

7.1 INTRODUCTION

This Chapter provides a brief overview of the socio-economic baseline in the Project Area. The information presented is from secondary data sources including EIRs undertaken for other projects in the district (refer to *Section 6.1*), and other relevant reports and studies, mostly conducted for Sasol. As such, data are only provided at the level of Inhambane Province and Inhassoro District. Several detailed studies were completed by ERM and Impacto between 2006 and 2008 as a part of an EIA and additional studies for seismic and drilling exploration in the offshore Blocks 16 and 19, including data on tourism, dugongs, sea grass, coral reefs and fishing. This will provide valuable data for comparison with new data that will be collected for this EIA on the *Sasol Pipeline and FSO Project*.

Specialist studies will be undertaken to provide a detailed socio-economic baseline of the Area of Direct Influence supported by secondary data for the Area of Indirect Influence. It should also be noted that the outcomes of the Scoping Report Disclosure Meetings will also influence the final definition of the Direct and Indirect Areas of Influence.

7.2 ADMINISTRATIVE DIVISION AND SETTLEMENTS

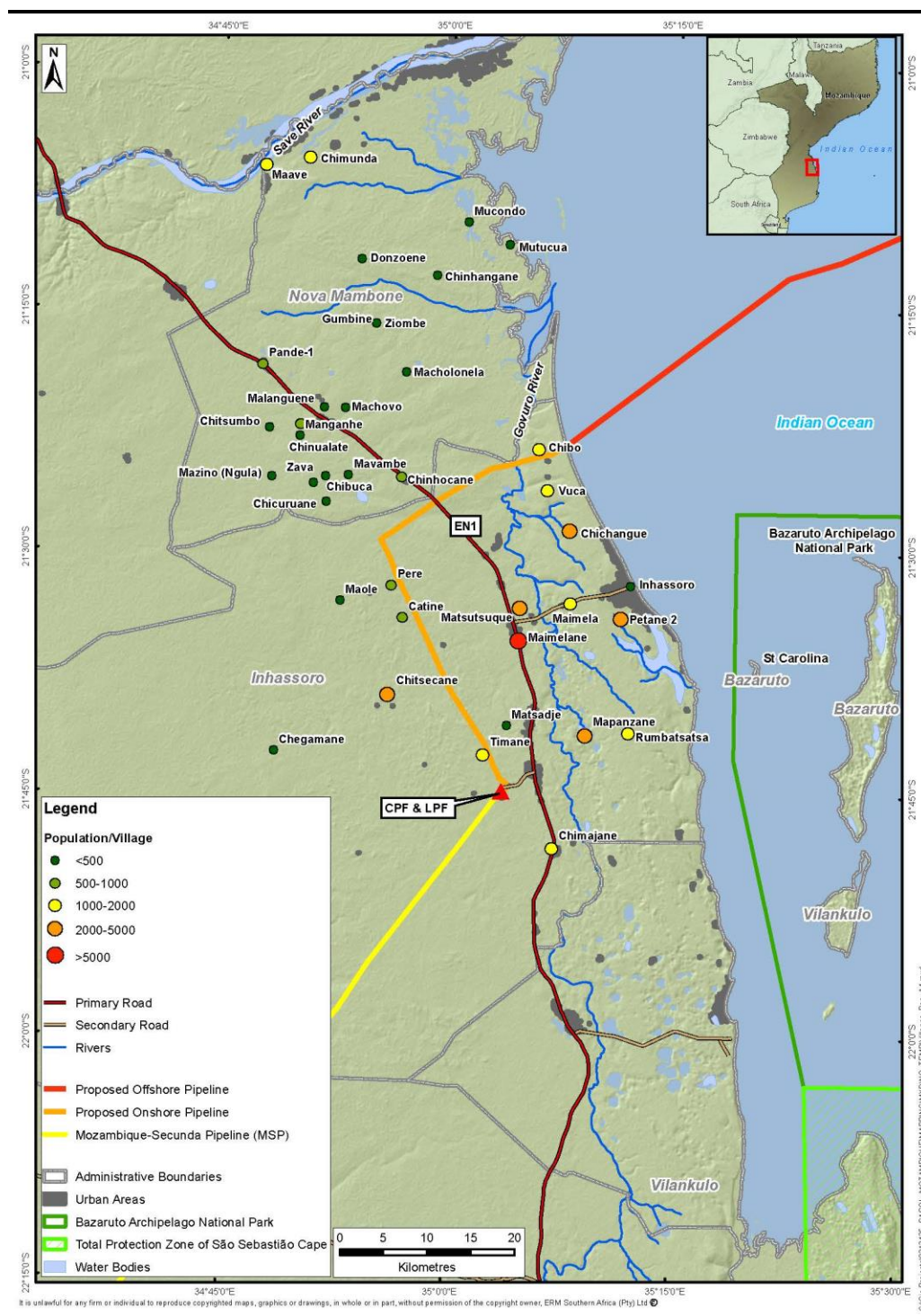
The Project is located in the southern region of Mozambique in Inhambane Province, the capital of which is the town of Inhambane. The onshore pipeline will pass through Inhassoro District and Inhassoro and Bazaruto Administrative Posts as shown in *Table 7.1*.

Table 7.1 *Administrative Divisions of the Inhassoro District*

Province	District	Administrative Post	Locality
Inhambane	Inhassoro	Inhassoro	Cometela Inhassoro Maimelane Nhapele
		Bazaruto	Bazaruto

The nearest settlements to the onshore pipeline are Temane, Masadge, Catine, Pere, Chinhocane and Chibo, as illustrated in *Figure 7.1* below. A detailed inventory of settlements within the Project Area will be undertaken as part of the socio-economic specialist study for the EIA Phase.

Figure 7.1 Distribution of Villages Surrounding the Onshore Pipeline



7.3 DEMOGRAPHICS - POPULATION AND POPULATION DENSITY

7.3.1 Inhambane Province

In 2011, Inhambane Province had a total estimated population of 1 402 245 inhabitants, representing approximately 6.1 percent of the total population of Mozambique. Projections developed by INE (2010) indicate that Inhambane Province will have 1 523 635 inhabitants by 2016.

The population distribution in the Inhambane Province is determined by the relatively poor agro-ecological conditions inland and the fishing and tourism opportunities along the coast. The southern districts and those in the interior of Inhambane Province have a predominantly dry climate and poor soils, which are not favourable for agriculture; as such, these districts have low population densities. There are higher population densities along the coast, especially in the southern part of the Province due to intensive coconut production. Availability of water supply and access to roads are also determinants of settlement distribution. Recent drought has also resulted in the relocation of some inland villages. Although the majority of households in the Project Area are grouped in villages, some isolated households can be found along the roads.

7.3.2 *Inhassoro District*

The population of Inhassoro District accounts for approximately 3.8 percent of the Province's total population and is predominantly rural (76.6 percent). According to the national census of 2007, the District had 48 190 inhabitants, with a population density of 10.2 people/km² which is significantly below the population density for the Province (18.5 people/km²) as well as other coastal districts in Inhambane Province (77.7 people/km²). More than 90 percent of the population in Inhassoro District is concentrated in the district headquarters. Projections developed by INE (2010) indicate that by 2016 Inhassoro District will have 62 132 inhabitants, indicating a population growth of less than one percent since 2007.

Table 7.2 *Population per Administrative Post for Inhassoro District*

Area	Total Population	Percent	Surface Area (km ²)	Population Density (people/km ²)
Inhassoro Administrative Post	45 597	94.6	4 645.4	9.8
Bazaruto Administrative Post	2 593	5.4	100.3	25.9
Inhassoro District	48 190	100	4 746	10.2

Source: INE, results of the 2007 Census

The average household size in Inhassoro District is six people; however, some households consist of up to 10 family members. Households may comprise extended families (two to three generations) and core household members (father, mother and children) (Golder, 2014b). Many household heads work as migrant labourers outside of the Project Area.

In Inhassoro District, the majority of the population (70.2 percent) is engaged in the agriculture, forestry and fisheries sectors. Approximately 12.5 percent of the population is engaged in the trading and finance sectors, mainly related to informal trading (fish products and other essential food supplies). *Table 7.3* below shows the distribution of the population per economic sector for the District.

Table 7.3 *Population per Economic Sector in Inhassoro District, 2010*

Economic Sector	Population Per Sector	
	Number	Percentage
Agriculture/Fisheries/Forestry	11.234	70.2
Mining	275	1.7
Manufacturing industry	517	3.2
Energy	26	0.2
Construction	706	4.4
Transports and Communications	172	1.1
Commerce and Finance	2.007	12.5
Administrative Services	148	0.9
Other Services	889	5.6
Unknown	34	0.2
Total	16.008	100

Source: INE, 2010

7.4.1

Fishing

The Fisheries Law No. 3/90 of 26 September 1990, which establishes the basic Fisheries legislation to be applied in Mozambique, classifies fishing activities according to the purpose of the fishing activity. In 2009, the Ministry of Fisheries identified six subsectors with important roles in the development of fisheries in Mozambique in a 'Master Plan for the Fisheries Sector for the period 2010-2019':

1. Small-Scale Fishing (also known as artisanal fishing);
2. Semi-Industrial Fishing;
3. Industrial Fishing;
4. Industrial Aquaculture;
5. Small scale Aquaculture; and
6. Processing.

Fishing is the dominant economic activity in the coastal areas of Inhassoro District. Small-scale (artisanal) fishing is the predominant type of fishing practiced in the Govuro River estuary and near-shore area of Inhassoro District (*Figure 7.2*), while industrial and semi industrial line fishery is practised east of the Bazaruto Archipelago (*Figure 7.2* and *Figure 7.3*).

Figure 7.2 A Typical Household and Fishing Net



Source: (Impacto, 2015)

The Mozambican Fisheries Regulation ((*Decree 43/2003*) determines zones for the different fishing sectors operating in Mozambique. According to this zoning, industrial vessels may operate from 5.5 km offshore, semi-industrial vessels from 1.8 km, while artisanal fishers can operate up to 5.5 km offshore.

Furthermore, an exclusive zone for the semi-industrial shrimp trawlers was created by a ministerial dispatch in 2003. This zone is located from Savane (19°47'S in Dondo District of Sofala Province) to the Save River mouth (21°00'S) and extends offshore to a set limit which is represented by the 35°11'E line of longitude.

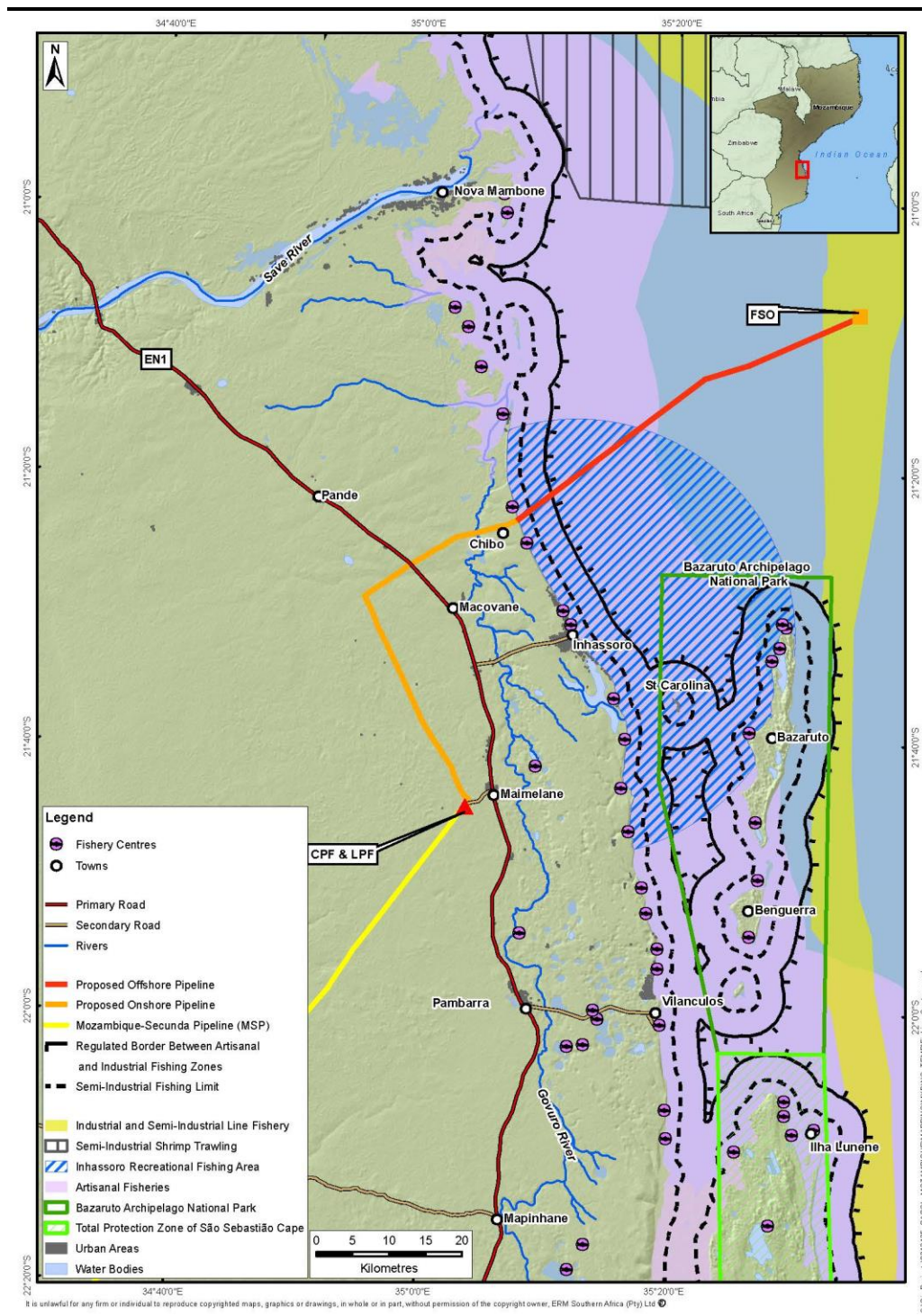
From 1987, the European Union (EU) and Mozambique have signed various Fisheries Partnership Agreements. The fisheries agreement allows EU vessels (mainly from France, Spain, Portugal, Italy and UK) to fish in Mozambican waters and is part of the tuna network fisheries agreements in the Indian Ocean. Mozambique and the European Union signed a three - year extension to the current fisheries partnership agreement, which came into force in January 2012 (and has since expired and not yet been renewed). Under that agreement 75 European boats were allowed to fish off the coast of Mozambique beyond the 12 nautical mile limit (approximately 21.6 km) in exchange for funding to support the Mozambican sectoral fisheries policy to promote sustainability in its waters ⁽¹⁾ .

The Project Area falls outside of the Sofala Bank, which is considered to be the most important fishing ground in Mozambique. Sofala Bank is the shelf region that extends for over 900 km of coastline from Angoche District in Nampula Province (16° 20'S) to the Save River mouth (21°00'S).

Figure 7.3 shows the main fishing grounds of the different types of fishery activities, as well as the location of the fishing centres along the coast and Bazaruto Island, based on data sourced from the Small-Scale Fisheries Development Institute (IDPPE) (2009), IIP, and the Department of Aquatic Environment (2011). As part of this EIA, a fishery study will identify and confirm the location of sensitive receptors during baseline data collection.

(1) http://ec.europa.eu/fisheries/cfp/international/agreements/mozambique/index_en.htm

Figure 7.3 Different Types of Fishing Activities in the Project Area and Fishing Centres



Small-Scale (Artisanal) Fishing

Small-scale (artisanal) fishing in Mozambique is defined as fishing practised on small boats of no more than 10 m in size, with simple means of propulsion and with less than 24 hours at a time (per trip) spent at sea. This definition also includes fishing without the aid of boats. The artisanal fishermen in Mozambique use diverse gear including seine nets, gill nets, traps and hook and line. They are grouped in villages, called fishing centres, some of which are temporary and can only be accessed with difficulty.

Catches are used for both subsistence and for cash income. Small-scale fishing and associated processing and sales at markets contribute significantly to the food security of communities along the coast. As can be seen in *Figure 7.3* the onshore section of the offshore pipeline (including the 500 m safety zone) overlaps with the regulated artisanal fishing zone.

A fishing census undertaken by the IDPPE in 2007 provided numbers of fishermen, fish processors and vessels present in the Districts of Inhambane Province (*Table 7.4*). It indicates that Inhassoro District had fewer permanent fishers and vessels than Vilanculos District but more non-permanent fishers and twice as many fish processors (Impacto and ERM, 2010). Besides artisanal fishers, the fishing industry also supports men and women involved in fish processing and resale (*Table 7.4*). Fish processing involves drying, salt drying, smoking, freezing, and resale of fresh fish within Inhambane Province but also further afield including Maputo. The socioeconomic baseline study as part of the EIA will provide more detail on fish processing and resale.

Table 7.4 *Number of Fishermen, Fish Processors and Vessels by District in the Inhambane Province in 2007*

Province	District	Permanent Fishers	Non-permanent Fishers	Fish Processors	Vessels
Inhambane	Inhambane Bay	278	71	5	202
	Vilanculos	1 988	1 032	59	540
	Inhassoro	1 400	1 158	128	305
	Govuro	996	273	102	321

Source: IDPPE 2007

In Inhassoro District, the main fishing gear generally used includes line, seine net, harpoon, trap and gill nets. However, a census conducted by IDPPE in 2009 indicated that the active fishing gear used in Inhassoro District is beach seine and hand-line (*Table 7.5*). Gill nets are used in neighbouring districts of Vilanculos and Govuro (Impacto and ERM, 2010). Divers (generally for lobster) also represent a significant proportion of the people involved in small-scale fishing. The socioeconomic baseline study as part of the EIA will provide more recent data on fishing gear used in the Project Area.

Table 7.5 Active Fishing Gear Counted in Each District in the Inhambane Province in 2009

Province	District	Beach Seine	Hand-line	Otter trawl	Chicocota (Mosquito Net Traps)	Gill net	Long-line	Spear
Inhambane	Inhambane Bay	14 159	26 711	0	0	14 642	0	0
	Tofo	0	8 340	0	0	471	0	0
	Vilankulos	36 625	10 731	0	0	3,081	0	0
	Inhassoro	15 803	7 691	0	0	0	0	0
	Bazaruto	3 443	98	0	0	0	0	0
	Govuro	3 743	0	0	0	13 023	0	0

Source: IIP 2009

Hook and Line Fishing

Line fishing takes place in the open sea, estuaries and rivers using an “*almadia*⁽¹⁾”. The lines used are either of the monofilament type or hand-made from plant fibres, eg raffia, and are between 80 and 100 m in length. One or more variable sized hooks are attached to each line. Hook and line artisanal fishing activities are expected to occur within the overlapping section of the offshore pipeline route but there is no overlap with the FSO location (Figure 7.3).

Seine Nets

Nearshore beach seine nets are used at several locations along the coast, within a range of 3 km from the shore, namely:

- Along the west coast of Bazaruto Island;
- The coast of Vilanculos and Inhassoro Districts;
- On some shallow banks inside Bazaruto Bay; and
- Inside the Govuro River estuary.

Nearshore beach seine net fishing is practised at low spring tides, near the channels and usually in areas where there is extensive seagrass cover. Beach seine fishing is undertaken using small boats and nets made from conventional material such as multifilament twine and netting. The nets are relatively small, ranging from 100 m to 150 m long, with mesh size under 2.5 cm and with the rope warps up to a maximum of 150 m. These nets are set from non-motorised canoes. To pull in the nets groups of around seven to 10 people are required.

The artisanal pelagic seine fishery in the Bazaruto Bay catches schools of scad (*Decapterus russellii*) and mackerel (*Rastrelliger kanagurta*) that enter the calm neap tide waters.

(1) Type of canoe

Gill Nets and Hand Line

Gill netting usually occurs in shallow waters and estuaries. The netting is made of monofilament and has stretch mesh of 5 to 7.5 cm. In most cases, the nets are 50 and 200 m in length and are usually set from a small canoe by two fishers.

The method of gill net fishing that is practiced inshore in the Govuro estuary and along the coast of Machanga District catches small species such as glassnose (*Thryssa vitrirostris*), kelee shad (*Hilsa kelee*), flathead mullet (*Mugil cephalus*) and Indian pellona (*Pellona ditchela*).

The artisanal hand line fishery operates within 10 km from shore, mainly in the following areas:

- The east coast of Benguerua and Magaruque Islands, which have been demarcated by the National Park as a multiple use area;
- The shallow rocky reefs in the northern area of Bazaruto Bay, east of Inhassoro and north of Santa Carolina Island; and
- The deep rocky reefs located northeast of the Inhassoro/ Govuro Coast and south of Machanga District.

Fishing mainly takes place from the early morning to lunchtime except on Sundays, public holidays, days of mourning or in bad weather. *Figure 7.4* below shows two images of artisanal fishing activities, including drying fish on the beach, while *Figure 7.5* shows a fishing market/camp and typical fisherman in the lower Govuro estuary.

Figure 7.4 *Fishing Activities in the Inhassoro Coastline*



Source: Impacto, 2004

Figure 7.5 *Fish Market / Camp and Fisherman on Lower Govuro River, near Estuary*



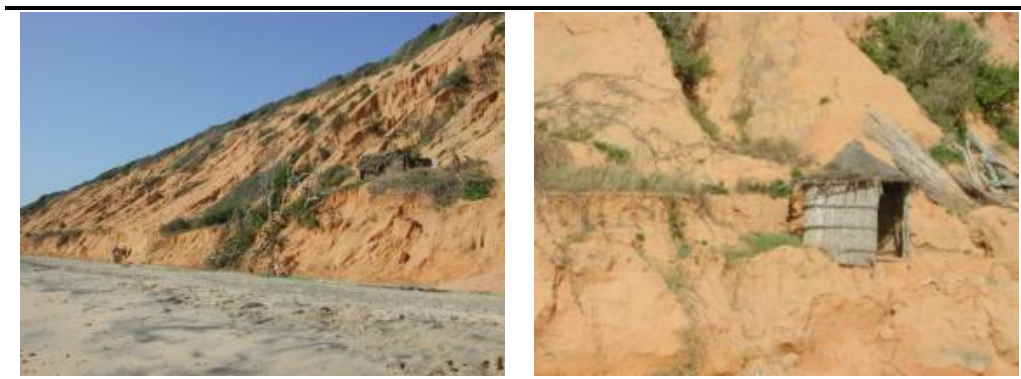
Source: J Hughes, 2015

Despite being known to occur, little is known about mangrove, estuarine and freshwater artisanal fisheries in the Project Area and this will be investigated in the EIA Phase.

Fishing Centres

A maritime fishing census done by the IDPPE in 2007 estimated that there were 79 fishing centres along the coast of Inhambane. Although artisanal fishing is a year round activity, some migration of fishermen does occur between fishing villages and from one province to another on a seasonal basis. *Figure 7.3* above show the location of the fishing centres while *Figure 7.6* below shows a typical traditional hut built on the beach dunes of Inhassoro. There is a fishing centre located about 2 km to the north of the pipeline landfall site and one about 5 km to the south of the landfall site.

Figure 7.6 *Traditional Huts Used by Fishermen on the Inhassoro Beach Dunes*



Source: (Impacto, 2004)

Semi-Industrial and Industrial Fishing

As indicated in *Figure 7.3*, the FSO location overlaps with the industrial and semi industrial line fisheries. The semi-industrial and industrial vessels fish primarily shrimp and a variety of by-catches which supply the local, regional and international markets with seafood.

The semi-industrial fleet is characterized by locally-owned vessels and fishing is practised along the coast by vessels of up to 20 m long, powered by engines and using ice and mechanical refrigeration systems for on-board conservation of the catches. Some of these vessels use mechanical fishing methods. Equipment used includes hand lines as well as stout fishing rods with large, non-gearred reels.

The industrial fleet comprises freezer vessels that can operate continuously over three weeks or more and are at least 20 m in length, consisting of two types of operators:

- The first is made up of joint venture companies between the Mozambican State and large multinationals based in Europe, with sufficient financial means to support fleet renovation and to place the produce on the international market. These companies have between eight and 30 vessels each and exploit 70 percent of the Total Allowable Catch (TAC), which contributes to foreign exchange earnings.
- The second type is that of industrial companies using local capital, with a maximum of four vessels per company and with low productivity due to the obsolescence of their fleet and equipment (Impacto and ERM, 2010).

Industrial line-fishing vessels operating in the Project Area are based in the Ports of Beira, Inhambane and Maputo. Data from 2007 indicates that approximately 10 shrimp fishing vessels were active in the Project Area at a depth of 10 to 45 m using trawl nets (Impacto 2007, cited in Impacto and ERM, 2010). According to the National Directorate for Fisheries Administration (ADNAP), 14 vessels were conducting line fishing within the Project Area in 2004. Line-fishing techniques are usually undertaken within depths varying from 30 to 250 m and operate year-round (Impacto and ERM, 2010).

Shrimp trawling occurs in sandy bottom areas between parallels 17°S and 25°40'S, which is south to southeast of the Project Area (*Figure 7.3*). According to the National Directorate for Fisheries Administration, about 12 industrial trawling vessels operated in the country in 2004.

These fleets trawl between March and December with the closed season in the summer months of January and February. The peak catch rates are reported from March to May-June when 60 percent of the year's catch is landed (Impacto and ERM, 2010).

Fishing data for the Project Area will be updated in the EIR by the fisheries specialist study.

Recreational Fishing

Recreational fishing is also undertaken within the Project Area, usually by amateur anglers participating in recreational fishing competitions. The number of fishing vessels for this activity is dependent upon each competition. Apart from the sports fishing competitions, there are also other sports fishing activities conducted by leisure boats from the tourist resorts. During the EIA Phase, the nature and number of any sports fishing competitions and recreational fishing by tourists will be defined as anecdotal evidence suggests there has been a decline in such activities in recent years.

Recreational fishing targets billfish species and their activities take place in two main areas:

- The area offshore of Bazaruto Archipelago; and
- The Cabo São Sebastião within a range of 2 to 5 km offshore.

Recreational fishing further takes place between 15 and 30 km east of Inhassoro and the Govuro River estuary, targeting both demersal rocky dwellers and pelagic species. The most popular fish species include marlin, sailfish, wahoo, skipjack and yellowfin tuna, trevally and Spanish mackerel. The rocky bottom fish dwellers, targeted by some sport-fishing clubs are also species targeted by the semi-industrial and artisanal line fishing industry.

There is a private fishing centre located on the banks of the Govuro River mouth, approximately 12.5 km along the coast north of the pipeline beach shore crossing. This lodge operates a catch and release system and offers deep-sea fishing, shore fishing, estuary fishing and salt water fly fishing, as well as charter fishing and fly fishing trips.

As can be seen in *Figure 7.3* the recreational fishing area overlaps with a section of the offshore pipeline route (including the 500 m safety zone). There is no overlap with the FSO location.

Illegal Fishing

Any artisanal, semi-industrial or industrial fishing operations in Mozambican waters, and all other businesses connected to fishing, are required to obtain an official fishing licence from the state. Fishing for personal subsistence is excluded from this rule.

Illegal fishing is known to occur in offshore Mozambican waters. Local boat owners are aware of occurrences of night fishing, mainly by foreign vessels. These activities take place particularly in the region of Cabo Delgado, Nampula and Inhambane (in the Bazaruto area), and are presumably related to migratory species, such as tuna.

The 85 km length of coastline between Morrumbene and Pomene appears to have the most concentrated artisanal illegal shark fisheries in southern

Mozambique, although the entire area from the Bazaruto Archipelago south to around Závora is subject to relatively high fishing pressure. Bottom-set longlines may be the most commonly used gear.

Regulatory and Strategic Framework of the Fishing Sector

The regulatory framework guiding the strategy of the Mozambican fisheries sector and its subsectors comprise:

- The Fisheries Law No. 3/90, which provides the legal framework for fishing in the country;
- Fishing Policy and Implementation Strategies, Resolution No. 11/96;
- The General Regulation of Offshore Fishing, *Decree No. 43/2003*, which regulates fishing activities at sea;
- The Regulation of Fishing in Inland Waters, *Decree No. 57/2008*;
- The Regulation of Operation of the Fishing Co-Management Committees, Ministerial Diploma No. 147/2007;
- The Fisheries Master Plan 2010-2019 (PDP 2010-2019)), which defines the long-term vision and the development goals of the sector, the target groups and other indirect beneficiaries, the contribution of the six fishing subsectors to the PDDII goals and the cross-sectorial aspects which impact on the development and promotion of fishing activities.
- The Strategic Plan of the Small-Scale Fishing Subsector, prepared in 2007 (implemented by the IDPPE: Mozambican Institute for the Development of Small-Scale Fishing, defines a vision for small-scale fishing with a ten-year horizon and a 5 year implementation period (now complete). The five main pillars of the PESPA include:
 - Improved social conditions in the fishing communities;
 - Growing income for small-scale fishers;
 - Marketing of the fish catches brings more favourable results for small-scale fishers;
 - Financial services aimed at the small-scale fisheries are accessible to and easier to obtain by a larger number of fishers; and
 - Institutions that are dedicated to the development and management of small-scale fishing are strengthened and improved.

- The Strategic Development Plan for Tuna Fisheries, approved on July 2013⁽¹⁾, has been aligned with the 2010-2019 Fisheries Master Plan (see above), as well as other relevant policies and strategies. The Strategic Plan aims to maximise the benefits of the tuna industry to the economy of Mozambique, through better use and control of the tuna fisheries in the Exclusive Economic Zone (EEZ) and participation in the strengthening of the management of tuna stocks in the Indian Ocean. This Strategic Plan defines priority actions as well as general actions for the management of tuna fisheries, small-scale fisheries and industrial fishing activities. The Ministry of Fisheries is responsible for the implementation of this strategy at a national level.
- The Line Fishing Management Plan within Marine Waters of Mozambique for the period 2014-2018 was approved by Ministerial Decision No. 162/2014. This Plan establishes requirements to be met in order to undertake line fishing within marine waters under Mozambican jurisdiction (which extends to 12 nautical miles offshore). It focuses on the contribution of fisheries to the national economy. The main objective of the Management Plan is to contribute to a sustainable use of living marine resources while supporting economic growth and improvement of conditions of fishing communities.

7.4.2 *Agricultural Activities and Food Security*

Soils are generally poor and sandy in the coastal areas of Inhassoro District. The majority of the local population practices 'rain fed, slash and burn' shifting agriculture and the most common crops are sorghum, millet, peanuts, beans, cassava and maize. Agriculture is mainly practised on small plots (*machambas*) at the household level. Each household cultivates an average area of 1.8 ha, mainly for subsistence, but any surplus is sold to provide a source of income. Given the low fertility soils and long periods of drought, as is currently experienced, the area faces cyclical food security problems. In the interior areas of the District, where the soil productivity and rainfall are adequate there is some commercial production of maize and peanuts.

Besides cropping, households carry out various activities that contribute to household income and which may play a central role in the livelihood strategies of these families during drought periods. These include:

- Creation of reed and wood products in the coastal areas and the interior of Inhassoro;
- Livestock rearing and bushmeat hunting;
- Fishing along the coast and in rivers and lakes in the interior;
- Harvesting and sale of forest products (fruit, honey, medicinal plants, timber poles, etc);
- Production of charcoal and firewood, which are mainly sold along the EN1;
- Artisanal production of stone for construction;

(1) At the 22nd Ordinary Session of the Council of Ministers.

- Thatching grass;
- Manufacture of traditional beverages (e.g. palm wine); and
- *Ganho-Ganho* (temporary labour).

Figure 7.7 below illustrates some of the above livelihood activities.

Figure 7.7 *Livelihood Activities of the Families in the Project Area*



Source: Impacto, 2015

7.4.3 *Timber Resources*

The main timber resources exploited in Inhassoro District comprise Mondzo (*Combretum imberbe*), Chanfuta (*Azelia quanzensis*), Umbila (*Pterocarpus angolensis*), Cimbirre (*Androstachys johnsonii*), Sandalwood (*Spirostachys africana*), Chacate-preto (*Guibourtia conjugata*) and Msasa (*Brachystegia spiciformis*).

According to the Inhassoro District Profile for the Strategic Environmental Assessment (Impacto, 2011) there were 18 forestry operators¹ in 2011 within the district with annual licenses, of which four were in Cometela Locality, 12 in Maimelane and two in Nhapele. In addition there are two timber processing companies in Inhassoro Town and Maimelane.

Although the use of uncontrolled fires has reduced significantly due to awareness initiatives, Inhassoro District is still affected by erosion and deforestation as timber is used by the local communities for local construction and as firewood for fuel (MAE, 2005).

7.4.4 *Tourism*

Inhambane Province is one of the main tourism destinations in Mozambique. Tourism has been defined as “the greatest asset for the development of the province’s economy” (GPE, 2010, cited in Golder, 2014b) and is the largest formal sector employer in the coastal region of Inhassoro District.

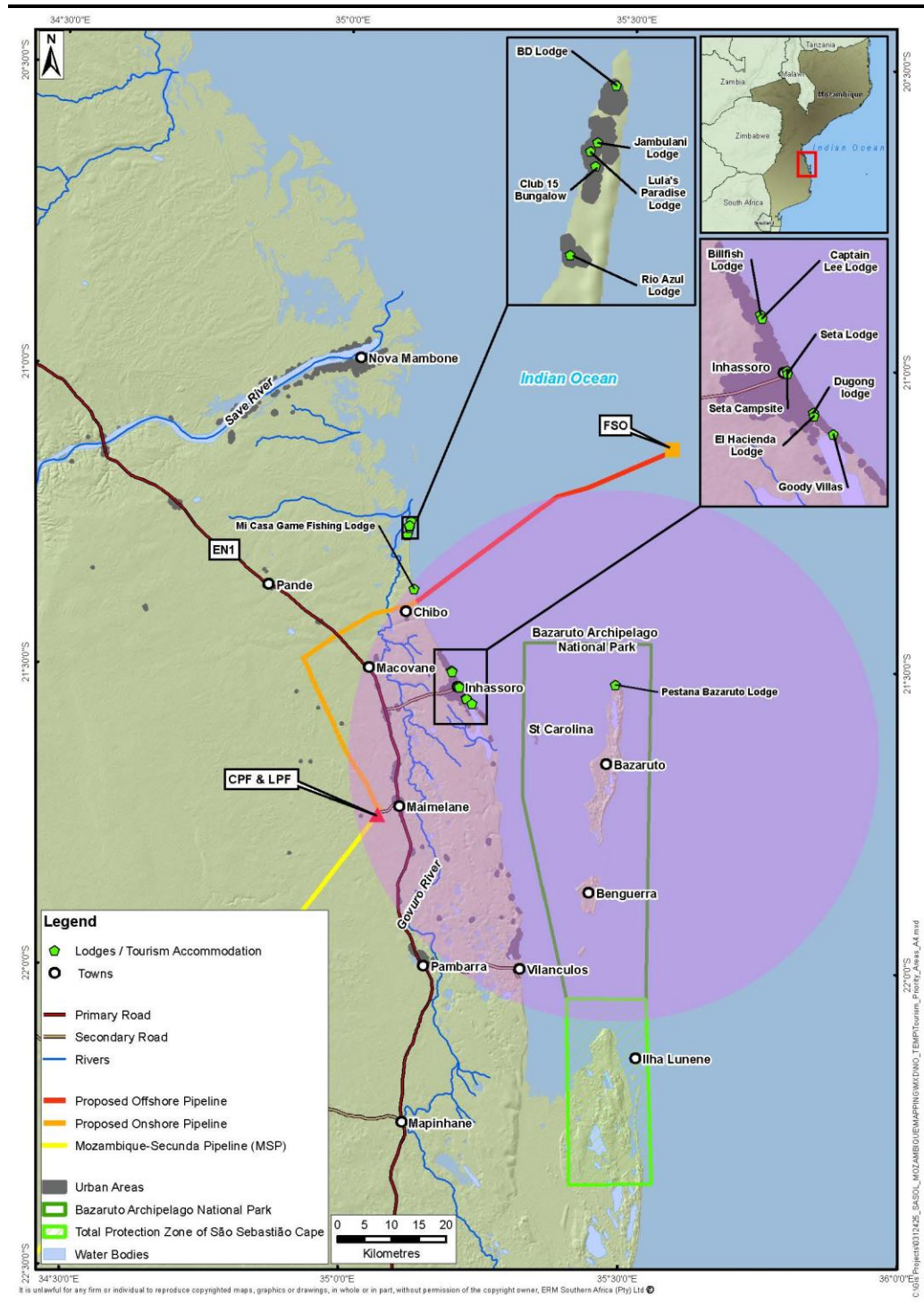
¹ Forestry operators are awarded a forestry concession for the purpose of forest exploration, in particular, felling, transportation, extraction, drying, including the manufacture of charcoal, as well as timber processing, according to a previously approved management plan.

Inhassoro District is situated within the Vilanculos/Bazaruto/Inhassoro region and is listed as one of the Priority Areas for Tourism Investment (PATI), as shown in *Figure 7.8* below. The Vilanculos/ Bazaruto/ Inhassoro cluster is currently Mozambique's most developed leisure destination. Tourist attractions include pristine islands, the BANP, with marine-based recreational activities including high quality diving and snorkelling, extensive beaches, recreational fishing, and swimming in clear, calm waters (Golder, 2014b).

Several national and provincial strategies have recognised the tourism potential of the area (Golder, 2014b), including:

- The Strategic Plan for the Development of Tourism in Mozambique (2004-2013) which classifies the Bazaruto islands and the mainland coast (including the Project Area) as a Type A Priority Area for Tourism Investment. Available details on the impact of this Plan and any updates will be considered in the EIA;
- The inclusion of the BANP into the Greater Limpopo Transfrontier Conservation Area would add additional weight to the region's priority status; and
- The Inhambane Tourism Strategy, prepared in 2012 but not yet adopted, aims to develop world-class tourism based on the province's key, mainly coastal, attractions (Tourism Strategy Company, 2012). The status of this strategy will be verified during the development of the EIA.

Figure 7.8 The Vilanculos/Bazaruto Priority Area for Tourism in Relation to the Onshore and Offshore Project Components



The most significant recent intervention in the Province has come from the Mozambique Anchor Tourism Investment Programme (MATIP). This joint initiative by the Government of Mozambique (GoM) and the International Finance Corporation (IFC) identified 2 750 ha about halfway along the coast between Inhassoro and Vilanculos as an ‘anchor investment site’, and developed an ambitious plan for large-scale tourism. However, this area falls outside the Project Area (to the south – south-east) (Golder, 2014b).

The District is well served by a range of tourism facilities, from affordable lodges to high-end hotels and resorts, estimated to total around 50 establishments in Inhassoro, Bartolomeu Dias Peninsula and Bazaruto Archipelago (Figure 7.9). Luxury establishments are concentrated on the Bazaruto Archipelago islands, Vilanculos town and the nearby São Sebastião Peninsula. These areas, especially the islands, have developed a profile as an upmarket destination for regional and international tourists.

Figure 7.9 *Tourism Establishment Signboards in Inhassoro*



Source: J Hughes 2015

It is important to highlight that only the Bazaruto and Santa Carolina islands are in the Inhassoro District (Bazaruto Administrative Post). The other islands are in the Vilanculos District and are outside the Project Area; hence their absence from the table below. Santa Carolina is the smallest island of the Bazaruto Archipelago and has the ruins of the old Hotel Santa Carolina. Over the years, there have been several plans by investors to build a new hotel on the island but to date none has gone ahead. Data on tourism will be updated as part of the EIA Phase.

The closest lodge to the pipeline shore crossing site is the Mi Casa Game Fishing Lodge – approximately 2 km from the shore crossing - which became operational from November/ December 2015, but which is located outside of the primary tourism areas. Offshore, the closest lodge to the pipeline and FSO is the Pestana Bazaruto Lodge, located at the northern tip of the Bazaruto Island, while further north on Bartolomeu Dias Peninsula are several other lodges accessed by a 4x4 vehicle via the coastal track or along the beach depending on tides and estuary water levels (Figure 7.9).

Turnover generated by the estimated 1 798 bed nights available in tourism establishments in Inhassoro and Vilanculos Districts in 2005 was in the order of US\$17.5 million. This was based on reported occupation rates and consumption of food and drink and other third party goods and services – the latter estimated at approximately 31 percent of the value of income to tourism facilities in Inhassoro, and 57 percent in Vilanculos (Impacto and ERM, 2010).

Data from the Ministry of Tourism indicate that Inhambane Province attracted 18 510 international visitors during 2010, ranking second only to Maputo City (Golder, 2014b). The average occupancy rate of tourism establishments in the Province is however decreasing with occupancy levels being around 10 percent due to the international economic crisis; high operating costs; low standards of service delivery; red tape; corruption; inadequate infrastructure; and insecurity in Mozambique. Tourism is highly seasonal with the peak periods over Christmas and Easter given its distance from the main tourist source areas in South Africa and Zimbabwe.

The main attractions are diving and snorkelling with the most popular dive sites being the north-western side of Magaruque including Two Mile Reef, Five Mile Reef, the Potholes, the Greek Temple, and reefs along the eastern side of Bazaruto Island and the Coral Gardens in the north (Impacto and ERM 2010) as shown in *Figure 7.3*. A key advantage of the area is that the reefs are easily accessible and provide for a range of diver experience levels. The Twelve Mile Reef is mainly visited by divers from the Archipelago lodges but is also a key deep sea fishing area. The best diving period is between April and December, while deep sea fishing events (involving 30 to 60 boats) usually take place in the peak holiday periods of April, December / January. Most recreational fishing for billfish takes place north of Bazaruto Island, sometimes up to 20 km from shore with the 25 Mile Reef often cited as a good fishing area (www.sealine.co.za). As noted previously, sports fishing competitions/events and recreational fishing by tourists will be confirmed and documented in the EIA, as anecdotal evidence suggests there may have been a decline in these activities in recent years mainly linked to insecurity in central Mozambique.

7.4.5 *Hydrocarbon Exploration and Production*

Seismic and drilling exploration activities in the region have taken place over the past 45 years. Most notably Sasol has been undertaking activities in Inhambane Province since 2000 and extracting onshore gas resources in Inhambane Province since 2004, which is processed at the Temane Central Processing Facility (CPF), in the Inhassoro District. According to INE (2010), 1.7 percent of the population in Inhassoro is engaged in the mining sector, which includes oil and gas operations.

Of direct relevance to the proposed *Sasol Pipeline and Offshore FSO Project* is the previous EIA Process and additional studies for Block 16 and 19. Issues raised during the EIA process in regulatory meetings and by the stakeholder forum that was established for the project, centred mainly on project risks to conservation, fishing and tourism. Priority concerns included risks to priority coastal features contributing to the conservation importance of the BANP, namely coral reefs and reef fish, dugongs, and turtles and the potential impact on tourism and fishing.

Due to the concerns raised over shallow water seismic surveys in particular, additional more detailed studies of dugongs and seagrass, coral reefs, fisheries and tourism were conducted to establish an improved baseline. Monitoring studies were also conducted for fisheries and marine turtles.

A compensation mechanism to compensate fishermen for temporary loss of access to fishing grounds in the safety zone around project activities was also developed and implemented.

In July 2006, Sasol compiled a Preamble for inclusion in the EIR for Sasol's Exploration Project in Blocks 16 and 19 in which it agreed with the recommendations of the EIA and committed to postponing seismic surveys and the drilling of wells in the shallow water area until the completion of further studies. In its response to Sasol's application for an Environmental License for activities in the deep water, its commitment to postpone exploration activities in the shallow water and to conduct further studies, MICOA (Ministry for the Coordination of Environmental Affairs) recommended that the 'environmental impact of hydrocarbon activities in the shallow water environment be investigated in detail'.

The subsequent additional (2007) and monitoring (2008) studies undertaken focussed on the area's dugong population and their habitat, the artisanal fishery, the tourism industry, coral reef health, noise impact modelling and marine turtle monitoring. These studies were supported by a well-documented stakeholder engagement process as well as an independent peer review by SAIEA (Southern African Institute for Environmental Assessment).

Two key aspects of this process were:

1. That the dugong study indicated that the Bazaruto area contained probably the last viable population of dugongs in the Western Indian Ocean and recommended that no exploration activities occur in the shallow water area with the retention of exploration rights and the establishment of a reserve for dugongs; and
2. That the artisanal fishery study concluded that the local fishery played a key role in the local economy, recommending that no seismic surveys take place in the shallow water near Inhassoro since the local fish resources were particularly sensitive.

In August 2008, and on the basis of the additional and monitoring studies' findings, Sasol committed not to pursue any shallow water exploration activities (seismic surveys and drilling) at that stage. It also committed to wait for the recommendations of the Strategic Environmental Assessment (SEA) which the Mozambique Government planned to undertake, before reviewing this decision and revisiting its exploration plan for the shallow water area.

The project team is aware of the issues and concerns raised and how they were addressed during the Block 16 and 19 EIA process and cognisant that the proposed pipeline and offshore FSO project will likely generate similar stakeholder concerns. This is especially likely given several recent EIA processes that have raised awareness of Sasol's expanding footprint in the region.

In October 2015, the National Petroleum Institute (INP) of Mozambique announced the results of the fifth license round for concession areas for exploration and production of oil and gas in 11 offshore areas and four onshore areas. Sasol Petroleum Mozambique Exploration Ltd, partnering with ENH, was awarded the PT5-C area, which encompasses the land between the Pande and Temane Blocks and a large portion located to the south of the CPF.

7.5 *AMENITIES AND SERVICES*

In general the Project Area is poorly served by social infrastructure, and where this exists it is concentrated at the District Headquarters and at some Administrative Post headquarters.

7.5.1 *Schools*

Inhassoro District has 40 first level primary schools (EP1), seven second level primary schools (EP2), one secondary school (ESG) and one professional school (ETP) in the Inhassoro centre, supported by the Catholic Church (Inhassoro District Profile for the Strategic Environmental Assessment, Impacto, 2011). Only one school is known to be located close to the onshore pipeline route, situated at Chibo village on the western side of the Govuro River.

In the survey undertaken by Kula, Estudos e Pesquisas Aplicadas, Lda for the PSA Development and LPG Project (Golder, 2014b), one third of the population had no formal education, and about half have finished primary school. Only 8.2 percent had completed secondary school. Adult literacy was low at 7.3 percent. Furthermore, none of the interviewees had completed university education and only 0.6 percent had completed some form of vocational education.

Figure 7.10 *Example of a Typical Primary School in the Area, Located in Maperepere, in the Nhapele Locality in Inhassoro District*



Source: (Impacto, 2016)

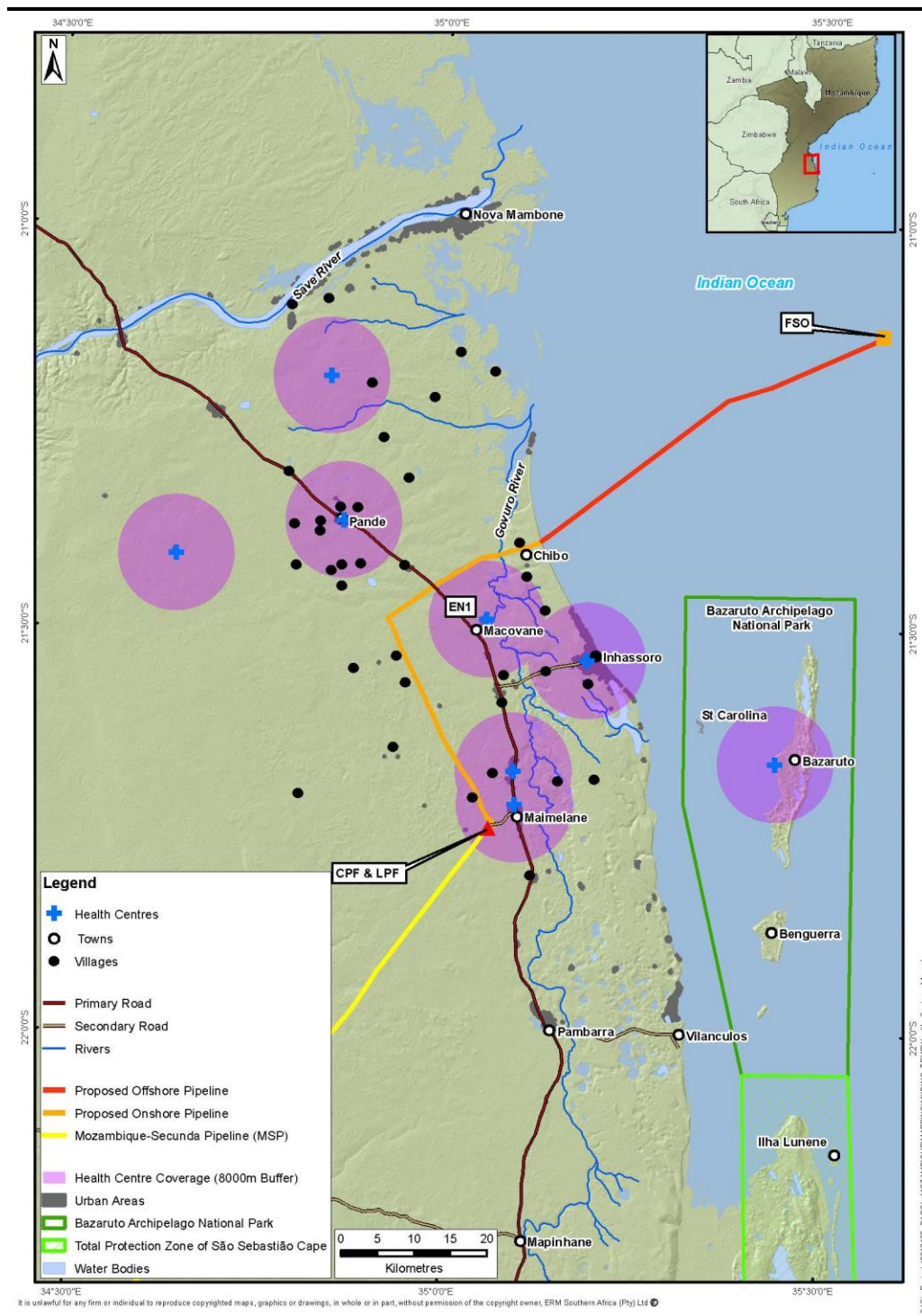
7.5.2 *Health*

In general Inhassoro is poorly served and there is no hospital in the District with the nearest one located in Vilanculos. Type 1 Rural Health Centres with improved resources are located in the District Headquarters and in the most populated areas located along the EN1 national road, such as the new health centre in Mangugumete (Administrative Post of Maimelane), funded by the Sasol's Corporate Social Investment programme. The district also has three type 2 Rural Health centres and Bazaruto Island has one Urban Type Health Centre (*Figure 7.11*).

The main diseases in Inhassoro District in 2011 comprised malaria, diarrhoea and dysentery, sexually transmitted diseases (including HIV/AIDS), tuberculosis and pneumonia (Impacto, 2011). Many people still rely on traditional herbal medicines and several traditional doctors operate in the area. According to the District Government (2011) the main cause of deaths amongst adults in the District was HIV/AIDS due to non-adherence to the basic principles of prevention and anti-retroviral treatment. However, in 2013 a 10 percent improvement in enrolment of people into the anti-retroviral programmes was achieved, along with a 29 percent improvement in retention of patients on the Programme. Sasol's HIV/AIDS Awareness Programme is reported to have contributed substantially to this (Golder, 2014b).

Plans, strategies and initiatives in the health sector will be reviewed and documented in the EIA, with reference to the National Strategic Framework for the Health Sector 2014 - 2019 (MISAU, 2013) and other relevant data sources.

Figure 7.11 Health Facilities in the Inhassoro District



7.5.3 Water Supply and Sanitation

Piped water systems exist only in the District Headquarters and communities depend on hand pumps and traditional open shallow wells and cisterns to collect rainwater for their water supply. There are insufficient hand pumps to meet the needs in the rural areas, especially in the interior areas where water supply relies on boreholes. Water from boreholes is sometimes brackish, of poor quality or saline.

These boreholes supply water to people and also to cattle. The Non-Governmental Organizations (NGOs) Kulima and German Agro Action have been supporting communities located along the coast to build protected wells. However, some people living near the pipeline route still rely on hand-dug wells to reach water 2-5 m below ground level, but many of these are drying up during the current drought period forcing people to either move or go further to find water (ERM pers. obs. 2015). *Figure 7.12* illustrates some examples of manual water pumps found in the Inhassoro District.

Figure 7.12 *Examples of Manual Water Pumps in the District of Inhassoro*



More than half of the households in the district (55.3 percent) do not have latrines, meaning that Inhassoro is one of the coastal districts with a high rate of defecation in the bush. Of the 44.7 percent who have access to latrines, nine percent of the total households in the District have improved latrines and 34.9 percent have traditional latrines. Only 0.8 percent of households in the district have toilets connected to septic tanks.

7.5.4 *Electricity Supply*

Inhassoro District has a 33kV power distribution network that covers the headquarters of the Inhassoro Administrative Post and some localities along the coast. However, only 1.5 percent of the households in the district benefit from this source of energy (Impacto, 2011). More than half of the District's population (50.8 percent) use alternative energy sources (eg paraffin and kerosene) for lighting. This is below the provincial level (76 percent) and slightly below the national level (54 percent).

Most cooking is done with locally produced charcoal or wood and approximately 28 percent of households in Inhassoro are depend on wood as fuel, which makes Inhassoro the most fuel wood dependent coastal district in the Province (Impacto, 2011). The main wood source for firewood and charcoal is a timber locally known as Chanfuta (*Pod Mahogany, Afzelia quanzensis*), listed as Near-Threatened in the IUCN Red List.

7.5.5 *Road Network*

The road network in Inhassoro District comprises a total of 236.7 km of roads, of which 156.8 km are classified and 79.9 km unclassified. With the exception of the EN1, and the current surfacing of the Inhassoro to EN1 road, all of the District roads are unpaved.

Roads in the Project Area are generally passable by vehicles subject to weather conditions. Communities benefit from roads established by Sasol to well sites and along pipelines. These roads provide access to natural resources (such as timber, fuelwood, non-timber forest products, and bush meat); to other communities either for social interaction or trade, or to reach health centres or schools.

7.5.6 *Maritime Transport*

There is a state vessel, with capacity for 32 passengers which serves the local area but which has been out of order for several years. Transport to the islands is by motorised boats from tourism establishments or other owners in Inhassoro or by means of traditional boats (*dhow*s) (Impacto, 2011). Refer to *Section 6.7* below for additional details related to shipping and navigation.

7.6 *SHIPPING AND NAVIGATION*

The marine area between Sofala and Maputo is an important area for shipping traffic. Ships in deeper waters, to the east of the proposed FSO location, are generally routed from Beira Port to the northern ports in Mozambique such as Quelimane and Nacala Ports or to the Maputo Port in the south, or are travelling to other international ports, such as Durban. Approximate vessel transport routes are shown in *Figure 7.13* below. Durban is regarded as the “Mother-Port” for the Southern Africa region and accounts for the majority of traffic along the eastern seaboard, including traffic to and from the ports of Durban and Richards Bay.

Fishing vessels and commercial ships travel close to the coast between the Ports of Quelimane, Beira, Inhambane and Maputo. The Maritime Authority (the National Maritime Institute - INAMAR) indicated that an annual average of 1 000 cargo and fishing ships cross the Project Area at a distance of 20 to 35 miles (36 to 63 km) from the coast, mostly in transit through the Mozambique Channel (Impacto and ERM, 2010). This category of traffic includes Industrial and Semi-Industrial Fishing Vessels, which use the Port of Beira as a base. A large number of small-scale fishing vessels, numbering about 7 400, are also involved in artisanal fishing in Sofala Bay (to the north of the Project Area), generally within three nautical miles (5.5 km) of the coastline (Impacto and ERM, 2010).

The Port of Beira is the most important port near the Project Area and handles international shipping, domestic and regional cabotage ⁽¹⁾, small-scale transport, fishing vessels and tourism vessels. The Port of Beira acts as a transit port, handling the import and export of cargo from Zimbabwe, Malawi, Zambia, South Africa and other countries in the region.

International vessel movement using the Beira Port and crossing the Project Area includes shipping traffic from Europe, Asia and the Americas, as well as some non-regular traffic from North Africa, the Horn of Africa and other parts of the world. Much of the traffic through the Mozambique Channel comprises oil tankers passing through at a great distance from shore (*Figure 7.13* shows approximate distance from the coast).

National cabotage in Mozambique using the Beira Port and crossing the Project Area accounts for the second tier of marine traffic in the region. It involves traffic between Beira-Maputo and Beira-Quelimane, followed by traffic between Beira and other national ports of Pemba, Nacala, Angoche and Inhambane. Additional traffic in the region is accounted for by traffic from other regional ports such as Mombassa (Kenya), Dar es Salaam (Tanzania), Moroni (Comoros) and Tamatave (Madagascar).

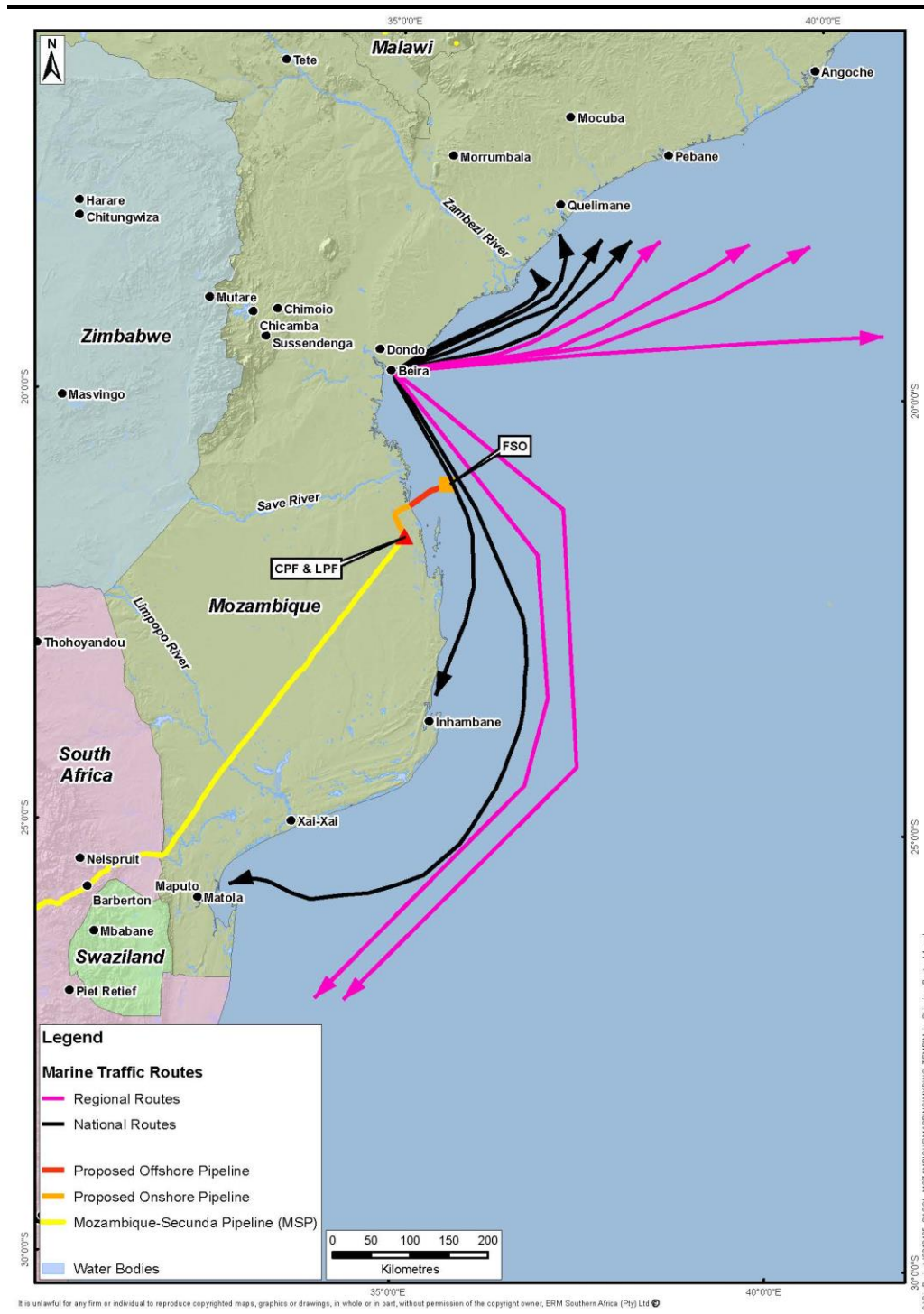
Traffic from tourism vessels includes cruise ships, yachts and small pleasure boats. Cruise ships and yachts undertake temporary visits to the Bazaruto Archipelago, while the small pleasure boats tend to remain in the area on a permanent basis. Generally, tourism vessels are mainly concentrated in the Bazaruto Area around the islands. The best diving period is April to December, while the peak times for deep sea and recreational fishing are the peak seasons of April, December and January, especially in areas to the north of Bazaruto Island, sometimes up to 20 km from shore (Impacto and ERM, 2010). Generally, over December and January an average of 17 and sometimes up to 20 - 30 boats may be found on and around the Two Mile Reef, supporting diving and snorkelling (ERM and Consultec, 2006). As noted previously, the presence of diving and sports fishing vessels in the area will be defined during the EIA Phase.

Another important category of maritime travel is small-scale transport. This category of traffic includes small passenger vessels connecting the various Islands of the Bazaruto Archipelago with the mainland (Vilanculos, Inhassoro and Nova Mambone at the Save River mouth).

Figure 7.13 below shows the national (domestic) navigation routes closer to the Project Area than the international routes.

(1) Cabotage refers to the transport of goods or passengers between two places in the same country by a transport operator from another country.

Figure 7.13 Main Shipping Navigation Routes in the Project Area



Source: Adapted from Impacto and ERM, 2010

7.7 CULTURAL ASPECTS, ARCHAEOLOGY AND CULTURAL HERITAGE

The main ethno-linguistic groups in this region comprise the Matsuda, the Ndau and Elomwe. The predominant local language in the region is Xitswa. According to SAL (2006), a native population known as "Bazarutos" or "Mahoca", descendants of Ndau origin Tsonga group, migrated from the Save River to the islands of the Bazaruto Archipelago. This group speaks "Xihoca" which is a mixture of Cindau and Xitswa.

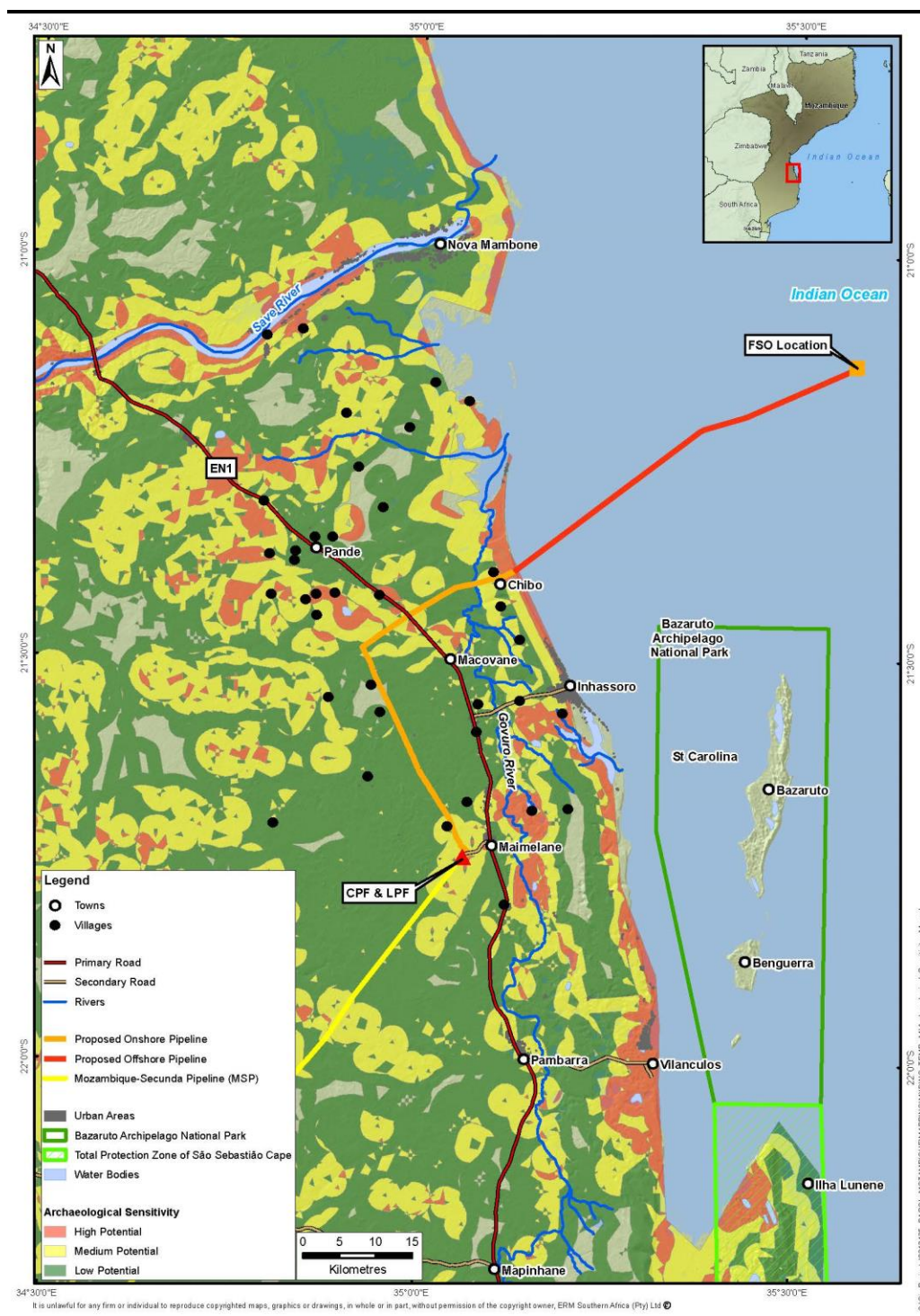
The main religions practiced are Catholicism (45.9 percent), Protestant / Evangelical (23 percent) and Zionism (5.4 percent). Family cemeteries are generally located near people's residence. In all Administrative Posts there are cemeteries for the local traditional chiefs that have access restrictions that need to be respected. Cultural sites such as sacred forests, trees and pools have also been identified in the Inhassoro District by Golder (2014b).

Inhassoro District has high archaeological potential due to its strategic setting along the coastal trade routes (both inland and along the shoreline) and the Govuro River. Five well-documented sites occur in the broader PSA Project Area (Golder, 2014b). Similar sites may also be found within the Pipeline and FSO Project Area and will be validated in the EIA.

Archaeological remains collected in neighbouring areas in the Inhambane Province include potsherds/fragments of ceramics, iron slag, beads, stone tools and lithic instruments (Impacto, 2012) as well as microlithic artefacts, pottery shards of the Matola tradition, characteristic of early farming communities (Early Iron Age), associated with shells, etc found in the PSA Project Area (Golder, 2014b). However, the majority of archaeological sites have been damaged by humans or climate - induced erosion (Golder, 2014b).

Figure 7.14 below illustrates the potential areas of archaeological interest and cultural heritage sites close to the onshore pipeline route (ERM, 2015). Areas of medium and high interest are typically associated with settlements. These will be studied in more detail during the EIA phase.

Figure 7.14 Archaeological Sensitivity Map



7.7.1

Vulnerability to Climate Change

The Project Area is located in areas with low soil productivity, low precipitation and in areas prone to cyclones. In the coastal areas of Inhassoro District, the soils are poor and sandy and the majority of the population practices rain-fed, slash and burn shifting agriculture. Agriculture has extremely low levels of productivity, and is highly dependent on climatic factors; as a result, the area faces cyclical food security problems, with long periods of drought.

Floods also regularly occur in the region, causing major constraints for the population living and/or practicing agriculture on the river banks. Besides agriculture and fishing, rural residents rely heavily on other natural resources to supplement food supply and income, which play a major role in livelihood strategies especially during drought periods. Due to Inhambane's high poverty levels and dependence on natural resources the population is extremely vulnerable to climate change. Coastal erosion of dunes and embankments between Inhassoro and the Bartolomeu Dias Peninsula is evident and threatens tourism and other infrastructure.

7.7.2 *Social Development Plans and Strategies*

The development strategy of the Government of Mozambique is summarised in two plans, the Action Plan for the Reduction of Absolute Poverty 2006-2009 (PARPA II) and the Poverty Reduction Action Plan 2011-2014 (PARP). Any available details on the impact of these plans and any updates will be considered in the EIA Phase.

Heads of state and government from across the world, including Mozambican President Filipe Nyusi, approved a new agenda for sustainable development covering the next 15 years and replacing the Millennium Development Goals (MDGs). The UN Sustainable Development Goals (SDGs) contain goals such as the eradication of poverty, combating inequalities and minimizing the impact of climate changes. Outcomes and updates of the country's commitments to the SDGs will be reviewed as part of the main EIA.

The Inhambane Province Development Plan 2011-2020 draws on national strategies and defines as the general objective the reduction of poverty from 57.9 percent (2009) to 45.0 percent in 2014 and 40.0 percent by 2020. Details of this plan will be presented in the EIA Phase.

The Inhassoro District Strategic Plan for Development 2011-2015 (PEDD) gives local effect to the national and provincial plans. Any available details on the impact of this plan and any updates for the period 2016-2020 will be considered in the EIA Phase.

Fisheries and tourism related plans are referred in the respective sections above.

Table 7.6 Summary of the Socio-Economic Environment

Administrative Structure	<ul style="list-style-type: none"> • The Project is located in the southern region of Mozambique in Inhambane Province. • The onshore pipeline will pass through Inhassoro District and Inhassoro and Bazaruto Administrative Posts. • The nearest settlements to the onshore pipeline are Temane, Masadge, Catine, Pere, Chinhocane and Chibo.
Demographics	<ul style="list-style-type: none"> • There are 1 402 245 people in Inhambane Province (2011), approximately 6.1 percent of the population of Mozambique. • Inhassoro District comprises 3.8 percent of the Provinces population and is predominantly rural. • The main religions practiced are Catholicism (45.9 percent), Protestant / Evangelical (23 percent) and Zionism (5.4 percent). • The predominant local language is Xitswa.
Economic Activities	<ul style="list-style-type: none"> • The majority of the population (70.2 percent) of Inhassoro District is engaged in the agriculture, forestry and fisheries sectors. • Fishing is the predominant activity in coastal areas. • Small-scale (artisanal) fishing for subsistence and cash is the predominant type of fishing practiced in the Govuro River estuary and the near-shore. • The main fishing gear used includes line, seine net, harpoon, trap and gill nets. Diving (generally for lobster) is also undertaken. • Fish processing and resale is also an important economic activity. • Industrial and semi industrial line fishing is practised east of Bazaruto Archipelago and supplies fish to national and international markets. • Agriculture is practiced across the District and is mainly 'rain fed, slash and burn' shifting agriculture. • Common crops are sorghum, millet, peanuts, beans, cassava and maize. • Agriculture is mainly practised on small (approximately 1.8 ha) plots. • Secondary economic activities including hunting, harvest and sale of non-timber forest products and labouring also form an essential part of households livelihood strategies
Tourism	<ul style="list-style-type: none"> • Inhambane Province is one of the main tourism destinations in Mozambique. • The Vilanculos/Bazaruto/Inhassoro cluster is listed as one of the Priority Areas for Tourism Investment (PATI) and is Mozambique's most developed leisure destination. • Tourist attractions include pristine islands, the BANP, marine-based recreational activities including diving and snorkelling, beaches, recreational fishing, and swimming. • The District is well served by a range of tourism facilities, from affordable lodges to high-end hotels and resorts. • Tourism is the largest formal sector employer in the coastal region of Inhassoro District.
Infrastructure	<ul style="list-style-type: none"> • Education facilities are limited in the District with a third of the population having no formal education. • There is no hospital in Inhassoro District; Rural Health Centres are located in the District Headquarters. The main diseases in 2011 comprised malaria, diarrhoea and dysentery, sexually transmitted diseases (including HIV/AIDS), tuberculosis and pneumonia. • The main sources of energy are wood, charcoal paraffin and kerosene,. • All District roads are unpaved with the exception of the main EN1.

Cultural Heritage	<ul style="list-style-type: none">• Inhassoro District has high archaeological potential due to its strategic setting along the coastal trade routes• Family cemeteries are located near people’s residences and cemeteries for local chiefs with access restrictions are located in each Administrative Post.• Cultural sites such as sacred forests, trees and pools have also been identified in Inhassoro District.
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