025 and was available in six languages (completed in English). CDE Consulting could not achieve the targeted sample size for the Laamu Atoll Visitor Survey due to very low visitor numbers and limited survey access. MoTE data shows only 0.34% of Maldives visitors stayed in Laamu during early 2025, with arrivals dropping to 262 in May and 289 in June, below the required sample base. Rahaa Resort's non-participation and the fact that 92% of Six Senses Laamu guests arrived by seaplane further limited access, making the target sample unachievable. Hence, the achieved sample was smaller than planned; results are therefore interpreted as an initial baseline to inform dependency analysis, carrying-capacity considerations, and MMA/Biosphere Reserve management.

Indirect Utilisation: Tourism in Laamu Atoll is closely tied to its natural capital, with visitor activities heavily dependent on the health of coral reefs, lagoons, and mangroves. In 2024, most indirect utilisation occurred through diving and marine excursions, concentrated around the reef systems of Hithadhoo, Gaadhoo, Maavah Kandhu, and other protected sites. These areas attracted thousands of dives annually, with an estimated USD1 million generated from diving activities alone. Additional ecosystem-based excursions, such as kayaking in the Hithadhoo mangrove protected area and visits to uninhabited islands and heritage sites, brought in a combined USD540,000 in economic value. Guesthouse visitors, though smaller in number, also contributed to local tourism revenue through reef and mangrove excursions, particularly at Baresdhoo. Together, these activities demonstrate how Laamu Atoll's marine ecosystems function as living assets that sustain tourism income, employment, and local livelihoods while reinforcing the need to maintain ecosystem integrity to ensure continued economic and ecological benefits.

Direct Utilisation: Direct utilisation of natural resources in Laamu Atoll's tourism sector reflects the differing operational scales of resorts and guesthouses. Resorts rely entirely on desalinated seawater, producing over 79,000 cubic metres annually through three reverse osmosis plants, ensuring no pressure is placed on fragile groundwater systems. Wastewater is treated on-site and safely discharged, demonstrating a high standard of environmental management. Energy consumption remains dominated by diesel generation, with gradual integration of renewable energy through solar photovoltaic systems. In contrast, guesthouses depend mainly on groundwater and rainwater harvesting, with smaller-scale consumption and minimal energy use, though their reliance on groundwater raises long-term sustainability concerns. Guesthouses are connected to the Fenaka public electricity grid, which further reduces direct fuel dependence. These contrasting models reveal a dual dependency on Laamu Atoll's natural capital — marine-based resources supporting resort operations and terrestrial freshwater sources sustaining community-level tourism — highlighting the need for integrated resource management to balance economic growth with ecosystem preservation.

Environmental Impacts: While the overall environmental footprint of Laamu Atoll's tourism sector remains small relative to other atolls, its impacts are diverse and closely monitored. Improvements have been recorded in marine protected areas, seagrass health, mangrove condition, and coral

diversity, indicating positive effects of conservation initiatives and regulated tourism practices. However, waste generation continues to pose challenges. In 2024, resorts in Laamu produced approximately 660 tonnes of solid waste, with about 16% as food waste, 12% as wood waste, and smaller fractions as paper, metal, and plastics. Guesthouses generated less waste overall, though food waste exceeded 50%, reflecting local consumption patterns. Both sectors are adopting measures to minimize waste, such as composting, recycling, and reducing single-use plastics. From a natural capital perspective, these ongoing efforts — coupled with significant investments in reef restoration, seagrass protection, and coastal management — underscore Laamu Atoll's commitment to aligning tourism development with environmental sustainability, ensuring that the ecosystems underpinning its tourism economy remain resilient and productive.

The **visitor survey findings** highlight that tourism in Laamu Atoll attracts a globally diverse, predominantly young and eco-conscious audience, with most visitors coming from the United States and Europe, and aged between 25 and 44 years. The majority were visiting the Maldives and Laamu for the first time, indicating the atoll's emerging reputation as a sustainable and nature-oriented destination. Most visitors travelled as couples or in small groups, staying on average 6–8 nights, with longer stays recorded at guesthouses than resorts. This visitor profile reinforces Laamu Atoll's growing niche in the Maldivian tourism market — one driven by natural beauty, tranquillity, and sustainability-focused experiences rather than mass tourism.

Visitors' activities and spending patterns reveal a strong dependence on the natural environment as the core of Laamu Atoll's tourism offering. The most common experiences — swimming (81%), snorkelling (79%), and diving (40%) — take place directly within the coral reef and lagoon ecosystems that form the backbone of Laamu Atoll's natural capital. Supporting activities such as dolphin watching, kayaking, and sandbank picnics further emphasize the appeal of the atoll's marine and coastal habitats. Average spending per activity ranged widely, from low-cost snorkelling and kayaking to high-value private island experiences exceeding USD1,000, showing that healthy ecosystems directly translate into substantial visitor expenditure.

Despite their deep engagement with the environment, most visitors demonstrated limited awareness of conservation issues, with few raising concerns about coral bleaching or plastic waste. However, when prompted, respondents overwhelmingly supported stronger sustainability measures, including reducing resource use, enforcing diving guidelines, and eliminating single-use plastics. This suggests that while environmental awareness may not yet be a primary motivation for travel, visitors are receptive to sustainability initiatives and expect responsible management of natural assets. Strengthening visitor education, community engagement, and eco-certification programs in Laamu could therefore enhance both visitor experience and long-term conservation outcomes, ensuring that tourism continues to benefit from — and contribute to — the protection of the atoll's unique natural capital.

Dependency: Tourism in Laamu Atoll remains deeply and directly dependent on the health of its natural capital — the coral reefs, lagoons, seagrass meadows, and beaches that form the foundation of its visitor economy. These ecosystems sustain the atoll's main tourism products, particularly diving, snorkelling, and eco-excursions, which together generate tens of thousands of dollars annually in direct ecosystem service value. Although Laamu accounts for only 0.4% of national tourist arrivals, it represents a growing niche market of sustainability-minded travellers seeking authentic, low-impact experiences. With just six establishments and a total of 462 beds, the atoll's tourism footprint remains small but economically significant, generating around USD30 million in income in 2024. This model demonstrates that Laamu Atoll's tourism sector can achieve high economic efficiency while maintaining a light environmental footprint — provided that ecosystem integrity remains intact.

The atoll's land footprint is equally modest, with resorts occupying less than 25 hectares in total. However, the ecological implications of even small-scale coastal development are notable. Construction and infrastructure expansion can alter native vegetation, disturb nesting and foraging habitats, and increase sedimentation on nearby reefs. The close connectivity between terrestrial and marine ecosystems means that tourism impacts extend beyond land use to include surrounding reef systems, seagrass meadows, and lagoons that provide vital ecosystem services such as carbon sequestration and coastal protection. Ongoing biodiversity surveys have identified over 200 fish

species and 36 coral genera in the reefs near resort islands, highlighting both the richness and vulnerability of Laamu Atoll's ecosystems. Maintaining this balance between development and conservation is essential to protect the natural capital upon which the atoll's tourism and community livelihoods depend.

Economically, Laamu Atoll's natural capital-based tourism model delivers strong direct contributions to the national and local economy. In 2024, the formal tourism sector contributed approximately USD12 million to the Maldivian economy, largely through wages, taxes, and service charges. The resort sector accounted for the majority of this value, while guesthouses added around USD370,000, supporting local employment and business linkages. With 65% of total income originating from accommodation and another 28% from food and beverage services, the structure of Laamu Atoll's tourism economy underscores its reliance on healthy ecosystems to sustain both high-value hospitality and nature-based recreation. Guesthouses, though smaller in scale, mirror this pattern and offer greater opportunities for community involvement and economic diversification, linking tourism more closely with local livelihoods and conservation stewardship.

Employment data further illustrates the social dimension of natural capital dependency. In 2024, resorts in Laamu employed over 350 staff, 58% of whom were Maldivians. Jobs were concentrated in food and beverage, housekeeping, and environmental management — sectors directly connected to the upkeep of ecosystem quality and visitor experience. Women represented 14% of the total workforce, with higher participation in spa and wellness services, suggesting potential to expand gender-inclusive employment in areas such as eco-guiding, hospitality, and sustainability management. Guesthouses employed smaller but more localized teams, though reliance on foreign labour remains high. Expanding training and capacity-building programs for youth and women could strengthen community engagement in natural capital management while ensuring that tourism growth translates into inclusive local benefits.

From an environmental perspective, Laamu Atoll presents a model of sustainable coexistence between tourism and nature. Protected areas, mangrove restoration projects, and community co-management initiatives have significantly improved ecosystem health in recent years, with measurable gains in coral, seagrass, and fish populations. The atoll's tourism sector remains well below its ecological carrying capacity, providing an opportunity to scale up responsibly. However, challenges persist in waste management and bait-fishery practices, which require stronger regulation and infrastructure to prevent degradation of reef and lagoon environments. With its unique combination of rich biodiversity, low-impact tourism, and active conservation measures, Laamu Atoll exemplifies how natural capital can underpin both economic prosperity and environmental resilience — positioning it as a leading example of nature-positive tourism in the Maldives.

1 Introduction

This report presents the findings of a Resource Use Survey and Visitor Survey conducted in 2025 in Laamu Atoll, Maldives, under the framework of the ENDhERI project. ENDhERI is a national initiative funded by the GEF and supported by the UNEP.

The project seeks to strengthen reef protection, enhance ecosystem resilience, and support ecological recovery by minimizing the environmental impacts of development activities within Laamu Atoll. In doing so, it contributes significantly to the Government of Maldives' broader vision of adopting progressive environmental policies and advancing a national model of Green Growth for atoll development.

Central to the ENDhERI approach is the conservation and sustainable use of marine natural capital, with a focus on building resilience and recovery of reef ecosystems. The project promotes integrated coastal zone management within a MMA or Biosphere Reserve framework. It also advocates for the adoption of sustainable standards and practices across critical sectors—agriculture, fisheries, tourism, and construction—ensuring that development activities are environmentally responsible. These atoll-level transformations are expected to guide national policy and planning processes, particularly in relation to governance, spatial planning, and natural capital accounting.

Tourism in the Maldives is inseparable from the country's natural capital, particularly coral reefs and coastal ecosystems, which form the foundation of its global appeal (Didi, Nizam & Hamza, 2016). Surveys consistently confirm that the natural beauty of the Maldives—its beaches, underwater life, climate, and tranquillity—is the primary motivation for travel (CDE Consulting, 2021). Visitors are drawn to activities directly dependent on healthy ecosystems, including snorkelling, diving, fishing, and a wide array of water sports and excursions (Westmacott & Rijsberman, 2000; King et al., 2023). With nature-based experiences ranking among the top reasons for visitation, safeguarding environmental quality is not just a conservation concern—it is a strategic imperative for the tourism industry.

Evidence shows that tourism both depends on and invests in ecosystem health. Beach resort tourism is a major driver of visitor satisfaction and return rates (Didi, Nizam & Hamza, 2016), while resorts increasingly channel resources into environmental protection, restoration, and Nature-based Solutions (NbS). A study of 52 Maldivian resorts found that 80 percent were engaged in some level of ecological management, with many expressing interests in expanding their investments (Jarvis, Stoeckl & Liu, 2016; Duvat & Magnan, 2019). This positive engagement, however, is matched by vulnerability: any decline in environmental quality—whether caused by tourism or external pressures—directly threatens the sector's long-term viability (World Tourism Organization (UNWTO), 2023).

The global and local value of marine biodiversity underscores the urgency of proactive management. Non-consumptive uses, such as manta ray tourism, generate far greater economic returns than extractive alternatives (Anderson et al., 2011). Visitor satisfaction is closely tied to ecological integrity, making biodiversity protection central to both market competitiveness and community well-being (Jarvis, Stoeckl & Liu, 2016). To safeguard this interdependence, it is essential to measure the sustainability of tourism across four key dimensions: the pressures it places on the environment, its consumption of critical resources such as water and energy, the ecosystem services it relies on, and the industry's responses to mitigate impacts and improve outcomes (UNWTO, 2023). The Visitor Survey and Resource Use Survey in Laamu Atoll are designed to capture this information, providing a robust evidence base to guide sustainable tourism policies and investments.

MoTE, in support of ENDhERI objectives, has undertaken these surveys to assess the tourism sector's reliance on, and impacts to, biodiversity and marine natural capital in Laamu Atoll. The Resource Use Survey and Visitor Survey provide valuable insights into the sector's ecological footprint and highlight dependencies on fragile coastal and marine ecosystems. The findings are intended to inform future development scenarios, anticipate potential environmental and business risks, and ultimately guide more sustainable decision-making for tourism in Laamu Atoll.

2 Background

2.1 An Overview of Laamu Atoll

Laamu Atoll or Hadhunmathi Atoll, is an administrative division of the Maldives, comprising of 92 islands. These include 2 operational resort islands, 6 resorts under development, 11 residential islands, and 1 airport island. The inhabited islands within the atoll are as follows: Dhanbidhoo, Fonadhoo, Gan, Hithadhoo, Isdhoo, Kalaidhoo, Kunahandhoo, Maabaidhoo, Maamendhoo, Maavah, and Mundoo. Gaadhoo Island was previously inhabited, but its population was relocated to Fonadhoo in 2016. (Statistics, Statistical Yearbook of Maldives 2024, n.d.).

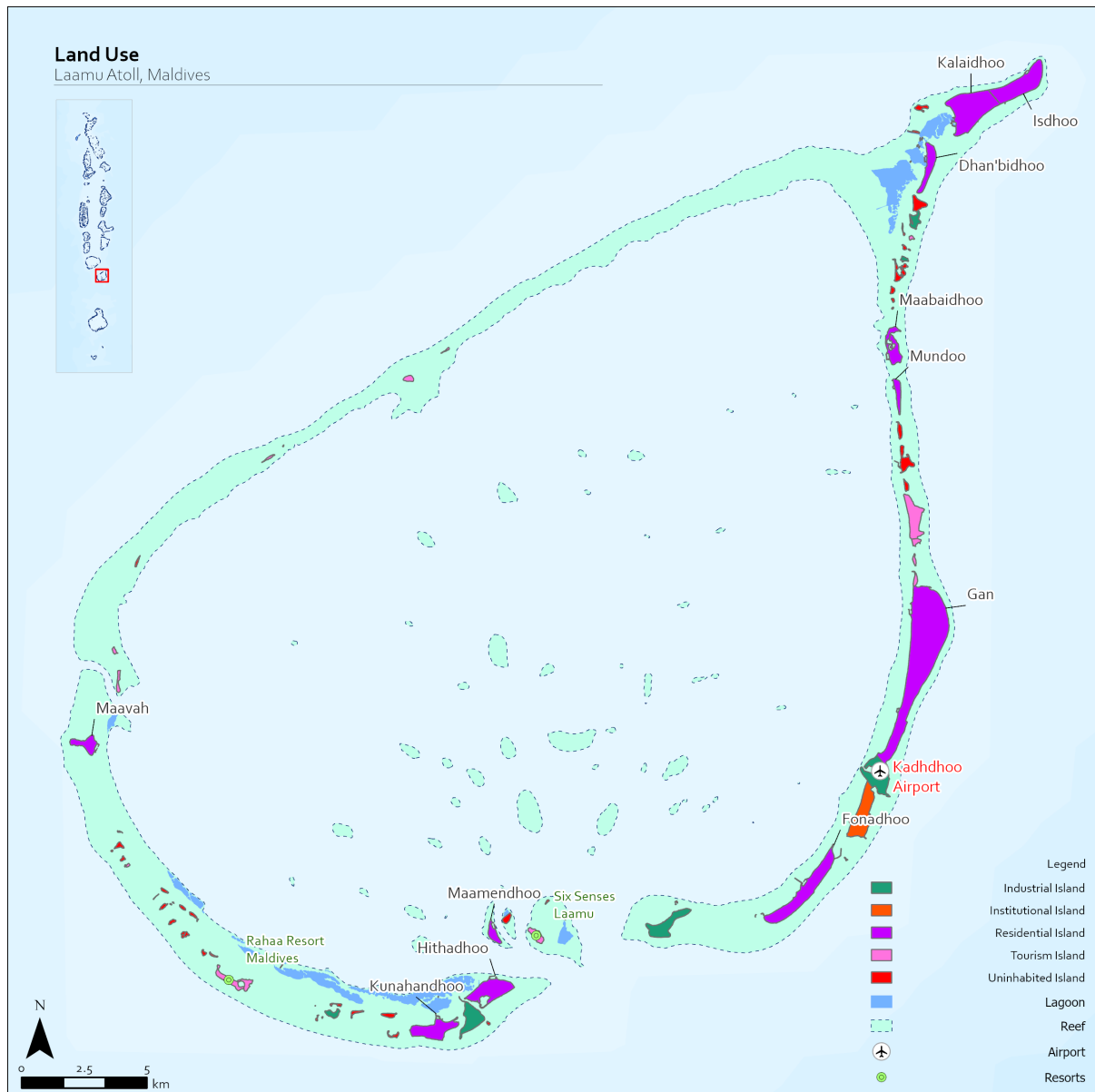


Figure 2-1 Land use of Laamu Atoll

As of 2023, the registered population of Laamu Atoll's inhabited islands is 18,885, consisting of 9,202 males and 9,683 females, according to the Statistical Yearbook of Maldives 2024. (Statistics, Statistical Yearbook of Maldives 2024, n.d.). Of the registered population, 14,699 residents reside within Laamu Atoll, while the remainder live in other regions. This represents approximately 82.2% of the registered population. The island with the largest number of residents is Gan, with a total of 4,815 (2,460 males and 2,355 females). Mundoo has the smallest resident population, totalling 176 (104 males and 72

females). (Statistics, Statistical Yearbook of Maldives 2024, n.d.). Laamu Atoll has an overall Maldivian sex ratio of 92, with 6,225 females and 6,747 males. Mundoo exhibits the highest sex ratio among the islands, at 109, while Maabaidhoo has the lowest, at 81.

Of the residents of Laamu Atoll, 10,472 are aged 15 years and over, and the total Labour force is 6,786. The employed population is 6,417, while 369 individuals in the labour force are unemployed. Gan has the largest number of employed residents, at 2,232, with education and manufacturing being the most common industries of employment (261). The top three industries for the atoll are education (830), public administration and defence (806), and manufacturing (731). (Statistics, EC 7 : Number of employed resident population 15 years of age and over by industry, sex and by island in 2022).

Accessibility to Laamu atoll is by both air and sea. There is a domestic airport in Laamu Atoll called Kadhdhoo Domestic Airport, located on Kadhdhoo Island which is connected to Gan by a causeway. In addition to Gan, Maandhoo (industrial island) and Fonadhoo (inhabited island and administrative capital of the atoll) are connected by this causeway, Laamu Link Road, which is 14.9 km long. There is also a seaplane service, operated by Trans Maldivian Airways, that travels exclusively to Six Senses Laamu. Six Senses Laamu and Rahaa Resort are both accessible from the main island via the resorts' own speedboats. The rest of the inhabited islands can be accessed through private charter speedboats or the Raajje Transport (RTL) ferry. Travel within these and other islands is facilitated by motorcycle, walking, bicycle, taxi services, and the RTL bus service.

Laamu Atoll has a total of 29 historical and cultural sites, as listed by the National Centre for Cultural Heritage. Isdhoo has the highest number of these sites, with five historical sites. Notable sites include Isdhoo *Bodu Hatheli*, Isdhoo *Kuda Hatheli*, Isdhoo *Aasaaree Misky*, Havitha, and *Beyskulhi*. Laamu atoll hosts several Protected Areas (PA) and Environmentally Sensitive Areas (ESAs) including Marine Protected Areas (MPAs) and mangroves.

2.2 The Concept of Natural Capital and Ecosystem Services

NC and ES are increasingly recognized as the foundation of human well-being and economic prosperity (Costanza, 2020). While ecosystem services—such as provisioning, regulating, cultural, and supporting functions—directly sustain livelihoods, the ecosystems that generate them constitute natural capital. Despite growing global recognition, the integration of NC and ES into mainstream policy and management remains partial and inconsistent (Guerry et al., 2015). Valuation frameworks emphasize the importance of sustainable scale, fair distribution, and efficient allocation (Daly, 1992), underscoring the imperative to balance human activity within ecological limits, distribute benefits equitably across generations and species, and allocate resources effectively.

Tourism, a global social, cultural, and economic phenomenon, depends heavily on NC and ES, particularly in island and coastal contexts. In the Maldives, tourism is deeply tied to the ecological health of reefs and lagoons that provide both cultural services—such as recreation and aesthetic value—and regulating functions that maintain environmental stability (UNWTO, 2023). Sustainable tourism therefore requires careful management of its ecological footprint while ensuring benefits for visitors, industry actors, host communities, and ecosystems. The degradation of ecosystem services directly undermines the economic viability of tourism-dependent economies like the Maldives.

The Government of Maldives has begun operationalizing NC accounting through pilot testing the SEEA framework in Laamu Atoll, a region both ecologically sensitive and economically vital (ENDhERI, 2023). SEEA provides a spatially based, integrated statistical system for tracking ecosystem extent, condition, services, and their links to human activity (United Nations, 2024). This approach advances sustainable development by ensuring that natural resources and ecosystem services are explicitly valued in decision-making, enabling policymakers to weigh ecological trade-offs alongside economic growth imperatives.

Complementing SEEA, the SF-MST provides a multi-purpose structure for capturing the sustainability dimensions of tourism. SF-MST integrates environmental, economic, and social indicators across multiple scales (UNWTO, 2023). Its environmental dimension highlights the pressures of tourism on

natural resources, emissions, waste, and ecosystem conditions. Its economic dimension captures contributions to GDP, employment, and investment. Its social dimension addresses host community well-being, workforce equity, and governance quality. By adopting a nested “economy-in-society-in-nature” model, SF-MST moves beyond siloed analysis, providing coherent and comparable datasets for resilience and sustainability assessments.

Together, SEEA and SF-MST enable a holistic understanding of tourism’s sustainability. They align NC and ES with tourism’s economic and social realities, offering a strong evidence base for policy reform and integrated planning. For Laamu Atoll, these frameworks provide the analytical foundation for the Resource Use Survey and Visitor Survey, which aim to quantify the tourism sector’s ecological dependencies and pressures. This research is particularly timely, given Laamu’s dual role as a biodiversity-rich ecosystem and a critical node of economic growth. By situating tourism within the broader context of NC and ES accounting, this study positions Laamu Atoll as a testing ground for national-scale sustainable development strategies.

2.3 Three Dimensions of Tourism Sustainability

The economic sustainability of tourism depends on understanding how the sector contributes to and distributes value within the national economy. Key indicators include visitor numbers and spending patterns, the structure and performance of tourism enterprises, employment quality, investment in infrastructure, and government expenditure. Together, these factors reveal both the scale of tourism’s economic contribution and the equity of its benefits, offering a basis to assess how growth in the sector supports long-term national development (UNWTO, 2023).

The environmental dimension of tourism highlights the pressures placed on natural resources and ecosystems. Measuring emissions, waste generation, and the consumption of water and energy provides insight into the sector’s footprint, while tracking changes in land use, ecosystem condition, and biodiversity identifies its broader ecological impacts. Integrating such environmental data with tourism statistics creates opportunities for more informed decision-making, enabling policymakers and businesses to anticipate risks, reduce impacts, and align tourism growth with ecosystem resilience (UNWTO, 2023).

The social dimension of tourism encompasses the experience of visitors, the well-being of host communities, the quality and equity of employment, and the effectiveness of governance systems. Community perspectives, workforce conditions, and stakeholder participation all shape the sector’s legitimacy and long-term sustainability. Governance structures—through regulation, planning, and sustainability strategies—play a crucial role in balancing visitor demand with community interests and environmental limits. Incorporating these diverse perspectives enables a more holistic understanding of tourism’s contribution to sustainable development and resilience (UNWTO, 2023).

2.4 Marine and Coastal Biodiversity in Laamu Atoll

Laamu Atoll, one of the largest natural atolls in the world, hosts a diverse array of marine and coastal ecosystems that are foundational to both biodiversity and the socio-economic fabric of the region. With 99 islands (77 vegetated and 22 unvegetated), only 11 of which are inhabited. Laamu supports rich and varied ecosystems including coral reefs, mangroves, seagrass meadows, and macroalgal communities. The atoll’s elongated formation spans approximately 48 km north to south and 28 km east to west, encased by a shallow lagoon varying in depth and punctuated by coral reefs and sandbanks (McNamara et al., 2019).

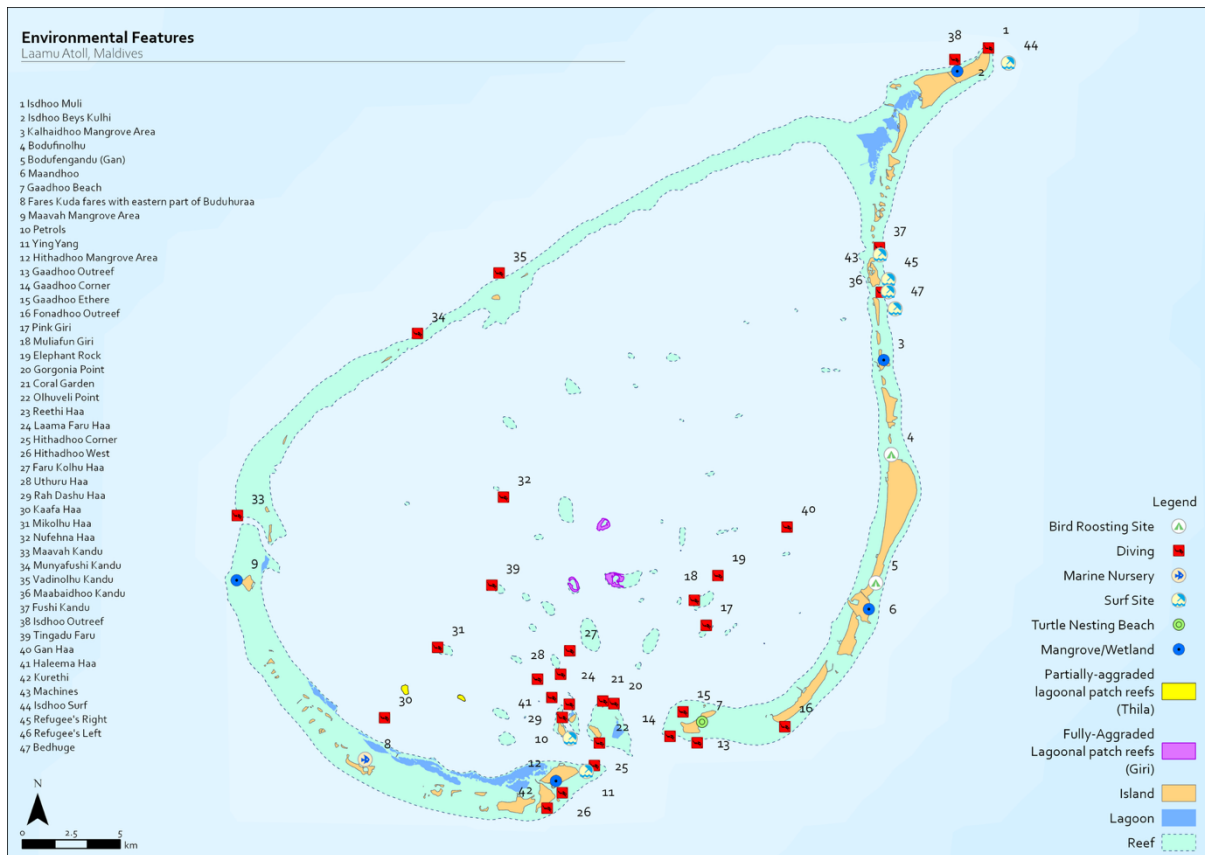


Figure 2-2 Environmental features of Laamu Atoll

2.4.1 Coral Reef

Laamu Atoll's coral reef system spans 56 reefs over 203.7 km² (Naseer and Hatcher, 2004), forming a critical habitat for reef-associated species. Recent assessments by Femmami (2019), show a mean live coral cover of 19%, with hard corals comprising 17% and soft corals 2%. Variation is notable across the atoll, with coral cover ranging from 7% in Hithadhoo Corner to 34% in Maabaidhoo Inside (Femmami, 2019). The presence of coral-dependent species, particularly from the Chaetodontidae family (butterflyfish), points to ongoing reef recovery. The atoll's reef fish diversity is also high, with 110 fish species recorded across 20 sites and a Simpson diversity index averaging 0.91. This reflects a globally significant level of species richness, especially at Fushi Kandu and Maabaidhoo Outside. Ecologically important invertebrates, including sea cucumbers, lobsters, and giant clams, were also documented, further underscoring the ecosystem's value.

2.4.2 Mangrove Ecosystems

The mangrove cover in Laamu Atoll is spread across several islands, with substantial ecological variation in species composition and structure. Six mangrove genera have been identified across Hithadhoo, Maavah, Maabaidhoo, and Gan (Muttaqin et al., 2023). Hithadhoo island hosts a large, semi-enclosed mangrove dominated by *Rhizophora mucronata* and *Ceriop tagal*, with *Lumnitzera racemosa* and *Derris trifoliata* occurring near the mainland edge. In contrast, Maabaidhoo's mangrove (Maabaidhoo Koaru) is notable for its dominance of *Pemphis acidula*, along with saplings of *R. mucronata* and *C. tagal* that were reportedly introduced in 2017 from Hithadhoo. Interestingly, despite lower species richness, Maabaidhoo mangrove supports higher juvenile fish abundance compared to Hithadhoo (Cerri et al., 2024; White & Cameron, 2019), highlighting its crucial nursery role. Mangrove areas in Maavah are minimal and have been heavily altered for agriculture, while Gan island features a densely vegetated mangrove area dominated by *Bruguiera gymnorrhiza*, with abundant natural regeneration evident beneath mature canopies.

2.4.3 Seagrass Meadows

Seagrass beds in Laamu Atoll are widespread in its shallow lagoons and are increasingly recognized for their ecological importance. According to Muttuqin et al. (2023), seagrass covers approximately 4,128.77 ha across the atoll, with covering ranging from 35.79% to 89.71%. The highest observed in Southeast Kalhaidhoo. Dominant species include *Thalassia hemprichii* and *Cymodocea rotundata*, with others such as *Thalassodendron ciliatum* and *Syringodium isoetifolium* also present. A study (Blatchford, 2019), at the Six Senses Laamu resort recorded six seagrass species and documented 141 fish species using these meadows, with the highest abundance and diversity at the uninhabited island of Gaadhoo. These meadows serve as vital nursery grounds, particularly for juvenile reef fish and commercially important species. Despite the ecological value of these habitats, historical attitudes towards certain ecosystems, particularly seagrass, have been negative. Seagrass has often been cleared around resorts to enhance the appearance of beaches (Shareef, Wu & Roe, 2019). However, this perspective is gradually shifting due to efforts from conservation bodies such as the Maldives Underwater Initiative (MUI) and Blue Marine Foundation. Their collaborative work led to the formation of the Maldives National Seagrass Monitoring Network, which has introduced a standardized protocol for mapping and monitoring seagrass. Initial findings around Six Sense Laamu identified six seagrass species and observed rapid expansion of meadows, with total area increasing by 20% in one year (MUI- Roe, 2020).

2.4.4 Protected Areas

The government of the Maldives has pledged to bring one island, one reef and one mangrove under a protected area regime and has committed to establish better management regimes for these areas. To conserve key biodiversity habitats of Laamu Atoll, MoTE has designated the following areas as protected areas under the Environmental Protection and Preservation Act 4/93.

Gan Boda Fengan' du Protected Area includes the body of water and surrounding vegetation, including the marine area on the eastern side of the island. The total protected area is 15.03 hectares, made up of a terrestrial area of 4.91 hectares and a marine area of 10.12 hectares.

Gaadhoo Protected Area boundary includes key habitats of a turtle nesting beach, seagrass, mangroves and part of the terrestrial vegetation of the island. The total protected area is 614.88 hectares, made up of 19.96 hectares of terrestrial area and 594.92 hectares of marine area.

Hithadhoo Kulhi Protected Area boundary includes mangroves, terrestrial vegetation, seagrass beds, surf zones and a marine area including the Manta Point. The total protected area is 634.7 hectares, made up of 25.46 hectares of terrestrial area and 609.21 hectares of marine area.

Maabaidhu Koaru Protected Area boundary includes wetland, terrestrial vegetation, seagrass beds, a surf zone and marine area. The total protected area is 174.46 hectares, made up of 31.59 hectares of terrestrial area and 142.87 hectares of marine area.

Fushi Kandu Protected Area boundary includes a channel, grouper aggregation site, coral reef and 3 islands. The total protected area is 346.62 hectares, made up of 6.66 hectares of terrestrial area and 339.96 hectares of marine area.

Hithadhoo Gaadhoo Kandu is the channel between Hithadhoo and Gaadhoo islands. The protected area boundary is made up entirely of marine area, and comes to a total of 1505.07 hectares.

Fushi island with Vandolhu Kandu Olhi Protected Area boundary is made up of a channel and the adjacent reef. The total protected area is 706.02 hectares.

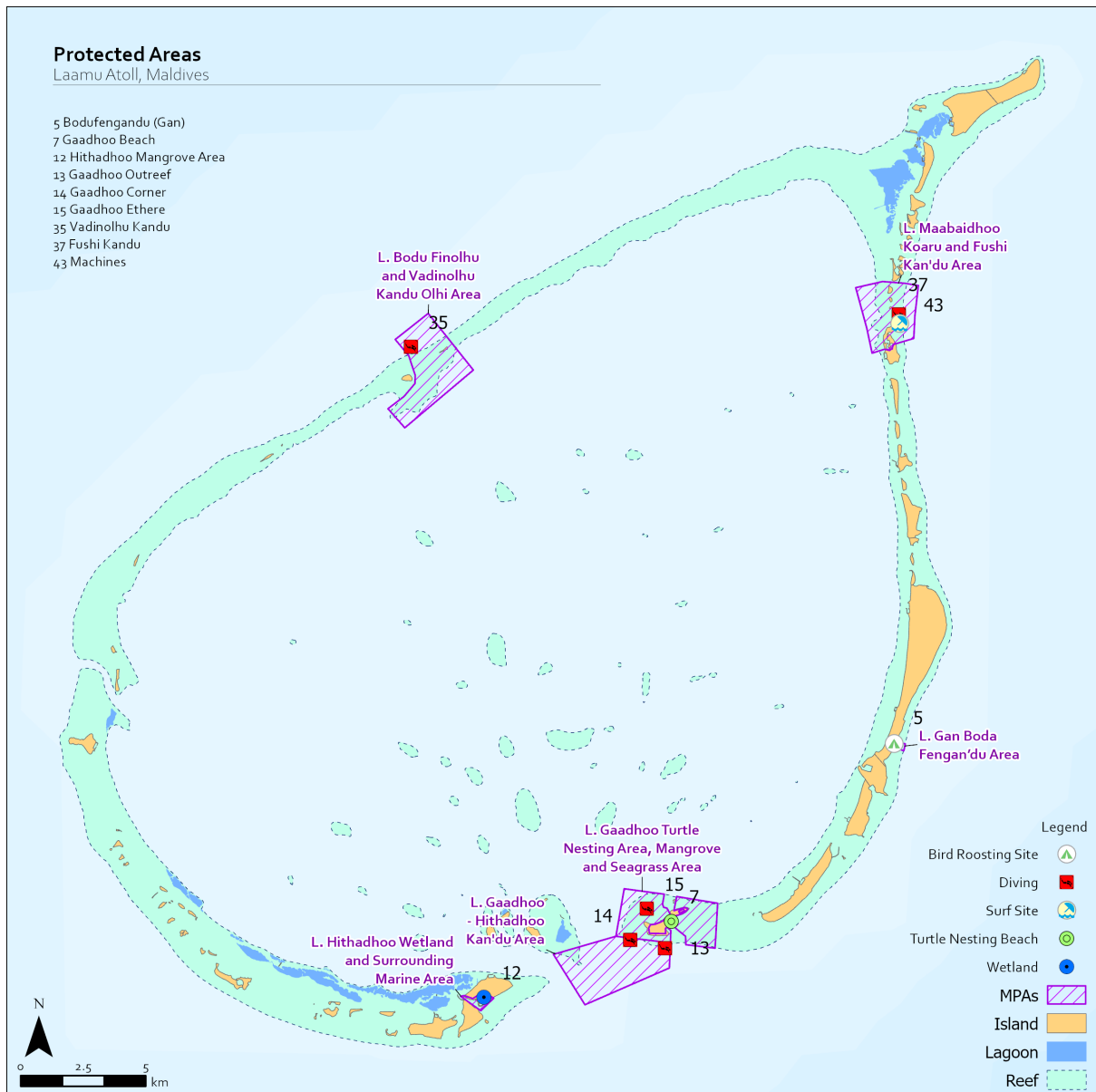


Figure 2-3 Protected Areas of Laamu Atoll

2.4.5 Environmentally Sensitive Areas

There are five identified Environmentally Sensitive Areas (ESA) located in Laamu Atoll. The Fonadhoo Diving Point, Isdhoo Muli, Mathigulhi Sarahadhu, Mundoo Channel, Reethi Haa and Hudhafaru.

1. Fonadhoo Diving Point

Fonadhoo Diving Point is located on the south eastern side of Laamu atoll, falling within the jurisdiction of Laamu Fonadhoo. Fonadhoo Diving Point consists of a coral reef habitat, supporting healthy coral reef benthic and fish assemblages, alongside reef manta rays.

In 2020, the Manta Trust identified a reef manta ray (*Mobula alfredi*) cleaning station at a site locally known as Fonadhoo Beyru along the southeastern side of Fonadhoo. The cleaning station sits at around 24m in depth, with 11 manta rays, all thought to be part of the residential population, estimated to have been captured on Manta Trusts' first 'Eyes of the Reef' deployment on Fonadhoo Beyru (MUI 2022).

Maldives Resilience Reefs (MRR) and partners conducted a baseline coral reef survey at a site approximately 1.75km northeast of the Fonadhoo Dive Point in 2019 and 2022, with results indicating

the hard coral cover had doubled in that time with sponges increasing in cover from less than 1% to 14% (Fischer, 2022). MRR and partners also led a study to reassess spatial variability in fish abundance, richness and diversity between 2019 and 2022, with the results showing a 7% increase of commercially and ecologically important species with snappers (*Lutjanidae spp.*) being the most abundant species in both years. However, it was noted that there was a 6-10% decline in fish species richness in that timeframe (Shephard 2022). Surveys conducted by MRR and Blue Marine in 2021 showed that there was high fishing pressure on the south and eastern edges of Fonadhoo, with the report also finding that Fonadhoo reported the highest number of fishing vessels (53 in total), though these were classified as smaller dinghies.

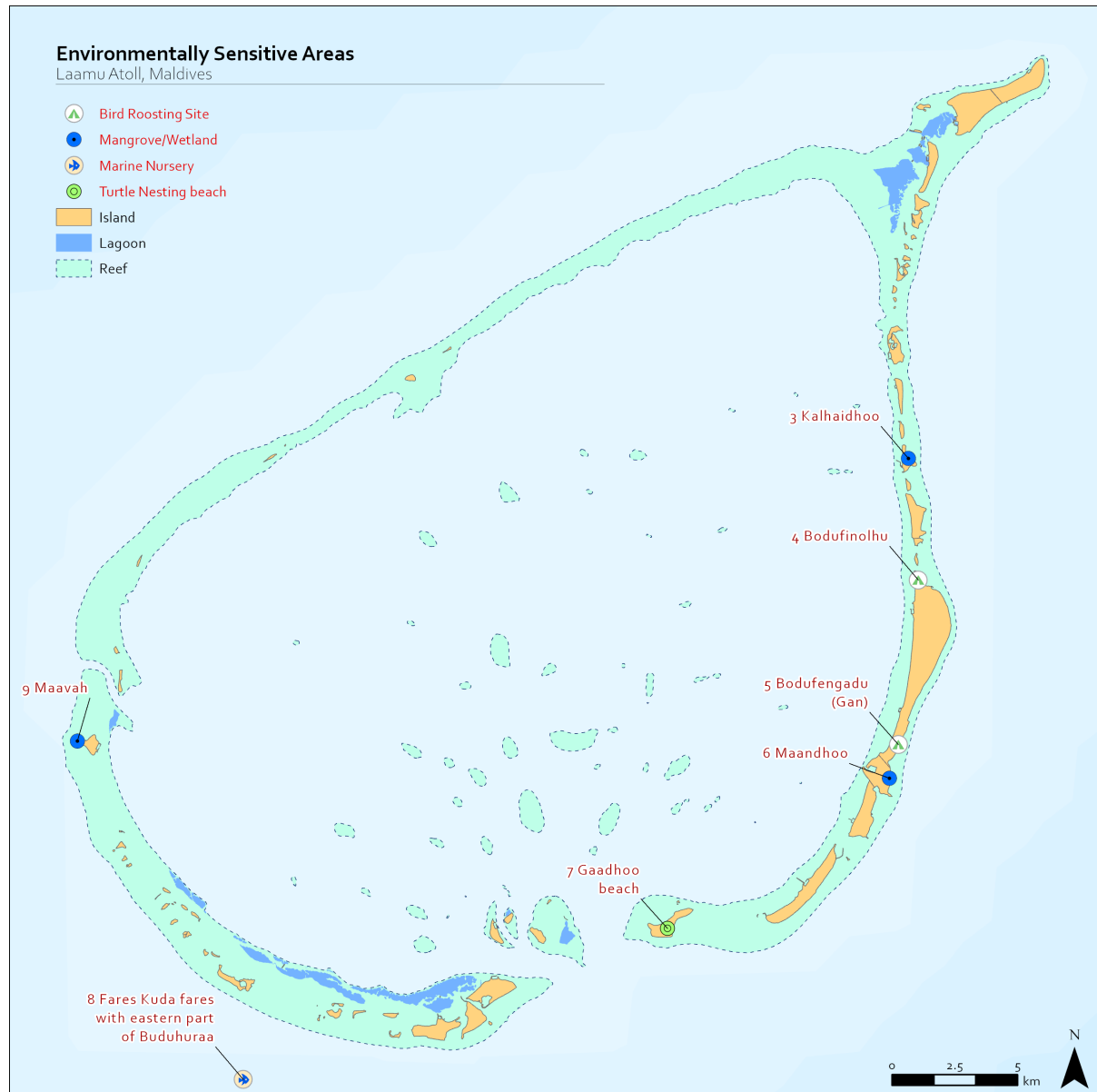


Figure 2-4 Environmentally Sensitive Areas of Laamu Atoll

2. Isdhoo Muli

Isdhoo Muli is located on the northeastern tip of Laamu Atoll, within the jurisdiction of Laamu Isdhoo, being located on the northeastern edge on the outer reef area of the island. The site is predominantly a coral reef habitat.

The 2017 United Nations Development Programme Low Emission Climate Resilient Development coral reef survey showed that the outer reef of Isdhoo had 40% coral cover. In 2022, MRR and partners conducted baseline coral reef surveys of a site at 5m and 10m approximately 0.5km northeast of the

Isdhoo study site (Fischer 2022), showing the live coral cover was at 27.23% at the time. Isdhoo Muli was also found to contain the second highest fish abundance and highest species richness across the 28 sites surveyed in 2021/22. The most abundant fish family was Balistidae (triggerfish). Resource use surveys conducted by MRR and Blue Marine in 2021 showed that there was high fishing pressure for the reef fishery, billfish fishery, tuna fishery, lobster fishery, octopus fishery, sea cucumber fishery and invertebrate collection (Rees 2021).

3. Mathigulhi Sarahadhu

Mathigulhi Sarahadhu is located on the southwestern side of Laamu Atoll, on the western lagoon of Kunahandhoo. Within this area, there are two vegetated islands and several rock banks and scattered small seagrass habitats. The two vegetated islands, Maafushi and Kudafushi are under the jurisdiction of the Ministry of Fisheries, Marine Resources and Agriculture; and the two rock banks called the Bodumahigulhi and Kudamahigulhi are under the jurisdiction of Laamu Atoll Council.

The site is situated within an extensive coral reef system that covers around 4,113 ha. This reef system is comprised of a sloping reef, flat reef areas and patch reefs. The flat reef portions become exposed above the water's surface during low tide and are on average, 700m wide. The outer sloping portion of the reef that drops off has a perimeter measuring around 25,690m, covering an area of roughly 1,798 ha. This reef system has a relatively complex geomorphology compared to other reef systems in the area.

4. Mundoo Channel

Mundoo channel is located on the central eastern side of Laamu Atoll, north of Mundoo and south of Maabaidhoo islands, connecting the inner atoll with the open ocean. The site consists of coral reef and seagrass habitats. MRR and partners conducted baseline coral reef surveys of a site approximately 0.15km south of the study site at 10m and 15m.

The coral reef environment has reef-flat and reef-slope, having distinctive habitat characteristics. The total reef area covers approximately 50 hectares, with 22 hectares being reef flats. The seagrass beds found around Mundoo island provide food to a range of fish and invertebrates, play a vital role in absorbing carbon dioxide and provide structural habitat and nursery areas to a range of marine flora and fauna.

Reef fish and coral surveys from 2021/22 predicted that the decrease in coral cover in Maabaidhoo from 2019 to 2021 might be linked to harbour extension that happened between 2019 and 2022, highlighting the importance of reducing physical stressors to promote coral growth (Fischer, 2022). The coral cover of Mundoo Kandu was first surveyed in 2021/22, and it was found that the most abundant species was *Gnathodon speciosus* and *Melichthys indicus*.

Surveys conducted in 1998 showed the Mundoo channel was a grouper spawning site for *Plectropomus areolatus* during the new moon period, and also possibly for *Plectropomus laevis* (Sluka, 2001). The Mundoo Kandu outer channel was identified as a grouper spawning site by 16 local grouper fishers in 2016-17 (Evans et al., 2018). 95% of the fishers who reported spawning aggregations said they had fished at the site and more than half reported catch declines.

5. Reethi Haa and Hudhafaru

Reethi Haa and Hudhafaru is located on the southern inner atoll area of Laamu atoll, north of Maamendhoo and Olhuveli islands. The southern part of the site, consisting of Laamafaru Haa and Reethi Haa dive sites and the northern reef of Maamendhoo is within the jurisdictional boundary of Maamendhoo island. Three shallow faros and a deep faro are located in this area. Rahdhashu Haa, another deep faro, is located just outside the southwestern corner of this area.

MRR and partners conducted baseline coral reef surveys of Laamafaru Haa at 5m and 10m in both 2019 and 2022. Surveys found that the site was recovering well from a mass bleaching event in 2016, with the live coral cover being 26.01% in 2022 (up from 13.90% in 2019). However, the abundance of commercially and ecologically important species declined by over 19% and species richness

decreased by 36-40%. Resource surveys carried out by MRR and Blue Marine in 2021 showed that there was some fishing pressure for the livebait fishery, reef fishery, sea cucumber fishery, octopus fishery and invertebrate collection.

2.5 Conservation Status and Local Perspective

In terms of conservation, Laamu has been incorporated into national strategies such as the Maldives National Biodiversity Strategy and Action Plan 2016-2025, which aims to protect 10% of coral reefs and 20% of wetlands and mangroves (King, 2024). Six sites within Laamu were officially designated as protected areas in 2021, including reef channels and key biodiversity areas. While these steps mark important progress, public awareness and involvement remain limited (ENDheRI, 2023). A recent survey by ENDheRI (2022), found that over 70% of residents were unaware of existing environmental laws or projects, and fewer than 30% felt that conservation efforts provided tangible benefits or sufficient protection for the environment.

2.6 Nature-based Tourism in Maldives

Tourism in the Maldives is fundamentally dependent on healthy ecosystems and the services they provide. Coral reefs, lagoons, and beaches underpin the country's global reputation as a premier destination for diving, snorkelling, water sports, and island excursions (King et al., 2023). Surveys indicate that 30–40 percent of guests visit specifically for snorkelling or diving (Westmacott & Rijsberman, 2000), while beaches remain the strongest motivator for most visitors (CDE Consulting, 2021). Other drivers include rest and relaxation (35%), honeymoons (25%), and snorkelling (17%). These patterns highlight the dominance of nature-based tourism, with visitors consistently choosing the Maldives for its clear waters, diverse marine life, and tranquil settings.

Beach resort tourism not only drives guest satisfaction and retention (Didi, Nizam & Hamza, 2016) but also generates revenue streams that can support environmental protection, restoration, and NbS. A survey of 52 resorts found that 80 percent were engaged in some form of ecosystem management, with investment levels ranging from under USD10,000 to over USD250,000, and more than half of resorts expressing willingness to expand their commitments if given the right opportunities (Jarvis, Stoeckl & Liu, 2016; Duvat & Magnan, 2019). This positive engagement underscores the sector's reliance on environmental quality but also its vulnerability—any degradation of ecosystems, whether from tourism itself or external pressures, directly threatens the long-term viability of the industry (UNWTO, 2023).

The high non-consumptive value of marine biodiversity further illustrates this interdependence. For instance, a single manta ray can generate up to USD100,000 in lifetime tourism revenue, far exceeding its market value in extractive uses (Anderson et al., 2011). Visitor satisfaction is strongly tied to the condition of marine ecosystems (Jarvis, Stoeckl & Liu, 2016), making biodiversity conservation both an ecological necessity and an economic imperative. The SF-MST therefore calls for systematic information on four critical dimensions: the pressures tourism places on ecosystems, its use of natural resources such as water and energy, the role of biodiversity in sustaining tourism activities, and industry responses to mitigate impacts and enhance outcomes (UNWTO, 2023). The Visitor Survey and Resource Use Survey in Laamu Atoll are designed to provide this evidence, ensuring that tourism planning aligns with ecosystem resilience and long-term sustainability.

2.7 Environmental Impacts and Risks from Tourism Development

Tourism in the Maldives generates significant economic benefits but also poses serious risks to fragile ecosystems if not properly managed. Coastal development, dredging, and resort construction frequently lead to habitat loss, sedimentation, and water pollution, with coral reefs among the most vulnerable (Jones et al., 2016; Erftemeijer et al., 2012). Sand-pumping and engineered sea defences, used to counter beach erosion, further disturb marine habitats (Zubair, Bowen & Elwin, 2011). In

addition, nutrient loading from sewage disposal, boat discharges, and imported goods promotes algal growth that reduces coral cover and undermines reef resilience (Dhunya, Huang & Aslam, 2017).

Empirical evidence underscores these pressures. Cowburn et al. (2018) show that newer resorts often have lower coral cover due to construction impacts, while high visitor use through snorkelling and diving can physically damage reef structures. Despite depending on these ecosystems for their market appeal, most tourism operators do not own or directly manage them. Resorts also place heavy demands on energy, freshwater, and waste management systems—challenges that are magnified by the small size and isolation of Maldivian islands. These dynamics highlight concerns of tourism intensity, overtourism, and ecological carrying capacity (UNWTO, 2023), which remain critical issues for long-term sector sustainability.

At the same time, tourism presents opportunities for conservation when managed responsibly. Visitor demand for healthy ecosystems and resort initiatives such as no-take marine zones have been shown to increase fish and invertebrate populations (Moritz et al., 2017). The “one island, one resort” model enables greater accountability for environmental management, limiting pressures on shared resources (Hussain, 2022). With its global visibility and dependence on intact ecosystems, the Maldivian tourism sector is uniquely positioned to contribute to climate change mitigation, biodiversity protection, and sustainable consumption. Harnessing this potential requires careful management of production and consumption across transport, accommodation, food, and recreation to ensure that economic growth reinforces, rather than erodes, the natural capital on which the industry depends (UNWTO, 2023).

2.8 Current Tourism Practices

Tourism in the atoll remains relatively small in scale compared to other regions of the country, with two operational resorts offering 360 beds and four registered guesthouses providing 102 beds. The two resorts—Six Senses Laamu on Olhuveli Island and Rahaa Resort on Kudafares and Fares Islands—are positioned along the eastern and southern boundaries of the atoll. Their locations create opportunities for nearby inhabited islands to engage in tourism-related activities such as organizing excursions or selling local products to visitors, thereby linking community livelihoods with the sector.

Six Senses Laamu is recognized internationally for its strong commitment to sustainable tourism. The resort has pioneered initiatives in coral reef restoration, seagrass and mangrove protection, and waste reduction through sorting, recycling, and upcycling. It actively sources local produce and reinvests in conservation through a dedicated Sustainability Fund. Guests are encouraged to participate in coral planting, marine monitoring, and awareness programs, while local students benefit from educational sessions on marine ecosystems. These practices position Six Senses Laamu as a model for integrating tourism operations with ecosystem protection and community engagement.

In contrast, guesthouse development in Laamu Atoll is more locally oriented. While MoTE officially lists four guesthouses with 102 beds including— Reveries Diving Village (46 beds), Nazaki Residences (32 beds), Clouds Beach Retreat Laamu (16), and Sunsetvilla (8 beds), all located on Gan—survey data indicates there may be up to 17 operational guesthouses spread across five islands. These include ten in Gan, three in Fonadhoo, two in Maavah, one in Mundoo, and one in Kalaidhoo (Epoch Associates). Most guesthouses cater to domestic tourism and focus primarily on generating economic opportunities and employment.

Notably, all 11 inhabited islands have designated potential tourism areas within their land-use plans, indicating significant scope for expansion of tourism activities across the atoll. This expansion, if pursued without integrating sustainability, could intensify environmental pressures on Laamu Atoll’s ecosystems.

2.9 Maldives Visitor Survey

The Maldives Visitor Survey (MVS) is a periodic national survey led by the Ministry of Tourism to understand the profiles, motivations, experiences, and satisfaction levels of international visitors

departing the Maldives. It serves as a key evidence base for tourism planning, marketing, and policy development. MVS gathers insights into:

- Visitor demographics and travel behaviour
- Motivations for visiting the Maldives
- Booking patterns and information sources
- Experiences with transport, accommodation, dining, and activities
- Visitor expenditure and satisfaction

The findings help identify market trends, assess visitor perceptions, and guide strategies to enhance the Maldives' competitive edge as a tourism destination.

The survey is conducted as an exit survey at Velana International Airport (VIA). Enumerators distribute questionnaires to departing international visitors after immigration and collect them at the departure gates after security clearance.

The MVS continues to show that visitors associate the Maldives with beauty, peace, and paradise. Maintaining clean beaches, healthy reefs, and high service quality remains central to sustaining the Maldives' reputation as one of the world's premier island destinations

2.10 Research Gaps

Current research in Laamu Atoll remains fragmented, with a lack of integrated studies combining ecological, economic, and social perspectives. Most tourism assessments in the Maldives focus on economic performance or biodiversity threats in isolation (Shakeela & Becken, 2015). A more holistic understanding is needed to align tourism development with environmental sustainability, particularly through visitor surveys and ecosystem service valuation (Baloch et al., 2012).

In Laamu Atoll, the Visitor Survey and Resource Use Survey are central to the ENDhERI project's goals of strengthening reef resilience, embedding natural capital into planning, and shaping national policy reform. By capturing how tourism both depends on and impacts ecosystems, the surveys generate vital evidence to integrate sustainability into decision-making across the sector. Their findings are intended not only to inform local management but also to guide the Government of Maldives in advancing Green Growth strategies, natural capital accounting, and integrated coastal governance. The following chapter outlines the methodology used to design and implement these surveys, ensuring that the data collected is robust, representative, and directly applicable to sustainable policy and planning.

3 Definitions and Methodology

3.1 Key Concepts

The methodology for the Laamu Atoll Visitor and Resource Use Surveys is grounded in a set of key concepts that link tourism, ecosystems, and sustainability. These concepts provide the analytical framework for assessing how tourism depends on natural capital and how its activities impact ecosystem services.

Natural Capital

NC refers to the world's stocks of natural assets, including geology, soil, air, water, and biodiversity. In Laamu Atoll, it specifically encompasses the coral reefs, lagoons, seagrass meadows, mangroves, and beaches that provide goods and services vital to human well-being and economic activity, especially tourism.

Managed Marine Area

An MMA is a designated marine space managed for both conservation and sustainable use through integrated coastal zone management. Within Laamu Atoll, MMAs are essential in balancing ecological protection with sustainable development, ensuring that marine ecosystems continue to support livelihoods and tourism.

Biosphere Reserve

Recognized under United Nations Educational, Scientific and Cultural Organization's Man and the Biosphere Programme, biosphere reserves promote a balanced relationship between people and nature. Laamu Atoll's biosphere reserve model integrates three core functions—conservation, sustainable development, and logistic support (research, monitoring, and education)—to serve as a living laboratory for sustainable island management.

Ecological Footprint

This metric quantifies the environmental impact of individuals, communities, or sectors by measuring the natural resources consumed and waste generated, relative to the Earth's regenerative capacity. For tourism in Laamu, it provides a benchmark for understanding pressures on ecosystems.

Natural Capital Accounting

NCA is a systematic framework for measuring and valuing stocks and flows of natural capital using tools such as the UN's SEEA. In this study, NCA helps capture tourism's dependence on ecosystem services and the potential costs of environmental degradation.

System of Environmental-Economic Accounting

The SEEA is a global statistical standard developed by the UN to integrate environmental and economic data. Its use in Laamu Atoll supports evidence-based decision-making by aligning ecological information with measures of economic performance, including tourism.

Sustainable Tourism

Defined as tourism that considers its economic, social, and environmental impacts, sustainable tourism ensures that the needs of visitors, the industry, the environment, and host communities are addressed in both the present and the future.

Tourism Intensity

Tourism intensity measures the ratio of tourist numbers to resident populations or ecosystem area, providing insights into the level of pressure placed on local infrastructure and ecosystems. It is a critical indicator for Laamu Atoll, where tourism expansion remains a possibility.

Carrying Capacity

This concept refers to the maximum number of people or activities that an area can sustain without environmental degradation or diminished visitor experience. For Laamu Atoll, carrying capacity is vital in assessing how much tourism growth can occur without undermining natural capital.

Ecosystem Services

ES are the benefits humans derive from ecosystems, categorized into provisioning (e.g., fish and freshwater), regulating (e.g., coastal protection), cultural (e.g., recreation and aesthetics), and supporting services (e.g., nutrient cycling). These services are central to Laamu Atoll's tourism appeal.

Dependency Analysis

This structured assessment examines how strongly tourism relies on natural capital and how changes in ecosystem condition may affect the sector's viability. In Laamu, dependency analysis is used to link visitor preferences and resource use patterns with ecosystem resilience and long-term sustainability.

3.2 Methodology and Design of Resource Use Survey

3.2.1 Purpose and scope

The Resource Use Survey (RUS) quantifies how tourism establishments in Laamu Atoll use—and invest in—the natural capital on which their businesses depend. It captures annual (calendar year 2024) stocks, flows, and management practices for energy, fuels, electricity, water, wastewater, solid waste, ecosystem interactions, visitor spending, and employment. The evidence feeds the ENDheRI NCA pilot and supports SEEA-consistent atoll-level accounts and SF-MST sustainability indicators.

3.2.2 Survey population and recruitment

The survey frame comprised all four operational tourist accommodations in Laamu Atoll at the time of fielding: two resorts, Six Senses Laamu and Rahaa Resort and two guesthouses Reveries Diving Village and Clouds Beach Retreat Laamu. Each establishment received a formal request from CDE Consulting—on behalf of MoTE—inviting participation and explaining purpose, confidentiality, and the atoll-level aggregation of results. Respondents were asked to submit 2024 data by 30 June 2025.

3.2.3 Instrument design

The instrument is a structured questionnaire (Adobe PDF, fillable) organized into nine thematic modules:

Visitors & Guest-nights (A) – visitor flows by mode (seaplane, domestic air, private jet, marine), total guest-nights, average length of stay.

Tourist Spending & Value Added (B) – revenues by characteristic products (accommodation, Food & Beverage, transport, sports/recreation, equipment rental) and gross value-added components (compensation, service charge, Tourism sector GST (TGST), Green Tax).

Fuels & Electricity (C) – diesel, petrol, Liquified Petroleum Gas (LPG) by use (generation, boilers, marine/land transport, incinerator, other); generator capacity; electricity produced/consumed; peak/average loads; solar Photo-Voltaic (PV) and Battery Energy Storage Systems (BESS) capacities and output.

Solid Waste (D) – total waste, composition, treatment pathways (reduce/reuse/recycle/compost/incinerate/other); technology inventory and investment values.

Water Resources (E) – Reverse Osmosis (RO) desalination plant capacities and storage; desalinated, rainwater, and groundwater volumes; specific energy for water production; water per guest-night.

Wastewater (F) – treatment/disposal method (reuse for irrigation; treated/untreated outfall) and Sewage Treatment Plant (STP) investment value.

Ecosystem Interactions (G) – top dive sites; activity counts and monetary values (diving, protected/sensitive sites, mangroves, sandbanks, uninhabited islands, cultural/heritage); site-level visitation, frequency, and fees; observed 5-year condition change by habitat.

Environmental Protection Actions (H) – climate/coastal risk measures (nature-based and engineered) with year and cost; monthly Operation and Maintenance (O&M) expenditures (waste, beach cleanups, sewage, coastal structures).

Employment (I) – workforce totals by sex, nationality, and job level; staff by functional area.

Each item specifies the unit of measure (e.g., litres, kWh, m³, kg, USD), the reference period (2024 annual totals unless noted), and the granularity needed to support per-guest-night and per-activity metrics.

3.2.4 Data collection procedures

Mode: Self-administered fillable PDF in Adobe Acrobat, returned via email.

Reference checks: Where feasible, respondents were encouraged to draw directly from utility logs, generator run-hours, RO plant logs, STP O&M records, finance/point-of-sale systems, and HR payroll.

Follow-ups: CDE Consulting conducted clarifications by email/phone to resolve missing values, units, or obvious outliers (e.g., negative volumes, inconsistent totals).

Confidentiality: Establishment-level returns are confidential; all reporting is at aggregated atoll level only.

3.2.5 Derived indicators and calculations

To ensure comparability across establishment types and sizes, Resource Use Survey produces a core set of intensity and performance indicators:

Visitor & demand: guest-nights; average length of stay; arrivals by mode.

Energy & emissions: fuel use by function; electricity generation/consumption; kWh per guest-night; diesel/petrol/LPG per guest-night; optional Greenhouse Gas emissions estimation using standard emission factors (for sensitivity analysis).

Water: total desalinated/rain/groundwater; m³ per guest-night; kWh per m³ of water produced.

Waste: total and composition; kg per guest-night; treatment shares (recycled/composted/incinerated/disposed).

Wastewater: treatment coverage (% treated), reuse share, and outfall use.

Ecosystem interactions: annual counts and expenditure/value by activity and site; trends in habitat condition (improved/unchanged/declined).

Finance: revenues by product; value-added components (compensation, TGST, Green Tax).

Employment: totals by sex, nationality, job level, and functional area (for equity and skills profiles).

Where establishments supplied both totals and guest-nights, intensities are standardized as per guest-night; where only room-nights were available, conversion factors follow reported occupancy data. Monetary values are in USD (current).

3.2.6 Data quality assurance

Internal consistency checks: fuel input against electricity output and generator capacity; reconcile water production with consumption; check waste composition against totals; verify that value-added components sum logically relative to reported revenues.

Range and unit validation: standardize units and flag implausible ratios (e.g., kWh/guest-night far outside Maldivian benchmarks).

Handling missing data: if minor fields are missing, intensities are calculated on available denominators with footnoted caveats; no imputation is applied to financial totals.

3.2.7 Alignment with policy frameworks

Variable definitions and indicators align with:

SEEA-Ecosystem Accounting/NCA (stocks/flows of water, energy, residuals; ecosystem use and condition), and

UNWTO SF-MST (environmental pressures, resource use, ecosystem reliance, and industry responses), ensuring that atoll-level outputs can inform national accounts, green-growth policy, and MMA/Biosphere Reserve management.

3.2.8 Ethics and data governance

Participation was voluntary. The invitation letter set out the purpose, confidentiality, data uses, and contact points. CDE stores raw returns on secure servers with restricted access; publication uses atoll-level aggregates only, with no establishment-level disclosure.

3.2.9 Limitations

As a self-reported, establishment-level census, the Resource Use Survey may be affected by non-response, heterogeneous record-keeping practices, and partial coverage of informal activities. Where only a subset of establishments report, results are presented transparently as partial coverage with no extrapolation unless clearly stated.

3.3 Methodology and Design of Visitor Surveys

3.2.1 Objective

The primary objective of the Laamu Visitor Survey was to examine visitor behaviours, preferences, and awareness in relation to natural capital and biodiversity conservation, while also evaluating the ecological footprint of tourism activities within Laamu Atoll. The survey specifically targeted guests staying in registered tourist accommodations in the atoll. Initially, four establishments were identified—Six Senses Laamu, Rahaa Resort, Reveries Diving Village, and Clouds Beach Retreat Laamu—with a combined capacity of 418 beds and 209 rooms. However, due to limited participation, only Six Senses Laamu and Reveries Diving Village took part in the final survey.

3.2.2 Survey Instrument

The survey instrument was a structured questionnaire designed to capture both quantitative and qualitative data. It was divided into three sections:

Section A: Visitor Profile – Demographic and travel-related characteristics.

Section B: Visitor Behaviour and Preferences – Engagement in marine and cultural activities, spending patterns, environmental concerns, and ecosystem experiences.

Section C: Sustainability – Attitudes toward conservation, personal actions to reduce environmental impact, and willingness to contribute to sustainability initiatives.

Earlier iterations included six thematic areas, but these were consolidated following pilot testing and stakeholder feedback to improve clarity, reduce redundancy, and minimize survey fatigue among respondents.

3.2.3 Survey Method

The survey adopted a mixed-methods approach, combining structured quantitative questions with qualitative items that allowed respondents to elaborate on their perceptions and motivations. This design enabled both statistical analysis and contextual interpretation.

3.2.4 Target Population

To capture tourism-specific dynamics, the survey was directed at visitors staying in the four registered tourist accommodations in Laamu Atoll. Data provided by participating establishments in 2024 suggested that approximately 4,500 visitors stayed at Six Senses Laamu and 920 at Reveries Diving Village. On this basis, a target of 300 surveys was set to ensure a balance between representativeness and operational feasibility. Ultimately, due to non-participation by two establishments, the final sample was significantly lower than planned.

3.2.5

Sample Size Determination

An initial target of 300 responses was established as a pragmatic compromise between statistical robustness and fieldwork constraints. While the standard formula for large populations at a 95% confidence level and $\pm 5\%$ margin of error suggests 384 responses, the finite population of Laamu (estimated at 5,420 visitors annually) would adjust this figure to 359. Given resource limitations and logistical considerations, 300 was deemed sufficient to generate meaningful insights. Sampling was allocated proportionally to accommodation bed capacity to reflect the distribution of visitors across the atoll.

Accommodation	Bed Capacity	Proportion of Total (%)	Target Surveys
Six Senses Laamu	194	46.4%	139
Rahaa Resort	162	38.8%	116
Reveries Diving Village	46	11.0%	33
Clouds Beach Retreat	16	3.8%	12
Total	418	100%	300

Due to non-participation, proportional allocation was not fully achieved, limiting representativeness.

3.2.6 Sampling Approach

Surveys were conducted at resorts and guesthouses rather than at the Kadhdhoo Airport terminal. Establishment-based sampling provided several advantages: (i) precise alignment with bed capacity data allowed proportional allocation of surveys; (ii) administration in a calm environment facilitated higher-quality responses; and (iii) integration into guest checkout processes improved participation rates. In contrast, airport-based surveys risked hurried responses, misclassification of passengers, and seasonal variability in data capture.

3.2.7 Survey Administration

Although initially designed as a paper-based survey administered by trained enumerators, the method was revised to a digital format for efficiency and quality control as well as to match the ethos of high-end resorts. Eight iPads pre-loaded with JotForm surveys were distributed—six to Six Senses Laamu and two to Reveries Diving Village—each equipped with independent mobile connectivity. Staff members were trained to administer the survey, primarily at the time of guest check-out. Pilot testing with five respondents informed improvements in question clarity and sequencing.

Initially, the survey was administered to guests at checkout points and waiting areas such as receptions and lounges. However, due to low response rates and concerns about disrupting the guest experience or conflicting with the ethos of the establishments, the approach was revised to include a QR code-based survey option.

Despite plans to use printed maps of Laamu Atoll to support spatial identification of ecosystem use, this component was dropped due to practical limitations and to align with sustainability values of tourism establishments.

3.2.8 Survey Period

The survey was conducted between 22nd April and 30th June 2025. Survey was not affected by seasonal disruptions, weather conditions, or holiday-related interruptions.

3.2.9 Languages

The survey was translated into six languages—English, Spanish, German, French, Russian, and Chinese—to accommodate Laamu's diverse visitor profile. Translations were professionally prepared and verified by native speakers. However, in practice, all respondents completed the survey in English.

3.2.10 Limitations and Assumptions

Several limitations shaped the outcomes of this survey:

Limited Establishment Participation: Only two of the four registered accommodations participated.

Reduced Sample Size: Final response numbers fell short of the 300-survey target.

CDE Consulting was unable to achieve the targeted sample size for the Laamu Atoll Visitor Survey due to factors beyond its control. According to Ministry of Tourism and Economic Development (MoTE) data, only 0.34% of all tourists to the Maldives stayed in Laamu during the first eight months of 2025—equivalent to just 3–4 visitors per 1,000 tourists. The survey period (22 April–30 June 2025) coincided with the lowest visitor arrivals of the year, with only 262 visitors in May and 289 in June, making it statistically impossible to reach the target sample of 300 respondents. Furthermore, Rahaa Resort, which holds 38.8% of Laamu's bed capacity, did not participate despite repeated follow-ups and assurances. In addition, around 92% of tourists to Six Senses Laamu arrived directly by seaplane, preventing data collection at Kadhdhoo Airport. These combined constraints made it infeasible to achieve the intended sample size within the survey timeframe.

Response Bias: Visitors with higher environmental awareness may have been more likely to participate.

Seasonality: Data collected during the survey period may not capture seasonal variations in visitor behaviour.

Underutilized Multilingual Options: Although translations were available, respondents opted exclusively for English.

Dropped Visual Aids: Planned use of maps to support ecosystem identification was abandoned during pilot testing.

Despite these constraints, the survey provides valuable insights into visitor behaviour and perceptions in Laamu Atoll and serves as a foundational step for integrating natural capital considerations into tourism planning and management.

4 Resource Use Assessment

This chapter analyses the patterns and intensity of resource use linked to tourism and related activities in Laamu Atoll. It focuses on the consumption of water, energy, and materials, as well as the generation of waste within resorts, guesthouses, and supporting sectors. The assessment identifies trends in efficiency, areas of overuse, and potential risks to the atoll's natural capital, providing insights to guide more sustainable resource management practices.

The chapter is organized into sections covering water use, energy consumption, waste management, and material sourcing, each supported by findings from the resource use survey. These insights form the foundation for understanding tourism's environmental footprint and inform the dependency and sustainability analyses presented in later chapters.

4.1 Number of Visitors

About 8,200 tourists are estimated to have visited Laamu Atoll in 2024. MoTE data shows that Laamu Atoll receives about 0.4% of tourist arrivals to the Maldives.

In the first eight months of 2025, Laamu Atoll received 5,077 tourists, against 1,486,926 arrivals to the Maldives overall (of which 1,455,376 were recorded across the atolls). This means about 0.34% of all visitors to the Maldives—or roughly 3–4 per 1,000 tourists—stayed in Laamu during this period; equivalently, the rest of the country hosted ~1.48 million visitors, ~292 times Laamu Atoll's volume. Laamu Atoll's share of “all-atoll” arrivals is ~0.35%, underscoring its relatively small current footprint within the national tourism market.

Laamu Atoll's arrivals peaked in January (966) and trended down through April (837) before a sharp low in May (262), then recovered to 465–474 in July–August. Month-by-month, Laamu accounted for 0.42–0.45% of national arrivals in January–April, dipped to 0.19–0.20% in May–June, and stabilized around 0.25% in July–August. The April to May decline in Laamu (–69%) was far steeper than the national drop (–32%), indicating higher volatility at atoll level. On average, Laamu hosted ~635 visitors per month in this period, closely tracking national seasonality but at a much smaller scale.

4.1.1 Where tourists stay

In 2024, tourism activity in Laamu Atoll was primarily concentrated in resort accommodation, which hosted most visitors. Of the 8,200 tourists, approximately 86% stayed in resorts, and an average stay of 6.8 nights, reflecting the dominance of high-end tourism in the atoll's market. In comparison, around 14% of tourists chose guesthouse accommodation, where visitors stayed an average of 8 nights, contributing a total of 2,870 guest nights during the year. This distribution highlights the current structure of Laamu Atoll's tourism sector, where resorts capture most arrivals, yet guesthouses are emerging as an important segment offering longer stays and greater opportunities for community engagement. The mix of resort and guesthouse tourism demonstrates the atoll's growing potential to diversify its visitor base while maintaining a strong focus on sustainable, nature-based experiences.

4.1.2 Mode of travel

Tourist access to Laamu Atoll is primarily by air, reflecting the atoll's remote geographic location in the southern Maldives. Most visitors — approximately 92% — arrive directly at resort islands by seaplane, which provides both convenience and a scenic introduction to the atoll's natural beauty. A smaller share, around 7%, reach Laamu via domestic flight connections, typically landing at Kadhdhoo Airport, located within Laamu Atoll, before transferring by speedboat to their destination. Less than 1% of visitors arrive by private planes or yachts, reflecting the limited use of private transport for tourism in the region. In contrast, all tourists staying in guesthouses travel to the atoll via domestic flights, connecting through VIA to Kadhdhoo. This transport pattern underscores the importance of maintaining efficient domestic air links and sustainable aviation services to support both resort and community-based tourism in Laamu Atoll.

4.2 Indirect Utilization

Tourism in Laamu Atoll depends heavily on the health and accessibility of its surrounding ecosystems. Indirect utilisation in this context refers to the use of natural capital through visitor activities such as diving, snorkelling and excursions to uninhabited islands and mangrove areas. This section summarises the spatial concentration of these activities and the associated expenditure patterns, highlighting the economic importance of Laamu's marine and coastal ecosystems as living assets that sustain tourism income, local employment, and community livelihoods.

4.2.1 Areas visited

The most common activities undertaken by tourists was diving, with most diving happening around the Hithadhoo and Gaadhoo areas.

The top dive sites within Laamu that are visited by tourists staying at the resorts include Hithadhoo Corner, Hithadhoo West, Haleema Haa, Hithadhoo Inside, Maavah Kandhu, Laama Faru Haa, Fushi Kandhu, Kurethi, Fonadhoo Outside, Gaadhoo Inside and Tingadu Nemo.

The main site that tourists staying at the guesthouses visit is Baresdhoo.

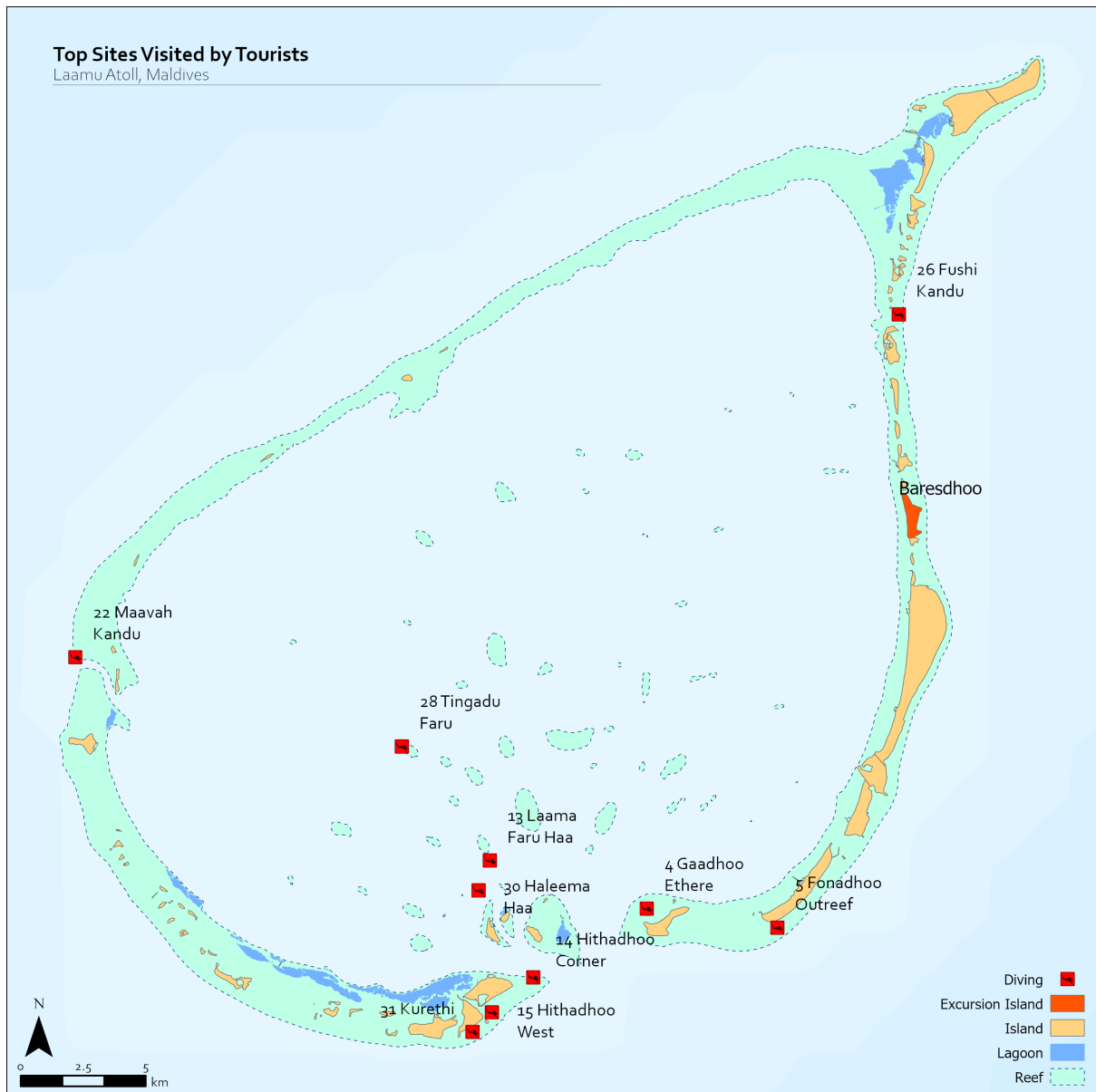


Figure 4-1 Top natural sites visited by tourists in Laamu Atoll

All the top sites are on the PA or ESA list of ERA. Data on the frequency of visits and the number of visitors to each site was not available.

4.2.2 Tourist expenditure

In 2024, tourists staying in resorts went diving more than 5,000 times, with the total estimated value of these excursions being approximately USD1 million. There were also several excursions to protected areas, with approximately 2500 diving trips to marine protected areas and 200 kayaking trips in the Hithadhoo mangrove marine protected area. The estimated value of these excursions was USD400,000, with USD20,000 coming from excursions to the mangroves. There were no excursions to environmentally sensitive areas or sandbanks in 2024. There were about 250 visits to uninhabited islands, with the trips having an approximate total value of USD125,000. In 2024, there were about 250 trips to cultural and heritage sites, with an estimated total value of about USD15,000.

The most popular dive site was Hithadhoo Corner, with the resort running daily trips to the area, and with the area receiving an average of 801 tourists every year and contributing USD84,000 in income.

The resort also ran weekly dive trips to the Hithadhoo Baaneykolhu reef system, with that area receiving an average of 262 tourists per year and contributing an income of USD27,000.

There were also weekly trips to the dive sites in Gaadhoo, with an average of 300 visitors per year and contributing USD30,000. The resort ran dive trips to Fushi Kandhu twice per week, receiving an average of 189 visitors per year and contributing an income of USD20,000. There were also weekly dive trips run to the Fonadhoo Diving point, which received 160 visitors per year and USD17,000 and the Reethi Haa and Hudhafaru area, which received 58 tourists per year and USD6000. There were monthly dive trips to the Mundoo Channel, which received 44 visitors and contributed USD4500. There were also periodic dive trips to Vadinolhu Kandhu, which received 20 visitors and contributed USD2000. There were very rare diving and surf trips to Haviththa Sarahandhu in Isdhoo and the resort is hoping to begin trips to L. Gan Boda Fengada soon.

Visitors staying in guesthouses participated in excursions and dive trips mostly at Baresdhoo, with an average of about 100 visitors per year and a reported total number of 122 ecosystem interactions made in 2024. Ecosystem interactions such as diving and excursions to protected areas by visitors at guesthouses was estimated to be valued at USD40,000 in 2024. More specifically, the visits to Baresdhoo were valued at about USD41,000 that year.

4.3 Direct Utilization

4.3.1 Freshwater consumption

In 2024, the resorts in Laamu Atoll relied entirely on desalinated water for its operations, demonstrating a closed-loop approach to water management that minimizes pressure on Laamu Atoll's fragile freshwater systems. No groundwater was extracted during the year. In Six Senses Laamu, about 142 cubic metres of rainwater were collected and used to supplement non-potable needs. The resort operated three RO desalination plants with a combined daily capacity of 550 cubic metres and a total storage capacity of 520 cubic metres. Over the year, the plants produced 79,349 cubic metres of desalinated water, and on average, each guest consumed approximately 1.88 cubic metres of water per night, reflecting both the comfort standards of high-end hospitality in a remote island setting. Importantly, all wastewater generated at the resort is treated on-site and discharged via an established outfall system, significantly reducing the risk of pollution to surrounding marine ecosystems. This integrated water cycle — from desalination and reuse to wastewater treatment — highlights the resort's dependence on natural capital while illustrating responsible water management practices that safeguard reef and lagoon health.

In contrast, guesthouses in Laamu Atoll depend primarily on groundwater and rainwater harvesting, reflecting the smaller scale and more localized nature of their operations. In 2024, around 10–15 million litres of groundwater were used, alongside approximately 15,000 litres of rainwater, which was collected from rooftop systems. Drinking water was sourced from commercially bottled supplies, while no water was obtained from the Fenaka Desalination Plant. Unlike resorts, the guesthouse reliance on groundwater extraction raises sustainability concerns, as it can lead to salinization and depletion of freshwater lenses, particularly on smaller islands. Positively, the guesthouse treats and recycles wastewater for irrigation, reducing freshwater demand and nutrient runoff. From a natural capital perspective, this difference in water sourcing reflects two scales of dependency: resorts rely on energy-intensive desalination that draws on marine resources, while guesthouses depend on limited freshwater reserves. Both models underline the need for integrated water management policies in Laamu Atoll that balance tourism growth with the long-term protection of freshwater and coastal ecosystems.

4.3.2 Fuel and energy consumption

In 2024, resorts in Laamu Atoll consumed more than 1.65 million litres of fuel. The 2024 total comprised 1.5 million litres of diesel (90%), 120,000 litres of petrol (7%), and 30,000 litres of LPG (2%). On a per-room basis, this equates to an average annual consumption of roughly 14,600 litres of fuel per room, reflecting the high energy demands of remote island operations dependent on self-generated electricity and marine logistics.

Diesel remained the dominant energy source, with the majority — 70% (915,706 litres) — used for electricity generation through on-site generators. Additional diesel use included water heating (16%), marine transport (14%), and minimal consumption for land transport (<1%). Petrol was used exclusively for marine operations, with 60% allocated to guest transfers (68,000 litres) and 40% to recreational trips (45,000 litres). No petrol was consumed for internal transport or mosquito control activities, indicating that energy use is concentrated in core operational and guest service areas.

In Six Senses Laamu, the resort's electricity generation capacity is supported by diesel generator sets with a combined output of 2,620 kW — two units rated at 810 kW and one at 1,000 kW. In 2024, these generators collectively produced 5,835,572 kWh of electricity, translating to approximately 58,940 kWh per room annually. Complementing this system, the resort operates a roof-mounted solar PV array with a capacity of 350 kWp, which contributes to offsetting fossil fuel consumption during peak sunlight hours. Although there is currently no battery energy storage system in place, the resort has announced plans to invest in such infrastructure by 2026, which would allow for greater integration of renewable energy and further reductions in diesel dependency.

Overall, the resort's energy profile demonstrates both its reliance on fossil fuels and its gradual transition toward cleaner energy. Continued investment in renewable energy systems, storage capacity, and efficiency improvements could significantly reduce per-room emissions and operational costs while strengthening the resort's alignment with Laamu Atoll's natural capital-based sustainability objectives.

In 2024, the 23-room guesthouse recorded a substantial reduction in fuel use compared to the previous year, reflecting improved operational efficiency and greater reliance on grid electricity. Total fuel consumption decreased by more than 55%, from approximately 12,000–12,250 litres in 2023 to 5,000–5,550 litres in 2024. Of this, diesel accounted for around 50%, petrol for 33–36%, and LPG for about 13–14%. On a per-room basis, the guesthouse used roughly 220–240 litres of total fuel per room annually, highlighting a much lower consumption intensity compared to resort operations in the atoll.

Diesel use was concentrated in marine transport, which consumed approximately 70–80% of total diesel fuel (2,000–2,500 litres). No diesel was used for land transport or incineration, as the guesthouse relies on grid electricity for both energy and water heating needs. Petrol consumption was directed entirely to land transportation, representing about 33–36% of total fuel use, while marine transport, recreational activities, and mosquito control recorded no petrol use during the year. LPG contributed a small share, primarily used for kitchen and food service operations.

Electricity for the guesthouse is fully supplied by the Fenaka Powerhouse and the public grid, with a total consumption of 187,500 kWh in 2024, equivalent to approximately 8,150 kWh per room annually. The guesthouse currently operates without a solar PV system or a BESS, making it fully dependent on centralized electricity generation. Transitioning to renewable energy solutions — such as rooftop solar panels or hybrid systems — would not only reduce fossil fuel dependence but also align with Laamu Atoll's natural capital objectives by minimizing emissions and operational impacts on the environment.

4.4 Current Impacts of Tourism on Biodiversity and Natural Capital

Over the last 5 years, most aspects of the ecosystem saw improvements. These areas included marine protected areas, seagrass, popular dive sites, mangroves, protected species abundance and threatened species abundance. There has been no change seen in environmentally sensitive areas or land species diversity.

In 2024, tourism establishments in Laamu Atoll generated an estimated 660 tonnes of solid waste, reflecting the significant material footprint associated with resort and guesthouse operations. The majority of this waste — approximately 16% — was food waste, which was either composted for reuse within landscaping and gardening or, in some cases, disposed of at sea. A smaller proportion of waste came from wood materials (around 12%), much of which was repurposed or donated for reuse, and paper waste (about 2%), which was either recycled, reused, or sent to landfill. Oil waste made up a minor share — less than 1% — but was treated sustainably through conversion to biodiesel. Metal

waste accounted for roughly 1%, with most of it recycled as scrap metal. Other categories, including plastics, glass, and green waste, were collectively managed through landfill disposal, with some glass reused on-site through crushing and recycling. In addition, the installation of bottling and water treatment systems at resorts has helped to significantly reduce plastic waste generation, particularly single-use PET bottles.

Among guesthouses, food waste represented more than half (56%) of total solid waste, underscoring the link between small-scale accommodation and local food systems. Plastics and glass each contributed around 16% of the total waste generated, while green waste and miscellaneous categories accounted for the remaining 8% combined. Most guesthouses dispose of their waste through local council waste facilities, with limited recycling capacity, though some plastics are occasionally repurposed or collected for recycling. Overall, these waste patterns highlight both the environmental pressures of tourism in Laamu Atoll and the ongoing efforts to reduce waste at source — particularly through composting, reuse, and the gradual shift toward circular waste management practices that align with the atoll's natural capital-based sustainability vision.

4.5 Awareness and Investments for Environment

The resorts have taken several initiatives and made investments for measures against climate change risks. These include annual sand pumping for beach replenishment, spending USD800,000 for permanent beach structures, spending USD110,000 for reef rehabilitation and coral gardening and implementing seagrass conservation program.

Airport transfers and marine transportation remain a significant cost for resort operations, with a monthly cost of transfers/transportation at about USD2,420. Other monthly operational expenditures include USD300 for waste management centre operations and USD1,000 for sewage and wastewater treatment. There were no monthly costs for beach cleanups or maintenance of existing coastal protection structures throughout the duration of the survey.

5 Visitor Behaviour and Preferences

Understanding visitor behaviour and preferences is central to aligning tourism growth with environmental sustainability and local benefits. This chapter summarizes insights from the Laamu Atoll visitor survey, including travel motivations, spending patterns, activity choices, and perceptions of environmental quality. It also highlights visitor awareness of sustainability initiatives and factors shaping satisfaction and revisit intent.

The chapter is organized as follows: Section 5.1 described the profiles visitors (origin, party type, length of stay); Section 5.2 covers the sources of information, Section 5.3 illustrates the motivation to visit, Section 5.4 details the activities enjoyed by the visitors and their spending on these activities, Section 5 shows the level of awareness of visitors and lastly Section 6 gives an analysis of the ecological footprint of tourist activities.

5.1 Profile of Visitors

Of the 41 respondents, most were from the United States of America (16) and Europe (18). Amongst the European respondents 5 were from the United Kingdom, 5 were from Spain, 3 were from Italy, 2 were from Switzerland and there was one respondent each from France, Germany and Ireland. There were also 3 respondents from Brazil, 3 from China and 1 from the Philippines.

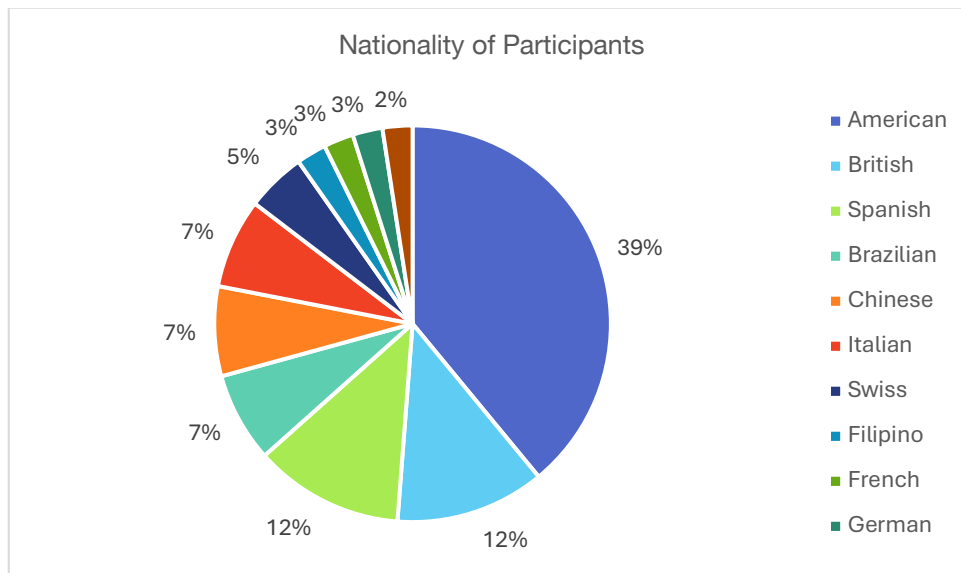


Figure 5-1 Nationality of Participants

Most of the respondents lived in the country they were a national of, with 16 respondents residing in the United States of America, 5 residing in Spain, 4 in the United Kingdom, 4 in Italy, 3 in Brazil, 3 in China, 2 in Germany, 2 in Switzerland, 1 in Ireland and 1 in the Philippines.

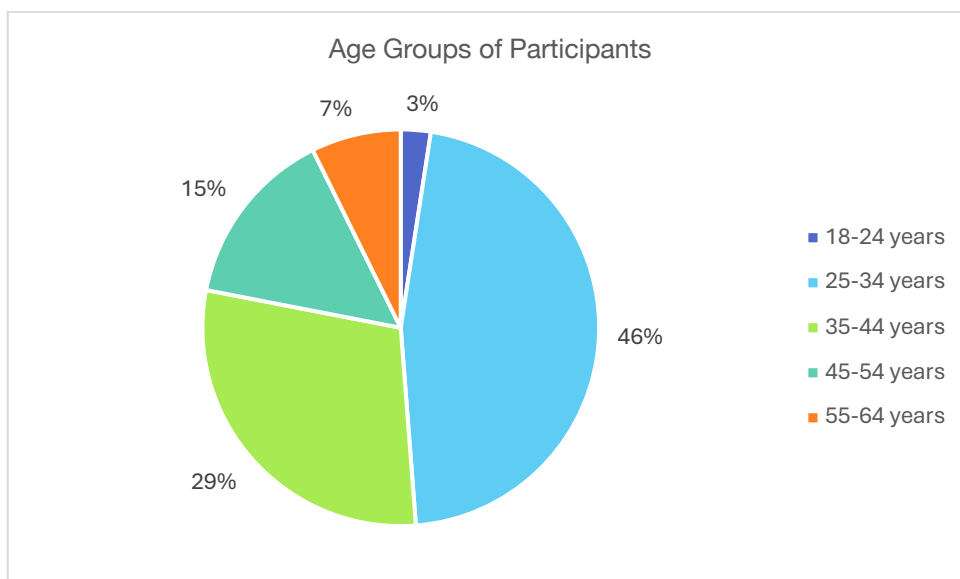


Figure 5-2 Age Group of Participants

From the total respondents, 19 respondents were aged from 25-34, 12 respondents were aged 35-44, 6 were aged 45-54, 3 were 55-64 and one respondent was aged between 18 and 24.

5.1.1 Place of stay and number of nights

Majority of the participants were from resorts with 25 of them having stayed at a resort and 16 of them having stayed at a guesthouse.

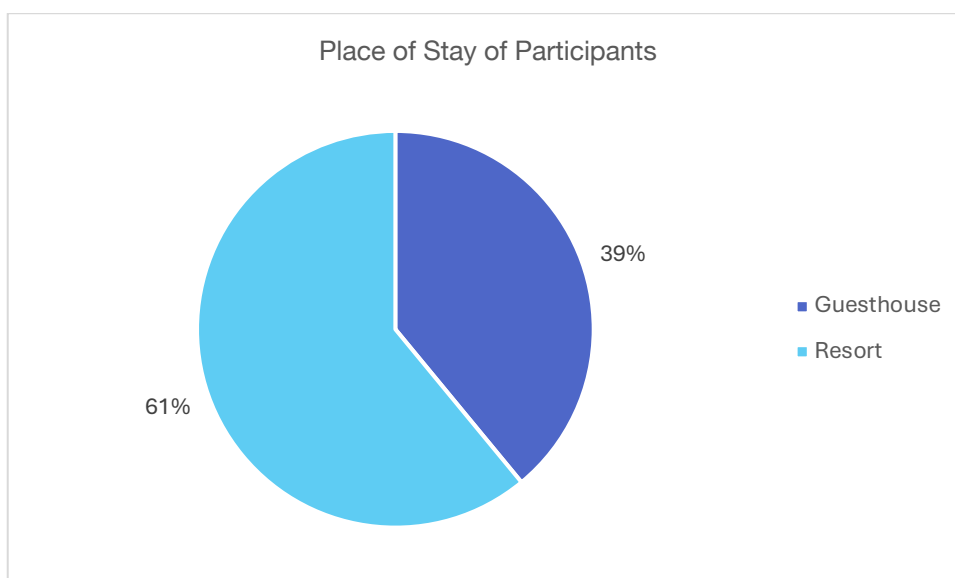


Figure 5-3 Place of stay of participants

From the total respondents, 24 of the respondents stayed at a tourist resort in Laamu Atoll for at least one night, tourists having stayed for an average of 6.22 nights in a resort. 9 respondents stayed at a tourist resort for 6 nights, 4 respondents stayed for 4 nights, and 2 respondents stayed for 5 nights, 7 nights and 9 nights. 17 of the respondents stayed at a guest house in Laamu Atoll for at least one night. 4 respondents stayed for 3 nights and 9 nights, with 3 respondents staying for 1 night and 7 nights.

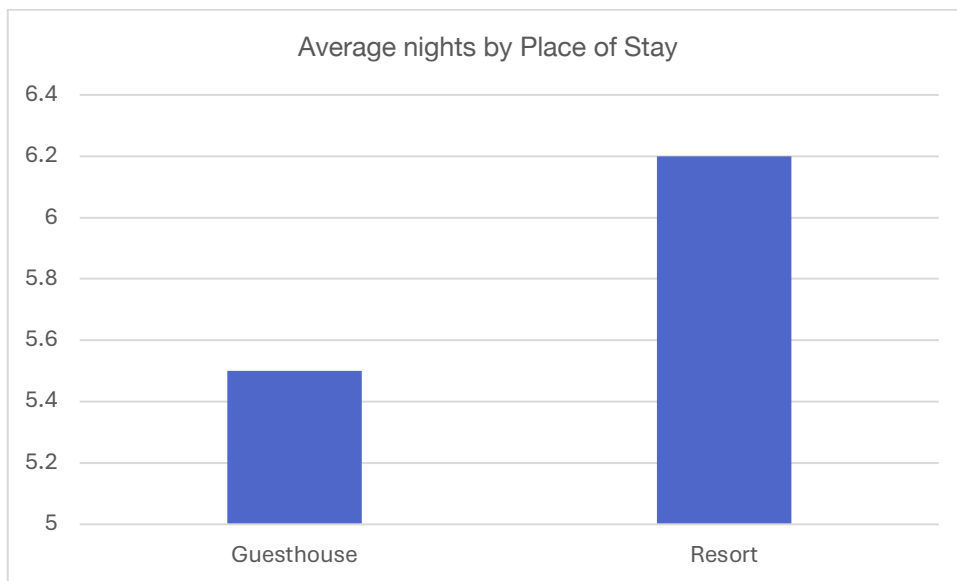


Figure 5-4 Average nights by place of stay

Generally, guesthouse stays were longer than resort stays, with 29% of resort goers staying for longer than one week whereas 41% of those who stayed at guesthouses stayed for longer than one week. None of the respondents stayed at resorts in another atoll, guesthouse in another atoll or on a liveaboard/safari vessel.

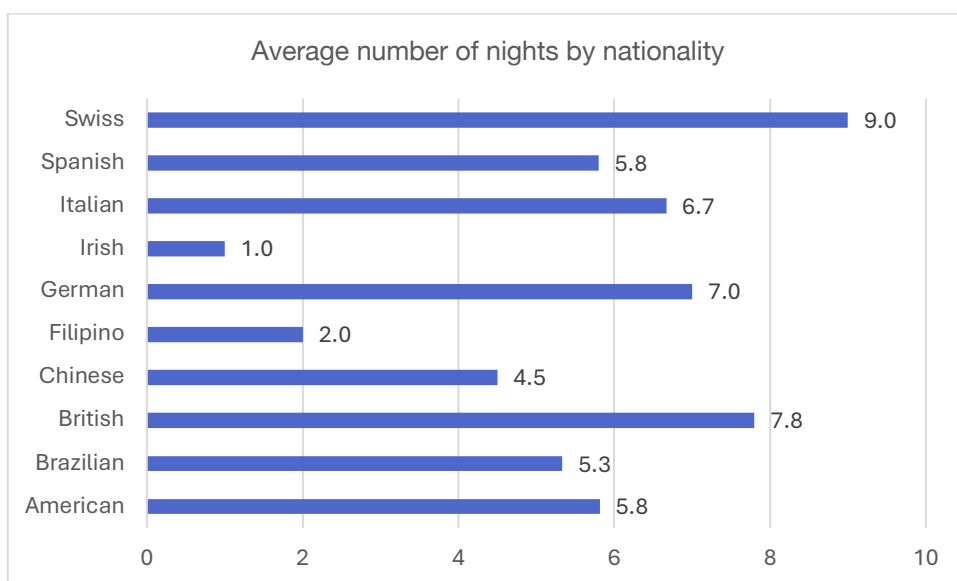


Figure 5-5 Average number of nights by nationality

In terms of nationalities, Swiss stayed the longest (9 nights) and the Irish (1 night) stayed for the shortest duration.

5.1.2 Number of times visited

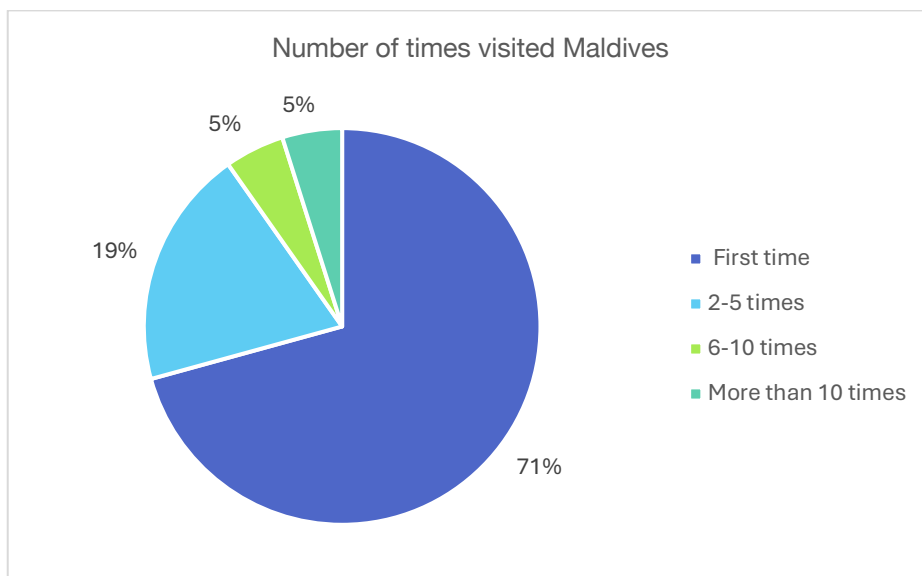


Figure 5-6 Number of times visited Maldives

For most respondents (71%), it was their first time visiting the Maldives, 19% had visited 2-5 times, 5% 6-10 times and 5% had visited the Maldives more than 10 times.

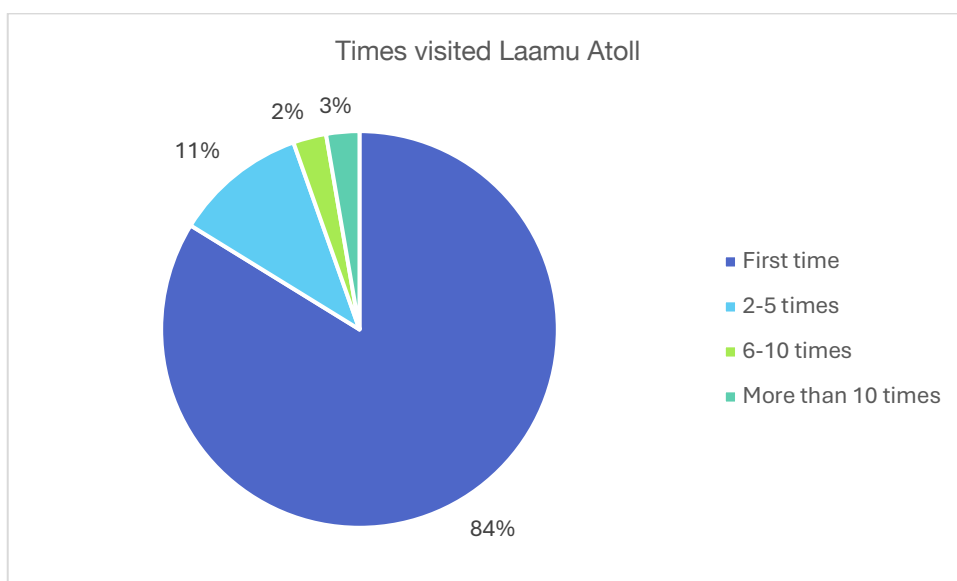


Figure 5-7 Number of times visited Laamu Atoll

Amongst the respondents 84% were visiting Laamu atoll for the first time, with 4 respondents having visited 2-5 times, 1 having visited 6-10 times and 1 respondent having visited Laamu more than 10 times.

5.1.3 Travel companion and number of people in group

Most respondents (23) were travelling with their partner, 5 were travelling with family and 14 were travelling with a work/business/associate or study group.

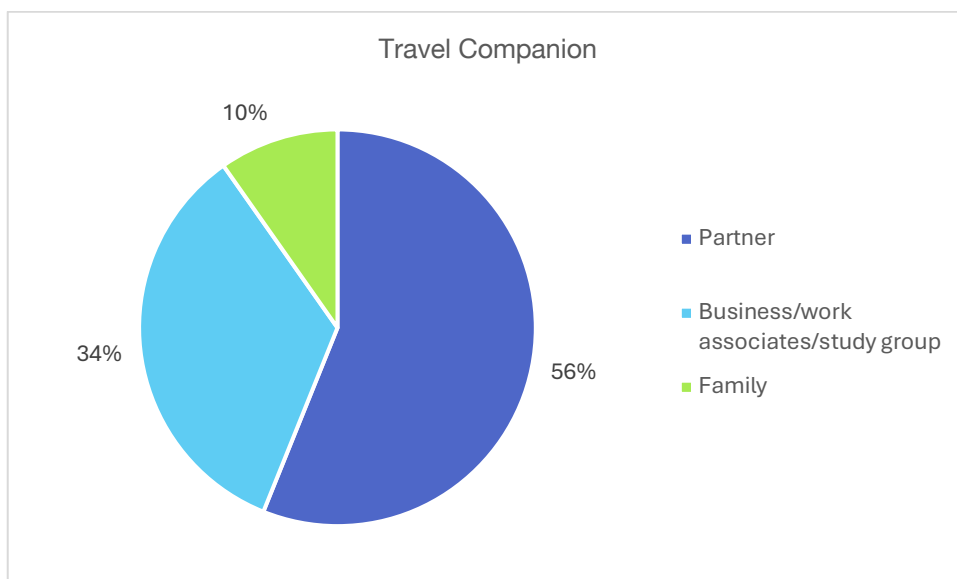


Figure 5-8 Travel companion

A majority of respondents (25) were travelling as part of a couple, 2 respondents were travelling in a group of 3, 1 respondent was travelling in a group of 4, with 9 respondents travelling in a group of 15+ people. 3 respondents were travelling with at least one minor under the age of 18.

5.2 Source of Information

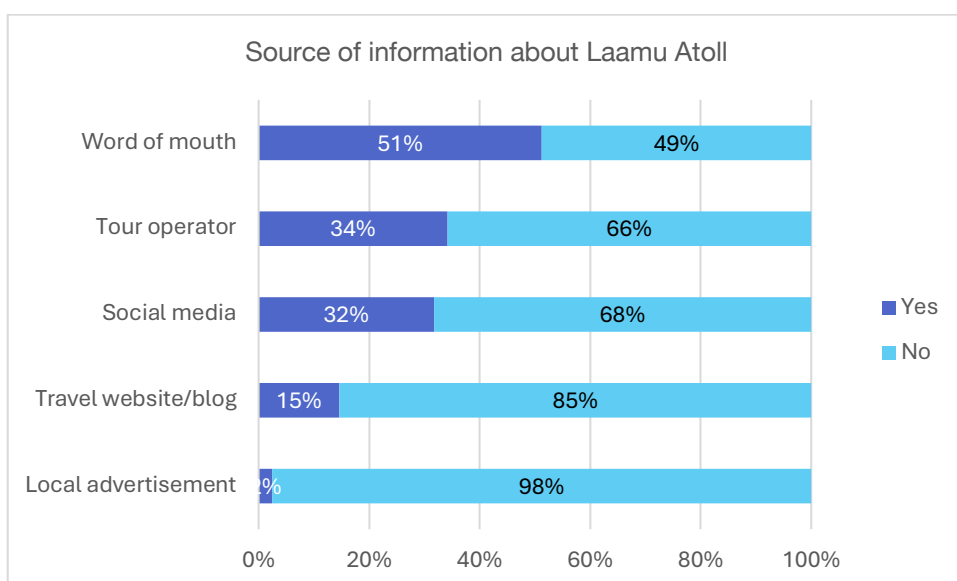


Figure 5-9 Source of information about Laamu atoll

Most respondents heard of Laamu atoll through word of mouth (51%), while 34% heard of Laamu atoll through a tour operator and 32% through social media. 15% heard about Laamu atoll through a travel website/blog and 1 respondent heard about Laamu atoll through a local advertisement.

5.3 Motivation for Visit

5.3.1 Motivation to choose the Maldives

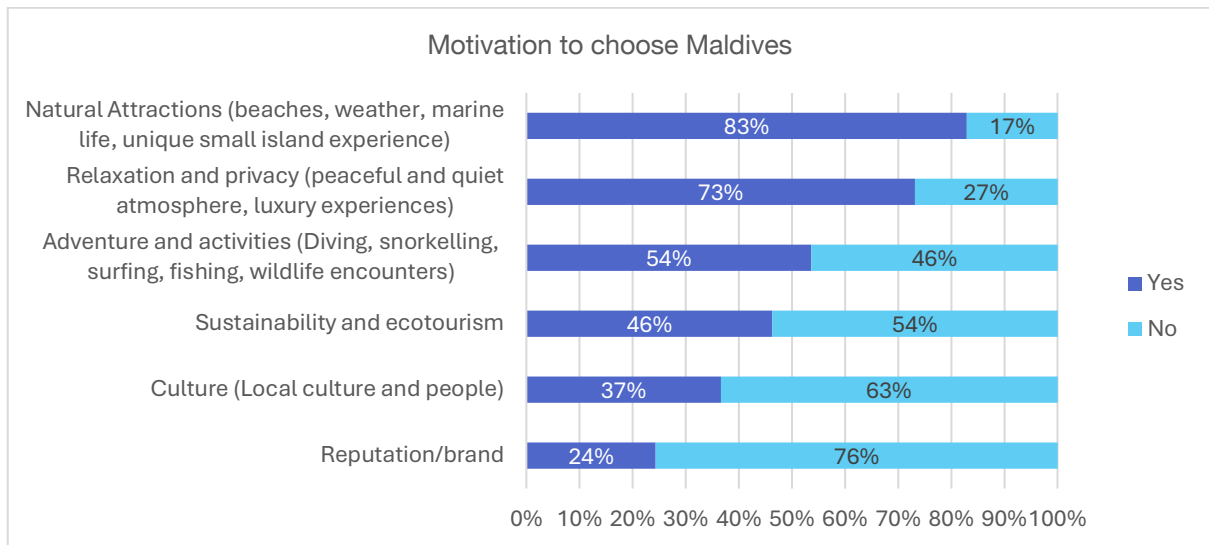


Figure 5-10 Motivation to choose Maldives

83% of respondents were motivated to choose the Maldives for their visit due to the natural attractions, 73% chose to visit for relaxation and privacy, while 54% were attracted to the adventure and activities. 46% chose to visit the Maldives due to the sustainability and ecotourism, 37% for the culture and 24% chose the Maldives for its reputation. 1 respondent was travelling for work purposes.

5.3.2 Motivation to choose Laamu atoll

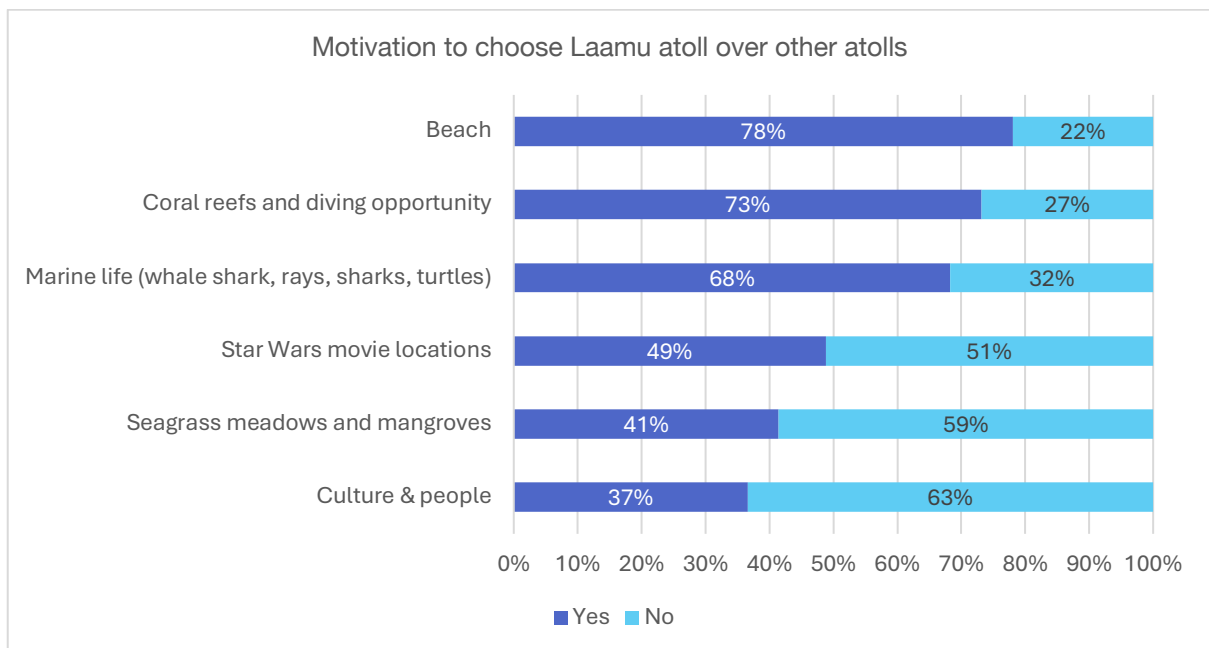


Figure 5-11 Motivation to choose Laamu Atoll over other atolls

78% of respondents selected Laamu atoll over other atolls for the beach, 73% for the coral reefs and dive sites and 68% for the marine life. 49% chose Laamu atoll as it was featured in the 2016 movie Star Wars: Rogue One, 41% selected Laamu atoll for the seagrass meadows and mangroves and 37% of respondents chose it for the culture and people.

5.4 Visitor Activities and Expenditure

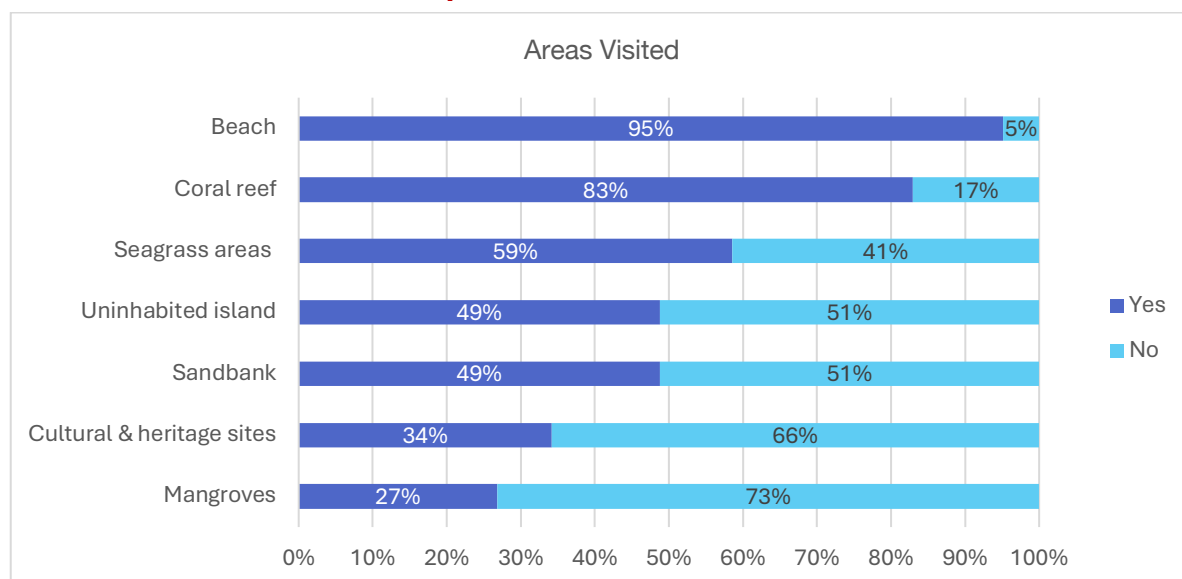


Figure 5-12 Areas visited in Laamu Atoll

During their time in Laamu atoll, most respondents visited the beach (95%), coral reefs (83%) and seagrass areas (59%). 49% visited a sandbank, 49% visited an uninhabited island and 34% visited cultural/heritage sites. 27% of respondents visited mangroves during their stay.

Respondents were surveyed on the activities they experienced during their stay and questioned on the number of times they carried out the activity/experience as well as their estimated total spend on each activity. The results are summarised in the table 1 below.

Table 5-1 Activities undertaken by tourists visiting Laamu Atoll.

#	Activity	Yes (%)	No (%)	Number of times	Estimated spend (USD)
a.	Swimming	81	19	1-10	0-2000
b.	Snorkelling	79	21	1-9	0-1500
c.	Diving	40	60	1-10	65-5000
d.	Canoeing/kayaking	17	83	1-3	0-100
e.	Picnicking/Sand bank visit	26	74	1	35-2000
f.	Photography	21	79	1-9	1-200
g.	Surfing	21	79	1-2	150-700
h.	Dolphin cruise/Whale watching	36	64	1	50-500
i.	Whale shark encounter	5	95	1	90
j.	Turtle watching/hatching	21	79	1-9	0
k.	Shark/sting ray feeding	7	93	2	0
l.	Private island experience	12	88	1	35-2000
m.	Fishing	19	81	1-2	35-900
n.	Guided tours	14	86	1-2	0

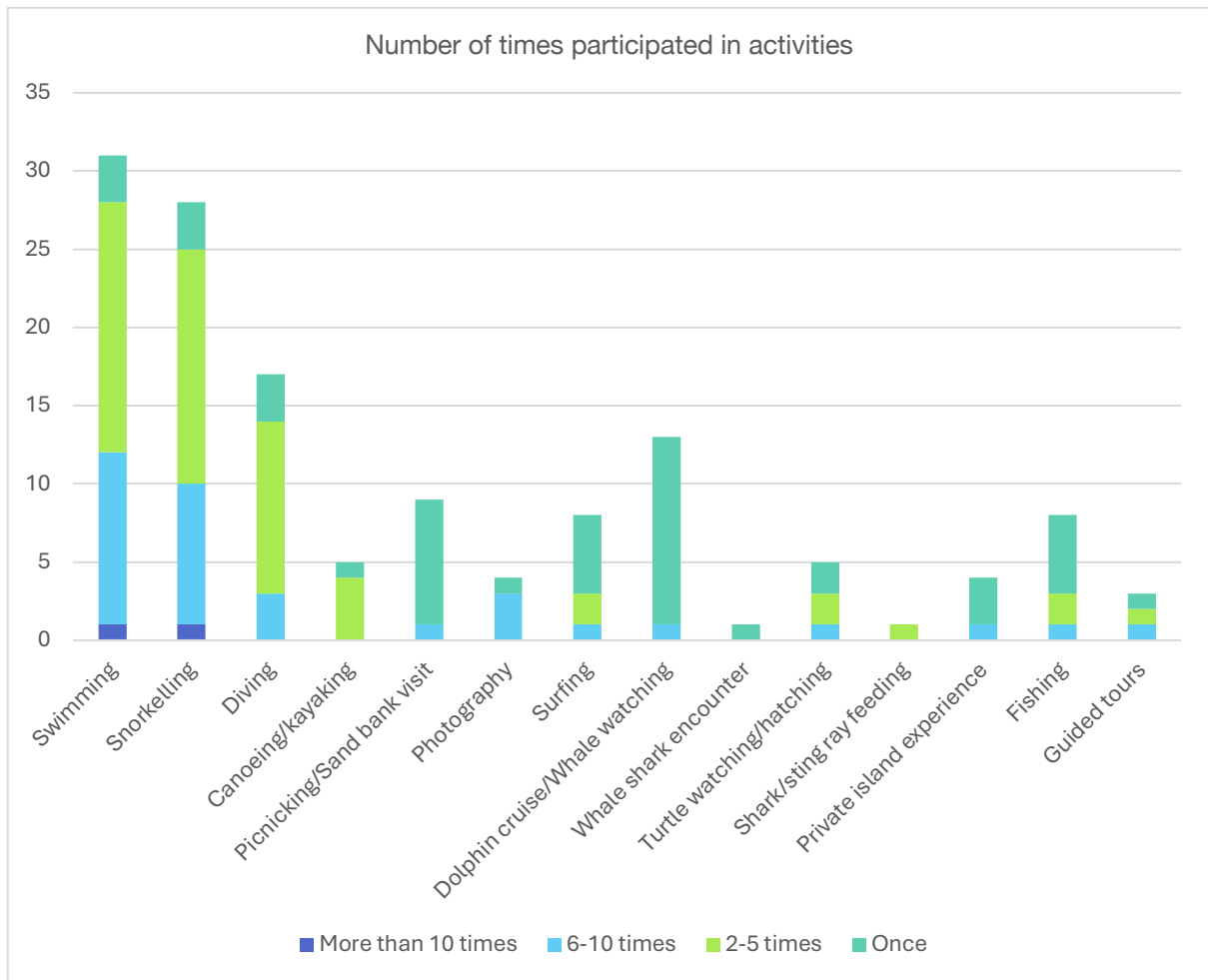


Figure 5-13 Number of times participated in activities

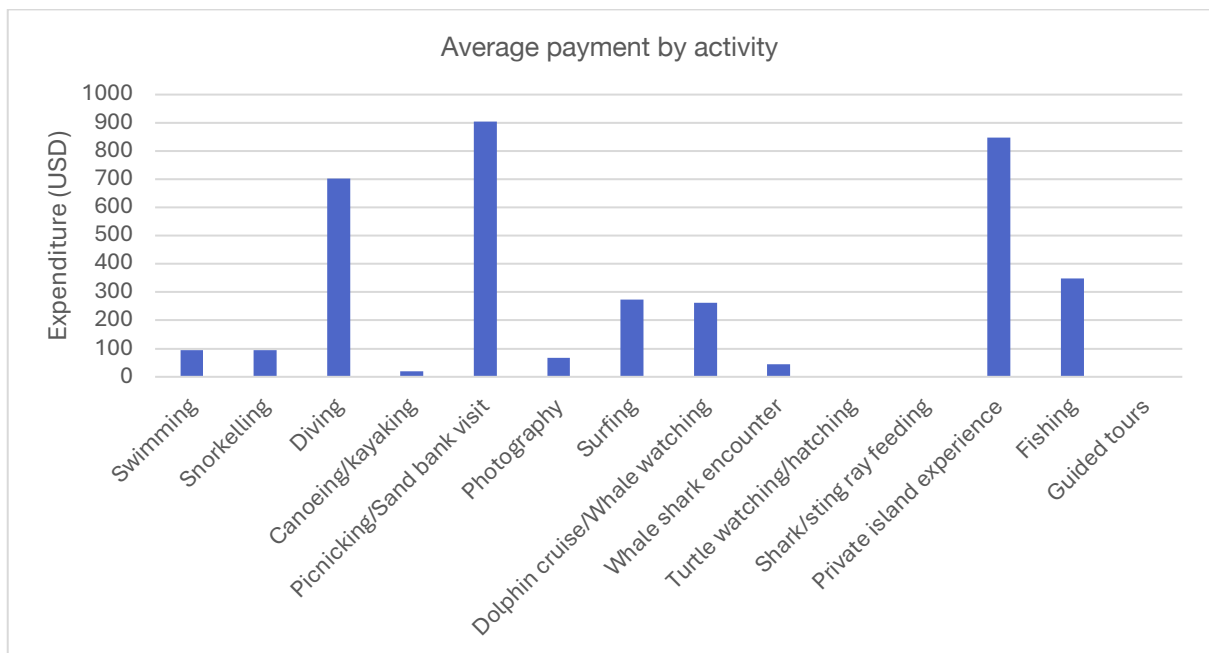


Figure 5-14 Average payment by activity

The analysis of survey responses reveals distinct patterns in both the frequency of participation and expenditure across the range of tourist activities offered.

Swimming and snorkelling emerged as the most frequently undertaken activities, with a majority of participants engaging multiple times during their stay. These activities are characterized by their accessibility, low cost, and broad appeal across different visitor segments. Diving also recorded a moderate level of participation; however, it was undertaken less frequently compared to swimming and snorkelling. This is likely attributable to the specialized nature of the activity, requiring training, equipment, and guided supervision.

In contrast, activities such as picnicking or sandbank visits, private island experiences, and whale shark encounters recorded limited participation. The lower frequency of engagement in these activities suggests that they cater primarily to niche markets or represent higher-end, premium experiences that appeal to smaller visitor segments.

The expenditure data supports this distinction between high-frequency, low-cost activities and low-frequency, high-value experiences. Common activities such as swimming, snorkelling, and photography were generally associated with expenditures below USD100 per person. Conversely, premium offerings including picnicking or sandbank visits (≈USD900), private island experiences (≈USD850), and diving (≈USD700) were identified as the highest-cost activities among respondents. Mid-range activities such as fishing, dolphin or whale watching, and surfing averaged between USD250–350, indicating balanced participation and moderate spending.

Overall, the results indicate a diversified tourism activity profile that combines mass-participation, low-cost experiences with selective, high-value offerings. This structure supports both broad visitor engagement and opportunities for higher-margin premium tourism products, aligning well with sustainable tourism development objectives that emphasize inclusivity and economic diversity.

5.4.1 Visitor Expenditure

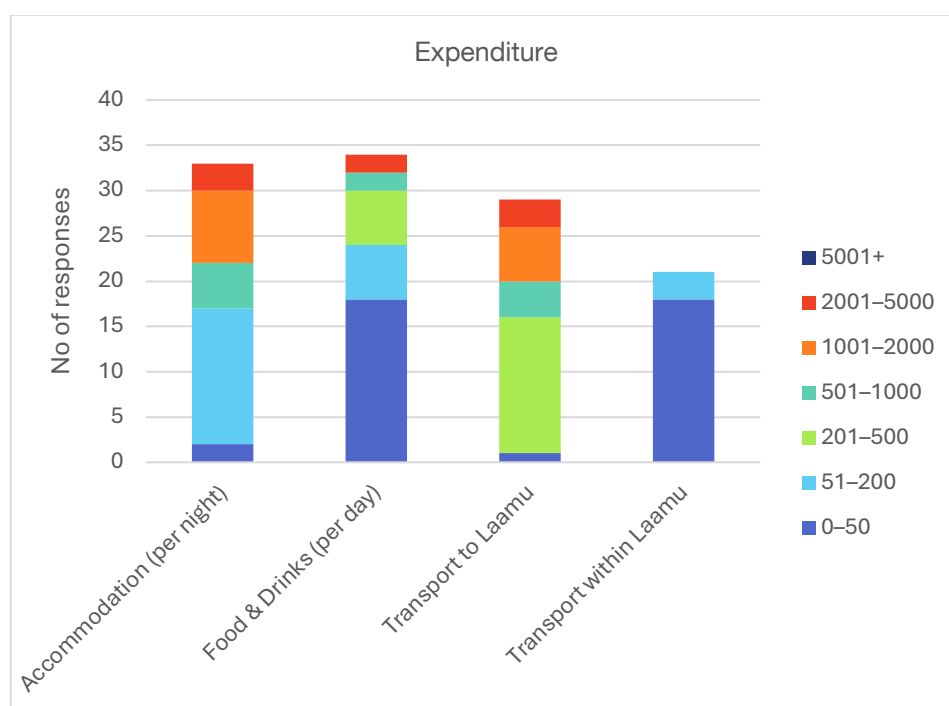


Figure 5-15 Expenditure

The expenditure patterns show a clear segmentation between budget-conscious and high-end visitors. Most respondents spend between USD51–200 per night on accommodation, typical of mid-range resorts, while a smaller segment—around eight respondents—spend USD1000–2000, reflecting

premium stays. Food and beverage expenses are generally modest, with the majority spending under USD50 per day, though a few outliers report significantly higher amounts, extending up to USD5000, likely due to luxury resort dining or extended stays. Transport to Laamu Atoll predominantly falls within the USD200–500 range, aligning with domestic flight and transfer costs, while higher payments exceeding USD1000 point to private or chartered transfers. Finally, transport within Laamu Atoll incurs minimal expense for most visitors, with nearly all reporting costs below USD50, suggesting that local transfers are either inexpensive or already included in accommodation packages.

5.5 Visitor Awareness on Environmental Conservation

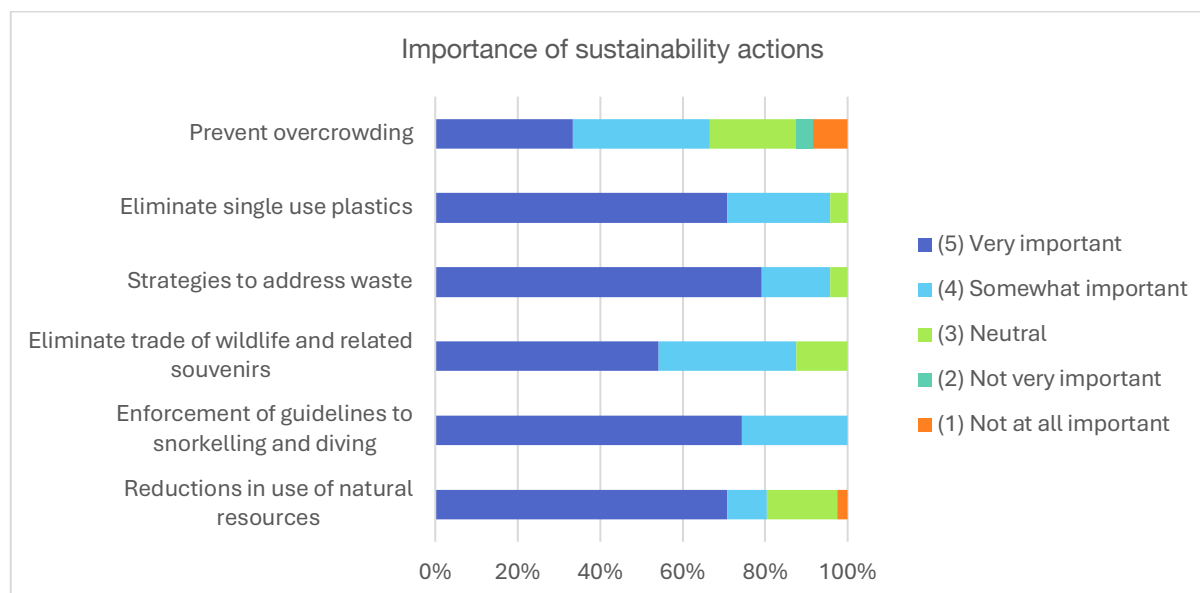


Figure 5-16 Importance of sustainability actions

Most respondents surveyed did not comment on the need for environmental conservation, with 88% of respondents leaving the field blank or answering, “no concerns”. 3 respondents commented on coral bleaching and 2 respondents commented on plastic waste, with one respondent suggesting the community run more trash pickup events. One respondent commented on the lack of marine life and one respondent commented on oil spillage. 3 respondents commented on the lack of dive sites, with one suggesting the locals make an artificial dive site such as a shipwreck in the area, while one respondent commented on the lack of a picnic island and suggesting the government make an island dedicated to picnicking. Furthermore, one respondent suggested limiting the number of resorts, and 2 respondents suggested building more hotels near surfing areas. But overall, most visitors were not aware of the need for environmental conservation, with most concerns being centred around improving visitor experience.

5.6 Ecological Footprint of Tourism Activities

Marine and coastal ecosystems remain an important aspect of tourism in the Maldives, with a majority of respondents being attracted to visit Laamu atoll due to the beaches (78%), coral reefs (73%) and marine life (68%). The impact of tourism on these ecosystems also cannot be understated, with the majority of visitors carrying out activities such as swimming (81%), snorkelling (79%) and diving (40%) in these waters which can physically damage reef systems, with 3 respondents noting that they noticed coral bleaching during their activities. Additionally, a number of tourism activities offered such as canoeing/kayaking, surfing and dolphin/whale shark cruises can impact the natural marine environment as they can contribute to pollution through fuel and oil spills, with boat traffic potentially disturbing marine life and habitats. Additionally, shark and sting ray feedings are offered as tourist attractions, which have an impact on the marine ecosystem as it disrupts the natural behaviours of these animals.

5.7 Visitor Feedback

5.7.1 Environmental or other concerns and impacts

Visitors were asked if they noticed concerns and or environmental impacts during their activities and what are the suggestions to improve the activities. Most respondents surveyed did not comment on the need for sustainable tourism practices, with 98% of respondents leaving the field blank or answering, “no concerns”. One respondent commented on an oil spillage in this field. However, some respondents noted concerns in other parts of the survey including 3 respondents who commented on coral bleaching and 2 respondents who commented on plastic waste, with one respondent suggesting the community run more trash pickup events. One respondent commented on the lack of marine life and 3 respondents commented on the lack of dive sites, with one suggesting the locals make an artificial dive site such as a shipwreck in the area, while one respondent commented on the lack of a picnic island and suggesting the government make an island dedicated to picnicking. Furthermore, one respondent suggested limiting the number of resorts, and 2 respondents suggested building more hotels near surfing areas. But overall, most visitors were not aware of the need for environmental conservation, with most concerns being centred around improving visitor experience. No respondents commented on a willingness to support such initiatives.

5.7.2 Importance of sustainable actions in Laamu Atoll.

Visitors were surveyed on the importance of specific sustainable actions on Laamu Atoll. The following table highlights the number of respondents who answered in each category and how they answered.

Table 5-2 Tourist perspective on sustainable actions in Laamu Atoll

	(1) Not at all important	(2) Not very important	(3) Neutral	(4) Somewhat important	(5) Very important
Reduction in use of natural resources (water, energy)	1		7	4	29
Enforcement of guidelines to snorkelling and diving				10	29
Eliminate trade of wildlife and related souvenirs			3	8	13
Strategies to address waste			1	4	19
Eliminate single-use plastics			1	6	17
Prevent overcrowding	2	1	5	8	8

The reduction in use of natural resources was considered to be very important to 75% of respondents and somewhat important to 10% of respondents. 17% of respondents were neutral on the topic and 1 respondent found it not at all important. Enforcement of snorkelling and diving guidelines was very important to 74% of respondents and somewhat important to a further 26% of respondents. 54% of respondents found eliminating trade of wildlife and related souvenirs to be very important, with 33% finding it somewhat important and 13% being neutral on the topic. Implementing strategies to address waste was very important to 79% of respondents and somewhat important to 17% of respondents, with one respondent being neutral about the topic.

Elimination of single-use plastics was very important to 71% of respondents, somewhat important to 25% of respondents and one respondent was neutral. Preventing overcrowding was very important to 33% of respondents and somewhat important to 33% of respondents. 21% of respondents were neutral on the need to prevent overcrowding while 4% and 8% of respondents found it to be not very important and not at all important respectively.

5.8 Comparison with Maldives Visitor Survey

5.8.1 Visitor markets and profile

For the past three Maldives Visitor Surveys, the most common nationalities amongst respondents were Indian, British, German and Russian, with Indians being the most common nationality all three years. In December 2021, most respondents were from India (23%), UK (10%), Germany (10%) and Russia (7%). In February 2022, the most common nationalities were Indian (18%), British (12%), Russian (11%) and German (8%), while in September 2022, 15% of respondents were Indian, 12% Russian, 12% German and 9% British. Across all three surveys, most respondents resided in the country that they listed as their nationality. Amongst respondents surveyed as part of the Laamu Atoll Visitor Survey, the most common nationality was American (39%), followed by British (12%), Spanish (12%), and Italian, Brazilian, and Chinese (7%) each. Respondents largely resided in their country of nationality.

The age group most represented across all surveys was 25-34 years, a trend consistent since the February 2014 MVS. In the Maldives-wide surveys, the top three age groups were 25-34, 35-44 and 45-54. This pattern was also seen in Laamu, where 46% of respondents were aged 25-34, 29% were aged 35-44, 15% were aged 45-54, 7% were 55-64, and 2% were aged 18-24.

Across all surveys, resorts remained the most common accommodation type, followed by guesthouses. In December 2021, 81% of respondents stayed in resorts, 13% in guesthouses, 4% in both, and 2% on liveaboards. In Laamu Atoll, 61% of respondents stayed at resorts, while 39% stayed in guesthouses.

In December 2021, respondents stayed an average of 7.4 nights, with that number increasing in February 2022 to 8 nights, before decreasing to 7.5 nights in September 2022. Across all three surveys, European respondents tended to stay longer than average, while American and Indian respondents tended to have a shorter stay than the average. Respondents who stayed in resorts and guesthouses generally tended to have similar lengths of stays, with respondents who stayed in both resorts and guesthouses tended to stay 1-2 days longer. Across all three surveys, respondents who stayed at liveaboards tended to have longer stays compared to respondents who stayed in resorts, guesthouses or a combination of the two. Respondents who stayed in Laamu atoll resorts spent an average of 6.2 nights, while those staying in guesthouses spent an average of 7.2 nights. Guesthouse visitors generally had longer stays than resort visitors. None of the respondents stayed in liveaboards or in other atolls during their trip.

Across all three Maldives Visitor surveys, the majority of respondents were first time visitors to the Maldives. In December 2021, 78% of respondents were first time visitors, with 18% having visited 2-5 times, 2% visiting 6-10 times and 1% having visited more than 10 times. 77% of respondents surveyed in February 2022 were first time visitors, 20% had visited 2-5 times, 2% 6-10 times and 1% had visited more than 10 times. In September 2022, 80% of respondents were first time visitors, with 20% being repeat visitors. Interestingly, amongst visitors to Laamu atoll there were a higher proportion of repeat visitors. Only 71% of respondents were first time visitors, while 19% visited 2-5 times, 5% visited 6-10 times and 5% visited more than 10 times.

A majority of respondents travelled with a partner in all three Maldives Visitor surveys. In December 2021, 64% of respondents travelled with a partner, 25% travelled with family, 6% travelled alone and 4% travelled with friends. 62% of respondents surveyed in February 2022 travelled with a partner, 20% travelled with family, 6% with friends, 5% travelled alone and 1% were travelling on business. Amongst respondents surveyed in September 2022, 60% travelled with a partner, 29% with family, 5% with friends, 4% travelled alone and 1% travelled for business. In the Laamu Atoll Visitor Survey, 56% of respondents were travelling with a partner, 12% travelled with family, while 34% of respondents were travelling as part of a work/business/associate/study group.

5.8.2 Motivation and purpose of visit

Most respondents who visited the Maldives in the survey period cited the beach and underwater beauty as their main motivations for visiting the Maldives. In December 2021, 77% of respondents stated the beach motivated them to visit while 59% stated underwater beauty was a motivating factor. In February 2022, 75% of respondents cited the beach and 60% cited underwater beauty as a motivation for visiting while in September 2022, 80% and 59% of respondents stated the beach and underwater beauty as motivations for visiting, respectively. Other common reasons respondents cited for visiting the Maldives included the weather (57% in December 2021 and 60% in February 2022) and peacefulness (53% in September 2022).

The most common reasons for respondents to visit the Maldives were rest and relaxation, honeymoon and snorkelling. In December 2021, 35% of respondents were visiting for rest and relaxation, 25% for a honeymoon and 17% for snorkelling. In February 2022, 58% were visiting for rest and relaxation, 29% for honeymoon and 24% for snorkelling and in September 2022, 48% visited for rest and relaxation, 37% for honeymoon and 19% for snorkelling. Other common reasons cited for visiting the Maldives were diving (9% in December 2021 and September 2022) and health and wellness (13% in February 2022).

Respondents surveyed as part of the Laamu Atoll Visitor Survey also stated similar reasons for visiting the Maldives. 83% cited natural attractions, 73% relaxation and privacy, 54% action and adventure, 46% sustainability and ecotourism, 37% for culture and 24% for reputation. Reasons that respondents chose Laamu atoll over other atolls included the beach (78%), coral reefs (73%), marine life (68%), seagrass meadows (41%) and culture (37%). 49% of respondents also cited Laamu Atoll being the filming site for Star Wars: Rogue One as their reason for visiting.

The most common activities carried out by respondents while in Laamu atoll were visiting the beach (95%), coral reefs (83%), seagrass areas (59%), sandbanks (49%), uninhabited islands (49%), cultural/heritage sites (34%) and mangroves (27%).

5.8.3 Planning and booking

In December 2021 and February 2022, the most common sources of information when it came to planning a trip to the Maldives were the internet, word of mouth, travel agents and television advertisements. In December 2021, 64% of respondents heard about the Maldives through the internet, 43% through word of mouth, 22% through a travel agent and 15% through television. In February 2022, 63% heard through the internet, 41% through word of mouth, 22% through a travel agent and 15% through television. The survey questions were slightly different in the September 2022 survey and 39% of respondents heard about the Maldives through friends/family, 37% through Instagram, 27% through a travel agent and 23% through YouTube videos. Most of the respondents surveyed for the Laamu Visitor Survey heard about the Maldives through word of mouth (51%), followed by tour operators (34%), social media (32%) and travel websites/blogs (15%).

5.8.4 Transportation to Place of Stay

A majority of respondents across all three Maldives Visitor surveys travelled to their place of stay through speedboat, followed by seaplanes and domestic flights. Another trend that was consistently seen across the surveys was that the shortest wait time was associated with speedboats, followed by seaplanes, with respondents waiting for domestic flights usually waiting at the airport for the longest time. As Laamu atoll is not in close proximity to Velana International Airport, the majority of respondents travelled to their place of stay through seaplane (92%) and domestic flights (7%).

5.8.5 Costing

In December 2021, most respondents spent between USD1000-5000 or USD5001-10,000 on their trip at 37% and 34% respectively. 7% of respondents spent less than USD1000 on their trip while 21% spent more than USD10,000. Similarly, in February 2022, most respondents spent between USD1000-10,000 on their trip, with 34% spending USD1000-5000 and a further 34% spending USD5001-10,000. 6% spent less than USD1000 and 23% spent more than USD10,000. In September 2022, respondents spent slightly less money than in previous years with only 15% spending more than USD10,000. In September 2022, 6% of respondents spent less than USD1000, 36% spent USD1000-5000 and 43% spent USD5001-10,000.

Respondents who stayed in Laamu Atoll spent a total of between USD415-7100 on their trip, which is on par with the national average. These costs were split between accommodation (USD100-3000), food and drink (USD25-500), transport to Laamu (USD270-3500) and transport within Laamu (USD20-100).

6 Dependency Analysis

This chapter examines the interdependencies between the tourism sector and natural capital in Laamu Atoll. It explores how tourism activities rely on key environmental assets — such as coral reefs, beaches, seagrass beds, and marine biodiversity — and how these dependencies influence the sustainability and resilience of the atoll's economy. The analysis also highlights the potential vulnerabilities that may arise from overexploitation, pollution, and climate-related pressures on these ecosystems.

The chapter is structured to identify critical ecological linkages supporting tourism operations, assess the extent of resource use and ecosystem service dependence, and evaluate the implications for policy and management. Together, these insights provide a foundation for developing strategies that safeguard natural capital while sustaining tourism-driven economic growth in the Maldives.

6.1 Relationship Between Tourism Activities and the Health of Natural Capital

This section identifies the key natural assets that directly support tourism—such as coral reefs, lagoons, beaches, and seagrass meadows—and outlines how each contributes to visitor experiences and atoll-level economic activity.

6.1.1 Tourism dependency on natural capital

Tourism in Laamu Atoll is entirely dependent on atoll's exceptional natural capital — its coral reefs, lagoons, seagrass meadows, and beaches. These ecosystems are the foundation of all visitor experiences and form the core of Laamu Atoll's economic value. In 2024, Laamu hosted around 8,200 tourists, equivalent to 0.4% of total arrivals to the Maldives. Although small in national terms, this represents a niche but expanding segment of eco-conscious travellers drawn to Laamu Atoll's sustainability ethos and pristine environment. With six tourist establishments providing 462 beds in total, the atoll's tourism footprint remains relatively modest, indicating significant potential for growth without breaching ecological or social carrying capacities. The income generated by these establishments contributes directly to local employment, procurement, and services while supporting broader national revenue through taxes and foreign exchange earnings.

The strength of Laamu Atoll's tourism economy lies in its ecosystem-based activities, particularly diving and snorkelling, which are concentrated around high-value natural sites such as Hithadhoo, Gaadhoo, Maavah Kandu, and other protected reefs. These ecosystems support an extensive diversity of marine life, creating premium tourism experiences that sustain visitor demand and spending. In 2024 alone, diving and guided excursions generated an estimated USD40,000–41,000 in direct ecosystem service value at a single site, demonstrating the tangible financial return derived from healthy coral and seagrass systems. When extended across all sites in the atoll, these figures highlight the central role of well-managed natural assets in maintaining the atoll's economic productivity. The continued protection of these ecosystems not only safeguards biodiversity but also secures the long-term viability of Laamu Atoll's tourism industry.

6.1.2 Land footprint

In Laamu Atoll, the physical footprint of resort development remains relatively small in absolute land area, but its ecological implications are significant. Six Senses Laamu occupies Olhuveli Island, which covers 18.1 hectares, while Rahaa Resort has been developed on Kudafares (0.6) and Fares (5.4), with a combined area of 6.0 hectares. Together, these resorts use less than 25 hectares of land — a minute portion of Laamu Atoll's total island area. However, from a biodiversity and natural capital perspective, even such limited terrestrial development represents a considerable transformation of coastal ecosystems. Resort construction typically involves clearing native vegetation, creating access through reef, and installing infrastructure, all of which disturb fragile island habitats and disrupt ecological connectivity. The removal of coastal vegetation reduces habitat for native flora and fauna, such as nesting birds, crabs, and turtles, while also diminishing the islands' natural resilience to erosion and storm surges.

The environmental influence of these developments extends beyond their terrestrial boundaries. The surrounding reef systems, seagrass meadows, and lagoons — integral components of Laamu Atoll's natural capital — are closely connected to the resort islands. For instance, near Six Senses Laamu, marine surveys have recorded 36 genera of coral and more than 200 fish species, as well as seagrass meadows that host six of the eight seagrass species found in the Maldives. These habitats provide vital ecosystem services such as carbon sequestration, fish nursery functions, and sediment stabilization. While the resorts bring economic value through tourism, they also create ecological “zones of influence” through increased light, noise, and nutrient inputs, as well as physical disturbances from transport and recreation. From a natural capital accounting standpoint, it is essential that Laamu Atoll's tourism development considers not only the direct land area occupied by resorts but also the broader ecological footprint — ensuring that economic growth aligns with the conservation of the atoll's rich biodiversity and the ecosystem services that sustain it.

6.1.3 Income from tourism

In 2024, the total income generated from tourism-related activities in Laamu Atoll was estimated at approximately USD30 million. Most of this income — around 65% — was derived from accommodation services in resorts, reflecting the central role of high-end lodging in driving the atoll's tourism economy. Food and beverage services accounted for a further 28%, highlighting the strong connection between visitor spending and hospitality offerings. Sports and recreational services contributed about 6% of total income, primarily from activities such as diving, snorkelling, and guided excursions that rely directly on Laamu Atoll's rich natural capital. A smaller share, approximately 1%, was generated through air transportation services, while no income was recorded from water transport or equipment rental during the year. Overall, these figures underscore the dominance of accommodation and hospitality services within Laamu Atoll's tourism revenue mix, while also pointing to the growing importance of ecosystem-based recreation as a complementary source of income.

For guesthouse operations, accommodation services were the main income generator, accounting for 50.4% of total revenue in 2024. Food and beverage services made up 27%, followed by air transportation at 15%, and sports and recreational activities contributing the remaining 8%. Like the resort sector, no income was reported from water transportation or equipment rental. These figures indicate that while guesthouses operate on a smaller scale, they mirror the broader revenue structure of Laamu's tourism economy, with accommodation and hospitality as the primary income sources supported by growing demand for nature-based and cultural experiences.

6.1.4 Direct contribution to economy

In total, Laamu Atoll's formal tourism sector contributed approximately USD12 million to the Maldivian economy in 2024, with the majority of this value generated through resort operations. The main economic components included employee compensation (USD4 million), service charges (USD3 million), and Tourism Goods and Services Tax (USD5 million), alongside green tax payments (USD263,754), sports and recreation services (USD168,231), and equipment rentals (USD50,580). Guesthouse operations, though smaller in scale, added another USD370,246, driven by local employment and visitor spending. These combined contributions exemplify how Laamu Atoll's natural capital directly translates into financial returns through tourism-related wages, taxes, and services, while also stimulating multiplier effects across supporting sectors such as transport, retail, and energy.

From a natural capital perspective, Laamu Atoll demonstrates the efficiency and resilience of ecosystem-based tourism as a development model. Despite its limited infrastructure and small visitor base, the atoll generates substantial economic output per hectare of developed land, emphasizing the high value of conserving ecosystem integrity. Community-level engagement — through local employment, women's entrepreneurship, and youth training — further enhances the inclusive nature of this economic contribution. As Laamu advances its vision of becoming an “all-in-one sustainable destination,” continued investment in biodiversity protection, renewable energy, waste management, and low-impact mobility will be crucial. These actions will ensure that the atoll's natural capital remains not only an ecological treasure but also a reliable and regenerative economic asset for the Maldives.

6.1.5 Employment benefits

In 2024, the resorts employed a total of 357 staff members, illustrating the direct employment benefits generated by Laamu Atoll's natural capital-based tourism economy. Of this workforce, 58% were Maldivians, highlighting the important role of local human capital in sustaining tourism that depends on the health of coral reefs, beaches, and seagrass ecosystems. Employment was heavily male-dominated (86%), with women representing 14% of the total workforce. Senior roles showed a similar pattern — 3% of all employees held top managerial positions, of which 91% were men, while middle management (9%) included 83% men and 17% women. Supervisory positions accounted for 13% of the total workforce, with 34% women, showing some gender diversity at intermediate levels. The largest share of jobs — 74% — consisted of operational staff, who are essential in maintaining guest services, managing resort infrastructure, and supporting the sustainability practices that protect Laamu's ecosystems.

Employment distribution across departments further reflects the strong dependency of the resort's operations on the natural environment as a productive asset. The food and beverage service department accounted for 28% of total employment, serving as the front line of guest interaction and local product use, linking agriculture and fisheries with tourism. Housekeeping (16%), front office (11%), and engineering (10%) departments collectively ensure the smooth running of resort facilities that rely on clean energy, water efficiency, and waste reduction — all vital to minimizing environmental pressure. Departments such as beach, gardening, and environmental conservation (5%), dive centre and water sports (3%), and spa and gym (4%) directly connect employment to ecosystem services, from coral reef recreation to wellness experiences grounded in the island's natural beauty. Together, these areas showcase how tourism employment in Laamu is tightly interlinked with the health and stewardship of its natural capital.

Gender distribution also offers insight into how natural capital-based tourism can evolve toward greater social inclusivity. While men dominate most technical and operational areas — including transport, IT, and security, where women are absent — the spa and gym stands out as the only department with a female majority (64%), emphasizing the potential for women to play stronger roles in wellness and nature-based guest experiences. Expanding training opportunities for women and youth in fields such as environmental management, sustainable diving operations, and eco-tourism guiding could diversify participation while strengthening the local workforce's capacity to protect and benefit from natural capital. Ultimately, the employment structure in Laamu demonstrates how the tourism economy depends not only on its pristine ecosystems but also on empowering the local community — particularly women and young people — to become active stewards of those ecosystems that underpin long-term economic resilience.

6.1.6 Employment in guesthouses

In 2024, the guesthouse employed a total of 28 staff members, of whom 86% were men and 14% were women. Among the male employees, 29% were Maldivians, while 71% were foreign workers. All female employees were foreign nationals, representing 14% of the total workforce, and they were exclusively employed in housekeeping and laundry services. Most male staff — approximately 32% — also worked in housekeeping and laundry, highlighting the operational focus of employment in small-scale accommodation facilities.

Employment distribution across other functions was relatively even. 14% of employees worked in operations, and another 14% were engaged in management, administration, human resources, and food and beverage services respectively. Middle management accounted for 11% of the total workforce, while 7% of employees held top management positions. The remaining 4% each worked in security, beach and environmental maintenance, front office, and finance. No staff were employed in engineering, IT, spa and gym operations, reservations, sales and marketing, or supervisory roles, reflecting the limited specialization within small guesthouse operations.

This employment structure underscores the heavy reliance on foreign labour in operational roles and the underrepresentation of Maldivians, especially women, in guesthouse tourism enterprises. Strengthening local capacity through training in hospitality, environmental management, and small

business operations could help increase national participation and improve the link between natural capital stewardship and livelihood opportunities within Laamu Atoll's guesthouse sector.

6.2 Critical Stress Points

Tourism in Laamu Atoll interacts closely with its rich marine ecosystems, particularly through diving, which is the most popular activity for visitors. The most frequented dive sites include Hithadhoo Corner, Haleema Haa, Maavah Kandhu, Laama Faru Haa, Fushi Kandhu, Kurethi, Fonadhoo Outside, Gaadhoo Inside, and Tingadu Nemo. These reefs are some of the most biodiverse areas of the atoll, providing vital ecosystem services such as carbon storage, nursery grounds, and coastal protection. Encouragingly, dive schools in the atoll have reported that they do not observe significant tourism impacts on reefs, largely due to the designation of protected areas and the strict diving guidelines enforced in the Maldives. This demonstrates the positive role that regulation and good practice can play in safeguarding natural capital while still enabling high-value tourism activities.

Baresdhoo, an uninhabited island within Laamu Atoll, represents another focal point for marine-based tourism. Around 100 visitors per year participate in excursions and diving at this location, with 122 ecosystem interactions recorded in 2024, valued at approximately USD 41,000. These figures highlight both the ecological and economic significance of Baresdhoo, showing how natural capital directly supports tourism livelihoods. With managed visitation levels and a strong regulatory framework, the island's ecosystems remain resilient, providing visitors with opportunities to experience Laamu Atoll's biodiversity while maintaining ecological integrity.

In addition, local tourism operators have taken steps to support environmental management through waste transfer and transportation initiatives, investing about USD300 per month in maintaining a clean environment. While modest, such efforts reflect an awareness of the importance of responsible tourism practices. When combined with the Maldives' wider system of protected areas and sustainable diving protocols, these initiatives contribute to a positive balance between economic benefits and ecosystem health. From a natural capital perspective, Laamu Atoll provides an encouraging example of how tourism can coexist with conservation, ensuring that coral reefs, seagrass meadows, and island habitats continue to thrive alongside community and visitor use.

6.3 Carrying Capacity Analysis

Laamu Atoll's tourism industry is still at an early stage of development, with clear room to grow before approaching carrying capacity limits. At present, the atoll hosts just six registered tourist establishments — two resorts and four guesthouses — offering a combined 462 beds. This is a small capacity compared to many other atolls in the Maldives, where single resorts may exceed Laamu Atoll's total bed count. With such a limited accommodation base, Laamu Atoll's ability to absorb higher tourist arrivals without exceeding ecological or infrastructural thresholds remains relatively secure.

Tourist arrivals data underscores this point. In 2024, Laamu received about 8,200 tourists, equivalent to roughly 0.4% of total arrivals to the Maldives. Similarly, during the first eight months of 2025, Laamu welcomed 5,077 tourists, representing just 0.34% of the national total (1.49 million). In other words, for every 1,000 visitors to the Maldives, only about 3–4 chose Laamu, while other atolls collectively hosted nearly 300 times more. Even at its busiest months (January–April 2025), Laamu Atoll's share remained below half a percent of national arrivals. These figures demonstrate that the atoll is currently operating far below any saturation threshold.

The distribution of tourists within Laamu also reflects its modest scale. In 2024, one resort in the atoll hosted around 6,400 visitors, with an average stay of nearly seven nights, while the largest guesthouse welcomed just over 1,000 visitors, averaging about eight nights per stay. Taken together, these patterns highlight that Laamu Atoll's tourism sector remains small and highly concentrated, with visitor flows centered in a handful of establishments. This scale of activity suggests there is still significant potential for growth. From a natural capital perspective, it also presents a valuable opportunity: the atoll can expand its tourism sector in a managed and sustainable manner, ensuring that reefs, seagrass meadows, and island ecosystems — the natural foundations of its tourism economy — are protected as demand increases.

6.4 Long-term Impacts of Current Tourism Practices on Natural Capital

In recent years, Laamu Atoll has seen promising momentum in biodiversity conservation, particularly through the designation of protected marine areas and strengthened ecosystem monitoring. Since 2019, marine baseline surveys covering coral reefs, seagrass meadows, and mangroves have informed the formal proposal and eventual designation of six new MPAs in the atoll by the Maldivian government. The atoll was also declared a Hope Spot by Mission Blue in 2021, recognizing its high ecological significance and its model role in combining conservation with tourism. These protections have led to strengthened community co-management efforts and greater enforcement in vulnerable reef areas, helping to reduce unsustainable fishing pressures and promote habitat recovery.

Mangrove conservation in Laamu is another area showing gains, although still under-explored. Mangroves occur in four islands within the atoll — Hithadhoo, Gan, Maabaidhoo, and Gaadhoo — and recent efforts have begun to document their species composition and associated fish fauna. In 2019, collaborative research led by Non-Governmental Organizations (NGOs) and resort partners characterized mangrove forests and recorded 32 fish species using those habitats, including commercially important snappers, groupers and emperors. Because mangroves act as carbon sinks, nurseries for juvenile fish, and coastal stabilizers, their preservation contributes both to ecological resilience and to tourism potential. The alignment of mangrove inventory and protection with the broader MPA network is helping to integrate terrestrial–marine linkages in conservation planning.

Nonetheless, some stressors remain that require further action, particularly in waste management and bait-fishery practices. While the MPAs and protected status exert pressure reduction, there is limited published evidence of fully integrated waste management systems across all inhabited and tourism islands in Laamu, raising concerns about pollution leakage into lagoon and reef environments. (The natural capital accounting pilot for Laamu also cites limitations in data continuity and monitoring capacity, which affects tracking of waste and pollutant fluxes.). Moreover, bait fishery practices (collecting small fish to use as live bait for larger fisheries) remain a challenge beyond protected zones. Laamu Atoll’s atoll-level fisheries co-management initiative, “Laamaseelu Masveriyaa”, is making inroads by promoting sustainable fishing and improved decision making, but stricter controls and alternatives to destructive or high-bycatch bait collection are needed to prevent collateral damage to juvenile fish and reef food webs. Strengthening waste infrastructure and refining bait fish regulations would complement existing conservation gains, helping ensure that Laamu Atoll’s natural capital remains robust and capable of supporting both ecological health and nature-based tourism into the future.

7 Conclusion

Tourism in Laamu Atoll is fundamentally built upon the atoll's natural capital — its coral reefs, lagoons, seagrass meadows, beaches, and mangrove systems — which provide the ecological foundation for nearly all visitor activities. The reefs and clear waters sustain high-value dive tourism, mangroves and lagoons offer unique eco-experiences, and the scenic island landscapes attract visitors seeking tranquility and connection with nature. These ecosystems generate direct economic benefits through accommodation, excursions, and marine recreation, while indirectly supporting livelihoods, employment, and government revenues. In this sense, natural capital acts as both an economic engine and a shared community asset, linking biodiversity conservation with long-term tourism resilience. Laamu Atoll's ability to attract eco-conscious visitors and maintain a premium tourism model depends on the continued health and productivity of these ecosystems.

At the same time, tourism exerts measurable pressures on Laamu Atoll's natural resources, particularly through freshwater demand, energy use, and waste generation. Resorts rely on energy-intensive desalination and fossil fuels to meet operational needs, while guesthouses depend on groundwater extraction, posing risks of resource depletion and salinization. Solid waste, though increasingly managed through composting and recycling, remains a persistent environmental concern, especially plastics and food waste. Despite these pressures, the atoll has made significant progress in adopting sustainable practices — from wastewater treatment and renewable energy investments to reef and mangrove protection initiatives. These actions demonstrate a growing awareness that Laamu Atoll's long-term tourism success depends on preserving its environmental integrity. Strengthening integrated resource management, expanding renewable energy, and reinforcing community-led conservation will ensure that tourism continues to support — rather than erode — the very natural capital that sustains Laamu Atoll's economy and identity.

The survey methodology applied in the Laamu Atoll Visitor and Resource Use Surveys proved to be both robust and effective in achieving the objectives of the study. It successfully captured comprehensive and interlinked data on visitor behaviour, tourism activities, and the use of natural resources, providing valuable insights into the atoll's tourism–natural capital relationship. The combination of quantitative and qualitative approaches enabled the assessment of both direct and indirect contributions of tourism to the economy, as well as its environmental impacts. Despite the relatively small number of resorts and guesthouses in Laamu Atoll, the methodology generated meaningful results that are representative of the atoll's tourism dynamics and resource dependencies. Its success demonstrates that the approach is well-suited for replication across other atolls — particularly those with larger tourism capacity — where comparative data could further enhance understanding of natural capital's role in sustaining the Maldivian tourism sector.

The visitor survey findings reaffirm that Laamu Atoll's tourism sector is deeply dependent on its natural capital, with the majority of visitors drawn by its pristine beaches, coral reefs, marine life, and seagrass ecosystems. Most tourists engaged in activities such as swimming, snorkeling, diving, and dolphin watching — all of which rely directly on the health of marine and coastal ecosystems. These experiences not only define Laamu Atoll's appeal but also generate substantial local and national economic value through accommodation, excursions, and related services. The data underscore that maintaining the ecological integrity of these natural assets is essential for sustaining the atoll's competitiveness and economic contribution to the Maldivian tourism industry.

At the same time, the survey reveals opportunities to strengthen visitor awareness and participation in environmental stewardship. While most visitors showed limited initial concern for conservation issues, they expressed strong support for measures such as reducing resource use, enforcing diving and snorkeling guidelines, and eliminating single-use plastics when asked. This alignment of visitor expectations with sustainable practices presents an opportunity for Laamu Atoll to position itself as a leading model for nature-positive tourism in the Maldives. By investing in education, eco-certification, and community-led initiatives, Laamu atoll can ensure that future tourism growth enhances — rather than diminishes — the resilience and value of the natural capital that sustains it.

Tourism in Laamu Atoll demonstrates a clear and measurable dependency on the atoll's natural capital, where coral reefs, seagrass meadows, lagoons, and beaches form the foundation of its economic and

social value. These ecosystems not only sustain high-value tourism activities such as diving, snorkeling, and nature excursions but also underpin the atoll's broader economy through employment, taxation, and service industries. Despite representing just 0.4% of national arrivals, Laamu Atoll's tourism sector generated nearly USD30 million in income in 2024, reflecting the economic efficiency of a low-impact, ecosystem-based tourism model. The findings underscore that maintaining the health of Laamu Atoll's natural capital is not merely an environmental imperative but a direct economic necessity for sustaining visitor demand and long-term growth.

From a spatial and operational perspective, Laamu Atoll's tourism footprint remains small but significant. Resorts and guesthouses together occupy less than 25 hectares of land, yet their influence extends across interconnected marine ecosystems that provide critical ecological services such as carbon sequestration, fish nursery habitats, and shoreline stabilization. Continued investments in wastewater treatment, energy efficiency, and reef-safe operations have helped mitigate pressures, while ongoing biodiversity monitoring and protected area management have strengthened ecosystem resilience. These practices highlight that even modest-scale development, when guided by sustainable principles, can balance economic gain with ecological protection. The challenge now lies in ensuring that future growth — both in accommodation and visitation — occurs within the limits of ecosystem capacity.

Looking ahead, Laamu Atoll offers a compelling model for nature-positive tourism in the Maldives. The atoll's experience shows that biodiversity conservation, community participation, and sustainable tourism can reinforce one another when managed strategically. Employment in tourism — particularly in sectors directly tied to natural capital, such as environmental management, food services, and recreation — provides vital livelihoods for local communities. However, to strengthen this relationship, Laamu must continue to address gaps in waste management, groundwater use, and fisheries regulation. Expanding renewable energy systems, enhancing women's participation, and embedding ecosystem stewardship into all levels of tourism operations will ensure that Laamu Atoll's natural capital remains a productive, resilient, and regenerative foundation for both the economy and the environment in the years ahead.

8 Recommendations

This chapter presents a set of actionable recommendations derived from the findings of the visitor and resource use surveys conducted in Laamu Atoll. The recommendations aim to strengthen sustainable tourism planning, improve natural capital management, and enhance the socio-economic benefits of tourism for local communities. Each recommendation is grounded in evidence gathered through field surveys and the reviews of other studies carried out under the ENDhERI Project.

The chapter is structured to provide a clear framework for implementation. Each recommendation includes its objective, rationale, expected outcomes, and specific actions with assigned institutional responsibilities. Together, these measures are intended to guide MoTE and its partners in advancing a more resilient, inclusive, and environmentally responsible tourism sector in the Maldives.

1. Strengthen and replicate the survey methodology across atolls with larger tourism capacity.

Objective: To institutionalize a standardized national framework for assessing the tourism sector's dependence on and impacts to natural capital, enabling data-driven decision-making and sustainable tourism planning at both atoll and national levels.

Rationale: The methodology used for the Laamu Atoll Visitor and Resource Use Surveys proved effective in capturing detailed insights into the interlinkages between tourism activities, resource use, and natural capital. However, given the relatively small number of resorts and guesthouses in Laamu, the methodology would yield even richer data if replicated in atolls with higher tourism density. Expanding the approach to more developed atolls would provide comparative baselines and strengthen national natural capital accounting for tourism.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
1.1 Review and standardize the Laamu survey methodology for replication across atolls.	MoTE	Maldives Bureau of Statistics (MBS), Visit Maldives Corporation (VMC)
1.2 Identify and prioritize atolls with high tourism density for replication.	MoTE	MBS, Atoll Councils
1.3 Develop national survey guidelines and digital data-collection tools.	MBS	MoTE,
1.4 Build institutional and atoll-level capacity for survey implementation.	MBS	Atoll Councils, MoTE
1.5 Conduct Visitor and Resource Use Surveys in selected atolls and compile datasets.	MoTE	MBS, Atoll Councils
1.6 Integrate survey findings into national frameworks (SEEA, SF-MST).	MBS	MoTE
1.7 Prepare national and atoll-level reports with comparative insights.	MoTE	MBS, VMC, Civil Society

Expected Outcome: A standardized, institutionalized methodology for Visitor and Resource Use Surveys will be adopted nationwide, producing comparable datasets across atolls and enabling integration with SEEA and SF-MST frameworks.

2. Increase tourism supply within ecological carrying capacity limits.

Objective: To promote sustainable tourism expansion that aligns with ecosystem capacity and community benefit.

Rationale: Tourism in Laamu currently accounts for less than 0.4% of national arrivals, leaving significant scope for sustainable growth. Carefully managed expansion — through new eco-resorts, guesthouses, and community-based tourism — can generate employment and diversify income while remaining within environmental thresholds. Strategic planning should prioritize low-impact developments that enhance biodiversity protection and ecosystem resilience.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
2.1 Conduct carrying capacity assessments for tourism expansion.	MoTE	Environmental Regulatory Authority (ERA), MBS
2.2 Integrate ecological thresholds into tourism zoning and permits.	MoTE	Atoll Councils, ERA
2.3 Promote low-impact eco-resorts and community-based tourism initiatives.	MoTE	Civil Society, VMC, Private Sector

Expected Outcome: Tourism growth occurs within defined ecological limits, ensuring environmental resilience and sustainable economic opportunities.

3. Prioritize investments in integrated waste management systems.

Objective: To establish a coordinated, circular waste management approach that minimizes pollution and protects reef ecosystems.

Rationale: Waste generation remains a critical challenge for both resorts and guesthouses, particularly with plastics and food waste. Establishing a coordinated atoll-wide waste management system — including segregation, composting, recycling, and responsible disposal — will help prevent pollution and protect Laamu’s reefs and lagoons. Partnerships between tourism operators, councils, and waste service providers can improve efficiency and promote circular economy practices.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
3.1 Establish an atoll-wide waste management plan emphasizing segregation and recycling.	MoTE	ERA, Atoll Councils
3.2 Strengthen public-private partnerships for waste collection and recycling services.	MoTE	Private Sector, Civil Society
3.3 Implement awareness programs on waste segregation and reduction.	Civil Society	MoTE, Island Councils

Expected Outcome: A functioning, circular waste management system with shared infrastructure and community participation.

4. Accelerate renewable energy adoption and battery storage investment.

Objective: To transition tourism operations in Laamu Atoll towards renewable, low-carbon energy systems.

Rationale: Energy consumption in Laamu Atoll's resorts remains heavily dependent on diesel-based generation. Transitioning to solar and hybrid energy systems, supported by battery energy storage, would significantly reduce fuel use and emissions. Such investments would not only cut operational costs but also enhance the atoll's climate resilience and reputation as a leader in sustainable tourism.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
4.1 Facilitate solar PV and battery storage investments for resorts and guesthouses.	MoTE	Fenaka, Private Sector
4.2 Provide financial incentives and technical support for renewable transitions.	MoTE	Ministry of Finance and Planning (MoFP), Civil Society
4.3 Develop renewable energy training programs for technicians and operators.	Technical and Vocational Education Authority (TVET)/ Maldives National University (MNU)	MoTE, Fenaka

Expected Outcome: Increased renewable energy adoption in tourism establishments and public infrastructure, contributing to national low-carbon targets.

5. Strengthen natural capital stewardship through community participation.

Objective: To empower local communities as active custodians of natural capital supporting tourism.

Rationale: Sustaining Laamu Atoll's tourism economy depends on the continued health of its natural ecosystems and the active engagement of local communities in protecting them. Expanding training, awareness, and employment opportunities in waste management, conservation, and renewable energy will empower residents to become custodians of the natural capital that underpins tourism. This inclusive approach ensures that economic growth remains aligned with environmental protection and social well-being.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
5.1 Develop local conservation and stewardship programs linking tourism and livelihoods.	MoTE	Island Councils, Civil Society
5.2 Offer targeted training in conservation, renewable energy, and waste management.	MNU/TVET	MoTE, Civil Society
5.3 Incentivize tourism operators to support community-led environmental initiatives.	MoTE	Private Sector, VMC

Expected Outcome: Stronger community ownership and co-management of natural resources underpinning sustainable tourism.

6. Strengthen marketing and destination positioning.

Objective: To position Laamu Atoll as a premier sustainable tourism destination built on natural capital and community engagement.

Rationale: To position Laamu Atoll as an “all-in-one destination,” marketing should highlight its unique natural capital — pristine reefs, seagrass meadows, mangroves, and cultural landscapes — as the foundation of visitor experiences. A storytelling-based branding strategy should be developed to convey the atoll’s interconnectedness between nature, community, and sustainability. Narratives could focus on how Laamu’s tourism supports reef protection, seagrass restoration, and community livelihoods, creating a sense of shared purpose between visitors and residents. A dedicated destination marketing website should showcase real-time information on available experiences, including diving, eco-excursions, cultural tours, and conservation projects. Integrating a real-time inventory of experiences would allow visitors to book directly, promoting local operators and spreading tourism benefits across the atoll. A coordinated social media marketing strategy can amplify Laamu Atoll’s brand visibility, featuring immersive visual storytelling, visitor testimonials, and conservation success stories under a cohesive “Laamu Natural Capital” brand identity.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
6.1 Develop a destination marketing strategy emphasizing Laamu Atoll’s natural capital.	VMC	MoTE, Civil Society
6.2 Establish a digital platform to promote eco-experiences and local operators.	VMC	Private Sector, MoTE
6.3 Coordinate storytelling campaigns showcasing conservation and community initiatives.	VMC	MoTE, Civil Society

Expected Outcome: A well-recognized Laamu Atoll brand that integrates nature, community, and sustainability in visitor experiences.

7. Accelerate sustainable development of tourism facilities in Laamu Atoll.

Objective: To promote NetZero, nature-positive infrastructure and tourism facilities that respect ecological integrity.

Rationale: From a facilities standpoint, Laamu Atoll’s transformation into a holistic destination should prioritize NetZero, nature-positive infrastructure. Expanding sustainable accommodation — through solar-powered resorts, low-impact guesthouses, and eco-lodges — can ensure growth remains within ecological limits. Tourism facilities should be designed to organize natural and cultural resources into coherent products, such as integrated marine-forest trails or “reef-to-table” culinary circuits. Developing safe and efficient e-mobility systems (electric boats, bikes, and shuttles) would reduce emissions and preserve air and water quality. Access to startup finance and green investment will be critical to empower local entrepreneurs to innovate in eco-tourism products, renewable energy, and circular waste management, thereby enhancing Laamu’s resilience and competitiveness as a low-carbon destination.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
7.1 Introduce sustainability certification standards for tourism facilities.	MoTE	ERA, VMC
7.2 Support e-mobility and renewable-powered transport systems in inhabited islands	MoTE	Island Councils, Private Sector

7.3 Facilitate green financing for local entrepreneurs in eco-tourism ventures.	MoTE	MoFP, Civil Society
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Expected Outcome: Enhanced environmental performance and competitiveness of Laamu Atoll's tourism sector through sustainable infrastructure.

8. Enhance ownership, community participation, and governance.

Objective: To strengthen governance and local ownership mechanisms for inclusive, resilient tourism management.

Rationale: True sustainability will depend on local ownership and community engagement. Awareness and sensitization programmes should help residents understand the benefits of natural capital conservation as a shared economic asset. Youth education and training across the atoll can build local capacity in sustainable tourism management, guiding, and conservation monitoring. Women's entrepreneurship and employment should be supported through tailored training and microfinance opportunities in hospitality, wellness, crafts, and eco-tourism services. Establishing a multi-stakeholder collaboration platform — involving government, resorts, guesthouses, NGOs, and communities — will help align natural capital goals with tourism development plans. Lastly, implementing a quality control and certification system (e.g., for eco-lodging, diving practices, and waste management) would ensure that Laamu maintains high environmental and service standards, reinforcing its reputation as a model destination where economic growth and natural capital conservation thrive together.

Key Actions:

Key Action	Primary Responsibility	Co-Responsible Agencies
8.1 Establish participatory tourism governance mechanisms at atoll and island levels.	MoTE	Atoll Councils, Island Councils, Civil Society
8.2 Build youth and women's capacity for leadership in sustainable tourism.	MNU/TVET	MoTE, Civil Society
8.3 Develop transparent monitoring frameworks for tourism–environment indicators.	MBS	MoTE, ERA

Expected Outcome: Improved local governance systems with enhanced participation and accountability in tourism-related decision-making.

9 References

1. Agardy, T., Hicks, F., Nistharan, F., Fisam, A., Abdulla, A., Schmidt, A., & Grimsditch, G. (2017). Ecosystem Services Assessment of North Ari Atoll Maldives.
2. Anderson, R. C., Adam, M. S., Kitchen-Wheeler, A. M., & Stevens, G. (2011). Extent and economic value of manta ray watching in Maldives. *Tourism in Marine Environments*, 7(1), 15-27.
3. Baloch, Q. B., Shah, S. N., Iqbal, N., Sheeraz, M., Asadullah, M., Mahar, S., & Khan, A. U. (2023). Impact of tourism development upon environmental sustainability: a suggested framework for sustainable ecotourism. *Environmental Science and Pollution Research*, 30(3), 5917-5930.
4. Blatchford, A. (2019) Characterisation of seagrass meadows and associated fish assemblages in Laamu Atoll, Maldives. Dissertation.
5. CDE Consulting. (2021) *Maldives Visitor Survey*. MOT-Ministry of Tourism.
6. Cerri, F., Louis, Y. D., Fallati, L., Siena, F., Mazumdar, A., Nicolai, R., ... & Galli, P. (2024). Mangroves of the Maldives: A review of their distribution, diversity, ecological importance and biodiversity of associated flora and fauna. *Aquatic Sciences*, 86(2), 44.
7. Costanza, R. (2020). Valuing natural capital and ecosystem services toward the goals of efficiency, fairness, and sustainability. *Ecosystem Services*, 43, 101096.
8. Cowburn, B., Moritz, C., Birrell, C., Grimsditch, G., & Abdulla, A. (2018). Can luxury and environmental sustainability co-exist? Assessing the environmental impact of resort tourism on coral reefs in the Maldives. *Ocean & coastal management*, 158, 120-127.
9. Dhunya, A., Huang, Q., & Aslam, A. (2017). Coastal habitats of Maldives: status, trends, threats, and potential conservation strategies.
10. Didi, A., Nizam, I., & Hamza, S. (2016). The determinants of customer satisfaction and the intention to return: a study on tourism sector of Maldives. *International Journal of Accounting & Business Management*, 4(2).
11. Duvat, V. K. E. & Magnan, A. K. (2019). Contrasting potential for nature-based solutions to enhance coastal protection services in atoll islands. In C. Klöck & M. Fink (Eds.), *Dealing with climate change on small islands: Toward effective and sustainable adaptation* (pp. 45–75). University of Göttingen Press. <https://doi.org/10.17875/gup2019-1211>
12. ENDheRi. (2022). Laamu Environmental KAP Survey Report, s.l.: Ministry of Climate Change, Environment and Energy.
13. ENDheRi. (2023). Report on historical analysis of the dynamic of the ecosystem and their services under current intervention management inside the ICZM. Ministry of Climate Change, Environment and Energy.
14. Erftemeijer, P. L., Riegl, B., Hoeksema, B. W., & Todd, P. A. (2012). Environmental impacts of dredging and other sediment disturbances on corals: a review. *Marine pollution bulletin*, 64(9), 1737-1765.
15. Femmami, N. (2019). Monitoring and enforcing the South Ari Atoll marine protected area in the Maldives (Doctoral dissertation, Department of Environment and Geography, University of York).
16. Guerry, A. D., Polasky, S., Lubchenco, J., Chaplin-Kramer, R., Daily, G. C., Griffin, R., ... & Vira, B. (2015). Natural capital and ecosystem services informing decisions: From promise to practice. *Proceedings of the National academy of Sciences*, 112(24), 7348-7355.
17. Hussain, Z. (2022). A comparative assessment of domestic tourism and its impacts on the one-island one-resort hotels of the Maldives among different stakeholders using stakeholder theory.
18. Jarvis, D., Stoeckl, N., & Liu, H. B. (2016). The impact of economic, social and environmental factors on trip satisfaction and the likelihood of visitors returning. *Tourism Management*, 52, 1-18.
19. Jones, R., Bessell-Browne, P., Fisher, R., Klonowski, W., & Slivkoff, M. (2016). Assessing the impacts of sediments from dredging on corals. *Marine Pollution Bulletin*, 102(1), 9-29.
20. King, C. (2024). Maldives tourism climate action plan: strategic pathways for climate resiliency in tourism.

21. Matunga, H., Matunga, H. P., & Ulrich, S. (2020). From exploitative to regenerative tourism: Tino rangatiratanga and tourism in Aotearoa New Zealand.
22. McNamara, K. E., Clissold, R., Piggott-McKellar, A., & Buggy, L. (2016). Vulnerability and vulnerable groups: Baseline, indicators and assessments for Laamu Atoll, Maldives.
23. McNamara, K. E., Clissold, R., Piggott-McKellar, A., Buggy, L., & Azfa, A. (2019). What is shaping vulnerability to climate change? The case of Laamu Atoll, Maldives. *Island Studies Journal*, 14(1), 81-100.
24. Moritz, C., Ducarme, F., Sweet, M. J., Fox, M. D., Zgliczynski, B., Ibrahim, N., ... & Abdulla, A. (2017). The “resort effect”: Can tourist islands act as refuges for coral reef species?. *Diversity and Distributions*, 23(11), 1301-1312.
25. MUI- Roe, P. (2020). Six Senses Laamu Seagrass Monitoring 2020.
26. MUI- Shareef, Wu, Roe (2019) MUI Seagrass Monitoring Report April 2019: Characterizing and establishing baselines for Seagrass Meadows at Olhuveli Island, Six Senses Laamu.
27. Muttaqin, E., Hartati, I. D., Pingkan, J., Samudra, S. H., Pamungkas, S., Rosdiana, A., ... & Warmia, A. (2023). Preliminary survey of ecosystem extent and condition in Laamu Atoll, Maldives.
28. Naseer, A., & Hatcher, B. G. (2004). Inventory of the Maldives’ coral reefs using morphometrics generated from Landsat ETM+ imagery. *Coral Reefs*, 23, 161-168.
29. Shakeela, A., & Becken, S. (2015). Understanding tourism leaders’ perceptions of risks from climate change: An assessment of policy-making processes in the Maldives using the social amplification of risk framework (SARF). *Journal of Sustainable Tourism*, 23(1), 65-84.
30. UNWTO-UN World Tourism Organisation. (2023). Statistical Framework for Measuring the Sustainability of Tourism (SF-MST). *Draft prepared for Global Consultation October 2023*
31. United Nations. (2024). System of Environmental-Economic Accounting Ecosystem Accounting, s.l.: United Nations publication.
32. Westmacott, S. & Rijsberman, F. (2000). Cost-effectiveness analysis of coral reef management and protection: A case study of the Republic of the Maldives. *Integr. Coast. Zo. Manag. Coral Reefs Decis. Support Model*. 67–81.
33. White, L. and Cameron, T. (2019) A characterization and comparison of the mangrove habitats and their fish assemblages on the islands of Hithadhoo and Maabaidhoo, Laamu Atoll, Maldives. dissertation.
34. Zubair, S., Bowen, D., & Elwin, J. (2011). Not quite paradise: Inadequacies of environmental impact assessment in the Maldives. *Tourism management*, 32(2), 225-234.

10 Annex

10.1 Resource use survey questionnaire

Resort Resource Use Survey

We would like to invite you to participate and contribute to a Resource Use Survey being conducted as part of the Enhancing National Development through Environmentally Resilient Islands (ENDhERI) initiative, led by the Maldives Ministry of Tourism and Environment. Under this project, Natural Capital Accounting is being piloted in Laamu Atoll, with a strong emphasis on sustainable management across tourism, fisheries, agriculture, and land-based development. Supporting this pilot requires gathering accurate data on how tourism establishments use water, energy, materials, and manage waste on an annual basis. This survey will also contribute to better understand the value of natural capital and interdependency between resort/guesthouse operations and natural resources in Laamu Atoll.

ENDhERI has appointed CDE Consulting to implement the Maldives Resource Use Survey, and CDE Consulting is conducting a survey of the resorts and guest houses in Laamu Atoll that will provide invaluable inputs. This survey is fully endorsed by the Ministry of Tourism and Environment, Government of the Maldives.

Your resort/guesthouse has been selected—alongside two other resorts and two guesthouses in Laamu Atoll—to provide essential insights into current resource use patterns. The data you share will play a critical role in shaping atoll-level assessments and informing sustainable planning under the ENDhERI framework.

Please note:

- All information you provide will be treated with strict confidentiality.
- Results will be aggregated at the atoll level only, ensuring that no individual establishment's data is identifiable or published.
- The findings will help support evidence-based decision-making towards green growth, pollution reduction, ecosystem resilience, and improved resource-use efficiency in tourism operations.

We hope you will support this important initiative by completing the enclosed questionnaire with data for the year 2024 using Adobe Acrobat reader and share with us the completed survey by 30 June 2025. Your cooperation is vital to advancing sustainable development in Laamu Atoll and beyond. Please complete this survey and send via email to sustainability@cde.com.mv and/or hana@cde.com.mv.

Thank you for your time and contribution.

Sincerely,

Simad Saeed
Managing Director
CDE Consulting

A. Visitors

A1. Please provide the following information on visitor flow for the year 2024:

		Tourists	Same day visitors
a.	Total number of tourists in 2024:		
	Mode of transport		
b.		Air - Seaplane	
c.		Air - Domestic	
d.		Air – Private jet	
e.		Water	

A2. What was the total number of guest nights in 2024:

A3. What was the average length of stay (nights) in 2024:

B. Tourist Spending

B1. Please provide income from the following products in USD for the year 2024:

	Tourism characteristic products	Tourist expenditure (USD)	
		Tourists	Same day visitors
a.	Accommodation services		
b.	Food and beverage services		
c.	Air transportation		
d.	Water transportation		
e.	Sports and recreational services		
f.	Equipment rental		

B2. Please provide gross value added to the Maldivian economy in USD for the year 2024:

		USD
a.	Compensation of employees	
b.	Service charge	
c.	Tourism Goods and Services Tax	
d.	Green Tax	
e.	Sports and recreational services	
f.	Equipment rental	

C. Fuel and electricity

C1. How much fuel was consumed annually?

	Year	Diesel (litres)	Petrol (litres)	LPG (litres)
a.	2023			
b.	2024			

C2. How much diesel was consumed for the different operations in 2024?

	Diesel use	Diesel 2024 (litres)
a.	Electricity generation	
b.	Boilers – water heating	
c.	Marine transport	
d.	Land transport	
e.	Incinerator	
f.	Other: specify	
g.	Other: specify	

C3. How much petrol was consumed for the following operations in 2024?

#	Operation	Petrol 2024 (litres)
a.	Transportation of guests to and from resort (marine)	
b.	Transportation of guests within the resort (land)	
c.	Recreational trips	
d.	Mosquito and vector control	

C4. What is the total installed capacity of diesel generator sets in the resort?

#	Generators	kW
a.	Gen set 1	
b.	Gen set 2	
c.	Gen set 3	
d.	Gen set 4	
e.	Gen set 5	
f.	Total	

C5. How much electricity was produced in TOTAL (kWh) from diesel generator sets in the year 2024?

C6. Do you have **solar PV** installed in the resort? a. Yes – b. No

C7. If yes, what is the capacity of the solar PV system (kWp)?

	Type	kWp	Year 1	Year 2
a.	Roof mount			
b.	Floating			
c.	Ground mount			
d.	Stilts on lagoon			

C8. Do you have **Battery** Energy Storage System (BESS) installed on the resort? a. Yes b. No

If yes, what is the capacity of the BESS (kWh)?

C9. How much electricity was consumed annually (kWh) in 2024?

C10. What was the electricity consumption (kWh) per guest night in 2024?

C11. What was the daily peak load and average load for the resort (kWh) in 2024?

D. Solid Waste Management

D1. What was the total quantity of solid waste generated in 2024 (kg):

D2. Please provide the quantity of waste generated by type and method of treatment:

#	Type of waste	Quantity (kg)	Method of treatment
a.	Food waste		
b.	Plastics		
c.	Paper		
d.	Glass		
e.	Green		
f.	Other		

D3. What technologies do you use for food waste treatment ?

#	Treatment method	Machinery	Investment value (USD)	Status of equipment
a.	Pulpers, macerators, shredders			
b.	Composting			
c.	Anaerobic digestion			
d.	Incineration			
e.	Pyrolysis			
f.	Gasification			
g.	Others (specify)			

D4. What technology is used to reduce waste and for waste volume reduction?

#		Machinery	Investment value (USD)	Status of equipment
a.	Bottling plant to reduce PET bottles			
b.	Plastic shredder			
c.	Compactor/baler			
d.	Glass crusher			
e.	Others (specify)			

E. Water Resources Consumption

E1. What is the capacity of desalination plants on the resort?

	Desalination Plant	Capacity (m ³ /day)
a.	RO plant 1	
b.	RO plant 2	
c.	RO plant 3	
d.	RO plant 4	
e.	RO plant 5	

E2. What is the desalinated water storage capacity on the resort (m³)?

E3. What was the total volume of desalinated water produced in 2024 (m³)?

E4. What was the total amount of energy (kWh) used to produce water in 2024?

E5. What was the water consumption (m³) per guest night in 2024?

E6. What was the total volume of rainwater consumed in 2024 (m³)?

E7. What was the total volume of groundwater in 2024 (m³)?

F. Wastewater

F1. What is the method of wastewater treatment and disposal in the resort:

- a. Treated, recycled and used for irrigation
- b. Treated and disposed via an outfall (Indicate location on map)
- c. Untreated and disposed via an outfall (indication location on map)

F2. What is the investment value for wastewater treatment plant (STP):

G. Ecosystem Interaction

G1. What are the top ten dive sites within Laamu that are visited by your guests?

G2. What is the total number of estimated ecosystem interactions undertaken by tourists in 2024?

#	Interaction	Number of interactions	Total Estimated Value (USD)
a.	Diving		
b.	Excursions to Protected Areas		
c.	Excursions to Sensitive Environmental Sites		
d.	Mangroves		
e.	Sandbank		
f.	Visits to Uninhabited island		
g.	Cultural & heritage sites		

G3. What are sites visited by the tourists and indicate how many were paid visits and the value of those visits?

#	Location	Activity Undertaken	Average number of visitors per year	Frequency of visit (weekly average)	Value of the activity (USD)
a.	Isdhoo Muli				
b.	Fonadhoo Diving Point				
c.	Mathigulhi Sarahadhu				
d.	Reethi Haa and Hudhafaru				
e.	Haviththa Sarahadhu (Surfing and Diving Point) (Isdhoo)				
f.	Addu Boat Farah Eri Sarahadhu (Isdhoo)				
g.	Koaru (Maabaidhoo)				
h.	Tholhi Baanaa Sarahadhu (Maabaidhoo)				

#	Location	Activity Undertaken	Average number of visitors per year	Frequency of visit (weekly average)	Value of the activity (USD)
i.	Hithadhoo Baaneykolhu (Reef System)				
j.	Hithadhoo Corner (Famous Dive Site)				
k.	Mundoo Channel				
l.	Fushi Kandhu (Channel)				
m.	Hithadhoo Gaadhoo Kandhu				
n.	Vadinolhu Kandhu				
o.	L. Gan Boda Fengada				
p.	L. Maabaidhoo Koaraai Fushi kandhu sarahahdhu				
q.	L. Bodu Finolhu adhi Vadinolhu Kandhu Olhu sarahahdhu				
r.	L. Gaadhoo key biodiversity areas				
s.	L. Gaadhoo Hithadhoo Kandhu				
t.	L. Hithadhoo Kulhi aai vashaigenvaa sarahahdhu				

G4. What are the observed changes in ecosystem condition over the last 5 years:

#	Habitat	Improved	No change	Declined
	Marine Protected Areas			
	Environmentally Sensitive Areas			
	Seagrass			
	Popular dive sites			
	Mangrove			

	Protected species abundance			
	Threatened species abundance			
	Land species diversity			
	Other, please specify:			
	Other, please specify:			

H: Actions taken for Environment Protection

H1. Please identify the initiatives and the investment value for measures against climate change risks

#	Type of protection measure	Year of investment	Estimated cost (USD)
a.	Beach replenishment		
b.	Temporary beach structures (sandbags, cement bags, geo bags, submerged breakwaters)		
c.	Permanent beach structures (groynes, breakwaters)		
d.	Increased setbacks, relocated structures, raised structures		
e.	Reef rehabilitation/coral gardening		
f.	Others (specify)		

H2. How much is spent monthly for the following operational activities?

#	Activity	Estimated monthly expenditure (USD)
a.	Waste transfer/transportation	
b.	Waste management centre operations	
c.	Beach cleanups	
d.	Sewage and wastewater treatment	
e.	Maintenance of existing coastal protection structures	
f.	Others (specify)	

I. Employment

I1. What is the number of staff employed by type, level, and local/foreign?

	Male	Female
Total employment		
Maldivian		
Foreign		
Top Management and Professionals		
Middle Management (Managers, HOD)		
Supervisors and Team Leaders		
Operational staff, rank and file		

I2. What is the number of staff employed by area of work?

	Male	Female
Management, administration, human resource		
Finance, purchasing, stores		
Front office		
Reservations, sales, & marketing		
Housekeeping and laundry service		
Food and beverage service		
Transport		
Spa, Gym		
Dive Center, Water sports, Recreation		
Beach, gardening, environmental conservation		
Engineering		
IT		
Security		

Guesthouse Resource Use Survey

We would like to invite you to participate and contribute to a Resource Use Survey being conducted as part of the Enhancing National Development through Environmentally Resilient Islands (ENDhERI) initiative, led by the Maldives Ministry of Tourism and Environment. Under this project, Natural Capital Accounting is being piloted in Laamu Atoll, with a strong emphasis on sustainable management across tourism, fisheries, agriculture, and land-based development. Supporting this pilot requires gathering accurate data on how tourism establishments use water, energy, materials, and manage waste on an annual basis. This survey will also contribute to better understand the value of natural capital and interdependency between resort/guesthouse operations and natural resources in Laamu Atoll.

ENDhERI has appointed CDE Consulting to implement the Maldives Resource Use Survey, and CDE Consulting is conducting a survey of the resorts and guest houses in Laamu Atoll that will provide invaluable inputs. This survey is fully endorsed by the Ministry of Tourism and Environment, Government of the Maldives.

Your resort/guesthouse has been selected—alongside two other resorts and two guesthouses in Laamu Atoll—to provide essential insights into current resource use patterns. The data you share will play a critical role in shaping atoll-level assessments and informing sustainable planning under the ENDhERI framework.

Please note:

- All information you provide will be treated with strict confidentiality.
- Results will be aggregated at the atoll level only, ensuring that no individual establishment's data is identifiable or published.
- The findings will help support evidence-based decision-making towards green growth, pollution reduction, ecosystem resilience, and improved resource-use efficiency in tourism operations.

We hope you will support this important initiative by completing the enclosed questionnaire with data for the year 2024 using Adobe Acrobat reader and share with us the completed survey by 30 June 2025. Your cooperation is vital to advancing sustainable development in Laamu Atoll and beyond. Please complete this survey and send via email to sustainability@cde.com.mv and/or hana@cde.com.mv.

Thank you for your time and contribution.

Sincerely,

Simad Saeed
Managing Director
CDE Consulting

A. Visitors

A1. Please provide the following information on visitor flow for the year 2024:

		Tourists	Same day visitors
a.	Total number of tourists in 2024:		
	Mode of transport		
b.	Air - Seaplane		
c.	Air – Domestic flight		
d.	Air – Private jet		
e.	Water – Boat or liveaboard		

A2. What was the total number of guest nights in 2024:

A3. What was the average length of stay (nights) in 2024:

B. Tourist Spending

B1. Please provide income from the following products in USD for the year 2024:

	Tourism characteristic products	Tourist expenditure (USD)	
		Tourists	Same day visitors
a.	Accommodation services		
b.	Food and beverage services		
c.	Air transportation		
d.	Water transportation		
e.	Sports and recreational services		
f.	Equipment rental		

B2. Please provide gross value added to the Maldivian economy in USD for the year 2024:

		USD
a.	Compensation of employees	
b.	Service charge	
c.	Tourism Goods and Services Tax	
d.	Green Tax	
e.	Sports and recreational services	
f.	Equipment rental	

C. Fuel and electricity

C1. How much fuel was consumed annually by the guesthouse for its operations (excluding electricity purchased from the public grid)?

	Year	Diesel (litres)	Petrol (litres)	LPG (litres)
a.	2023			
b.	2024			

C2. How much diesel was consumed for the different operations within the guesthouse in 2024?

	Diesel use	Diesel 2024 (litres)
a.	Electricity generation	
b.	Boilers – water heating	
c.	Marine transport	
d.	Land transport	
e.	Incinerator	
f.	Other: specify	
g.	Other: specify	

C3. How much petrol was consumed for the following operations within the guesthouse in 2024?

#	Operation	Petrol 2024 (litres)
a.	Transportation of guests to and from guesthouse (marine)	
b.	Transportation of guests within the island (land)	
c.	Recreational trips	
d.	Mosquito and vector control	

C4. What are the sources of electricity for your guesthouse?

Source	Yes/No	Additional info
Fenaka Powerhouse and public grid		If yes, go to C5
Own diesel generator		If yes, go to C6
Own solar PV system		

C5. How much electricity was consumed annually by the guesthouse from the public grid in 2024 (kWh)?

C6. What is the total installed capacity of diesel generator sets in the guesthouse (for backup or specific guesthouse operations)?

#	Generators	kW
a.	Gen set 1	
b.	Gen set 2	
c.	Gen set 3	
d.	Gen set 4	
e.	Gen set 5	
f.	Total	

C6. How much electricity was produced in TOTAL (kWh) from guesthouse-owned diesel generator sets in the year 2024?

C7. What is the capacity of the solar PV system (kWp) installed for the guesthouse's use?

	Type	kWp	Year 1	Year 2
a.	Roof mount			
b.	Floating			
c.	Ground mount			
d.	Stilts on lagoon			

C8. Do you have Battery Energy Storage System (BESS) installed on the guesthouse premises?

a. Yes

b. No

If yes, what is the capacity of the BESS (kWh)?

C9. What was the electricity consumption (kWh) per guest night in 2024

a. Electricity from Fenkaka powerhouse and public grid

b. Electricity from your own generator sets

c. Electricity from your own solar PV system

D. Solid Waste Management

D1. What was the total quantity of solid waste generated by the guesthouse in 2024 (kg)?

D2. Please provide the quantity of waste generated by the guesthouse by type and method of treatment or disposal:

#	Type of waste	Quantity (kg)	Method of treatment
a.	Food waste		
b.	Plastics		
c.	Paper		
d.	Glass		
e.	Green		
f.	Other		

D3. Do you use any technologies to treat food waste within the guesthouse premises?

a. Yes

b. No

If yes, what technologies do you use *within the guesthouse* for food waste treatment?

#	Treatment method	Machinery	Investment value (USD)	Status of equipment
a.	Pulpers, macerators, shredders			
b.	Composting			
c.	Anaerobic digestion			
d.	Incineration			
e.	Pyrolysis			
f.	Gasification			
g.	Others (specify)			

D4. What technology is used *within the guesthouse* to reduce waste volume before treatment and/or disposal?

#		Machinery	Investment value (USD)	Status of equipment
a.	Bottling plant to reduce PET bottles			
b.	Plastic shredder			
c.	Compactor/baler			
d.	Glass crusher			
e.	Others (specify)			

E. Water Resources Consumption

E1. What are the sources of water for potable use?

Source	Yes/No	Additional info
Bottled water from outside		
Desalinated water		
Water bottled by the guesthouse		

E2. What are the sources of water for non-potable use?

Source	Yes/No	Additional info
Rainwater		-
Groundwater		-
Desalinated water from Fenaka Desalination Plant		If yes, got to E3
Own desalination plant		

E3. What is the rainwater storage capacity on the guesthouse premises (m³)?

E4. What was the total volume of rainwater consumed by the guesthouse in 2024 (m³)?

E5. What was the total volume of groundwater consumed by the guesthouse in 2024 (m³)?

E6. How much water was consumed annually by the guesthouse from Fenaka in 2024 (m³)?

E7. What is the capacity of desalination plants on the guesthouse premises?

	Desalination Plant	Capacity (m ³ /day)
a.	RO plant 1	
b.	RO plant 2	
c.	RO plant 3	
d.	RO plant 4	
e.	RO plant 5	

E2. What is the desalinated water storage capacity on the guesthouse premises (m³)?

E3. What was the total volume of desalinated water produced by the guesthouse in 2024 (m³)?

E4. What was the total amount of energy (kWh) used by the guesthouse to produce water in 2024 (if applicable)?

E5. What was the water consumption (m³) per guest night in 2024?

a. Rainwater:

b. Groundwater:

c. Fenaka:

d. Own desalination plant:

F. Wastewater

F1. What is the method of wastewater treatment and disposal for the guesthouse?

- Treated by guesthouse, recycled and used for irrigation (on guesthouse premises)
- Treated by guesthouse and disposed via guesthouse's outfall (Indicate location on map)
- Untreated by guesthouse and disposed via guesthouse's outfall (Indication location on map)
- Connected to island's sewerage

F2. What is the investment value for the guesthouse's sewage treatment and/or disposal method?

G. Ecosystem Interaction

G1. What is the total number of estimated ecosystem interactions undertaken by tourists facilitated by the guesthouse in 2024?

#	Interaction	Number of interactions	Total Estimated Value (USD)
a.	Diving		
b.	Excursions to Protected Areas		
c.	Excursions to Sensitive Environmental Sites		
d.	Mangroves		
e.	Sandbank		
f.	Visits to Uninhabited island		
g.	Cultural & heritage sites		
h.	Other: Please specify		

G2. What are sites visited by the tourists through guesthouse-organized activities and indicate how many were paid visits and the value of those visits?

#	Location	Activity Undertaken	Average number of visitors per year	Frequency of visit (weekly average)	Value of the activity (USD)
a.					
b.					
c.					
d.					
e.					
f.					
g.					

G3. What are the observed changes in ecosystem condition over the last 5 years in areas directly impacted or regularly visited by the guesthouse's operations/guests?

#	Habitat	Improved	No change	Declined
	Marine Protected Areas			
	Environmentally Sensitive Areas			
	Seagrass			
	Mangrove			
	Protected species abundance			
	Threatened species abundance			

	Land species diversity			
	Other, please specify:			
	Other, please specify:			

H: Actions taken for Environment Protection

H1. Please identify the initiatives and the investment value for measures against climate change risks undertaken by the guesthouse on its premises.

#	Type of protection measure	Year of investment	Estimated cost (USD)
a.	Beach replenishment		
b.	Temporary beach structures (sandbags, cement bags, geo bags, submerged breakwaters)		
c.	Permanent beach structures (groynes, breakwaters)		
d.	Increased setbacks, relocated structures, raised structures		
e.	Reef rehabilitation/coral gardening		
f.	Others (specify)		

H2. How much is spent monthly by the guesthouse for the following operational activities? [

#	Activity	Estimated monthly expenditure (USD)
a.	Waste transfer/transportation	
b.	Waste management centre operations	
c.	Beach cleanups	
d.	Sewage and wastewater treatment	
e.	Maintenance of existing coastal protection structures, if any	
f.	Others (specify)	

I. Employment

I1. What is the number of staff employed by the guesthouse by type, level, and local/foreign?

	Male	Female
Total employment		
Maldivian		
Foreign		
Top Management and Professionals		
Middle Management (Managers, HOD)		
Supervisors and Team Leaders		
Operational staff, rank and file		

12. What is the number of staff employed by the guesthouse by area of work?

	Male	Female
Management, administration, human resource		
Finance, purchasing, stores		
Front office		
Reservations, sales, & marketing		
Housekeeping and laundry service		
Food and beverage service		
Transport		
Spa, Gym		
Dive Center, Water sports, Recreation		
Beach, gardening, environmental conservation		
Engineering		
IT		
Security		

10.2 Visitor survey questionnaire

Laamu Visitor Survey

ES: EC: EE:

Male (checkbox): Female (checkbox)

Section A – Profile of Visitors

1. Nationality: _____

2. Country of Residence: _____

3. Age Group (please select one):

- a. 18-24 years
- b. 25-34 years
- c. 35-44 years
- d. 45-54 years
- e. 55-56 years
- f. 65 years and over

4. How many nights are you staying during this visit?

#	Place of stay	No. of nights
a.	Tourist Resort in Laamu atoll	
b.	Hotel or Guesthouse in Laamu Atoll	
c.	Tourist Resort in another atoll in the Maldives	
d.	Hotel or Guesthouse in another atoll	
e.	On a liveaboard/safari vessel	
f.	Total nights in Maldives	

5. How many times have you visited the Maldives? (please select one box)

- a. First time
- b. 2-5 times
- c. 6-10 times
- d. More than 10 times

6. Is this your first visit to Laamu Atoll? (please select one)
- a. Yes, first time
 - b. No, 2-5 times
 - c. No, 6-10 times
 - d. No, more than 10 times
7. With whom did you travel? (please select one box)
- a. Travelled alone
 - b. Partner
 - c. Family
 - d. Friends
 - e. Business/work associates/study group
8. How many people are in your travel group, including yourself?
- a. Adults: _____
 - b. Children (below 18 years): _____
9. What motivated you to choose the Maldives? (Please select all relevant boxes)
- a. Natural Attractions (beaches, weather, marine life, unique small island experience)
 - b. Relaxation and privacy (peaceful and quiet atmosphere, luxury experiences)
 - c. Adventure and activities (Diving, snorkelling, surfing, fishing, wildlife encounters)
 - d. Culture (Local culture and people)
 - e. Sustainability and ecotourism
 - f. Reputation/brand
 - g. Other, please specify _____

Section B: Visitor Behaviour and Preferences

10. How did you hear about Laamu Atoll? (Please select all relevant options)

- a. Social media
- b. Travel website/blog
- c. Word of mouth
- d. Local advertisement
- e. Tour operator
- f. Other, please specify _____

11. What aspect of Laamu Atoll prompted you to select the atoll, over others? (please select all relevant options)

- a. Beach
- b. Coral reefs and diving opportunity
- c. Marine life (whale shark, rays, sharks, turtles)
- d. Seagrass meadows and mangroves
- e. Culture & people
- f. Star Wars movie locations
- g. Other, please specify _____

12. Which of these areas did you visit/experience? (Please select all relevant boxes)

- a. Beach
- b. Coral reef
- c. Seagrass areas
- d. Mangroves
- e. Sandbank
- f. Uninhabited island
- g. Cultural & heritage sites

13. Which of the following activities did you participate in during your stay in Laamu Atoll? (Please select all relevant options)

- a. Swimming
- b. Snorkelling
- c. Diving
- d. Canoeing/kayaking
- e. Picnicking/Sand bank visit
- f. Photography
- g. Surfing
- h. Dolphin cruise/Whale watching
- i. Whale shark encounter
- j. Turtle watching/hatching
- k. Shark/sting ray feeding
- l. Private island experience
- m. Fishing
- n. Guided tours

14. How many times did you engage in the following activities during your stay and how much did you spend (in USD) per activity?

#	Activity	Number of times	Estimated spend/ expenditure in total (USD)
a.	Swimming		
b.	Snorkelling		
c.	Diving		
d.	Canoeing/kayaking		
e.	Picnicking/Sand bank visit		
f.	Photography		
g.	Surfing		
h.	Dolphin cruise/Whale watching		
i.	Whale shark encounter		
j.	Turtle watching/hatching		
k.	Shark/sting ray feeding		
l.	Private island experience		
m.	Fishing		
n.	Guided tours		

15. What are the environmental or other concerns/impacts that you noticed during your activities and what are your suggestions to improve the activities?

#	Activity	Concerns	Suggestions for improvement
a.	Swimming		
b.	Snorkelling		
c.	Diving		
d.	Canoeing/kayaking		
e.	Picnicking/Sand bank visit		
f.	Photography		
g.	Surfing		
h.	Dolphin cruise/Whale watching		
i.	Whale shark encounter		
j.	Turtle watching/hatching		
k.	Shark/sting ray feeding		
l.	Private island experience		
m.	Fishing		
n.	Guided tours		

16. How much did you spend on the following?

#	Item	USD
a.	Food and drinks per day	
b.	Accommodation per night	
c.	Transport to Laamu atoll	
d.	Transport within Laamu atoll	

Section C: Sustainability

17. The following matrix presents statements on the importance of sustainable actions on Laamu Atoll. Please indicate how important each is to you.

	(1) Not at all important	(2) Not very important	(3) Neutral	(4) Somewhat important	(5) Very important
Reduction in use of natural resources (water, energy)					
Enforcement of guidelines to snorkelling and diving					
Eliminate trade of wildlife and related souvenirs					
Strategies to address waste					
Eliminate single-use plastics					
Prevent overcrowding					

- End of questionnaire -