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## SEYCHELLES FISHING AUTHORITY (SFA)

# Social Impact Assessment for the Implementation Phase of the Seychelles Mariculture Master Plan

**Submitted to:**
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REPORT

Golder Associates

# Table of Contents

**TABLES**



**FIGURES**

**TABLE OF ABBREVIATIONS**

| | |
|---|---|
| ADZ | Aquaculture development zones |
| BQAF | Broodstock Quarantine & Acclimation Facility |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Programme |
| ESIA | Environmental and Social Impact Assessment |
| GDP | Gross Domestic Product |
| IFC | International Finance Corporation |
| MLUH | Ministry of Land Use and Housing |
| MMP | Mariculture Master Plan |
| MPP | Mariculture Master Plan |
| NCD | Non-communicable diseases |
| NGO | Non-Governmental Organisation |
| SFA | Seychelles Fishing Authority |
| SIA | Social impact assessment |
| SMP | Social Management Plans |
| SP | Significance points |
| WHO | World Health Organisation |

**APPENDICES**

No table of contents entries found.

# 1.0 INTRODUCTION

Golder Associates Africa (Pty) Ltd have been appointed by the Seychelles Fishing Authority (SFA) as independent environmental assessment practitioners to conduct an Environmental and Social Impact Assessment (ESIA) for the proposed implementation of the Seychelles Mariculture Master Plan (MMP). This report discusses the potential socio-economic impacts of the MMP.

## 1.1 OBJECTIVES OF THE SOCIAL STUDY

The objective of the social impact assessment (SIA) component of the ESIA is to assess the implementation of the Seychelles MMP from a social perspective, with a focus on the inner islands (Mahé, Praslin and La Digue). The SIA will thus forecast and assess probable social impacts of the implementation process and recommend mitigation measures needed to enhance any positive effects and to reduce and eliminate any adverse impacts.

The SIA will undertake to:

- Describe the existing social baseline of the study area;
- Identify, describe and evaluate the social issues of the various project alternatives for the project lifecycle;
- Make recommendations to avoid or mitigate negative impacts and enhance positive impacts;
- Address monitoring and evaluation aspects;
- Propose a Social Management Plan that sets out the impacts and associated mitigation measures and recommendations which will be incorporated into the environmental assessment report as an Environmental and Social Management Plan.

## 1.2 BACKGROUND AND CONTEXT

As a core component of the Blue Economy Strategy the development of an aquaculture sector has been prioritised by the Seychelles government. The process commenced in 2007 with a Rapid Assessment Study to gauge public and private opinion as to the desirability of developing marine aquaculture in Seychelles. Based on the positive response a comprehensive Scoping Study followed in 2009 to assess the opportunities and constraints to developing an offshore mariculture industry and the need for a Master Plan to drive the rational development of the sector. The Scoping Study revealed strong institutional support for the development of an environmentally responsible mariculture sector leading to the development of a MMP, which started in 2011 and phase 1 was concluded at the end of 2015.

See Figure 1 and Figure 2 for the location of the proposed MMP.

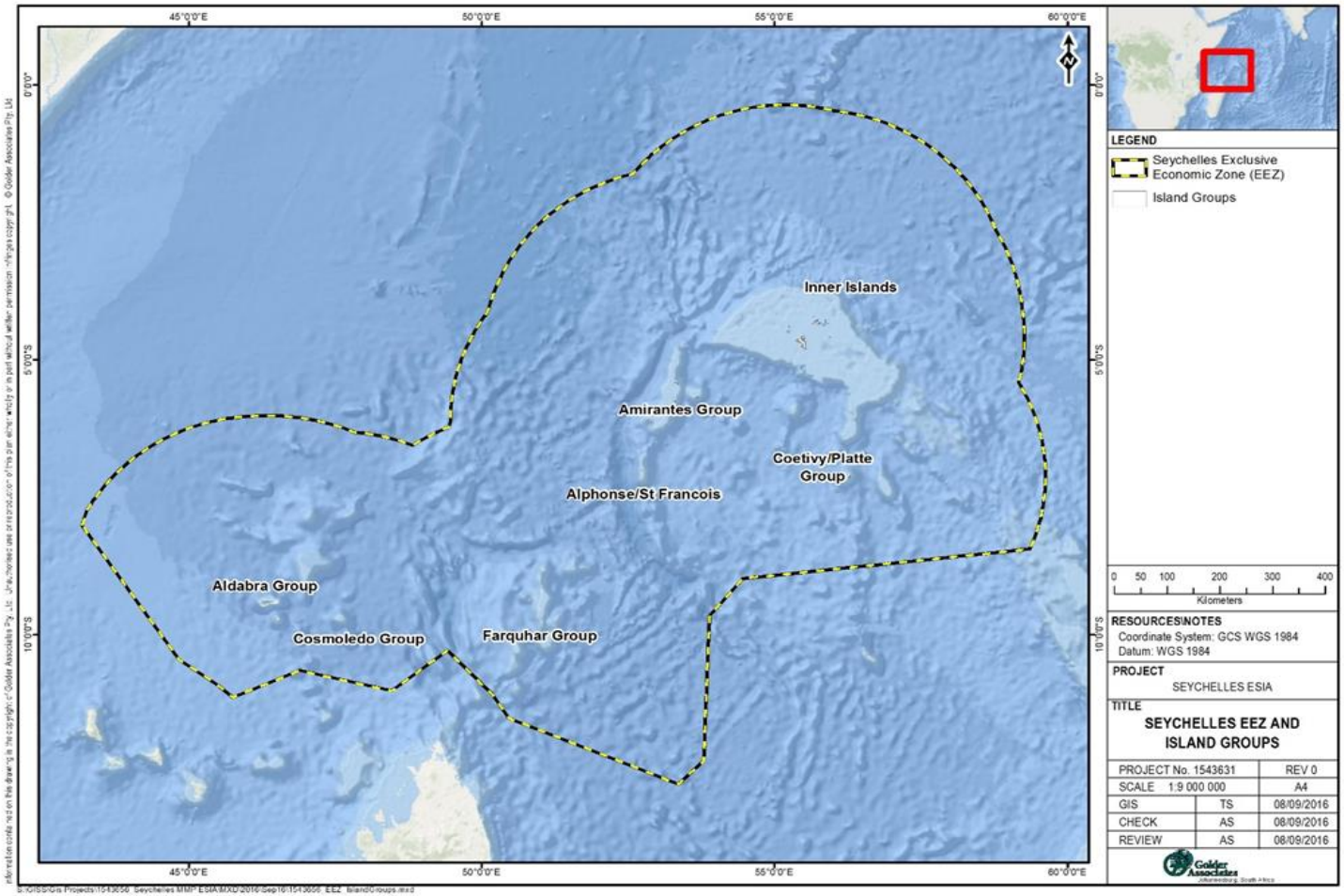


**Figure 1: Location of the inner islands and ESIA study area within the Seychelles EEZ**

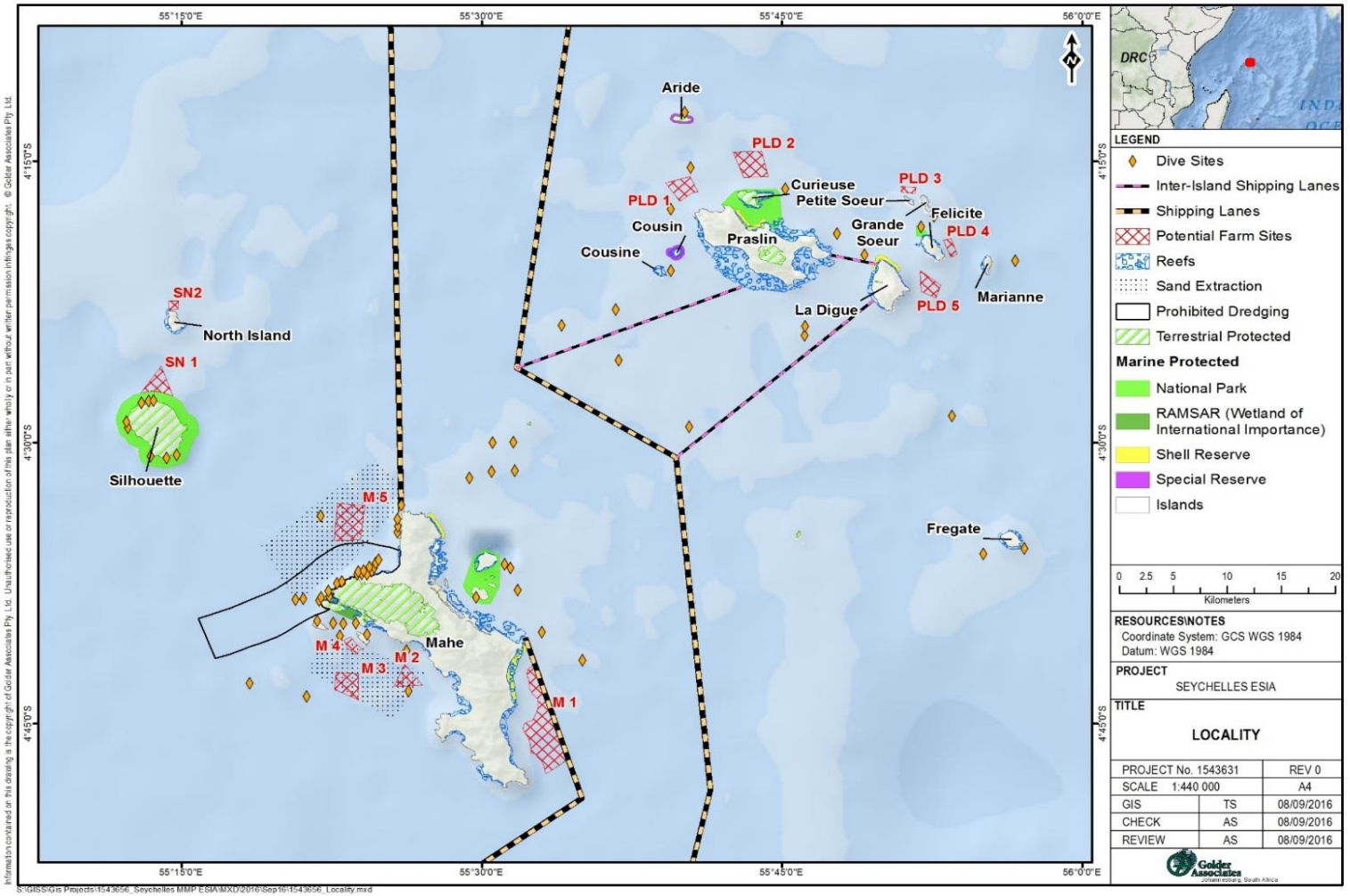


**Figure 2: Locality map (including potential farm sites)**

## 1.3 GEOGRAPHY AND HISTORY

The Republic of Seychelles is located in the middle of the Western Indian Ocean. It is composed of more than 115 islands distributed over an area of more than 1,3 million km$^2$. The islands constituting the Seychelles may be divided into two groups: the Mahé group, comprised of 45 islands, is characterised as mountainous with much granite and includes the outlying islands. The coralline group includes 70 islands which are mostly just above sea-level. Mahé is the main island and hosts the capital city, Victoria. Mahé island is 27 km long and 11 km wide. It has a maximum height above sea-level of 905 metres (Morne Seychellois Mountain). Two other major islands are Praslin and La Digue. Both islands are close to Mahé, 33.6 and 48 km respectively. Praslin is home to the Coco de Mer and La Digue is the only remaining sanctuary of the "veuve" -the Seychelles Paradise-flycatcher (Seychelles National Bureau of Statistics 2015a).

Twenty kilometres north-west of Mahé is Silhouette Island. It is the third largest granitic island in the Seychelles. It has an area of 20.1 km$^2$ and has a population of some 200, most of whom work on the island. The main settlement is La Passe, where the Hilton Hotel is located (SO Seychelles 1996).

North Island is located 5.8 km North of Silhouette Island. North Island has an area of 201 ha. North Island was purchased in 1997 by Wilderness Holdings Limited, an ecotourism company from South Africa. In 2003, Wilderness Holdings Limited opened a private resort for the ecotourism market. The development of the resort has resulted in growth in infrastructure and population of the island (Hill *et al.* 2002).

# 2.0 SOCIAL IMPACT METHODOLOGY

The SIA was undertaken in accordance with Seychelles national legislation, following the guidance of the IFC Performance Standards and with consideration of Good International Industry Practice. The SIA methodology involves delineation of a study area, consultation with stakeholders and their representatives as to potential effects, and measuring project effects against baseline conditions. An in-depth understanding of the project and its environmental effects is required to determine the ways and extent of project impacts on project-affected stakeholders. Impact significance is assigned qualitatively, based on professional experience and the level of concern expressed in consultations. Impact significance is assigned before and after mitigation and social management is applied.

## 2.1 DETERMINING THE STUDY AREA

The study focus for the SIA consisted of the proposed MMP affected communities situated in and around the proposed aquaculture development zones (ADZs) and related onshore infrastructure. The study area is the Seychelles Inner Islands, namely:

- Mahé;
- Praslin;
- La Digue;
- North Island; and
- Silhouette Island.

## 2.2 DESKTOP REVIEW

The purpose of the desktop review was to collect secondary information which would inform the baseline section. Among others, the following key sources were considered:

Bovet P, Gédéon J, Louange M *et al.* Health situation and issues in the Seychelles in 2012.

COMESA. Investor's Guide to the Seychelles.

SFA, 2013. Aquaculture in Seychelles: History, Current State of Play and Lessons Learnt.

Hill MJ, Vel TM, Holm KJ *et al.* North Island.

Hilmi, N., Allemand D. Coastal livelihoods in the Republic of Seychelles.

IFC. Projects and people: A handbook for addressing project-induced in-migration.

King V, Walmsley B. Seychelles, A Country Report.

Seychelles Republic. Report by the Government of the Republic of Seychelles to the African Commission on Human and Peoples Rights.

Seychelles Ministry of Land Use and Housing, Abu Dhabi Urban Planning Council. Seychelles Strategic Land Use and Development Plan.

Seychelles National Bureau of Statistics:

- Seychelles Population Projections: 2014 to 2080.
- Household Budget Survey 2013.
- Seychelles in Figures 2015.
- Formal Employment and Earnings, 2015 Q1.
- Poverty and inequality estimates, 2015.
- Migration and Tourism Statistics 2015.
- Population and Vital Statistics - Mid-Year Population Estimates: 2016.
- Quarterly Unemployment Statistics 2016-Q2.

Seychelles Parliament. Constitution of the Republic of Seychelles.

Stead S. Aquaculture and Fisheries Socio-Economic Impact Assessment for the inner main islands of the Seychelles.

Wang H, Salomon JA, Murray CJL. Life expectancy in Seychelles - Authors' reply.

World Health Organization. Country Cooperative Strategy at a Glance - Seychelles.

World Health Organization. Diabetes Country Profile: Seychelles.

## 2.3 FIELDWORK COMPONENT

Primary data collection was undertaken through key stakeholder interviews, focus group discussions and public meetings. The focus group meetings were held between the 25th of June 2016 and the 5th of July 2016. The focus groups typically consisted of 10 to 14 people, however, at times more people attended. The details on the focus group consultation are provided in Table 1.

*Table 1: SIA Consultation*

| Stakeholder Group | Date | Type of Consultation |
|---|---|---|
| Bel Ombre Fishermen | 25 June 2016 | Community Focus Group Discussion |
| Roche Caiman fishermen | | |
| North/Central Mahé | 25 June 2016 | Public Meeting |
| South Mahé | | |
| Fishing industry stakeholders | 28 June 2016 | Focus Group Discussion |
| NGO/ Civil society organisations | | |
| Fishing industry stakeholders | 30 June 2016 | Focus Group Discussion |
| Tourism industry stakeholders | | |
| Key community members- Praslin | 1 July 2016 | Community Focus Group Discussion |
| Key community members- La Digue | | |
| Key community members- Mahé | 4 July 2016 | |
| La Digue | 2 July 2016 | Public Meeting |
| Praslin | | |
| La Digue Fishers Association | 3 July 2016 | Focus Group Discussion |
| Principal Secretary- Ministry of Land Use and Housing (MLHU) | 4 July 2016 | Key Informant Interview |
| Mahé police headquarters | 5 July 2016 | Telephonic Consultation |

## 2.4 DATA ANALYSIS AND REPORT WRITING

Quantitative data was analysed through statistics, reports and historical surveys. Statistical analysis was used to generate baseline data.

Qualitative data collected through the focus group discussions was analysed using content analysis to gain insight into community issues and challenges. The content analysis measures the replication of key themes through the responses of participants within focus groups.

Where these key themes are related to salient community dynamics, issues and concerns, these were incorporated into the social baseline. Potential project impacts that were identified through content analysis were incorporated into the impact analysis and assessment.

The impact assessment takes into consideration the various components of the proposed Seychelles MMP for all project phases (construction, operations, closure).

## 2.5 STUDY LIMITATIONS

The majority of quantitative data presented in this report was collected through secondary sources (previous survey results and government documents) which are in some cases dated. Although qualitative data collection methods (focus group discussions) were used to verify the secondary information as far as possible, qualitative methods can only confirm trends and themes. Certain updated official statistics are limited, and therefore detailed statistics (especially on the local level) are also limited.

## 2.6 IMPACT ASSESSMENT METHODOLOGY

The significance of the identified impacts will be determined using the approach outlined below (terminology from the South African Department of Environmental Affairs and Tourism Guideline document on EIA

Regulations, April 1998). This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided as follows:

| **Occurrence** | | **Severity** | |
|---|---|---|---|
| Probability of occurrence | Duration of occurrence | Scale/extent of impact | Magnitude (severity) of impact |

To assess each of these factors, the following four ranking scales are used:

| **Magnitude** | **Duration** |
|---|---|
| 10 - Very high/do not know | 5 - Permanent |
| 8 - High | 4 - Long-term |
| 6 - Moderate | 3 - Medium term (8 - 15 years) |
| 4 - Low | 2 - Short-term (0 - 7 years) (impact ceases after the operational life of the activity) |
| 2 - Minor | 1 – Immediate |
| 0 - None | |
| **Scale** | **Probability** |
| 5 - International | 5 - Definite/do not know |
| 4 - National | 4 - Highly probable |
| 3 - Regional | 3 - Medium probability |
| 2 - Local | 2 - Low probability |
| 1 - Site only | 1 - Improbable |
| 0 - None | 0 - None |

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

- SP (significance points) = (magnitude + duration + scale) x probability.

The maximum value is 100 significance points (SP). The impact significance will then be rated as follows:

| | | |
|---|---|---|
| **SP >75** | **Indicates high social significance** | **A social impact that could lead to the decision not to proceed with the project.** |
| **SP 30 – 75** | Indicates moderate social significance | A social impact which is sufficiently important to require specific management measures and which could have an influence on the decision unless it is mitigated. |
| **SP <30** | Indicates low social significance | Social impacts with little real effect and which should not have an influence on or require modification of the project design or approach. |
| **+** | Positive impact | An impact that constitutes a benefit or an improvement over pre-project conditions. |

For the methodology outlined above, the following definitions were used:

- **Magnitude** is a measure of whether the impact is destructive or benign[1]. The magnitude can range from:

  *Minor,* where the impact affects the social environment in such a way that the cultural and social functions and processes are not affected.

  *Low*, where the impact affects the social environment to the extent that some cultural and social functions and processes are temporarily disrupted.

  *Moderate* where the affected social environment is largely modified to the extent that many cultural and social functions and processes are affected.

  *High*, where the social environment is affected to the extent that cultural and social functions or processes will temporarily or permanently cease.

  *Very high*, where the impacts will constitute a fatal flaw and result in societal breakdown and enduring conflict.

- **Scale/Geographic extent** refers to the area that could be affected by the impact and is classified as onsite, local, regional, national, or international.

- **Duration** refers to the length of time over which an environmental impact may occur: i.e. immediate/transient, short-term (0 to 7 years), medium term (8 to 15 years), long-term (greater than 15 years with impact ceasing after the closure of the project), or permanent.

- **Probability of occurrence** is a description of the probability of the impact actually occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur).

# 3.0 BROAD /LEGAL FRAMEWORK

This SIA has taken into account the various legal, institutional and regulatory frameworks of the Republic of Seychelles. Specific reference is made to the Seychelles Constitution.

The Seychelles Constitution, Article 38 declares that:

*"the State recognizes the right of every person to live in and enjoy a clean, healthy and ecologically balanced environment and with a view to ensuring the effective realization of this right the State undertakes ….to ensure a sustainable socio-economic development of Seychelles by a judicious use and management of the resources of the Seychelles."*

*Article 40 (f)* declares that:

*"It shall be the duty of every citizen of Seychelles….to protect, preserve and improve the environment;"*

(Seychelles Parliament 2010).

# 4.0 SOCIAL BASELINE

The socio-economic environment refers to a wide range of interrelated and diverse aspects and variables relating to or involving a combination of social and economic factors. These aspects and variables could, in general, be categorised into several categories including, economic, demographic, public services, fiscal and social.

[1] Adapted from the Guideline for involving Social Assessment Specialists in the EIA process and Section 2 of the South African National Environmental Management Act, Act No 107, 1998 (Parliament of South Africa 1998; Barbour 2007).

## 4.1 POPULATION DEMOGRAPHICS

### *Population Numbers*

The Seychelles population stood at 94 677 at in mid-June 2016. In mid-2016 there were 47,343 males and 47,334 females. These population figures reflect a growth rate of 1.3% since 2015. Of interest, is that the ratio of men to women is practically 1:1. From July 2015 to June 2016 the Seychelles received 297 in-migrants (Seychelles National Bureau of Statistics 2016a).

The Seychelles population is projected to grow to some 100,000 in mid-2020, reaching 108,000 in mid-2045. More details are provided Table 2 (Seychelles National Bureau of Statistics 2014a).

*Table 2: Projected resident population ('000)*

| Population | Mid-2020 | Mid-2025 | Mid-2030 | Mid-2035 | Mid-2040 | Mid-2045 |
|---|---|---|---|---|---|---|
| Total population | 100,009 | 102,917 | 104,289 | 106,308 | 107,481 | 108,034 |
| Male | 51.6 | 51.4 | 51.1 | 50.5 | 49.7 | 53.4 |
| Female | 48.4 | 48.6 | 48.9 | 49.5 | 50.3 | 46.6[2] |
| % Growth rate over 5 year period | 0.9 | 0.6 | 0.3 | 0.3 | 0.3 | 0.1 |
| Median age | 34 | 35 | 37 | 39 | 40 | 41 |

In reference to Table 2, indications are that the Seychellois population is slowly growing older. The % growth rate is projected to decrease steadily to as low as 0.1% from 2042 to 2045. Any significant influx of migrants may skew these figures, due to the low baseline population numbers.

### *Geographical Distribution*

The Seychellois population are mainly located on the three main islands of Mahé, Praslin and La Digue. Indications are that 78.9% of the population are located on Mahé Island, some 8.7 % on Praslin and the rest (3.7%) on La Digue and the Outer Islands (Seychelles National Bureau of Statistics 2015a).

### *Household Characteristics*

The average household size in 2013 was 3.4 persons, down from 3.7 persons in 2010. In 2013, the number of households was 28 367 (Seychelles National Bureau of Statistics 2014b).

The household head distribution by sex and marital status is depicted in Table 3:

*Table 3: Percentage distribution of households by sex and marital status of head of household*

| Marital status | sex | | Both sexes |
|---|---|---|---|
| | Male | Female | |
| Single/ never married | 26.7 | 38.5 | 33.5 |
| Married / co-habiting | 65.4 | 40.8 | 51.2 |
| Separated / divorced / widowed | 7.9 | 20.7 | 15.3 |
| Total | 100.0 | 100.0 | 100.0 |

[2] The source document indicates a female percentage of 54.6. This is assumed to be an error and has been corrected to 100%.

*Source:* (Seychelles National Bureau of Statistics 2014b)

## 4.2 ETHNICITY, RELIGION AND LANGUAGES

The Seychelles Constitution states that English, French and Creole are the official languages in the Seychelles (Seychelles Parliament 2010). Creole is the most common language spoken in the inner islands.

The ethnic groups in the Seychelles consist of primarily the Seychellois Creole at 89%, with Indian (5%), Malagasy (3%) and Chinese (1%) making up the rest. Most citizens consider themselves as Seychellois. The constant flux of immigrants to Seychelles, initially from continental Africa, Europe and the Indian sub-continent, and later from China, have created an ethnically diverse, harmonious people, accustomed to meeting and working alongside people from places and backgrounds vastly different to their own (COMESA 2012).

The Roman Catholic religion is dominant (close to 90%) The other Christian affiliations (some 8%), Hindu (less than 1%) and other religions make up the rest (COMESA 2012; Bovet *et al.* 2013).

*Figure 3: Catholic shrine- South Mahé (left), Catholic Church -La Digue (right)*

*Figure 4: Catholic churches (South Mahé)*

## 4.3 SOCIAL SERVICES AND FACILITIES

### 4.3.1 Education

In 2015 the national literacy rate was 95.32% (The World Bank: 2015). According to the 2012 figures, the literacy rate is almost even for both genders, with male at 91.4% and female at 92.3%. These figures are noteworthy, when considering that the 2004 literacy rate was 88% (Seychelle Republic 2004).

The total number of private and public education facilities is depicted in Table 4. Pre-primary and primary schools have the most establishments available in Seychelles. There is only one special needs school. Private educational facilities are limited; with public educational facilities outweighing the number of private. (Seychelles National Bureau of Statistics 2015a).

*Table 4: Education facilities*

| Facility | Total No. of Institutions | No. of Private | No. of Public |
|---|---|---|---|
| Pre-Primary School | 33 | 4 | 29 |
| Primary School | 28 | 4 | 24 |
| Secondary School | 14 | - | - |
| Tertiary Institutions | 14 | 3 | 10 |
| Special Schools | 1 | 0 | 1 |
| Grand Total | 90 | 11 | 64 |

*Source:*(Seychelles National Bureau of Statistics 2015a)

In 2014 there was a total of 662 primary school teaching staff with a pupil/teacher ratio of 13:1 and 550 secondary teaching staff with a pupil/teacher ratio of 12:1. Public tertiary education and training (non-university) facilities have a teaching staff of 180 with a pupil/teacher ratio of 13:1. Private tertiary education and training (non-university) facilities have a teaching staff of 37 with a pupil/teacher ratio of 3:1 (Seychelles National Bureau of Statistics 2015a).

Respondents from social focus group meetings from all three large islands (Mahé, Praslin and La Digue) indicated that the access to primary schools is adequate. Access to tertiary institutions, however, is problematic as most tertiary institutions are located on Mahé, necessitating that people who want to further their education have to relocate to the main island to do so.


**Figure 5: Schools, Anse Royale (left), La Digue Island (right)**

Tertiary Non-university education and training (Public) Institutions consist of the following:

- Seychelles Institute of Technology.
- Maritime Training Centre.

- School of Advanced Level Studies.
- School of Visual Arts.
- School of Business Studies and Accounting.
- National Institute of Health and Social Studies.
- Seychelles Agricultural and Horticultural Training Centre.
- Seychelles Tourism Academy.
- Seychelles Police Academy.
- Seychelles Institute of Teacher Education.

Private tertiary institutions in the Seychelles include the following:

- Seychelles Polytechnic.

  The Seychelles Polytechnic was established in 1983. The Polytechnic offers post-secondary education and training in three main programme areas. These programme areas are Business & Secretarial Studies, Visual Arts and the Manchester Twinning Programme (a first-year degree programme in partnership with the University of Manchester in the UK) (Seychelles Polytechnic 2016).

- University of the Seychelles (UniSey).

  There is only one university in the Seychelles The young University of Seychelles had its first student intake in September 2009 (Africa Universities 2016). The University of Seychelles, popularly known as UniSey, has three campuses, two of which are close to Victoria and the third located south of the capital at Anse Royale. The university had 1,330 students enrolled in 2015, offering a number of undergraduate and postgraduate courses, many in cooperation with leading international universities (University of Seychelles 2015).

### 4.3.2 Health Care

According to the Seychelles Constitution, access to health care is free for all Seychellois. The Seychelles operates a three-tier health delivery system (primary, secondary and tertiary). This system comprises of a central referral hospital, a cottage hospital and district health centres. A number of special clinics, including rehabilitative hospitals, wellness centres, youth health centres, and prison health centres provide services to vulnerable groups (Bovet *et al.* 2013; World Health Organization 2014).

The Seychelles National Care is centralised in Victoria (Mahé). Residents in Praslin and La Digue who are in need of free health care can travel for free by ferry to Victoria to obtain free health care. Residents that are pregnant in Praslin and La Digue are encouraged to travel to the main island (Mahé) to give birth to their children.

In 2014, the private healthcare included 22 general practitioners, four dentists and nine pharmacists. In addition, there are 26 private medical, dental and optometry clinics that offer primary healthcare, referring patients the government healthcare system when necessary. At the same time, the government healthcare system had available 153 medical practitioners, including 13 consultants in 2014. There were 20 dentists, including two consultants. There were seven government pharmacists (World Health Organization 2014; Seychelles National Bureau of Statistics 2015a).

The ratio of population per doctor was 522 in 2014. The ratio per dentist was 3807. Although these ratios are considered to be high for the WHO African Region, it must be considered that the Seychelles is deeply dependent on expatriate medical practitioners, who account for just more than 60% of all medical doctors (World Health Organization 2014; Seychelles National Bureau of Statistics 2015a).

The following healthcare facilities are available in the Seychelles.

*Table 5: Health facilities (number)*

| Government Establishments | 2014 |
|---|---|
| Hospitals | 6 |
| Hospital Beds | 302 |
| Health centres | 18 |
| **Private Clinics** | |
| General Practitioners | 22 |
| Dentists | 4 |
| Pharmacists | 9 |

*Source:*(Seychelles National Bureau of Statistics 2015a)

## 4.4 HEALTH

From 2005 to 2008, the five leading causes of hospitalisation in the Seychelles were: obstetrics and gynaecology (20.2%), infectious diseases (9.6%), respiratory ailments (9.4%), digestive problems (8.4 %) and cardiovascular disease (8.3%). There has been an increase in non-communicable diseases which is linked to the ageing population and behavioural factors such as smoking, excessive alcohol intake, physical inactivity and unhealthy diet. The decrease in the consumption of traditional foods based on fish, rice, and tea in favour of fatty and sugary foods also partly explains the increase in non-communicable diseases (NCDs). The main risk factors are cardiovascular diseases, hypertension, obesity, smoking and diseases related to alcoholism (see Table 6). According to the Seychelles National Cancer Registry in 2010, 131 new cases of cancer were reported and 93 people died (Bovet, 2012). In the risk factors highlighted by the WHO, 36.7% of adult females suffer from obesity and 17.6% of adult men. Weight-related illnesses are more prevalent in females than males (World Health Organization 2016).

*Table 6: Prevalence of diabetes and related risk factors (WHO, 2016)*

| | Males | Females | Total |
|---|---|---|---|
| Diabetes | 9.6% | 10.5% | 10.1% |
| Overweight | 48.3% | 64.5% | 56.3% |
| Obesity | 17.6% | 36.7% | 26.9% |
| Physical inactivity | 18.2% | 23% | 20.6% |

*Source:* (World Health Organization 2016)

Along with favourable socio-economic development that contributes to public health successes, the Seychelles are actively fighting infectious diseases and NCDs, producing significant achievements, including high life expectancy (Bovet, 2012). The life expectancy at birth for Seychelles is reported to have decreased from 62·0 years to 61·3 years for men, and from 72·4 years to 71·8 years for women between 1990 and 2010 (Wang, Salomon and Murray 2013).

### Social Security

A telephonic interview with the Seychelles Police Headquarters revealed that there are 17 police stations throughout the Seychelles with a ratio of 1:1000 police to civilians. Respondents from a focus group meeting with key community members from Praslin stated that the island needed to have their policing services upgraded and that there is a lack of experienced policemen and women.

## 4.5 HOUSING

The most recently published Population and Housing Census of the Seychelles (2010), reported 23 770 housing units in the Seychelles. There are in the order of 4.9 rooms per household (Seychelles National Bureau of Statistics 2014b).

The Seychelles Ministry of Land Use and Housing (MLUH) are aware of the predicted increase in pressure on various social infrastructure. The MLUH have planned to develop additional housing, hospitality, office,

retail and industrial units over the next 30 years as depicted in the Seychelles Strategic Land Use and Development Plan 2015 (Seychelles Ministry of Land Use and Housing and Abu Dhabi Urban Planning Council 2015).

Residential development will be supported within existing settlements through new development and redevelopment. The MLUH has planned to develop additional housing units as shown in Table 7.

*Table 7: Seychelles strategic development plan prediction for housing units*

| | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|
| Housing Units | 5815 | 8960 | 11290 | 13570 | 15830 |

*Source:* (Seychelles Ministry of Land Use and Housing and Abu Dhabi Urban Planning Council 2015)

The tenancy figures for housing in 2013 are depicted in Table 8. The majority of homes in the Seychelles are owned followed by 11% of the population renting accommodation.

*Table 8: Tenancy (owned, rented, supplied free)*

| Tenure | % |
|---|---|
| Owner Occupied | 82.0 |
| Rent free | 6.9 |
| Renting | 11.1 |
| Total | 100.0 |

*Source:* (Seychelles National Bureau of Statistics 2014b)

## 4.6 EMPLOYMENT AND ECONOMY

### 4.6.1 Employment

The employment by sector (Government, Parastatal and Private) for 2015 and Quarters one and two of 2016 is shown below Table 9.

*Table 9: Formal employment by sector*

| Sector | 2013 Annual Average | 2014 Annual Average | 2015 Annual Average | 2016 Q1&2[3] |
|---|---|---|---|---|
| **Private** | 31 769 | 33 370 | 33 344 | 32 254 |
| **Parastatal** | 5 173 | 5 432 | 5 762 | 6 381 |
| **Government** | 8 876 | 9 150 | 9 317 | 9 086 |
| **All Sectors** | **45 818** | **47 952** | **48 424[4]** | **47 721** |

*Source:* (Seychelles National Bureau of Statistics 2016b)

From Table 9, it follows that the private sector provides most employment and that employment within this sector is fluctuating slightly, as is the case in the government sector. In contrast, employment within the parastatal sector showed slight but constant growth. the employment by the government sector shows a relative stability while

The average monthly employment by industry is shown in Table 10 below. According to the 2015 figures, the highest concentration of employment numbers is in accommodation and food service activities (19%) which are tourism related activities. The second largest employment industry is that of construction (11.5%) which

[3] These figures are based on the average monthly employment for the first two quarters of 2016.

[4] There is a slight between Table 1a and Table 4 in the source document

is evident by all the new developments taking place in and around the inner islands. This trend is also reflected in the first two quarters of 2016.

*Table 10: Average 2015 Employment by Industry compared to Q2 2016*

| Industry | 2015 | % | 2016 Q1&2[5] | % |
|---|---|---|---|---|
| Agriculture, forestry and fishing | 551 | 1.14 | 663 | 1.43 |
| Manufacturing | 4417 | 9.12 | 4182 | 9.01 |
| Electricity, gas, steam and air conditioning supply | 519 | 1.07 | 554 | 1.19 |
| Water supply; sewerage, waste management and remediation activities | 642 | 1.33 | 601 | 1.30 |
| Construction | 5564 | 11.49 | 4998 | 10.77 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 4096 | 8.46 | 4052 | 8.73 |
| Transportation and storage | 3489 | 7.21 | 3672 | 7.92 |
| Accommodation and food service activities | 9093 | 18.78 | 8979 | 19.36 |
| Information and communication | 1073 | 2.22 | 885 | 1.91 |
| Financial and insurance activities | 1679 | 3.47 | 1550 | 3.34 |
| Real estate activities | 1084 | 2.24 | 1014 | 2.19 |
| Professional, scientific and technical activities | 1587 | 3.28 | 1445 | 3.11 |
| Administrative and support services activities | 3040 | 6.28 | 2980 | 6.42 |
| Public Administration and defence; compulsory social security | 4595 | 9.49 | 4615 | 9.95 |
| Education | 3108 | 6.42 | 3119 | 6.72 |
| Human health and social work activities | 1947 | 4.02 | 1510 | 3.25 |
| Arts, entertainment and recreation | 1004 | 2.07 | 895 | 1.93 |
| Other service activities | 656 | 1.35 | 483 | 1.04 |
| Activities of households as employers of domestic personnel | 191 | 0.39 | 66 | 0.14 |
| Activities of extraterritorial organisations and bodies | 46 | 0.09 | 22 | 0.05 |
| Unclassified | 43 | 0.09 | 106 | 0.23 |
| **Total** | **48 247** | **100** | **46391[6]** | **100** |

*Source:* (Seychelles National Bureau of Statistics 2016b)

[5] These figures are based on the average monthly employment for the first two quarters of 2016.

[6] There are discrepancies in the average monthly employment by industry, as reported in the 2016 Q2 report on formal employment and earnings. The official reported total is 47 721, but when combining the respective industry totals, it comes to 46 3951, a discrepancy of some 1330. However, indications are that the trends are largely similar.

### 4.6.1 Earnings

The average monthly earnings for the private, parastatal and government sectors are indicated in Table 11.

*Table 11: Average earnings per sector (Rupees)*

| Sector | 2013 Annual Average | 2014 Annual Average | 2015 Annual Average | 2016 Q1&2 Average |
|---|---|---|---|---|
| **Private** | 8 187 | 9 052 | 9 544 | 10 012 |
| **Parastatal** | 11 519 | 13 112 | 13 799 | 14 369 |
| **Government** | 9 826 | 11 648 | 12 220 | 12114 |
| **All Sectors** | **27 290** | **29 532** | **33 812** | **36498** |

*Source:* (Seychelles National Bureau of Statistics 2016b)

The above statistics show a steady any increase over all three sectors. The highest average earnings are accumulated within the parastatal sector. This trend has been consistent since 2013.

### 4.6.1 Unemployment

The national unemployment[7] rate in 2014 was 3%, decreasing from 3.3% in 2013. Of the national unemployed rate, the female unemployment rate was (4.8%), which is higher than that of the males at 3.4%. The unemployment rate for youths (between ages of 15-24) was 11%. Among the unemployed youth[8], the rounded male:female ratio was 51:49 respectively (Seychelles National Bureau of Statistics 2015b).

In comparison, the national unemployment rate increased to 4.2% during the second quarter of 2016. Of the national unemployed rate, the female unemployment rate was (4.6%), which is higher than that of the males at 3.9%. The unemployment rate among the youth decreased to 10%. Of the unemployed youth, women made up 54%, and males 46%) (Seychelles National Bureau of Statistics 2016c).

The estimated poverty threshold in the Seychelles for 2013 was SCR 3,945 per adult equivalent per month. An estimated 39.3% of the population live below the poverty line (see Table 12). The Poverty Gap Index[9] was estimated at 12.6%, which reflects the mean shortfall of gross income from the poverty line as a percentage of the poverty line. The Gini Index[10] was estimated at 45.9%, which measures the disparity in income distribution (Seychelles National Bureau of Statistics and The World Bank 2016).

*Table 12: Poverty and inequality based on estimated gross income, 2013*

| Indicator | |
|---|---|
| Poverty line (SCR/adult equivalent /month) | 3,945 |
| Poverty headcount ratio (%) | 39.3[19] |
| Poverty gap index (%) | 12.6 |
| Poverty gap squared index (%) | 6.6 |
| Gini index (%) | 45.9 |

*Source:*(Seychelles National Bureau of Statistics 2015c).

Seychelles' relatively high poverty rate may appear to be the result of a poverty line which is unusually high. For a high-income country, this falls within the general range, which plots the relationship between per capita income and national poverty lines (Seychelles National Bureau of Statistics and The World Bank 2016).

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7 Unemployment for the purposes of this report is defined here as persons in the working age population, were not employed, were available to work and were looking for work (Seychelles National Bureau of Statistics 2016c).

, 8 When contemplating the significance of the high unemployment among the youth, considered that the youngest members in this category, would not typically be in the job market.

9 The poverty gap index is a measure of the intensity of poverty. It is defined as the average poverty gap in the population as a proportion of the poverty line.

10 The Gini index is a measurement of the income distribution of a country's residents. Tis number helps define the gap between the rich and the poor, with 0 representing perfect equality and 1 representing perfect inequality.

## 4.7 TRANSPORT

Thoroughfares in the Seychelles consist of a total of 998 km of roadway. Of this, 508 km is tarred and 490 km is paved roadway. The traffic density is four vehicles per kilometre of road. There are an estimated number of 615 private cars per 1000 households. More than a quarter of households have motorised transport. On the islands of Mahé and Praslin, there are independently operated taxis and there are a few operating on La Digue. The local population of La Digue predominantly uses bicycles as their means of transport. Cars are not commonly used on the island.

The city of Victoria on Mahé Island houses the main seaport. Small harbours are located at Praslin and La Digue. These small harbours service local fishing boats, tourist charters and general boat traffic between the islands. Transport between the islands relies on a network of regular air and sea transport that operates for the most part out of Mahé (Seychelles National Bureau of Statistics 2015a).

Respondents from social focus group meetings stated that all local roads require upgrading as they are too narrow and it is becoming a safety and security risk.


*Figure 6: Bicycle rental, La Digue (left), Inter-Island Ferry's (right)*

## 4.8 LAND USE

Almost half of the ground comprising the Seychelles (about 47%) is protected by a number of conservation areas. Arable land includes approximately 10,000 ha, of which about 60% consists of coconut and other tree-crop plantations. A large amount of arable land has been used for other purposes, especially for housing (King and Walmsley 2013).

On the major granitic islands, 42% of the land is covered by forests. Forest cover consists of unprotected natural forest (41%), national park forests (48%) and plantations (11%). Forested areas do not lend themselves to other uses due to the topography of the land. However, as land availability decreases, housing developments are rapidly encroaching into the higher forested areas.

There is an economic desire to endorse local products which translate into the need for industrial land. Industrial developments include coconut oil and soap manufacturing factories, a tuna-canning operation and various related operations. Land is also needed for public utilities such as sewage works and desalination operations. On Mahé, the airport, the Victoria Sewage Works and the desalination plant are all located on reclaimed land. Other industries and some housing are also located on reclaimed land (King and Walmsley 2013).

# 4.9 ECONOMIC ACTIVITY

## 4.9.1 Fisheries

Seychelles has a well developed fishing sector that is a vital part of the social and economic development of the country. Three main types of fisheries are recognised: artisanal fisheries targeting demersal and semi-pelagic species, semi-industrial fisheries targeting pelagic species, and industrial fisheries targeting species of tuna. In economic terms, the industrial fisheries are of greatest importance. The per capita consumption of fish in Seychelles is one of the highest in the world at around 54-65 kg/person/year and the artisanal fisheries contribute significantly to the protein requirements of the country. Artisanal fisheries catches have remained fairly stable since comprehensive monitoring began in 1985, averaging around 4000 tonnes per annum but with some inter-annual variation. A wide range of fish and invertebrate species are targeted and the general catch composition has remained stable. The demersal stocks targeted by the artisanal fisheries are known to be over- or optimally exploited close to centres of population, and lightly exploited elsewhere, while the industrialised fisheries for pelagic species require a precautionary approach to management as some stocks are being exploited close to maximum sustainable yield levels (Robinson *et al.* 2010).

The submarine banks of the Seychelles form the basis of the artisanal fisheries providing vital food security, employment and high-value trade commodities. The Mahé Plateau is of particular importance. This shallow bank of some 39,000 km$^2$ supports important demersal fisheries such as: *Lethrinidae, Lutjanidae, Scaridae, Serranidae, Siganidae* some 100 species of demersal fish are commonly caught in the fishery. Also important are the sea cucumber, lobster and octopus fisheries.

As with many small island nations, Seychelles has a high reliance on marine resources. Fisheries and ancillary services also account for 15 percent formal employment. Seychelles is characterised by a wide range of marine habitats: shallow water fringing reefs, granitic reefs, banks and plateau shelves, drop-offs, lagoons, seamounts and pelagic habitats.

The only fisheries that could potentially be impacted by aquaculture are the near-shore artisanal fisheries, which are characterised by a multispecies resource base, encompassing a diverse assemblage of demersal, reef-associated and pelagic fish species, plus a range of invertebrate groups such as lobsters, sea cucumbers and octopus. The artisanal fisheries, practised solely by Seychellois fishers, comprise a variety of vessel and gear types. Although still used in a few near-shore areas, the traditional wooden canoes ('pirogues') have largely been replaced by more powerful craft. The fleet is now dominated by small fibreglass boats ('Mini-Mahé') powered by outboard motors (> 15 hp) and partially decked whaler vessels ('Lekonomi' and 'Lavenir') powered by inboard motors. Until the introduction of the schooner fishery in 1974, the fleet was largely restricted to near-shore fishing grounds on the Mahé Plateau but now have moved further offshore. The outlying coralline islands and atolls are less exploited. The main gear type employed is hook and line, with bamboo traps ('kazye'), beach seines, droplines, and longlines of lesser importance. Spear guns and shark gillnets are prohibited in Seychelles, as is the use of trawl nets to target demersal resources.

There are two fisheries that could be impacted upon by cage aquaculture and these are the trap fishery and the near-shore dropline fishery. The spatial distribution of the trap fishery around the inhabited inner islands and its operational detail were examined in detail by Christophe (2006). The spatial data was transferred to the GIS maps of Mahé, Praslin and La Digue. The data shows that the fishery is largely restricted to less than 2 km offshore and where it occurs further offshore, particularly off Praslin, it takes place in shallow waters and far away from any of the proposed aquaculture developments. The dropline fishery (mainly targeting large sharks) is restricted to hard ground and is also restricted by the depth to around 25 m. Other artisanal fisheries such as the inshore octopus and the beach seine fishery also occur in areas far removed from the proposed aquaculture zones.

The main commercial fishing products produced in the Seychelles is depicted in Table 14.

*Table 13: Fishery Products*

| Fishery Products | Tonnes |
|---|---|
| Fish Landed | 3 468 |
| Canned Tuna | 32 219 |
| Smoked Fish | 41 |

*Source:* (Seychelles National Bureau of Statistics 2015a)

### 4.9.2 Small-Scale Fisheries

As a whole, the fisheries sector contributed 7.7% to the GDP in 2008. Subsistence and semi-industrial small-scale fishing contribute between 1% and 2% to the Seychelles GDP annually. Land-based economic opportunities are very limited in the Seychelles. Fishing is, therefore, an integral source of income, employment, food security and foreign exchange in the country. The fishing industry accounts for 17% of employment in the Seychelles, indicating the importance of this industry. Some 30% of this employment is in the small-scale sector, and 10% of the population is reliant on income from the small-scale fishing sector (Hilmi, N., Allemand 2015).

The small-scale fishing industry is challenged by numerous constraints, in spite of its economic importance in coastal regions. One of these constraints is the high operating and investment costs which have made it problematic for the sector to conform to quality standards set by the EU. This has both blocked access to the European market and also reduced competitiveness in the global market. Other constraints comprise little development in value-added products, inadequate marketing, as well as insufficient processing companies (Hilmi, N., Allemand 2015).

The main commercial fishing products produced in the Seychelles is depicted in Table 14.

*Table 14: Fishery Products*

| Fishery Products | Tonnes |
|---|---|
| Fish Landed | 3 468 |
| Canned Tuna | 32 219 |
| Smoked Fish | 41 |

*Source:*(Seychelles National Bureau of Statistics 2015a)

*Figure 7: Commercial tuna vessel (left) and artisanal fishing vessel (right)*

### 4.9.3 Tourism

A major contributor to the GDP of the Seychelles is tourism, amounting to 25.6% in 2010, which is an increase of 2.2% from 2007. The tourism industry directly employs 25% of the labour force and generated in the order of $270 million per year (2012). The Seychelles economy is tourism dependent, reflecting almost a

quarter of the of GDP. Only Macau and Maldives have economies more reliant upon tourism, according to 2012 figures. Tourism generates $270 million per year. In 2012, Seychelles received 208,034 tourists (King and Walmsley 2013).

Although the expected increases in the tourism industry have been realised, there are some constraints to the growth of this sector. For example, various environmental factors associated with tourism impact negatively on this sector. These factors include climate change, conflict over land use between agriculture and tourism, as well as water shortages. The capacity of local communities to handle increases in tourism activity, as well as the ability of government to monitor development in tourism, has also been indicated as a threat to the sector (Hilmi, N., Allemand 2015).


*Figure 8: Department of tourism promoting tourism in the Seychelles (left), key tourist node on the Anse Royale beachfront (right)*


*Figure 9: Luxury boats and super yachts at Eden Island Marina (left), Mahé New beach villa developments, Beau Vallon (right)*

### 4.9.4 Mariculture

Mariculture has not been well developed in the Seychelles. While there are a small number of clam and pearl oysters being produced by small-scale farming operations, these industries do not require much labour and as such generate few employment opportunities.

Mariculture opportunities have not been comprehensively assessed. Few policies are in place and little planning has been conducted for the sector as yet. Recommendations for the development of this sector are dependent on the building of biotechnical mariculture capacity which is still being developed in the country. A development plan funded by the African Development Bank has been commissioned by the government to

investigate biotechnical and economic prospects in the sector. The SFA also has numerous international links, specifically in research, which should be beneficial in the planning process (Hilmi, N., Allemand 2015).

### 4.9.5 Agriculture and Forestry

Due to a paucity of land-based opportunities in the Seychelles, agriculture and forestry contribute considerably less to the GDP than the more lucrative tourism sector. However, by 1995, subsistence agriculture, forestry and fishing contributed 6% to the GDP and the agricultural industry provided employment for nearly 6% of the labour force. There has recently been a revival in the traditional exports of cinnamon and copra as the government provides incentives to the sector to increase productivity. The heavy reliance on the importation of staple foods means that food security remains an issue. This is in spite of the country becoming mostly self-sufficient in eggs, poultry and pork during the late 1990's (Hilmi, N., Allemand 2015).

Most agricultural practices are focused in the South of Mahé. This consists mainly of small-scale commercial farming that is conducted in small open fields and greenhouse tunnels. The mountainous terrain and low soil fertility of the Seychelles greatly reduce productivity in the agricultural sector (Hilmi, N., Allemand 2015).

*Table 15: Agricultural Production (2014)*

| Cash Crops | Tonnes |
|---|---|
| Copra | 2 |
| Cinnamon bark | 8 |
| Tea (green leaf) | 27 |

*Source:* (Seychelles National Bureau of Statistics 2015a)

*Figure 10: Agricultural Greenhouses, Mahé South (left), Palm oil plantation, La Digue (right)*

# 5.0 SOCIAL IMPACT ASSESSMENT

Social impacts are the real and perceived impacts experienced by humans (at the individual and higher aggregation levels) as a result of social change processes caused by planned interventions. *Social impacts relate to all social and cultural consequences to human populations of any public or private actions that alter the ways in which people live, work, play and relate to one another* (Becker and Vanclay, 2003) Impacts are anticipated for construction, operation, decommissioning and closure phases of the project.

The assessment will focus on the impacts that the project is expected to have on the local social environment and will also look at the long-term, indirect social impacts, with a focus on the inner islands (Mahé, Praslin and La Digue).

This assessment is focused on the land-based aquaculture facilities and the ADZs.

## 5.1 CONSTRUCTION RELATED IMPACTS

The construction impact relates to the building of the Broodstock Quarantine & Acclimation Facility (BQAF) and Research and Development (R&D) facilities. This section considers the social impacts that may occur as a result, or in anticipation of the construction process.

### 5.1.1 Job Opportunities and Local Employment

#### *Description of Impact*

The land-based component, includes the construction of the BQAF and R&D facilities. Indications are that, to a large extent, conventional construction techniques will be used. Over and above the construction of the infrastructure, installation of specialised equipment and related structures will be required.

The Seychelles has a vibrant construction sector. As stated in Section 4.6, the construction sector is the second, employment sector in the Seychelles (King and Walmsley 2013; Seychelles National Bureau of Statistics 2015a). The skills and capacity that would be required are available in the Seychelles. They may be a requirement for specific skills to install the specialised equipment and related structures. Depending on the nature of this equipment, the capacity could potentially be found in the Seychelles. If this is not the case, it could be important. The number of people required for this specialised function with very low and will have an insignificant impact on local employment and population structure.

It is unclear at this stage how many construction workers would be required, but indications are that it will be a small number. These construction jobs will be of a temporary nature. It follows that the land-based construction related impacts will be very limited and should, to a very large extent, be fulfilled from the Seychelles labour market. Very little if any importation of labour is anticipated.

When considering that, in 2016, the national unemployment rate was just above 4%, with the youth (10%) and woman youth (4.6%) the largest component thereof, an opportunity may arise (Seychelles National Bureau of Statistics 2016c). Recruitment of labour for the land-based construction activities, should therefore target the youth and women, as part of the process to address the mentioned unemployment disparity.

This impact is perceived to be positive, even if of low significance. Any new construction activity and the associated creation of job opportunities will, *per se,* make a positive socio-economic contribution to some extent. This viewpoint is supported by the fact that the bulk of the construction skills are available locally. The positive impact can be enhanced by focusing on the employment of the youth and women. This conclusion is based on the viewpoint that the construction activities will not cause any significant influx of foreigners and importation of labour into the Seychelles.

This aspect is considered in the following section.

#### *Mitigation and Management Measures*

- Ensure adherence to the approach that local labour is used as far as possible with an emphasis on employing youth and women.
- Introduce contractual obligations for contractors to use local labour as far as possible.
- If specific skilled positions cannot be sourced within the local districts, they should be sourced at the national level first before looking at international workers.
- Establish community liaison officers to manage the local MMP public interface, specifically during the construction phase.
- Maximise the usage of local service providers, including contractors.

### 5.1.2 Population Influx

#### *Description of Impact*

This variable refers to the moving into the area of temporary workers during the construction phase of a project. Typically, the skills levels required, which varies between highly skilled (e.g. professional engineers), technical staff (e.g. surveyors) to skilled machine operators to general unskilled/semi-skilled labourers, could influence this variable. An influx of a large number imported labour could result in social conflict and pressure on social services and facilities impacts.

When considering the low number of employment opportunities during the construction phase, linked to the fact that the bulk of the construction skills will be available locally, a population influx is not anticipated.

#### *Mitigation and Management Measures*

Over and above the mitigation measures indicated in Section 5.1.1 of this report, the following measures are recommended

- The use of Seychelles labour should be specified in the tender documentation.
- Before construction commences, representatives from the district and community-based organisations, as well as neighbouring residents should be informed of the details of the construction company, the size of the workforce and construction schedules.
- Construction workers should be easily identified as part of the construction team by e.g. wearing specific clothing and name tags.
- Criminal incidents should be communicated to the workforce and employees to ensure a general awareness of the safety situation in the area.

### 5.1.3 Project-Induced In-Migration

#### *Description of Impact*

Project-induced in-migration associated with economic opportunity is a common phenomenon. Project-induced in-migration, in the context of this report, is seen as the large scale movement of people into an area in expectation of, or response to, economic opportunities associated with a new project (IFC 2011). In-migration is sometimes related to expectations rather than an ensured advantage.

Migrant groups will often vary according to the unique demographic, social or economic circumstances. Categories of migrant groups typically include labourers and their families, entrepreneurs and opportunistic seekers of prospects (IFC 2011).

In this regard, it is important to consider that jobs form part of a basic need. The introduction of job opportunities is likely to create competition among jobless people, be that local or migrants from other regions or even countries. Largescale in-migration may also have impacts on the cultural-social fabric of the recipient society. In this regard, some focus group respondents have stated that an influx of foreign cultures could have a negative impact on the Seychellois culture, as some foreign workers are believed to have made a nuisance of themselves on beaches popular with tourists and locals.

According to the Seychelles National Bureau of Statistics, there has been a net loss of 3,815 long-term migrants and a net gain of 1,420 in short-term migrants (Seychelles National Bureau of Statistics 2015d). They are little indication that this level of in and out migration had a significant impact on the social and cultural activities of the Seychellois (Personal observations and numerous discussions with Seychellois people).

Project-induced in-migration is not anticipated to realise during the construction of the BQAF and R&D facilities. This conclusion is underpinned by the following factors:

- The extraordinarily high employment levels in the Seychelles, will preclude any in-migration to a specific area due to the availability of jobs.

- As indicated, the number of temporary jobs created during the construction period is anticipated to be very limited.
- It is unlikely that significant labour imports will be required.
- Being an island, a large movement of unofficial in-migration will be difficult.

In a similar vein it is unlikely that any of the side effects of large scale immigration would realise. It is also not anticipated that there would be any additional housing requirements, due to the small number of jobs and the proximity to the residential areas.

### *Mitigation and Management Measures*

No further mitigation or management measures are proposed, over and above the ones made previously. In this regard the two following measures are reiterated:

- Implement an effective stakeholder engagement and awareness process regarding the construction process in particular, and the larger Seychelles MPP as well.
- Before construction commences, representatives from the District Authority, the District Social Committee and the District Team, and community-based organisations, as well as neighbouring residents should be informed of the details of the construction process, contractor (if any), the size of the workforce and construction schedules.

## 5.1.4 Skills Requirements

### *Description of Impact*

This aspect relates to the skills gap, if any, that may exist between the project requirements and the local labour offering. If the skills required by a construction process, or a project, are of a higher level and complexity than those on offer by the local inhabitants, it can have a number of diverse consequences. Among these are the need to import labour, competition for scarce resources in the local economy, as well as capital flowing out of the local economy. Extensive capacity building and training will be required if sustainable social and economic growth is to be attained over the longer term.

As indicated before, the skills required for the construction of the BQAF and R&D facilities are, to a large extent, locally available. If however, the recommended measure to focus on the employment of the youth and women is considered, it may require some focused capacity building and training. For such an approach to be successful, participants would have to be selected and empowered in a transparent manner. To this extent, the following recommendations are made.

### *Mitigation and Management Measures*

- Finalise the details of the construction activities, specific job requirements and associated skills as well as the schedules. This should take place before the construction starts, to enable the process of capacity building if required.
- Develop the capacity requirements and associated budgets.
- Develop a list of potential candidates, focusing firstly on the unemployed youth and women before construction commences. Representatives from the District Authority, the District Social Committee and the District Team, as well as neighbouring residents should be consulted should be consulted in this regard.
- Appoint a training coordinator to manage and coordinate this process. This function can be combined not only why with those of the proposed community liaison officers.

### 5.1.5 Change in Employment Equity of Vulnerable Groups

Change in employment equity of vulnerable groups is interpreted as the degree to which job opportunities generated by the construction match, or stimulate the employment of vulnerable groupings living at or close to the development, including women and the youth.

As indicated before, the 2016 mid-year unemployment level in the Seychelles is just more than 4%. Of significance is that the youth[11] makes up 10% of this total, and women almost 5% (Seychelles National Bureau of Statistics 2016c). There is therefore an opportunity to **target unemployed women and the youth** to participate in the construction process. As disused before, this also opens up the prospect to build the skills and capacity of these people as required. This process may provide them with an opportunity to participate in the construction labour market over the longer term.

Due to the small number of people involved in the construction process, the impact will only affect a few people. Even though the numbers are small, the potential benefit is assessed as a potential positive impact.

#### *Mitigation and Management Measures*

- Implement the recommendations made to focus on involving women and the youth in the construction process.
- Implement the skills training and capacity building focus as indicated in Sections 5.1.1 and 5.1.4.

### 5.1.6 Impacts on Daily Living and Movement Patterns

Impacts on daily living and movement patterns relate to the project related traffic impacts of construction activities on residents and road users. The impacts on daily living and movement patterns relate to increases in levels of traffic and movement of vehicles, including heavy construction vehicles, in and out of the area as a result of building and infrastructure related activities. These project related vehicular movements may interfere adversely with current traffic patterns and negatively impact on public safety and access.

Heavy construction vehicles have the potential to damage roads, create noise, dust, visual intrusions and cause risk impacts for other road users and residents in the area. Care must be taken that any increases in traffic will not have a negative effect on pedestrians, in particular, children who may not, as yet, be well versed in road use and traffic rules.

#### *Mitigation and Management Measures*

Communicate information regarding the construction routes, peak operational times, hazards associated and precautionary measures to the local district as well as the relevant community representatives.

Notify the public of construction progress, when and where new construction will start and what routes will be affected. The proposed liaison officers could fulfil this function.

- Construction traffic past community infrastructures such as schools, crèches, sporting facilities, etc. must be strictly managed.
- Ensure construction activities avoid peak traffic hours and particular social usage requirements.
- General road rules should be enforced, and specific provision should be made for management of construction related complaints.
- Ensure safe and secure public transport access points.
- Develop and implement a formal grievance mechanism.

[11] Of the unemployed youth, some 8% are men and 14% female (Seychelles National Bureau of Statistics 2016c).

### 5.1.7 Introduction of New Social Classes and Related Socio-Cultural Impacts

If a large number of outsiders with different values, beliefs and practices migrate to a project area during the construction phase, the presence of the outsiders may result in the disruption of the existing social-cultural networks. The intensity of such an impact would be more prominent if these outsiders are mostly single males and if no adequate housing facilities are created. The conduct of these groups (if outsiders) could lead to social tension and conflict between the locals and the construction workers.

Typically, any large influx of labourers from outside the area would include many foreigners or even specialists with different values, beliefs and practices. Such an event could result in the significant disruption of the existing social networks.

Respondents in focus group consultations in Mahé and Praslin stated that some foreign cultures could have a negative impact on Seychellois culture. It was also stated that the ways and norms of these foreign workers are very different to the way of the Seychellois and there is a fear the Seychellois culture will deteriorate and eventually disappear due to the foreign influence in the Seychelles.

While recognising the viewpoints expressed in some of the focus group consultations, it is not predicted that new social classes will be introduced during the construction process. It is therefore unlikely that the adverse socio-cultural impacts will be realised. This viewpoint is based on the small number of construction workers, the anticipated high level of local employment and the employment focus on women and the youth.

#### *Mitigation and Management Measures*

- Implement a comprehensive stakeholder engagement process.
- Maximise the use of local service providers, including contractors.
- The use of local labour should be a key requirement in the tender documentation.
- Provide skills related capacity building and support, particularly aimed at women and the youth.
- An appropriate exit strategy should be developed for the temporary construction related employees.

### 5.1.8 Quality of life Impacts

#### *Description of Impact*

The quality of life can be defined as the general well-being of a person or society. It is defined by the English Dictionary in terms of health and happiness as well as a subjective measure of a person's satisfaction/dissatisfaction with the cultural or intellectual conditions under which they live[12]. This is a concept based on people's perceptions, but it has the potential to disrupt projects depending on how well it is addressed and mitigated.

The quality of life has many factors and is difficult to measure quantitatively. The WHO has defined and developed a system to measure quality of life, which considers among others:

- Physical health.
- Psychological health.
- The level of independence.
- Social relationships.
- Environment.
- Spirituality/religion/personal beliefs.

[12] http://www.thefreedictionary.com/quality+of+life

In this case, the quality of life impacts refers to the potential for noise, dust, bad odours or adverse air quality intrusions as experienced by the respective affected residents. Such intrusions may influence physical and psychological health as well as the experienced environment. It follows from the above that quality of life is an interrelated experiential impact that may influence the lives of those people affected. Although most of these aspects (e.g. noise, air quality, visual intrusions and so forth) are the subject of specialist reports, it is the intrusion impacts (if any) on specific social receptors that may be experienced that is of relevance in this regard. The distance from the potentially intrusive aspect is a key consideration.

The construction process may cause increases in noise levels, graphic impacts, potentially some light pollution and some dusting intrusion. Due to the limited nature of the construction activities and the relatively short construction period, limited quality of life impacts is anticipated, if any.

#### *Mitigation and Management Measures*

- Manage construction times to minimise noise intrusion during night time.
- Ensure effective dust management.
- Minimise on site lighting during the night times.
- It is recommended that the measures identified in the EMP be followed to reduce the occurrence of any intrusion impacts.
- Operating contractors/investors must comply with all MMP rules and regulations.
- Address issues and aspects identified using the proposed grievance mechanism in a timely and thorough fashion. Records of any such incidents should be kept and prompt feedback provided to the relevant stakeholders.

## 5.2 OPERATIONAL PHASE

The operational phase of the aquaculture industry for purposes of this ESIA has been set at 25 years, however, it is possible that the sector develops into a stable scenario that continues for many more years.

### 5.2.1 Job Opportunities and Local Employment

#### *Description of Impact*

It is anticipated that the operational phase is expected to result in 200 additional job opportunities within 5 years of the implementation of the MMP ADZs and escalating to approximately 730 job opportunities after 10 years (see Table 16). By the 25$^{th}$ year of operations it is estimated that the required number of aquaculture sector employees will be approximately 1850.

*Table 16: Labour estimate (ten year middle-of-the-road projection)*

| 10 year projection | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Estimated Operational Job Opportunities | **37** | **70** | **99** | **124** | **200** | **251** | **310** | **384** | **563** | **730** |

If the operational labour requirements largely outstripped the availability of labour in the Seychelles, large numbers of employees would have to be imported. However, due to the phased growth in employment opportunities and the relatively small annual increments, little labour importation is anticipated.

It would be important that a robust awareness, capacity building and skill development process be implemented and maintained along the life the project. There may initially, be some importation of employees with specialised skills. This importation is, again, not anticipated to be of any significance due to the limited number of such people required. It is anticipated that as local skills will develop capacity over time and the need to import specialised skills would diminish.

The national unemployment rate in 2016 was just above 4%. As indicated earlier, the youth (10%) and woman (4.6%) make up the largest component of the unemployed (Seychelles National Bureau of Statistics

2016c). In 2016 terms, this equates to a shortage of some 1800 job opportunities per year. In reference to Table 16, it is clear that the anticipated growth in job opportunities is far below the unemployment levels. The implication is that the job opportunities required will not outstrip the available resources in the Seychelles labour pool.

There should be a concerted effort to employ local people as far as possible. Recruitment of labour for the operational phase of the ADZ should, as in the case of the construction phase, therefore **target the youth and women**, as part of the process to address the mentioned unemployment disparity.

Implications of the operational phase of this component of the MMP, is anticipated to be positive and should not exceed the pool of available employees in the Seychelles. The absorption of more local employees due to the operational phase will have a positive socio-economic impact, which will escalate as the project grows over time

### *Mitigation and Management Measures*

The proposed measures to enhance the positive impacts are largely the same as during the construction phase, but repeated here for continuity.

- Recruit locally as a priority (from among those that are unemployed, poor or under income stress).
- Contractors (if any) must be contractually obliged to use local labour as far as possible.
- There should be an emphasis on employing the youth and women.
- If specific skilled positions cannot be sourced within the local districts, they should be sourced at the national level first before looking at international workers.
- Continue using the proposed community liaison officers to manage the local MMP public interface, specifically during the construction phase.
- Maximise the usage of local service providers, including contractors.
- A multi-level governance approach should be adopted to ensure all those with interest in mariculture is given the opportunity to learn more about this sector and be involved in decision-making on its future development (Stead 2016).

## 5.2.2 Population Influx

### *Description of Impact*

In reference to Table 2, the Seychelles population is projected to grow to some 103 000 by mid-2020. This reflects an average growth rate of some 7.5% over a ten year period (Seychelles National Bureau of Statistics 2014a). The anticipated growth in job opportunities over a similar operation period will be less than the number of unemployed or underemployed people[13]. There may be an initial importation of specialised skills but this will decrease over time as local capacity is developed. Indications are that there will not be a significant influx during this phase of the Seychelles MMP.

### *Mitigation and Management Measures*

- The use of local labour should be a key requirement in the tender documentation.
- The operators must maximise the usage of local service providers. These requirements should be captured in a contractual agreement.
- The SFA must ensure that all operators source the bulk of their employees from the local labour market. The focus on creating employment opportunities for the youth and women should continue.

[13] This conclusion is based on the unemployment ratios in 2016, with an average projection for the next 10 years.

- The operators/investors should implement formal mentorship and skills development programmes to build the capacity of local candidates to fill the required skilled positions.
- There should be a concerted effort, monitored by the SFA, by operators/investors to make provision to replace expatriates with local people over time. A twinning programme[14] could be a mechanism to achieve this.

### 5.2.3 Project-Induced In-Migration

#### *Description of Impact*

As mentioned before, project-induced in-migration, in the context of this report, is seen as the large scale movement of people into an area in expectation of, or response to, economic opportunities associated with a new project.

Project-induced in-migration is not anticipated to occur during the operational phase of the ADZ related process. This conclusion is underpinned by the same factors as identified for the construction period. These are:

- The extraordinarily high employment levels in the Seychelles will preclude any in-migration to a specific area due to the availability of jobs.
- Significant labour imports are unlikely.
- Being an island, a large movement of unofficial in-migration will be difficult.

It is unlikely that any of the side effects of large scale immigration, with the associated drawbacks would realise.

#### *Mitigation and Management Measures*

No further mitigation or management measures are proposed, over and above the ones made previously.

### 5.2.4 Skills Requirements

#### *Description of Impact*

The implementation of the Seychelles MMP in order to establish a new aquaculture sector is a diverse process and will require a multitude of expert skills. A national science skills survey was undertaken in 2009 and updated in 2013. The purpose was to determine the number of diplomonads and graduates with qualifications applicable to marine aquaculture (SFA, 2013). Please refer to Table 17 for the results.

*Table 17: science graduates in the Seychelles by employment sector*

| Qualification | Government | Private sector | International programme | NGO and other | Total |
|---|---|---|---|---|---|
| Higher Diploma | 2 | 3 | 1 | 0 | 6 |
| BSc | 25 | 2 | 3 | 6 | 36 |
| BSc Honours | 1 | 0 | 0 | 0 | 0 |
| MSc | 2 | 2 | 0 | 0 | 0 |
| PHD | 1 | 0 | 0 | 2 | 3 |
| BVS | 6 | 0 | 0 | 0 | 6 |
| **Total** | **37** | **7** | **4** | **12** | **60** |
| **Percent** | **61.7** | **11.7** | **6.7** | **20** | **100** |

[14] A twinning programme is one where the expat specialist works with a local understudy for a set number of years, after which the understudy becomes the lead. The expat will then continue for another year to provide advice and support to the local specialist.

*Source:* (Hecht 2013)

The results show an impressive list of people with the relevant qualifications. Most of these skilled people worked for the government, with NGOs a distant second, followed by the private sector. There is however a need for more people with tactical and scientific qualifications in the mariculture field. Indications are that this process is being urgently addressed by the SFA.

On the short-medium term, it is anticipated that a number of appropriately qualified people will be required during the operational phase of this Seychelles mariculture process. If these people cannot be sourced locally or nationally, they will be imported from outside.

When considering the project employee numbers in table Table 16, and one makes the conservative assumption that 50% of those require specialised scientific and technical skills, the number of skills to be imported would still be low.

UniSey, however, has started offering courses in environmental science. If current and future students are made aware of the opportunities and skills requirements for the mariculture field, the bulk of the required skills could be developed in the Seychelles over time. It is therefore anticipated that the need for an external specialist will decrease over time. This will become a reality if there is a policy approach that necessitates operators and investors to employing, and where necessary mentor, appropriately qualified Seychellois people for the mariculture projects.

### *Mitigation and Management Measures*

- Identify the skills required for the operations of the mariculture projects.
- Implement and coordinate a process to educate and train current and future students in the relevant scientific and technical aspects – ensure close linkages with UniSey and its international partners'.
- Develop an approach or policy whereby operators and investors must appoint as many local specialists as feasible, possibly as an investment or corporate social responsibility criteria.
- Appoint a scientific training coordinator to manage and coordinate this process.

## 5.2.5 Change in Employment Equity of Vulnerable Groups

As indicated in Section 5.1.5, changes in employment equity of vulnerable groups are interpreted as the degree to which job opportunities match employment of vulnerable groupings living at or close to the development, including women and the youth.

The motivation and mitigation measures proposed for the construction periods, is the same as for the operational period. The mitigation measures are therefore repeated here, for ease of access.

Due to the much larger number of people involved in the operational phase this impact may affect a significantly more people than during the construction phase. The benefit is assessed as a positive impact.

### *Mitigation and Management Measures*

- Implement the recommendations made to focus on involving women and the youth in the operations process.
- Implement the skills training and capacity building focus as indicated in Sections 5.1.1 and 5.1.4.

## 5.2.6 Impacts on Daily Living and Movement Patterns

Impacts on daily living and movement patterns relate to the individual fish farm related traffic and access related impacts on residents, road users and boat traffic. These individual fish farm related vehicular and marine traffic movements might interfere adversely with current land and marine traffic patterns. Indications are that the projected growth will be incremental, as new fish farms are implemented in the various ADZs. This will ensure that the increase in daily living and movement patterns will also increase incrementally.

### *Mitigation and Management Measures*

- Communicate information regarding the operational routes (land and sea), operational times and associated information to the local district as well as the relevant community representatives.
- Operational land traffic past community infrastructures such as schools, crèches, and sporting facilities must be strictly managed.
- Marine traffic must consider tourism locations and activities to minimise adverse tourism and quality of life impacts.
- Maintain the formal grievance mechanism.

## 5.2.7 Introduction of New Social Classes and Related Socio-Cultural Impacts

Indications are that initially, a number of outsiders with different values, beliefs and practices may migrate to the Seychelles during the operational phases. These would typically be the technical and scientific personnel needed for the operational phase of the projects. The intensity of such an impact would be more prominent if these outsiders are mostly single males and if no adequate housing facilities are available. The conduct of these outsiders, due to different values, beliefs and practices could lead to social tension and conflict between the locals and the outsiders.

As mentioned, there was feedback from local stakeholders that some foreign cultures have a negative impact on the Seychellois culture and may become a nuisance factor. It was also stated that the ways and norms of these foreign workers are very different to the way of the Seychellois and there is a fear that the Seychellois culture will deteriorate and eventually disappear due to the foreign influence in the Seychelles.

It is foreseen, however, that the adverse impact of the outsiders will decrease over time, if the capacity building drive and local sourcing emphasis are driven strongly. Based on this assumption, it is not foreseen that predicted that new social classes would be introduced to any significant extent during the operational phases of the projects.

### *Mitigation and Management Measures*

- Implement a comprehensive stakeholder engagement process.
- Continue with the community liaison process recommended earlier.
- Implement the mitigation measures proposed in section 5.2.4.
- Develop appropriate exit strategy for the outside employees.

## 5.2.8 Quality of life Impacts

### *Description of Impact*

As indicated before, the quality of life relates to the measure of a person's satisfaction or dissatisfaction with the cultural or intellectual conditions under which they live. This is a concept based on people's perceptions, but it has the potential to disrupt projects depending on how well it is addressed and mitigated.

In this case, the quality of life impacts refers to the potential for noise, visual, light pollution or physical intrusion at sensitive social receptors such as houses, tourism sites, hotels, cultural venues and so forth. The distance from the potentially intrusive aspect is also a key consideration.

Due to the nature and long-term duration of the operational activities, some quality of life impacts are anticipated.

### *Mitigation and Management Measures*

- Continue with the community liaison process recommended earlier.
- Ensure that the operational activities are planned to minimise intrusion impacts.

- Consider the location and distance from hotels and tourism sites, diving or sport fishing sites or any other culturally or sensitive sites to minims the potential for intrusion impacts during the site selection and operational phases of the ADZ projects.
- Consider photic intrusion when selecting the type and placement of light sources (further explained in Visual Impact Assessment Report (ESIA Report - APPENDIX F).
- It is recommended that the measures identified in the EMP be followed to reduce the occurrence of any intrusion impacts.
- Address issues and aspects identified using the proposed grievance mechanism in a timely and thorough fashion. Records of any such incidents should be kept and prompt feedback provided to the relevant stakeholders.

### 5.2.9 Potential for Conflict Between Mariculture and Other Users of the Sea

#### *Description of Impact*

The small-scale fishing in the Seychelles, which includes the artisanal and semi-industrial subsectors, contributes between 1% and 2% of the GDP annually, while the fisheries sector, as a whole, contributed 7.7% in 2008, an increase of 1.3% from 2004. In the Seychelles 17% of the total population is employed in the fishing industry, 30% of which are active in the small-scale sector, while 10% of the population is directly dependent on the small-scale fishing sector. The Seychelles has very limited land-based opportunities, thus, the fishing is a vital source of income, employment, food security and foreign exchange in the country. (Hilmi, N., Allemand 2015). Competition for any diminishing resource (or perceived as such) will increase the conflict potential among those stakeholders.

Local stakeholders raised a number of aspect during the consultation process, including the following:

- Concerns that the proposed mariculture industry could destroy their fishing livelihoods.
- The need to ensure local fishermen benefit from the mariculture fishing industry.
- The requirement that farmed fish not be sold in the local markets, but should be exported.
- The SFA should consult with the fishermen's associations when planning the ADZ sites.
- Government and the SFA should assist with the local fishermen with funding and capacity building to get involved in the mariculture fishing industry. The importance for local fishermen to be able to invest into such projects and participate in the blue economy was stated.
- The proposed mariculture industry needs to be symbiotic to the local and commercial fishing industry.
- Concerns that the proposed ADZ sites will limit the fishermen's access to favoured fishing grounds.

#### *Mitigation and Management Measures*

- On-going stakeholder engagement and a grievance mechanism are needed.
- Develop mechanisms to allow entrance or joint ventures with mariculture project operators and investors.
- ADZ investors must comply with all new MMP regulations, standards and licence conditions to guarantee sustainable healthy fishing practices.
- All opportunities to benefit the artisanal fishing industry should be considered and implemented where feasible.
- SFA will need to set up a Mariculture Monitoring Committee to manage the new sector, to monitor the price of fish and various conflicts between operators and local fishermen (Stead, 2016).
- Improve capacity building on the Mariculture industry.

### 5.2.10 Impacts on Social Infrastructure

#### *Description of Impact*

A sizeable number of migrants have already settled in the Seychelles due to other industry developments. It is predicted that there will still be a foreseeable growth in the local population of approximately 2 000 people which will result in added pressure on the existing social amenities in the Seychelles Inner Islands.

This increasing population will put pressure on local infrastructure and services, including the availability of land for building purposes and subsistence agriculture and access to potable water, education, health care and social security services. Indications are that some of the MMP workforces will be housed either within the current available housing in the area or placed in designated expatriate contractor housing, which will alleviate some pressure on local infrastructure and services. It is important to note that the planned expatriate contractor housing has not yet been developed and is part of the Seychelles Strategic Development Planning for the near future.

Respondents from social focus group meetings from all three large islands (Mahé, Praslin and La Digue) stated that there is adequate access to primary school educational institutions. Access to tertiary institutions is a problem as most tertiary institutions are located on Mahé and people who are wanting to further their education have to relocate then to the main island to do so. The predicted population growth for the operational phase may lead to increased pressure on the existing educational infrastructure.

It is estimated that there are currently approximately 522 people per doctor. With the perceived local population growth this ratio is expected to increase, but the there is space to grow the doctor-patient ratio quite significantly. The Seychelles National Care is centralised in Victoria (Mahé). Access to health care in general is not anticipated to become too constrained, due to the relatively low number of imported employees expected[15].

Regarding social security, the current ratio of policemen to civilians is 1:1000. This ratio is still acceptable and shows potential for growth. It is not anticipated that the initial influx of the scientific and technical expats will strain this service to any extent.

#### *Mitigation and Management Measures*

- The development areas highlighted in the Seychelles Strategic Land Use and Development Plan must be implemented to reduce the predicted pressure on social infrastructure.
- Operating contractors/investors must comply with all MMP rules and regulations.
- The involvement and capacity building of local stakeholders to participate in the projects must be driven robustly.
- The sourcing of local skills and employees must be driven as a priority.

## 6.0 ANTICIPATED MACRO-ECONOMIC BENEFITS

It is anticipated that there will be continued local and regional economic growth as discussed in the construction phase moving into the operational phase of the MMP. The operational phase of the proposed MMP will continue to benefit the country's economy. At that point of the MMP the SFA would have attracted a range of private investors for commercial ADZ developments, generating a substantial industry revenue.

The operational phase of the MMP will lead to diversification of the National economy, local fishing industry and fish processing in the Seychelles. This will further grow the potential to link with large commercial export markets, thus being a catalyst for growth in the formal and secondary economy.

[15] If he mitigation measures are implemented.

This new sectoral income source will also decrease the strong present-day dependency on tourism and provide for improved economic stability.

# 7.0 DECOMMISSIONING AND CLOSURE RELATED IMPACTS FOR ALL AQUACULTURE RELATED IMPACTS

The eventual termination of ADZ sites is unavoidable and the decommissioning activities are expected to give rise initially to impacts similar to those mentioned under the construction phase (associated with the dismantling of infrastructure). Rehabilitation follows demolishing or removal of existing ADZ infrastructure and specific onshore infrastructure. This phase is not described in detail in this ESIA, as imminent closure and decommissioning of the aquaculture sector is not anticipated. However, this phase would involve the removal of infrastructure such as the cages, moorings and boats from the waters, with the land-based facilities being utilised for alternate purposes. This would require removal of aquaculture equipment and infrastructure activities.

The closure phase of the MMP is expected to give rise to the loss of employment and associated economic impacts.

### *Description of Impacts*

Potential impacts related to the Decommissioning Phase may include the following:

- A temporary increase in employment opportunities followed by a significant decrease after decommissioning;
- Noise and impacts linked to ADZ decommissioning activities; and
- Noise and dust impacts linked to specific onshore decommissioning activities.

Closure impacts include:

- Loss of employment for approximately 1850 workers;
- The loss in economic benefits from mariculture.

### *Mitigation and Management Measures*

Potential mitigation measures may include:

- Provide employees with clear, transparent information on planned activities and closure dates for relevant ADZ sites;
- Offer employment to current employees at alternative ADZ sites;
- Implement and initiate planned exit strategies.

# 8.0 IMPACT RATINGS

The rating of social impacts is presented in Table 18, Table 19 and Table 20 was derived using the impact assessment methodology described in section 2.6 earlier in this report.

The significance points (SP) are calculated for each of the impacts. Where the impact is deemed positive, it is coloured blue. Therefore the positive impacts (blue) in his assessment table range from low to moderate.

*Table 18: Impact Assessment Matrix for the **construction phase** of the proposed Seychelles MMP*

| POTENTIAL SOCIAL IMPACTS: CONSTRUCTION PHASE | SOCIAL SIGNIFICANCE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before mitigation | | | | | | After mitigation | | | | | |
| | M | D | S | P | SP | Rating | M | D | S | P | SP | Rating |
| ***1. Job Opportunities and Local Employment*** | | | | | | | | | | | | |
| Impact on job opportunities and local employment. | 2 | 2 | 3 | 4 | 28 | **Low** | 4 | 2 | 3 | 4 | 36 | **Moderate** |
| ***2. Population Influx*** | | | | | | | | | | | | |
| Construction causing an influx of foreign migrant labour. | 4 | 2 | 3 | 2 | 18 | **Low** | 2 | 2 | 2 | 2 | 12 | **Low** |
| ***3. Project-Induced In-Migration*** | | | | | | | | | | | | |
| Large scale movement of people into the project area or even the Seychelles in expectation of, or response to the construction of the BQAF and R&D facilities. | 2 | 2 | 3 | 1 | 7 | **Low** | 2 | 2 | 3 | 1 | 7 | **Low** |
| ***4. Skills Requirement*** | | | | | | | | | | | | |
| The implications of significant skills gaps between the project requirements and the local labour offering. | 2 | 2 | 3 | 3 | 21 | **Low** | 4 | 2 | 3 | 4 | 36 | **Moderate** |
| ***5. Change in Employment Equity of Vulnerable Groups*** | | | | | | | | | | | | |
| To what level will the project requirements affect the employment of minority and potentially disadvantaged grouping. | 2 | 2 | 2 | 2 | 12 | **Low** | 4 | 2 | 3 | 3 | 27 | **Low** |
| ***6. Impacts on Daily Living and Movement Patterns*** | | | | | | | | | | | | |
| Impacts on daily living and movement patterns due to increased levels of construction traffic and movement of heavy vehicles. | 6 | 2 | 2 | 4 | 40 | **Moderate** | 4 | 2 | 2 | 2 | 16 | **Low** |
| ***7. Introduction of New Social Classes and Related Socio-Cultural Impacts*** | | | | | | | | | | | | |
| A large number of outsiders with different values, beliefs and practices migrate to the area during the construction phase. | 4 | 2 | 3 | 3 | 24 | **Low** | 2 | 2 | 3 | 3 | 21 | **Low** |
| ***8. Impacts on Quality of Life*** | | | | | | | | | | | | |
| The measure to which intrusion impact influence the physical and psychological health as well as the experience of the environment. | 4 | 2 | 1 | 2 | 14 | **Low** | 2 | 2 | 1 | 2 | 14 | **Low** |
| ***Impacts Arising from Biophysical Components are Assessed in EIA*** | | | | | | | | | | | | |

*Table 19: Impact Assessment Matrix for the **operations phase** of the proposed Seychelles MMP*

| POTENTIAL SOCIAL IMPACTS: OPERATIONS PHASE | SOCIAL SIGNIFICANCE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Before mitigation | | | | | | After mitigation | | | | | |
| | M | D | S | P | SP | Rating | M | D | S | P | SP | Rating |
| ***1. Job Opportunities and Local Employment*** | | | | | | | | | | | | |
| Impact on job opportunities and local employment. | 8 | 3 | 4 | 3 | 45 | **Moderate** | 8 | 3 | 4 | 4 | 60 | **Moderate** |
| ***2. Continued Population Influx*** | | | | | | | | | | | | |
| The ADZ related mariculture projects causing an influx of foreign migrant labour. | 4 | 3 | 4 | 2 | 22 | **Low** | 2 | 3 | 4 | 2 | 18 | **Low** |
| ***3. Project-Induced In-Migration*** | | | | | | | | | | | | |
| Large scale movement of people into the project area or even the Seychelles in response to the implementation of the mariculture projects. | 2 | 2 | 3 | 1 | 7 | **Low** | 2 | 2 | 3 | 1 | 7 | **Low** |
| ***4. Skills Requirement*** | | | | | | | | | | | | |
| The implications of a significant skills gap between the skills required for the operations of the ADZ related mariculture project and the local labour offering. | 6 | 2 | 4 | 3 | 36 | **Moderate** | 6 | 4 | 4 | 3 | 42 | **Moderate** |
| ***5. Change in Employment Equity of Vulnerable Groups*** | | | | | | | | | | | | |
| To what level will the project requirements affect the employment of minority and potentially disadvantaged grouping, | 2 | 2 | 4 | 2 | 16 | **Low** | 6 | 2 | 4 | 3 | 36 | **Moderate** |
| ***6. Impacts on Daily Living and Movement Patterns*** | | | | | | | | | | | | |
| Impacts on daily living and movement patterns on land and sea due to increased levels of operational movement of vehicles and boats. | 6 | 2 | 2 | 4 | 40 | **Moderate** | 4 | 2 | 2 | 2 | 16 | **Low** |
| ***7. Introduction of New Social Classes and Related Socio-Cultural Impacts*** | | | | | | | | | | | | |
| A large number of outsiders with different values, beliefs and practices migrate to the area during the construction phase. | 4 | 2 | 3 | 3 | 24 | **Low** | 2 | 2 | 3 | 3 | 21 | **Low** |
| ***8. Impacts on Quality of Life*** | | | | | | | | | | | | |
| The measure to which intrusion impact influence the physical and psychological health as well as the experience of the environment. | 4 | 3 | 4 | 3 | 33 | **Moderate** | 4 | 2 | 3 | 3 | 24 | **Low** |
| ***9. Conflict Potential*** | | | | | | | | | | | | |
| The potential for conflict between mariculture and other users of the Sea. | 8 | 3 | 4 | 4 | 60 | **Moderate** | 4 | 3 | 4 | 4 | 44 | **Moderate** |
| ***10. Impacts on Social Infrastructure*** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| To what level can the existing infrastructure accommodate the influx of scientist and technicians from outside the Seychelles? | 4 | 3 | 4 | 3 | 33 | **Moderate** | 6 | 3 | 4 | 3 | 39 | **Moderate** |
| ***11. Impacts on Social Infrastructure*** | | | | | | | | | | | | |
| Pressure on the existing social amenities. | 4 | 3 | 3 | 2 | 20 | **Low** | 4 | 3 | 2 | 2 | 18 | **Low** |
| ***Impacts Arising from Biophysical Components - Assessed in EIA*** | | | | | | | | | | | | |

*Table 20: Impact Assessment Matrix for the decommissioning and closure phase of the proposed Seychelles MMP*

| **POTENTIAL ENVIRONMENTAL IMPACT: DECOMMISSIONING AND CLOSURE PHASE** | **ENVIRONMENTAL SIGNIFICANCE** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Before mitigation** | | | | | | **After mitigation** | | | | | |
| | **M** | **D** | **S** | **P** | **SP** | **Rating** | **M** | **D** | **S** | **P** | **SP** | **Rating** |
| ***1. Loss of employment*** | | | | | | | | | | | | |
| Closure will lead to a decrease in employment opportunities | 8 | 2 | 4 | 4 | 56 | **Mod** | 6 | 2 | 4 | 4 | 48 | **Mod** |
| ***2. Loss of economic benefits*** | | | | | | | | | | | | |
| Reduced regional economic contributions | 8 | 2 | 4 | 4 | 56 | **Mod** | 6 | 2 | 4 | 4 | 48 | **Mod** |

# 9.0 CUMULATIVE IMPACTS

Cumulative impacts are defined as impacts resulting from the combined effects of two or more projects or actions. Cumulative impacts usually relate to large scale rather than site-specific impacts and have a tendency to increase the intensity of impacts already predicted for the proposed project.

Cumulative impacts are expected to arise because of the combined effects of the larger MMP project and other, existing and planned MMP operations in and around the inner islands. These cumulative impacts relate to large scale rather than site-specific impacts associated with a concentration of projects, and their tendency to dominate the local economy, thereby causing the local economy to become increasingly dependent on mariculture that inevitably has a finite lifespan, and their tendency to alter the local Seychellois image and quality of life. Cumulative impacts that have been identified are:

The inshore zone (aquaculture within 2km of the land) and offshore zone aquaculture developments (cage culture beyond 5kms of the land) of the MMP have not been included in the scope of this SIA. It is important to note that these additional aspects of the larger MMP will have significant cumulative impacts if all four aquaculture zones are operational concurrently.

## *Description of Impacts*

Possible cumulative impacts to consider are as follows:

- Local population change.
- Increased socio-cultural tension.
- Maximised economic benefits.
- Economies of scale is an issue.
- Harbour and airport capacities becoming stretched.

### *Mitigation and Management Measures*

- It is recommended that a large single concentrated land-based aquaculture zone would be more feasible than having land-based sites scattered across the inner islands.

# 10.0 SOCIAL MANAGEMENT PLAN

Social Management Plans (SMPs) are a management tool for addressing social impacts during the implementation of planned interventions (projects, plans, policies and programmes). SMPs have the potential to operationalise the findings of dedicated phases of predictive assessment, outline the priorities, resources, strategies, processes, activities, commitments and staffing employed to avoid and mitigate adverse impacts, and enhance the positive impacts of development. The SMP may detail monitoring, reporting and community engagement processes and may be developed with the participation of impacted parties. They have the potential to be integrated with environmental management plans and consist of a collection of more specific plans, including plans for community engagement and participation, community development, complaints and grievance handling, procurement and local business development, local and indigenous employment, traffic, housing, resettlement, community health, and cultural heritage (Franks. DM and Vanclay. F, 2013).

The SMP establishes the role and responsibilities of the proponent, government, stakeholders and communities in mitigating and managing social impacts and opportunities during the construction, operational and closure phases of the proposed MMP (refer to Table 21).

## 10.1 Mitigation and Management Plan

A social impact assessment not only forecasts impacts, but it also identifies means to mitigate adverse impacts. Mitigation includes avoiding the impact by not taking or modifying an action; minimising, rectifying, or reducing the impacts through the design or operation of the project or policy; or compensating for the impact by providing substitute facilities, resources, or opportunities. Ideally, mitigation measures are built into the selected alternative, but it is appropriate to identify mitigation measures even if they are not immediately adopted or if they would be the responsibility of another person or government unit.

### 10.1.1 Approach

The approach should be to avoid or if not avoidable, minimise adverse impacts. The first step in evaluating potential mitigation for each variable is to determine whether the proponent could modify the project or proposed policy to avoid the adverse effects. The next step in the process is to identify ways to minimise negative social impacts. Attitudes (particularly negative ones) formed about the MMP cannot be eliminated, but might be moderated if the public is aware of and consulted with about the proposed MMP, The affected stakeholders (directly and indirect) and their respective issues and needs should be considered in the decision-making process.

There are at least three benefits of identifying irresolvable social impacts that may result from a proposed project. The first is identifying methods of compensating individuals and the community for unavoidable impacts, the second occurs when the community may find ways of enhancing other quality of life variables as compensation or the adverse effects. The third happens when the identification of irresolvable social impacts makes community leaders and project proponents more sensitive to the feelings of community residents. By articulating the impacts that will occur and making efforts to avoid or minimise the adverse consequences, or compensating the residents or the community for the losses, benefits may be enhanced and avoidable conflicts can be managed or reduced.

## 10.2 Management Program

This section discusses the proposed mitigation and management measures for the impacts discussed in the above impact sections. The management objective for this impact assessment is to provide solutions in which to minimise the negative social impacts and enhance to positive impacts. Most of the impacts discussed in this SIA are medium to low significance with the population influx and socio-cultural impacts having the potential to create high significant changes in the social environment

### 10.2.1 Construction Phase

*Table 21: Social Mitigation and Management Table*

| Phase | Potential impact | Objectives | Performance criteria | Mitigation measure(s) | Responsible person / party | Time-frame | Monitoring and reporting frequency |
|---|---|---|---|---|---|---|---|
| Construction | Job Opportunities and Local Employment | To enhance local employment opportunities | Compliance with national labour regulations.<br>HR requirements are in place and maintained. | ■ A multi-level governance approach should be adopted to ensure all those with interest in mariculture is given the opportunity to learn more about this sector and be involved in decision-making on its future development (Stead 2016).<br>■ Implement and enforce recruitment and procurement policies for all contractors which include maximising the usage of local service providers and utilisation of local labour, including the youth and women should be a key requirement in the licencing/operational agreements.[16]<br>■ If specific skilled positions cannot be sourced within the local districts, they should be sourced at a national level first before looking at international workers.<br>■ Finalise the details of the construction activities, specific job requirements and associates skills as well as the schedules. This should take place before the construction starts, to enable the process of capacity building if required.<br>■ Before construction commences, representatives from the District Authority, | Project investors / developer / operators (Monitored and supervised by the SFA and relevant government department). | Duration of Construction Activities – approximately 12 -24 months (for land-based infrastructure). | On project initiation and verified on a monthly basis. |

[16] These requirements will be applicable in the case may construction and development work would be done on a contractual basis. If not the case the developer myself must be bound by these criteria

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| | | | | the District Social Committee and the District Team, and community-based organisations, as well as neighbouring residents should be informed of the details of the construction process, contractor (if any), the size of the workforce and construction schedules.<br>■ Employ community liaison officers to manage the local MMP public interface, starting before the construction phase.<br>■ Deploy the (to be employed) community liaison officers to manage the local MMP public interface, starting before the construction phase. | | | |
| **Construction** | Population influx | Manage potential population influx for MMP vacancies. | Developers to comply with national and MMP job criteria requirements. | ■ Monitor potential influx through the community liaison officers and local structures.<br>■ Maximise the usage of local service providers, including contractors. In this regard the use of Seychelles labour should be specified in the tender documentation.<br>■ Criminal incidents should be communicated to the workforce and employees to ensure a general awareness of the safety situation in the area. | The SFA and relevant government department (MLUH) | Duration of Construction Activities – approximately 12 -24 months (for land-based infrastructure) | Monthly |
| **Construction** | Project-induced in-migration | Manage population in-migration into the MMP project areas. | Recruitment centre in place and utilised. No job seekers at construction sites. | ■ Coordinate with the Department of Immigration and Civil Status to be aware of and help control any possible project-induced in-migration.<br>■ Implement an effective and ongoing stakeholder engagement and information sharing process regarding the project | The SFA and relevant government department (MLUH) | Pre-construction and for the duration of Construction Activities – approximately 12 – 24 months | Weekly |

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| | | | | process in particular, and the larger Seychelles MPP as well.<br>■ Ensure a formal and structured recruiting process – consider recruitment through a formal employment office or info centre at Victoria, Mahé.<br>■ Monitor potential in-migration through observations of the community liaison officers.<br>■ Implement spatial plans for existing and new residential units within the Seychelles, through controlled and regulated development. | | | |
| **Construction** | Skills Requirements | Enhance local skills development to address the current shortage of industry relevant skills | The SFA to fill scholarship, bursary and capacity building positions. | ■ Develop the capacity requirements and associated budgets.<br>■ Develop a list of potential candidates, focusing firstly on the unemployed youth and women before construction commences. Representatives from the District Authority, the District Social Committee and the District Team, as well as neighbouring residents should be consulted in this regard.<br>■ Appoint a training coordinator (could be the community liaison officer) to manage and coordinate this process. This function can be combined with those of the proposed community liaison officers.<br>■ Provide skills related capacity building and support, particularly aimed at women and the youth.<br>■ Formalise skills development through a process of developing a strategic community skills development programme inclusive of stakeholder | The SFA and relevant government department (Department of Education) | Pre-construction and for the duration of Construction Activities – approximately 12 -24 months | Weekly |

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| | | | | engagement input and monitoring and adaptation mechanisms.<br>■ Establish a community liaison committee to consult on human resource and social issues and develop joint solutions where feasible. | | | |
| **Construction** | Change in employment equity of vulnerable groups | To enhance the employment of women and youth. | Developers to comply with national and MMP job criteria requirements. | ■ Implement the recommendations made to focus on involving women and the youth in the construction process.<br>■ Implement the skills training and capacity building focus as indicated in Sections 5.1.1 and 5.1.4. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Construction Activities – approximately 12 -24 months | Monthly |
| **Construction** | Impacts on daily living and movement patterns | Increase awareness on road access and safety | Comply with the necessary national health and safety regulations. | ■ Communicate information regarding the construction routes, peak operational times, hazards associated and precautionary measures to the Ward councillor as well as the relevant community organisations.<br>■ Notify the public of construction progress, when and where new construction will start and what routes will be affected.<br>■ Construction traffic past community infrastructures such as schools, crèches, sporting facilities, etc. must be strictly managed.<br>■ Ensure construction activities avoid peak traffic hours and particular social usage requirements.<br>■ General road rules should be enforced, and specific provision should be made for management of construction related complaints.<br>■ Ensure safe and secure public transport | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Pre-construction and for the duration of Construction Activities – approximately 12 -24 months | Weekly |

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| | | | | access points.<br>■ The development of a strategy to address community safety and security would be needed. This can be achieved by expanding on existing health and safety procedures to reduce risk to communities and employees.<br>■ Implement a community safety and security plan. | | | |
| **Construction** | Introduction of New Social Classes and Related Socio-Cultural Impacts | To limit the number of outsiders with different values, beliefs and practices. | Developers to comply with national and MMP job criteria requirements. | ■ Implement a comprehensive stakeholder engagement process.<br>■ Maximise the use of local service providers, including contractors.<br>■ The use of local labour should be a key requirement in the tender documentation.<br>■ Provide skills related capacity building and support, particularly aimed at women and the youth.<br>■ An appropriate exit strategy should be developed for the temporary construction related employees. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Construction Activities – approximately 12 -24 months | Weekly |
| **Construction** | Quality of life impacts | To manage the potential for adverse intrusions. | Comply with the necessary national health and safety regulations and EIA recommendation. | ■ Manage construction times to minimise noise intrusion during night time.<br>■ Ensure effective dust management.<br>■ Ensure use of low impact lighting.<br>■ It is recommended that the measures identified in the EMP be followed to reduce the occurrence of any intrusion impacts.<br>■ Operating contractors/investors must comply with all MMP rules and regulations.<br>■ Address issues and aspects identified | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities. | Monthly |

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| | | | | using the proposed grievance mechanism in a timely and thorough fashion. Records of any such incidents should be kept and prompt feedback provided to the relevant stakeholders. | | | |

### 10.2.2 Operations Phase

| Phase | Potential impact | Objectives | Performance criteria | Mitigation measure(s) | Responsible person / party | Time-frame | Monitoring and reporting frequency |
|---|---|---|---|---|---|---|---|
| Operations | Job opportunities and local employment | Maximise local employment | Developers to comply with national and MMP job criteria requirements | ■ Recruit locally as a priority (from among those that are unemployed, poor or under income stress).<br>■ Contractors (if any) must be contractually obliged to use local labour as far as possible.<br>■ There should be an emphasis on employing the youth and women.<br>■ If specific skilled positions cannot be sourced within the local districts, they should be sourced at the national level first before looking at international workers.<br>■ Continue using the proposed community liaison officers to manage the local MMP public interface, specifically during the construction phase.<br>■ Maximise the usage of local service providers, including contractors. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities. | Monthly |

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| | | | | ■ A multi-level governance approach should be adopted to ensure all those with interest in mariculture are given the opportunity to learn more about this sector and be involved in decision-making on its future development (Stead 2016). | | | |
| **Operations** | Population influx | Manage population growth in the inner islands. | Developers to comply with national and MMP job criteria requirements | ■ The use of local labour should be a key requirement in the tender documentation.<br>■ The operators must maximise the usage of local service providers. These requirements should be captured in a contractual agreement.<br>■ The SFA must ensure that all operators source the bulk of their employees from the local labour market. The focus on creating employment opportunities for the youth and women should continue.<br>■ The operators/investors should implement formal mentorship and skills development programmes to build the capacity of local candidates to fill the required skilled positions.<br>■ There should be a concerted effort, monitored by the SFA, by operators/investors to make provision to replace expatriates with local people over time. A twinning programme[17] could be a mechanism to achieve this.<br>■ The development areas highlighted in the Seychelles Strategic Land Use and | Project investors / developer / operators (Overseen by the SFA and relevant government department- MLUH) | Duration of Operational Activities. | Monthly |

[17] A twinning programme is one where the expat specialist works with a local understudy for a set number of years, after which the understudy becomes the lead. The expat will then continue for another year to provide advice and support to the local specialist.

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| | | | | Development Plan must be implemented to reduce the predicted pressure on social infrastructure.<br>■ As per the IFC performance standards requirements, the development of an Influx Management Plan may be required if the population influx is high for the local area. | | | |
| **Operations** | Project-Induced In-Migration | Manage population in-migration into the MMP project areas. | Recruitment centre in place and utilised. No job seekers at construction sites. | ■ Coordinate with the Department of Immigration and Civil Status to be aware of and help manage possible project-induced in-migration.<br>■ Recruitment through a formal employment office or info centre at Victoria, Mahé.<br>■ Monitor potential in-migration through observations of the community liaison officers. | The SFA and relevant government department (MLUH) | For the Duration of Operational Activities | Quarterly |
| **Operations** | Skills Requirements | Enhance local skills development to address the current shortage of industry relevant skills | The SFA to fill scholarship, bursary and capacity building positions. | ■ Identify the skills required for the operations of the mariculture projects.<br>■ Implement and coordinate a process to educate and train current and future students in the relevant scientific and technical aspects – ensure close linkages with UniSey and its international partners'.<br>■ Develop an approach or policy whereby operators and investors must appoint as many local specialists as feasible, possibly as an investment or corporate social responsibility criteria.<br>■ Appoint a scientific training coordinator to manage and coordinate this process. | The SFA and relevant government department (Department of Education) | Duration of operational activities. | Monthly |

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|---|---|---|---|---|---|---|---|
| **Operations** | Change in employment equity of vulnerable groups | To enhance the employment of women and youth. | Developers to comply with national and MMP job criteria requirements. | ■ Implement the recommendations made to focus on involving women and the youth in the operations process.<br>■ Implement the skills training and capacity building recommendatoipns. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities | Monthly |
| **Operations** | Impacts on daily living and movement patterns | Increase awareness on road access and safety | Comply with the necessary national health and safety regulations. | ■ Communicate information regarding the operational routes (land and sea), operational times and associated information to the local district as well as the relevant community representatives.<br>■ Operational land traffic past community infrastructures such as schools, crèches, sporting facilities must be strictly managed.<br>■ Sea traffic must consider tourism locations and activities to minimise adverse tourism and quality of life impacts.<br>■ Maintain the formal grievance mechanism. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities | Monthly |
| **Operations** | Introduction of new social classes and related socio-cultural impacts | To limit the number of outsiders with different values, beliefs and practices. | Developers to comply with national and MMP job criteria requirements. | ■ Implement a comprehensive stakeholder engagement process.<br>■ Ensure robust and ongoing communication and awareness, using the offices of the proposed community liaison.<br>■ Implement the mitigation measures proposed.<br>■ Develop appropriate exit strategy for the imported employees. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities | Monthly |

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| **Operations** | Quality of life impacts | To manage the potential for adverse intrusions. | Comply with the necessary national health and safety regulations and EIA recommendation. | ■ Continue with the community liaison process recommended earlier.<br>■ Ensure that the operational activities are planned to minimise intrusion impacts.<br>■ Consider the location and distance from hotels and tourism sites, diving or sport fishing sites or any other culturally or sensitive sites to minims the potential for intrusion impacts during the site selection and operational phases of the projects.<br>■ Consider photic intrusion light pollution when selecting the type and placement of light sources.<br>■ It is recommended that the measures identified in the EMP be followed to reduce the occurrence of any intrusion impacts.<br>■ Address issues and aspects identified using the proposed grievance mechanism in a timely and thorough fashion. Records of any such incidents should be kept and prompt feedback provided to the relevant stakeholders. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities | Monthly |
| **Operations** | Potential for conflict between mariculture and other users of the sea | To manage the predicted conflicts between the artisanal and semi-industrial fishing subsectors | Adhere to signed agreements and grievance mechanisms. | ■ Ongoing stakeholder engagement and a grievance mechanism are needed.<br>■ Develop mechanisms to allow local entrance or joint ventures with mariculture project operators and investors.<br>■ ADZ investors must comply with all new MMP regulations, standards and licence conditions to guarantee sustainable healthy fishing practices.<br>■ All opportunities to benefit the artisanal | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Duration of Operational Activities | Monthly |

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| | | | | fishing industry should be considered and implemented where feasible.<br>■ Suggest that SFA set up a Mariculture Monitoring Committee to manage the new sector, to monitor the price of fish and various conflicts between operators and local fishermen (Stead, 2016).<br>■ Develop and implement capacity building on the Mariculture industry. | | | |
| **Operations** | Impacts on social infrastructure | To manage the predicted pressure on the existing social amenities. | Comply with national infrastructure development plans | ■ The development areas highlighted in the Seychelles Strategic Land Use and Development Plan must be implemented to reduce the predicted pressure on social infrastructure.<br>■ Operating contractors/investors must comply with all MMP rules and regulations.<br>■ The involvement and capacity building of local stakeholders to participate in the projects must be driven robustly.<br>■ The sourcing of local skills and employees must be driven as a priority. | Project investors / developer / operators (Overseen by the SFA and relevant government department- MLUH) | Duration of Operational Activities | Monthly |

### 10.2.3 Decommissioning Phase

| Phase | Potential impact | Objectives | Performance criteria | Mitigation measure(s) | Responsible person / party | Time-frame | Monitoring and reporting frequency |
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| Decommissioning | Loss of employment | To manage the decrease in employment positions. | Comply with local labour regulations. | ■ Provide employees with clear, transparent information on planned activities and closure dates for relevant ADZ sites.<br>■ Offer employment to current employees at alternative ADZ sites. | Project investors / developer / operators (Overseen by the SFA and relevant government department) | Pre-closure and decommissioning and for the duration of the closure phase. | Weekly |
| **Decommissioning** | Loss of economic benefits | To manage the reduced national economic contributions. | Maintain GDP contribution. | ■ Provide stakeholders with clear, transparent information on planned activities and closure dates for relevant ADZ sites.<br>■ ADZ investors must comply with MMP regulations, standards and licence conditions.<br>■ Implement adequate exit strategy. | The SFA and relevant government department. | Pre-closure and decommissioning and for the duration of the closure phase. | Monthly |

## 10.3 Monitoring and Reporting

The monitoring and reporting phase involves the collection, analysis, and dissemination of information over time. This phase can assist in refining assessments, track the progress of social impact management approaches and identify changes needed, report to communities on impacts and activities, and facilitate an informed dialogue around these issues. Complaints handling processes (also known as grievance mechanisms) and participatory monitoring processes are essential activities during the entire life of the aquaculture sector (Franks 2011, 2012).

The monitoring programme outlines preliminary performance indicators and an approach to monitoring and reporting for the mitigation strategies. A more detailed monitoring program can be developed in consultation with the key stakeholders during the finalisation of the SMP. The principal objectives of the monitoring program will be to:

- Demonstrate compliance with the EIA and EMP commitments;
- Track the identified impacts and the delivery of their mitigation strategies;
- Identify new impacts arising from changing conditions and develop responses; and
- Enable regular stakeholder contact and feedback.

# 11.0 RECOMMENDATIONS

From a social perspective, the following recommendations are made:

- The proposed MMP project be implemented.
- The proposed mitigation measures are implemented to limit the negative impacts and enhance the positives.
- The requirements of the EIA must be strictly adhered to.
- Establish a joint working group with key local stakeholders before construction commences.
- Establish a MMP environmental monitoring committee.
- **Develop and implement a formal grievance mechanism.**

# 12.0 CONCLUSION

The findings of the SIA indicate that the development of the onshore infrastructure and ADZ sites will **generate positive economic growth, develop local skills in maritime sciences and create job opportunities**. The proposed MMP will also generate population influx and attract in-migration of foreign work seekers which may contribute to certain socio-cultural tensions in the inner islands.

The results of the study indicate that the recommended mitigation measures are expected to reduce the significance of adverse impacts to acceptable levels while positive impacts will on average be significantly enhanced to maximise benefits to surrounding communities. Implementation of influx management, community skills development and community safety and security measures are expected to mitigate the respective impacts.

Ongoing monitoring, management and implementation of measures outlined in specialist reports and the Environmental Management Programme will be critical to ensuring environmentally real impacts do not affect communities.

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