# Charting a Blue Course

## Investment Projects for the Blue Economy Transition in São Tomé e Príncipe

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PROBLUE

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# Summary

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# List of Acronyms

| | |
|---|---|
| AU CAADP | African Union “The Comprehensive African Agricultural Development Programme” |
| BE | Blue Economy |
| CC | Climate Change |
| CECAF | Fishery Committee for the Eastern Central Atlantic |
| COSATEF | Coordination Committee for Monitoring and Evaluation of Technical and Financial Assistance |
| COTIA | Technical Inter Ministerial Committee for Blue Economy |
| COVID-19 | Coronavirus Disease 2019 |
| CO2 | Carbon |
| DA | Directorate of Agriculture |
| Del CE | European Commission Delegation |
| DGA | General Directorate for the Environment |
| DNP | National Direction for Planning |
| ENAPORT | National Entreprise for Port Administration (National Acronym) |
| ENPAB | National Strategy and Action Plan for Biodiversity |
| ENRP III | National Poverty Reduction Strategy |
| ENTEA | Law adopted by the National Parliament in 2022 “Strategy for Blue Economy Transition” |
| ESS | Environmental and social safeguard |
| EU | European Union |
| ESIA | Environment and Social Impact Analysis |
| FAO | Food and Agriculture Organization of the United Nations |
| FISH4ACP | Unlocking the potential of sustainable fisheries and aquaculture for ACP countries |
| GCF | Green Climate Fund |
| GDP | Gross Domestic Product |
| INDC | Intended Nationally Determined Contribution |
| INE | National Institute for Statistics |
| IRR | Internal Return Rate |
| MARAPA | ONG Museum of the Sea and Artisanal Fishing (national acronym) |
| M&E | Monitoring and Evaluation |
| MPCAFF | Modernization Plan for Coastal Artisanal Fishing Fleet |
| MPFBE | Ministry of Planning, Finance and Blue Economy |
| NAP | National Adaptation Plan |
| NAPA | National Action Plan for Adaptation to Climate Change |
| NGO | Non-Governmental Organizations |
| NPV | Net Present Value |
| PEMT | Strategic and marketing plan for tourism Sao Tomé e Principe (Portuguese acronym) |
| PNADD | National Environment Action Plan for Sustainable Development |
| PNIASAN | National Plan for Agricultural Investments, Food and Nutrition Security |
| PNIEA | National Investment Plan for the Blue Economy |
| PROBLUE | Blue Economy Programme, World Bank |
| PRIASA | Food Security Support Infrastructure Rehabilitation Project (French acronym) |
| PTRS | Sustainable Tourism Platform |
| SDG | Sustainable Development Goal |
| SIDS | Small Island Developing State |
| STP | Democratic Republic of São Tomé e Príncipe |
| SWOT | Strengths, weaknesses, opportunities, and threats analysis |
| TCP | Technical Cooperation Programme |
| UIEEA | Intelligence Strategic Unit for Blue Economy |
| UNCT | United Nations Country Team |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNIDO | United Nations Industrial Development Organization |
| WACA | West Africa Coastal Areas Management Program, World Bank |
| WB | World Bank |

# Executive Summary

The Democratic Republic of São Tomé e Príncipe (STP) is the smallest independent island state in Africa, having gained independence in 1975, following the Seychelles. It has a total area of 1001 km2 and is located in the equatorial zone of the Gulf of Guinea, with an Exclusive Economic Zone (EEZ) of 160,000 km2 (160 times its land area). The country is situated approximately 300 km from the African continent, with Gabon to the east, Equatorial Guinea and Cameroon to the northeast, and Nigeria to the north. São Tomé e Príncipe consists of two main islands, São Tomé (859 km2) and Príncipe (142 km2), which are 150 km apart, as well as several islets, including Rolas (where the equator line is located), Cabras, the Seven Rocks (all three closer to the island of São Tomé), and the smaller islets of the island of Príncipe: Bom Bom, Cap Jockey, Cabo, Tinhosas Stones, and Jalé.

STP has a predominantly young population, with about 52% under 20 years old and about 4% over 65 years old, resulting in an average loan age of 19 years. However, as an island micro-state, the country faces many development problems specific to islands and small countries, such as weak governance capacity, the inability to provide basic services to the population, and a lack of adequate infrastructure (ports, electricity, airports). Additionally, high production and distribution costs of goods and services, including food products, exacerbate the poverty level of 66.2% of the population. The virtually non-existent corporate structure and undiversified, highly dependent economy make the country vulnerable to exogenous shocks.

To address these challenges, STP developed and adopted a Transition Strategy for the Blue Economy in December 2019. This strategy aims to establish the coherence of public policies linked to oceanic resources with the policies of other sectors, such as fisheries and aquaculture, tourism, and energy.

The Blue Economy is being touted as a viable solution for the sustainable development of Small Island Developing States (SIDS), as it provides coordination mechanisms that promote growth and poverty reduction, while protecting the environment and building resilience to climate change. The Transition Strategy for the Blue Economy, which was adopted by São Tomé e Príncipe (STP), aims to align public policies related to oceanic resources with those of other sectors, such as fisheries and aquaculture, tourism, and energy.

The Blue Economy remains a priority pillar for STP's development, as outlined in its Program for the XVIII Legislature of the New Government (2023 to 2026), which was initiated at the end of 2022. The investment projects identified in this document have been earmarked as priorities for boosting economic growth and improving the living conditions of the population. This renewed commitment by national authorities has given the transition process added impetus[1].

STP, with support from the FAO, is leading the transition towards the blue economy to leverage its natural resources and ecosystem services, which are essential for the development of fisheries and aquaculture, transportation, trade, energy, tourism, and ecotourism. This transition will also contribute to the protection and conservation of biodiversity and endangered ecosystems and species. In 2019, a Blue Economy Transition Strategy, developed through an endogenous process that involved

*1 Statement of Government Policy for the XVIII Legislature (2023-2026).*

stakeholders from both islands, was supported using the TCP Facility. This Strategy proposes an innovative governance framework that promotes inter-sectorality and high-level political and technical management.

The first challenge for STP[2] is to ensure the sustainability of ecosystem services and to develop the various sectors concerned in the long term. This will require a paradigm shift in the conception of development and public and private investments. It will entail balancing all national strategies for the various sectors of the economy in line with the expectations of the blue economy and limiting negative externalities of one sector on another. The aim is to achieve long-term economic growth based on the enhancement of the uses and services of aquatic ecosystems and resources as a heritage. This will require coordination at the global, regional, national, and local levels, the adjustment of institutions to new governance needs, the identification of investment needs aligned with the new vision, and the development of appropriate financing mechanisms. The Blue Economy presents an opportunity for STP to contribute to the SDGs, particularly SDG14, and take advantage of new cooperation and financing opportunities.

Funded by the PROBLUE Fund, the World Bank has joined the programme to strengthen capacities for developing specific parts of the National Investment Plan in preparation. This plan refers to the three project priorities proposed by the National Government during the Hand in Hand FAO Forum, organized in Rome in October 2022.

The purpose of this paper is to consolidate the analysis of the three investment projects prioritized for inclusion in the National Investment Plan for the Blue Economy. While the report does not imply endorsement of these projects by the World Bank and FAO, its primary objective is to illuminate the drivers of cost and benefit associated with the priorities already identified by the Government of São Tomé e Príncipe. These projects are under preparation and are identified as P1. Blue Cabotage, P2. Rehabilitation of Beaches, and P3. Plan for Modernization of the Coastal Artisanal Fishing Fleet (PMCAFF).

A detailed economic assessment, proposed modifications, and development of concept notes for the three pre-identified priority projects are expected. To achieve this, the following tasks are required:

- Undertake an economic and financial assessment of the pre-identified projects, outlining economic costs and benefits, based on a quantitative methodology.
- Develop reasonable assumptions, in consultation with project-specific stakeholders/promoters, where critical data is not available.
- Propose modifications to the projects, based on iterative analysis of their economic impact.
- Develop individual parts for each blue investment project (Chapters 2, 3, and 4), which should include, at a minimum, a description of the project, relevant expected outcomes, promoters and key stakeholders, cost estimation, impacts and risk estimation, potential financing sources, implementation period, and where possible, key performance indicators[3].

To prepare for these projects, an economic analysis must be conducted to determine the value of anticipated benefits relative to the costs associated with the three projects. The total Net Present Value (NPV) of the projects needs to be estimated, a discount rate defined, and the Investment Rate of Return (IRR) calculated. Hypotheses will be based on discussions with potential beneficiaries, public and private stakeholders, as well as on the results of recent studies, expertise relating to these

*2 The commitment to this transition of the economy was confirmed by the Minister of Planning, Finance and Blue Economy (MPFEB) who in his letter n° 495/MPFEA-GM/2020 of February 6, 2020 wished to be able to benefit from the continued support of FAO for the formulation of an Investment Plan, the development of a multi-annual support plan and support for the innovative governance framework put in place to support the management of implement the National Blue Economy Transition Strategy.*

*3 Concept notes are expected to be prepared in a way that serves as a basis for the Government of STP to mobilize financial and technical resources for implementation.*

projects, and consultations with consultants involved in FAO programs (FISH4ACP, TCPSTP3804) and the European Commission's studies (Cabotage). National literature referencing sectoral strategies and the blue economy strategy adopted by the Government of STP, including the tourism sector and marine ecosystem protection, will also be considered. Financially modeling projected impacts will help ensure that project funds are being allocated to investments and activities that will provide a return to the local population while identifying key risks and thresholds for the projects to achieve their desired impact. The methodology used accounts only for the project's impact on direct beneficiaries rather than a broader multiplier approach that encompasses positive externalities and spill-over effects, including overall growth of the tourism and business ecosystems. Because estimating the value of such externalities is difficult, project investments could result in larger-scale private and public investments. The economic analysis is based on increased revenues for SMEs and individual beneficiaries through the project's activities and investments, along with increased revenues within the Sao Tome e Principe Blue Economy ecosystem.

**The P1 project (Blue Cabotage)** aligns with one of the national priorities which involves establishing a cabotage system around STP, utilizing existing quays when feasible. The Blue Cabotage plan requires an investment of 18.8 million euros, which includes the construction of six multipurpose blue cabotage ports: five in São Tomé and one in Príncipe. Ponta Mina in Principe accounts for 41% of the total investment. The project is expected to have a significant impact on the blue and green economy, particularly on fisheries, tourism, and agriculture value chains, by facilitating the transportation of goods and people and reducing the carbon footprint.

The blue cabotage project can be phased in two or three stages, depending on available financial resources, and prioritizing the functional requirements of each national site. These priorities may include opening up certain areas for multi-sector maritime activities such as tourism and ecotourism, conservation of threatened or fragile coastal areas and species, contribution to the transport of goods to the port of Ana Chavez or Principe and considering the mobility of tourists along coastal circuits in relation to seaside hotels, historical sites, or exceptional natural areas to visit.

The first socio-economic impacts associated with port investments include job creation (direct and indirect) linked to the operation, maintenance, monitoring, and management of infrastructure. Coordination with the Camaras District, the Regional Authority of Principe, and central national authorities involved in the management of these infrastructures (ENAPORT, IMAP, customs) is expected.

It is estimated that over 20,200 people have been directly and positively impacted by the P1 project in terms of their income and professional position, which represents approximately 81,260 people indirectly and directly positively impacted in their means and living conditions.

According to the calculations outlined in the document, the Net Present Value of the São Tomé e Príncipe cabotage projects for the horizon of 30 years falls within the respective ranges of 1,096,268 to 7,071,614 Euros and 2,733,076 to 10,022,937 Euros with Internal Rates of Return between 14.69% and 22.07% and between 16.66% and 24.06%, respectively. In the best-case scenario, the break-even year for Sao Tome is projected to occur in the 8th year and the 15th year for Principe.

Several studies have shown that cabotage emits less CO2 than the road transport currently used in the country, as stated in the Third National Communication on Climate Change in São Tomé e Príncipe. Given these analyses and arguments, the adoption of cabotage appears entirely justified in light of the existing situation and the comparative advantages established in terms of risks, costs, and pollution associated with road transport.

**The P2 project, "Rehabilitation of beaches to support blue tourism development,**" is part of the Program of the XVIII Constitutional Government, which covers the period 2023-2026 and highlights the

tourism sector as a growth sector. In recent years, considerable efforts have been made to produce new laws that can contribute to the development of the tourism sector, and the recent World Bank Systematic Country Diagnostic has identified tourism, along with agriculture and fisheries, as sectors with potential for driving growth and job creation, leveraging STP's natural capital.

In STP, beaches, bays, and lagoons are the most attractive places for tourism, according to a tourism survey. With the rising popularity of São Tomé as a tourist destination, it has become necessary to manage beaches in a sustainable manner to avoid environmental degradation and loss of customers. Uncontrolled access of vehicles, haphazard construction of kiosks, and lack of hygiene services need to be addressed and standards set (FAO, 2022).

The blue investment project for rehabilitating beaches focuses on ten priority sites: Lagoa Azul, Namorados, Tamarinos, Governador, and Micondó, as well as Piscina, Cabana, Café, Granja, and Bone de Joquel. These locations were chosen due to their popularity among tourists and locals, and their potential for sustainable development.

To ensure the success of this project, a technical group must be established to oversee implementation, monitoring, and evaluation. This group will include representatives from the Ministry of Environment, Infrastructure and Tourism, as well as the Ministry of Planning, Finance, and Blue Economy, and the relevant district authorities.

The estimated total cost of the project is 6,040,000 euros. Beyond the direct employment opportunities generated by the rehabilitation work, the local population, who use the beaches for leisure, stand to benefit the most. It is estimated that at least 10,000 people will be impacted, both directly and indirectly, by the project, with positive effects on their livelihoods.

To assess the financial and economic impact of the project, calculations were carried out taking into account the various services offered on the sites, as well as the taxes levied on private activities and rentals of restaurants and kiosks. According to the assumptions used, the net present value (NPV) ranges from 1,599,681 to 3,988,773 euros over 30 years, with break-even years of 13, 12, or 11. The internal rates of return (IRRs) range from 14.69% to 19.64%, which suggests a favorable outlook for the rehabilitation project.

The proposed phasing allows for the rehabilitation of all ten beaches within a period not exceeding 16 months. This timeframe is considered feasible and will ensure minimal disruption to the local population and tourists.

Some specific recommendations are proposed:

- Create limited and priced parking areas on the beaches to indirectly contribute to the creation of attendance gauges.
- Prioritize the use of collective and renewable energy vehicles on the sites to allow joint use of pedestrian spaces and enhance the discovery of landscapes (flora and fauna).
- Mark and classify the beaches.
- Recover damaged sectors of coastal sand systems through natural reconstruction of dune constructions and planting of auto clonal species.
- Construct stone barriers to protect and control coastal erosion.
- Safeguard vulnerable and at-risk areas by setting up appropriate emergency and management

plans that take into account the dynamics of coastal areas.

- Promote fauna and flora observation activities with specific observation points.
- Maintain the state of the beaches close to natural.
- Create inspection brigades, of which the local population is a part, to act as inspection agents.
- Establish beach health officers/teams managed by district authorities to keep beaches clean, controlled, and safe.
- Train and raise awareness in schools for the protection of beaches and the environment. Additionally, create television and radio awareness programs aimed at the general public.
- Create teams and focal points to monitor and track progress.
- Involve and entrust inspection and monitoring responsibilities to the Ministry of Defense and the Port Authority to take care and preserve the coastal sites.

**The Plan for the Modernization of the Coastal Artisanal Fishing Fleet (PMCAFF)**, also known as the P3 project, is crucial due to the significant role that fisheries play in the national and local economy, food security, and poverty alleviation. The targeted modernization can contribute to reducing informal jobs, regulating fishing activities, and improving the means of work and subsistence for fishing communities, who are key contributors to the coastal economy. According to the FAO (2018), fishing contributes to 9% of GDP, with 4,155 fishermen and 2,355 women fishmongers (DP, 2019 and DP, 2014, respectively), and about 30,000 people living directly and indirectly from fishing activities (15% of the population).

In addition, the modernization of the coastal fishing fleet can have a positive impact on food security, with a high consumption rate of fish (29.3 kg/year/hab.) and 99% coverage rate of fish consumption (FAO, 2019). The project can also provide employment opportunities for unskilled youth and women involved in the value chain, including processing and trading of fish products. Furthermore, it can enhance safety at sea for fishermen.

Due to the significance of the fishing industry, a public support scheme is proposed to prioritize the investment file, which can promote private actors' engagement in the formal economy by raising the level of organization of fishing communities. The project aims to engage a public-private partnership to mobilize the necessary financial resources according to a non-discretionary planning framework, with the population concerned by this sector and jobs and its contribution to food security weighing in favor of this priority across all districts of the country.

The MPCAFF must align with Fishing Capacity Management Plans at STP and the general logic of improving value chains and rational management of fisheries resources to achieve the project's objectives. The project aims to reduce the environmental impacts linked to shipyards and manufacturing processes of fishing units and adjust catches while contributing to the carbon balance by reducing traction costs and impacts on forest resources, in coherence with the Blue Economy.

Currently, the government supports the sector for the acquisition of new, safer, larger, and more equipped fishing units with aid generally set at 25% of the investment value for a limited number of fishing boats. Under PMCAFF, public funds support investments in return for private commitments in good fisheries governance, and private commitment in association with investors for more efficient fishing units and better supervision.

The total financial requirement for the project is 1,653,500 euros over a period of 5 years, with a maximum of 300 new boats to be purchased (in exchange for approximately 120 to 150 fishing boats) and a share of subsidies (public investment) up to 1,035,000 euros, along with a share of private loans that cannot exceed 618,000 euros over the first 5 years.

Additionally, PMCAFF includes investments in shipyards adapted to small-scale fleets that meet environmental and social standards (working conditions). These investments amount to up to 350,000 euros per shipyard.

The profitability of the project is guaranteed by PMCAFF, with a net present value of 172,850 euros over 10 years, an internal rate of return of 22%, and a break-even year in year 6.

Regarding individual boat purchases, it is difficult at this stage to provide an indicative analysis of individual profitability units, given the assumptions, bonuses, and possible involvement of fishermen's associations (as associated investors) and the types of boats purchased and replaced.

Positive indicators to be considered are the proposed aid grids, the amounts of monthly repayments applicable according to the configuration of the projects (with low levels of monthly repayment per person depending on the project), and the previous analyses on the profitability of the fishing units proposed in the case of PMCAFF (as developed in the FAO TCP "Analysis of the seafood sector in Sao Tome e Principe, FAO Rome 2019, Alioune Sy and Olivio Soares").

The PMCAFF indicators are as follows:

- Launch of 300 new fishing units over the next 5 years from the launch date of PMCAFF (to be readjusted at the end of year n according to a sliding system n+5 over a period of at least 10 years).

- Exit of at least 120 fishing units with a maximum of 150 units (to be readjusted at the end of year n for a sliding system n+5 over a period of at least 10 years).

- All candidates for the acquisition of new boats must adhere to the conditions defined in the specifications in favor of responsible and sustainable fishing.

- Distribution of the acquired units must fall within the following indicative ranges for the first year of implementation of PMCAFF (to be readjusted at the end of year n for a rolling system n+5 over a period of at least 10 years): A maximum of 50 units of type 7.4 x 2.1 Semiduplo fundo cheio de polyretano Malas na proa e popa, a maximum of 100 units of type 7.1 x 1.8 Semiduplo fundo cheio de polyretano Malas na proa e popa, and a maximum of 150 units of Tamanho type 6.6 x 1.3.

- Depending on the annual budgetary commitments and the defined quotas, the planning for years n+1 to n+5 will be readjusted, and the necessary additional resources will be sought for the new year n+5 (in reality n+6 from the date of PMCAFF implementation up to n+10, year by year).

The document states that the main benefits of the PMCAFF can be enjoyed by several stakeholders, including: i) shipyards that comply with certified manufacturing standards, ii) purchasers of new fishing units, iii) fishing communities, and iv) the state and its administrations.

To oversee the development and modernization of the fishing sector and ensure the organization and sustainability of fishing activities in the country, the Directorate General of Fisheries must develop a Fisheries Master Plan.

Improving transport, storage, and marketing conditions for products is crucial, and this will be done as part of the two other priority projects - cabotage and the development of the tourist market.

Through modernization, small-scale fishing can enter into a responsible and sustainable economic cycle, contributing to food security and environmental issues outlined in the SDGs, and improving the incomes and means of subsistence of those involved.

The project will be implemented in phases, with a preparatory phase for mobilizing financial resources, communication on the PMCAFF, and preparation. The second phase will involve developing funding requests within fishing communities and conducting a selection process, while the third phase will start with the construction of fishing units (year 1), followed by their delivery (phase 4), and simultaneous implementation of reimbursement procedures. Phase 5 will involve continuing the process for cycles 2, 3, 4, and year 5, with remobilization of financial resources and returning to phase 1 for a 10-year cycle. The phasing of the project and its implementation will allow year-by-year specification of the contributions to the objectives achieved.

# 1. Introduction

The World Bank's support is a result of dialogue with the FAO, which has been supporting the country's transition to the Blue Economy since its launch in 2017. This transition has been reaffirmed by all successive governments since that time. The primary focus of the process was the development of the National Strategy Framework, which is in line with the FAO's Blue Growth Initiative led in 2015.

The adoption of the Strategic Framework for the transition to the Blue Economy was reinforced in 2022 by the National Parliament's adoption of the Blue Economy Law (ENTEA). This has paved the way for the preparation of a National Investment Plan for the transition and the development of a Priority Support Program for the Transition, which has received support from the FAO.

São Tomé e Príncipe was invited to present priority projects identified as part of the PNIEA preparation work during the first investment forum held in Rome (FAO Headquarters in October 2022) through the new Hand in Hand (FAO 2021) initiative launched by the FAO. The World Bank, through PROBLUE and in connection with the WACA project, and the FAO, on the basis of its support for the UIEEA, have joined forces to pool and project resources for the consolidation of priority projects. These projects will be presented at the Investment Forum, which will bring together all technical partners and financiers in Sao Tome in the first half of 2023. This will be done during the 2nd Edition of the Blue Economy Week to defend the projects and advocate for the mobilization of financial and technical resources for their implementation and outcome.

The three projects, as well as the planned blue cabotage sites and beach rehabilitation sites, will benefit the coastal communities already identified and supported by projects from the World Bank or other partners. This collaborative approach towards investing in the Blue Economy will contribute to the improvement of the livelihoods and living conditions of these communities, particularly in the areas of fisheries, tourism, and mobility of people and goods.

Through the synergies between FAO and the World Bank, the ability to attract other technical and financial partners has increased, and the expertise in handling such projects has been multiplied.

The progress made hand-in-hand by these two institutions in support of the government is expected to initiate support and commitment processes from public institutions (both national and international) and private entrepreneurs for sustainable blue development. This is the essence of their common commitment.

# 2. Context

The Democratic Republic of São Tomé e Príncipe (STP) is a Small Island Developing State (SIDS) and has been the smallest independent state in Africa since 1975. It is composed of two main islands, São Tomé (859 km2) and Príncipe (142 km2), located 150 km apart, along with several volcanic islets. Its total terrestrial area is 1001 km2, and it has an Economic Exclusive Zone of 160,000 km2. Situated in the equatorial zone of the Gulf of Guinea, at 0o 25'N latitude and 6o 20'E longitude, 30% of the land area of STP is designated as conservation status, with the entire island of Principe being placed under the UNESCO label.

STP has a population of 215,000 inhabitants, with an average annual growth rate of 2.17% over the past decade. Approximately 40% of the population lives in the district of Água Grande, an urbanized area of the island of São Tomé, where the capital of the country is located. Despite a marginal decline from 68.4% to 66.7% between 2010 and 2017, poverty rates in STP remain persistently high (INE, 2020). Furthermore, 52.1% of the population is under 20 years old, with a literacy rate of 90.1% (INE, 2020).

STP's islands are highly vulnerable to the effects of climate change due to the fragility of their ecosystems and low level of socio-economic development[4]. The country is already exposed to various climate-related hazards, such as floods, coastal and river flash floods, storms, and droughts. The average rise in sea level is causing severe coastal degradation and salinization, increasing the incidence of flash floods that can damage coastal activities essential for livelihoods in coastal communities, where almost all economic infrastructure is concentrated, including social habitats (see Annex 1: Environmental context).

Given this context, São Tomé e Príncipe has chosen to lead a transition towards the blue economy, with the support of the FAO, in order to make the most of its natural potentials, which are linked to ecosystem services perceived as supporting the development of fisheries and aquaculture, transport, trade, energy, tourism and ecotourism, and contributing to the objectives of protection and conservation of biodiversity and endangered ecosystems and species. The TCP Facility supported the development of a Blue Economy Transition Strategy in 2019 through an endogenous process involving stakeholders from both islands. This strategy, adopted by the government, proposes an innovative governance framework promoting inter-sectorality and high-level political and technical management.

The islands of STP are highly vulnerable to the effects of climate change due to the fragility of their ecosystems and low levels of socio-economic development[5]. The country is already exposed to various climate-related hazards, including floods, coastal and river flash floods, storms, and droughts. The average rise in sea level is causing severe coastal degradation and salinization, leading to an increased incidence of flash floods that can damage coastal activities essential for the livelihoods of coastal communities[6]. These areas concentrate almost all economic infrastructures, including social habitats (see Annex 1: Environmental context).

Given this context, São Tomé e Príncipe, with the support of the FAO, has chosen to lead a transition towards the blue economy to make the most of its natural potentials linked to ecosystem services, which support the development of fisheries and aquaculture, transport, trade, energy, tourism, and

*4 e 5 STP is ranked 137 in the ND-Gain (Notre Dame Global Adaptation Initiative, University Notre Dame) and rated as a country with ''high vulnerability score and low readiness score" (https://gain.nd.edu/our-work/country-index/rankings/).*

*6 STP, 2019, Third National Communication on Climate Change*

ecotourism. This transition also contributes to the objectives of protecting and conserving biodiversity and endangered ecosystems and species. The TCP Facility supported the development of a Blue Economy Transition Strategy in 2019 through an endogenous process involving stakeholders from both islands. This strategy, adopted by the government, proposes an innovative governance framework that promotes inter-sectorality, high-level political and technical management. To support its transition to the blue economy, São Tomé e Príncipe has identified the need to plan for the sustainability of ecosystem services and to think long-term about the development of the various sectors involved. This will require a shift in paradigm, with development and public and private investments evaluated from the perspective of the blue economy, rather than the maritime economy. The national strategies of all sectors of the economy will need to be balanced with reference to the expectations of the blue economy, limiting negative externalities between sectors and promoting long-term economic growth through the sustainable use and enhancement of aquatic ecosystems and resources. This will require coordination of commitments at global, regional, national, and local levels, institution-building to meet new governance needs, identification of investment needs aligned with the new vision, and the establishment of appropriate financing mechanisms to take advantage of new cooperation and financing opportunities associated with the blue economy. This transition will be a strong lever for the country to contribute to the SDGs, particularly SDG14.

The primary beneficiary of the transition towards the Blue Economy is the national economy, which will experience increased opportunities for public and private business, entrepreneurship, markets, and employment based on sustainable marine resource utilization and ecosystem protection and conservation. Women and young entrepreneurs and employees will benefit from the advancements made towards decent and sustainable jobs related to new investment opportunities and diversified trades, taking into account the impact on specific sectors of the Blue Economy such as fishing (modernization, value chain, risks of the sea, depletion of resources, etc.). This will lead to more lucrative activities in the sectors of ecosystem conservation and protection, as well as the development of paid roles in the coastal and maritime tourism sectors. Other maritime, recreational, and tourism activities closely tied to marine ecosystem services will also benefit from the proposed investments.

While the report does not imply endorsement of these projects by the World Bank and FAO, its primary objective is to illuminate the drivers of cost and benefit associated with the priorities already identified by the Government of São Tomé e Príncipe.

## 2.1 Blue Economy in São Tomé e Príncipe

Maritime countries, particularly Small Island Developing States (SIDS), are facing high growth expectations in the maritime economy sectors, which are exerting direct pressure on living natural, mineral, and energy resources, as well as on coastal territories. In addition to these pressures, there are threats to ocean and coastal ecosystems due to the fragility of marine biodiversity and the direct anthropogenic effects induced by climate change. The oceans play a crucial role in climate regulation through carbon sequestration, and demographic projections indicate an increase in pressures on the coast, as already two-thirds of the world's population live near a coast, and by 2050, a quarter of the world's population will be African. Despite sustained economic growth rates in some African countries, nearly 45% of the population lives in a state of extreme poverty. Ninety percent of African trade transits by sea, and the potential for ocean energy is estimated to be 400% of current global demand, according to the International Energy Agency. The world maritime economy weighed 1.5 trillion euros in 2010, and the outlook is estimated to reach 2.5 trillion euros by 2020, according to the African Union Commission. The biotechnology market is expected to be worth 5 trillion euros in 2022.

The Democratic Republic of São Tomé e Príncipe (STP) is the smallest independent island state in Africa, having gained independence in 1975 after the Seychelles. It is located in the equatorial zone of the Gulf of Guinea and has a total area of 1001 km2. The country's Exclusive Economic Zone (EEZ) is 160,000 km2, which is 160 times its land area. São Tomé e Príncipe is situated approximately 300 km from the African continent, with Gabon to the east, Equatorial Guinea and Cameroon to the northeast, and Nigeria to the north. The country consists of two main islands, São Tomé (859 km2) and Príncipe (142 km2), which are 150 km apart. Additionally, there are several islets, including Rolas, where the equator line is located, Cabras, the Seven Rocks (all three closer to the island of São Tomé), and the smaller islets of the island of Príncipe: Bom Bom, Cap Jockey, Cabo, Tinhosas Stones, and Jalé.

São Tomé e Príncipe has a predominantly young population, with approximately 52% under 20 years old and 4% over 65 years old, resulting in an average age of 19 years. As an island micro-state, the country faces various development problems specific to islands and small countries that significantly affect the implementation of public policies. These issues include weak governance capacity, the inability to provide basic services to the population, lack of adequate infrastructure (ports, electricity, airports), high production and distribution costs of goods and services, including food products, despite favorable natural conditions for agro-livestock. Furthermore, the corporate structure is virtually non-existent, and the economy is undiversified and heavily dependent on external factors, making the country vulnerable to exogenous shocks and exacerbating the poverty level, which currently stands at 66.2% of the population.

In December 2019, STP developed and adopted its Transition Strategy for the Blue Economy, marking the country's first step towards promoting Blue Growth. The Blue Economy is considered a viable means for the sustainable development of Small Island Developing States (SIDS), as it provides coordination mechanisms that promote growth and poverty reduction while prioritizing environmental protection and climate resilience. The Transition Strategy for the Blue Economy adopted by STP aims to establish coherence between public policies related to oceanic resources and policies of other sectors such as fisheries and aquaculture, tourism, and energy.

In the Program for the XVIII Legislature of the New Government (2023-2026), which came into effect at the end of 2022, the Blue Economy remains a priority pillar of the country's development. The investment projects outlined in this document have also emerged as priorities for promoting economic growth and improving the living conditions of the population. This renewed commitment from the highest national authorities has given the transition process added momentum[7].

The Strategic Intelligence Unit for Blue Economy (UIEEA), which is overseen by the Minister of Planning, Finance, and Blue Economy, is now operational and has carried out all necessary activities to establish conditions for the effective implementation of the entire governance structure. The implementation of the Transition Strategy for the Blue Economy involves identifying, designing, and implementing important investment projects for Blue Growth. Currently, the country is in the process of identifying projects for the preparation of the National Investment Plan for the Blue Economy (PNIEA). In March 2022, the Blue Economy week was organized, which reiterated the government's commitment to the Blue Economy transition. The commitment was formalized by the signature of an inter-ministerial memorandum of understanding for the promotion of Blue Employment, Blue Entrepreneurship, Blue Education[8], and the decision to elevate the Blue Economy Strategy to the rank of National Law. This

*7 Statement of Government Policy for the XVIII Legislature (2023-2026).*

*8 Platform to support the Promotion of Employment, Entrepreneurship and Education Blue (P4EA)*

*9 New National Law September 2022 adopted by the Parliament of STP (LEI-QUADRO DA ESTRATEGIA DE TRANSIÇÃO PARA A ECONOMIA AZUL) adopting the Blue Economy Strategy Framework in STP, with mention and definition of the roles of the institutions dedicated specifically to the transition to the Blue Economy and in particular the UIEEA (Strategic Intelligence Unit for the Blue Economy), but also the Coordination Committee, ¨Seguimento e Avaliação das Ajudas Técnicas e Financeiras" (COSATEF) and the Technical Inter Ministerial Committee for Blue Economy (COTIEA) and the Coordination Committee of Technical and Financial Partners in support of the transition.*

*• Creation in April 2022 of the Employment, Entrepreneurship and Education Platform in support of the Blue Economy (P4EA) through a memorandum of understanding signed by 4 Ministries of the Government of STP relating to the Ministry of Planning, Finance and Blue Economy, Ministry of Labour, Family Solidarity and Vocational Training, the Ministry of Youth, Sports and Entrepreneurship and the Ministry of Education and Higher Education*

*• Partnership agreement between INE-PT, INE-CV, INE-STP, OECD, FAO for work on the development of the Blue Economy satellite account.*

*• Development and support for geo-spatialized Territorial Planning to help determine blue investments in STP with the first elements of mapping of the Blue Economy brought within the framework of the first Forum of the Hand in Hand Initiative of the FAO (October 2022, Rome).*

National Law[9] formalizes the inter-ministerial Committee, chaired by the Prime Minister and Head of Government, and technically by UIEEA, chaired by the Minister responsible for the Blue Economy portfolio. Additionally, the law includes the creation of a coordination committee (piloted by the Prime Minister) and a commission chaired by the Ministry of Planning, Finance, and Blue Economy charged with coordinating, monitoring, and evaluating financial and technical partners supporting the transition toward the blue economy.

To strengthen governance in the Blue Economy through strategic partnerships, major mechanisms are under development, such as the promotion of marine and coastal spatial planning with the adhesion request of STP to OIC-UNESCO and the development of blue economy satellite accounts through the establishment of a technical working group involving INE STP, INE Cabo Verde, INE-Portugal, and OCDE. During the Blue Economy Week, a first meeting of the partners involved in the Blue Economy was held under the presidency of the Minister of Planning, Finance, and Blue Economy and the Vice presidency of the Minister of Foreign Affairs. The partners pre-identified ongoing and forthcoming interventions, and financing mechanisms were discussed, including GCF. In October 2022, a high-level delegation from São Tomé e Príncipe, including the President of the Republic, the Minister in charge of Fisheries, and the Minister of Finance in charge of the Blue Economy, participated in an international investment forum at the FAO headquarters and presented three priority projects of its blue economy investment plans currently under development São Tomé e Príncipe (fao.org). The economic transition toward the blue economy will offer opportunities for economic diversification and the creation of new, decent employment opportunities.

The project's activities will focus on promoting new blue employment and entrepreneurship, and will directly benefit a wide range of stakeholders in the Sao Tomean society, including coastal communities, civil society organizations, private sector actors, national government stakeholders, and local authorities. The project aims to engage both high-level decision-makers and technical staff. At the community level, particular attention will be paid to the most vulnerable groups, including those in climate-risk coastal areas, women, and youth, to ensure their full participation in project training and to promote new, decent, and sustainable employment.

One major constraint to the development of the blue economy in the Democratic Republic of São Tomé e Príncipe (STP*) is the financing of priority investments in this sector. As a Small Island Developing State, STP's key economic sectors are focused on the Blue Economy, including Fisheries and Aquaculture, Tourism, new renewable energy, infrastructures, and maritime transport, as well as the environment. These sectors have been planned together in a specific National Strategy (Transition Strategy for the Blue Economy, 2019) under the leadership of the Ministry of Planning, Finance, and Blue Economy. This National Strategy was adopted as law in August 2022, further strengthening the political will to achieve the transition towards a green and blue economy in accordance with STP Vision 2030.

Although key public policies for the blue economy (National Strategy for Blue Economy in STP, 2019; Fisheries Master Plan, 2006; Strategic and Marketing Plan for Tourism in São Tomé e Príncipe, 2018; STP Transport Master Plan for Maritime Transport, 2013) refer to climate change and its potential impacts on the related sectors, there is still a need to identify appropriate and costed adaptation and mitigation priorities, as well as funding opportunities for these priorities.

It is important to identify investment needs, improve the planning and coordination of public and private investments in alignment with national priorities and comparative advantages of potential funding mechanisms, and address technical assistance needs. Special attention will be given to investment opportunities that create and diversify jobs in the blue economy sectors, promote entrepreneurship, and particularly benefit women and young people who are strongly affected by unemployment. The promotion of entrepreneurship and diversification of income opportunities will improve livelihoods and contribute to the resilience of young workers and women. This will indirectly help mitigate the social

and environmental impacts on these groups by increasing their access to decent and sustainable jobs in the blue sector.

## 2.2 Main Economic Sectors

The economy of STP is primarily driven by agriculture, fisheries, and tourism, with the offshore oil industry becoming increasingly important. Services account for about 70% of GDP[10], led by trade and transport, which represents 24% and communication, which represents 13%.

While agriculture's contribution to GDP is only 4%[11], based mainly on fisheries (3% of GDP in 2019, but 9% if the entire value chain is considered) and the production and export of cocoa, which accounts for over 80% of agricultural export revenues, there has been a recent trend of inversion (55% in 2020). However, its strategic importance in socio-economic terms is quite relevant as it represents more than 70% of rural employment and contributes significantly to food and nutritional security.

The fisheries sector alone, with an average national production of 11,000 tons/year exclusively from small-scale fisheries, employs 4,155 fishermen (DGPA, 2019) and 2,355 women fishmongers (DGPA, 2014). It is, however, recognized that the fisheries value chain accounts for around 30,000 people who live directly and indirectly from fishing activities (15% of the active population). With an average consumption of 30 kg/year and per capita, 53.3% of protein of animal origin (17% of total protein) comes from fish products in the population's diet (FAO, 2019). Currently, the national fish production entirely covers the national demand, and no significant fish exports or imports are recorded.

Tourism is becoming increasingly important in São Tomé e Príncipe, not only as a contributor to the country's economy but also in terms of improving the quality of tourism products and promoting the destination. The tourism sector accounts for approximately 36% of total exports of goods and services[12]. In 2017, it contributed 14% to GDP with revenues of around USD 53.8 million (an increase from USD 11 million in 2011), providing employment for 1,834 workers (869 men and 965 women). The number of tourists visiting the country has grown significantly, from around 8,000 in 2010[13] to approximately 34,918 in 2019[14] (an increase of 340%). Despite this growth, the COVID-19[15] pandemic has caused a halt in arrivals, and the exploitation of the natural, historical, and cultural resources of São Tomé e Príncipe for tourism is still in its early stages.

## 2.3 Poverty levels

According to the 2017 Family Budget Survey (IOF), the incidence rate of extreme poverty in São Tomé e Príncipe was 47% (INE, 2020). Female-headed households, which make up more than a third of families, experience higher poverty rates than male-headed households, with a rate of 61.6% compared to 55.8% (INE, 2020). Due to inadequate connections between investment, territorial development, and local value chains, as well as an underdeveloped environment for promoting local entrepreneurship and business innovation, the unemployment rate in STP is 8.4% (INE, 2020), with higher rates among women (14.6%) than men (5.1%), and significantly higher among young people aged 15-24 years (21.3%).

*10 https://www.ine.st/index.php/component/phocadownload/file/613-nota-pib-2020*

*11 2018 African Economic Outlook (African Development Bank)*

*12 https://bcstp.st/Banco-Central?x=wOgqPO8BlRrdHdPOd1%2BEuA==&&z=mCLJy8EbGDua1xVDQp043w*

*13 Iano Estratégico e de Marketing para o Turismo de São Tomé e Príncipe. 2018*

*14 INE-Instituto Nacional de Estatística de S. Tomé e Príncipe*

*15 Despite this, and by the stop in arrivals created by COVID-19 - information available from INE-STP indicates that in 2020 the number of tourists has fallen to 10,334, a reduction of 64.8%.*

To address these challenges, the National Investment Plan for Blue Economy (PNIEA) is being developed with the support of the FAO technical cooperation Project TCP/STP/3804. The plan proposes to act based on a review of the situation of blue jobs undertaken by the P4EA Platform (Employment, Entrepreneurship Training Education in favor of the Blue Economy). The Readiness Programme will focus on training to meet the need for diversifying blue job opportunities and addressing the constraints faced by young people and women in search of decent and sustainable jobs.

Given the effects of climate change on fisheries value chains, which pose risks to the abundance, variability, and/or spatial redistribution of fisheries resources, particularly those of species more sensitive to the effects of warming surface temperatures oceans and/or water acidification, it is essential to compensate for the risks and opportunities of the fisheries sector by increasing opportunities in other sectors of the blue economy, such as conservation, protection, and/or rehabilitation of coastal ecosystems (for example: coral reefs, mangroves, beaches, etc.). Coastal and maritime tourism development can also contribute to providing new employment opportunities for coastal maritime communities with skills in marine activities, thus increasing resilience and financial autonomy for young people seeking new jobs and revenues.

It is worth noting that half of the population of STP is under twenty years old (UNSD, 2020 - https://unstats.un.org/unsd/demographic-social/products/dyb/dyb_2020/), which highlights the importance of investing in initiatives that promote sustainable development and employment opportunities for young people. In particular, it is important to consider the effects of climate change on fisheries value chains, which pose risks to the abundance, variability, and spatial distribution of fisheries resources, especially those of species that are more sensitive to the warming of surface temperatures and water acidification[16]. To address this challenge, it is necessary to compensate for the potential risks and job losses in the fisheries sector by creating more opportunities in other sectors of the blue economy, such as the conservation, protection, and rehabilitation of coastal ecosystem areas (such as coral reefs, mangroves, and beaches). These efforts will not only benefit the environment but will also support the development of coastal and maritime tourism, which can provide new employment opportunities for coastal communities with skills in marine activities. By doing so, it will help to build more resilience and financial autonomy for young people by creating opportunities for new jobs and revenues.

## 2.4 Population and mobility

The current estimated population of STP in 2022 is 217,164 (according to INE-STP), which is a significant increase from 73,600 inhabitants in 1970. This growth has resulted in a strong densification of urban areas and their outskirts, with a mobility trend observed among rural populations towards coastal areas. This shift is due to the younger generations seeking new work opportunities in fields such as tourism, tertiary, trade, and fishing, as well as the abandonment of agricultural professions, which have become increasingly difficult due to the development of phenomena such as theft of production and/or livestock[17].

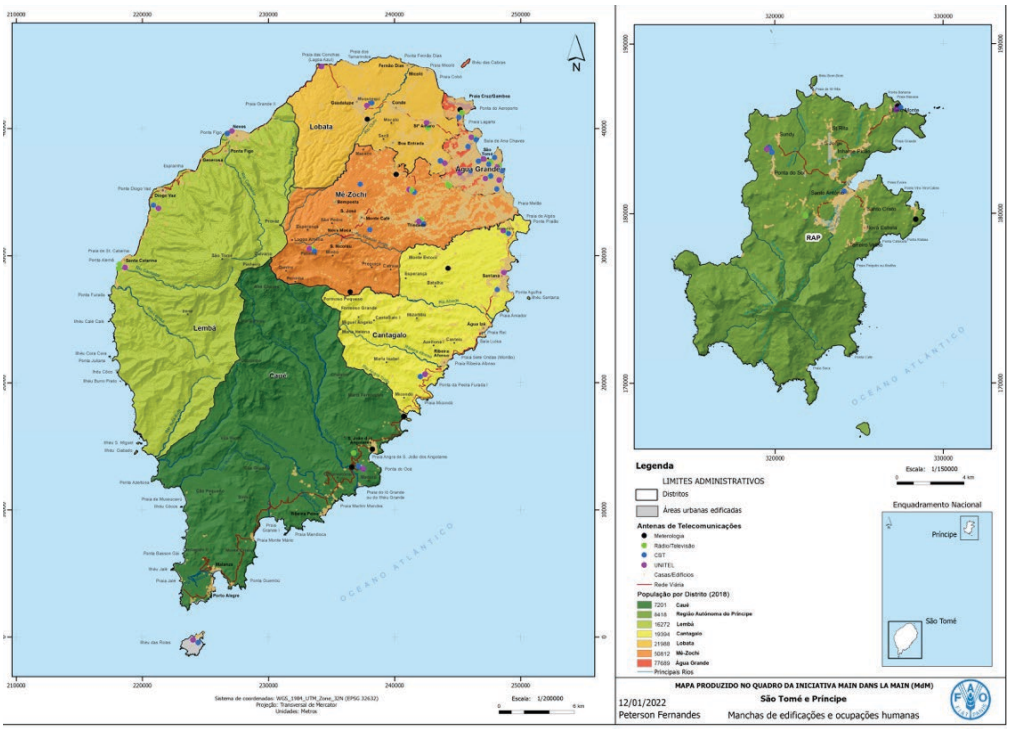
As a result, the so-called urban population now represents approximately 75.8% of the total national population (according to INE-STP), with an average annual rate of urban concentration estimated at 2.96% for the period 2020-2025. The rate of urbanization in 2018 was 72.8% of the total population, with an urbanization rate of 3.33% per year (over the period 2015-20). The coastal area is particularly affected by these changes, as it faces new pressures that threaten both settlement conditions and the environment, especially in areas subject to climatic risks and erosion accelerated by certain human activities, such as the extraction of sand[18].

*16 https://www.fao.org/3/I9705EN/i9705en.pdf*

*17 These phenomena of theft have been denounced in most of the Districts visited either directly by the owners of agricultural land who are victims of these lootings and thefts or by the representatives of the District Camaras to whom the rural populations complain of these offences.*

*18 Sampling of sand from settlement beaches north of Principe and cumulative erosion with climatic effects (floods) on settlement and residential areas described in the mission report Geomorphology studies and coastal dynamics and vegetative options for coastal protection of communities Ió Grande, Praia Melão, Pantufo, Praia Lochinga-Gambôa-Cruz, Micoló and Abade, Field Visit Report - Elena (Nena) Vandebroek (Deltares) Luisa Torres Duenas (Deltares) Alessio Giardino (Deltares), Bouke Ottow (Deltares), Jenny Pronker (CDR International B.V.).*

Fig. 1: Demography, urbanization and administrative mapping (Source FAO, 2022)




These dynamics are compounded by the influence of private interests focused on the coastal areas around tourist sites, especially beaches and old port facilities (pontoons) that attract private investors interested in hotel and recreational activities or restoration. Along the west coast of Sao Tome in the Cantagalo district, privatized spaces are multiplying, limiting access to the coast from the national road and access roads to the beaches. This phenomenon, beyond the control of local authorities, is developing due to a lack of territorial planning and without consideration of environmental impacts[19].

As for transportation and access roads, the high urban concentration, particularly in the northern region of Sao Tome, leads to congestion on the national traffic lanes (national coastal peripheral road), where pedestrians, residents, roadside vendors, schoolchildren, motorcycle taxis, and collective taxis all jostle for space, creating a sense of insecurity. Despite the current satisfactory condition of these roads, which are often too narrow and lack suitable sidewalks for the abundant pedestrian traffic, the juxtaposition of users and means of transport means that certain times of the day carry a high risk of accidents.

Access to the national coastal peripheral roads is limited to paths and tracks, which depending on the season, may not provide secure travel conditions, especially for pedestrians and motorcyclists. Furthermore, a significant portion of small goods transportation relies on these routes (e.g., fish, agricultural food products, wood, and itinerant trade products toward the urban center).

Considering the coastal influence and associated risks, enhancing travel by coastal seaway is an element of national interest. It can alleviate road traffic congestion and reduce negative effects on tourist populations passing through unsanitary residential areas. Moreover, the development of small maritime transport all around and between the islands can secure permanent access for products and people to public services and markets of economic interest. This development can also contribute to substituting energy sources used for decarbonization and reducing the polluting effects caused by land vehicles such as trucks, cars, and motorcycles. The interest of developing small maritime transport has been further emphasized by the effects of climatic events such as the heavy rainy season in December 2022.

*19 TObservations on the ground and denunciation made by the District Camaras and confirmed by the Department of the Environment during site visits and technical meetings held in January 2023.*

## 2.5 Agricultural dynamics[20]

Comparative maps depicting agricultural properties and cropping choices indicate that over the span of seventy years (1953/2023, as shown in the maps below), large agricultural properties have been replaced by protected areas occupying the central part of the island of Sao Tome. These protected areas cover a large area of the southern coasts of Lemba district, bordering Caué district, with another part of the Lobata coast bordering Lemba district, and with some protected plots in the southwestern tip of the island near Porto Alegre. The remaining large agricultural properties have been fragmented into small and medium-sized agricultural properties. Simultaneously, urban areas have expanded further along the northeast coast and to the south in some attractive areas, particularly for tourist activities, such as the districts of Agua Grande and Cantagalo.

In Principe, the southern half of the island has been removed from the old large agricultural properties for the benefit of protecting spaces and ecosystems. The central strip of the island, crossing from East to West, still has small agricultural enterprises in operation.

These developments have resulted in a change in the distribution of cultivated agricultural land, favoring food production. The productions are then regularly transported to more densely populated urban areas.

## 2.6 Legal and Institutional Framework[21]

Since the 1990s, the Democratic Republic of São Tomé e Príncipe (DRSTP) has established an entity responsible for environmental issues within the institutional framework of its governance. This entity is tasked with coordinating the country's environmental actions, defining and executing the State's policy on the environment. Different governments have combined the environment sector with other sectors in various ways, which has influenced the designations and caused minor internal issues.

As the environmental safeguard body, the Directorate-General for the Environment has been deepening its approach to dealing with environmental issues to achieve effective environmental management. This involves adopting medium to long-term strategies and policies, including formulating environmental policies, raising awareness through information and communication, and investing in research and new technologies.

The "Base Law for the Environment" Law Nº 10/1999, developed by the General Directorate for the Environment, under the supervision of the "Ministry of Natural Resources" in collaboration with the UNDP, is the primary law regarding environmental regulation, and is the basis for other regulations.

The Environmental Impact Assessment process is legally defined in the Environmental Base Law (Law No. 10/99) and regulated by Decree-Law No. 37/99 of November 20, which outlines the procedures for the Environmental Impact Assessment process.

In accordance with paragraph e) of Article 1 of Decree No. 37/99, issued on August 3, 1999, which regulates the Environmental Impact Study Process, the Environmental Impact Study is a fundamental element of the evaluation process of environmental impact. It involves conducting a technical and scientific analysis of the consequences that may arise from carrying out proposed activities on the environment. This includes examining the risks and benefits in the short, medium, and long term,

*20 2400 T of coffee were exported in 1889 (the regular maritime link was established in 1858). The large agricultural properties (cocoa and coffee) will grow until 1907 with private railways attached to the properties and with small ports intended to export coffee and cocoa. The total exported volume of cocoa will reach a record of 36,500 Tons in 1913. Long after the declaration of the abolition of slavery in 1876, there will still remain in 1958, 170 Roças in activity.*

*21 Antónia Alariza Mendes Júnior Bento Luiz, Consultora Nacional Especialista em Ambiente e Avaliação de Impactos Ambientais), FAO TCPSTP3804, Janeiro 2023, "Relatório Ambiental com contribuições e nota específica pormenorizada sobre os impactos e recomendações destinadas a serem integradas na análise e rendimentos dos investimentos prioritários do Plano Nacional de Investimentos para a Economia Azul".*

considering the possible options for the activity and for the intended implementation area.

There are several other environmental decrees and regulations in place, including:

- Law No. 11/99 - Conservation of Fauna, Flora, and Protected Areas
- Decree No. 35/99 - Inert Extraction, which sets out the conditions for the exploitation of aggregates (such as sand, limestone, reefs, and pebbles) in coastal areas and rivers.
- Decree No. 36/99 - Waste, which establishes criteria for the licensing of different operations related to the collection, transport, storage, disposal, or use of solid waste.
- Law No. 9/01 - Fisheries and Halieutic Resources Law, which defines the general principles of the policy for the conservation, exploitation, and management of fisheries resources and the aquatic environment.
- Law No. 5/01 - Forest Law
- Law No. 6/06 - São Tomé Natural Park Law (Obô)
- Law No. 7/06 - Príncipe Natural Park Law (Obô)
- Regulation of the extraction and exploitation of aggregates in São Tomé e Príncipe, approved by Law No. 9/2020 of September 20th, which applies to the exploration, extraction, transport, and commercialization of aggregates throughout the territory of São Tomé e Príncipe.

Despite the existence of a comprehensive legal framework in the environmental sector and the efforts made in recent years, there are still significant deficiencies in technical, material, and financial capacity that limit the effective implementation of legislation, as well as management, monitoring, inspection, and environmental awareness programs.

## 2.7 Policies relevant to prioritized projects and blue economy development

- **Tourism as a driver for blue economy**

The political recognition of the potential positive impacts of the tourism sector on the economy and employment was manifested in 2001 with the development of the first strategic plan dedicated to the development of tourism. This was followed by a Tourism Master Plan in 2008, and a plan specifically for the Autonomous Region of Príncipe in 2012 (Plan and Agenda for the Sustainable Development of the Island of Príncipe). In 2018, this plan was updated with projections for 2025[22]. All of these policy instruments have expressed the objective of maximizing the contribution of tourism to national employment and income generation, while ensuring that the social and economic benefits of tourism are equitably distributed.

In terms of legislation, Legislative Decree 28/2014 regulates hotels and similar activities, replacing No. 692, dated August 20, 1964. This law clearly defines that all tourist activities carried out in São Tomé e Príncipe must safeguard the environment and ecological values of the country, protect cultural events and the way of life of the country's population, and preserve and maintain public and private goods related to tourism activity. Law n ° 8/2012 of September 12 allows organized civil society, including NGOs, to participate in the development process of the country.

*22 Plano Estratégico e de Marketing para o Turismo de São Tomé e Príncipe. 2018.*

*23 https://www.facebook.com/plataformadeturismoresponsavelesustentavel/*

Public-private partnerships are encouraged with the aim of promoting economic interests in a sustainable manner, without harming the environment and biodiversity. In 2014, the Responsible and Sustainable Tourism Platform (PTRS)[23] was established to provide a national forum that brings together various national public and private tour operators, cooperatives, non-governmental organizations (NGOs), and local communities. This initiative is accompanied by a sustainable development charter that promotes good social, economic, and environmental practices. The main objective is to ensure a permanent and sustainable source of income for the management of protected areas, as well as to provide economic opportunities for the benefit of rural communities and small and medium-sized national enterprises.

The country is home to several dense and diverse marine, terrestrial, and intermediate ecosystems, including mangroves, coral reefs, and riparian areas, which support a diverse range of flora and fauna. The coastal mangrove forests are a crucial element for biodiversity and conservation, with their value as “biological shields” (Feagin et al., 2010) and provision of important indirect benefits for coastal living resources, such as the maintenance of fish stocks, erosion control, and regulation of biogeochemical cycles.

n 2015, a study conducted in São Tomé identified 26 species of fish spawning only in the Malanza site, which is the largest mangrove ecosystem in the country. Mangroves also play an increasingly important role as tourist destinations, where visitors can access services offered by local communities such as guided tours, canoe trips, and small restaurants, contributing to rural livelihoods and economic diversification. However, significant degradation of the mangrove area, resulting in the proliferation of invasive and salt-tolerant vegetation, has been observed in Ribera Alphonso, hindering the recovery of slow-growing native vegetation.

Coral reefs are one of the most unique and threatened marine ecosystems in São Tomé e Príncipe and are the only reef zone in the Gulf of Guinea. The National Report of the Convention on Biological Diversity (2014) emphasized the necessity of minimizing anthropogenic pressures on coral reefs and other vulnerable marine and coastal ecosystems affected by climate change, in order to preserve their integrity and functioning.

The beaches in São Tomé e Príncipe gained worldwide recognition after they were featured in a commercial for Bacardi Rum, shot on Banana Beach (Principe) in the early 1980s. Since then, São Tomé has been associated with wild sandy beaches, which are one of the most attractive ecosystems for tourism development (as per the Strategic and Marketing Plan for Tourism of São Tomé and Principe 2018). However, these coastal environments are under severe threat from sea-level rise, pollution, and sand extraction for housing construction. As the popularity of São Tomé as a tourist destination continues to rise, it has become necessary to manage the beaches sustainably to prevent environmental degradation and loss of income.

Tab.1: Advantages and constraints in relation with some potentials for new niche-markets for tourism sector

| Item | Advantages and potentials |
|---|---|
| General | STP boasts stunning landscapes, with many endemic bird and flower species. It also offers a peaceful and secure atmosphere, both in its cities and countryside, along with a friendly local population. Luxury hotels owned by Portuguese, South African, and other international chains can be found on the islands, providing excellent service by international standards. Additionally, there has been a rise in the number of guesthouses owned by locals. The government recognizes the importance of tourism and considers it a priority sector. Small-scale tourism ventures, such as eco-lodges, diving, canoeing, kayaking, and tour guide companies, are on the rise. Over the past decade, tourism has become an increasingly vital part of STP's economy. |
| Beaches | The stunning beaches of STP gained international fame in the early eighties when they were featured in a Bacardi Rum commercial shot on Banana Beach (Principe). Since then, STP has been renowned for its untamed and picturesque sandy beaches.<br>However, as STP gains popularity as a tourist destination, it has become essential to manage its beaches sustainably to prevent environmental degradation and loss of business. Currently, the unregulated construction of kiosks, lack of proper hygiene facilities, and unrestricted vehicular access are pressing concerns that require attention. It is necessary to establish and enforce standards to regulate these activities and preserve the natural beauty of the beaches for future generations. |
| Diving | There has been significant interest in developing the diving market in STP, with several proposals submitted for consideration under the Blue Economy initiative. Although various dive sites are already in informal use for occasional dives, the market remains fragmented and does not comply with international health and safety standards. It is crucial to implement adequate quality control measures to ensure that a safe and quality product is provided to customers. Any diving fatality can have severe negative consequences on the market.<br><br>Scuba diving is an equipment-intensive activity that requires a significant capital outlay to establish a retail outlet or dive shop, which must offer a full range of equipment and filling facilities. Dive boats are a considerable capital expense, with high operating costs, and health and safety considerations for both the operator and customers. Qualifying as a diving instructor requires a significant investment of both time and money. Economic sustainability is also influenced by environmental awareness and conservation efforts, quality service delivery, customer satisfaction, and sustainable business management practices. Liability concerns can be managed through the use of waivers, declarations of medical fitness to dive, adherence to industry standards, and public liability insurance[24]. |
| Sport fishing | STP boasts healthy stocks of marlin, and if a "catch-and-release" policy similar to the one in Cabo Verde is adopted, this market could provide a steady and sustainable income to the country's GDP. However, simply providing marinas for vessels to moor is not enough to develop this sector. A detailed market analysis is necessary to identify the best sources for tourist anglers and improve air links between STP and mainland Europe or the Americas. This would inevitably involve upgrading the São Tomé airport to handle more passengers or a higher frequency of arrivals and departures. Moreover, direct flights from the Americas, such as Brazil and Florida, would require a longer runway than the current ones landing in STP. Finally, marine protected areas must be established to prevent a free-for-all situation from developing between local fishermen and visiting anglers. |
| Cruise Liner | STP is already receiving visits from cruise liners. In fact, two cruise lines that sail from Europe to Cape Town have included STP in their itineraries. However, cruise lines prefer to moor alongside to disembark passengers on land instead of offshore disembarkation via lifeboats, as this poses a higher risk of accidental injuries for senior passengers. Once the rehabilitation of the road between Porto Neves and São Tomé is completed, travel time to the city will be reduced to just a few minutes. Moreover, tourists can travel to the airport for a domestic flight to Principe and visit the Biosphere, or travel along the scenic coast road to various eco-lodges.<br>Choosing Porto Neves as the location for the cruise liner berth offers additional advantages. The old Customs House can be renovated and transformed into an Arrivals Hall with on-site Customs and Immigration services. This will not only benefit the cruise industry but also create downstream activities that can boost the local economy. |

*Source: Joseph Sciortino, FAO 2022.*

*24 Dimmock, Kay; Cummins, Terry; Musa, Ghazali (2013). "Chapter 10: The business of Scuba diving". In Musa, Ghazali; Dimmock, Kay (eds.). Scuba Diving Tourism. Routledge. pp. 161–173.*

| Constraints and actions proposed |
| --- |
| The STP Government has developed several key strategic development documents, including the Agenda for Transformation Horizon 2030, the Strategic Marketing Plan for Tourism in STP - Horizonte 2025, and the National Plan for Integrated Management of Urban Solid Waste (PNGIRSU) 2018-2023.<br>However, one significant challenge to the successful implementation of the tourism marketing strategy is the lack of hygiene facilities in villages adjacent to potential tourist attractions such as beaches and historical sites. The available toilets in these villages are often situated close to the water's edge and emit strong odors, which can deter potential visitors. Addressing this issue is crucial to attracting and retaining tourists in the area.<br>One of the major challenges is the inadequate management of MSW or solid waste, which includes glass, metal, and plastic, as well as non-recyclable waste. This issue is caused by the lack of an engineered landfill, resulting in visible waste along the coastal roads and tourist attractions. Addressing these challenges requires simultaneous action to improve waste management and requalify the beaches. However, organic waste is not a problem as it is mostly composted.<br>The various municipalities along the coast have acknowledged these challenges and proposed several sub-projects under the Blue Economy initiative. These projects range from public hygiene conveniences to district-wide landfills and recycling initiatives. However, the fragmented nature of these proposals overlooks the complexity of landfills, the intricacies of individual waste streams, and the cost and maintenance of each operation. A comprehensive approach is necessary to address the issue of MSW effectively. |
| In the diving market, scuba diving was once considered a high-risk activity, but improvements in equipment, training, and service provision have helped to modify this perception. Medical support services and the local availability of a decompression chamber have greatly improved the management of diving accidents and reduced the risk of permanent injury. However, the lack of a decompression chamber in STP hinders the management of diving accidents. Typically, decompression chambers are based at the local hospital, as the equipment has other medical applications.<br>To support the diving tourism sector, the General Direction should prepare a National Diving Masterplan for São Tomé et Principe, including:<br>To develop the diving tourism sector, the General Direction should prepare a National Diving Masterplan for São Tomé et Principe, which should include the following components:<br>- A comprehensive record of a set of test dives (with the assistance of the local diving community) surveyed by a selected international dive operator. The record should include information on marine flora and fauna, inventory of wrecks (if any), recommended dive depth, difficulty level (beginner or advanced), currents, and accessibility (by boat or shore).<br>- Photographic records and video footage of the test dives, which can be used by the government of STP and DG Tourism to market diving tourism overseas and prepare a dive destination map for STP.<br>- Technical guidelines on the establishment of a diving tourism industry in STP in line with internationally accepted health and safety standards. The guidelines should include the setting up and operation of a decompression chamber in conjunction with the hospital. |
| Although developing the sport fishing and marine conservation markets may be longer-term goals than beaches and diving, there are still constraints that require assessment and preparation in the near term. In particular, the sport fishing market requires the following studies before any significant investments can be made:<br>- An updated stock assessment of pelagic game fish, which typically includes Marlin, Swordfish, Wahoo, Dorado, Barracuda, Mackarel, Amberjack, and other species of interest.<br>- Development of game fishing regulations to ensure sustainable practices.<br>- Preliminary planning for Marine Protected Areas involving local stakeholders.<br>- A market study to determine the number and types of deep-sea angling vessels likely to relocate to STP, as well as their maintenance requirements onshore.<br>- To prepare for the development of the sport fishing market, a market study is needed to identify the target countries for probable visitor (deep sea anglers) arrivals, potential employment generated by this sector, and potential visitor expenditure per trip.<br>- If the market study identifies the Americas (Florida or Brazil) as an important target origin for deep-sea anglers, the airport authority needs to evaluate the landing requirements for wide-bodied aircraft versus continued arrivals of smaller aircraft from nearby hubs.<br>Regarding the physical infrastructure, the marina can be included in a second phase of the extension of the port at Ana Chavez or assigned an independent area inside the bay for private sector investment. The site will need to be evaluated for the amount of dredging required, which could be added to the dredging quantities for the extension of the commercial port. The purchase and installation of floating pontoons fall under the responsibility of PPP investment, and if the market demand is strong, this sub-project could be moved forward. |
| "The cruise liner terminal at Porto Neves would require the following studies before making any major investments:<br>- A current market study of the cruise liner industry to determine the minimum number of days a cruise liner should spend at port and plan potential activities during the visit. This study will help identify major selling points for longer stopovers.<br>- An outline design for enlarging the existing quay at Porto Neves, including the mooring dolphins, and a preliminary cost estimate. The cost should also include the architectural rehabilitation of the old Customs House, as well as re-organization of the landing area, including parking for vehicles and minibuses.<br>- A financial feasibility study to determine the project's economic viability." |

- **Policy context related to climate change with key sectors of blue economy**

The National Action Plan for Adaptation to Climate Change (NAPA)[25] has identified the protection of coastal areas and the impacts related to tourism as one of the priority sectors for adaptation. The plan includes several priority measures related to the sector such as beach rehabilitation and protection of tourist areas, sand dredging, rehabilitation of tide stations, construction of dikes, displacement of local communities at risk, diversification of activities and support measures for populations living on the exploitation of coastal resources, strengthening of equipment, and modernization of artisanal fishing, construction of barriers, a Climate Alert System and the State of the Sea, construction of drainage ditches, and construction of water tanks.

Diversification is also a priority area of intervention in NAPA, and it is fully aligned with supporting the creation of decent blue jobs for young populations and women. This will help reduce negative impacts on fisheries value chains by driving young populations and women towards the best coastal jobs for conservation, protection, ecotourism, or maritime new blue activities diversification.

The promotion of the Blue Economy, along with the protection and prevention of the degradation of coastal areas and their habitats, are identified by the iNDC as fundamental strategic elements for adaptation. These priority areas of adaptation and natural ecosystem preservation represent a source of potential new decent jobs in the fields of key blue economic sectors.

Other strategic documents with direct or indirect implications for the blue economy and climate adaptation include: the National Poverty Reduction Strategy (ENRP III) 2017-2021; the National Strategy and Action Plan for Biodiversity 2015-2020 (ENPAB); the Participatory Strategy for Water and Sanitation in São Tomé e Príncipe for 2030; the Maritime Safety Strategy, approved by Decree-Law No. 2/018; the Transformation Agenda in Horizon 2030, National Strategy and Action Plan for Coastal and Marine Ecosystems (2005); the Multisectoral Investment Plan to Integrate Resilience to Climate Change and the Risk of Disasters in the Management of the São Tomé e Príncipe Coastal Zone (2017); the National Environment Action Plan for Sustainable Development (PNADD); the National Communications on Climate Change; the Updated Charter for Agricultural Policy, Rural Development and Fisheries; the Fisheries Master Plan 2006-2010; the National Plan for Agricultural Investments, Food and Nutrition Security (PNIASAN) 2016-2020, which includes a specific program on fisheries[26]; and the Strategic Plan for Tourism Development (2018).

*25 The Republic of STP, by signing the United Nations Framework Convention on Climate Change in 1992, ratified in 1999, and the Kyoto Protocol in 1997, with ratification in 2008, demonstrated its firm commitment to combat climate change and its harmful effects on humanity , and has engaged in carrying out all the initiatives leading to mitigate the negative impact of this global phenomenon, notably: the National Action Plan for Adaptation to Climate Change (NAPA), the intended Nationally Determined Contribution (iNDC), the National Communications submitted to the United Nations Framework Convention on Climate Change (1st in 2005, 2nd in 2012 and 3rd in 2019), among other initiatives. https://faolex.fao.org/docs/pdf/sao185103.pdf*

*26 PNIASAN is linked with Malabo process and AU CAADP process.*

# 3. Project 1: Development of Blue cabotage in STP[27]

## 3.1 National strategy and blue cabotage priorities

The National Poverty Reduction Strategy II, which was implemented from 2012 to 2016, outlines the future transport policy for São Tomé e Príncipe. It emphasizes the importance of ensuring logistical coordination between transport projects and the economy, as well as introducing inter-modality and possible substitution between the various modes of transport, including air, maritime, and land transportation (FAO, Joseph Sciortino, 2022).

The top priority in the maritime sector is to establish a cabotage system around STP, utilizing existing quays where possible. The Blue Cabotage plan, also known as Project 1, requires an investment of 18.83 billion euros[28] (as outlined in Tables 4, 5, and 6), including the construction of six multi-purpose blue cabotage ports - five in São Tomé and one in Príncipe. Ponta Mina in Príncipe represents 41% of the total estimated investment (67.81 million euros). The project is expected to have a strong ripple effect on the blue and green economy, particularly on the fishing, tourism, and agriculture value chains, by ensuring the transport of goods and people and reducing the carbon footprint (See Figure 2).

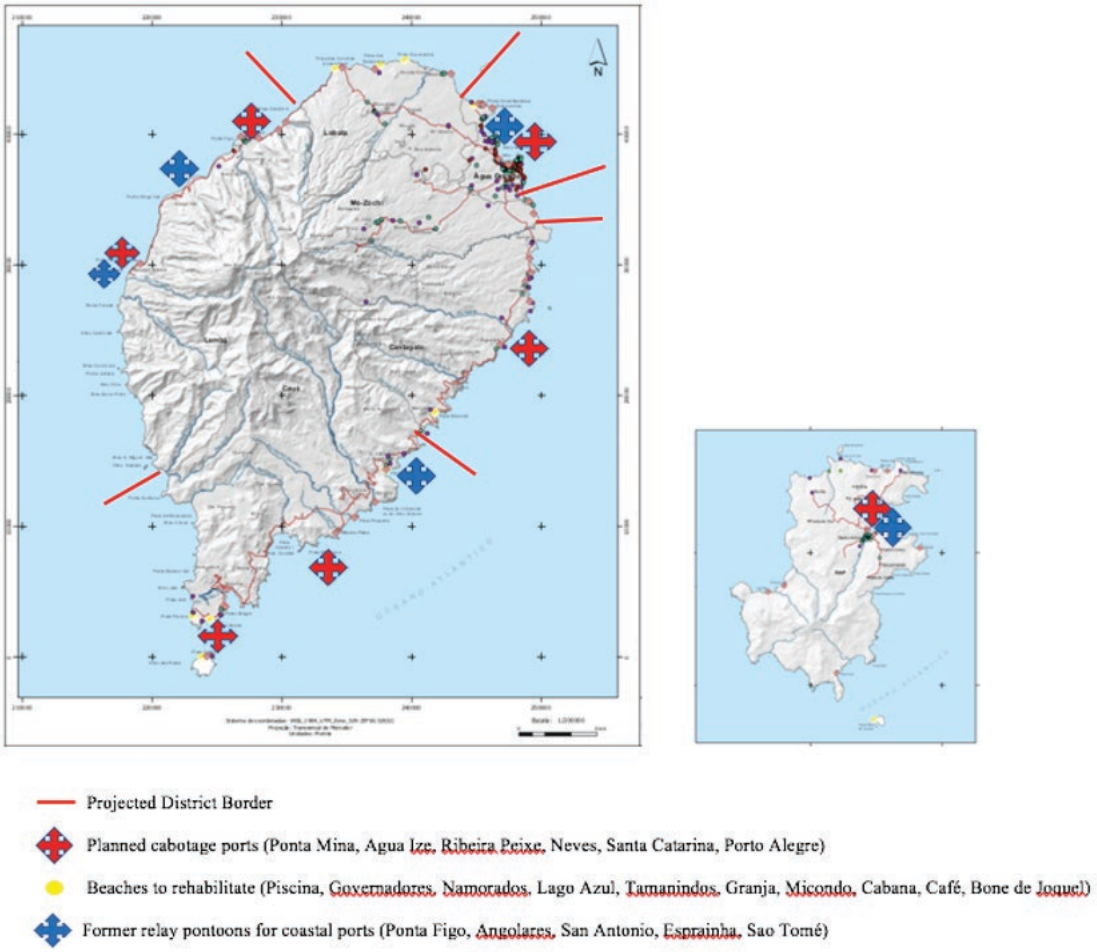
## 3.2 The port sites presentation

- The Port of Ponta Mina is a crucial element for the development of the autonomous region of Príncipe. Given the fact that it is poorly served with the pier at Santo António, it is the top priority of the Cabotage Master Plan.
- The Port Neves Pier has multipurpose features and can be upgraded to cabotage functions for both fuel and consumer goods transportation. It can also support the development of the fishing industry and boat repair facilities, taking advantage of existing support infrastructure.
- The Santa Catarina and Porto Alegre Pier can be improved to support fisheries and agriculture. Due to their location, they are also strategic for the creation of a maritime alternative (cabotage) to the highway. This can reduce the risk of isolation in case of any event that affects the existing road network.
- The Água Izé wharf mainly supports agriculture but also closes the support network for cabotage and tourism.
- The Ribeira de Peixe Pier can be enhanced to support tourism development and motivate private oil industry investment in a new transport system for palm oil. This will have positive impacts on land transport and infrastructures.

*27This detailed presentation of the elements relating to the cabotage project includes the technical elements described in the work of the consultants of the study financed by the European Union and supplemented by the contributions of the FAO consultants (FAO TCP/STP/3804, 2022) who reworked on the proposals initially formulated and updated certain points through consultation with the national technicians of ENAPORT under the joint coordination of the UIEEA.*

*28 67,880 M Euros including Ana Chavez port expansion.*

Fig. 2: Ports and beaches included in the 3 investment projects

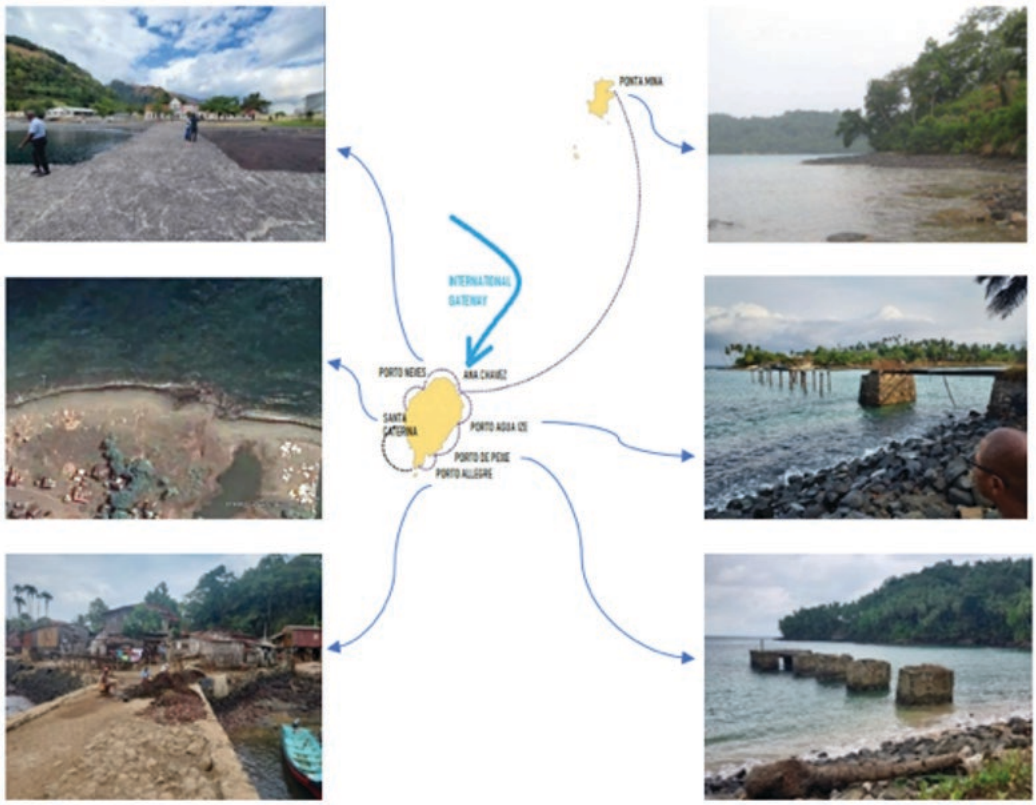



Tab. 2: Blue Cabotage Ports identified and intermediary existing pontoons

| Blue Port for cabotage project and other pontoons | | Baseline |
|---|---|---|
| Sao Tomé | Port Neves Pier | • Multipurpose features<br>• Can be upgraded to cabotage functions (both transport of fuel and transport of consumer goods)<br>• To support the development of the fishing industry, boat repair facilities, cruising industry)<br>• Taking advantage of the existing support infrastructure |
| | Esprainha<br>Angolares<br>Ponta Figo<br>São Tomé | • Possible rehabilitation to serve as a relay base for ecotourism, recreational marine and diving activities, program for the marine and coastal environment. * |
| | Santa Catarina | • Piers can be enhanced to support the fisheries and agriculture<br>• Strategic for the creation of a maritime alternative (of cabotage) to the highway, reducing the risk of isolation in case of any event that affects the existing road network |
| | Porto Alegre | • Piers can be enhanced to support the fisheries and agriculture<br>• Strategic for the creation of a maritime alternative (of cabotage) to the highway, reducing the risk of isolation in case of any event that affects the existing road network |
| | Água Izé wharf | • More dedicated to supporting agriculture, closes the support network for cabotage but also for tourism and ecotourism sectors |
| | Ribeira de Peixe Pier | • To support the development of the recreative and tourism activities<br>• Strategic for ecotourism<br>• Could be enhanced in a second phase to support the export of palm oil in bulk<br>• Potential to attract private investment in ecotourism and maritime sector |
| Principe | Port of Ponta Mina | • Key element for the development of the autonomous region of Príncipe (and given the fact that it is very poorly served with the pier at Santo António)<br>• Configures as the top priority of the Cabotage Master Plan |
| | San Antonio | • Possible rehabilitation to be used for the construction site of Ponta Mina and then conversion into a marina for tourism and recreational activities. |

*The rehabilitation of these existing sites will require technical studies and impact analysis which are not quantified in this document.
Source: FAO, TCPSTP3804, 2022

Fig. 3: Project 1 “Photos of ports selected for Blue Cabotage in STP”




*Source: FAO, TCPSTP3804, 2022.*

Tab. 3: Equipment and activities planned in the cabotage ports project.

| CABOTAGE PROJECT AND RELATED/RELATED ACTIVITIES | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Actividades** | **Equipments and activities / Ports** | **Sta. Catarina** | **Neves** | **Água Izé** | **Ribeira Peixe** | **Porto Alegre** | **Ponta Mina** |
| **TURISM** | Equipment fire / Security | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Signaling / Security (Horizontal) | ☑ | ☑ | ☑ | ☒ | ☑ | ☑ |
| | Relief for shipwrecked people | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Admin Buildings (with 2 toilets) | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Medical care (border control) | ☒ | ☑ | ☒ | ☒ | ☒ | ☑ |
| **BUSINESS** | Grue | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Forklift | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| **FISHERIES** | Fuel Station | ☑ | ☑ | ☑ | ☒ | ☑ | ☑ |
| | Ice factory | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Cold room | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| | Maritime access stairs to the pier | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ |
| **GENERAL** | Connection/access to the main road | ☑ | ☑ | ☑ | ☒ | ☑ | ☑ |
| | Environmental impact * | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ |

*** Rehabilitation or reconstruction of the 6 quays are not included in Annex I of Decree No. 37/1999 – “Regulation on the environmental impact assessment process”, therefore the proposed actions are not subject to an environmental impact assessment. However, the project considers a set of corrective measures applied to physical, biotic and socio-economic environments.**

*Source: Sr Manuel dos Santos Diogo Coelho do Nascimento, Merchant Marine Officer, January 2023.*

## 3.3 Phasing

The Blue Cabotage project can be designed in three or four phases, depending on the available financial resources. It should take into account the functional priorities of each national site, considering their contribution to opening up certain areas, encouraging the development of multi-sector maritime activities such as tourism, ecotourism, conservation of threatened or fragile coastal spaces and species, and contributing to the transport of goods to the port of Ana Chavez or Principe or from the north to the south area. Also, the project should consider tourists' mobility according to coastal circuits related to seaside hotel residence areas, historical sites, or exceptional natural areas to visit.

The following phasing is proposed based on these criteria[29]:

- The first priority is Ponta Mina, with the possibility of rehabilitating the port of San Antonio to facilitate the construction site. The rehabilitated port can subsequently be used as a marina, complementing the main port of Ponta Mina when it becomes operational.

- The second priority is the ports of Neves, Santa Catarina, Porto Alegre, and Agua Izé. They should encourage the establishment of mixed goods and passenger transport and promote local multisectoral activities such as tourism, conservation actions and programs, professional fisheries, sport fishing, recreational fishing, and yachting development.

- Third priority[30]: The port of Ribeira Peixe and the rehabilitation of existing pontoons, which can play a role in the deployment and strengthening of ecotourism projects and marine activities such as diving, recreational and sports fishing, and visits to historic and landscape sites near coastal areas. This package includes Ribeira Peixe, Ponta Figo, Esprainha, the central pontoon of Sao Tomé, and Angolares.

- Fourth priority: As part of the port infrastructures investment project, Ana Chavez expansion needs to be taken into account and studied.

The detailed presentation of the port proposals will only deal with the six main ports, five ports of phases 1 and 2, and Ribeira Peixe contained in phase 3 due to the analysis made by the architects and engineers of the European and FAO missions. Specific studies will be necessary to estimate rehabilitation costs for the other pontoons mentioned in phase 3. For Santo Antonio in Principe, the proposal will relate to an estimated budget for a study of the rehabilitation needs before a more in-depth study that will consider the conversion of the port into a marina after the commissioning of the port of Ponta Mina.

## 3.4 Investment Costs

The priorities for the Blue Cabotage project are based on the following reasons:

1. To promote balanced development between the two inhabited island territories, with a priority given to Principe.

2. To establish cabotage along the territorial dimension of Sao Tome's coast.

3. To connect cabotage bases with areas of mixed interest, such as tourism, fishing, environment, and trade.

*29 The detailed presentation of the port proposals will only deal with the 6 main ports (5 ports of phase 1 and 2 and Port of Ribeira Peixe contained in phase 3 due to the analysis made by the architects and engineers of the European missions and the FAO 2022 mission). For the other pontoons mentioned in phase 3, an estimated study budget for their rehabilitation will be proposed as an indication.*

*30 With the exception of the Ribeira Peixe site, the rehabilitation of the other pontoons will have to be prepared by technical and impact studies.*

4. Expansion of Ana Chavez Port is also mentioned, but further detailed proposals will need to be studied in the future.

Each port site and infrastructure of the cabotage project is addressed in a specific annex, with details including a) justification, b) proposed work description and equipment, c) environmental measures, and d) cost elements. These details can be consulted in the technical studies mentioned earlier.

Tab. 4: Consolidated priority list of potential public investments (Euros, €)

| | Name and proposed infrastructure | Sector operator | Environmental Impact | Cost Inc. ESIA |
|---|---|---|---|---|
| Phase 1 | Ponta Mina new landing quay * | Cabotage ENAPORT | Category A Full marine ESIA | 7.050,000 |
| | | | *Sub. Total Phase 1 (including provisional costs for Santo Antonio consolidation)* | *7.730,000* |
| Phase 2 | Porto Neves refurbished landing quay* | Cabotage ENAPORT | Category B ESIA | 1.520,000 |
| Phase 2 | Porto Alegre refurbished landing quay* | Cabotage ENAPORT | Category A Full marine ESIA | 2.460,000 |
| Phase 2 | Santa Catarina new landing quay* | Cabotage ENAPORT | Category A Full marine ESIA | 2.430,000 |
| Phase 2 | Agua Izé refurbished landing quay* | Cabotage ENAPORT | Category B ESIA | 2.433,000 |
| | | | *Sub. Total Phase 2* | *8.843,000* |
| Phase 3 | Ribeira Peixe refurbished landing quay* | Cabotage ENAPORT | Category B ESIA | 2.257,000 |
| | | | *Sub. Total Phase 3 (to be completed with costs for existing pontoons rehabilitation)* | *2.257,000* |
| | | | ***Sub. Total Phase 1, 2 and 3*** | ***18 830 000*** |
| Phase 4 | Ana Chavez port expansion | Gateway Terminal ENAPORT | Category A Full marine ESIA | 49.080,000 |
| | | | ***Sub. Total Phase 4*** | ***49.080,000*** |
| | | | **TOTAL** | **67.810,000** |

*These projects can share a single ESIA firm if undertaken as a package

Tab. 5: Comparison of estimated costs (2013, 2022, 2023) (Euros, €)

| Sites | Estimated costs | | | % 2/1 | % 3/1* |
|---|---|---|---|---|---|
| | 1) Del CE Gabon 2013 | 2) FAO 2022 | 3) WB 2023 | | |
| Agua Izé * | 1 632 926,00 | n.c. | 2 433 000,00 | n.c. | 0,49 |
| S. Catarina | 1 665 421,00 | 2 430 000,00 | n.c. | 0,46 | n.c. |
| Porto Neves | 1 299 775,00 | 1 520 000,00 | n.c. | 0,17 | n.c. |
| Ponta Mina | 6 029 645,00 | 7 050 000,00 | n.c. | 0,17 | n.c. |
| Porto Alegre | 1 738 309,00 | 2 460 000,00 | n.c. | 0,42 | n.c. |
| Ribeira Peixe | 1 514 290,00 | 2 257 000,00 | n.c. | 0,49 | n.c. |
| Ana Chavez | n.c. | 49 050 000,00 | n.c. | n.c. | n.c. |

*+ 49% applied for cost estimation 2023 for Agua Izé port.

Tab. 6: Estimated costs (Source: FAO 2022, Joseph Sciortino) (Euros, €)

| Items | Ana Chavez | Ponta Mina* | Porto Neves | Santa Catarina | Porto Alegre | Ribeira Peixe | Agua Izé** |
|---|---|---|---|---|---|---|---|
| ESIA | 1 000 000,00 | 300 000,00 | 50 000,00 | 300 000,00 | 500 000,00 | 500 000,00 | 500 000,00 |
| Design Fees | 750 000,00 | 350 000,00 | 100 000,00 | 350 000,00 | 150 000,00 | 150 000,00 | 150 000,00 |
| Civil works | 41 000 000,00 | 5 500 000,00 | 950 000,00 | 1 190 000,00 | 1 300 000,00 | 1 100 000,00 | 1 273 000,00 |
| Equipment | 4 000 000,00 | 565 000,00 | 350 000,00 | 475 000,00 | 400 000,00 | 400 000,00 | 400 000,00 |
| Contingencies | 2 300 000,00 | 335 000,00 | 70 000,00 | 115 000,00 | 110 000,00 | 107 000,00 | 110 000,00 |
| Total | 49 050 000,00 | 7 050 000,00 | 1 520 000,00 | 2 430 000,00 | 2 460 000,00 | 2 257 000,00 | 2 433 000,00 |

*Santo Antonio consolidation estimated cost 680 000, 00 € to add.
**Authors calculation 2023, Agua Izé Port.

The following maps (Figure 4) depict the geographic proximity of sectoral establishments that can confer on the port infrastructure investment project a role in incentivizing and facilitating the development of intersectoral private initiatives between coastal communities, fishing activities and value chains, tourism and ecotourism activities, as well as transportation. It is noteworthy (yellow circles on the map, Figure 4) that the territories of positive impacts are planned systematically to straddle several districts, which requires partnerships between the District Camaras for monitoring, evaluation, and management of the infrastructures. The national institutions involved in the operation of the new port sites should work closely with the field. This aspect should be taken into account in the governance of these infrastructures and monitoring the performance and evolution of these investments through the links between the State and the central administrations, and the territorial authorities (Camara de District and Autonomous Region of Principe).

## 3.5 Social and economic analysis

The first socio-economic impacts of port investments are related to job creation (both direct and indirect) associated with the operation, maintenance, monitoring, and management of the infrastructure. These jobs could be coordinated with the District Camaras, the Regional Authority of Principe, and the central national authorities involved in the management of these infrastructures such as ENAPORT, IMAP, and customs.

As of 2022, there were approximately 746 jobs in the tourism sector in Principe (hotels, residences, accommodations, restaurants, bars, travel agencies), and 325 jobs outside of the tourism sector (source: Autonomous Government of Principe). According to INE-STP (2019), employment in Principe represents less than 7% of the total employment in the country, of which around 9.6% of the total number of people employed work in the catering and hotel industry (or any other form of tourist accommodation).

Each port site and infrastructure of the cabotage project is addressed in a specific annex, with details including a) justification, b) proposed work description and equipment, c) environmental measures, and d) cost elements. These details can be consulted in the technical studies mentioned earlier.

Tab. 7: Socio economics impacts in Principe and Sao Tome of the Blue Cabotage Investment project

| Impacts in Principe / Ponta Mina and Santo Antonio / 7,730.000 € invested | Number | Nb. / People / Family | Total Nb. People |
|---|---|---|---|
| Total jobs | 25 | 7 | 175 |
| Direct jobs | 10 | 7 | 70 |
| Indirect jobs | 15 | 7 | 105 |
| Indirect beneficiaries in Principe | | | |
| Artisanal Fishermen | 322 | 4 | 1 288 |
| Women fishmongers | 205 | 4 | 820 |
| Tourists visiting Principe (2017) | 3325 | 1 | 3 325 |
| Workers in small and medium enterprises (out of tourism sector) | 325 | 4 | 1 300 |
| Workers in tourism sector (Hotel, restaurant, bar, residence…) | 746 | 4 | 2 984 |
| *Total population Principe indirect beneficiaries* | *1 598* | - | *6 392* |
| *Total population Principe beneficiaries* | *1 623* | - | *6 567* |
| Impacts in Sao Tomé, Cantagalo, Lemba, Lobata, Caué / 8.843,000 € invested | | | |
| Total jobs | 32 | 7 | 224 |
| Direct jobs | 16 | 7 | 112 |
| Indirect jobs | 16 | 7 | 112 |
| Indirect beneficiaries in ST (Cantagalo, Lemba, Lobata, Caué) | | | |
| Artisanal Fishermen | 1769 | 4 | 7 076 |
| Women fishmongers | 1690 | 4 | 6 760 |
| Tourists visiting Sao Tomé (2017) | 33250 | 1 | 33 250 |
| Workers in small and medium enterprises (out of tourism sector) | 15159 | 4 | 60 636 |
| *Total population ST indirect beneficiaries* | *18 618* | - | *74 472* |
| *Total population ST beneficiaries* | *18 650* | - | *74 696* |
| **Total General beneficiaries in Sao Tomé e Principe** | **20 273** | | **81 263** |

The estimate for Sao Tome is made on the basis of 2019 data produced (IIo Recenseamento Empresarial 2020, Nov. 2021), corrected by the difference coefficient calculated on the comparative INE-STP data for Principe and Autonomous Government data from RAP (+62%).

Tab. 8: Estimate of costs and income related to investments for the ports of Principe, Ponta Mina and Santo Antonio.

| **Investment Amount** | | | | **Euros** |
|---|---|---|---|---|
| Total Investment Amount | | | | 7 730 000 |
| Annual depreciation (40 years) | | | | 193 250 |
| **Revenues from Port Activities** | **Nb. Vol. Ton. / Year** | **Unit Price** | | **Total** |
| Passenger transport cabotage (Tourists) | 4500 | 80 | | 360 000 |
| Boat parking Marina (20 Boats 365 days/year) | 7300 | 15 | | 109 500 |
| Freigh transport (port costs, loading, unloading) | 3715 | 60 | | 222 900 |
| Sale of diesel at pump (storage 10 500 L) | 220 000 | 1,5 | | 330 000 |
| Sale of gasoline at pump (storage 31 500 L) | 500 000 | 1,6 | | 800 000 |
| Sale of ice T / year (Max Prod. capacity 1T/day) | 300 | 286 | | 85 800 |
| Fish storage T / year (Max Capacity 6 T/day) | 900 | 204 | | 183 600 |
| **Total revenues (Port taxes included)** | | | | **2 136 800** |
| **Variables Expenses** | **Nb. Jobs** | **Average monthly salary** | **Nb./ Y** | **Total** |
| Supervisory staff and senior technicians | 4 | 800 | 12 | 38 400 |
| Handling personnel and services | 8 | 200 | 12 | 19 200 |
| | **Cons./KW/mois** | **Coût KW** | | |
| Energy consumed per year | 18 000 | 0,16 | | 2 880 |
| Diesel supply (21,000 L stored) | 220 000 | 1,4 | | 308 000 |
| Petrol supply (21,000 L stored) | 500 000 | 1,5 | | 750 000 |
| Maintenance (estimated 1% of Total Investment/year) | | | | 77 300 |
| **Total des Charges** | | | | **1 195 780** |

Tab. 9: Estimate of costs and income related to investments for the ports of Sao Tomé (District Cantagalo, Caué, Lemba, Lobata) (Euros).

| **Investment Amount** | | | **Euros** |
|---|---|---|---|
| Total Investment amount | | | 8 843 000 |
| Annual depreciation (40 years) | | | 221 075 |
| **Revenue on port activities** | **Nb. Vol. Ton / year** | **Unit Price** | **Total** |
| Passenger transport cabotage (Tourists) | 15 000 | 40 | 600 000 |
| Boat parking Marina (20 Boats 365 days/year) | 7 300 | 15 | 109 500 |
| Freigh transport (port costs, loading unloading) | 1 920 | 20 | 38 400 |
| Sale of diesel at pump (storage 4 x 11,000 L) | 528 000 | 1,5 | 792 000 |
| Sale of gasoline at pump (storage 4 x 11,000 L) | 528 000 | 1,6 | 844 800 |
| Sale of ice T / year (Max. Prod. Capacity 1T/Day) | 1 200 | 286 | 343 200 |
| Fish storage T / year (Max. capacity 6 T/Day) | 3 600 | 204 | 734 400 |
| **Total revenue (Port taxes included)** | | | **3 462 300** |
| **Variable expenses** | **Nb. Jobs** | **Average monthly Salary** | **Total** |
| Supervisory staff and senior technicians | 8 | 800 | 76 800 |
| Handling personnel and services | 24 | 200 | 57 600 |
| | **Con./kW/month** | **KW Cost** | |
| Energy consumed per year | 72 000 | 0,16 | 11 520 |
| Diesel supply (4 x 11,000 L stored) | 528 000 | 1,4 | 739 200 |
| Petrol supply (4 x 11,000 L stored) | 528 000 | 1,5 | 792 000 |
| Maintenance (estimated 1% of Total Investment/year) | | | 88 430 |
| **Total des Charges** | | | **1 765 550** |

The financial and economic analysis of the cabotage project has been conducted based on the following assumptions:

- Discount rate of 13%
- Hypothesis 1: Calculation based on an annual increase of 3% in turnover and variable expenses over the depreciation period.
- Hypothesis 2: Calculation based on an annual increase of 5% in turnover and variable expenses over the depreciation period.

The table below presents the results of the analysis under these two hypotheses, using the indicative data provided in the previous tables which detail the composition of income and expenses, as well as the cost of investment.

Tab. 10: Financial analysis of Cabotage investment projects in Principe and São Tomé islands (Cf. Annex).

| | **Cabotage project "Principe"** | | **Cabotage project "São Tomé"** | |
|---|---|---|---|---|
| Total Investment Amount | 7 730 000 Euros | | 8 843 000 Euros | |
| Depreciation period | 30 years | | 30 years | |
| Break-even year Hyp.1 | 19th | | 8th | |
| Break-even year Hyp.2 | 15th | | 8th | |
| | **NPV*** | **IRR** | **NPV*** | **IRR** |
| Hyp.1: 3% increase per year | 1 096 268 | 14,69% | 7 071 614 | 22,07% |
| Hyp.2: 5% increase per year | 2 733 076 | 16,66% | 10 022 937 | 24,06% |

Net Present Value in Euros
Internal Return Rate

## 3.6 SWOT analysis[31]

This paragraph provides a summary of the reference situation analysis, highlighting the most significant aspects of the environmental and social dimensions in terms of their current conditions and the applicable policies and management instruments. The obtained diagnosis results are organized in a SWOT table for each proposed project, as shown below.

Tab. 11: SWOT Analysis for Blue cabotage project

| **Strengths** | **Weaknesses** |
|---|---|
| - Low environmental impact through the reduction of pollutants and noise emissions.<br>- Increased flow of goods between countries along the African coast, including Angola, Gabon, Nigeria, and Togo.<br>- Easy access to identified pontoon sites.<br>- Addition of national historical value.<br>- Possibility for nautical tourism.<br>- Maritime cabotage transport is more eco-efficient compared to the currently used road modal.<br>- Coastal shipping can significantly reduce greenhouse gas emissions.<br>- Reduced traffic congestion, resulting in relief of road traffic in the country.<br>- Alternative access to roadways in the north, center, and south of the country.<br>- Low incidence of accidents on roadways.<br>- Energy efficiency.<br>- Lower fuel consumption compared to road transport, which consumes a significant amount of fuel in our country.<br>- Long service life of the infrastructure: the track is natural, and the coastal structure has long-term operational capacity.<br>- | - The productivity and flow of products in ports are still low, with machines operating and producing below average percentages per day.<br>- No studies have been conducted to collect data on the movement of vehicles on the country's roads (land transport flow).<br>- There are no studies on vehicle tariffs.<br>- There are no indicators related to user mobility/displacement by land, with only urban and rural data estimates available.<br>- No national studies compare CO2 emissions between various modes of transportation.<br>- The Directorate of Forests does not supervise the exploitation of agricultural products, leading to species extinction and environmental degradation.<br>- Agricultural productivity is low.<br>- Lack of a national data/information source.<br>- Storage problems of agricultural products.<br>- Problems with the conservation of agricultural products.<br>- Issues related to disposal of agricultural products.<br>- Lack of guarantees for stabilizing the internal market.<br>- No preparation of environmental impact studies. |
| **Opportunities** | **Threats** |
| - There is a possibility of rehabilitating old train lines as a way of adding value to tourist spaces.<br>- Pontoons could potentially be used for the disposal of fishery products.<br>- The issue of solid urban waste management could be integrated into the cabotage project. | - The pontoons are in an advanced state of degradation, with the exception of the one in Neves.<br>- There are difficulties in accessing certain areas, such as Ribeira Peixe, to transport products to the identified pontoon site, which is 50 meters long.<br>- There is a lack of environmental impact studies for the cabotage project. |

*31 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro 2023.*

## 3.7 Environmental and social impacts[32]

Overall, the proposed interventions within the three identified projects do not suggest significant negative environmental and social impacts. However, it is important to limit the impacts induced by the physical interventions to the areas of intervention where they will occur. Environmental impact studies must be conducted in accordance with National Decree No. 37/1999, which establishes regulations on environmental impacts, to ensure proper management, planning, and implementation of these projects. The priority objective is to avoid and/or minimize negative social and environmental impacts related to infrastructure rehabilitation, construction, and associated activities.

Tab. 12: Summary of potential environmental and social impacts and mitigation measures[33]

| Environmental aspects | Environmental Impacts | Mitigation Measures |
|---|---|---|
| Rehabilitation of existing quays | - Conservation and enhancement of cultural and material heritage.<br>- Improvement of transfer points (platform).<br>- Revitalization of inoperative infrastructures. | Avoid changes to existing quay structures. |
| Construction of solid walls, Demolition of existing pylons | - Pollution of the water column due to earthworks to allow navigation and installation of port equipment. | Conservation of habitats and biodiversity, identification and implementation of conservation measures that can positively contribute to the preservation of species. |
| Breakwater | - Maritime agitation | --- |
| Rockfill | - Coast Configuration | --- |
| Use of the Pier | - Alternative to road transport.<br>- Reduction of truck traffic on highways for long-distance transport (south-central-north zone).<br>- Reduction in the occurrence of accidents and deaths on the highway.<br>- Lower transport costs.<br>- Geoeconomics efficiency with the possibility of taking advantage of the coast.<br>- High load capacity.<br>- Energy efficiency (less energy use).<br>- Lower environmental impact due to reduced CO2 emissions.<br>- Preservation of the environment. | Adopt accident prevention measures |

## 3.8 Recommendations[34]

Cabotage was widely used during colonial times for transporting goods from large agricultural properties located near the coasts, such as Água Izé, Ribeira Peixe, and Porto Alegre. However, with the disappearance of these estates and the degradation of infrastructures, road transport became more popular.

In the case of transporting goods from Santa Catarina to Porto Alegre, road transport is not suitable due to the long journey. Using boats for transportation would significantly reduce logistical costs.

*32 Antônia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro 2023.*

*33 The characterization of the impacts related to the projects will be based on the Physical, Biotic and Socioeconomic aspects. The characterization of physical impacts is associated with the components of: Geology, Geomorphology, soil, hydrology, landscape and air quality, waste production, impacts on sites of archaeological or cultural interest, biotic impacts are associated with Wildlife and the Flora and finally socio-economic, related to employment, trade and population movements in the community.*

*34 Antônia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro, 2023.*

Studies show that cabotage shipping emits less CO2 compared to the current road transport used in the country. According to the Third National Communication on Climate Change in São Tomé and Príncipe, the transport sector is the second highest emitter of CO2 with 37.6 Gg CO2eq., while the energy industry is the first with 56.7 Gg CO2eq. emissions. Maritime transport is not badly classified in terms of GHG emissions in São Tomé e Príncipe since only small vessels (passengers and goods) that connect the islands, as well as small fishing boats and motorized canoes, accounted for an average energy consumption of 90.9 TJ in 2012.

Therefore, the adoption of cabotage is justified due to the existing situation and the potential to reduce energy consumption further with modern ships that have mixed motor (sailing and motor).

## 3.9 Implementation schedule[35]

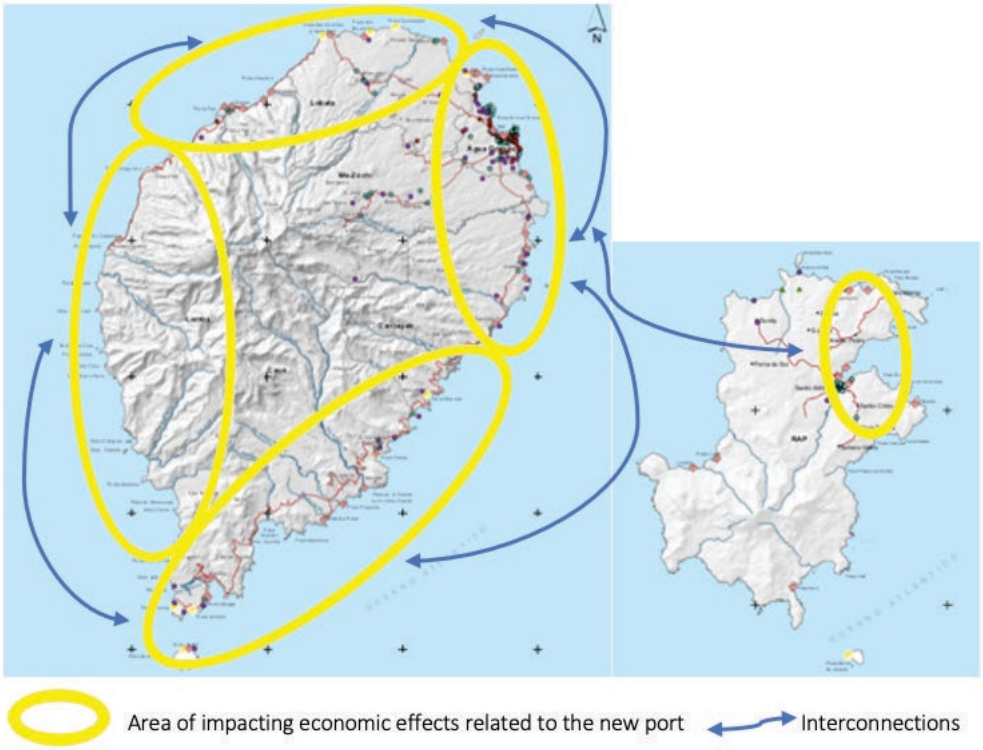
Tab. 13: Indicative phasing and calendar for Blue Cabotage project

| Monthly calendar ITEMs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Availability of funds PHASE 1 (7,730.000 €) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies for S. Antonio P (phase 1.A) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies ESIA Ponta Mina | | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil works S. Antonio P | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ordering equipment S. Antonio P | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reception of equipment S. Antonio P | | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil works Ponta Mina | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ordering equipment for Ponta Mina | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reception of equipment Ponta Mina | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commissioning of Port Ponta Mina | | | | | | | | | | | | | | | | | | | | | | | | | |
| Availability of funds PHASE 2 (8,843.000 €) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies: Agua Izé, S. Catarina, Neves, P. Alegre | | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil works 4 new ports | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ordering equipment 4 new ports | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reception of equipment 4 new ports | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commissioning of 4 new ports | | | | | | | | | | | | | | | | | | | | | | | | | |
| Availability of funds PHASE 3 (2,257,000 €) * | | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies: Ribeira Peixe and existing pontoons | | | | | | | | | | | | | | | | | | | | | | | | | |
| Civil works Ribeira Peixe and existing pontoons | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ordering equipment Ribeira and pontoon | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reception of equipment Ribeira and pontoon | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commissioning of Ribeira and pontoon | | | | | | | | | | | | | | | | | | | | | | | | | |

*To be completed with specific costs for existing pontoons rehabilitation on basis of studies conducted during the beginning of phase 3.

35 The schedule for the sites should be consolidated on the basis of the necessary preparatory expertise within the framework of consultation with the institutions involved and designated officials. The calendar presented here can only be conceived as an indication.

Fig. 4: Maps with specific considerations on cabotage, fisheries and beaches (Source. FAO TCPSTP3804, 2022).



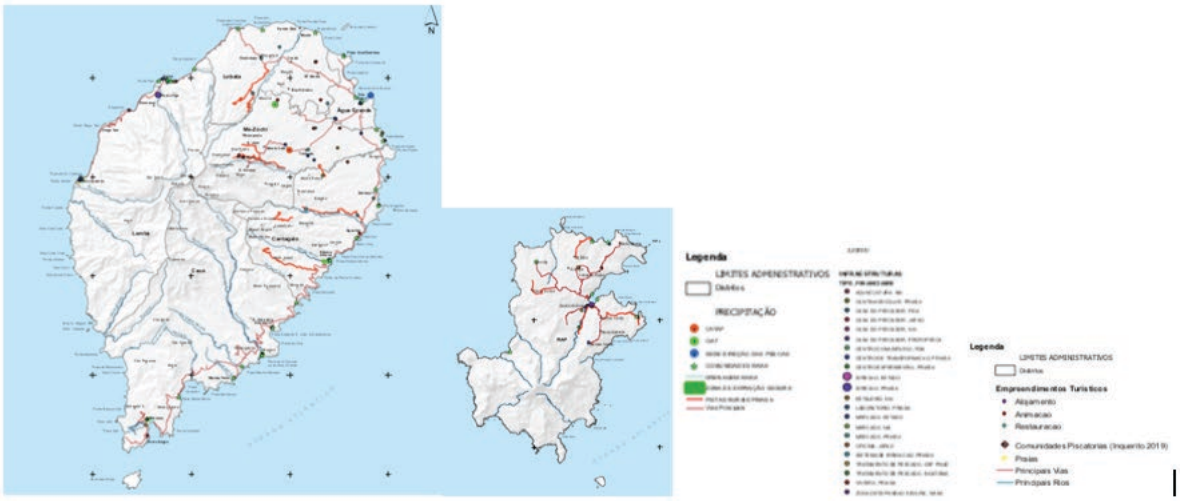



Fig. 5.1: Ponta Mina

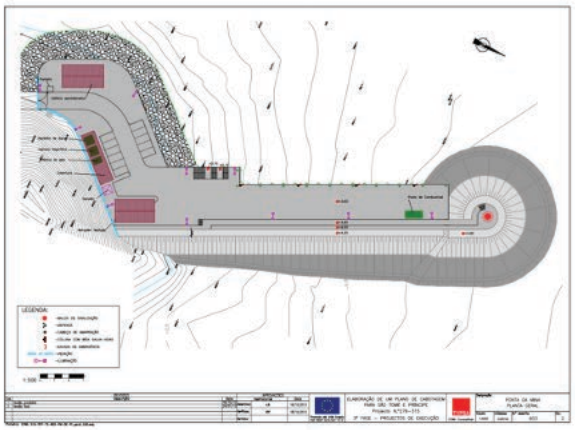


Fig.5.2: Santa Catarina

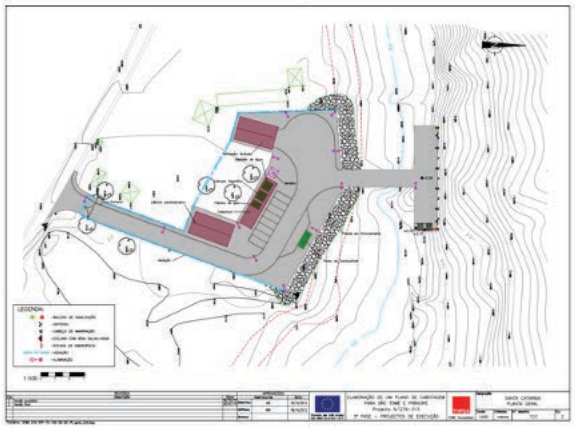


Fig. 5.3: Porto Neves

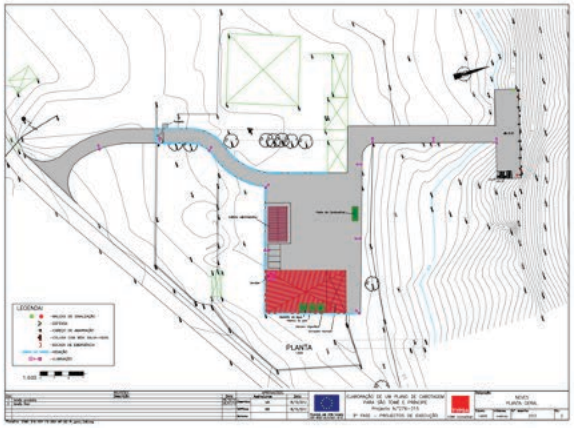


Fig. 5.4: Porto Alegre

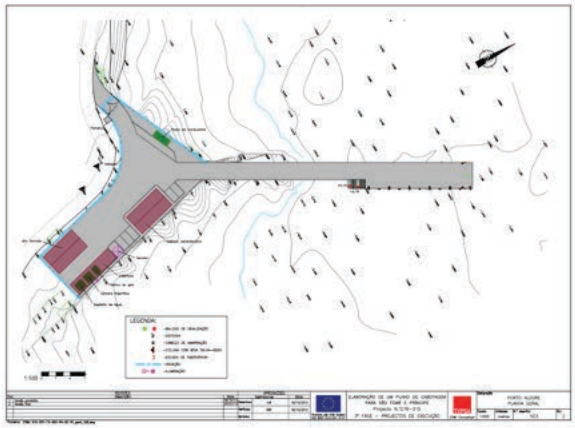


Fig. 5.5: Ribeira Peixe

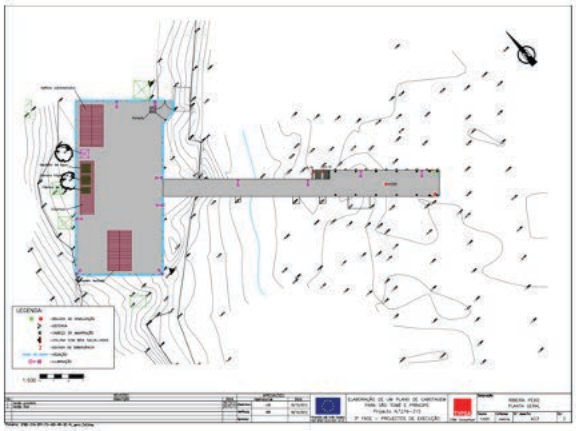
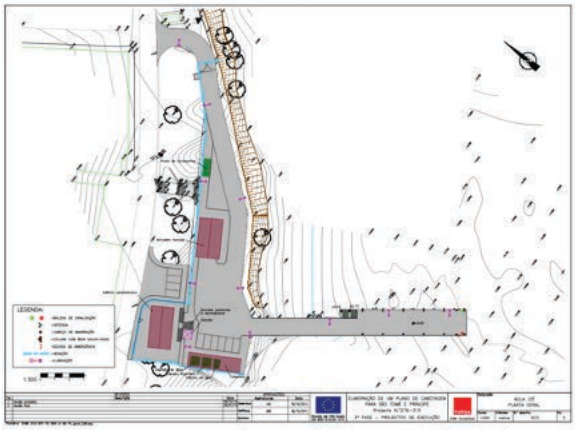


Fig. 5.6: Agua Izé



# 4. Project 2: Rehabilitation of beaches to support blue tourism development

## 4.1 National Strategy for Tourism[36]

As part of the program of the XVIII Constitutional Government for the period of 2023-2026, the tourism sector is highlighted as a growth sector[37]. In recent years, considerable effort has been made to produce new laws that can contribute to the development of the tourism sector[38].

The "Strategic and Marketing Plan for Tourism São Tomé e Príncipe" (PEMT), prepared in 2018 with support from IFC for the period up to 2025, laid out a vision to develop a nature-based tourism offering that brings shared benefits to STP's population[39]. The PEMT defined five objectives:

1. Prepare São Tomé e Príncipe for tourism in a sustainable manner, with positive impacts on local development.
2. Contribute to the preservation of natural and cultural spaces.
3. Improve the experience and increase the visibility of São Tomé e Príncipe as a tourist destination.
4. Qualify, standardize, and consolidate the quality of the offer.
5. Improve the performance of tourism.

The PEMT projected a tourist inflow of more than 50,000 tourists per year by 2025, an increase in the number of rooms from the current 723 to 980, and a growth of 73.4% in the sector's contribution to the GDP in the same period.

The recent World Bank Systematic Country Diagnostic identified tourism, together with agriculture and fisheries, as sectors with potential for driving growth and job creation, leveraging STP's natural capital[40].

STP, with its abundant biodiversity and pristine beaches, is well-positioned to develop nature-based tourism offerings that bring shared benefits to its population, as outlined in the 2018 Tourism Strategic and Marketing Plan developed with the support of the World Bank Group. Nature-based tourism also brings climate benefits. For example, well-preserved coral reefs and seagrass beds, while presenting further erosion rates, create white sand and nurture biodiversity, which is an important attraction for visitors to Small Island and Coastal Development States (SIDS).

*36 World Bank - Terms of Reference - São Tomé e Príncipe – Mid-term evaluation and update for Tourism Strategic and Marketing Plan World Bank, 2022.*

*37 Sustainable development will imply, from the Government's point of view, not only an increase in production to satisfy food security and domestic demand, but also the implementation of public policies to support the sector producing goods and services for export and strengthening levels of external booking and to encourage export policies, the Government proposes some priorities in which: The government proposes a dozen priorities among which: i) Build cabotage ports connecting Porto-Alegre/Ribeira-Peixe/Água Izé/Ana-Chaves/Ponta-Mina/Neves/Sta. Catarina and countries of the sub-region, with the purpose of supporting fishing, agriculture, tourism, transport of consumer goods, fuels and export products, ii) Reclassify the beaches that are a tourist attraction and manage them in a sustainable way, iii) Expansion of the export of tourism services through partnership agreements between São Tomé e Príncipe and the main countries that send tourists.*

*38 Of note are the application of the tourist tax, in the amount of STD 75,000.00, paid by the guest/tourist per day of stay, the legislation on the rental industry of motor vehicles and pleasure boats, the legislation on games of fortune or gambling, the application of hotel licensing fees, the establishment of a legal regime for travel agents and tour guides, among others.*

*39 Beside the strategy for the tourism sector, the government of STP has already elaborated several main strategic development documents of the country, namely:*

*• Horizon 2030 Transformation Agenda.*

*• National Plan for Integrated Management of Urban Solid Waste (PNGIRSU) 2018-2023.*

*40 As explained in the 2019 World Bank Country Economic Memorandum, the tourism sector can provide a platform to grow STP exports of high-value goods such as cocoa products, coffee, pepper and natural cosmetics, which are already bought by tourists as souvenirs.*

Compared to other West African Small Island and Coastal Development States like Cabo Verde or The Gambia, tourism in STP is still relatively incipient. The sector employs an estimated 3,000 people, representing 179 million dobras in direct employment in 2019 (equivalent to 1.9% of nominal GDP), and is an important source of export revenue (estimated at 6.9% of GDP).

Tourism had been growing strongly before the COVID-19 pandemic[41], with an average annual growth rate of 15% between 2015 and 2019, when it reached almost 35,000 tourist arrivals. STP's three main tourism markets are Portugal (55%), Angola (7%), and France (5%). The main tourism products are Sun and Beach tourism and ecotourism (land and marine). In recent years, there has also been growing interest in the country as a destination for radical sports (such as Trail) and maritime sports (such as diving and sport fishing). Recent market research in European markets (UK, Germany, and Sweden) conducted with the support of the PROBLUE Trust Fund identified low awareness of STP as a tourism destination.

The sustainable development of the tourism sector in STP faces a number of cross-cutting and sector-specific challenges. These include structural obstacles, infrastructure bottlenecks, energy deficiencies, limited connectivity and mobility, a difficult business environment that curtails private investment, and weaknesses in governance and institutional capacity for policy coordination and implementation, necessitating better coordination between central and local institutions. However, the transformation towards a blue economy perspective provides an opportunity to address these challenges through the national investment plan and the promotion of blue governance (intersectionality).

Furthermore, STP's capacity to attract investments constrains the development of tourism offerings, including accommodation, food, tours, activities, and goods for tourists. In the case of small and medium enterprises, severe challenges in accessing finance also hinder progress[42].

While there are a few luxury hotel chains from Portugal, South Africa, and other international locations on the islands of STP, reflecting high levels of service by international standards, the number of guesthouses owned by locals is also increasing. Small-scale tourism operations include eco-lodges, diving, canoeing, and kayaking companies, and tour guide companies. Future large-scale marine tourism operations should include sport fishing and, subject to stringent management and authorization control, cruise liner visits (FAO, 2022).

Based on the situational analysis and defined assumptions, the vision for tourism in São Tomé e Príncipe is as follows: "By 2025, São Tomé e Príncipe will be the most pristine island tourist destination in Equatorial Africa, featuring unique nature and biodiversity, breathtaking beaches, and the warmth of Santomean hospitality. This hospitality is rooted in the historical and cultural legacy of coffee and cocoa plantations and will be reflected in the local products and services offered by entrepreneurial initiatives. These initiatives will enhance the quality of life of families and create a high-value tourist experience.[43]"

## 4.2 The beaches sites presentation

São Tomé e Príncipe boasts exceptionally beautiful landscapes, with many endemic species and a secure and tranquil atmosphere in both the cities and countryside. The beaches of São Tomé e Príncipe have been immortalized in the Bacardi Rum commercial shot on Banana Beach (Principe) in the early 1980s (FAO, 2022). Since then, São Tomé has become synonymous with wild sandy beaches[44], and

*41 As in other countries, the COVID-19 epidemic strongly affected the tourism sector in STP. The number of tourists decreased by 70% in 2020 and revenues generated by the sector fell by 66%. By the middle of that year, 68% of enterprises in the sector were temporarily closed. The tourism inflow started to recover in 2021 (15,700 tourists, a growth of 45% over 2020) and the recovery is picking up pace in 2022 (over 14,000 tourists in January-July). Tourism sector operators point to 2023 as the possible recovery to 2019 levels. The Tourism Authority and operators worked together to adopt Covid-19 protocols and norms, including a Covid-19 safe & clean seal, which was widely adopted. Following the pandemic, and building on its current assets, STP has the potential to position itself as a sustainable and safe tourism destination.*

*42 Even if on the positive side, recent developments include an expansion in the use of international credit cards and ATMs, greater organization of private sector operators into associations, and the involvement of non-governmental organizations in initiatives to support sustainable tourism.*

*43 Sao Tome and Principe Investment Promotion Strategy 2017-2019, Trade and Investment Promotion Agency (APCI), October 2016.*

*44 Sao Tome and Principe Investment Promotion Strategy 2017-2019, Op. Cit.*

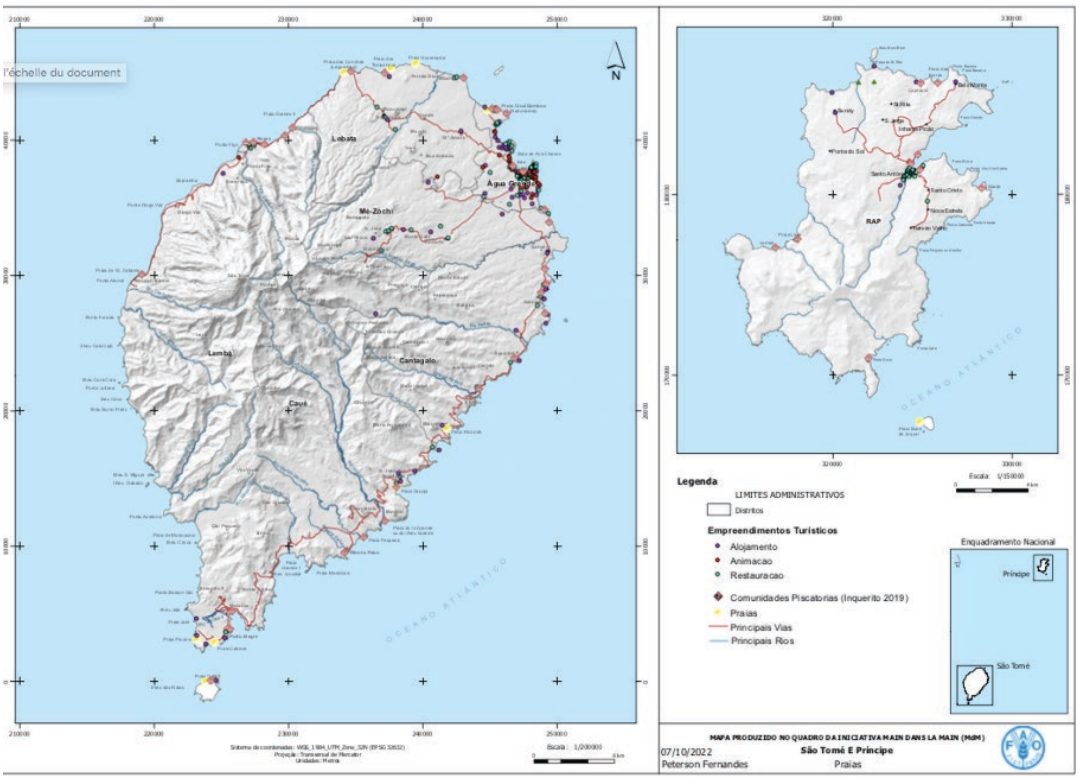
beaches, bays, and lagoons are the most popular tourist attractions (27% of favorite sites) according to a tourism survey.

With the increasing popularity of São Tomé as a tourist destination, it has become necessary to manage its beaches in a sustainable manner to prevent environmental degradation and loss of customers. The haphazard construction of kiosks, lack of hygiene services, and uncontrolled vehicle access need to be addressed and standards set (FAO, 2022).

The beaches identified as priorities for the rehabilitation blue investment project are: Lagoa Azul (Lobata), Namorados (Lobata), Tamarinos (Lobata), Governador (Lobata), Micondó (Cantagalo), Piscina (Caué), Cabana (Caué), Café (Caué), Granja (Caué), and Bone de Joquel (Principe) (see figure below).

The two primary constraints hindering tourism development are the absence of hygiene facilities and poor management of municipal solid waste (MSW)[45]. These problems have been acknowledged by various municipalities along the coast, and as a result, a number of sub-projects have been presented for consideration under the Blue Economy initiative. Municipalities in the districts of Agua Grande, Lobata, Cantagalo, Caué, and Lemba have presented various projects ranging from public hygiene conveniences to district-wide landfills and various recycling initiatives. However, the fragmented nature of these proposals ignores the complexity of landfills, the intricacies of the individual waste streams from collection to the end processors overseas, and the cost and maintenance of each operation[46].

Fig.6: Mapping of beaches considered in the rehabilitation investment blue project (FAO, 2022).




*45 The ambition of PNGIRSU (Plano Nacional de Gestão Integrada de Resíduos Sólidos Urbanos 2018-2023, is to increase waste valorisation by 2023, focusing on the feasibility of waste management infrastructure, such as composting stations and centres for waste recovery. The non-recyclable component, however, needs to be placed in a sanitary landfill or landfills as the case may be. The initial investment costs for a classic sanitary landfill are also high, more than €4.5 million foreseen in the case of the project developed in 2008/2009 by TRAGSA (Spain).Other factors that currently hinder the construction of a centralised sanitary landfill are:*

*- High transport costs for a centralized landfill given the fragility of the transport network and the general difficulties of the municipalities (Câmaras Distritais).*

*- The separation of waste and recovery by composting/recycling reduces to 30% of waste mass targeted for the landfill.*

*- The heavy rainfall in certain months on the island of São Tomé requires special drainage measures, which are more difficult to control in a large sanitary landfill.*

*46 The opinion among international experts (Sharholy et al. ,2008; Zurbrugg, 2003; Jaramilo, 2002; Medina; 1999), is that there are advantages in the construction of regional/municipal controlled landfills with initial financial and technical support from international donors/institutions. Seven such municipal landfill sites have been identified, table below, and the global base value of investment in infrastructure and complementary activities (excluding the purchase of land) is around €4,400,000 (which represents around €4.5 /inhab year), with the ultimate objective of eliminating open dumps.*

Fig.7: Some examples of the emblematic beaches and coastal sites


## 4.3 Phasing

The activities for the rehabilitation of the beaches under this investment project must be phased in accordance with a technical group that will oversee implementation, monitoring, and evaluation. This group will include representatives from the Ministry of Environment, Infrastructure, and Tourism, as well as the Ministry of Planning, Finance, and Blue Economy. Additionally, designated representatives from the District Camaras that are concerned with the targeted beaches will participate.

Each beach project must be subject to public communication, posted in the Camara de District for free consultation, targeting civil society, economic operators, and professional associations representing construction trades, public works, fishing, tourism, agriculture, transport, and trade in the districts. All projects will be compiled in a public document available at the national level.

The organization of works on the sites will follow the following process:

**Phase 1: Preparatory phase, communication, and contracting**

- Establish a technical committee for implementing, monitoring, and evaluating worksites
- Conduct local and national communication
- Develop a project description statement and screening
- Prepare bidding documents and supervision fees
- Evaluate tenders.

**Phase 2: Public works**

- Construct an access road to the car park (last km for car parking access)
- Build a 1000 m2 parking area
- Delimit the locations on the site of the planned buildings (restaurants, showers, toilets, kiosks, waste collectors, and others).

**Phase 3: Connections**

- Connect to electric current
- Install water inlet connections

**Phase 4: Construction**

- Construct a beach restaurant (container system and wood terrace)
- Build hygiene facilities
- Construct 5 commercial kiosks
- Build a beach service room
- Construct a shower and changing room

**Phase 5: Final equipment and signage**

- Install bins for sorted waste
- Install signage for traffic, environmental protection, good practices, prohibitions, and walking guides for landscape, history, fauna, and flora
- Connect photovoltaic panels.

## 4.4 Investment Costs

The equipment provided on each beach is provided as a guide and should be adjusted based on the specific characteristics of each site.

Water and electricity connections, along with photovoltaic panel equipment, will ensure the operation of public services, small shops, and catering. The installation of septic tanks will also need to be considered for the treatment of water and liquids to minimize degradation and discharges into the sea.

The estimated total investment cost is 6,040,000 euros, as detailed in the table below.

*41 As in other countries, the COVID-19 epidemic strongly affected the tourism sector in STP. The number of tourists decreased by 70% in 2020 and revenues generated by the sector fell by 66%. By the middle of that year, 68% of enterprises in the sector were temporarily closed. The tourism inflow started to recover in 2021 (15,700 tourists, a growth of 45% over 2020) and the recovery is picking up pace in 2022 (over 14,000 tourists in January-July). Tourism sector operators point to 2023 as the possible recovery to 2019 levels. The Tourism Authority and operators worked together to adopt Covid-19 protocols and norms, including a Covid-19 safe & clean seal, which was widely adopted. Following the pandemic, and building on its current assets, STP has the potential to position itself as a sustainable and safe tourism destination.*

*42 Even if on the positive side, recent developments include an expansion in the use of international credit cards and ATMs, greater organization of private sector operators into associations, and the involvement of non-governmental organizations in initiatives to support sustainable tourism.*

*43 Sao Tome and Principe Investment Promotion Strategy 2017-2019, Trade and Investment Promotion Agency (APCI), October 2016.*

*44 Sao Tome and Principe Investment Promotion Strategy 2017-2019, Op. Cit.*

Tab.14: Detailed composition of estimated cost for beach rehabilitation blue investment project

| ITEM | Activity | Estimated Cost € |
|---|---|---|
| ESIA | Category C. Project Description Statement and screening | 10,000 |
| Design fees | Bidding documents and supervision fees | 15,000 |
| Civil Works (for each beach) | Mobilization | 20,000 |
| | Access road to the car park (Last km for car parking access) | 280,000 |
| | Beach restaurant (containers system and wood terrasse) | 110,000 |
| | Hygiene facilities | 48,000 |
| | Parking 1000 m2 | 7,000 |
| | 5 commercial kiosks | 10,000 |
| | Beach service room | 8,000 |
| | Bins for sorted waste | 12,000 |
| | Shower and changing room | 8,000 |
| | Signage (road and on-site services) | 4,000 |
| | Water supply | 25,000 |
| | Photovoltaic panels | 12,000 |
| | Three-phase power supply | 35,000 |
| | **TOTAL** | **604,000** |

ESIA costs and design costs will be pooled for the 10 sites in order to reduce the overall cost.
Source: Estimated based on FAO inventory, 2022 at revised costs 2023.

Fig. 7: Photos of some examples of existing and modular containers system



## 4.5 Social and economic analysis

A significant proportion of the national population could potentially benefit from the beach rehabilitation project for leisure and well-being, as it is a common habit for families to visit bathing sites, especially during weekends and public holidays.

Tab. 15: Socio economics impacts in Principe and Sao Tome of the Rehabilitation of Beaches

| Impacts beaches rehabilitation | Number | Nb. / People / Family | Total Nb. People |
|---|---|---|---|
| Total jobs | 340 | 7 | 2380 |
| Beneficiary direct jobs (guarding, cleaning, security, transport) | 110 | 7 | 770 |
| Beneficiary indirect jobs (restaurants, trade kiosks, hotels, other activities) | 190 | 7 | 1330 |
| Artisanal fishermen direct beneficiaries of activities on the beach | 50 | 7 | 350 |
| Farmers direct beneficiaries of activities on the beach | 50 | 7 | 350 |
| Total economic beneficiaries | 730 | 7 | 5110 |
| **Total beneficiaries** | **1 460** | **-** | **10 290** |

The project's financial and economic analysis is based on the following assumptions:

- Discount rate of 13%
- Hypothesis 1: Calculation based on an annual increase of 3% in turnover and variable expenses over the depreciation period.
- Hypothesis 2: Calculation based on an annual increase of 5% in turnover and variable expenses over the depreciation period.

The calculations will only consider public revenues consisting of revenue from services provided on the beaches (parking, toilets, showers and cabins, rental of restaurants and kiosks) and taxes.

Table 16 presents the results under these two hypotheses, based on the indicative data provided in the previous tables that detail the composition of income and expenses, as well as the cost of the investment.

The financial return of the rehabilitated beaches is higher than the indicators measured here and presented in the table below if we consider that the public revenues measured must be added to the impact on the indirect revenues produced for the benefit of the private sectors.

In a conservative estimate, if we consider that 20% of private revenues are due to public investments made on the beaches, we can see that the financial performance of the project is sufficient to recognize its interest.

Tab. 16: Estimate of costs and income related to investment for the beach rehabilitation blue project (Euros)

| | | | | | | |
|---|---|---|---|---|---|---|
| **Investment Amount** | | | | | | |
| Total 10 Beaches package | 6 040 000 Euros | | | | | |
| Annual depreciation | 201 333 | | | | | |
| | **Nbr** | **Nbr. J** | **Prix** | **Total** | **Taxe 15%** | **Total TTC** |
| **Direct on-site turnover (taxed locally 15%)** | | | | | | |
| Restaurant rental (10) / Month | 10 | | 1 300 | 156 000 | 23 400 | 179 400 |
| Kioks (5/ per beach / Month) | 50 | | 110 | 66 000 | 9 900 | 75 900 |
| WC access | 30 | 180 | 0,2 | 10 800 | 1 620 | 12 420 |
| Access to shower and private cabin | 20 | 180 | 1,5 | 54 000 | 8 100 | 62 100 |
| Vehicles parking for 10 plages | 30 | 180 | 2 | 108 000 | 16 200 | 124 200 |
| | | | | | 59 220 | |
| **Total Direct Public Incomes** | | | | | | **454 020** |
| | | | | | | |
| **Indirect turnover (taxed locally 20%)** | | | | | **Taxe 20%** | **Total TTC** |
| Transport collective vehicles minibus | 30 | 160 | 3 | 144 000 | 28 800 | 172 800 |
| Car rent with driver (day) | 5 | 160 | 15 | 120 000 | 24 000 | 144 000 |
| Beach restauration (food and drink) | 20 | 160 | 15 | 480 000 | 96 000 | 576 000 |
| Nights and services Hotels | 10 | 160 | 110 | 1 760 000 | 352 000 | 2 112 000 |
| | | | | | 450 720 | |
| **Total Private Indirect Incomes** | | | | | | **2 954 720** |
| **Total net income** | | | | **2 898 800** | | |
| **Total Public taxes** | | | | **509 940** | | |
| | | | | | | |
| **Charges** | | | | | | |
| Investment maintenance (1%) | | | | 60 400 | | |
| Guarding / Surveillance / Security | 70 | | 2 160 | 151 200 | | |
| Garbage removal and beach cleaning | 40 | | 1 920 | 76 800 | | |
| Fixed costs electricity and water | 12 | | 2 400 | 24 000 | | |
| **Total Public Charges** | | | | **312 400** | | |

Activities calculated over 160 (or 180) days including weekends, i.e. 104 days and 54 (or 74) additional days representing three (or four) full months of visits by tourists and retirees, which constitute minimum numbers.
These indicative prices were developed with the support of the General Directorate of Tourism in 2023

Tab. 17: Financial analysis of Beaches rehabilitation project in STP with only public incomes (Cf. Annex).

| | Beaches rehabilitation | |
|---|---|---|
| Total Investment Amount | 6 040 000 Euros | |
| Depreciation period | 30 years | |
| Break-even year Hyp.1 | (32 033 Euros) 29th | |
| Break-even year Hyp.2 | (86 270 Euros) 19th | |
| | **On basis of Public Incomes** | |
| | **NPV*** | **IRR** |
| Hyp.1: 3% increase per year | 71 287 | 13,14% |
| Hyp.2: 5% increase per year | 1 204 609 | 15,10% |

Net Present Value in Euros Year 30th
Internal Return Rate

Tab. 18 bis Financial analysis of Beaches rehabilitation project in STP considering additional impact on private indirect incomes (Cf. Annex).

| | Beaches rehabilitation | |
|---|---|---|
| Total Investment Amount | 6 040 000 Euros | |
| Depreciation period | 30 years | |
| With constant incomes and charges | (199 411 Euros) 13th | |
| Break-even year Hyp.1 | (12 770 Euros) 12th | |
| Break-even year Hyp.2 | (207 410 Euros) 11th | |
| | **On basis of Public Incomes + 10% private indirect incomes** | |
| | **NPV*** | **IRR** |
| With constant incomes and charges | 1 599 681 | 14,69% |
| Hyp.1: 3% increase per year | 2 419 906 | 17,66% |
| Hyp.2: 5% increase per year | 3 988 773 | 19,64% |

Net Present Value in Euros Year 30th and Internal Return Rate

## 4.6 SWOT analysis[47]

This paragraph provides a summary of the diagnosis of the current situation, emphasizing the most significant aspects of the environmental and social dimensions, both in terms of current conditions and their alignment with applicable policies and management tools. The results of the diagnosis are organized in the form of a SWOT table for each of the proposed projects.

47 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro 2023.

Tab. 19: SWOT Analysis for beaches rehabilitation blue project

| Strengths | Weaknesses |
|---|---|
| - The Legal Regime for Extraction of Inert in S.T.P, also known as Law No. 9/2020, was enacted in September 2020.<br>- There are beaches with well-preserved natural landscapes.<br>- Sandy beaches have high ecological and socioeconomic importance, serving as a source of various goods and services, such as tourism, artisanal fishing, sports, and leisure.<br>- Beaches also play a role in controlling erosion and stabilizing the shoreline.<br>- There is a possibility of organizing the coastal strip for urban containment purposes.<br>- Bathing areas could be structured to allow for more careful and appealing enjoyment.<br>- It is important to safeguard areas at risk of coastal erosion and protect natural resources. | - There is a lack of specific regulations and instruments for managing coastal and marine areas.<br>- There has been an increase in illegal extraction of aggregates.<br>- Several beaches, such as Praia Melão, Micolo, Tamarinos, Governadora, and Lagoa Azul, are in an advanced state of degradation in the short term, which is a cause for concern.<br>- Mangrove zones are also in an advanced state of degradation.<br>- The roads leading to the beaches are in a state of high degradation due to a lack of maintenance.<br>- The beaches are not classified and signposted.<br>- The current management model is inadequate and inefficient.<br>- There are no concrete studies demonstrating the degree of degradation and the impacts caused by dredging.<br>- There is no inspection by the General Directorate of Natural Resources and Energy.<br>- The competent authorities lack statistical data on the quantity of waste produced.<br>- There are no elaborate management plans for solid waste management.<br>- There is no separation/sorting and selective collection of solid urban waste.<br>- Insufficient and often inadequate material resources and rolling media are available for the management of urban solid waste.<br>- Many beaches lack sanitation infrastructure.<br>- Environmental impact studies are lacking in designing projects in coastal areas. |
| **Opportunities** | **Threats** |
| - There is a possibility of defining clear responsibilities for each actor, including institutions and concessionaires, with guidelines for beach safety (on land and at sea) that are tailored to economic sustainability.<br>- The Directorate of Tourism is developing a National Strategy for tourism development.<br>- The WACA project has conducted a Coastal Vulnerability Study.<br>  - The MARAPA and Ong OIKOS organizations have prepared a study on Mangrove Biodiversity.<br>  - The WACA project has also created a project for Rocky Berms.<br>  - Some interventions have already been implemented, such as the disposal of 38 sand faces at Praia de Lagoa Azul, as a means of recovering the high level of environmental degradation present there.<br>  - The WACA project has also prepared a vulnerability study of coastal zones. | - The negative impacts caused by the dredging operation located at Praia Fernão Dias.<br>- Pressure from private entities on coastal spaces.<br>- Absence of Environmental Impact Studies for coastal area occupation and rehabilitation projects. |

## 4.7 Environmental and social impacts[48]

Overall, the proposed interventions under the three identified projects are not expected to have significant negative environmental and social impacts. However, it is important to conduct environmental impact studies in accordance with National Decree No. 37/1999 to ensure proper management, planning, and implementation of these projects. The priority objective is to avoid and/or minimize any negative social and environmental impacts that may arise from infrastructure rehabilitation and construction, as well as associated activities.

Tab. 20: Summary of potential environmental and social impacts and mitigation measures[49]

| Environmental Aspect | Environmental Impact | Mitigation Measures |
|---|---|---|
| Coastal Planning | - Protection of coastal natural resources.<br>- Sustainability of the coastline.<br>- Valuing the beach in tourism. | - Promotion of environmental ecosystem services.<br>- Environmental Awareness for the entire population |
| Weed removal and land clearing | - Triggering of erosion processes, loss of habitat | - Planting autonomous vegetation to reduce erosion processes |
| Access Maintenance | - Physical restoration of coastal ecosystems (pathways). | - Improve and level it with clayey materials (earth) or stones.<br>- Maintenance and constant cleaning of the berms. |
| Natural reconstruction of dune buildings | - Recovery of damaged sectors of coastal sand systems.<br>- Soil stabilization.<br>- Sand retention. | - Planting with autoclones species |
| Rehabilitation and protection of cliffs | - Coastal erosion protection and control | - Build stone barriers |
| Construction of support infrastructure and services | - Coastal artificialization with construction | - Delimitation of the construction area, respecting the coastal limit and considering plant balance |
| Beach users | - Solid waste production | - Containers for waste separation, with selective collection, recycling, and reuse of inorganic waste, (Preparation of Solid Waste Management Plan) |
| Services provision | - • Employment generation and increased expectations of population living conditions | - Use local human resources |
| Turism | - Creation of a decisive opportunity for tourism development in the country.<br>- Collective benefits from the environmental riches of the coast.<br>- Enhancement of landscape spaces.<br>- Protection of biodiversity and natural spaces.<br>- Opportunity to develop nautical tourism. | - Carry out sustainable tourism.<br>- Integrated and sustainable management of natural resources and protection of the environment. |

*48 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro 2023.*

*49 The characterization of the impacts related to the projects will be based on the Physical, Biotic and Socioeconomic aspects. The characterization of physical impacts is associated with the components of: Geology, Geomorphology, soil, hydrology, landscape and air quality, waste production, impacts on sites of archaeological or cultural interest, biotic impacts are associated with Wildlife and the Flora and finally socio-economic, related to employment, trade and population movements in the community.*

## 4.8 Recommendations[50]

To maintain the natural environment, it is recommended to preserve the existing access points and improve them with clay or stones only where there are level differences due to frequent use. It is important to constantly maintain and clean the borders to prevent overgrowth of vegetation. These access points are often part of specific ecosystems and should be preserved accordingly.

Introducing major changes such as building roads or paved pavements would disrupt the natural dynamics of the flora and fauna in the area. Access to the site should be regulated, and private vehicles limited or replaced by collective electric vehicles. Providing free access for private vehicles can lead to the privatization of the land and the removal of trees for private construction or tourist complexes.

It is also recommended to:

- Create limited and priced parking areas on beaches to indirectly contribute to the creation of attendance gauges.
- Prioritize the use of collective and renewable energy vehicles on the sites to allow joint use of pedestrian spaces, benefiting the discovery of landscapes (flora and fauna).
- Mark and classify the beaches.
- Restore damaged sectors of coastal sand systems through natural reconstruction of dune constructions and planting of auto-clonal species.
- Construct stone barriers to protect and control coastal erosion.
- Safeguard vulnerable and at-risk areas by setting up appropriate emergency and management plans that take into account the dynamics of coastal areas.
- Promote fauna and flora observation activities with specific observation points.
- Maintain the state of the beaches close to their natural state.
- Establish inspection brigades that include local population members who will act as inspection agents.
- Create beach health officers/teams managed by district authorities to keep beaches clean, controlled, and safe.
- Provide training and awareness in schools for the protection of beaches and the environment; also develop television and radio awareness programs aimed at the general public.
- Establish teams and focal points to monitor and track progress.
- Involve and entrust inspection and monitoring responsibilities to the Ministry of Defense and the Port Authority to help care for and preserve the coastal sites.

*50 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro, 2023.*

## 4.9 Implementation schedule

Referring to the activities and phasing described in 4.3, the indicative calendar is as follow:

**Phase 1: Preparatory phase, communication and contracting**

- Establishment of a technical committee for the implementation, monitoring and evaluation of worksites
- Local (at District level) and national communication
- Project Description Statement and screening
- Bidding documents and supervision fees
- Tenders

**Phase 2: Public works**

- Access road to the car park (Last km for car parking access)
- Parking 1000 m2
- Delimitation of the locations on the site of the planned buildings (restaurants, showers, toilets, kiosks, waste collectors, others).

**Phase 3: Connections**

- Electric current connection
- Water inlet connections

**Phase 4: Construction**

- Construction of: Beach restaurant (container system and wood terrace), Hygiene facilities, 5 commercial kiosks, Beach service room, Shower and changing room

**Phase 5: Final equipment and signage**

- Bins for sorted waste
- Signage (traffic, environmental protection, good practices, prohibitions and walking guide landscape, history, fauna, flora)
- Connection of photovoltaic panels

Tab. 21:: Indicative Calendar for beach' rehabilitation blue investment project

| Monthly calendar / Phases | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phase 1: Preparatory phase, communication and contracting | | | | | | | | | | | | |
| Phase 2: Public works: Access, parking and location layout | | | | | | | | | | | | |
| Phase 3: Servicing connection | | | | | | | | | | | | |
| Phase 4: Constructions | | | | | | | | | | | | |
| Phase 5: Final equipment and signage | | | | | | | | | | | | |

# 5. Project 3: Blue investment project for the coastal artisanal fleet modernization

## 5.1 Strategy for coastal artisanal fleet

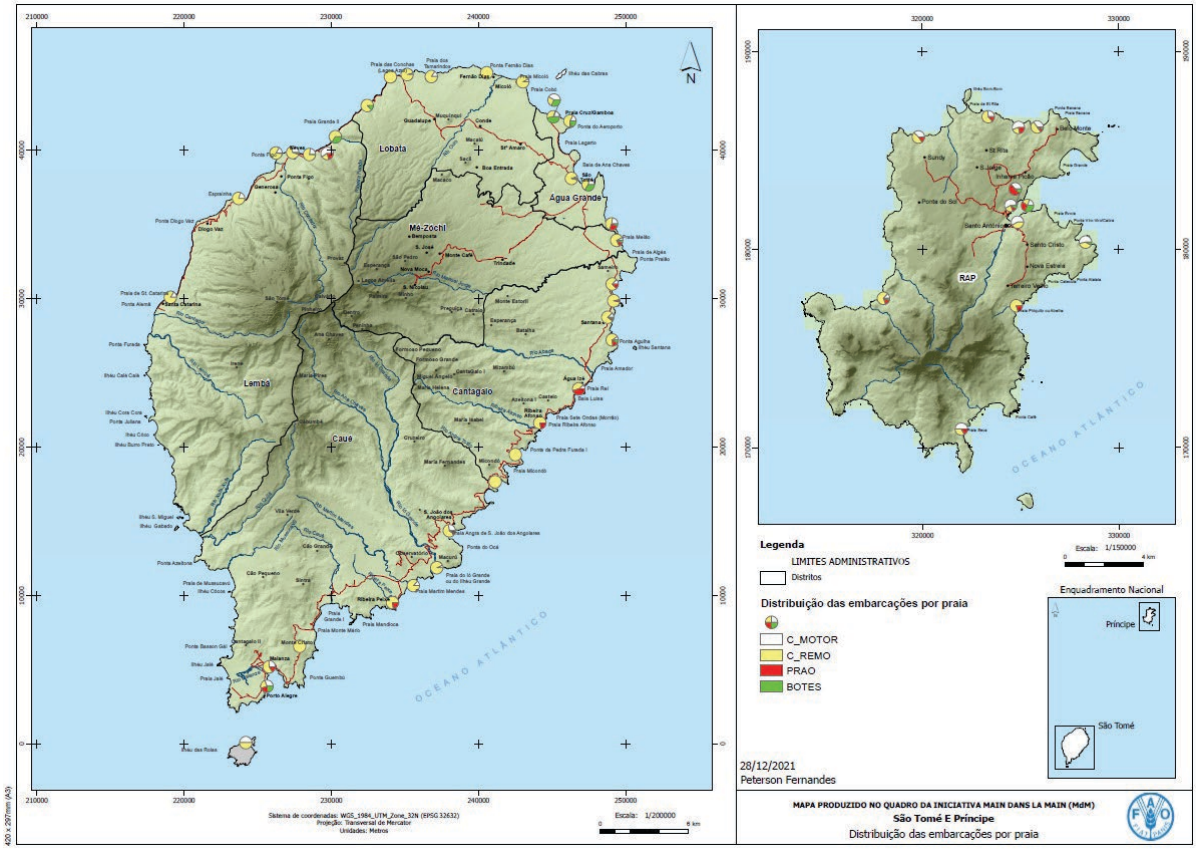
The modernization of coastal artisanal fisheries presents a significant challenge in the blue economy to improve the value chain of these fisheries. This transformation can contribute to reducing informal jobs, regulating fisheries, and improving working conditions and livelihoods for fishing communities, who are significant contributors to the coastal economy (9% of GDP, FAO, 2018; 4,155 Fishermen - DP, 2019; 2,355 women fishmongers - DP, 2014). It is estimated that around 30,000 people directly and indirectly depend on fishing activities, which accounts for 15% of the population[51].

Moreover, positive impacts are also expected in terms of food security (no export, consumption of 29.3 kg/year/person, 53.3% of animal protein - 17% of total protein, and a fish consumption coverage rate of 99% - FAO, 2019), employment opportunities for young people without qualifications, and women involved in the value chain (product processing and trade). Additionally, the modernization could enhance the safety at sea for fishermen.

Given the significant impact of this sector on the population and food security, the investment proposal is given priority. A public support scheme is proposed to encourage private actors to revitalize the fisheries sector and raise the level of organization of these communities. This will bring them into the scope of a formal economy, which can be administered and monitored, capable of mobilizing the necessary financial resources to achieve modernization objectives through a planned double dynamic (public/private). This priority is common to all regions of the country.

*51 National production: 45 landing sites / coastal villages (28 in ST and 17 in RAP) with very little basic social infrastructures, new fish markets in some towns and Central fish market at ST. built (AfdB project), but problem of cold chain.*

Fig. 9: Map of localization site for coastal artisanal fishing boats




The investment project aimed at achieving the aforementioned objectives must take the form of a Modernization Plan for the Coastal Artisanal Fishing Fleet (MPCAFF). This plan should be in agreement with the actions of the General Directorate of Fisheries and financial resources should be coordinated based on the national resources available and the resources that can be mobilized through international support[52].

To ensure the adequacy of the plan's execution, it will be supervised by the General Directorate of Fisheries in close partnership with the Ministry of Planning, Finance, and the Blue Economy (UIEEA). This will include communication and selection of files, monitoring, and evaluation of the plan's proper application. Additionally, the plan must be consistent with national objectives for the management of fishery resources and the administration of the profession.

Furthermore, the plan must take into account the necessary reinforcements of the capacities of the existing shipyards in the country.

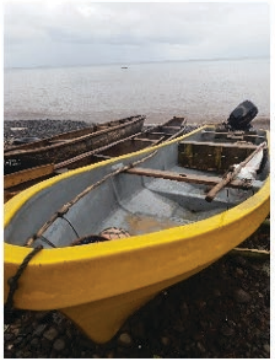
*52 Tuna Fishing EU agreement: 8.000 tm/year (840,000 €/year as Public revenue paid by EU for the access payment).*

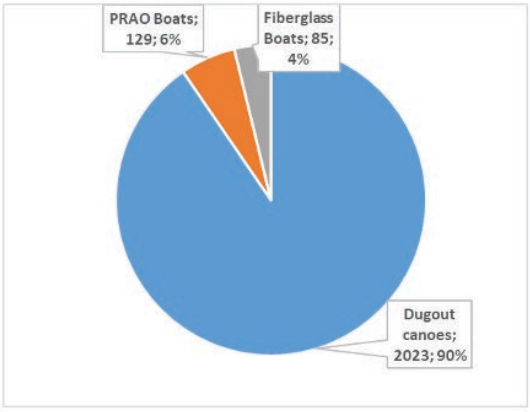
## 5.2 Context of artisanal fisheries sector and fleet

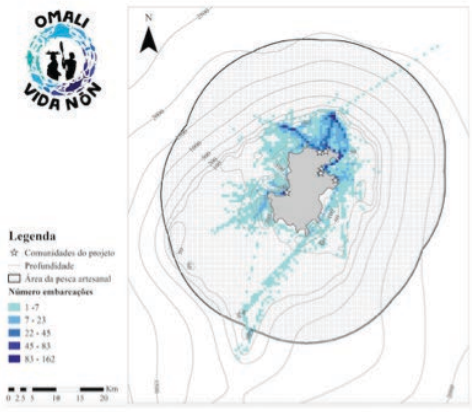
In São Tomé e Príncipe, there are currently 2023 canoes made from a single tree trunk, 20% of which are motorized, 129 outrigger canoes called “praos,” made of fiberglass or laminated wood panels, and 85 fiberglass boats built in São Tomé with a standard design of 10m long and 1.5m wide, capable of supporting larger and more powerful engines (Porriños et al., 2021).

The majority of the fleet, more than 90%, is made up of canoes, which are less durable and less safe than the other two types of vessels. According to the World Bank (2019), many fishermen are seeking to switch to safer prao-canoes (Serkovic & Million, 2019). Most of the artisanal fishing activities are concentrated on a narrow coastal strip in the shallower waters of STP’s island platforms. This is mainly due to the lack of resources for fishermen to venture further out to sea. However, due to the scarcity of fish resources, they tend to move away from the coast to fish (KII, 2021; Belhabib, 2015; Omali Vida Nón, 2019; Santos et al., 2017).

Fig.10: Existing fish-boat, cannot, prao, and fiberglass boat, fisheries areas and % of each category in the national context.






**Shipyards and boat building**

If we consider the three main types of boats used by artisanal fishermen in São Tomé e Príncipe (STP) - canoes, outrigger canoes, and fiberglass boats - and knowing that more than 90% are canoes, with 6% being outrigger canoes and the rest being fiberglass boats, the data related to the construction techniques and capabilities of these fishing units on site in STP are as follows:

- Canoes are made locally, mainly from acacia and “oca” trunks. They are priced between 7,000 STN and 20,000 STN (i.e., between 300 and 850 USD). From the felling of the tree to the end of the canoe, it takes several weeks, a job that is normally carried out by a single specialist based in

the fishing community.

- Outrigger canoes or PRAOS are built with imported materials that can be found on the island, such as sheets of plywood, wooden planks, and various chemicals like glue, thinner, bitumen, or paint. They are sold for approximately 25,000 STN each (i.e., 1,055 USD), and the operation takes about 1-3 work weeks for two people. The PRAO canoe is characterized by lower fuel consumption levels and increased safety thanks to better boat stability.

- Fiberglass boats are built with materials that are usually imported from Portugal, such as fiberglass rollers, resins, and so on. Depending on the size of the boat, they are sold for between STN 55,000 and 210,000 (i.e., between USD 2,500 and 9,000).

**The modernization plan for the coastal artisanal fishing fleet (MPCAFF)**

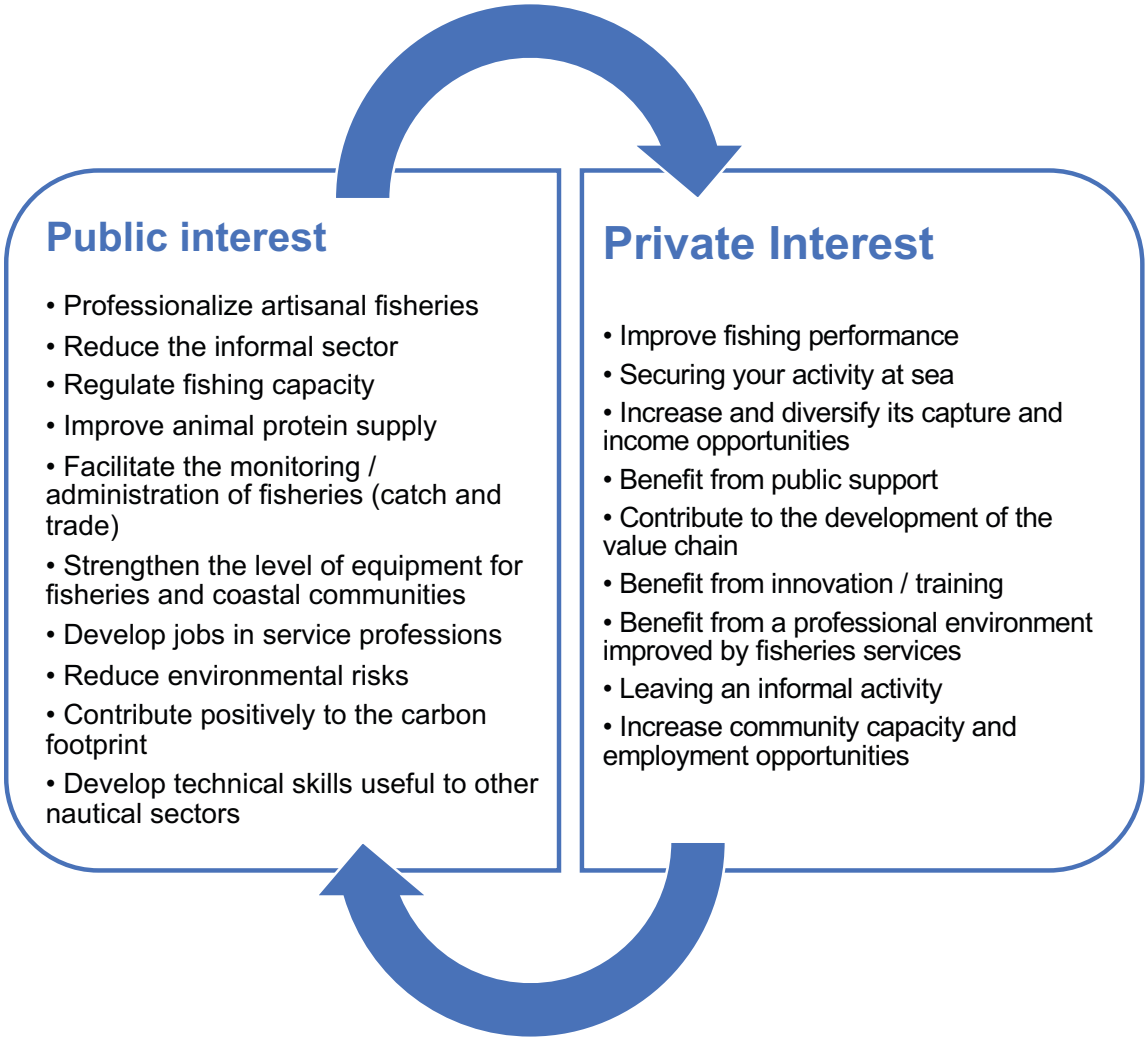
Currently, the government provides support to a local workshop for the construction of proa canoes and fiberglass boats. The government subsidizes up to 25% of the total cost and offers favorable conditions for fishermen to reimburse the remaining cost. As of 2021, six fiberglass vessels and ten praos have been constructed under these conditions (Ref. KII Former Fishery Officer, 2022).

However, manufacturers of praos and fiberglass boats have raised concerns regarding the availability of materials in the market to build these boats. They are also facing payment issues due to reduced catches, which have led to lower revenues, and reduced orders caused by the COVID-19 pandemic (KII Boat Manufacturing, 2021).

To grow their business, boat manufacturers typically provide repair services for boats. They see opportunities to improve their technical know-how and increase production by having better shipyards and locally sourced materials.

The Plan for the Modernization of the small-scale coastal fishing fleet also includes the modernization and upgrading of shipyards in accordance with environmental and social protection standards for workers and the direct environment. These shipyards will serve as a support base for the implementation of the PMCAFF and as a maintenance, repair, and service base for other future fleets of São Tomé e Príncipe, including those for tourism, ecotourism, transport, and service units for the protection and conservation of marine ecosystems. Similar to fishing investments for new units built, the state will use public funds to support the modernization and upgrading of these shipyards within the framework of the PMCAFF. Territorial balance will be a priority, with consideration given to candidates for the standardization of existing construction sites for equal services on the islands.

Fig.11: Public and private interest in committing to the MPCAFF




The reference situation highlights the constraints that the renewal plan needs to consider, such as:

- Enhancing the technical performance of new units by expanding prospecting areas and reducing travel time on the fishing site or diversifying catches depending on the season, along with better securing of boats.
- Increasing the number of days at sea through the development of coastal resources and rationalization of fisheries, including control of catches, gear, sizes, non-professional and/or prohibited activities.
- Improving the value of products landed by fishermen by enhancing the quality and conservation of products.
- Promoting products in new niches linked to tourism or processing and reducing manufacturing costs through economies of scale.

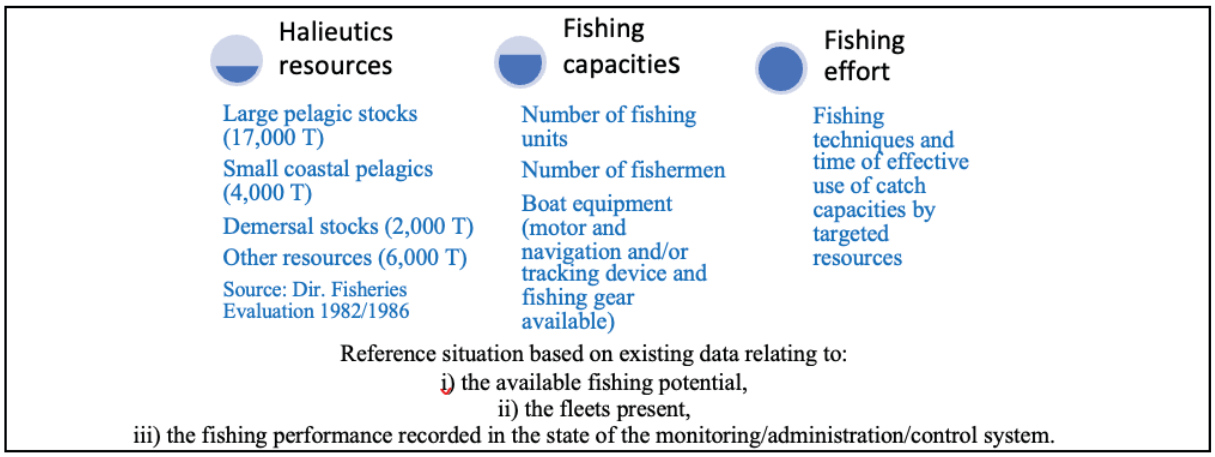
Considering these constraints and the stakes for the Blue Economy associated with the modernization of the coastal fishing fleet, the MPCAFF must align with the logic of the Management Plans for fishing capacities in STP and the broader objective of improving value chains and rationalizing fishery resources. Along with these objectives, the MPCAFF should also aim to reduce the environmental

impacts of shipyards and manufacturing processes of fishing units, as well as adjusting catches and contributing to the carbon balance by reducing traction costs and impacts on forest resources.

Fig.12: Public and Private investment


The underlying principles of the MPCAFF justify its inclusion within the National Investment Plan for the Blue Economy, given its potential for sustainability across the three dimensions of the environment, society, and the economy. The variables that we will aim to balance under the MPCAFF are outlined in the following tables.

Tab.22: Variable to be considered in the Modernization Plan for the Coastal Artisanal Fishing Fleet




Tab. 23: The expectations of the Modernization Plan for the Coastal Artisanal Fishing Fleet in relation to the sustainability of fisheries

| | |
|---|---|
| Environmental sustainability | Take into account the potential resources available in the coastal zone and adjust the fishing capacity plan to these potentials (per 5-year cycle). |
| | Control by better monitoring of boats (listed and administered), the fishing gear used and the catches made (size, species, places and period of capture by applying technical measures and the game of training, raising awareness and encouraging the principles responsible and sustainable fishing. |
| | Reduce the environmental impacts due to the uncontrolled use of construction materials for boats (secure construction sites in suitable sites brought up to standard for the use of polluting products and in adequate repair sites. |
| Social Sustainability | Take small-scale fisheries out of the informal sector by professionalizing the capture segment by identifying and registering the boats, which are administratively monitored in conjunction with the professional fishermen registered and listed. |
| | Reduce the risk of accidents at sea and loss of life. |
| | Structure fishing communities through improved services for the maintenance and equipment of new fishing units. |
| | Promote collective fishing by several fishermen on the same boat within fishing communities and strengthen local associations. |
| | Contribute to learning about sharing and collective risk management. |
| | Contribute to the collective learning of credit for investment in the means of production under public supervision. |
| Economic sustainability | Improve boat performance (travel time/fishing time, conservation, increased fishing capacity due to the number of people on board, geolocation devices, diversification of fishing gear on board the same trip, improvement of navigation conditions and therefore increasing the number of possible fishing days...) |
| | Improve the conditions for landing and management of fishing capacities and promotion of more rational marketing methods (grouping sites for boats and means of transporting products to different destinations: hotels, restaurants, processing sites, towns, etc. |
| | Reduce the acquisition costs of fishing units by public contribution (under the expected improvements in terms of human security, health security, administration and professionalization of small-scale fisheries (exit from the informal sector). |
| | Reduce acquisition costs of fishing units by reducing manufacturing costs (economies of scale). |
| | Reduce investment costs through increased maintenance capacity of fishing units (reinforcement of the presence and services of shipyards) |

## 5.3 Phasing

The investment project linked to the MPCAFF is expected to be phased as follows:

- Gradually replace non-motorized individual fishing dugout canoe units (approximately 1600 units) with a ban on new construction in this category.

Incentives will be provided to group fishermen together by offering a rate bonus or direct public aid.

Additionally, fishermen will be encouraged to acquire a new proa motorized unit or larger boat from the controlled second-hand market.

- Encourage owners of motorized monoxyle units to upgrade to a new proa unit (about 400 units) by offering bonuses for the exit of old monoxyle units.

Fishermen will also be incentivized to bring together several boats (with an incentive scale of aid or increased rate) and comply with administrative specifications such as obtaining construction authorization, fishing permit, and canoe registration.

- Encourage other coastal artisanal fishing units to modernize by offering a bonus for the exit of old units that can be resold in the second-hand market.

Fishermen will also be incentivized to bring together several boats (with an incentive scale of aid or increased rate) and comply with administrative specifications such as obtaining construction authorization, fishing permit, and canoe registration.

## 5.4 Investment Costs

Based on the expectations of the MPCAFF, we can formulate the following hypotheses for our calculations:

1. The support provided for the capacity building of shipyards in STP, combined with the MPCAFF's commitment to order from certified shipyards, is expected to reduce manufacturing costs of new artisanal fishing units by 15 to 20% compared to previous costs. Profits from the sites could help cover investments made for site adaptation and standardization.

2. When considering the accumulation of direct aid for exiting a fishing unit (whether destroyed or resold), community or collective investment bonuses, and assistance with specification applications for fisheries monitoring and management, combined public aid could be between 32% and 48% of the acquisition cost of the fishing units. This excludes reimbursement interest subsidies, which are assumed to be at 0 in the optimal hypothesis presented in the table below.

3. By substituting an old fishing unit with a more efficient and multi-active unit, it is estimated that the increase in yield could lead to a benefit of between 15% and 30% at the end of the annual fishing activity, compared to the old unit. This increase is due to increased catch volume from increased fishing time, more sea trips, and greater conservation capacity, as well as better valuation of catches through improved quality, better mobility in relation to markets, and better service facilities for unloading and transporting products to consumers. These factors can also improve demand for processing high-quality products, further enhancing the increase in yield."

Tab. 24: Updated construction costs of coastal artisanal fishing units (Euros).

| Size of boats | Boat type | Updated manufacturing costs | Expected profit margin (%) | Updated selling price | Profit margin (Euros) |
|---|---|---|---|---|---|
| 6,6 x 1,3 | Especifico para motor | 2222 | 0,40 | 3704 | 1481 |
| 7,1 x 1,8 | Semiduplo fundo cheio de | 4286 | 0,40 | 7144 | 2857 |
| 7,4 x 2,1 | polyretano Malas na proa e popa | 5715 | 0,40 | 9525 | 3810 |

- Information on the discounting of costs provided by promoters: the costs of imported inputs in the cost of the fishing unit represent 60%, average general increase in prices of 30% to 35% of imported inputs, because only resin has experienced an increase of 50% and the other materials, prices have increased between 5% and 10%.

Tab. 25: Pricing of aid and subsidies allocated under the MPCAFF according to the type of boat proposed (In USD on the September 2022 database – Source: Sao Tomé shipyard owner)

| Model of boat proposed according to Sao Tomé shipyard indications | Unit cost of a boat | Part Minimum State subsidy MPCAFF | Community Project Bonus | Fishing unit withdrawal bonus (per unit withdrawn and cumulative according to the number of units capped at 3) | Subsidy contribution Fisheries Resources Management Plan (FRMP specifications) No cumulative (1 per new boat) | Total Subsidy and bonus | | Balance remaining to be borrowed | | Amount of monthly payments to be repaid / 5 years at rate 0 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Min. | Max. | Min. | Max. | Min. | Max. |
| Tamanho 6,6 x 1,3 | 3704 | 700 | 350 | 150 | 350 | 700 | 1700 | 2004 | 3004 | 33,40 | 50,07 |
| 7,1 x 1,8 Semiduplo fundo cheio de polyretano Malas na proa e popa | 7144 | 1250 | 700 | 300 | 350 | 1250 | 3200 | 3944 | 5894 | 65,73 | 98,23 |
| 7,4 x 2,1 Semiduplo fundo cheio de polyretano Malas na proa e popa | 9525 | 1600 | 700 | 300 | 350 | 1600 | 3550 | 5975 | 7925 | 99,58 | 132,08 |

Amount in USD with exchange rate 1/24.53 Dobras STP

- The number of fishermen embarked on the units presented in the Tab. is 1 or 2 and 2 to 5 respectively for the largest boat (7.4 x 2.1).

## MPCAFF Assumptions

The MPCAFF is focused on capacity building and upgrading (both environmentally and socially) of a boatyard, at least for the program launch, as part of a modernization program that must be implemented over two 5-year periods, with additional 5-year cycles likely to follow. Other shipyards will be able to contribute to the modernization program under this initiative, with the opportunity to benefit from capacity building based on the same investment model. The aim is to distribute technical capacities for construction, repair, and maintenance of the small-scale fleet, and eventually, to expand to tourism and maritime services fleets throughout Sao Tomé and the island of Principe.

To bring this first project up to standard, specific investments are required as detailed below. The project site will be established on land already owned by the investor and located near the coast, although not necessarily on the waterfront, and will include a launching ramp.

Tab. 26: Projected investment costs for a shipyard in Sao Tome brought up to environmental and professional standards (social and protection) (Euros).

| ITEMS | Description | Euros |
|---|---|---|
| Design | Plan, layout on the ground, buildings and organization of workspaces | 35,000 |
| Mobilisation | Administrative costs and supervision | 10,000 |
| Roofed boat stand | 300 Euros / $m^2$ | 25,000 |
| Workshop building | 600 Euros / $m^2$ | 110,000 |
| Equipment | Tools, computer, work and storage ramps | 70,000 |
| Collector of hazardous waste, environmental and human protection | Containers and environmental and workers protection | 15,000 |
| Transporter/elevator | Transport mixed system | 25,000 |
| Cost of land | Between 700 m2 and 900 m2 | 60,000 |
| **Total** | | **350,000** |

Tab. 27: NPV and IRR calculation for Shipyard investment project in Sao Tome

| Year | Total Investment Amount | Annual Income | Annual Charges | Annual depreciation | Net Cash Flow | Discount Net Cash-Flow | Cumulative discount net cash-flow |
|---|---|---|---|---|---|---|---|
| 0 | € 350 000,00 | | | | - 350 000 | | -350 000 |
| 1 | | 232 835 | 139 710 | 29 000 | 93 125 | 82 412 | - 267 588 |
| 2 | | 232 835 | 139 710 | 29 000 | 93 125 | 72 931 | - 194 658 |
| 3 | | 232 835 | 139 710 | 29 000 | 93 125 | 64 540 | - 130 118 |
| 4 | | 232 835 | 139 710 | 29 000 | 93 125 | 57 115 | - 73 002 |
| 5 | | 232 835 | 139 710 | 29 000 | 93 125 | 50 545 | - 22 458 |
| 6 | | 232 835 | 139 710 | 29 000 | 93 125 | 44 730 | 22 272 |
| 7 | | 232 835 | 139 710 | 29 000 | 93 125 | 57 115 | 79 387 |
| 8 | | 232 835 | 139 710 | 29 000 | 93 125 | 35 030 | 114 417 |
| 9 | | 232 835 | 139 710 | 29 000 | 93 125 | 31 000 | 145 417 |
| 10 | | 232 835 | 139 710 | 29 000 | 93 125 | 27 434 | 172 850 |

The NPV = 172 850 Euros (Year 10th) and IRR = 22 %.
The discount rate = 13%

For individual boat purchases, given all the assumptions, bonuses, and potential involvement of fishermen's associations as associated investors, it is currently difficult to provide an indicative analysis of individual profitability units. However, some positive indicators to consider include the proposed aid grids, the monthly repayment amounts applicable based on project configuration (which can be relatively low per person for certain projects), and previous analyses conducted on the profitability of fishing units proposed in the PMCAFF. These analyses were developed in the FAO TCP report "Analysis of the Seafood Sector in São Tomé e Príncipe" (FAO Rome 2019) by Alioune Sy and Olivio Soares.

Tab. 28: Summary of the monthly payments due according to the acquisition project with reference to the previous table (Euros/month on 60 months).

| Subsidies | 1 fishermen without boat removed | 1 fishermen with 1 boat removed | 2 Fishermen without boat removed | 2 Fishermen with 1 boat removed | 2 Fishermen with 2 boats remvoved |
|---|---|---|---|---|---|
| Minimum basis | 50,07 | 47,57 | 25,03 | 23,78 | 22,53 |
| + Community bonus | 44,23 | 41,73 | 22,12 | 20,87 | 19,62 |
| + Community and FRMP bonuses | 38,40 | 35,90 | 19,20 | 17,95 | 16,70 |

Tab. 29: Summary of the monthly payments due according to the acquisition project with reference to the previous table (Euros/month on 60 months).

| | Subsidies | Minimum basic bonus | + Community bonus | + Community and FRMP bonuses |
|---|---|---|---|---|
| Different scenario for 7,1 x 1,8 Boat Type | 2 fishermen with 1 boat removed | 46,20 | 40,37 | 37,45 |
| | 2 fishemen 2 boats removed | 43,70 | 37,87 | 34,95 |
| | 3 fishermen 1 boat removed | 30,80 | 26,91 | 24,97 |
| | 3 fishermen 2 boats removed | 29,13 | 25,24 | 23,30 |
| | 3 fishermen 3 boats removed | 27,47 | 23,58 | 21,63 |
| | 4 fishermen 1 boat removed | 23,10 | 20,18 | 18,73 |
| | 4 fishermen 2 boats removed | 21,85 | 18,93 | 17,48 |
| | 4 fishermen 3 boats removed | 20,60 | 17,68 | 16,23 |
| | 5 fishermen 1 boat removed | 18,48 | 16,15 | 14,98 |
| | 5 fishermen 2 boat removed | 17,48 | 15,15 | 13,98 |
| | 5 fishermen 3 boat removed | 16,48 | 14,15 | 12,98 |

Tab.30: ter: Monthly payments due according to the acquisition project (Types 7,7 x 2,1) with reference to the previous tables (Euros/month on 60 months).

| | Subsidies | Minimum basic bonus | + Community bonus | + Community and FRMP bonuses |
|---|---|---|---|---|
| Different scenario for 7,7 x 2,1 Boat Type | 2 fishermen with 1 boat removed | 63,54 | 57,71 | 54,79 |
| | 2 fishemen 2 boats removed | 61,04 | 55,21 | 52,29 |
| | 3 fishermen 1 boat removed | 29,13 | 25,24 | 23,30 |
| | 3 fishermen 2 boats removed | 27,47 | 23,58 | 21,63 |
| | 3 fishermen 3 boats removed | 25,80 | 21,91 | 19,97 |
| | 4 fishermen 1 boat removed | 31,77 | 28,85 | 27,40 |
| | 4 fishermen 2 boats removed | 30,52 | 27,60 | 26,15 |
| | 4 fishermen 3 boats removed | 29,27 | 26,35 | 24,90 |
| | 5 fishermen 1 boat removed | 25,42 | 23,08 | 21,91 |
| | 5 fishermen 2 boat removed | 24,42 | 22,08 | 20,92 |
| | 5 fishermen 3 boat removed | 23,42 | 21,08 | 19,92 |

The shipyard on the island of Sao Tome, which is participating in the MPCAFF and has planned additional investments, is expected to produce a total of 60 boats per year according to appropriate standards and the hull configurations specified in the previous table. Other shipyards may also contribute to the nautical technical park in other regions of the country, including the island of Principe or another location on the southern part of the island of Sao Tome to ensure site availability for repairs.

To meet the production rate of fishing units in line with the MPCAFF, 14 employees will be required

instead of the current workforce, which is limited to 8 employees.

Assuming only one site is authorized to support the MPCAFF, the project will aim to construct 300 coastal artisanal fishing units over the next 5 years, targeting fishermen who register their approach to responsible investments, with specifications for good management of fishery resources. The objective is also to reduce the number of single members monoxyle units and encourage units that group at least two fishermen. In this context, the project aims to retire a minimum of 120 single-person fishing units.

The following are the indicators for the MPCAFF:

- Within the next 5 years from the launch of the MPCAFF, 300 new fishing units should become operational (with adjustments made at the end of year n using a sliding system n+5 over a period of at least 10 years).

- At least 120 fishing units should exit from activity, with a maximum of 150 units (with adjustments made at the end of year n using a sliding system n+5 over a period of at least 10 years).

- 100% of potential buyers for new boats must adhere to the conditions specified for responsible and sustainable fishing.

- The distribution of the units acquired must be within the indicative ranges specified for the first year of implementation of the MPCAFF (with adjustments made at the end of year n using a rolling system n+5 over a period of at least 10 years):

Maximum of 50 units of type 7.4 x 2.1 Semiduplo fundo cheio de polyretano Malas na proa e popa.

Maximum of 100 units of type 7.1 x 1.8 Semiduplo fundo cheio de polyretano Malas na proa e popa.

Maximum of 150 units of Tamanho type 6.6 x 1.3.

- Depending on the annual budgetary commitments and the defined quotas, the planning for years n+1 to n+5 will be adjusted, and additional resources will be sought for year n+5 (in reality n+6 from the implementation of the MPCAFF and up to n+10 year by year). Based on the proposed premium scales in the above table, the MPCAFF must have a budget provision estimated in the following table.

Fig.13: MPCAFF's indicators in term of fishing capacity (+ / - boats)

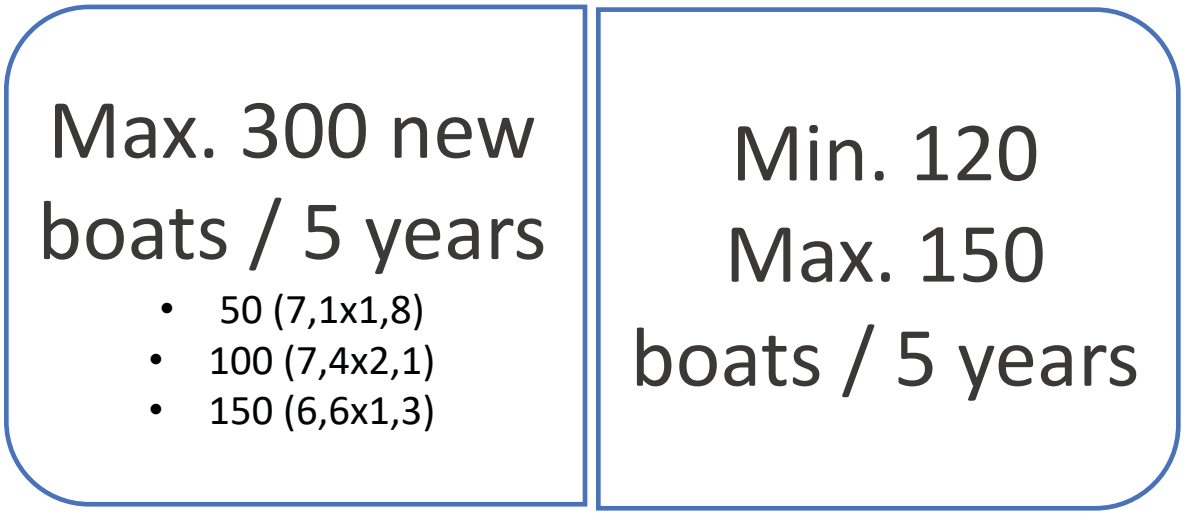


Fig. 14: MPCAFF Provisional Budget

| | | |
|---|---|---|
| 1,653.500 Euros/5 years | MPCAFF provisional budget | |
| 618,000 € | Total subsidies and grants | 1,035.000 € Loans |
| 105,000 € | MPCAFF provisional budget | |
| 310,000 € | For contribution to the Fisheries Resources Management Plan | |
| 105,000 € | MPCAFF provisional budget | |
| 167,000 € | For Community investment project label | |

The economic benefits of renewing coastal artisanal fishing units can be analyzed at various levels. There are several benefits that can be expected, directly linked to the MPCAFF, that concern the different stakeholders involved in the plan as economic actors in the value chain and/or investors.

These benefits include:

- General State Subsidy: automatically allocated for each new boat under the MPCAFF.
- Contribution to the Fisheries Resources Management Plan: Participation of new boat owners in the specifications defined in relation to the fisheries resources management plan which will be developed by the General Directorate of Fisheries and Aquaculture (for Principe and for Sao Tomé).
- Fleet boat exit: One for one, one for two, or one for three, at a maximum for large units purchased.
- Community investment project label: for new owners who are members of an association of fishermen and actively engage in community-based activities that support the Blue Economy (environmental protection, sustainability of fisheries, contribution to the development of ecotourism).
- The total amount of subsidies is optimal (618,000 Euros).
- Advances on loans granted and repayable are estimated and likely to vary depending on the achievement of quotas by category of vessels built.

## 5.5 Social and economic analysis

The economic aspects of renovating coastal artisanal fishing units can be evaluated at various levels. There are several benefits that can be directly linked to the Marine and Coastal Protected Area Financing Facility (MPCAFF) and that affect the different stakeholders involved in the project as either economic actors in the value chain or investors. Here are the main benefits that can be taken into account when

making economic calculations, depending on the perspective of the user:

**At the level of the shipyard brought into compliance with the standards of manufacture of certified serial copies in connection with the Fleet Modernization Plan, several advantages are to be expected:**

- Access to an investment budget adapted to its involvement in the plan to modernize the coastal artisanal fishing fleet.
- Acquisition of innovative and more economical manufacturing processes in terms of raw materials.
- Economy of scale on imported inputs (adjustment of taxes on incoming products in the national modernization plan).
- Economies of scale on mass production.
- Orders secured as part of a five-year plan (possibly renewed).
- Ease of recruitment due to the guaranteed order book.

**At the level of the purchaser of the new fishing unit, the following incentives can be noted:**

- Lower acquisition costs through positive impacts on shipyard cost.
- Accumulation of advantages of aid for the acquisition of a new unit (interest subsidy, exit bonus from an old unit, direct public aid in the event of collective investment, etc. other conditions defined in the modernization plan of the small-scale coastal fleet).
- Expectation of increased performance of the new unit due to the expansion of its prospecting radius, its greater security at sea and therefore increase in the number of potential outing days, reduction of travel time to reach fishing site, lengthening of effective fishing times, capacity to embark several types of gear on board (diversification by trip made possible), better conservation of catches and therefore better valuation of landed products.
- Mutualization of investment costs between several fishermen possibly.
- Ease of maintenance of the fishing unit due to the long-term presence of shipyards.
- Better inclusion in the professional framework and improved dialogue with the fisheries administration to guide the public investments needed to support fisheries.
- Increase in opportunities for the diversification of activities and markets by improving the safety conditions of vessels at sea and the quality of products landed.
- Planned phasing of government guaranteed acquisition loans.

**At the level of the fishing community, we can note:**

- Development of landing sites and parking of boats.
- Improved relations with the fisheries administration and markets.
- Education in the pooling of investments and risks.
- Reduction of material and human losses (maritime accidents).

- Employment and training opportunities.
- Strengthening of links with banking services and central regulatory institutions.
- Enhancement and securing of product processing sectors through better direct supply within the communities participating in the fishing capacity modernization plan.

**At the level of the State and its administrations, we will mainly note:**

- Ease of monitoring aid.
- Ease of catch regulation through the specifications imposed on the beneficiary of public aid.
- Reduction of costs related to accidents at sea and loss of equipment.
- Better managed monitoring of fishing capacities.
- Sustainability of public investments and better targeting of priority sites according to the level of community involvement in the modernization plan.
- Ease in the mobilization of financial resources in connection with the five-year planning of the MPCAFF.
- Implementation of international conventions facilitated.
- Adjustment of professional training to new equipment.
- Increased employment and contribution of fisheries to GDP.

## 5.6 SWOT analysis[53]

Tab. 31: SWOT Analysis for MPCAFF

| Strengths | Weaknesses |
|---|---|
| - The coastal zone is extensive and offers a diverse range of resources with high commercial value.<br>- There are protected marine areas in place.<br>- The national fishing fleet consists of artisanal and semi-industrial vessels.<br>- The production is primarily intended for human consumption.<br>- The fishing fleet consists of small artisanal and semi-industrial vessels that employ more sustainable fishing methods, such as selective fishing with a relatively small volume of high-quality catches.<br>- The PRAO type vessel (3 to 7 meters) and motorized boats (5 to 7 meters) have been improved.<br>- The semi-industrial fleet includes 10 Cariocos and 4 vessels with cabins.<br>- A new law on fisheries and aquaculture (Law No. 9/2022) has been introduced.<br>- Artisanal fishing catches were estimated to be around 6331 tons in 2022 (a growth of approximately 3% estimated by the Directorate of Fisheries).<br>- Bow canoes are the most commonly used vessels in the Pantufo and Praia Melão area.<br>- The National Institute of Statistics is preparing a study on maritime accounts.<br>- There are human resources with knowledge and experience in the scientific assessment of fisheries resources and socio-economic analysis of the fishing sector.<br>- The NGO MARAPA is implementing the Marine Artificial Reefs project.<br>- | - The country lacks its own port for artisanal fishing disembarkation.<br>- Statistical data is collected from fishing villages.<br>- Artisanal fishing primarily uses traditional pirogues made from hollowed out whole wood trunks (ranging from 3 to 5 meters in length).<br>- Semi-industrial fishing employs purse seines that can reach up to 12 meters.<br>- Artisanal and semi-industrial fishing are exempt from fishing licenses, taking into account the socio-economic situation of the country.<br>- There has been a decrease in the volume of demersal species (bottom species).<br>- Pelagic fish are fished at a maximum distance of 50 miles, in vessels suitable for only 12 miles from the coast. These vessels are of the open-mouth AZ model fiber type, which is not safe for fishermen.<br>- There is inadequate management, treatment, and storage of fish.<br>- Adequate conservation spaces are lacking.<br>- There is a lack of training on best fishing practices (safety and environmentally correct).<br>- Tree species such as Oca and tamarines are indiscriminately cut down for the construction of artisanal canoes.<br>- At least 30,000 citizens of the country live directly or indirectly from fishing, and these families are poor, numerous, and vulnerable.<br>- Fishing professionals are insufficiently prepared in terms of knowledge related to business management techniques, including marketing.<br>- Fishing professionals lack qualifications to perform other activities in the sea area.<br>- There is insufficient information on certain aspects of the fisheries sector within the national statistical system that are relevant for diagnosing the sector.<br>- There is a lack of qualified workforce.<br>- Some segments of the fleet have an imbalance between capacity and fishing opportunities (e.g., seine, surface).<br>- The value chains are not well structured or organized. |
| **Opportunities** | **Threats** |
| - São Tomé and Príncipe has a high per capita consumption of fish.<br>- It is important to ensure the Good Environmental Status of national marine waters, including the protection and enhancement of marine natural heritage.<br>- A cohesive and coherent network of protected marine areas should be created to contribute to the ecological sustainability of our oceanic waters.<br>- There is a need to motivate young school-aged people to participate in nautical activities.<br>- New job opportunities related to the sea should be created in accordance with the needs of each region.<br>- The installation of aquaculture units is a possibility to be explored.<br>- Port facilities can be modernized to improve efficiency and safety. | - The impact of water pollution, especially on coastal ecosystems, is significant, caused by waste and contaminants carried by rivers to the sea during rainfall and floods. Due to the lack of cleaning of riverbanks, waste is discharged into the sea, resulting in damage to the environment.<br>- Climate change and natural disasters have adverse effects on the marine ecosystem and coastal regions.<br>- Abusive fishing practices have a negative impact on habitats, leading to a decrease in the exploitable biomass of important resources.<br>- Climate change has led to a reduction in fishing opportunities for traditionally caught species.<br>- Brisa Fishing, which employs net/drag fishing, has a harmful effect on the aquatic environment.<br>- Inadequate financial resources available to institutions responsible for surveillance, monitoring, and action at sea have hampered effective measures.<br>- Fishing activity is unpredictable, and traditional pelagic species occasionally face scarcity.<br>- Adverse meteorological phenomena have a negative impact on the coastal region, exacerbating existing challenges. |

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## 5.7 Environmental and social impacts[54]

Tab. 28: Summary of potential environmental and social impacts and mitigation measures[55]

| Environmental Aspect | Negative impacts | Mitigation measures |
|---|---|---|
| Construction/Maintenance of fish marketing infrastructure | - Improvement of fishing support infrastructure | Maintenance of existing fish market infrastructures.<br>Construction of new fish markets. |
| Acquisition and equipment of non-predatory fishing tools | - Protection and preservation of aquatic fauna | Adoption of sustainable fishing techniques and adequate tools. |
| Acquisition of refrigerated chambers and refrigerated trucks | - Improvement of fish conservation conditions | Construction of fish storage sites. |
| Commercialization of fish | - Pressure on the fish production chain | Adoption and application of good hygiene and quality control practices for fish. |
| Construction of Atelier Naval infrastructure | - Fostering employment and the circular and sustainable blue economy | Choosing the right location that meets the environmental requirements and standards. |
| Fiber canoe manufacturing process | - Generation of waste and effluents in the manufacturing process of fiber canoes | Waste must be deposited in suitable containers and then transported to the final destination (management of construction waste). |
| Acquisition of fiber vessels | - Improvement of working conditions and safety of Fishermen | Adopt a vessel model that meets all safety requirements. |
| Fishing Modernization | - Ensuring food safety.<br>- Greater possibility of exploitation of marine resources; | Avoid accidental captures. |
| Industrial Fishing | - Reduction of aquatic fauna stocks.<br>- Excessive exploitation of aquatic fauna.<br>- Decrease/reduction/extinction of the species. | Adoption of sustainable fishing techniques (appropriate nets).<br>Periodic inspection and control of fishing vessels.<br>Respect the maturation period of the species.<br>Compliance with existing laws and regulations. |
| Industrial Fishing - Fuel spillage through vessel engines | - Pollution of the marine ecosystem | Acquire vessels with safer technical and environmental requirements. |

## 5.8 Recommendations[56]

From an environmental and social perspective, the sustainability of marine ecosystems, fishery resources, seafarer safety, and the health of products intended for human consumption are crucial factors that determine the best fishing and operating methods. Achieving these improvements requires investment in the transformation of fishing boats at the first stage of the value chain.

In the context of open fisheries, which still characterizes small-scale fisheries with low levels of investment, and due to the increasing migration of rural populations towards the coastal zone that offers more opportunities for young people with improved equipment, it is essential to raise the capacity level of first-time entrants. This will allow them to be managed within the framework of regulated and monitored fisheries. This requires more secure equipment for ships that can be registered and easily traced in their activities along the coasts and in the value chain to ensure traceability. It also involves reducing the individual nature of activities to put an end to illicit, unmanaged, and unregulated practices.

*54 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro 2023.*

*55 The characterization of the impacts related to the projects will be based on the Physical, Biotic and Socioeconomic aspects. The characterization of physical impacts is associated with the components of: Geology, Geomorphology, soil, hydrology, landscape and air quality, waste production, impacts on sites of archaeological or cultural interest, biotic impacts are associated with Wildlife and the Flora and finally socio-economic, related to employment, trade and population movements in the community.*

*56 Antónia Alariza Mendes Júnior Bento Luiz, Op. Cit. Janeiro, 2023.*

The modernization of the fleet must be done while regulating fishing capacities (fishing effort directed towards the most coastal species).

Therefore, given the vulnerability of our islands and the fragility of our coastal areas, the most environmentally viable proposal would be to always combine artisanal fishing with semi-industrial fishing, without completely replacing the techniques used in artisanal fishing, as many of them are sustainable and use resources rationally. For the sustainability of the value chain, existing resources, the economy of the actors involved (palaces, families), and the environment must be taken into account.

It is recommended to prioritize fleet modernization in order to increase operational capability. This involves improving equipment to allow for greater autonomy and mobility at farther distances from the coast. In the case of Sao Tome, this could enable more efficient fishing for pelagic resources (small and large) that are currently less vulnerable to overexploitation, while still benefiting coastal demersal resources.

The project will focus on the following objectives:

- Rationalizing marketing and distribution channels (including traceability, improved quality and quantity, and grouping of fishing actors at better-equipped sites)
- Providing financial and technical resources to promote co-management at national, local, public, and private levels
- Establishing embarkation points and fisheries monitoring and management offices at the district level
- Developing new boat models for standardized manufacturing to reduce costs and improve safety for fishermen and the environment
- Encouraging professional cooperation among local ports (in connection with cabotage ports)
- Improving access to ship repair equipment and workshops

To accomplish these goals, the General Directorate of Fisheries must create a Fisheries Master Plan to oversee the development and modernization of the sector and make fishing activities in the country viable.

Improving transportation, storage, and marketing conditions is also crucial for the success of the other two priority projects (cabotage and tourism market development).

The modernization component must enable small-scale fishing to enter into a responsible and sustainable economic cycle, addressing issues related to food security and the environment as included in the SDGs, by improving incomes and livelihoods.

## 5.9 Implementation schedule

Referring to the MPCAFF as planned, the indicative calendar is as follow:

**Phase 1: Preparatory phase, mobilization of financial resources, communication and definition of priority**

- Establishment of a technical committee for the definition, implementation, monitoring and assessment of MPCAFF.

- National and local communication with DG Fisheries and Aquaculture, the Districts and fisheries associations.
- Planning of annual quotas for new boat and priorities

**Phase 2: Development of funding applications within the fishing communities and conduct of the analysis process**

- Support for the preparation of application files with support from the District Chambers
- Definition of the application selection process

**Phase 3: Construction of fishing units (quota year 1)**

**Phase 4: Delivery of units built and implementation of reimbursement procedures**

**Phase 5: Continuation of the process year 2 and cycle 3, 4 and year 5 with remobilization of financial resources and return to Phase 1 for a 10-year cycle**

- Assessment of process implemented year 1
- Planning of new quota for year 6 (5+1)
- Back to implementation of cycle (Phase 1 to 5)

Tab. 29: Indicative calendar for MPCAFF project

| Monthly calendar / Phases | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Phase 1: Preparatory phase, mobilization of financial resources, communication on the MPCAFF and preparation of the PGRI and definition of priorities and specifications with community bonuses. | | | | | | | | | | | | |
| Phase 2: Development of funding applications within the fishing communities and conduct of the selection process | | | | | | | | | | | | |
| Phase 3: Start-up and construction of fishing units (year 1) | | | | | | | | | | | | |
| Phase 4: Delivery of units built and implementation of reimbursement procedures | | | | | | | | | | | | |
| Phase 5: Continuation of the process year 2 and cycle 3, 4 and year 5 with remobilization of financial resources and return to Phase 1 for a 10-year cycle | | | | | | | | | | | | |

# 6. Conclusion

The three priority projects presented by the government of STP for the Blue Economy sectors - tourism, fishing, port infrastructure, and transport - are seen as potential areas of investment that could lead to significant economic growth at both local and national levels. They are also considered to be avenues for establishing new forms of partnerships between public and private entities that prioritize positive environmental and social contributions, such as the fight against poverty, resilience to climate change, and food security.

The three projects are envisioned to be interconnected, with a focus on value chain transformation, productive system changes, and public regulation adaptations to facilitate their development. Contextual analysis, environmental impact assessments, and social impact analysis of these projects demonstrate the benefits of each, contributing to their adoption and implementation.

These projects have already attracted the attention of international partners. The upcoming investment forum during the 2nd Edition of the Blue Economy Week in STP will be a priority venue for the presentation and analysis of these projects, which should facilitate the mobilization of resources necessary for their implementation in the preliminary draft of the Blue Economy National Investment Plan.

According to the regulatory framework of the transition set forth in the ENTEA Law, the three projects discussed in this note should capture the attention of financial and technical partners, thereby marking major stages in the expected blue transformations, including the system of production, regulation, and recovery. These projects have already garnered the interest of international partners such as FAO, EU, World Bank, and African Development Bank, in connection with actions and support programs already developed in the country, aligned with these three themes such as ACPFISH4, WACA, PRIASA, and FAO GCF Readiness. The presentation and analysis of these projects are prioritized for the upcoming investment forum planned during the 2nd Edition of the Blue Economy Week in STP, which is expected to mobilize the necessary resources for their implementation as part of the preliminary draft of the Blue Economy National Investment Plan that will be presented during the same forum.

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# Annexes

## Annex 1: Environmental Context

**Antónia Alariza Mendes Júnior Bento Luiz**
Consultora Nacional Especialista em Ambiente e Avaliação de Impactos Ambientais, FAO TCPSTP3804
Relatório Ambiental com contribuições e nota específica pormenorizada sobre os impactos e recomendações destinadas a serem integradas na análise e rendimentos dos investimentos prioritários do Plano Nacional de Investimentos para a Economia Azul, Janeiro 2023

| | |
|---|---|
| Climate | The archipelago of São Tomé and Príncipe has a humid tropical climate, with abundant rainfall almost all year round.<br>The predominant relief features mean that S. Tomé and Príncipe has many areas with microclimates, with greater rainfall in the higher areas.<br>There are two seasons of the year in S. Tomé and Príncipe, the "Rain" season (warmer and more humid) covering the period from September to May, whose temperature varies between 22° (higher zones) and 31° (higher zones). low) and that of "Gravana", drier and cooler, covering the period from June to August, with the temperature varying between 18° (higher zones) and 27° (lower zones). |
| Temperature and humidity | Temperatures are also influenced by the relief, with important variations in the direction of increase being known as one goes from higher to lower zones. Ex: (daytime average) Lagoa Amélia (1488 m): 18.4° C; Monte Café (690 m): 22.4°C; Airport (8m):26.2°C. Humidity is also very high, reaching an average of 92% during most of the year, being less high in the lower altitude areas, varying between 70 and 80% throughout the year.<br>The sea of STP has an average temperature of around 27° C, according to the isotherms of the sea surface. |
| Climate change | In 2007, STP launched the National Adaptation Action Program (NAPA), identifying 22 urgent and immediate climate change adaptation priorities. Studies carried out during the preparation of the NAPA documented that STP has been experiencing the following phenomena: (i) an increase in temperature, (ii) a decrease in rainfall and consequent decrease in the flow of rivers and the supply of water to the populations, (iii) accidents with deaths of artisanal fishermen and loss of fishing equipment, due to increased fog, strong winds and sea turbulence (interrupting navigation and traditional safety practices at sea), (iv) the destruction of fishing canoes in ports and beaches due to the increased frequency of storms, and (v) the increasing poverty of women, due to the loss of their husbands' lives and fishing gear; (vi) drier seasons leading to dry conditions, which, followed by torrential rains, induce landslides and flooding, (vii) increased coastal erosion, leading to loss of homes and infrastructure, isolation of local communities, temporary inaccessibility to the sea and (viii) reduction of tourism. |
| Water resources | In São Tomé and Príncipe, water resources are characterized by climatic conditions that are very favorable to the maintenance of watercourses. The regime of watercourses is irregular and is closely related to the distribution of rainfall according to zones and seasons.<br>These water resources are fed by regular and abundant rainfall. They are valued at around 2 billion m3 per year, which represents 12,000 m3 per year/inhabitant, but are only used at 0.045%. A part of these resources corresponds to the floods of the rivers and are totally unexploited. Exploitable resources correspond to the flow regulated by vegetation and groundwater and represent between 300 and 600 million m3 per year. These are unevenly distributed across the country. Rainfall is more abundant on the southern and western slopes (6000 mm/year) of the islands of São Tomé and Príncipe. The North and East slopes (1000 mm/year), less irrigated, have more limited resources and are also the most populated areas, where the demand for water is the greatest. |
| Coastal Management in São Tomé and Príncipe | The archipelago is of volcanic origin, with no continental shelf, but there is an insular slope that reaches great depths a short distance from the coast. As such, fishing areas are located relatively far from the coast, forcing even artisanal fishermen to travel significant distances in relation to the coast with the consequent increase in risk in terms of safety. Fishing is practiced by artisanal fishermen using techniques adopted 50 years ago using dug-out canoes, two thirds of which are "rowed" or with improvised sails using materials that are not always suitable, which reduces safety and for coastal fishing was hit hard by the increase in fuel prices, affecting the price of fish, which supply 70% of protein consumption in the country. In the event of adverse weather conditions, fishermen are exposed to high security risks and are often unable to fish. The competent authorities, including the Maritime Police (Captaincy) find it difficult to organize search and rescue operations, despite the efforts that have been made in terms of equipment and training. Additionally, coastal zones in São Tomé and Príncipe are highly vulnerable in terms of topography, inadequate extraction of aggregates and an increase in extreme weather events. The tradition of occupying the coastline in vulnerable areas significantly increases the potential for accidents and loss of income and erosion processes. navigation capacity and the potential for catching fish in coastal areas. The small fleet of motorized fishing boats, which allows for greater flexibility. |
| Protected areas in São Tomé and Príncipe | *Obô Natural Park in São Tomé*<br>The "Obô" Natural Park of São Tomé and Príncipe (PNOST) was created through Law 6/2006 with a view to contributing to the protection of forest areas around Pico de São Tomé (19,500 ha) and its representative ecosystems (forestry, coastal and marine).<br>The PNOST presents a discontinuous territory, covering 3 distinct zones: |

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| | - a central massif, which is now recognized as a Natural Park by most visitors,<br>- the Malanza Zone, in the southern part of S. Tomé,<br>- the area of Praia das Conchas and Lagoa Azul<br>The Obô de S. Tomé Park is uninhabited, has no permanent human settlements, due to the relief, high rainfall, difficult access and the soil's unsuitability for agricultural activities in general. It is these factors that, in general, have ensured the absence of major negative impacts by human action, although the management of these spaces becomes urgent given the increase in activities that deplete their natural heritage, such as illegal hunting, the extraction of sandy beaches, palm plantation for the characteristic wine and, above all, the disorderly and illegal felling of trees. |
| | *The Prince's Natural Park*<br>Law 7/2006 created the Príncipe Natural Park «Obô» (PNP), to protect the representative ecosystems (8,500 ha) of Príncipe Island (forest, coastal and marine).<br>The Autonomous Region of Príncipe presents, as Protected Areas of regional and national scope:<br>- a Natural Park covering two geographically distinct areas (the southern third of the island and the Azeitona Forest),<br>- the Buffer Zone, not included in the Park, but likely to be extended to the remaining entirety of the Island (approximately the northern two thirds).<br>The Príncipe Natural Park is uninhabited, has no permanent human settlements, due to the relief, high rainfall, difficult access and the unsuitability of the soil for agricultural activities in general. It is these factors that, in general, have ensured the absence of major negative impacts by human action, although the management of these spaces becomes urgent given the increase in activities that deplete their natural heritage, such as uncontrolled hunting, disorderly slaughter illegally logging and, above all, harvesting or capturing endangered and protected species, such as parrots and sea turtles.<br>Príncipe Island, including the sea around it and the Tinhosas Islands, is, since 2012, a UNESCO World Biosphere Reserve; under the MaB Programme, UNESCO (Man and Biosphere Programme). Biosphere Reserves, in terms of functional zoning, include three types of areas, both marine and terrestrial:<br>Core Zones – with an essential vocation for the conservation of nature and biodiversity, which generally correspond to natural spaces classified at regional or national level.<br>Buffer Zones – immediate protection areas of the core zones and with potential for the development of conservation, education, research and tourism activities between others.<br>Transition Zones – areas for the establishment of human settlements and socio-economic activities. |
| Main ecosystems | Both in São Tomé and in Príncipe Island, a significant diversity can be identified in terms of habitats and ecosystems: natural ecosystems (primary forests, mangroves, inland, coastal and marine waters) and modified ecosystems (secondary forests, former plantations, forests shade, savannas and dry forests). In Principe there is no prairie at its northern end, as would be expected by analogy with São Tomé (Jones et al., 1991). |
| Vegetal cover | Biological diversity in São Tomé and Príncipe is manifested not only in terms of species richness and endemism, but also with the diversity of existing ecosystems, particularly in the forest domain.<br>It is important to highlight the shade forest, which is home to cocoa crops, the main product of the Santomean economy. Despite being the most important type of land use in the country, the cocoa culture demands the maintenance of the forest canopy to shade the cocoa plants and it has been shown that this practice helps to maintain high levels of forest biodiversity in producing countries (Rice & Greenberg 2000). Quoted in ENANB (2007).<br>São Tomé and Príncipe has a very rich biodiversity in endemic flora and fauna, as well as excellent vegetation due to its high potential for endemism. |
| Flora | São Tomé and Príncipe has a high degree of species richness and endemism, mainly birds, amphibians, higher plants, bats, reptiles, butterflies and molluscs. The rich biodiversity of the Islands is recognized by the scientific world, which considers the tropical forest of São Tomé and Príncipe as the second, in terms of priority for the conservation of avifauna, among 75 African forests. The flora of São Tomé and Príncipe is also notable: the island of São Tomé has an endemic genus and 87 endemic species. Príncipe has one endemic genus and 32 endemic species. (ENPAB II-2015)<br>Despite its small territorial extension, the country has a great diversity of ecosystems, particularly in the forest domain. Emphasis should be given to the shade forest, which is home to cocoa crops, the main product of the Santomean economy.<br>Therefore, forests play important economic, social, ecological and environmental roles, as they contribute to regulating the water regime, soil conservation, preventing erosion, functioning as climate regulators, improving air quality, and mitigating climate change. for the sequestration of atmospheric carbon and are fundamental for the conservation of biodiversity. They are also important for food, medicine, tourism and leisure, culture and the supply of raw materials. |
| Fauna | The fauna of São Tomé and Príncipe, as well as the flora, are rich, with many endemic species, due to the isolation of the islands.<br>The country has two large areas of environmental protection: The Natural Park of Obô, on the island of S. Tomé, and the Natural Park of the island of Príncipe.<br>Land mammals were almost all introduced by Man in the last five hundred years. The monkey (Cercopithecus mona) was one of the species introduced by the settlers, in addition to cats, wild pigs, the "Lagaia" (to combat the rodents that destroyed the plantations). |

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| | The archipelago, which is considered one of the best "hotspots" for birdwatching in the world, is a paradise for those interested in the diversity and exclusivity of the species found there. There are more than 65 species of birds, of which about 25 are endemic and very rare. There are also about 16 species of reptiles, including 7 endemics (ENPAB II-2015).<br>Bat species are important due to their strong endemism, being the target of scientific studies and protection and conservation measures.<br>The marine fauna is also extremely rich in biodiversity. Turtles inhabit the marine waters of the country and use the beaches for reproduction. A wide variety of cetaceans are also present in these waters, such as several species of dolphins, whales, killer whales and sperm whales. |

# Annex 2

## NPV and IRR calculation for Cabotage project (Sao Tome Island)

| | | | | | | | Hypothesis 1 : with annual rate of increase 3% | | | | | Hypothesis 2 : with annual rate of increase 5% | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Annual incomes | Annual charges | Annual depreciation | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow |
| 0 | | | | - 8 843 000 | | -8 843 000 | | | -8 843 000 | | -8 843 000 | | | -8 843 000 | | -8 843 000 |
| 1 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 1 501 549 | - 7 341 451 | 3 462 300 | 1 765 550 | 1 696 750 | 1 501 549 | - 7 341 451 | 3 462 300 | 1 765 550 | 1 696 750 | 1 501 549 | - 7 341 451 |
| 2 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 1 328 804 | - 6 012 647 | 3 566 169 | 1 818 517 | 1 747 653 | 1 368 668 | - 5 972 783 | 3 635 415 | 1 853 828 | 1 781 588 | 1 395 244 | - 5 946 207 |
| 3 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 1 175 933 | - 4 836 714 | 3 673 154 | 1 873 072 | 1 800 082 | 1 247 547 | - 4 725 236 | 3 817 186 | 1 946 519 | 1 870 667 | 1 296 466 | - 4 649 741 |
| 4 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 1 040 649 | - 3 796 066 | 3 783 349 | 1 929 264 | 1 854 085 | 1 137 145 | - 3 588 091 | 4 008 045 | 2 043 845 | 1 964 200 | 1 204 681 | - 3 445 060 |
| 5 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 920 928 | - 2 875 138 | 3 896 849 | 1 987 142 | 1 909 707 | 1 036 512 | - 2 551 579 | 4 208 447 | 2 146 037 | 2 062 410 | 1 119 394 | - 2 325 667 |
| 6 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 814 980 | - 2 060 157 | 4 013 755 | 2 046 756 | 1 966 998 | 944 786 | - 1 606 793 | 4 418 870 | 2 253 339 | 2 165 531 | 1 040 145 | - 1 285 522 |
| 7 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 721 222 | - 1 338 936 | 4 134 167 | 2 108 159 | 2 026 008 | 861 176 | - 745 617 | 4 639 813 | 2 366 006 | 2 273 807 | 966 506 | - 319 016 |
| 8 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 638 249 | - 700 687 | 4 258 192 | 2 171 404 | 2 086 788 | 784 966 | 39 350 | 4 871 804 | 2 484 306 | 2 387 498 | 898 081 | 579 065 |
| 9 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 564 822 | - 135 864 | 4 385 938 | 2 236 546 | 2 149 392 | 715 500 | 754 850 | 5 115 394 | 2 608 521 | 2 506 873 | 834 500 | 1 413 565 |
| 10 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 499 843 | 363 979 | 4 517 516 | 2 303 642 | 2 213 874 | 652 181 | 1 407 031 | 5 371 164 | 2 738 948 | 2 632 216 | 775 420 | 2 188 985 |
| 11 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 442 339 | 806 317 | 4 653 042 | 2 372 752 | 2 280 290 | 594 466 | 2 001 497 | 5 639 722 | 2 875 895 | 2 763 827 | 720 523 | 2 909 508 |
| 12 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 391 450 | 1 197 768 | 4 792 633 | 2 443 934 | 2 348 699 | 541 859 | 2 543 356 | 5 921 708 | 3 019 690 | 2 902 018 | 669 513 | 3 579 021 |
| 13 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 346 416 | 1 544 184 | 4 936 412 | 2 517 252 | 2 419 160 | 493 907 | 3 037 262 | 6 217 793 | 3 170 674 | 3 047 119 | 622 114 | 4 201 134 |
| 14 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 306 563 | 1 850 747 | 5 084 504 | 2 592 770 | 2 491 735 | 450 198 | 3 487 461 | 6 528 683 | 3 329 208 | 3 199 475 | 578 070 | 4 779 204 |
| 15 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 271 295 | 2 122 041 | 5 237 039 | 2 670 553 | 2 566 487 | 410 357 | 3 897 818 | 6 855 117 | 3 495 668 | 3 359 449 | 537 145 | 5 316 349 |
| 16 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 240 084 | 2 362 125 | 5 394 151 | 2 750 669 | 2 643 481 | 374 043 | 4 271 861 | 7 197 873 | 3 670 452 | 3 527 421 | 499 117 | 5 815 466 |
| 17 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 212 463 | 2 574 589 | 5 555 975 | 2 833 189 | 2 722 786 | 340 942 | 4 612 802 | 7 557 767 | 3 853 974 | 3 703 792 | 463 781 | 6 279 247 |
| 18 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 188 021 | 2 762 609 | 5 722 654 | 2 918 185 | 2 804 469 | 310 770 | 4 923 572 | 7 935 655 | 4 046 673 | 3 888 982 | 430 947 | 6 710 194 |
| 19 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 166 390 | 2 928 999 | 5 894 334 | 3 005 731 | 2 888 603 | 283 268 | 5 206 840 | 8 332 438 | 4 249 007 | 4 083 431 | 400 438 | 7 110 632 |
| 20 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 147 248 | 3 076 247 | 6 071 164 | 3 095 903 | 2 975 261 | 258 200 | 5 465 040 | 8 749 060 | 4 461 457 | 4 287 603 | 372 088 | 7 482 720 |
| 21 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 130 308 | 3 206 555 | 6 253 299 | 3 188 780 | 3 064 519 | 235 350 | 5 700 390 | 9 186 513 | 4 684 530 | 4 501 983 | 345 745 | 7 828 465 |
| 22 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 115 317 | 3 321 872 | 6 440 898 | 3 284 443 | 3 156 455 | 214 523 | 5 914 913 | 9 645 838 | 4 918 756 | 4 727 082 | 321 268 | 8 149 733 |
| 23 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 102 050 | 3 423 922 | 6 634 125 | 3 382 976 | 3 251 148 | 195 539 | 6 110 452 | 10 128 130 | 5 164 684 | 4 963 436 | 298 523 | 8 448 257 |
| 24 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 90 310 | 3 514 232 | 6 833 149 | 3 484 466 | 3 348 683 | 178 234 | 6 288 686 | 10 634 537 | 5 422 929 | 5 211 608 | 277 389 | 8 725 646 |
| 25 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 79 920 | 3 594 152 | 7 038 143 | 3 589 000 | 3 449 143 | 162 461 | 6 451 148 | 11 166 264 | 5 694 075 | 5 472 188 | 257 751 | 8 983 396 |
| 26 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 70 726 | 3 664 878 | 7 249 287 | 3 696 670 | 3 552 618 | 148 084 | 6 599 232 | 11 724 577 | 5 978 779 | 5 745 798 | 239 503 | 9 222 899 |
| 27 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 62 589 | 3 727 467 | 7 466 766 | 3 807 570 | 3 659 196 | 134 979 | 6 734 211 | 12 310 806 | 6 277 718 | 6 033 088 | 222 547 | 9 445 446 |
| 28 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 55 389 | 3 782 856 | 7 690 769 | 3 921 797 | 3 768 972 | 123 034 | 6 857 246 | 12 926 346 | 6 591 604 | 6 334 742 | 206 791 | 9 652 238 |
| 29 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 49 017 | 3 831 872 | 7 921 492 | 4 039 451 | 3 882 041 | 112 146 | 6 968 392 | 13 572 663 | 6 921 184 | 6 651 479 | 192 151 | 9 844 389 |
| 30 | 3 462 300 | 1 765 550 | 294 767 | 1 696 750 | 43 378 | 3 875 250 | 8 159 137 | 4 160 634 | 3 998 503 | 102 222 | 7 071 614 | 14 251 296 | 7 267 243 | 6 984 053 | 178 548 | 10 022 937 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NPV | 8th Year | - 700 687 | | | | NPV Hyp. 1 | 8th Year | 39 350 | | | NPV Hyp. 2 | 8th Year | 579 065 | | |
| | | 10th Year | 363 979 | | | | | 10th Year | 1 407 031 | | | | 10th Year | 2 188 985 | | |
| | | 20th Year | 3 076 247 | | | | | 20th Year | 5 465 040 | | | | 20th Year | 7 482 720 | | |
| | | 30th Year | 3 875 250 | | | | | 30th Year | 7 071 614 | | | | 30th Year | 10 022 937 | | |
| | IRR= | 19% | | | | | IRR= | 22% | | | | IRR= | 24% | | | |
| | Discount rate | 13,0% | | | | | | | | | | | | | | |
| | Total investment amount | | 8 843 000 | Euros | | | | | | | | | | | | |
| | Annual depreciation | | 294 767 | Euros | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 1 | | | 3% | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 2 | | | 5% | | | | | | | | | | | | |

https://donnees.banquemondiale.org/indicator/FR.INR.RINR?locations=ST

## NPV and IRR calculation for Cabotage project (Principe Island)

| | | | | | | | Hypothesis 1 : with annual rate of increase 3% | | | | | Hypothesis 2 : with annual rate of increase 5% | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Annual incomes | Annual charges | Annual depreciation | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow |
| 0 | | | | - 7 730 000 | | -7 730 000 | | | -7 730 000 | | -7 730 000 | | | -7 730 000 | | -7 730 000 |
| 1 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 832 761 | - 6 897 239 | 2 136 800 | 1 195 780 | 941 020 | 832 761 | - 6 897 239 | 2 136 800 | 1 195 780 | 941 020 | 832 761 | - 6 897 239 |
| 2 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 736 957 | - 6 160 282 | 2 200 904 | 1 231 653 | 969 251 | 759 065 | - 6 138 174 | 2 243 640 | 1 255 569 | 988 071 | 773 805 | - 6 123 434 |
| 3 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 652 174 | - 5 508 108 | 2 266 931 | 1 268 603 | 998 328 | 691 891 | - 5 446 282 | 2 355 822 | 1 318 347 | 1 037 475 | 719 022 | - 5 404 413 |
| 4 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 577 145 | - 4 930 963 | 2 334 939 | 1 306 661 | 1 028 278 | 630 662 | - 4 815 620 | 2 473 613 | 1 384 265 | 1 089 348 | 668 118 | - 4 736 295 |
| 5 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 510 748 | - 4 420 215 | 2 404 987 | 1 345 861 | 1 059 126 | 574 851 | - 4 240 769 | 2 597 294 | 1 453 478 | 1 143 816 | 620 817 | - 4 115 477 |
| 6 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 451 989 | - 3 968 226 | 2 477 137 | 1 386 237 | 1 090 900 | 523 980 | - 3 716 789 | 2 727 158 | 1 526 152 | 1 201 006 | 576 866 | - 3 538 612 |
| 7 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 399 991 | - 3 568 235 | 2 551 451 | 1 427 824 | 1 123 627 | 477 610 | - 3 239 179 | 2 863 516 | 1 602 460 | 1 261 057 | 536 026 | - 3 002 586 |
| 8 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 353 974 | - 3 214 261 | 2 627 994 | 1 470 659 | 1 157 336 | 435 343 | - 2 803 836 | 3 006 692 | 1 682 583 | 1 324 110 | 498 077 | - 2 504 509 |
| 9 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 313 251 | - 2 901 010 | 2 706 834 | 1 514 778 | 1 192 056 | 396 817 | - 2 407 019 | 3 157 027 | 1 766 712 | 1 390 315 | 462 815 | - 2 041 694 |
| 10 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 277 214 | - 2 623 796 | 2 788 039 | 1 560 222 | 1 227 818 | 361 701 | - 2 045 318 | 3 314 878 | 1 855 047 | 1 459 831 | 430 049 | - 1 611 645 |
| 11 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 245 322 | - 2 378 475 | 2 871 681 | 1 607 028 | 1 264 652 | 329 692 | - 1 715 626 | 3 480 622 | 1 947 800 | 1 532 822 | 399 603 | - 1 212 042 |
| 12 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 217 099 | - 2 161 376 | 2 957 831 | 1 655 239 | 1 302 592 | 300 516 | - 1 415 111 | 3 654 653 | 2 045 190 | 1 609 464 | 371 313 | - 840 729 |
| 13 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 192 123 | - 1 969 253 | 3 046 566 | 1 704 896 | 1 341 670 | 273 921 | - 1 141 189 | 3 837 386 | 2 147 449 | 1 689 937 | 345 025 | - 495 704 |
| 14 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 170 020 | - 1 799 233 | 3 137 963 | 1 756 043 | 1 381 920 | 249 680 | - 891 509 | 4 029 255 | 2 254 822 | 1 774 434 | 320 599 | - 175 106 |
| 15 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 150 460 | - 1 648 772 | 3 232 102 | 1 808 725 | 1 423 377 | 227 585 | - 663 924 | 4 230 718 | 2 367 563 | 1 863 155 | 297 901 | 122 796 |
| 16 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 133 151 | - 1 515 621 | 3 329 065 | 1 862 986 | 1 466 078 | 207 445 | - 456 479 | 4 442 254 | 2 485 941 | 1 956 313 | 276 811 | 399 606 |
| 17 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 117 833 | - 1 397 789 | 3 428 937 | 1 918 876 | 1 510 061 | 189 087 | - 267 393 | 4 664 366 | 2 610 238 | 2 054 129 | 257 214 | 656 820 |
| 18 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 104 277 | - 1 293 512 | 3 531 805 | 1 976 442 | 1 555 363 | 172 353 | - 95 039 | 4 897 585 | 2 740 750 | 2 156 835 | 239 004 | 895 824 |
| 19 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 92 280 | - 1 201 232 | 3 637 759 | 2 035 735 | 1 602 024 | 157 101 | 62 061 | 5 142 464 | 2 877 787 | 2 264 677 | 222 083 | 1 117 907 |
| 20 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 81 664 | - 1 119 568 | 3 746 892 | 2 096 807 | 1 650 084 | 143 198 | 205 260 | 5 399 587 | 3 021 677 | 2 377 911 | 206 361 | 1 324 268 |
| 21 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 72 269 | - 1 047 299 | 3 859 298 | 2 159 712 | 1 699 587 | 130 526 | 335 785 | 5 669 567 | 3 172 760 | 2 496 806 | 191 751 | 1 516 019 |
| 22 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 63 955 | - 983 345 | 3 975 077 | 2 224 503 | 1 750 574 | 118 975 | 454 760 | 5 953 045 | 3 331 398 | 2 621 647 | 178 176 | 1 694 194 |
| 23 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 56 597 | - 926 747 | 4 094 330 | 2 291 238 | 1 803 092 | 108 446 | 563 206 | 6 250 697 | 3 497 968 | 2 752 729 | 165 561 | 1 859 756 |
| 24 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 50 086 | - 876 661 | 4 217 160 | 2 359 975 | 1 857 184 | 98 849 | 662 055 | 6 563 232 | 3 672 867 | 2 890 365 | 153 840 | 2 013 596 |
| 25 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 44 324 | - 832 338 | 4 343 674 | 2 430 775 | 1 912 900 | 90 101 | 752 156 | 6 891 394 | 3 856 510 | 3 034 884 | 142 949 | 2 156 545 |
| 26 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 39 225 | - 793 113 | 4 473 985 | 2 503 698 | 1 970 287 | 82 128 | 834 284 | 7 235 963 | 4 049 336 | 3 186 628 | 132 829 | 2 289 374 |
| 27 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 34 712 | - 758 401 | 4 608 204 | 2 578 809 | 2 029 396 | 74 860 | 909 144 | 7 597 761 | 4 251 802 | 3 345 959 | 123 425 | 2 412 799 |
| 28 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 30 719 | - 727 682 | 4 746 450 | 2 656 173 | 2 090 277 | 68 235 | 977 379 | 7 977 649 | 4 464 392 | 3 513 257 | 114 687 | 2 527 485 |
| 29 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 27 185 | - 700 497 | 4 888 844 | 2 735 858 | 2 152 986 | 62 197 | 1 039 576 | 8 376 532 | 4 687 612 | 3 688 920 | 106 567 | 2 634 053 |
| 30 | 2 136 800 | 1 195 780 | 257 667 | 941 020 | 24 057 | - 676 440 | 5 035 509 | 2 817 934 | 2 217 575 | 56 692 | 1 096 268 | 8 795 359 | 4 921 993 | 3 873 366 | 99 023 | 2 733 076 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NPV | | | | | | | NPV Hyp. 1 | | | | | NPV Hyp. 2 | | | |
| | | | | | | | | | 19th Year | 62 061 | | | | 15th Year | 122 796 | |
| | | | | | | | | | 20th Year | 205 260 | | | | 20th Year | 1 324 268 | |
| | | 30th Year | - 676 440 | | | | | | 30th Year | 1 096 268 | | | | 30th Year | 2 733 076 | |
| | IRR= | 12% | | | | | | IRR= | 15% | | | | IRR= | 17% | | |
| | Discount rate | 13,0% | | | | | | | | | | | | | | |
| | Total investment amount | | 7 730 000 | Euros | | | | | | | | | | | | |
| | Annual depreciation | | 257 667 | Euros | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 1 | | | 3% | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 2 | | | 5% | | | | | | | | | | | | |

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## NPV and IRR calculation for the 10 beaches rehabilitation considering only public incomes

| Year | Annual incomes | Annual charges | Annual depreciation | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Hypothesis 1 : with annual rate of increase 3% | | | | | Hypothesis 2 : with annual rate of increase 5% | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow |
| 0 | | | | - 6 040 000 | | -6 040 000 | | | -6 040 000 | | -6 040 000 | | | -6 040 000 | | -6 040 000 |
| 1 | 963 960 | 312 400 | 201 333 | 651 560 | 651 560 | - 5 388 440 | 963 960 | 312 400 | 651 560 | 576 602 | - 5 463 398 | 963 960 | 312 400 | 651 560 | 576 602 | - 5 463 398 |
| 2 | 963 960 | 312 400 | 201 333 | 651 560 | 576 602 | - 4 811 838 | 992 879 | 321 772 | 671 107 | 525 575 | - 4 937 823 | 1 012 158 | 328 030 | 684 128 | 535 780 | - 4 927 618 |
| 3 | 963 960 | 312 400 | 201 333 | 651 560 | 510 267 | - 4 301 571 | 1 022 665 | 331 425 | 691 240 | 479 064 | - 4 458 759 | 1 062 766 | 344 421 | 718 345 | 497 849 | - 4 429 769 |
| 4 | 963 960 | 312 400 | 201 333 | 651 560 | 451 564 | - 3 850 007 | 1 053 345 | 341 368 | 711 977 | 436 669 | - 4 022 090 | 1 115 904 | 361 642 | 754 262 | 462 603 | - 3 967 166 |
| 5 | 963 960 | 312 400 | 201 333 | 651 560 | 399 614 | - 3 450 393 | 1 084 945 | 351 609 | 733 337 | 398 026 | - 3 624 065 | 1 171 699 | 379 724 | 791 975 | 429 852 | - 3 537 313 |
| 6 | 963 960 | 312 400 | 201 333 | 651 560 | 353 641 | - 3 096 753 | 1 117 494 | 362 157 | 755 337 | 362 802 | - 3 261 262 | 1 230 284 | 398 710 | 831 574 | 399 420 | - 3 137 893 |
| 7 | 963 960 | 312 400 | 201 333 | 651 560 | 312 956 | - 2 783 796 | 1 151 019 | 373 022 | 777 997 | 330 696 | - 2 930 567 | 1 291 799 | 418 646 | 873 153 | 371 143 | - 2 766 750 |
| 8 | 963 960 | 312 400 | 201 333 | 651 560 | 276 953 | - 2 506 844 | 1 185 549 | 384 213 | 801 337 | 301 431 | - 2 629 136 | 1 356 389 | 439 578 | 916 810 | 344 867 | - 2 421 883 |
| 9 | 963 960 | 312 400 | 201 333 | 651 560 | 245 091 | - 2 261 753 | 1 221 116 | 395 739 | 825 377 | 274 755 | - 2 354 381 | 1 424 208 | 461 557 | 962 651 | 320 452 | - 2 101 431 |
| 10 | 963 960 | 312 400 | 201 333 | 651 560 | 216 894 | - 2 044 859 | 1 257 749 | 407 611 | 850 138 | 250 441 | - 2 103 940 | 1 495 418 | 484 635 | 1 010 783 | 297 765 | - 1 803 666 |
| 11 | 963 960 | 312 400 | 201 333 | 651 560 | 191 942 | - 1 852 917 | 1 295 482 | 419 839 | 875 642 | 228 278 | - 1 875 662 | 1 570 189 | 508 867 | 1 061 323 | 276 684 | - 1 526 982 |
| 12 | 963 960 | 312 400 | 201 333 | 651 560 | 169 860 | - 1 683 057 | 1 334 346 | 432 435 | 901 911 | 208 076 | - 1 667 586 | 1 648 699 | 534 310 | 1 114 389 | 257 096 | - 1 269 885 |
| 13 | 963 960 | 312 400 | 201 333 | 651 560 | 150 319 | - 1 532 738 | 1 374 376 | 445 408 | 928 969 | 189 662 | - 1 477 923 | 1 731 134 | 561 026 | 1 170 108 | 238 895 | - 1 030 991 |
| 14 | 963 960 | 312 400 | 201 333 | 651 560 | 133 025 | - 1 399 712 | 1 415 608 | 458 770 | 956 838 | 172 878 | - 1 305 045 | 1 817 690 | 589 077 | 1 228 614 | 221 982 | - 809 009 |
| 15 | 963 960 | 312 400 | 201 333 | 651 560 | 117 722 | - 1 281 991 | 1 458 076 | 472 533 | 985 543 | 157 579 | - 1 147 466 | 1 908 575 | 618 531 | 1 290 044 | 206 266 | - 602 743 |
| 16 | 963 960 | 312 400 | 201 333 | 651 560 | 104 178 | - 1 177 812 | 1 501 818 | 486 709 | 1 015 109 | 143 634 | - 1 003 832 | 2 004 004 | 649 457 | 1 354 546 | 191 663 | - 411 080 |
| 17 | 963 960 | 312 400 | 201 333 | 651 560 | 92 193 | - 1 085 619 | 1 546 873 | 501 310 | 1 045 563 | 130 923 | - 872 909 | 2 104 204 | 681 930 | 1 422 274 | 178 094 | - 232 986 |
| 18 | 963 960 | 312 400 | 201 333 | 651 560 | 81 587 | - 1 004 032 | 1 593 279 | 516 350 | 1 076 929 | 119 337 | - 753 571 | 2 209 414 | 716 027 | 1 493 387 | 165 486 | - 67 500 |
| 19 | 963 960 | 312 400 | 201 333 | 651 560 | 72 201 | - 931 831 | 1 641 077 | 531 840 | 1 109 237 | 108 776 | - 644 795 | 2 319 885 | 751 828 | 1 568 057 | 153 770 | 86 270 |
| 20 | 963 960 | 312 400 | 201 333 | 651 560 | 63 895 | - 867 937 | 1 690 310 | 547 795 | 1 142 514 | 99 150 | - 545 645 | 2 435 879 | 789 419 | 1 646 460 | 142 884 | 229 153 |
| 21 | 963 960 | 312 400 | 201 333 | 651 560 | 56 544 | - 811 393 | 1 741 019 | 564 229 | 1 176 790 | 90 376 | - 455 270 | 2 557 673 | 828 890 | 1 728 783 | 132 768 | 361 921 |
| 22 | 963 960 | 312 400 | 201 333 | 651 560 | 50 039 | - 761 354 | 1 793 250 | 581 156 | 1 212 094 | 82 378 | - 372 892 | 2 685 556 | 870 335 | 1 815 222 | 123 368 | 485 290 |
| 23 | 963 960 | 312 400 | 201 333 | 651 560 | 44 282 | - 717 072 | 1 847 047 | 598 591 | 1 248 456 | 75 088 | - 297 804 | 2 819 834 | 913 851 | 1 905 983 | 114 634 | 599 924 |
| 24 | 963 960 | 312 400 | 201 333 | 651 560 | 39 188 | - 677 884 | 1 902 458 | 616 548 | 1 285 910 | 68 443 | - 229 361 | 2 960 826 | 959 544 | 2 001 282 | 106 519 | 706 443 |
| 25 | 963 960 | 312 400 | 201 333 | 651 560 | 34 679 | - 643 205 | 1 959 532 | 635 045 | 1 324 487 | 62 386 | - 166 975 | 3 108 867 | 1 007 521 | 2 101 346 | 98 978 | 805 420 |
| 26 | 963 960 | 312 400 | 201 333 | 651 560 | 30 690 | - 612 515 | 2 018 318 | 654 096 | 1 364 222 | 56 865 | - 110 110 | 3 264 311 | 1 057 897 | 2 206 413 | 91 970 | 897 390 |
| 27 | 963 960 | 312 400 | 201 333 | 651 560 | 27 159 | - 585 356 | 2 078 868 | 673 719 | 1 405 149 | 51 833 | - 58 277 | 3 427 526 | 1 110 792 | 2 316 734 | 85 459 | 982 850 |
| 28 | 963 960 | 312 400 | 201 333 | 651 560 | 24 035 | - 561 321 | 2 141 234 | 693 931 | 1 447 303 | 47 246 | - 11 032 | 3 598 903 | 1 166 332 | 2 432 571 | 79 409 | 1 062 258 |
| 29 | 963 960 | 312 400 | 201 333 | 651 560 | 21 270 | - 540 052 | 2 205 471 | 714 749 | 1 490 722 | 43 065 | 32 033 | 3 778 848 | 1 224 648 | 2 554 199 | 73 787 | 1 136 045 |
| 30 | 963 960 | 312 400 | 201 333 | 651 560 | 18 823 | - 521 229 | 2 271 635 | 736 191 | 1 535 444 | 39 254 | 71 287 | 3 967 790 | 1 285 881 | 2 681 909 | 68 563 | 1 204 609 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NPV | | | | | | NPV Hyp. 1 | | | | | NPV Hyp. 2 | | | | |
| | | | | | | | | | | | | | 19th Year | 86 270 | | |
| | | | | | | | | 29th Year | 32 033 | | | | 20th Year | 229 153 | | |
| | | 30th Year | - 521 229 | | | | | 30th Year | 71 287 | | | | 30th Year | 1 204 609 | | |
| | IRR= | 10% | | | | | IRR= | 11% | | | | IRR= | 15% | | | |
| | Discount rate | 13,0% | | | | | | | | | | | | | | |
| | Total investment amount | | 6 040 000 | Euros | | | | | | | | | | | | |
| | Annual depreciation | | 201 333 | Euros | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 1 | | | 3% | | | | | | | | | | | | |
| | Annual rate of increase Hypothesis 2 | | | 5% | | | | | | | | | | | | |

https://donnees.banquemondiale.org/indicator/FR.INR.RINR?locations=ST

## l IRR calculation for the 10 beaches rehabilitation considering public incomes and 10% of private indirect incomes

| | | | | | | Hypothysis 1 : with annual rate of increase 3% | | | | | Hypothysis 2 : with annual rate of increase 5% | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Annual charges | Annual depreciation | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow | Discounted Annual Income | Discounted Annual Charges | Net cash flow | Discount net cash-flow | Cumulative discount net cash-flow |
| | | | - 6 040 000 | | -6 040 000 | | | -6 040 000 | | -6 040 000 | | | -6 040 000 | | -6 040 000 |
| 0 | 312 400 | 201 333 | 901 960 | 901 960 | - 5 138 040 | 1 214 360 | 312 400 | 901 960 | 798 195 | - 5 241 805 | 1 214 360 | 312 400 | 901 960 | 798 195 | - 5 241 805 |
| 0 | 312 400 | 201 333 | 901 960 | 798 195 | - 4 339 845 | 1 250 791 | 321 772 | 929 019 | 727 558 | - 4 514 247 | 1 275 078 | 328 020 | 947 058 | 741 685 | - 4 500 120 |
| 0 | 312 400 | 201 333 | 901 960 | 706 367 | - 3 633 478 | 1 288 315 | 331 425 | 956 889 | 663 172 | - 3 851 075 | 1 338 832 | 344 421 | 994 411 | 689 177 | - 3 810 943 |
| 0 | 312 400 | 201 333 | 901 960 | 625 104 | - 3 008 375 | 1 326 964 | 341 368 | 985 596 | 604 485 | - 3 246 590 | 1 405 773 | 361 642 | 1 044 131 | 640 385 | - 3 170 558 |
| 0 | 312 400 | 201 333 | 901 960 | 553 189 | - 2 455 186 | 1 366 773 | 351 609 | 1 015 164 | 550 990 | - 2 695 600 | 1 476 062 | 379 724 | 1 096 338 | 595 048 | - 2 575 510 |
| 0 | 312 400 | 201 333 | 901 960 | 489 548 | - 1 965 638 | 1 407 776 | 362 157 | 1 045 619 | 502 230 | - 2 193 370 | 1 549 865 | 398 710 | 1 151 155 | 552 921 | - 2 022 589 |
| 0 | 312 400 | 201 333 | 901 960 | 433 228 | - 1 532 410 | 1 450 009 | 373 022 | 1 076 987 | 457 785 | - 1 735 585 | 1 627 359 | 418 646 | 1 208 713 | 513 776 | - 1 508 812 |
| 0 | 312 400 | 201 333 | 901 960 | 383 388 | - 1 149 022 | 1 493 510 | 384 213 | 1 109 297 | 417 273 | - 1 318 312 | 1 708 726 | 439 578 | 1 269 148 | 477 403 | - 1 031 410 |
| 0 | 312 400 | 201 333 | 901 960 | 339 281 | - 809 741 | 1 538 315 | 395 739 | 1 142 576 | 380 346 | - 937 966 | 1 794 163 | 461 557 | 1 332 606 | 443 604 | - 587 806 |
| 0 | 312 400 | 201 333 | 901 960 | 300 249 | - 509 492 | 1 584 464 | 407 611 | 1 176 853 | 346 687 | - 591 279 | 1 883 871 | 484 635 | 1 399 236 | 412 199 | - 175 607 |
| 0 | 312 400 | 201 333 | 901 960 | 265 707 | - 243 785 | 1 631 998 | 419 839 | 1 212 159 | 316 007 | - 275 272 | 1 978 064 | 508 867 | 1 469 198 | 383 016 | 207 410 |
| 0 | 312 400 | 201 333 | 901 960 | 235 139 | - 8 647 | 1 680 958 | 432 435 | 1 248 524 | 288 042 | 12 770 | 2 076 968 | 534 310 | 1 542 658 | 355 900 | 563 310 |
| 0 | 312 400 | 201 333 | 901 960 | 208 087 | 199 441 | 1 731 387 | 445 408 | 1 285 979 | 262 551 | 275 321 | 2 180 816 | 561 026 | 1 619 791 | 330 704 | 894 013 |
| 0 | 312 400 | 201 333 | 901 960 | 184 148 | 383 589 | 1 783 329 | 458 770 | 1 324 559 | 239 317 | 514 638 | 2 289 857 | 589 077 | 1 700 780 | 307 291 | 1 201 305 |
| 0 | 312 400 | 201 333 | 901 960 | 162 963 | 546 552 | 1 836 828 | 472 533 | 1 364 295 | 218 138 | 732 776 | 2 404 350 | 618 531 | 1 785 819 | 285 536 | 1 486 841 |
| 0 | 312 400 | 201 333 | 901 960 | 144 215 | 690 767 | 1 891 933 | 486 709 | 1 405 224 | 198 834 | 931 610 | 2 524 567 | 649 457 | 1 875 110 | 265 321 | 1 752 162 |
| 0 | 312 400 | 201 333 | 901 960 | 127 624 | 818 391 | 1 948 691 | 501 310 | 1 447 381 | 181 238 | 1 112 848 | 2 650 796 | 681 930 | 1 968 866 | 246 537 | 1 998 699 |
| 0 | 312 400 | 201 333 | 901 960 | 112 942 | 931 333 | 2 007 152 | 516 350 | 1 490 802 | 165 199 | 1 278 048 | 2 783 335 | 716 027 | 2 067 309 | 229 083 | 2 227 782 |
| 0 | 312 400 | 201 333 | 901 960 | 99 948 | 1 031 281 | 2 067 367 | 531 840 | 1 535 527 | 150 580 | 1 428 627 | 2 922 502 | 751 828 | 2 170 674 | 212 865 | 2 440 647 |
| 0 | 312 400 | 201 333 | 901 960 | 88 450 | 1 119 731 | 2 129 388 | 547 795 | 1 581 592 | 137 254 | 1 565 882 | 3 068 627 | 789 419 | 2 279 208 | 197 795 | 2 638 442 |
| 0 | 312 400 | 201 333 | 901 960 | 78 274 | 1 198 005 | 2 193 269 | 564 229 | 1 629 040 | 125 108 | 1 690 989 | 3 222 059 | 828 890 | 2 393 168 | 183 792 | 2 822 234 |
| 0 | 312 400 | 201 333 | 901 960 | 69 269 | 1 267 274 | 2 259 067 | 581 156 | 1 677 911 | 114 036 | 1 805 026 | 3 383 162 | 870 335 | 2 512 827 | 170 780 | 2 993 014 |
| 0 | 312 400 | 201 333 | 901 960 | 61 300 | 1 328 574 | 2 326 839 | 598 591 | 1 728 249 | 103 945 | 1 908 970 | 3 552 320 | 913 851 | 2 638 468 | 158 689 | 3 151 703 |
| 0 | 312 400 | 201 333 | 901 960 | 54 248 | 1 382 822 | 2 396 645 | 616 548 | 1 780 096 | 94 746 | 2 003 716 | 3 729 936 | 959 544 | 2 770 392 | 147 455 | 3 299 158 |
| 0 | 312 400 | 201 333 | 901 960 | 48 007 | 1 430 829 | 2 468 544 | 635 045 | 1 833 499 | 86 361 | 2 090 078 | 3 916 432 | 1 007 521 | 2 908 911 | 137 015 | 3 436 173 |
| 0 | 312 400 | 201 333 | 901 960 | 42 484 | 1 473 313 | 2 542 600 | 654 096 | 1 888 504 | 78 719 | 2 168 797 | 4 112 254 | 1 057 897 | 3 054 357 | 127 315 | 3 563 488 |
| 0 | 312 400 | 201 333 | 901 960 | 37 597 | 1 510 910 | 2 618 878 | 673 719 | 1 945 159 | 71 753 | 2 240 549 | 4 317 867 | 1 110 792 | 3 207 075 | 118 302 | 3 681 790 |
| 0 | 312 400 | 201 333 | 901 960 | 33 271 | 1 544 181 | 2 697 445 | 693 931 | 2 003 514 | 65 403 | 2 305 952 | 4 533 760 | 1 166 332 | 3 367 428 | 109 926 | 3 791 716 |
| 0 | 312 400 | 201 333 | 901 960 | 29 444 | 1 573 625 | 2 778 368 | 714 749 | 2 063 619 | 59 615 | 2 365 567 | 4 760 448 | 1 224 648 | 3 535 800 | 102 144 | 3 893 860 |
| 0 | 312 400 | 201 333 | 901 960 | 26 056 | 1 599 681 | 2 861 719 | 736 191 | 2 125 528 | 54 339 | 2 419 906 | 4 998 470 | 1 285 881 | 3 712 590 | 94 913 | 3 988 773 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | NPV Hyp. 1 | | | | | NPV Hyp. 2 | | | | |
| | 13th Year | 199 441 | | | | | 12th Year | 12 770 | | | | 11th Year | 207 410 | | |
| | 20th Year | 1 119 731 | | | | | 20th Year | 1 565 882 | | | | 20th Year | 2 638 442 | | |
| | 30th Year | 1 599 681 | | | | | 30th Year | 2 419 906 | | | | 30th Year | 3 988 773 | | |
| R= | 15% | | | | | IRR= | 17,66% | | | | IRR= | 19,64% | | | |
| e | 13,0% | | | | | | | | | | | | | | |
| ent amount | 6 040 000 | Euros | | | | | | | | | | | | | |
| ciation | 201 333 | Euros | | | | | | | | | | | | | |
| of increase Hypothesis 1 | 3% | | | | | | | | | | | | | | |
| of increase Hypothesis 2 | 5% | | | | | | | | | | | | | | |
| Public income + 10% indirect private incomes (963 960 + 250 400 = 1 214 360) | | | | | | | | | | | | | | | |
| www.banquemondiale.org/indicator/ER.LND.BIND?locations=ST | | | | | | | | | | | | | | | |

**Annex 3**

## Type of boat considered in the MPCAFF

**Kaiê Canibôtô** is a small fiberglass boat that replaces traditional rowing canoes and can be used without small portable outboard motors up to 8 CV (8HP). Easy to paddle, it can sail.

**Features:**

- Length - 5000mm
- Width - 1000mm
- Minimum depth - 400 mm
- Minimum thickness - 3 mm
- Buoyancy: 3 (three) minimum air chambers filled with polyurethane.
- Resistance: three reinforced zones and four safety beams minimum.

Monohull and single keel boat

**Kaiê A-Z** (*bote prao*)

**Features:**

- Length - 6000mm
- Width - 1100mm
- Minimum depth - 500 mm
- Minimum thickness - 4 mm
- Buoyancy: 3 (three) air chambers minimum which can be filled with polyurethane.
- Resistance: three reinforced zones and four safety beams minimum. Monohull and single keel boat.

Balance 310mm x 30mm x 57mm, minimum thickness of

4mm, two reinforced areas and three non-watertight compartments.

## Annex 4

### Simulation of possible bonuses and reimbursement levels depending on the number of fleet exits and the number of new owners for the acquisition of a boat according to the type chosen.

For the acquisition of a type boat Tamanho 6,6x1,3 (Unit Cost 3704 Euros)

**Without Community project Bonus and without Subsidy for contribution to FRMP**

| Number of associated investors (fishermen) | Units removed from the PAC Fleet | Without boat removed | With 1 boat removed | With 2 boats removed |
|---|---|---|---|---|
| 1 | Investment costs / person | | 3704,00 | |
| | Total bonuses and subsidies | 700 | 850,00 | - |
| | Balance to be paid per credit / person | 3004,00 | 2854,00 | - |
| | **Reimbursement / month / person** | **50,07** | **47,57** | - |
| 2 | Investment costs / person | | 1852,00 | |
| | Total bonuses and subsidies | 700 | 850,00 | 1000,00 |
| | Balance to be paid per credit / person | 1502 | 1427,00 | 1352,00 |
| | **Reimbursement / month / person** | **25,03** | **23,78** | **22,53** |

**With Community project Bonus and without Subsidy for contribution to FRMP**

| Number of associated investors (fishermen) | Units removed from the PAC Fleet | Without boat removed | With 1 boat removed | With 2 boats removed |
|---|---|---|---|---|
| 1 | Investment costs / person | | 3704,00 | |
| | Total bonuses and subsidies | 1050 | 1200,00 | - |
| | Balance to be paid per credit / person | 2654,00 | 2504,00 | - |
| | **Reimbursement / month / person** | **44,23** | **41,73** | - |
| 2 | Investment costs / person | | 1852,00 | |
| | Total bonuses and subsidies | 1050 | 1200,00 | 1350,00 |
| | Balance to be paid per credit / person | 1327 | 1252,00 | 1177,00 |
| | **Reimbursement / month / person** | **22,12** | **20,87** | **19,62** |

**With Community project Bonus and with Subsidy for contribution to FRMP**

| Number of associated investors (fishermen) | Units removed from the PAC Fleet | Without boat removed | With 1 boat removed | With 2 boats removed |
|---|---|---|---|---|
| 1 | Investment costs / person | | 3704,00 | |
| | Total bonuses and subsidies | 1400 | 1550,00 | - |
| | Balance to be paid per credit / person | 2304,00 | 2154,00 | - |
| | **Reimbursement / month / person** | **38,40** | **35,90** | - |
| 2 | Investment costs / person | | 1852,00 | |
| | Total bonuses and subsidies | 1400 | 1550,00 | 1700,00 |
| | Balance to be paid per credit / person | 1152 | 1077,00 | 1002,00 |
| | **Reimbursement / month / person** | **19,20** | **17,95** | **16,70** |

For the acquisition of a type boat Type 7,1 x 1,8 (Unit Cost 7144 Euros)

**Without Community project Bonus and without Subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 3572,00 | |
| | Total bonuses and subsidies | 1600,00 | 1900,00 | - |
| | Balance to be paid per credit / person | 2772,00 | 2622,00 | - |
| | **Reimbursement / month / person** | **46,20** | **43,70** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 1600,00 | 1900,00 | 2200,00 |
| | Balance to be paid per credit / person | 1848,00 | 1748,00 | 1648,00 |
| | **Reimbursement / month / person** | **30,80** | **29,13** | **27,47** |
| 4 | Investment costs / person | | 1786,00 | |
| | Total bonuses and subsidies | 1600,00 | 1900,00 | 2200,00 |
| | Balance to be paid per credit / person | 1386,00 | 1311,00 | 1236,00 |
| | **Reimbursement / month / person** | **23,10** | **21,85** | **20,60** |
| 5 | Investment costs / person | | 1428,80 | |
| | Total bonuses and subsidies | 1600,00 | 1900,00 | 2200,00 |
| | Balance to be paid per credit / person | 1108,80 | 1048,80 | 988,80 |
| | **Reimbursement / month / person** | **18,48** | **17,48** | **16,48** |

**With Community project Bonus and without Subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 3572,00 | |
| | Total bonuses and subsidies | 2300,00 | 2600,00 | - |
| | Balance to be paid per credit / person | 2422,00 | 2272,00 | - |
| | **Reimbursement / month / person** | **40,37** | **37,87** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 2300,00 | 2600,00 | 2900,00 |
| | Balance to be paid per credit / person | 1614,67 | 1514,67 | 1414,67 |
| | **Reimbursement / month / person** | **26,91** | **25,24** | **23,58** |
| 4 | Investment costs / person | | 1786,00 | |
| | Total bonuses and subsidies | 2300,00 | 2600,00 | 2900,00 |
| | Balance to be paid per credit / person | 1211,00 | 1136,00 | 1061,00 |
| | **Reimbursement / month / person** | **20,18** | **18,93** | **17,68** |
| 5 | Investment costs / person | | 1428,80 | |
| | Total bonuses and subsidies | 2300,00 | 2600,00 | 2900,00 |
| | Balance to be paid per credit / person | 968,80 | 908,80 | 848,80 |
| | **Reimbursement / month / person** | **16,15** | **15,15** | **14,15** |

**With Community project Bonus and subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 3572,00 | |
| | Total bonuses and subsidies | 2650,00 | 2950,00 | - |
| | Balance to be paid per credit / person | 2247,00 | 2097,00 | - |
| | **Reimbursement / month / person** | **37,45** | **34,95** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 2650,00 | 2950,00 | 3250,00 |
| | Balance to be paid per credit / person | 1498,00 | 1398,00 | 1298,00 |
| | **Reimbursement / month / person** | **24,97** | **23,30** | **21,63** |
| 4 | Investment costs / person | | 1786,00 | |
| | Total bonuses and subsidies | 2650,00 | 2950,00 | 3250,00 |
| | Balance to be paid per credit / person | 1123,50 | 1048,50 | 973,50 |
| | **Reimbursement / month / person** | **18,73** | **17,48** | **16,23** |
| 5 | Investment costs / person | | 1428,80 | |
| | Total bonuses and subsidies | 2650,00 | 2950,00 | 3250,00 |
| | Balance to be paid per credit / person | 898,80 | 838,80 | 778,80 |
| | **Reimbursement / month / person** | **14,98** | **13,98** | **12,98** |

For the acquisition of a type boat Type 7,4 x 2,1 (Unit Cost 9525 Euros)

**Without Community project Bonus and without Subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 4762,50 | |
| | Total bonuses and subsidies | 1900,00 | 2200,00 | - |
| | Balance to be paid per credit / person | 3812,50 | 3662,50 | - |
| | **Reimbursement / month / person** | **63,54** | **61,04** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 1900,00 | 2200,00 | 2500,00 |
| | Balance to be paid per credit / person | 1748,00 | 1648,00 | 1548,00 |
| | **Reimbursement / month / person** | **29,13** | **27,47** | **25,80** |
| 4 | Investment costs / person | | 2381,25 | |
| | Total bonuses and subsidies | 1900,00 | 2200,00 | 2500,00 |
| | Balance to be paid per credit / person | 1906,25 | 1831,25 | 1756,25 |
| | **Reimbursement / month / person** | **31,77** | **30,52** | **29,27** |
| 5 | Investment costs / person | | 1905,00 | |
| | Total bonuses and subsidies | 1900,00 | 2200,00 | 2500,00 |
| | Balance to be paid per credit / person | 1525,00 | 1465,00 | 1405,00 |
| | **Reimbursement / month / person** | **25,42** | **24,42** | **23,42** |

**With Community project Bonus and without Subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 4762,50 | |
| | Total bonuses and subsidies | 2600,00 | 2900,00 | - |
| | Balance to be paid per credit / person | 3462,50 | 3312,50 | - |
| | **Reimbursement / month / person** | **57,71** | **55,21** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 2600,00 | 2900,00 | 3200,00 |
| | Balance to be paid per credit / person | 1514,67 | 1414,67 | 1314,67 |
| | **Reimbursement / month / person** | **25,24** | **23,58** | **21,91** |
| 4 | Investment costs / person | | 2381,25 | |
| | Total bonuses and subsidies | 2600,00 | 2900,00 | 3200,00 |
| | Balance to be paid per credit / person | 1731,25 | 1656,25 | 1581,25 |
| | **Reimbursement / month / person** | **28,85** | **27,60** | **26,35** |
| 5 | Investment costs / person | | 1905,00 | |
| | Total bonuses and subsidies | 2600,00 | 2900,00 | 3200,00 |
| | Balance to be paid per credit / person | 1385,00 | 1325,00 | 1265,00 |
| | **Reimbursement / month / person** | **23,08** | **22,08** | **21,08** |

**With Community project Bonus and subsidy for contribution to FRMP**

| Nbr. of associated investors | Units removed from the PAC Fleet | 1 boat removed | 2 boats removed | 3 boats removed |
|---|---|---|---|---|
| 2 | Investment costs / person | | 4762,50 | |
| | Total bonuses and subsidies | 2950,00 | 3250,00 | - |
| | Balance to be paid per credit / person | 3287,50 | 3137,50 | - |
| | **Reimbursement / month / person** | **54,79** | **52,29** | - |
| 3 | Investment costs / person | | 2381,33 | |
| | Total bonuses and subsidies | 2950,00 | 3250,00 | 3550,00 |
| | Balance to be paid per credit / person | 1398,00 | 1298,00 | 1198,00 |
| | **Reimbursement / month / person** | **23,30** | **21,63** | **19,97** |
| 4 | Investment costs / person | | 2381,25 | |
| | Total bonuses and subsidies | 2950,00 | 3250,00 | 3550,00 |
| | Balance to be paid per credit / person | 1643,75 | 1568,75 | 1493,75 |
| | **Reimbursement / month / person** | **27,40** | **26,15** | **24,90** |
| 5 | Investment costs / person | | 1905,00 | |
| | Total bonuses and subsidies | 2950,00 | 3250,00 | 3550,00 |
| | Balance to be paid per credit / person | 1315,00 | 1255,00 | 1195,00 |
| | **Reimbursement / month / person** | **21,92** | **20,92** | **19,92** |

Source: Calculation FAO TCPSTP3808 – 2022


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