

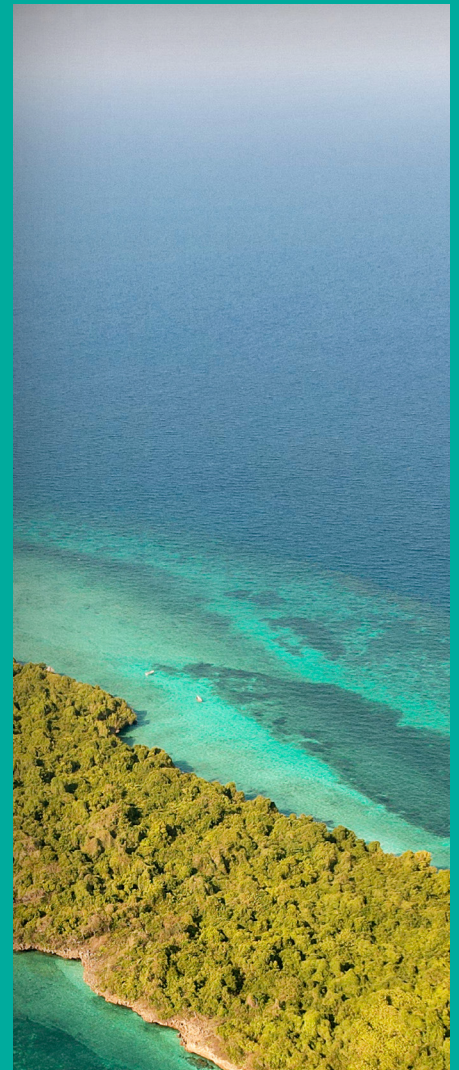
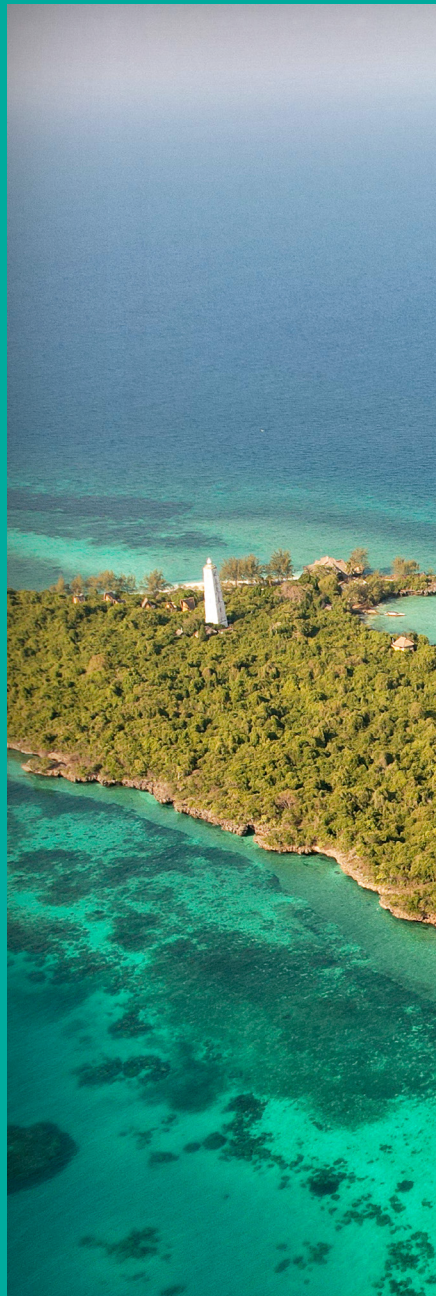


CHUMBE ISLAND
CORAL PARK
Zanzibar Tanzania

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V 0.1 January 2022

INTERPRETATION AND EDUCATION PLAN

C H U M B E I S L A N D C O R A L P A R K

Interpretation and Education Plan (IEP)

V 0.1 — for the Closed Forest Reserve of Chumbe Island

Produced by: Chumbe Island Coral Park (CHICOP)
PO Box 2303, Zanzibar, Tanzania

With support from: Sustainable Solutions International Consulting (SSIC)

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Chumbe Island Coral Park (CHICOP) Vision Statement

“The Chumbe Island Coral Reef Sanctuary and Closed Forest Reserve are effectively and sustainably managed in order to maximize their contribution to biodiversity conservation, serve as a model for effective ecotourism and MPA management, and provide a platform to promote wider environmental awareness for sustainable development and ecological stewardship in Zanzibar.”

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Executive Summary

Chumbe Island Coral Park (CHICOP) is an internationally acclaimed conservation area hosting a fully protected coral reef sanctuary and forest reserve. As a not-for-profit enterprise, the revenue generated by eco-tourism on the island funds all conservation management and supports Chumbe's extensive environmental education programmes with local schools and communities in Zanzibar.

With an on-site Education Center and sites of interest throughout the island, interpretation and education (IE) materials and the expression and transfer of information and calls to action are integral to the Chumbe initiative. However, much of the development of IEP materials through the project life has been ad hoc and without effective strategic planning. From March to October 2021, the Chumbe Team worked with IE specialists from the United States Forest Service (USFS) to more clearly define the projects' IE themes, topics and storylines; revisit and better define IE target audience; take stock of existing IE assets; and assess IE status, gaps and needs. This IE plan (IEP) is the result of this work and led to the refinement of four key thematic areas of IE focus for the Chumbe Project:

Thematic area 1: The Marine Environment

Thematic area 2: Land & Forest

Thematic area 3: Sustainable Development

Thematic area 4: Historical Monuments

Of these, '**land & forest**' was selected as a focus for this IEP, with the aim that the lessons learned could be extended and replicated to support the remaining three thematic areas. Six **priority topics** were then identified for IE related to land & forest:

Topic 1: Forest Value & Human Relationship

Topic 2: Geology & Evolution

Topic 3: Biodiversity & Wildlife

Topic 4: Ecology & Adaptations

Topic 5: Key Threats & Conservation Activities

Topic 6: Research & Ethnobotany

Within each of these topics, **theme statements** and **key storylines** were developed.

A complete **IE asset inventory** was undertaken and assessed against the above identified topics and associated storylines, and a **needs analysis** revealed gaps to address and areas requiring re-design and development. As a result, a total of twenty-six new and/or redesigned IE collaterals and materials were identified for development related to land & forest. Nine of these were prioritized for implementation in the first quarter of 2022, including: the completion of a Chumbe field herbarium; development of plant ID and information plates/cards for visitors to use; design, development, production and installation of new noticeboards in (i) the Education Centers atrium, and (ii) the entrance to the forest/side of mangrove pond.

Roles and responsibilities were identified, and a **timeline** was developed for implementing the nine priority collaterals identified. Mechanisms for **monitoring, evaluation and learning** were established for the progress of IE production and the impact of IE materials on the identified audiences. Mechanisms and schedules for maintenance were documented. Finally, a broad plan was outlined for completing the remaining product concepts for land & forest and replicating this approach for the remaining IE thematic areas of Chumbe Island in the coming months/years.

1. INTRODUCTION

Chumbe Island is located in the Western Indian Ocean (WIO), in the channel between Zanzibar's Unguja island and mainland Tanzania. It is part of the Zanzibar archipelago, a politically semi-autonomous region within the United Republic of Tanzania.

The Island is roughly oval in outline with its long axis running roughly north-south. It is approximately 1.1 km long and 300m wide at its widest point, and covers a total terrestrial area of 16.64 ha, and marine area of 55.06 ha. The highest point is ~ 5m above the high tide level.

Historically the island was uninhabited, and in 1904 (during a period when Zanzibar was under British Protectorate status) a lighthouse was built on the island as a navigation aid. Along with this a lighthouse keepers house and associated mosque was built for the lighthouse keeper. This led to the island being occupied by successive lighthouse keepers until the 1960's when Zanzibar gained independence followed by a revolution, after which management of navigation systems fell into disrepair, and the island was abandoned for decades.

Following this, military training operations on the nearby Unguja Island, active from the 1960's to early 1990's, meant that fishermen and other resource users tended to avoid the area. This resulted in the coral-rag forest on the island remaining largely undisturbed, and the coral reef adjacent to the island remaining healthy and highly biodiverse, whilst at the same time neighboring islands and coastal regions started to suffer the impacts of over-exploitation and destructive extraction practices prevalent at the time.

In the early 1990's a German aid worker, Sibylle Riedmiller, came across the island whilst searching for an appropriate location to establish an environmental education initiative to support raising awareness about marine conservation and sustainable management, primarily targeted towards school children. Chumbe was selected as an appropriate site due to the healthy, biodiverse coral reef, and dense coral-rag forest on the island. At the time, Zanzibar did not have any marine protected areas and little precedent existed for the establishment of such an initiative.

Therefore Ms. Riedmiller created Chumbe Island Coral Park (CHICOP) Ltd, a not-for-profit company set up for the sole purpose of establishing and sustainably managing Chumbe Island, which made Chumbe the first privately managed Marine Protected Area (MPA) in Africa.



Figure 1: Location of Chumbe Island Coral Park, Zanzibar, Tanzania, East Africa.

In the Articles and Memorandum of Association of CHICOP Ltd, the company's aim is:

"To manage, for conservation purposes, the Chumbe Island Reef Sanctuary and the Chumbe Island Closed Forest Reserve. This includes educational and commercial activities related to the non-consumptive use of the above-mentioned natural resources and the doing of all such other things as are incidental or conducive to the attainment of the above object."

(Company Articles of Association, S:3).

To achieve this, the Chumbe MPA is operationalized through three key pillars.

- I. Conservation
- II. Education
- III. Ecotourism



Figure 2: Chumbe Island. Delineated marine area indicates the fully protected coral reef sanctuary. Ec lodge is situated on the small peninsula. Remainder of the island is a fully-gazetted forest reserve.

Conservation

The Chumbe MPA has two core protected zones:

- *The Chumbe Reef Sanctuary (CRS)* — is situated off the west coast of the island and is host to seagrass beds, fringing coral reef (coral gardens) and slope reef colonies. Covering an area of 55.06 ha. the CRS is home to a vibrant diversity of marine life, including reef fish, a wide array of invertebrates, turtles, dolphins and other sea creatures.

The CRS is 100% no-take zone (NTZ), meaning that no fishing, extractive or damaging practices are permitted within the entire area. Scuba diving is permissible only for research and filming purposes, to avoid novice or inexperienced divers damaging the reef, whilst snorkeling is permitted for the tourists and school children visiting the MPA.

- *The Closed Forest Reserve (CFR)* — covers an area of 16.64 ha. This dense coral-rag forest exists on fossilized coral substrate with no groundwater lens. It has three key sub-habitats: (a) scrub, (b) tropical dry forest, and (c) a mangrove pool. The CFR is fully protected, with no extractive practices permitted. Trails for visitors and school children are available in the southern area of the forest, leaving the north inaccessible. The CFR is host to a small population of critically endangered Aders duiker antelopes (*Cephalophus adersi*), nearly 80 species of birds, and an array of insects, reptiles and crustaceans, including the largest land-living crab in the world (*Birgus latro*).

Monitoring, managing, and ensuring there is full compliance with the protected status of these areas has been the core responsibility of the Chumbe Ranger team since the MPAs inception. To that end, extensive outreach and communication initiatives have been undertaken for more than twenty years (and are on-going) with proximal communities to the MPA as well as wider society.

Education

Providing environmental education services to the people of Zanzibar and beyond has been a primary objective of the Chumbe MPA since its inception. This is implemented through several key streams of work:

- *The Environmental Education (EE) Schools Programme* - Operational since 1996, the programme became formally endorsed by the Ministry of Education in 2000. Since this time (to date) the programme has involved more than 8.3 thousand school students. Activities conducted under this programme include: full-day excursion trips to Chumbe Island (where the students learn about marine and forest ecology, sustainable coastal management and ecotourism - including snorkel-based in-water teaching); classroom-based pre- and post-visit teaching activities in schools; running an annual 'Chumbe Challenge Award' competition with schools; and engaging in wider schools-based activities (such as guest lecturing and supporting wider field-based activities).
- *Teacher Training* – Supporting both in-service and trainee teachers, this initiative provides resources & methodologies for educating around issues of sustainability. Since 2000 more than 1,300 teachers and trainee teachers have participated.
- *University / College Education Support* – Both providing direct education to university and college students through field excursions to Chumbe and associated in-classroom teaching; as well as providing opportunities to conduct field work and research on the island.
- *Fisher & Community-based Outreach, Communication & Education* – Outreach based educational initiatives, communication and awareness raising with target audiences of fishers and resource users began in the early years of the project's development, and continues to be a critical element of the programme to this day.

- *Wider Stakeholder Outreach & Awareness Raising* – Undertaken over the years with a wide spectrum of stakeholders, from government personnel and civil servants, to professionals working in the tourism industry in Zanzibar and Tanzania.

Ecotourism

The Chumbe concept as a not-for-profit organization revolves around generating revenue from high-end ecotourism to provide all of the funding required for conservation management and environmental education initiatives. This concept has been successfully realized since the late 1990's, when Chumbe became the first financially self-sustainable MPA in the world.

The island has a seven (7) bungalow ecolodge, and can host a maximum of 18 overnight guests. In addition to this, daytrips to the island can be arranged as long as the maximum number of tourism (combined overnights and day trippers) does not exceed 18 people. The target tourism market is high-end, with day trips costing a rack rate of \$90 USD/ person (\$70 for residents), and overnights costing between \$260 (low season) (\$200 for residents), and \$280 (high season) per person per night (all inclusive), (\$220 for residents).

Each guest bungalow has been built using eco-architecture and technology to ensure there is zero-impact on the environment from tourism operations. This includes: rainwater collection systems through specially designed roofs, filters and storage systems; water heating (for showers) through solar water-heating panels; greywater filtration systems; composting toilets to manage human waste; and electricity provision through solar photovoltaics.

In addition to this: general waste is minimized at source (i.e. re-useable containers, non-use of disposables), organic waste is composted, and night light is provided by solar powered torches (to avoid light pollution and protect the feeding and breeding patterns of nocturnal animals). Also a range of auxiliary services are utilized in collaboration with local communities to maximize benefit streaming to local stakeholders, and promote environmentally sensitive practices on the island (i.e. the development and purchase of organic, biodegradable soaps; souvenirs made from recycled materials [glass bottles, flip flop shoes etc.]; purchase of fish and marine products directly through local traders working with community fishers; purchase of agricultural products locally; and provision of boat and car transportation through partnerships with local operators).

The staff team who manage the lodge operations on-site are predominantly from local communities, and have all received on-the-job training to provide service standards consummate with high-end operations.

1.1. Chumbe's Theory of Change

The simplified Theory of Change (TOC) for the Chumbe initiative (Figure 3) recognizes sustainable ecotourism as the bedrock of the program, through which 100% of financing is provided for conservation and education activities. This work leads to effective management and enhancement of biodiversity, promotion of ecosystem integrity and associated food security, and wider environmental stewardship towards the environment of Zanzibar cross-sectorally.

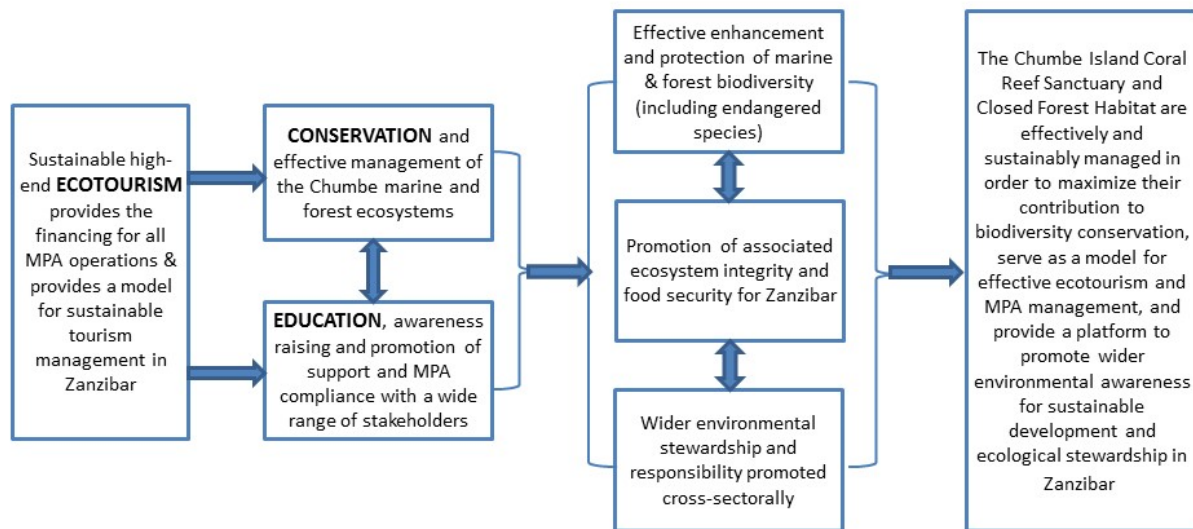


Figure 3: Simplified Theory of Change for CHICOP

Box 1: Sites of historical importance

As well as having a host of natural assets, Chumbe has historical assets that also form a part of the education program on the island.

A **lighthouse** was built on Chumbe in 1904, during the period when Zanzibar was a British protectorate and the Sultan of Zanzibar ruled locally. The lighthouse tower, made of coral rock, stands as a five-stage tower, and is approximately 34m (112 feet) high. The lighthouse falls under the jurisdiction of the Zanzibar Ports Corporation (ZPC) which ensures that it continues to function as an important and essential signal of shallow water to maritime users. In 1992 CHICOP signed a Memorandum of Understanding (MoU) with ZPC and the lighthouse was subsequently opened to public access. Since then it continues to be an historical monument of great cultural interest to all visiting guests and even the logo of the Chumbe MPA incorporates this unique landmark.

A **small mosque**, dating from around 1906, was built by the Zanzibar Indian Community for the first lighthouse keeper (who was of Indian descent) on Chumbe Island and is still in permanent use by the Islamic staff and visiting Islamic community members.

A **lighthouse keeper's house** was also constructed by the British in 1904, to provide a residence for the lighthouse keeper and his family. After the establishment of CHICOP, architectural plans were drawn up to convert the remains of the lighthouse keepers house into the **Education and Visitors Center**, and were developed in such a way as to retain the main infrastructure and maintain the remaining original construction as a historic monument. To date the Education and Visitor Center hosts the Island Manager office, the guest kitchen and dining area, the info table, island classroom, information boards and various chill-out areas.

1.2. Purpose of the Chumbe IEP

This interpretation and education plan (IEP) is being developed at this time (2021-22) through support from the US Forest Service (USFS) in order to:

- take stock of our IE assets;
- review to what extent our existing IE materials meet the needs of our target audiences;
- revisit and better define who those audiences are, and what their IE needs are;
- more clearly define our IE goals;
- revisit the objectives of the Chumbe Management Plan to ensure our IE goals align with the overall goals of the project / project's TOC;
- assess where improvements to existing materials needs to be undertaken, or gaps exist where new materials need to be produced in order to meet our IE goals;
- make a clear plan for improved product design, development, production and implementation / installation.

Note: 'Assets' and 'materials' may refer to ranging products, from written collaterals, to equipment, facilities and wider physical assets.

2. PLANNING PROCESS

The Chumbe IEP planning process was facilitated by USFS through monthly online meetings with the Chumbe core team and started in May 2021. After an introduction to interpretive planning concepts the Chumbe core team conducted workshops with the wider Chumbe team to identify the IE **target audiences**, explore **interpretive goals**, **thematic key areas**, and **desired outcomes** focusing at different audience groups. Results from these workshops were written up (annex A) and circled back to those Chumbe team members most closely working with these audiences for review and final input.

Four key themes were identified that are relevant for all audiences, and of these, one key theme was chosen to be the focus of Chumbe's IEP (**Forest and Land**), with the intention that the IEP remains a living document that will continue to be built upon as Chumbe progresses through the other three thematic areas.

Several mind mapping exercises within the Chumbe team were then used to produce a first draft of thematic interpretation and product concept ideas which formed the base for the development of **interpretative theme statements**, **sub-themes and storylines** (see sections 3.2 – 3.5) focusing solely on Chumbe's **Closed Forest Reserve**. These interpretive efforts are intended to foster conservation values through written media and interpretive products for which **design guidelines** and **recommendations** were developed. The recommendation section on how to best achieve Chumbe's interpretive goals and desired outcomes, taking into account Chumbe's current interpretive **inventory** and telling Chumbe's unique stories in respond to the implications of the audience analysis, was at the heart of the planning process.

3. INTERPRETATION PROGRAM STRATEGY

3.1. Audience analysis

In the Chumbe Management Plan, seven key audiences have been identified for interpretative educational targets which are also relevant for the development of this IEP.

I. School children

This audience has been by far the largest group targeted through the Chumbe Environment Education (EE) Program. Indeed, it was the lack of environmental education in schools that in large part prompted the establishment of the Chumbe project. School education in Zanzibar, as elsewhere in the region, is based on rote-learning of an extremely academic syllabus that has little relationship with the surrounding world. Extra-curricular activities, such as field excursions, are rarely organised and very few children have a chance to visit their surrounding ecosystems.

The initial trials for EE for school children took place between 1996 and 1999. These trials focused on establishing the *modus operandi* for school excursions to the island, including: processes for transportation; safety provisions during boat transport; programme design; material development; capacity building for the rangers in EE activities, such as snorkel training, managing groups of children, and proactive, positive, participatory teaching techniques; in-water safety standard establishment; and the development and installation of in-water 'Floating Information Modules' (FIMs) for the school children to use. Through the lessons learned from these early trials, the Chumbe EE programme for school children officially launched in February 2000, and has progressed since that time through twenty-one phases, with some focusing on different target aspects of conservation and sustainable development. CHICOP's EE program is, until now, the only regular and large-scale program in Tanzania that fills the gap in the school curricula and provides educational experiences and information for local schools on environmental issues and marine ecology.

In addition to field excursions, CHICOP also conducts outreach work within schools, which has proven to be extremely successful. Not only have schools fully participated in the field excursions, but they have also shown great enthusiasm to undertake more field based, hands-on, extra-curricular learning in the ordinary school environment. Some of the topics for many environmental clubs are waste management, biodiversity loss and climate change mitigation projects such as tree and mangrove planting activities.

II. School teachers

Teacher training has always been an integral component of the Chumbe EE programme. In 2001, the first 'teachers only' workshop was held on the island, attended by in-service teachers from schools proximal to Chumbe and various representatives from the associated Government Departments and the local Teacher Resource Centre. A result of this workshop was the decision to produce a "Coral Reef Module" for schools to follow (as an extra-curricular activity) in the form of an "Introductory Teachers Pack". The module aims to (1) bring issues of coral reef conservation and the importance of the marine environment into more everyday schooling in the region, and (2) assist teachers (and students) who are able to attend the Chumbe Education Programmes to make preparations prior to the excursion. This module has proven to be extremely popular and continues to be in use today.

Teachers actively bringing school children to the island are also provided with preparatory support from the Chumbe Education team, and a chance to learn hands-on the more field-based, participatory, fun and proactive methods for teaching the children through the visits. It is through

such work that both teachers and students have been inspired to set up Environmental Clubs in schools across Unguja.

From 2007-2015, the EE program was further expanded with an environmental education resource called the Chumbe Challenge Environment Award. This competition provided teaching material for student groups and teachers to continue working with environmental issues in their local environment once they had returned from an educational trip to Chumbe Island. Extensive evaluation seminars were held regularly to monitor the quality of the competition. However, to encourage competition diversity, it was decided in 2016 to change the format of the Chumbe Challenge Environmental Award and run more competitions throughout the year that link up to international environmental events such as World Environment Day, World Ocean Day, etc.

The Chumbe Education Team has also collaborated with teachers, the Ministry of Education and other partners to develop a series of teacher training materials and resources.

III. Fishers and marine resource users

CHICOP defines fishers and marine resource users under two categories: target communities and non-target communities. The **‘target communities’** of the Chumbe project come from the six villages most proximally located near Chumbe Island, namely:

- MAZIZNI (Shehia: Kiembe Samaki)
- CHUKWANI (Shehia: Chukwani)
- BUYU (Shehia: Chukwani)
- NYAMANZI (Shehia: Kombeni)
- KOMBENI (Shehia: Kombeni)
- DIMANI (Shehia: Dimani)

‘Non-target’ communities refer to all others in Unguja.

In the early years of the project, considerable outreach and awareness raising activities were conducted in the target communities (and less so in the non-target communities) regarding the protected status of Chumbe, the importance of conserving the reef habitat for sustainable fisheries, and the role Chumbe has in providing a model for sustainable ecotourism, etc.

Specialist EE excursions have also been conducted with fisher associations active in both target and non-target communities, as well as Sheha and Elders groups. Other specialist EE initiatives have been undertaken with women’s groups (such as the Chaza women’s groups and women seaweed collective), and other community groups and associations (such as local tourism collectives).

These community-based EE programmes have, and continue to be, essential for both enhancing environmental awareness amongst the local population, as well as promoting local resource users to be compliant with Chumbe’s non-extractive regulations and protected status.

IV. Universities and Academic Institutions

Since Chumbe opened to visitors in 1998, there has been considerable interest in the project from a wide range of national and international universities and academic institutions. As local Zanzibari higher educational establishments began to be more firmly established in the early 2000’s, student groups from key universities and colleges also began to make study visits to the island.

From the international academic community, student groups from the School for International Training (USA), Kilmar University (Sweden) and Oxford University (UK), have been regular visitors to the island, with other university groups visiting including the University of Bayreuth (Germany), University of Stockholm (Sweden), and University of Cambridge (UK).

Study topics for such groups are prepared in advance and the EE excursions are tailored to the students’ interest areas. In recent years, demand from the local Zanzibari institutions has become

such that Chumbe secures study visits for two local partner universities, with remaining study excursion slots only being made available through application and bidding.

V. Governmental Agencies

Environmental Education (EE) activities in support of wide-ranging government agencies have been on-going since the project's inception. These government agency-based EE programmes are essential for both creating awareness about the Chumbe project and its role in wider Zanzibar's efforts towards biodiversity conservation, sustainable development and food security; as well as promoting general environmental awareness amongst the civil service sector. Undertaking repeat excursion-based EE initiatives with these agency departments is critical due to the high turnover and transition rate of staff within the departments.

VI. Local NGOs

Since 2011, Chumbe has also undertaken excursion-based EE initiatives with a range of local NGOs that provide training for Zanzibaris in the areas of tourism and environment. Among the key organisations/training centres is the Kawa Training Centre, which has a strong capacity building focus on Zanzibari youth and offers licensed tour-guiding courses where EE excursions to Chumbe and pre-visit lectures by the EE team have become a significant part of the program.

VII. Tourists / visitors to the Chumbe eco-lodge

The Chumbe eco-lodge comprises of seven bungalows and tourists visit the island as either overnight lodge guests or day trippers. Carrying capacity of the island has been set at a maximum of 18 guests per day (lodge guests and day trippers combined).

All visitors are able to participate in guided snorkelling, forest trail and intertidal walks to experience and learn more about the exceptional natural environment. In addition, a range of comprehensive information boards are displayed in the Education Center that cover all aspects of the project, are regularly up-dated and provide another learning opportunity beyond the guided tours. Evening presentations by visiting researchers and/or the Conservation Manager are also very popular and allow staff and visitors alike to get further insights in current projects.

Since the opening of the island to visitors in 1998 annual average occupancy rates have ranged from a low of 21% (in 1999) to a high of 89% (in 2007). Throughout the year, seasonal fluctuations exist, with the months of July, August and December generally tipping into 90 + % occupancy. Lodge guests tend to stay between two and three nights on the island. Analysis conducted in 2017 found the majority of visitors originate from Germany, North America, Scandinavia and Great Britain; and learn of Chumbe through the online website and from TripAdvisor rankings. More than 90% of reviewers on this portal have rated the Chumbe experience as 'Excellent' (the top ranking available).

Box 2: Environmental Education Program – numbers to date

From the start of the EE program (1996) CHICOP has conducted environmental field excursions for 8,403 students, 1,395 teachers and 1,465 community members (prioritized fishers) and government officials. This equals a total number of 11,263 participants that have participated in Chumbe Environmental Education (EE) excursions up to December 2021 (Figure 4 and 5).

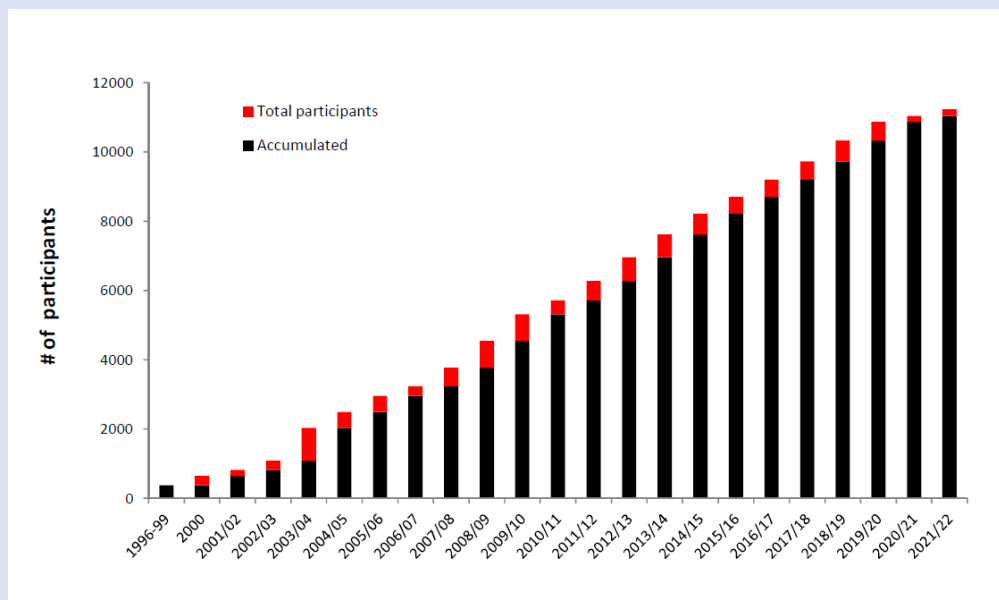


Figure 4: Total number of participants (students, teachers, government officials, community members, etc.) that have participated in EE trips to Chumbe Island, accumulative from 1996 until November 2021.

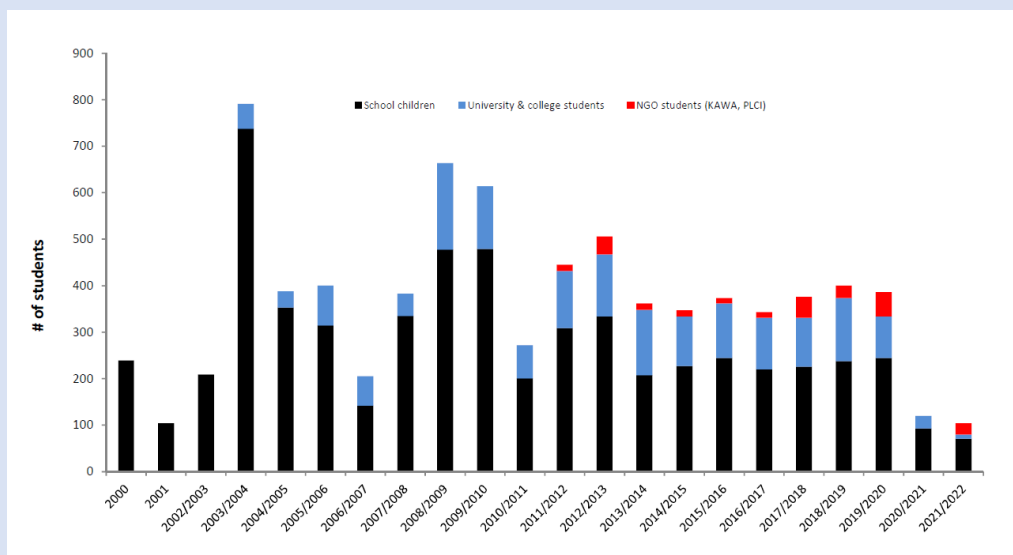


Figure 5: Break-down of EE-target groups (students, teachers, community and government members) that have participated in EE trips to Chumbe Island, from 2000 until December 2021 (excluding trial phase 1996-2000 data).

Box 3: Standard field excursion experience on Chumbe

Generally, all visitors participate in the following activities (though the activities are tailored to the audience concerned).

- **Snorkelling in the CRS** – Through this, visitors learn about the importance of the coral reef habitat for sustainable fisheries and biodiversity conservation; and the reliance humanity has on coral reef systems to provide essential ecosystem services. For many school children this is the first time they experience snorkelling and seeing a coral reef under water, and many have limited (or none) swimming experience. Therefore, Chumbe educators proficient in teaching snorkelling lead this work, and various support aids are available, such as inflatables with hand-holds, reef viewers etc.
- **Walking the forest trail in the CFR** – visitors are taught about the unique ecology of the coral-rag forest and the importance of sustainable landscape management for the many species dependent upon this habitat.
- **Undertaking an eco-bungalow tour** - visitors learn about sustainable eco-tourism and eco-architecture and the importance of sustainable tourism management to avoid detrimental impacts on marine and terrestrial environments.
- **Climbing the lighthouse** –this activity provides further insights in navigational aid infrastructural developments across the region through history

3.2. Interpretation goals and key thematic areas

Goals — In the context of this IEP, interpretation goals are defined as ‘the desires and organizational direction linked to Chumbe's mission, and the change Chumbe wants to see and create overall in the target audience(s)’. Through the process steps outlined in section 2, the following interpretation goals were identified as relevant for all target audiences:

- To showcase the concept of sustainability, and the importance of ecological conservation and the preservation of social and cultural heritage through an effectively managed marine protected area (MPA).
- To inspire and motivate visitors to make tangible changes to their own societies for a sustainable future.

Thematic areas — these represent the big ideas/ topical themes of importance / relevance to Chumbe that are considered priorities of focus. Through the planning process outlined in section 2, the following thematic areas were identified as relevant for all of Chumbe's target audiences.

I. **The marine environment** — including:

- the importance of marine biodiversity on coral reefs, intertidal areas and seagrass beds;
- mechanisms for healthy reef conservation;
- the importance and processes for managing beaches and coastlines;
- key threats to these habitats and conservation activities to address these threats.

- II. **The land & forest** — including:
- forest values and their human relationships;
 - geology and evolution;
 - ecology and adaptation;
 - biodiversity and wildlife;
 - key threats and conservation activities;
 - research and ethnobotany.
- III. **Sustainable development** — including:
- the concepts of sustainability;
 - environmental ethics;
 - eco-buildings;
 - waste management.
- IV. **Historical monuments** — focusing on the cultural, religious and social heritage of the Chumbe Lighthouse, Mosque and Lighthouse keeper's house (now the Education Center).

Of the above four interpretive themes, **Land & Forest** was selected as a focus for this IEP, with the aim that the lessons learned in the development of this IEP could then be extended and replicated to cover the remaining three priority thematic areas.

3.3. Interpretive CFR mission statement

Through workshopping with the Chumbe team, a mission statement was developed for the closed forest reserve (CFR) that drew from Chumbe's organizational vision and management plan aims, crafted to focus on the CFR alone. This resulted in the following statement.

"The Closed Forest Reserve (CFR) is one of the last pristine coral rag ecosystems in the Indian Ocean designated in 1994 for ecosystem and biodiversity protection and recreation and managed to exclude exploitation and provide spiritual, scientific, educational, recreational and visitor opportunities for present and future generations."

This mission statement was developed to underpin the development of interpretive topics, theme statements and storylines, in order to ensure all IEP product recommendations align with this mission statement.

3.4. Interpretive CFR topics, theme statements and storylines

Building on the ideas developed under the **thematic area of land & forest** (as outlined in section 3.2.) the Chumbe team workshopped this area further in order to focus in on six key **topics**. These are as follows:

Topic 1:	Forest value & human relationship
Topic 2:	Geology & evolution
Topic 3:	Biodiversity & wildlife
Topic 4:	Ecology & adaptations
Topic 5:	Key threats & conservation activities
Topic 6:	Research & ethnobotany

For each of these topics a **theme statement** has been developed, which was further developed into key **storylines** considered appropriate / priority for focus in IEP products. These are as follows.

Topic 1: FOREST VALUE & HUMAN RELATIONSHIP

Theme statement: Chumbe's protected coral rag forest is part of the East African Coastal Forest system which represents a global biodiversity hotspot of high socio-economic importance.

Key storylines:

- a) The Coastal Forests of Eastern Africa are small and often fragmented forest patches which are a result of deforestation and growing demand for farmland and forest resources.
- b) Compared to tropical rainforests, these coastal dry forests have not been priority areas for conservation because they have been hardly studied and their value, therefore, largely neglected.
- c) In Zanzibar, traditional boat building and firewood collection represents a delicate balance between human dependence on forest resource use and the need for conservation to protect these valuable environmental commodities.
- d) Chumbe's forest was declared a 'Closed Forest Reserve' in 1994 by the Government of Zanzibar, and the management was entrusted to Chumbe Island Coral Park.
- e) Through 30 years of effective park management, Chumbe Island hosts the most intact coral rag forest in the whole of Zanzibar archipelago and invites people from all over the world to explore the outstanding natural values of this forest.
- f) The Chumbe coral rag forest with its indigenous plant species is not only habitat for rare and endangered wildlife but also a natural pharmacy and important for people's spiritual and cultural well-being - a hideaway from the pressure and stresses of everyday life.

Topic 2: GEOLOGY & EVOLUTION

Theme statement: The sharp and weathered substrate of fossilized corals, tells geological stories of sea level change and forms the basis for life and biodiversity on Chumbe Island.

Key storylines:

- a) Once a vibrant coral reef during the last ice age, Chumbe witnessed a massive sea level drop about 10,000 years ago and became an island made of fossilized coral (locally known as 'coral-rag') which is largely limestone.

- b) Tide, wind and waves brought the first plant seeds and animals to the island which, over the next 10,000 years, turned the rocky and hostile landscape into a green sanctuary of high biological importance for generations to come.
- c) Climate change is impacting the complex dynamics of the island (such as increased sea level, greater coastal erosion) caused by human activities globally.

Note: The above storylines can be supported by further detailed information on the origins of the forest, seed distribution mechanisms, some highlights of the Chumbe geology (such as the giant clams on the forest walk, and the curved erosions of the coastline/intertidal).

Topic 3: BIODIVERSITY & WILDLIFE

Theme statement: Coral rag forests like on Chumbe Island are hidden treasures - not only for plant biodiversity but also for rare wildlife.

Key storylines:

- a) About 90% of Chumbe Island is undisturbed coral rag forest that is incredibly dense and appears like a green carpet with a canopy dominated by climbers.
- b) Also referred to as 'coral rag dwarf forest' because old and tall trees are not present, the nature reserve harbours a surprisingly high number of plant species and endemics.
- c) 178 species of plants belonging to 159 genera and 63 families were recorded during botanical surveys in 2021. Of these, 82% are considered to be indigenous – making Chumbe Island an area of important biodiversity value within the East African coastal forest.
- d) The forest is host to nearly 80 species of birds, including the African paradise flycatcher, Mangrove Kingfisher and Sea Eagle. The elusive Roseate tern (*Sterna dougalli*) also regularly nests on the islets in the southern part of the protected area.
- e) A saltwater-inundated mangrove pool in the nature reserve, dominated by Black Mangroves, provides a sheltered breeding habitat for bird species, reptiles and bats, including the Straw-coloured fruit bat (*Eidolon helvum*).
- f) Wildlife roams freely but seclusively through the nature reserve and features the critically endangered Ader's duiker (*Cephalophus adersi*), a small forest-dwelling antelope that is now extinct in its original range on the African mainland coastal thicket and forests of the Kenyan coast. A total of six animals were translocated from the Zanzibar's Mtende Region to Chumbe Island between 1998 and 2000. These shy animals were ear-tagged and have since been monitored using "drives", wildlife cameras and sighting records, revealing at least one offspring born on the island. Their shyness and the density of the forest however, makes monitoring challenging.
- g) Chumbe's terrestrial flagship species is the giant Coconut Crab (*Birgus latro*), the world's largest land-living crustacean with a weight reaching 4 kg and a length of up to a meter (leg to leg). This evolutionary marvel lives up to 60 years as a nocturnal forest resident, protected from overharvesting and habitat loss.

Note: the above storylines can be supported by further detailed information on the plant and animal diversity on the island, including a bird species list, butterfly inventory, plant inventory, and further information on the reptiles and crustacean species living in the forest.

Topic 4: ECOLOGY & ADAPTATIONS

Theme statement: Fossilized coral substrate, with only 10-20mm of soil and a lack of groundwater on the island, makes the coral rag forest a unique and rare environment where species have developed fascinating and adaptive mechanisms to cope with this harsh environment.

Key storylines:

- a) Freshwater is the most precious resource on Chumbe Island and its scarcity transforms the island into a 'functional desert'. A highly specialized plant community has developed to survive in these conditions, through the following key mechanisms:
 - *Finding water:* Some plants spread their roots over the ground to optimize the capture of water during the rains, for example, the baobab tree (*Adansonia digitata*) where you can see long over-ground roots. Other plants such as ficus species use aerial roots to collect moisture from cool air. Another trick plants use is to grow forms of rosettes or tunnelled shapes in which they can trap water and funnel it to their roots when it rains, like mother-in-law's tongue (*Sansivaria species*).
 - *Saving water:* Many plants on Chumbe have thick waxy coatings on their leaves to reduce water loss. Some trees, like the baobab, will shed leaves to save water during dry times. Dropping leaves also allows these plants to remove salts and toxins from themselves. This iconic 'tree of life' is also a great example of massive water storage capacity and a source of many myths, stories, and interesting facts about its history, habitat, and uses. Other trees would lose too much water by dropping leaves, so instead they peel back bark to cope with this problem.
 - *Stealing water:* Some plant species are thieves and murderers! For example, the strangler fig (family Moraceae) grows around other trees on Chumbe, and sucks out their water and nutrients. They also steal the plants sunlight through a canopy of dense leaves and roots that twist around the host plant. Eventually these parasitic plants kill their host.
- b) Another important ecological adaptation to Chumbe's environment is for 'defence'. For example, the candelabra tree Euphorbia (often mistaken for a cactus plant) has large succulent leaves filled with very poisonous milky white sap that will kill animals that try to eat it. It also has sharp spikes that deliver the toxin, and will blister a person's skin on contact. It has been known to cause blindness in people who get sap in their eyes.
- c) Coconut crabs are the masters of adaptation to their habitat because the hardened abdomen protects the crab and reduces water loss on land, specially adapted limbs enable it to climb vertically and they use a special organ called a branchiostegal lung to breathe air.

Note: the above storylines can be supported by further information about the key forest species, their history, biology and behaviour.

Topic 5: KEY THREATS & CONSERVATION ACTIVITIES

Theme statement: Chumbe's forest conservation work is taking place in the context of the urgent need to reduce deforestation on Zanzibar and restore forest ecosystems which are being lost at a rapid rate.

Key storylines:

- a) Zanzibar's coastal forest habitats are threatened by conversion to agriculture, infrastructure development and unsustainable harvesting of forest resources for charcoal production, firewood and bush meat, mainly driven by overpopulation.

- b) As the local government has little operational capacity and financial resources to fulfil its obligations to effectively protect forest habitats, privately managed conservation areas like Chumbe Island are crucial sanctuaries.
- c) Routine Patrolling, Surveillance and Enforcement (PSE) activities in the nature reserve have been the core responsibility of the Chumbe Ranger team since the forest gazettelement and ensure that the nature reserve is effectively managed and all attempted encroachments are deterred.
- d) Chumbe's forest conservation activities ensure habitat for wildlife, and protection of our forest as we depend on it for oxygen, habitat, erosion prevention and climate change regulation.
- e) In an enclosed ecological system such as Chumbe, invasive species are a constant challenge, and vigilance, along with swift response systems, are essential for preserving the ecological integrity of the indigenous habitat on the island.
- f) Globally, developers such as hotels can present a great risk to ecosystems through unsustainable land-use practices, over-exploitation and the importing of alien species into this fragile habitat. But Chumbe is making a difference, and leads by example so that others can learn how to combine business with preservation of the environment.

Note: the above storylines can be supported by further information on the 'ecosystem goods and services' provided by forests and information on forest loss regionally and globally.

Topic 6: RESEARCH & ETHNOBOTANY

Theme statement: Monitoring and managing Chumbe's Forest Reserve requires indigenous knowledge to work alongside scientific findings

Key storylines:

- a) Chumbe's coral rag forest is characterized by a highly specialized and endemic plant community that is poorly known because it has been hardly studied by scientists.
- b) Our rangers come from local villages and have extensive knowledge about traditional plant names and uses (medicinal, food and cultural) which has been merged with botanical surveys to increase our understanding of the value of what we protect.
- c) Since our earliest origins, humans have depended on plants for their primary needs and existence and our cultures evolved by passing ever more sophisticated knowledge of plants and their usefulness from generation to generation. As a visitor this knowledge is shared with you and provides a sense of place and culture.

Note: the above storylines can be further supported by inventories and examples of medicinal plants on Chumbe, the Chumbe herbarium, and information on past and current forest research projects active on the island.

3.5. Calls to action

Through the above topics, theme statements and storylines, CHICOP aims to promote 'calls to action' amongst the various target audiences as follows. Each of these relies on ensuring greater awareness about coral rag forest habitat, why it is important, and the need for its protection.

ACTION: Actively work to reduce deforestation activities in your communities. This may be through the use of alternative cooking fuels and sustainably sourced local woods and materials for construction.

Target Audiences: School children, School teachers, Local universities and academic institutions, Governmental Agencies and Local NGOs

ACTION: Ensure any wood products you purchase are sourced from sustainable forest materials (e.g., accredited by the Forest Stewardship Council [FSC] or other certified sources).

Target Audiences: Tourists / visitors (international) to the Chumbe eco-lodge

ACTION: Participate in initiatives to plant trees /reforest your communities.

Target Audiences: All audiences.

ACTION: Ensure laws and policies are in place and implemented to protect Zanzibar's natural forest heritage, and provide support to communities for alternate resource access.

Target Audience: Government Agencies.

ACTION: Consider a hotels impact / record of land and forest sustainability when choosing your travels.

Target Audience: Tourists / visitors to ecolodge

ACTION: Tell your friends and family about the work of Chumbe Island, the importance of forest conservation, and the importance of sustainable land and forest use in your communities.

Target Audience: All audiences.

4. Status, Gaps and Needs Analysis

Recognizing that the goals, themes and storylines outlined in section 3 are the aspirations for Chumbe's IEP materials, this section reflects on the extent to which existing materials already achieve this, the status of the IEP products Chumbe uses, where there are the gaps and which are the priority needs to address.

4.1. Interpretation Program inventory

Annex B provides a thorough inventory of all existing interpretive and educational information for Chumbe Island. Amongst these, the existing materials and products related to **'Land & Forest'** are as follows.

Table 1: Chumbe existing IE product inventory related to land & forest theme.					
Location	IE material / equipment	Description	Target audience(s) *	Language(s)	Notes
Education Center Atrium	Noticeboard (#2)	About the forest: highlighting the flora and fauna in the Forest Reserve	All (1-7)	English	Needs updating and branding
Education Center Classroom	Noticeboard (#4)	About tropical dry forests and mangroves (includes 'did you know' facts, highlights adaptations in coral rag forest, unique species, importance and conservation of mangroves)	EE audience (1-6)	English	Needs updating and branding
	Tool	An on-site Chumbe herbarium: collection of dried specimens from the Chumbe Forest	All (1-7)	English, Latin & Swahili	Currently in development
Education Center guest meeting area	Resource 1	A laminated information sheet on the birds of Chumbe (inventory)	All (1-7)	English	Needs updating and branding
	Resource 2	A booklet on the Coconut Crabs of Chumbe	All (1-7)	English	Needs updating and branding
	Resource 3	A booklet about the Chumbe Forest	All (1-7)	English	Needs updating and branding
In the forest	Resource 4	Plant ID cards located along the forest trail highlighting key species of interest.	All (1-7)	English, Latin & Swahili	Currently in development

* Note: audiences refer to those presented in section 3.1.

EE audience refers to: #1: School children, #2: School teachers, #3: Fishers and marine resource users, #4: Universities and academic institutions, #5: Governmental Agencies and #6: Local NGOs

Non-EE audience is #7: Tourists / visitors to the Ecolodge

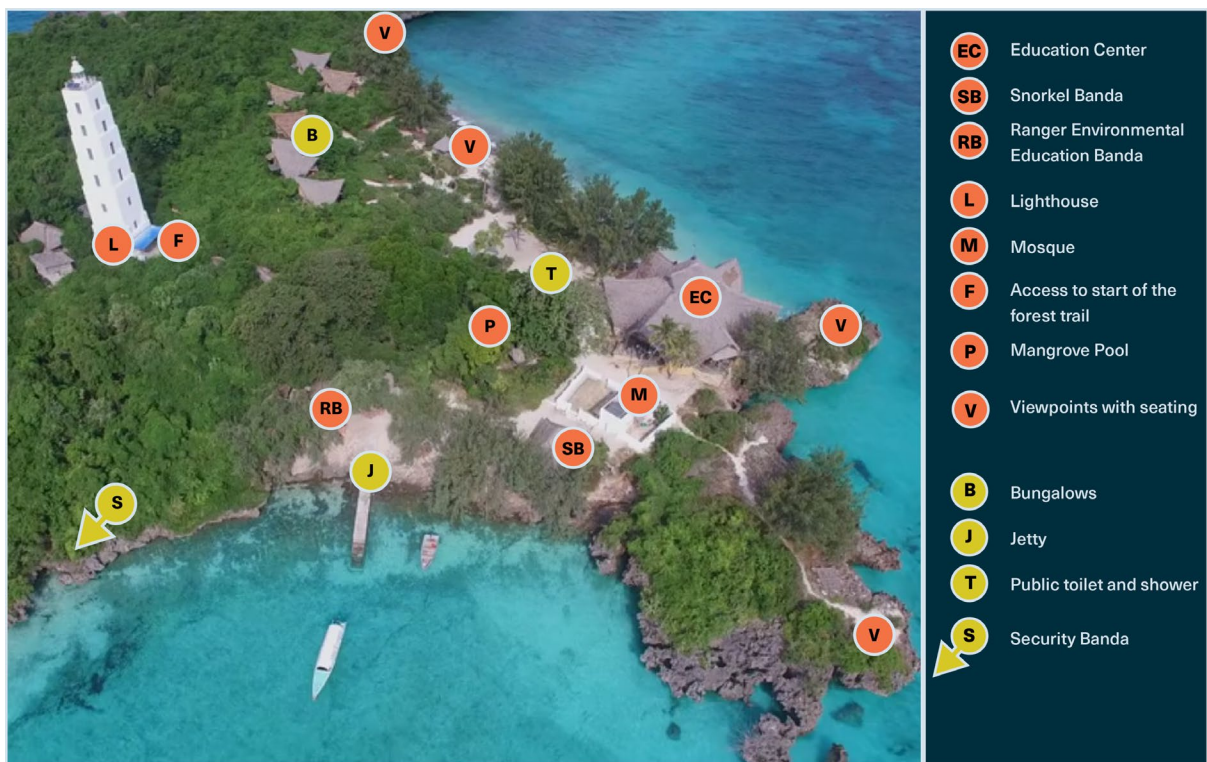


Figure 6: Site map of Chumbe Island infrastructure.

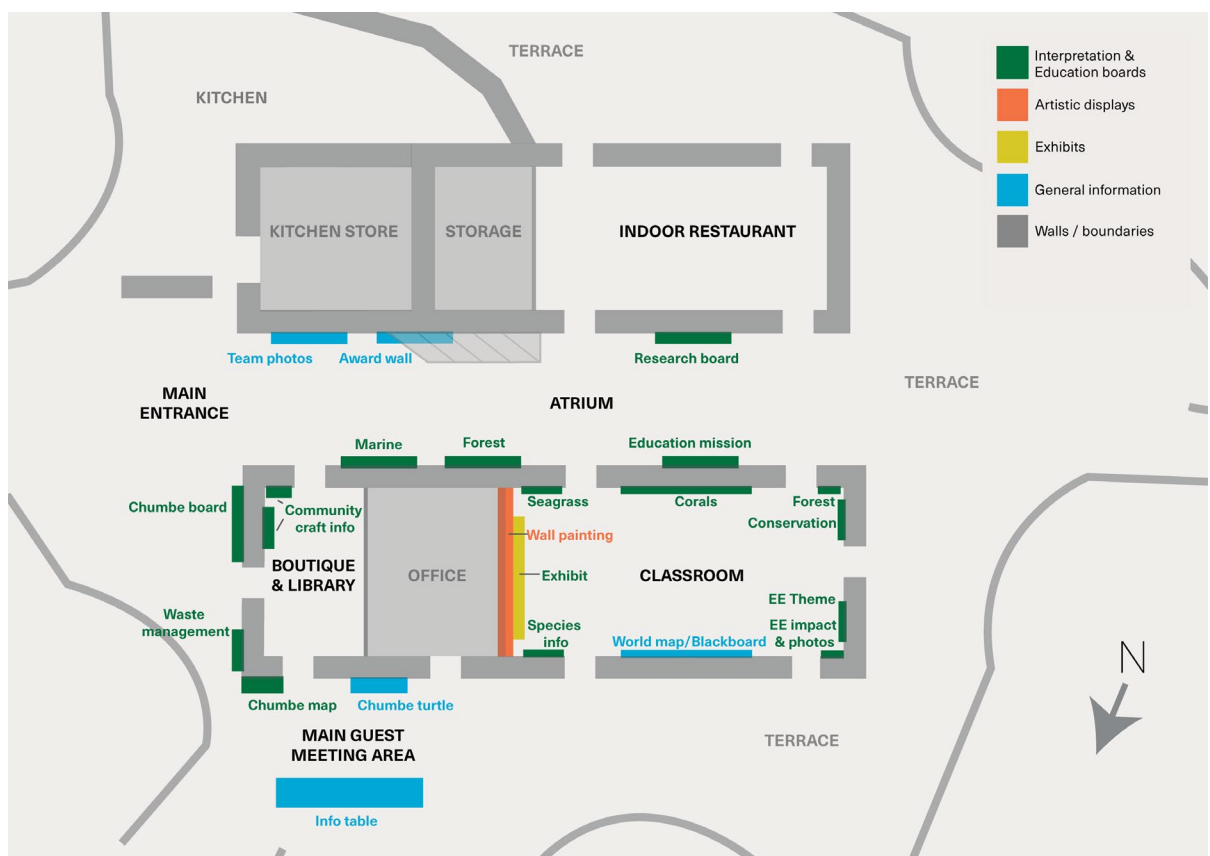


Figure 7: Birdseye view of the Education Center, showing the key areas where IE materials and resources are located.



Figure 8: Map showing the forest reserve and trail access areas.



Figure 9: Some of the existing IE materials about land & forest. Noticeboard #2 (left) and #4 (right).

4.2. Interpretation program needs analysis

Cross-checking the above existing inventory of IE materials against the themes and storylines identified in section 3.4, it is possible to see the following:

- Observation #1:** Most of the existing resources and IE materials are out of date and need improvements, re-designing, upgrading and re-developing in line with branding.
- Observation #2:** Existing resources and IE materials are haphazard, particularly the noticeboards, where there is a lack of a clear storyline or main IE purpose of expression.
- Observation #3:** The vast majority of existing materials are in English language. While the EE audiences (1-6) do largely speak English (as it is the language of schools past a certain age), the lack of information available in Swahili does limit the accessibility of some of these audience members, particularly people from communities and local fishers.
- Observation #4:** Of the topics and storylines identified in section 3.4, many are not yet covered by the existing IE materials (see box 4).
- Observation #5:** Most of the IE materials related to land & forest are situated within the Education Center. Other potential areas where IE information could be shared are currently under-utilized.
- Observation #6:** All of Chumbe's IE materials are currently located on the island, while activities are increasingly taking place within communities and amongst broader society. Therefore, more versatile and moveable materials are required to optimize exposure to key messaging.
- Observation #7:** Existing IE materials are nearly all physical (noticeboards, paper booklets etc.). Very little e-material exists. With increasing use of tablets and other e-devices across all target audiences, this lack of e-resources is a gap, and is under-utilizing potential medium for messaging and exposure.
- Observation #8:** The noticeboards on the island are generally comprised of laminated plastic sheets presented on a majamvi (traditional matting) material. While durable for the harsh conditions of the island, this form of presentation is outdated, and doesn't have consistency in appearance, branding etc.

Box 4: Topics & storylines not yet covered by IE materials

Topic 1: FOREST VALUE & HUMAN RELATIONSHIP — is somewhat covered in the existing IE materials, particularly noticeboard #4. However, key storylines that are not yet represented include the lack of studies done on this habitat overall in the region, the details of the biodiversity of Chumbe (recently updated through surveys) and the socio-cultural importance of the forest for medicinal and spiritual values.

Topic 2: GEOLOGY & EVOLUTION — is largely covered in existing IE materials, though not optimally represented.

Topic 3: BIODIVERSITY & WILDLIFE — while information on the Ader's duiker and coconut crab are well represented (particularly in noticeboard #2 and associated booklets), information on wider fauna and flora of the forest is lacking, including information on birds, butterflies, bats, reptiles and plant species of the forest.

Topic 4: ECOLOGY & ADAPTATIONS — information related to this topic is included in a sporadic fashion across various collaterals, and is particularly addressed in noticeboard #4, but is not thorough, nor systematic or told in a cohesive fashion.

Topic 5: KEY THREATS & CONSERVATION ACTIVITIES — again storylines under this topic are included in several IE collaterals, but in a fragmented fashion. Areas not covered include the importance of private reserves to support overstretched government budgets, details of the risks facing coral rag forests elsewhere and the key forest conservation activities on-going in the park.

Topic 6: RESEARCH & ETHNOBOTANY — while a dedicated research noticeboard exists, it is focused heavily on the marine activities underway in the protected area, with little information about forest activities. Ethnobotanical information is passed verbally during the forest trail guided tour, but little information is available in IE collaterals.

Therefore, work is required to:

- Update the existing IE materials and rejuvenate them with appropriate storytelling and branding.
- Produce further IE materials to capture the range of topics identified (for use both on and off island).
- Capitalize on the currently under-utilized locations and mechanisms available for IE presentation.

5. Recommendations

To address the gaps identified in section 4, the Chumbe Team identified a range of potential IE products to update and further develop; prioritized these to meet immediate needs; developed design guidelines to inform the design and development of these products; and linked the products identified to the audiences being targeted.

5.1. Proposed interpretive products and placements: land & forest priorities

Annex C shows the full range of potential interpretive products identified by the Chumbe Team to address the gaps in IE materials. A total of 24 IE products were identified relevant to the selected theme of **land & forest**. These were then further prioritized to the following nine products.

1. Completion of the Chumbe field herbarium

Placement:	Education Center Classroom
Topics supported:	#3: Biodiversity & Wildlife, #6: Research & Ethnobotany
Target audience(s):	All (1-7)
Language(s):	English, Latin and Swahili
Category:	Tool
Description:	This herbarium development is currently in progress, and will provide an important tool for EE audiences, as well as a tool of interest to tourist visitors to the island. The herbarium will consist of dried specimens collected from the Chumbe forest, with their identification and associated information. The collection will be stored in an attractive coconut wood box in the classroom.

2. Completion and installation of plant labels in the forest

Placement:	In the forest
Topics supported:	#3: Biodiversity & Wildlife, #6: Research & Ethnobotany
Target audience(s):	All (1-7)
Language(s):	English, Latin and Swahili
Category:	Tool
Description:	Labels on steel rods located along the forest path to identify key species (with species name presented in English, Swahili and Latin)

3. Update of Education Center atrium noticeboard (#2)

Placement:	Education Center Atrium
Topics supported:	#1: Forest Value & Human Relationship, #5: Key threats & conservation activities, and #6: Research & ethnobotany
Target audience(s):	All (1-7)

Language(s):	English & Swahili
Category:	Noticeboard
Description:	This noticeboard will be updated and entirely re-designed to focus on select storylines; predominantly visual and bi-lingual, the content will be strategically developed to avoid duplication of information and focus on the topics identified.

4. Development of plant ID and information plates/ cards

Placement:	Education Center Classroom
Topics supported:	#2: Geology & evolution, #3: Biodiversity & wildlife, and #4: Ecology & adaptations
Target audience(s):	All (1-7), with emphasis on EE audience
Language(s):	Swahili & English
Category:	Tool
Description:	Similar to the marine info-plates already existing on Chumbe, these cards (A4 or letter size) will include images of various key forest plants, their names, descriptions and key attributes of interest. They will be bilingual and intended to be carried into the forest during trail walks.

5. Production of graphic postcards with Chumbe forest themes

Placement:	Education Center guest meeting area & boutique / moveable (on and off island)
Topics supported:	#1: Forest Value & Human Relationship
Target audience(s):	#7: Tourists / visitors to the Ecolodge
Language(s):	English
Category:	Resource
Description:	A series of postcards will be produced focusing on various key forest attributes and information; highly visual with key 'call-to- action' messaging, these cards will be used as giveaways at events and with guests, as well as made available in the boutique.

6. Produce noticeboard at entry to forest / edge of mangrove pool

Placement:	Forest trail / edge of mangrove pool
Topics supported:	#2: Geology & evolution, #3: Biodiversity & wildlife, and #4: Ecology & adaptations
Target audience(s):	All (1-7)
Language(s):	Swahili & English
Category:	Noticeboard
Description:	Large, carved noticeboard, mostly visual, to be used to introduce guests to the forest (at start of forest trail). Will include map and key features to look out for on the trail.

7. Procurement and set-up of tablet with forest information, teaching tools and videos

Placement:	Education Center Classroom / moveable (on and off island)
Topics supported:	#1: Forest Value & Human Relationship, #2: Geology & Evolution, #3: Biodiversity & Wildlife, #4: Ecology & Adaptations, #5: Key Threats & Conservation Activities and #6: Research & Ethnobotany
Target audience(s):	EE audience
Language(s):	Swahili & English
Category:	Tool
Description:	To share images, videos and sounds of forest wildlife with students on EE trips, particularly species they are unlikely to see during the excursion (i.e. the elusive Ader's duiker and nocturnal coconut crabs). To match bird songs with bird images during forest studies as a demonstration tool for a more interactive experience.

8. Production of promotional banners

Placement:	Education Center / moveable (on and off island)
Topics supported:	All (holistic & generic)
Target audience(s):	All (1-7)
Language(s):	English & Swahili
Category:	Resource
Description:	Moveable for use both on and off island, these banners will be important for use in community and social events, to promote Chumbe and provide an easily accessible visual guide to the project's conservation and education goals.

9. Projector

Placement:	Education Center / moveable (on and off island)
Topics supported:	All (holistic & generic)
Target audience(s):	All (1-7)
Language(s):	n/a
Category:	Tool
Description:	Moveable for use both on and off island. To use for classroom sessions and guest presentations.

Risk Analysis

Table 2 provides a risk analysis of the design, development, production and installation of the above priority interpretive products. These relate to environmental risks (including any impact on the natural environment caused by the product), and health & safety concerns (for people involved in development, production and installation). Each line also indicates Director's approval to proceed with the products based on the risk levels presented.

Table 2: Risk analysis for priority products					
PRODUCT		ENVIRONMENTAL RISK		HEALTH & SAFETY	
1	Completion of the Chumbe field herbarium	Medium concern: Involves extraction of specimens from forest (granted permission under management agreement). Extraction phase completed.	✓	Low concern: As extraction phase is completed, activity only requires drying, placement and labeling of specimens.	✓
2	Completion and installation of plant labels in the forest	Low concern: Signs will be placed in available soil substrate near the species of interest without disturbing the surrounding environment. No clearing required	✓	Low concern: Placement is alongside the safe forest trail, does not require entry into denser parts of the reserve.	✓
3	Update of Education Center atrium noticeboard (#2)	Low concern: Involves professional printing (some use of chemicals) with placement inside building infrastructure. No natural areas disturbed.	✓	Low concern: Involves installation by maintenance team on island. Three-person team ensures all processes (ladder usage etc.) are secure.	✓
4	Development of plant ID and information plates/ cards	Low concern: Involves professional printing (some use of chemicals).	✓	Low concern: These will be handed to visitors to refer to during forest trail. May provide a distraction from the terrain and will require ranger notification to stop walking when referring to the plates.	✓
5	Production of graphic postcards with Chumbe forest themes	Low concern: Involves professional printing (some use of chemicals).	✓	Low concern: No health and safety concerns.	✓
6	Produce noticeboard at entry to forest / edge of mangrove pool	Low concern: Involves professional printing (some use of chemicals) and use of wood structure to be acquired from a sustainable source.	✓	Low concern: Will be positioned to ensure gathering point is in front gathering area, an appropriate distance from the edge of the mangrove pool.	✓
7	Procurement and set-up of tablet with forest information, teaching tools and videos	Low concern: Uses various materials in manufacture whose source sustainability credentials are undefined and not available for assessment.	✓	Low concern: Must be used with correct charger and at appropriately secure electrical charging outlet.	✓
8	Production of promotional banners	Low concern: Involves professional printing (some use of chemicals).	✓	Low concern: Care must be taken when erecting the banners.	✓
9	Projector	Low concern: Uses various materials in manufacture whose source sustainability credentials are undefined and not available for assessment.	✓	Low concern: Must be used with correct charger and at appropriately secure electrical charging outlet.	✓

5.2. Design guidelines

In order to develop the above products professionally, it is essential they conform to clear design guidelines.

Through workshopping with the Chumbe Team, with input from USFS interpretation specialists, and in alignment with CHICOPs existing branding, a full '**Design Guidelines**' document has been developed (see separate book).

These design guidelines outline the site conditions, and are intended to be applied by Chumbe staff, volunteers and contractors in order to:

- ensure consistency and appropriateness of visual identity and continuity of IE appearance throughout Chumbe,
- provide guidance for design considerations related to information interpretation, and
- advise on subject matter / content-based design considerations.

They provide details of Chumbe's color theme, layout design style, materials available for product development, and structural considerations related to site-selection for displays.

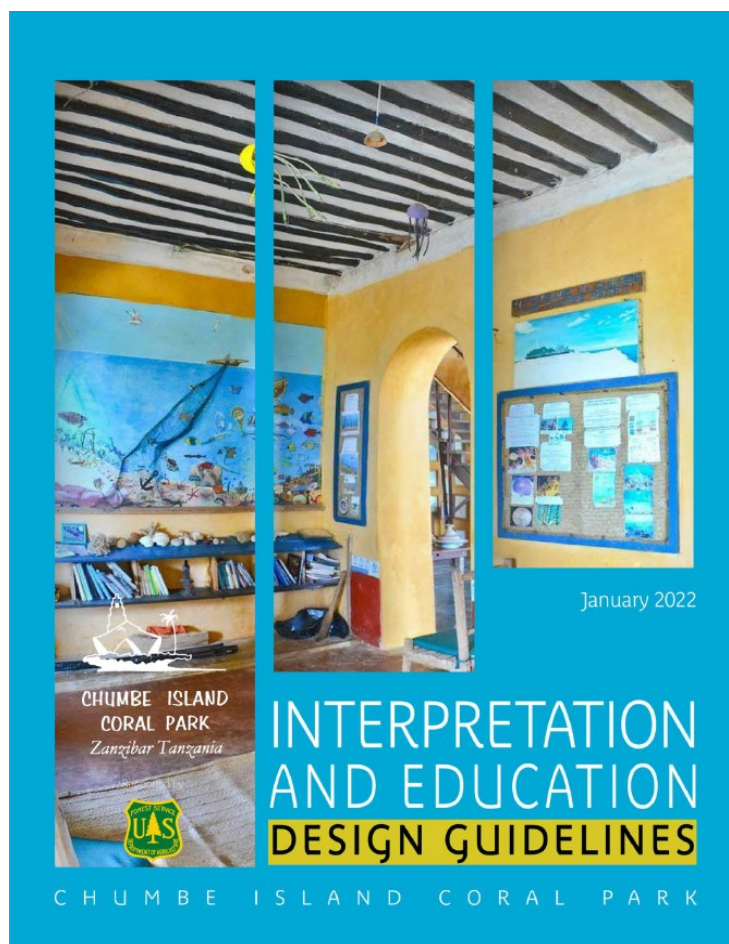


Figure 10: CHICOP has developed a full Design Guidelines document as a part of this initiative.

5.3. Budget: Land & Forest priorities

To develop, prepare, construct and install the nine prioritized IE products, the following budget is required.

Table 3: Land & Forest IE product priorities identified by Chumbe Team.						
PRODUCT		COSTED ITEMS	EST. USD	PER	QUAN	TOTAL
1	Completion of the Chumbe field herbarium	Expert advisory support to finalize all samples & complete replicate for confirmation of species through Missouri Botanical Gardens.	\$550.00	Person / day (Rob Wild)	2.0	\$1,100.00
		Postage cost	\$140.00	Post item	1.0	\$140.00
		Plant ID books for guest and EE reference	\$250.00	Book (collection)	1.0	\$250.00
2	Completion and installation of plant labels in the forest	Fabrication of label poles	\$5.00	pole	50.0	\$250.00
		Expert support for installation and ranger training	\$550.00	Person / day (Rob Wild)	1.0	\$550.00
			\$220.00	Person / day (John Ndege)	2.0	\$440.00
3	Update of Education Center atrium noticeboard (#2)	Printing. 128x96cm sign. Vinyl.	\$90.00	Print	1.0	\$90.00
		Replacement of noticeboard header, carved (wood + artisans time)	\$20.00	Product	1.0	\$20.00
		Majamvi matting for back of noticeboard	\$5.00	Piece	10.0	\$50.00
4	Development of plant ID and information plates/ cards	Expert advisory support on selected species, images and information to show	\$550.00	Person / day (Rob Wild)	1.0	\$550.00
			\$220.00	Person / day (John Ndege)	1.0	\$220.00
		Printing. A4 plasticized double-sided plates	\$5.50	Piece	100.0	\$550.00
5	Production of graphic postcards with Chumbe forest themes	Printing (100 cards per design, 10 designs)	\$0.50	Product	1,000.0	\$500.00
6	Produce noticeboard at entry to forest / edge of mangrove pool	Artisan carver and materials	\$1,100.00	solid piece + structures	1.0	\$1,100.00
		Printing	\$45.00	Square meter	2.0	\$90.00
		Installation	\$25.00	bag of concrete + hardcore	1.0	\$25.00
7	Procurement and set-up of tablet with forest information, teaching tools and videos	Purchase of tablet	\$205.00	Product	2.0	\$410.00
		Purchase of durable cases	\$20.00	Product	2.0	\$40.00
		Purchase of mounts for Classroom	\$35.00	Product	2.0	\$70.00
8	Production of promotional banners	Printing of banners. Standard upright size (incl. stands)	\$108.00	Print	3.0	\$324.00
9	Projector	Purchase of projector	\$180.00	Product	1.0	\$180.00
		Foldable projector screen	\$40.00	Product	1.0	\$40.00
			TOTAL		\$6,989.00	

These funds are kindly being provided by USFS.

6. Implementation

6.1. Roles and responsibilities

Development of the above IE materials is anticipated to require the following task elements:

- **Design & development** — all products are anticipated to conform (where relevant) to CHICOPs design guidelines.
- **Procurement / production** — this may involve procurement of certain IE materials available, or production (printing / manufacture etc.) of the materials following completion of the design process.
- **Installation** — of the material at the pre-identified location.
- **Maintenance** — of the material into the future.

In the following table, the roles and responsibilities for implementing this work is shown using a RACI matrix, whereby roles are divided into the following categories:

R = Responsible	i.e. Those who proactively do the work to complete the task.
A = Accountable	i.e. The one who is ultimately answerable for the correct and thorough completion of the task, who ensures the prerequisites of the task are met and who delegates the work to those responsible. This must only be one person.
C = Consulted	i.e. Those whose opinions are sought, typically subject-matter experts or associated within the organization; and with whom there is two-way communication.
I = Informed	i.e. Those who are kept up-to-date on progress, often only on completion of the task or deliverable.

The key individuals (and teams) who will fulfill the above roles are the following:

CD — Consultant interpretive specialist and graphic designer
ES — Chumbe Education Specialist (and Team)
PM — CHICOP Project Manager
DR — Co-Director of CHICOP
CM — Chumbe Maintenance Manager (and Team)
UF — USFS Team

Table 4: RACI chart showing roles & responsibilities for implementation																	
PRODUCT		DESIGN & DEVELOPMENT				PROCUREMENT / PRODUCTION				INSTALLATION				MAINTENANCE			
		R	A	C	I	R	A	C	I	R	A	C	I	R	A	C	I
1	Completion of the Chumbe field herbarium	ES	PM	DR	UF	ES	PM	DR	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
2	Completion and installation of plant labels in the forest	ES	PM	DR	UF	ES	PM	DR	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
3	Update of Education Center atrium noticeboard (#2)	CD	PM	DR, ES, PM	UF	ES	PM	DR, CD, PM, CM	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
4	Development of plant ID and information plates/ cards	CD	PM	DR, ES, PM	UF	ES	PM	DR, CD, PM	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
5	Production of graphic postcards with Chumbe forest themes	CD	PM	ES, DR, PM	UF	ES	PM	DR, CD, PM	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
6	Produce noticeboard at entry to forest / edge of mangrove pool	CD	PM	DR, ES, PM	UF	ES	PM	DR, CD, PM, CM	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
7	Procurement and set-up of tablet with forest information, teaching tools and videos	ES	PM	DR	UF	ES	PM	DR	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
8	Production of promotional banners	CD	PM	DR, ES, PM	UF	PM	PM	ES, DR	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR
9	Projector	ES	PM	DR	UF	ES	PM	DR	UF	ES	PM	CM	DR, UF	CM	ES	PM	DR

6.2. Timeline for implementation

The above activities are anticipated to take place over the months of January and February 2022, as shown in the below table.

D = Design and development

P = Procurement / production

I = Installation

Once the IE products are installed, maintenance will be on-going (see section 7 on MEL).

Table 5: Timeline for implementation									
PRODUCT		JANUARY				FEBRUARY			
		1	2	3	4	1	2	3	4
1	Completion of the Chumbe field herbarium	X	X	X	X				
2	Completion and installation of plant labels in the forest			X	X	X			
3	Update of Education Center atrium noticeboard (#2)				X	X	X	X	X
4	Development of plant ID and information plates/ cards				X	X	X	X	X
5	Production of graphic postcards with Chumbe forest themes			X	X	X	X	X	
6	Produce noticeboard at entry to forest / edge of mangrove pool			X	X	X	X	X	X
7	Procurement and set-up of tablet with forest information, teaching tools and videos						X	X	X
8	Production of promotional banners		X	X	X				
9	Projector			X	X	X			

7. Monitoring, Evaluation and Learning

Undertaking the monitoring, evaluation and learning (MEL) of the implementation of this IEP will involve several elements.

MEL on the progress of implementation — this will be an internal process, tracking the achievements, finalizations and installations of products, and ensuring the work progresses in a timely manner.

MEL on the effectiveness of implementation — this will be an MEL system that enables CHICOP to assess the effectiveness of the IE products in achieving the outcomes desired. It will involve the following.

- *Targeted MEL assessments:* Annual assessments will be undertaken by the EE team using targeted questions with all key audience demographics to gain perceptions of the materials, take home messaging, impacts and behaviour outcomes of the IE products. This will be through a combination of quantitative stakeholder questionnaires, qualitative semi-structured interviews with randomized samples of the audience populations, and participation observation methodologies.
- *Continuous MEL data gathering:* This will complement the above targeted assessments through the gathering of input that relates to the IE products continuously from existing MEL processes on the island. This includes the guest questionnaires, student post-visit questionnaires and other stakeholder fora that CHICOP implements routinely.

7.1. Maintenance, adapting & updating

For the priority products identified, the following regular maintenance processes should be followed.

1. **The Chumbe field herbarium** — will require monthly cleaning of the box and checking of all the cards.
2. **Plant labels in the forest** — should be routinely checked by rangers when providing forest trail walks. If any problems or need for repairs are observed they should be reported immediately to the Maintenance Department.
3. **Education center atrium noticeboard** — should be cleaned once per week to ensure removal of falling debris onto the board (such as lizard or bird droppings). The print quality should be checked bi-annually in case of fading or damage, and be re-printed and replaced if/when necessary.
4. **Plant ID and information plates/ cards** — should be checked each time they are returned by visitors, to assess any damage, wear or tear. If/ when damage makes the plate unsuitable for use it should come out of circulation. When the total plates are reduced by 30 percent, additional replacement plates should be printed.
5. **Postcards with Chumbe forest themes** — should be kept in a clean location. When stock is down to 25 percent remaining further re-prints should be made.

6. **Noticeboard at entry to forest / edge of mangrove pool** — should be cleaned once per week to ensure removal of falling debris onto the board (such as lizard or bird droppings). The print / product quality should be checked bi-annually in case of fading or damage, and be re-printed / re-produced and replaced if/when necessary.
7. **Tablet with forest information, teaching tools and videos** — should have appropriate virus software and automatic software maintenance systems installed. The product should be cleaned following IT equipment guidelines after each group EE visit.
8. **Promotional banners** — should be stored in a clean, dry place when not in use. They should be cleaned after display at events before packing up for storage.
9. **Projector** — should be stored appropriately when not in use, and briefly cleaned following IT equipment guidelines after each presentation.

Amongst the above products, some level of adjustments, adapting and updating overtime may also be required, as follows:

- **The Chumbe field herbarium** — if / when new species (not so far recorded) are identified in the forest through future surveys, specimens should be taken and added to the herbarium.
- **Plant labels in the forest** — if / when new species (not so far recorded) are identified in the forest that are of particular interest, and where/ when located adjacent to the forest trail, a plant label should be installed to identify it.
- **Education center atrium noticeboard and noticeboard at entry to forest / edge of mangrove pool** — the content of these noticeboards should be reviewed after two years and assessed whether everything is still relevant or any update/ adjustment is required. For example, if new information about the forest or wildlife is learned through research active on the island and is considered important to share in IE products, this noticeboard may want to be updated to reflect that new information.

8. Addressing the remaining products & IE themes

This IEP has focused on the prioritized thematic area of **land & forest**. Various potential interpretation products were identified for this theme, and this IEP shows the planning for the design, development and production of nine of these as prioritized. The remaining product ideas, as outlined in annex C will require further planning for production beyond this IEP.

In addition to this, three further thematic areas remain to be addressed through IE collaterals, as outlined in section 3. These are as follows:

- I. ***The marine environment*** — including:
 - the importance of marine biodiversity on coral reefs, intertidal areas and seagrass beds;
 - mechanisms for healthy reef conservation;
 - the importance and processes for managing beaches and coastlines;
 - key threats to these habitats and conservation activities to address these threats.
- II. ***Sustainable development*** — including:
 - the concepts of sustainability;
 - environmental ethics;
 - eco-buildings;
 - waste management.
- III. ***Historical monuments*** — focusing on the cultural, religious and social heritage of the Chumbe Lighthouse, Mosque and Lighthouse keeper's house (now the Education Center).

It is anticipated that the processes followed in the production of this IEP will be replicated for further IE material development for these remaining themes over 2022 and into 2023. To enable this, further funding will be sought to support both the IE process and product development.

8.1. Possibilities for partnerships and funding

Funding for this IEP and priority product development was provided by the United States Forest Service (USFS). CHICOP is extremely grateful for the training, mentorship, human and financial support provided to date, and would seek any further opportunities for continued partnership, both to finalize remaining land & forest product development, as well as further IE production for the remaining three themes.

Additional funding and support will also be sought through wider donors if/where required. CHICOP will also aim to use revenue generated from sales of merchandize (such as postcards, cook books and guidebooks) to help finance further collateral design and development.

The CHICOP Directors will continue to provide support, and tourist visitors to Chumbe Island will continue to be encouraged to '**Pack for a Purpose**'. This is an initiative that allows travelers to make a lasting impact in the community at their travel destination. If they save just a few kilos of space in their suitcase and take supplies for the project, they can make a priceless impact in the lives of our local stakeholders, particularly the EE audiences.

ANNEX A: Interpretive goals, themes and objectives

Workshop results from Chumbe Team

In June and early July, a series of mini-workshops were held to explore interpretive goals, themes and objectives for the Chumbe Interpretive Education Plan (IEP) being supported by USFS. These mini-workshops were facilitated by Eleanor Carter and Ulrike Kloiber, and focused on different Chumbe audiences; with team members most closely working with these audiences invited to participate, as follows:

GROUP 1: EE Team	GROUP 2: Outreach Team	GROUP 3: Tourist Team
Khamis Khalfan, Enock Kayagambe, Ben Taylor, Ulli Kloiber and Eleanor Carter.	Omari Nyange, Masoud Said, Khamis Khalfan, Enock Kayagambe, Ben Taylor, Ulli Kloiber and Eleanor Carter.	Ali Yussuf Chagga, Enock Kayagambe, Masoud Said, Omari Nyange, Matilda Revelian Ishungisa, Juma Salum, Ben Taylor, Ulli Kloiber and Eleanor Carter.
<i>Audience</i>		
1. School children 2. School teachers 3. Universities and Academic Institutions and local NGOs	4. Fishers and marine resource users (from target and non-target communities) 5. Governmental Agencies	6. Tourists / visitors to the Chumbe eco-lodge
<i>Mini-workshop date</i>		
June 22	June 29	July 01

GROUP 1 – Schoolchildren, school teachers, NGOs and Universities

Goals

1. To make students, teachers and NGO members enthusiastic about the concept of sustainability, and provide them the information they need to make tangible action for sustainability in their own backyard, and become ambassadors, peer educators and actors in sustainability for Zanzibar and the region.
2. To help students, teachers and NGO members to understand the concept of ecotourism and how vital it is for Zanzibar as part of blue economy.
3. To showcase evidence-based education to teachers (school and academia) as an alternative and high-impact teaching technique, with emphasis on practical learning.

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
LAND & FOREST Ecology, plants (including mangroves), birds and wider species (such as coconut crabs). Geology and evolution. Key threats (e.g. firewood gathering & alternatives such as renewable energy).	- Importance of the forest (reasons why we safeguard it, e.g., shade, oxygen, habitat for species and biodiversity; natural, cultural and spiritual heritage). - History and ecological evolution, and forest uses (firewood, food etc.). - Comparison between protected forest and forest that is gone/lost. - Value of forest and importance of acting (reforestation and conservation activities you can do in your own community / actions e.g., tree planting, protection, creating community groups etc.) - Understanding that everybody can contribute to conservation (not only task of government).	- Active conservation in own communities (e.g., tree planting for shade, fruit etc.) - Active contribution to carbon sequestration (making gardens in schools, using carbon calculations). - Appreciation and awareness of forest species (e.g., reduction in bird hunting, felling etc.)	Qual: Observations in schools post-visit. Interviews. Quan: # schools actively planting trees (or # trees planted) # schools calculating carbon
SUSTAINABLE DEVELOPMENT Eco-buildings (solar energy, grey water filtration system, etc.). Waste management (from sourcing to disposing, e.g. plastics ban, composting, recycling etc.). Environmental ethics.	Understanding water usage/harvesting / sustainability. - Understanding issues of waste (from sourcing through to disposing) and its impact on the environment. (The 4 R's: Reduce, Reuse, Repurpose, Recycle). - Understanding of 'eco food' (market value, health implications, etc) - Understanding energy, sourcing (impact on the environment) and alternative renewable energy. - Understanding eco-architecture and importance of locally available material - Understanding ecotourism principles and sustainable ethics (support to people, nature and economy) - Understanding principles of sustainable financing (for NGOs!) - Recognizing that everyone has a role to play in sustainable development.	Active improvements in waste management (schools and communities). - harvesting rainwater, - making a compost area - re-purposing of waste (turning challenges into opportunities, e.g., collecting and selling plastic waste with Zanrec, using compost for agriculture) - Active improvement on diet choices, health (consumption of more locally grown fruits and vegetables that are grown without pesticides) and employment choices (eco-farming)	Qual: Observations in schools post-visit. Interviews. Quan: # schools implementing waste management initiatives # schools implementing rain harvesting projects # schools involved in fruit/vegetable gardens # of trainings and discussions in NGOs and Universities pre/post Chumbe visit

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
HISTORICAL MONUMENTS Lighthouse Mosque Lighthouse keeper's house (now the Education Center)	- History of the buildings / connection to the past (facts and figures, sultan visit to mosque, lighthouse-keepers life on island, role of lighthouse in maritime navigation) - Architecture and building styles from the past (thick walls, no timber, durability) - Role of buildings for spirituality & religion. - History and culture as an integral part of ecotourism (respect people's beliefs and preserving cultures); understanding the difference between ecotourism and mass tourism. - Adaptations for the past meeting the future (construction of Education Center eco-roof).	- Respecting and preserving historical heritage. - Peer influencers for holistic ecotourism approaches in society.	Quan: Pre/Post questionnaire about historical heritage
MARINE ENVIRONMENT Coral reef Intertidal Seagrass Marine species (indicators / threats) Beaches and coastlines	- Appreciation of marine life and diverse habitats - Understanding value of protecting a reef (MPA) and its connection to sustainable fisheries (refuge, nursery, spillover effect, restocking neighbouring reefs), tourism value, medicinal value, cultural and spiritual value. - Understanding the difference between Chumbe (protected) and home reefs (fished/ unprotected). - Recognizing the importance of sustainable fisheries. - Understanding threats to the marine environment from everyday activities on land (inc. inland communities); e.g., marine debris/pollution / plastics; climate change impacts (driving cars, CO2 etc.).	- Reduction in waste / littering / marine debris. - Active clearing of marine debris/ beach clean ups. - Peer influencers/ spreading the message about value of protecting reef and sustainable fisheries. - Reducing carbon footprint (e.g., walking instead of driving, renewable energies). - Inspired to choose professional direction for marine conservation / management. - Creation of laws and bylaws regarding conservation of seagrass and coral reefs (initiated by NGOs!)	Qual: Student testimonials Interviews during post-visits Quan: # of beach clean-ups conducted per school # of students that are able to articulate influence on their professional direction

GROUP 2 – Fishers, marine resource users (from target and non-target communities) and Governmental Agencies

Goals

1. To show fishers, marine resource users and governmental agencies first-hand the ecological and social impacts of a privately managed and successfully enforced MPA.
2. To inspire and encourage replication of success elements within and beyond Zanzibar.

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
MARINE CONSERVATION Reef sanctuary with high biological diversity (number and range of different species), healthy coral reef	• Comparison between protected and unprotected coral reefs • Importance of Patrolling, Surveillance and Enforcement (Chumbe's approach and how to walk the talk by promoting fish, no fishing in MPA) • MPA demarcation through buoys (how they are installed and maintained, their importance for marine users such as ferry boats) • Chumbe's MPA approach: private sector involvement, close cooperation with Department of Fisheries and communities, importance of communication and persistence, transparency. • Understanding how to truly protect with commitment and passion • Understanding that everybody can contribute to marine conservation (not only task of government).	• To feel encouraged to take action and conserve • Replication of success elements, whether through officially gazetted MPAs or community managed areas	Qual: Community interviews Quan: Questionnaires. % of participants that state that they feel encouraged to take action
TEAM STRENGTH & COHESION	• Value of people with different background and origin coming together and work together • Understanding of local management and staff's ownership over resources (few high-end tourism businesses have local managers on site)	• Encouragement for local people to apply for and get involved in senior management positions • Empowerment of local people	Quan: % of EE participants that work in management positions

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
FOREST CONSERVATION	Same key messages as mentioned by group 1 with emphasis on: Urgency and importance to transition from non-renewable to renewable energy	Creation of mechanisms that enable communities to transition to renewable energy (e.g. usage of sustainable stoves)	TBD
HISTORICAL MONUMENTS Lighthouse, Mosque, Lighthouse keeper's house (Education Center)	Same key messages as mentioned by group 1 with emphasis on: Importance of private sector involvement in preserving historical monuments	Everybody can play a role here as well	Quan: Pre/Post questionnaire about historical heritage
SUSTAINABLE DEVELOPMENT Eco-buildings (solar energy, grey water filtration system, etc.). Waste management (from sourcing to disposing). Environmental ethics.	- Ideas of eco-tourism (to understand limitations) - Concept of carrying capacity - Transparency of business potential - Inspiration for individual action - Everyone has a role to play	- Take action individually and as community (e.g. collecting, sorting, etc) - To show commitment to do your part - Take eco-architecture elements back to communities	Quan: Questionnaire: % of EE participants that state that they feel encouraged to take action
TRANSFER OF KNOWLEDGE	- Appreciation of how EE is tailored to audiences - Utilization of & communication through local knowledge - Involvement of school curriculum in EE program - Understanding education as an important tool for conservation	School curriculum reviewed and put in action under aspects of sustainability (Ministry of Education)	Quan: Questionnaire: % of EE participants that state that knowledge transfer was tailored Follow-up interviews with Ministry of Education

GROUP 3 - Tourists / visitors to the Chumbe eco-lodge

Goals

1. To enable our tourists/guests a once in a lifetime experience in a truly lived eco-destination, knowing that their visit has a close-to zero impact on the environment and directly supports conservation and environmental education efforts on the ground
2. To go 'beyond a holiday experience' by making our tourists/guests enthusiastic and curious about the various aspects of sustainability, and to inspire them to become ambassadors and to make tangible action for sustainability in their respective home countries

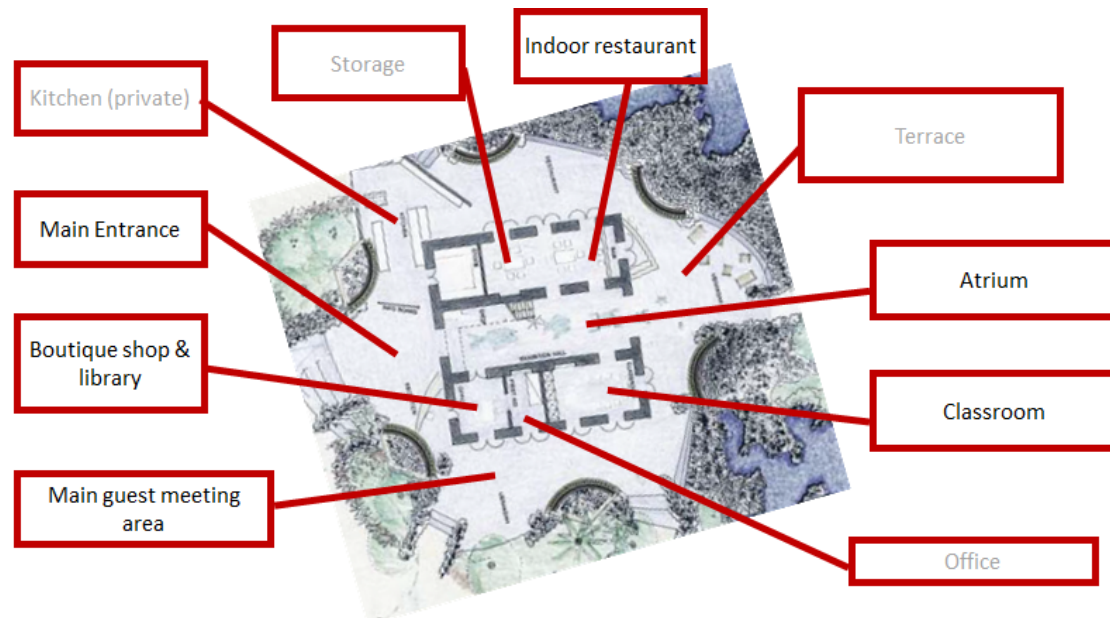
THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
CONSERVATION Chumbe's unique marine and terrestrial sanctuaries, healthy coral reef with marine life, best reef for snorkelling in Zanzibar, protected flag stone species such as sharks and coconut crabs, skilled rangers that provide guided activities	• Understanding Chumbe's approach to conservation (first privately managed marine park; most other parks get funds from governments or donors, ecotourism as financial engine of conservation work) • Conservation Do's & don'ts (e.g. no take zone, shell collection, responsible snorkelling, no fish feeding, etc.) • Ecological and socio-economic role of MPA (spill over effect, job opportunities, etc.) • Importance and status of endangered species, focusing on turtles, sharks, coconut crabs • Importance and sharing of local information and cultural stories, traditions and beliefs that are linked to conservation (e.g. forest protection). Chumbe should be no take zone. • Value of natural resources and linkage to carrying capacity • Value of skilled and trained rangers for protections enforcement and guest experience	• to reflect on own daily behaviour and how it contributes to conservation (e.g. to stop unnecessary pollution) • to stay engaged and continue to support Chumbe's conservation efforts e.g. most importantly through revisit and 'word of mouth' promotion to friends and family. • to use and consider traditional knowledge for conservation work around the world • to follow conservation guidelines outside of Chumbe as well (e.g. no shell collection, responsible snorkelling)	Quan: Questionnaires Guest feedback surveys

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
ENVIRONMENTAL EDUCATION (EE) PROGRAM Environmental Education Excursions to Chumbe Island, guests can see school children and communities	- Showcase how ecotourism revenue is channelled back in environmental education (what guests pay goes back to local communities through education programs) - Importance of EE (focusing on our next generation to learn about conservation and sustainability) - Understanding and impact of limited swimming skills among EE participants (rarely EE participants know how to swim or snorkel)	- to create awareness for environmental education - to support holiday destinations that engage in EE and community work, rather than booking large, all-inclusive destinations that don't showcase community involvement	Quan: Questionnaires Guest feedback surveys
RESEARCH Information boards about ongoing research, temperature loggers in coral reef, visiting researchers, research presentations	- Importance of research and how it impacts MPA management - Importance of Chumbe as a national and international research site (due to actual enforcement often used as 'control site' in Znz context) - Showcase and inform about partnerships with other educational institutions to develop the next generation of researchers.	- to engage in citizen science projects and to contribute to data collection - to increase attractiveness of research - to inspire to stay curious - to use scientific knowledge for decision making	Quan: Questionnaires Guest feedback surveys
SUSTAINABLE DEVELOPMENT Eco-buildings (solar energy, grey water filtration system, etc.). Waste management (from sourcing to disposing, e.g. plastics ban, composting, recycling etc.). Environmental ethics.	- Showcasing eco-architecture and eco-operations (including water harvesting, photovoltaic, composting, etc....) - Value of a small ecological footprint while staying on the island. - Importance and impacts of carrying capacity (in comparison with other hotels in Znz) - Recognizing that everyone has a role to play in sustainable development.	- To feel inspired and copy eco-operation aspects in their own homes - to reduce waste creation and to increase recycling and reusing efforts	Quan: Questionnaires Guest feedback surveys

THEME Topic & its tangible components	LEARNING OBJECTIVES What do we want the audience to learn about this topic?	OUTCOMES Anticipated behaviours we want to encourage in this audience	MEASURES How to measure outcomes
ECO-TOURISM Local food (cook book) & local staff	- Understanding of cost/value ratio (visiting rates are not so high, considering all conservation and education activities that are supported!) - Value of local food and island settings (dining under stars, at the beach) - Understanding local supply chain and community support - Value of local staff and family setting (opportunities for cultural interaction, informal capacity building e.g. through language exchange)	- To respect different cultures in their own communities. - To support the local supply chains and vendors back - To always remember that all choices they make can impact the environment and local economy. - Less is more. Consumerism is not always happiness - To always involve local people in tourism projects as they add value to any project activities.	Quan: Questionnaires Guest feedback surveys
HISTORICAL MONUMENTS Lighthouse Mosque Lighthouse keeper's house (now the Education Center)	- History of the monuments - Importance of conservation of historical monuments - Value of historical monuments for guest experience (e.g. lighthouse/sunsets viewing)	to respect and preserve historical heritage	Quan: Questionnaires Guest feedback surveys

ANNEX B: IE material & equipment inventory

1. EDUCATION CENTER



Location	IE material / equipment	Description	Target audience	Language
Main Entrance	Noticeboard 1	About Chumbe Island : information on the history of Chumbe, introduction to the project	All (1-7)	English
	Noticeboard 2	About community support & Waste management	All (1-7)	English
Boutique shop & library	Noticeboard	About the recycled and eco-friendly product gifts sold in the Chumbe boutique, and the local artisans who make them.	#7: Tourists / visitors to the Ecolodge	English
Main guest meeting area	Resource	Laminated information sheets - FAQ about reef-friendly sunscreen, - Chumbe Bird list, - Information on Chumbe's no-collection regulations	#7: Tourists / visitors to the Ecolodge	English
	Resource	Booklets - The Coconut Crabs of Chumbe - The Chumbe Forest - Chumbe's Sustainable seafood guide	All (1-7)	English
	Resource	6 x photo-guide books with underwater images of species found in the Chumbe MPA (also available for download from Chumbe website).	All (1-7)	English
	Tool	Chumbe wall map and turtle blackboard for showing the daily activities	#7: Tourists / visitors to the Ecolodge	English
Atrium	Noticeboard 1	About Marine : outlines in-house monitoring in the MPA	All (1-7)	English
	Noticeboard 2	About Forest : highlights flora and fauna in the Forest Reserve	All (1-7)	English
	Noticeboard 3	About Education : explains about the EE program include schools and community activities	All (1-7)	English

Location	IE material / equipment	Description	Target audience	Language
	Noticeboard 4	About Research : insights into most recent, international research activities on Chumbe	All (1-7)	English
	Noticeboard 5	About the Chumbe Team : Images of team members with short profiles	All (1-7)	English
	Display	Framed awards and accolades received by the Chumbe Project	All (1-7)	English
Classroom	Noticeboard 1	Marine Species Identification : Outlines biodiversity concept, introduction to marine species and graphic about most common fish families	EE audience (1-6)	English
	Noticeboard 2	Seagrass : did you know facts, importance of seagrass, zonation and anatomy of seagrass	EE audience (1-6)	English
	Noticeboard 3	Coral Reefs : What is a coral, reef types, threats, coral bleaching	EE audience (1-6)	English
	Noticeboard 4	Tropical Dry Forest & Mangroves : Did you know facts, adaptations in coral rag forest, unique species, importance and conservation of mangroves	EE audience (1-6)	English
	Noticeboard 5	Conservation : Importance of conservation, what is an MPA, who is fishing, temporal closures (example of octopus), shark conservation in Tanzania	EE audience (1-6)	English
	Noticeboard 6	Marine Debris : Did you know facts, what is marine debris, how long until it's gone	EE audience (1-6)	English
	Noticeboard 7	EE impact in numbers : images of various EE activities	EE audience (1-6)	N/A
	Tool	Mobile blackboard : used for teaching, with a painted world map on the reverse side	EE audience (1-6)	N/A
	Resource	Around 50 educational books : of various topics, focused at various age groups (inventory list of books available)	EE audience (1-6)	English, Swahili, German
	Display	Display of 'marine treasures' with 6 info cards themes : sea turtle, sea urchin, sea snail, clam, nautilus, cuttlefish	EE audience (1-6)	
	Resource and Tool	29x A5 printed and laminated intertidal cards that explain about the intertidal fauna and flora, can be taken with intertidal walks	All (1-7)	Bilingual (English & Swahili)
	Resource and Tool	Wall painting depicting different forms of marine resource use and conservation	All (1-7)	N/A
	Resource	Chumbe herbarium : collection of dried specimens from the Chumbe Forest	All (1-7)	N/A

2. SNORKEL BANDA

IE material / equipment	Description	Target audience	Language
Tool	Mask and snorkel sets – Guests	#7: Tourists / visitors to the Ecolodge	N/A
Tool	Mask and snorkel sets - 20x for EE program only	EE audience (1-6)	N/A
Safety resource	17x life jackets for EE program only	EE audience (1-6)	N/A
Tool	4 x floating tubes used to assist EE visitors with snorkeling	EE audience (1-6)	N/A
Tool	3 x reef viewers to view reef from boat	EE audience (1-6)	N/A

IE material / equipment	Description	Target audience	Language
Noticeboard 1	2 x canvas to show the location of reef and a snapshot of most common marine life, both used for Snorkel briefings	All (1-7)	N/A
Resource and Tool	30 x Waterproofed ID cards (A4) showing common marine life	All (1-7)	English

3. ECO-BUNGALOWS

IE material / equipment	Description	Target audience	Language
Resource	Bungalow book: Provides insights into project history, conservation and education programs and highlights eco-lodge information for overnight guests	#7: Tourists / visitors to the Ecolodge	English

4. FOREST

IE material / equipment	Description	Target audience	Language
Notices	Plant ID cards: highlight key species of interest along the forest trail (IN DEVELOPMENT)	All (1-7)	English, Latin & Swahili

5. LIGHTHOUSE

IE material / equipment	Description	Target audience	Language
Noticeboard 1	Laminated info sheet: about the history of the lighthouse and visiting guidelines	All (1-7)	English

6. RANGERS EE BANDA

IE material / equipment	Description	Target audience	Language
Noticeboard 1	Chumbe wall map and turtle blackboard for showing the daily activities	EE audiences (1-6)	N/A

7. HEAD OFFICE

IE material / equipment	Description	Target audience	Language
Tool	Sony speaker: used for interactive guest and student presentations	All (1-7)	N/A

8. ONLINE / WEBSITE

IE material / equipment	Description	Target audience	Language
Resources	Free downloadable EE material developed by CHICOP: https://chumbeisland.com/education-programme/educational-resources/ , includes: Downloadable teacher training materials to support local schools to learn about their surrounding environment, and encourage proactive work in schools regarding	EE audiences (1-6), particularly school teachers and school children	English & Swahili

IE material / equipment	Description	Target audience	Language
	waste management, climate change mitigation and tree planting (English). • A downloadable book on “Environmental Sustainability in Zanzibar” developed by CHICOP in collaboration with the Ministry of Education (Bilingual English and Swahili) • A downloadable booklet on waste management called “Each one – teach one: WASTE in Zanzibar” exploring issues of waste and the environment in Zanzibar. (Available in both English and Swahili) • Links to animation videos openly available online that teachers can use to teach students about the marine environment, the importance of conservation, and issues of waste management.		

Other key sites on Chumbe that are currently without any IE materials or information include the composting area, key viewpoints on the forest trail, and the mosque.

ANNEX C: Product concepts

Reminder:

The following are the six **key topics** identified in the IEP

- #1: Forest Value & Human Relationship
- #2: Geology & Evolution
- #3: Biodiversity & Wildlife
- #4: Ecology & Adaptations
- #5: Key Threats & Conservation Activities
- #6: Research & Ethnobotany

The following are the **target audiences** identified in the IEP

- #1: School children
- #2: School teachers
- #3: Fishers and marine resource users
- #4: Universities and academic institutions
- #5: Governmental Agencies
- #6: Local NGOs
- #7: Tourists / visitors to the Ecolodge

*These are collectively referred to
as the Environmental Education
(EE) audience*

Nr.	PRODUCT	ADDRESSING TOPICS:	TARGET AUDIENCES	LANGUAGE(S)	PLACEMENT	Additional comments to the product
1	Chumbe field herbarium	#3: Biodiversity & Wildlife #6: Research & Ethnobotany	EE audience	Latin, Swahili, English	Stored in wooden box in classroom	PRIORITY. In progress
2	Digital Chumbe field herbarium	#3: Biodiversity & Wildlife #6: Research & Ethnobotany	#4: Universities and academic institutions (researchers)	Latin, Swahili, English	Online	As back-up of the physically mounted specimens (common practice to scan /photograph herbaria), in progress
3	Plant labels	#3: Biodiversity & Wildlife #6: Research & Ethnobotany	All	Latin, Swahili, English	Along the Chumbe nature trail	PRIORITY. 55 labels in production already
4	Improved guided forest tour through thematic stations along the nature trail	#1: Forest Value & Human Relationship #2: Geology & Evolution #3: Biodiversity & Wildlife #4: Ecology & Adaptations #5: Key Threats & Conservation Activities #6: Research & Ethnobotany	All	Swahili, English	Nature trail	Develop the existing forest tour into a better experience, foremost for tourists but also for EE groups
5	Outdoor information panel	#2: Geology & Evolution #3: Biodiversity & Wildlife #4: Ecology & Adaptations	All	Swahili & English	Near lighthouse / entrance to forest	This panel would link to the nature trail tour but designed as stand-alone feature
6	Outdoor information panel	#5: Key Threats & Conservation Activities Call to Action	All	Swahili & English	Near baobab area/ exit to forest trail	This panel would link to the nature trail tour but designed as stand-alone feature
7	Updated forest reserve / nature trail booklet	#2: Geology & Evolution #3: Biodiversity & Wildlife #4: Ecology & Adaptations #6: Research & Ethnobotany	#7: Tourists / visitors to the Ec lodge	English	Info table in Education Center To also be available in the island's shop	To provide updated / further written information about the labeled plants along the nature trail, including Chumbe map, worldwide distribution, ethno-botanical facts
8	Chumbe Plant Photo-ID Guide	#3: Biodiversity & Wildlife #6: Research & Ethnobotany	All	Latin, Swahili, English	Info table in Education Center	Similar to the existing Chumbe UW photo-guides: https://chumbeisland.com/wp-content/uploads/2019/10/2019-UWG-VOL-1.pdf

Nr.	PRODUCT	ADDRESSING TOPICS:	TARGET AUDIENCES	LANGUAGE(S)	PLACEMENT	Additional comments to the product
9	Updated noticeboard / infographic poster to create awareness for dry forest including rare and hidden forest fauna (e.g. duiker)	#1: Forest Value & Human Relationship, #5: Key threats & conservation activities, and #6: Research & ethnobotany	All	Visuals only with minimal text	Education Center Aisle	PRIORITY: Improvements for existing forest information board in Education Center aisle
10	Photo exhibition that shows the Chumbe forest during dry and wet season	#1: Forest Value & Human Relationship #3: Biodiversity & Wildlife	All	Visuals only with minimal text	Upstairs or extra room in Education Center	Temporary exhibition?
11	Drawing of mangrove zonation along coastal areas in Zanzibar	#4: Ecology & Adaptations	EE audience	Visual only	Classroom	To show important mangrove areas around Zanzibar.
12	Establishment of 'Sultan trail' (preliminary suggestion – to be further explored in terms of impact from cutting the additional trail)	#1: Forest Value & Human Relationship #3: Biodiversity & Wildlife	#7: Tourists / visitors to the Ec lodge (particularly overnight guests that stay several nights)	N.A.	From Lighthouse to the middle of the island, along the existing path that the Sultan built	To increase accessibility of the forest for guests that are staying more nights, more adventurous and in contrast to southern interpretation trail, trail could lead up to a special tree that was captured during the botanical survey
13	Wall painting	#1: Forest Value & Human Relationship Call to action	All	Visual (done by local artist)	Lighthouse cement water tank	Transform the rainwater harvesting tank at the entrance of forest into a visual communication tool
14	Plant ID and information plates/ cards	#1: Forest Value & Human Relationship #3: Biodiversity & Wildlife #6: Research & Ethnobotany	All but especially EE audience	Swahili, English	Classroom	PRIORITY: Bilingual, similar to existing intertidal cards that can be taken into the field
15	Graphic postcards with Chumbe forest themes	#1: Forest Value & Human Relationship Call to action	#7: Tourists / visitors to the Ec lodge	Visual with one key message in English	Chumbe shop	PRIORITY: Offer them for free as give aways with a conservation/acting message
16	QR scan code posters	#2: Geology & Evolution #3: Biodiversity & Wildlife #5: Key Threats & Conservation Activities #6: Research & Ethnobotany	#7: Tourists / visitors to the Ec lodge	English (potentially other languages like German and Spanish)	Education center	Develop 4 thematic different ones and guests can decide which one to choose

Nr.	PRODUCT	ADDRESSING TOPICS:	TARGET AUDIENCES	LANGUAGE(S)	PLACEMENT	Additional comments to the product
17	Tablet with forest information, videos,	#1: Forest Value & Human Relationship #2: Geology & Evolution #3: Biodiversity & Wildlife #4: Ecology & Adaptations #5: Key Threats & Conservation Activities #6: Research & Ethnobotany	EE audience	Swahili, English	Manager's Office in Education Center	PRIORITY: Given out on request to guests or for EE trips
18	5 framed posters 'Story of trees'	#1: Forest Value & Human Relationship #2: Geology & Evolution #3: Biodiversity & Wildlife #6: Research & Ethnobotany	All	Swahili, English	Upstairs or extra room in Education Center	A series of 5 tree species that tell their name, where they grow on Chumbe and how they are used in the community (the idea is to connect especially local EE groups with traditional botanical roots of Znz)
19	Coconut crab ID and adoption program	#3: Biodiversity & Wildlife #5: Key Threats & Conservation Activities Call to action	#7: Tourists / visitors to the Ecolodge	English	Info table	Citizen science project: scientific basics are prepared and need to be tested, adoption certificates have been drafted
20	3D sculptures made out of recycled material	#1: Forest Value & Human Relationship #3: Biodiversity & Wildlife	All	Visual	Classroom (hanging from ceiling)	Made by communities
21	Promotional banners	Holistic and generic	All	English & Swahili	Moveable for use both on and off island	PRIORITY: With lots of community events taking place these are much needed.
22	Updated noticeboard in classroom	#3: Biodiversity & Wildlife #5: Key Threats & Conservation	All	English & Swahili	Classroom	to update with information and conform branding style.
23	New noticeboard at entrance to forest trail	#2: Geology & evolution, #3: Biodiversity & wildlife, and #4: Ecology & adaptations.	All	English & Swahili	Forest	PRIORITY: For rangers to introduce forest before hike.
24	Binoculars	#3: Biodiversity & Wildlife	All	n/a	Classroom	For use in the forest to view birdlife (for guests and EE students)

In addition to the abovementioned Interpretation and Education products, priority exists for the development of the following: 25: **Training booklet for Guiding Rangers** — to cover all key topics and designed for the Chumbe Guiding Rangers, as support to CHICOPs capacity building program to improve their standard of work for guided forest trails. 26: **Best practice guidelines on managing coral rag forests** — to cover the basic essentials of all topics, and targeted towards the wider hotel and tourism industry in Zanzibar. To support businesses and entrepreneurs to better manage land and forests around areas of their development/ investment