

# Bonaire

## Sustainable Urban Development Carrying Capacity Study



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# Abbreviations



ADR	Average daily rate
AoM	Tailor-made waste program/ Afvalbeheer op Maat
BC	Island Council/ Bestuurscollege
BES	Bonaire, Sint Eustatius en Saba
BIA	Bonaire International Airport
BNMP	Bonaire National Marine Park
BONHATA	Bonaire Hotel and Tourism Association
BOPEC	Bonaire Petroleum Corporation
CAGR	Compound Annual Growth Rate
CBS	Statistics Netherlands/Centraal Bureau voor de Statistiek
CGB	ContourGlobal Bonaire
CO2	Carbon Dioxide
DCNA	Dutch Caribbean Nature Alliance
DRFTA	Disaster Risk Financing Technical Assistance
EIA	Environmental Impact Assessment
EU	European Union
FCB	Fundashon Cas Bonaireano
FDI	Foreign Direct Investment
GHG	Greenhouse Gas
GDP	Gross Domestic Product
HGB	Bonaire Mortgage Guarantee/ Hypotheek Garantie Bonaire
IND	Immigration and Naturalisation Agency
IUCN	International Union for Conservation of Nature
MJOP	Multi-Year Road Program/Meerjarenprogramma Wegen Bonaire
MT	Metric Tonne
NMBP	Nature and Environment Policy Plan (implementation)
OCTs	Caribbean Overseas Countries and Territories
OLB	Public Entity Bonaire/Openbaar Lichaam Bonaire
RCN	National Office for the Caribbean Netherlands / Rijksdienst Caribisch Nederland
RESEMBID	Resilience, Sustainable Energy and Marine Biodiversity Programme
RHI	Reef Health Index
ROB	Spatial Development Plan/ Ruimtelijk Ontwikkelingsplan Bonaire
SDM	Sustainable Development Masterplan
STINAPA	Bonaire National Parks Foundation / Stichting Nationale Parken Bonaire
STMP	Strategic Tourism Master Plan
TCB	Tourism Corporation Bonaire
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNWTO	United Nations World Tourism Organization
WEB	Water-en Energiebedrijf Bonaire N.V.
WSNP	Washington Slagbaai National Park
WTTC	World Travel and Tourism Council
WWF	World Wildlife Fund

# Introduction

## ***Background and context of the study***

In the wake of COVID-19, tourism on Bonaire is showing signs of rapid and near-complete recovery. At the same time, the population has continued to grow significantly. In 2019 and 2020 this growth was driven primarily by net immigration into Bonaire from other islands in the Dutch Caribbean, Central and South America, and European Netherlands. Bonaire's economy is heavily concentrated on tourism and, in recent years, has experienced a steady increase in foreign direct investment (FDI), mainly in real estate. As in other Caribbean islands, the tourism-based economy has generated a flourishing real estate market, and demand after the pandemic has accelerated.

A rapid recovery of tourism and the influx of FDI present Bonaire both opportunities and challenges. Tourism and FDI bring opportunities to create employment, reduce poverty, stimulate regional development, and fund the maintenance and protection of ecosystems. However, the urbanization associated with tourism and FDI can also magnify the challenges and constraints in Bonaire's pursuit of sustainable development because of its ecological fragility and economic vulnerability. The continuous threat of climate change and natural disasters highlights these threats. These threats and their resulting impacts need to be addressed to promote resilient growth on Bonaire.

Considering the path that sustainable urban development can or should take on Bonaire is essential. Sustainable urban development is built on three pillars: socioeconomic sustainability, physical-ecological sustainability, and cultural sustainability. Managing resources that balance a community's economic growth while balancing cultural integrity, biological diversity, social structures, and functioning infrastructure is vital for sustainable development.

The World Bank, through the European Union (EU)-funded Disaster Risk Financing Technical Assistance (DRFTA) for Caribbean Overseas Countries and Territories (OCTs), will work closely with Bonaire's government to assess the island's carrying capacity in light of the rapid growth in tourism, population, and real estate development. Will do this by developing a study assessing the island's carrying capacity as a function of its environment, economic activity, culture, social structure, infrastructure, land use, and climate resilience.

## ***Objective of the study***

The main objective is to assess Bonaire's carrying capacity to develop tourism and manage development, by providing an analytical tool to determine growth scenarios and simulate impacts. The study will give the Executive Council of Bonaire the information and tools to inform a growth strategy for mobilizing the island's institutional, financial, and technical resources.



### The outputs of this study are:

- Snapshot of the current development status as it relates to economic development, population growth, visitor growth, and infrastructure development.
- Identification of the resident sentiment towards the island development and their experiential carrying capacity
- Identification of island growth carrying capacity indicators and priority issues
- The advantages and disadvantages of potential growth scenarios
- Recommendations to address the salient developmental issues and establish a sustainable growth model

The **desired outcome** is to define desired conditions and thresholds for tourism and population growth and associated impacts from tourism and population growth that balances:

- Sustainable economic development and inclusive growth
- Improvement of the quality of life of Island residents
- Protection and conservation of natural and cultural heritage
- Increase the quality of the visitor experience

## **Methodological Approach**

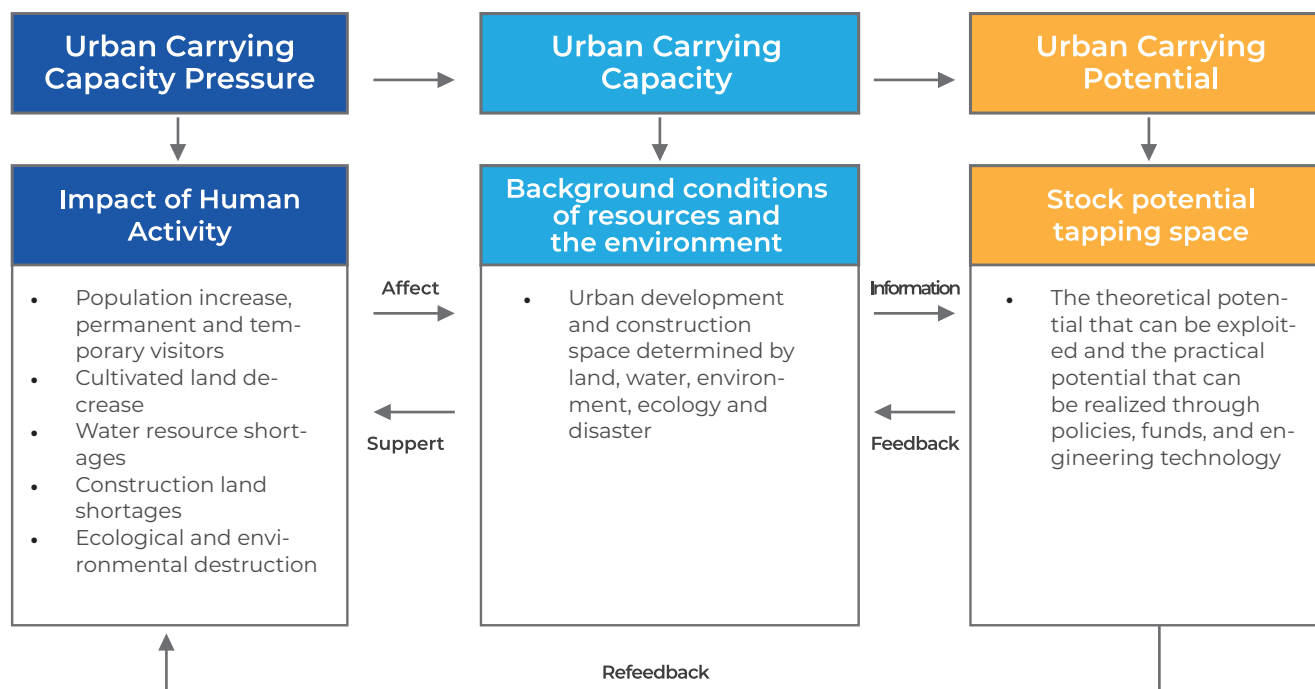
The term “Carrying Capacity” was initially derived from the Belgian mathematician Verhulst’s research on ecological issues and resource availability in natural environments in the early 1800s. However, the 1950s textbook on ecology by Eugene Odum popularized the term in its modern meaning as the equilibrium value of the

logistic population growth model. Subsequently, the concept of carrying capacity has been extended. It is often used to examine the extent to which a region’s development is limited in different aspects such as the environment, economics, geography, and society.

With the rapid advancement of industrialization and urbanization, tensions between limited resources and unlimited development demand are becoming increasingly common. To address this issue, urban carrying capacity evaluations have gained practical significance for effective resource allocation and territorial spatial planning. Studies addressing urban carrying capacity are still nascent and include only a narrow body of literature, highly theoretical and with limited applications.

For this study, the urban carrying capacity is defined as the maximum amount of human social and economic activity that can be supported by urban built space; while ensuring ecosystem security and social stability within a given regional framework. Considering the demand for built space, use of existing resources, and bearing potential through policy or technology adjustments.

This study used the comprehensive carrying capacity “pressure-capacity-potential” theoretical framework as a guiding principle. From the point of view of the coordination and integration of these “three forces,” this model analyzes the degree of stress on urban space and provides systematic answers to the questions of what pressure urban built space is under in a given period, how high its resilience is, and to what extent it can support intensive human activities. (Li B et al., 2022). See the conceptual model shown in Figure 1.



Source: Li B et al., 2022

Bonaire is highly dependent on economic activity from tourism, and its population density is affected by the growth in temporary visitors. Therefore, the UNEP/MAP/PAP 'Guidelines for carrying capacity assessment for tourism in Mediterranean coastal areas' was used as an appropriate reference. These guidelines present the indicator framework to be assessed according to physical-ecological, infrastructural, socio-demographic, and political-economic parameters. Additional indicators, relevant to urban development carrying capacity in an island setting were added to this framework. See Appendix A Bonaire Carrying Capacity indicator framework.

This study incorporates stakeholder concerns through a resident sentiment survey and actively engaged them through workshops, town hall meetings, and interviews, seeking to obtain insight and validation of the study findings and recommendations.

The following steps were followed to develop Bonaire's Sustainable Urban Development Carrying Capacity Study:

1. International indicators were selected following the UNEP/MAP/PAP methodology. A list of indicators with baseline data, as appropriate, was compiled and included in the Appendix A.
2. Baseline data, trendlines, and current conditions for Bonaire were collected for each indicator based on desktop research and information provided by local stakeholders and experts through one-to-one and group interviews.
3. A resident sentiment survey was conducted in August 2022, targeting all segments of the population who are permanent residents.
4. Stakeholders' workshops were held in November 2022 to review the critical issues identified in the desktop research and resident survey. Participants were asked to rank the importance of all issues to determine which were considered a priority and provide potential solutions.
5. An analysis of the workshop findings was conducted to determine if there was consensus among stakeholders on which issues had the greatest impact on their lives. These findings assisted in the consolidation of the Carrying Capacity challenges findings.
6. Utilizing regression analysis, a growth model was developed and used to derive three different scenarios: status quo, accelerated growth, and slow growth. An analysis of the different growth scenarios pros and cons of each path was derived and the most appropriate sustainable growth model was identified.
7. Research was conducted on the current plans, policies, and programs in place, in development, and on-hold that affect the current carrying capacity challenges.
8. Finally, recommendations on policy, investments, and technology that will help mitigate the carrying capacity constraints were derived and validated with the Bonaire government executive council in May 2023.

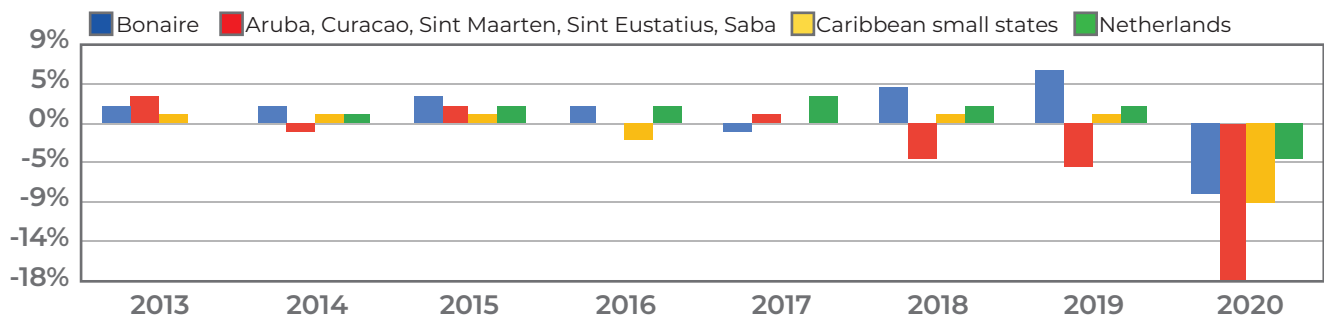


# Bonaire's current Urban Carrying Capacity Pressure

## Economic development

In the years before the COVID-19 pandemic, Bonaire's real GDP growth mostly outpaced that of the other small Caribbean island states, particularly other Dutch Caribbean islands. Figure 2 shows that, in 2018 and 2019, the average growth of other Dutch Caribbean islands was negative, primarily due to the economic downturn on Sint Maarten, Saba, and Sint Eustatius in the aftermath of Hurricane Irma in September 2017.

**Figure 2: Real GDP growth in the Caribbean and the Netherlands, 2013–2020**



Source: Statistics Netherlands Bonaire/The Hague/Heerlen, World Bank, and OECD National Accounts data files.

Note: Caribbean small states include Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

Like many other Caribbean islands, Bonaire's economy highly depends on tourism. The contribution of travel and tourism to gross domestic product (GDP) measures the direct contribution of tourism to the economy. The direct effects consider only the immediate effects of tourism demand on production. This measure excludes indirect effects (for example, suppliers), induced effects (for example, wages), and investment activities (for example, hotel construction)<sup>1</sup>. According to the 2021 Tourism Recovery Plan, the direct contribution of tourism to the Bonaire economy was an estimated 30 percent in 2017. With indirect spin-offs included, the contribution of tourism to GDP in 2017 was estimated at 80 percent. The plan also noted that the total contribution in 2019 should be expected to be higher because tourism continued to grow in 2018 and 2019 (OLB 2021a). Table 1 compares several tourism destinations for which the total travel and tourism contribution to GDP was calculated and shows that Bonaire has relatively high exposure to tourism.

**Table 1: Tourism sector's total contribution to GDP**

Country/Territory	Year	Tourism Total GDP
Bonaire	2012	16%
Aruba	2013	20%
Bermuda	2018	5%
Jamaica	2018	9%
Montenegro	2009	10%
Iceland	2017	9%
Greece	2017	7%
Netherlands	2019	4%

Sources: OLB (2021a) and WTTC (2022)

<sup>1</sup> The indirect effects of tourism consumption on other industries derive from the links between industries that serve tourism and those that supply the tourism industry with intermediate inputs and capital goods, and in turn, the links between these industries and others that supply them, and so on. All these effects generate additional value-added employment, employee compensation, taxes, other income, and so on. In addition, the increase in income distributed to the labor force and the owners of productive capital resulting from incremental visitor demand generates increased demand for goods and services through a rise in household consumption. This additional demand generates a chain of induced effects on various goods and services.

Fueled by tourism growth, Bonaire's GDP increased by 4 percent in 2018 and 6 percent in 2019. Between 2017 and 2019, the economic sector "Accommodation and food service activities" grew by 27 percent. Sectors most closely related to tourism accounted for about 50 percent of GDP up until 2019<sup>2</sup>. Moreover, the increased demand for housing boosted economic activity in the real estate sector by 18 percent and in the construction sector by 54 percent. The economic downturn in 2020 can almost

wholly be attributed to contractions in the "Accommodation and food service activities" and "Culture, recreation, and other services" sectors, which were impacted the most by the pandemic. Other tourism-dependent sectors remained relatively stable. There was one exception: the demand for new developments continued to grow during the pandemic, resulting in a 19 percent increase in the construction sector for 2020. Table 2 presents the contribution of different economic sectors to the economy.

**Table 2: Contribution to Bonaire's GDP by economic sector, 2017–2020**

Caribbean Netherlands, Bonaire; gross value added, branches							
GDP (mIn USD)	2017	2018	2019	Share of total (2019)	2020	Growth (2017-2020)	Growth (2019-2020)
Manufacturing	9	10	10	2%	10	11%	0%
Energy, water, waste treatment	15	20	26	5%	23	53%	-12%
Financial institutions	24	27	28	6%	28	17%	0%
Business services	44	52	55	11%	53	20%	-4%
Public administration and services	52	53	57	11%	61	17%	7%
Education	29	28	29	6%	32	10%	10%
Health and social work activities	51	50	54	11%	56	10%	4%
Construction	24	27	37	7%	44	83%	19%
Renting, buying, selling real estate	22	25	26	5%	25	14%	-4%
Transport, information and communication	46	38	38	7%	40	-13%	5%
Wholesale and retail trade	55	57	65	13%	63	15%	-3%
Culture, recreation, other services	25	26	28	6%	18	-28%	-36%
Accommodation and food serving	44	50	56	11%	28	-36%	-50%
Total	440	463	509		481	9.32%	-5.50%

Source: CBS (2022a). Note: Values at current prices in million US\$.

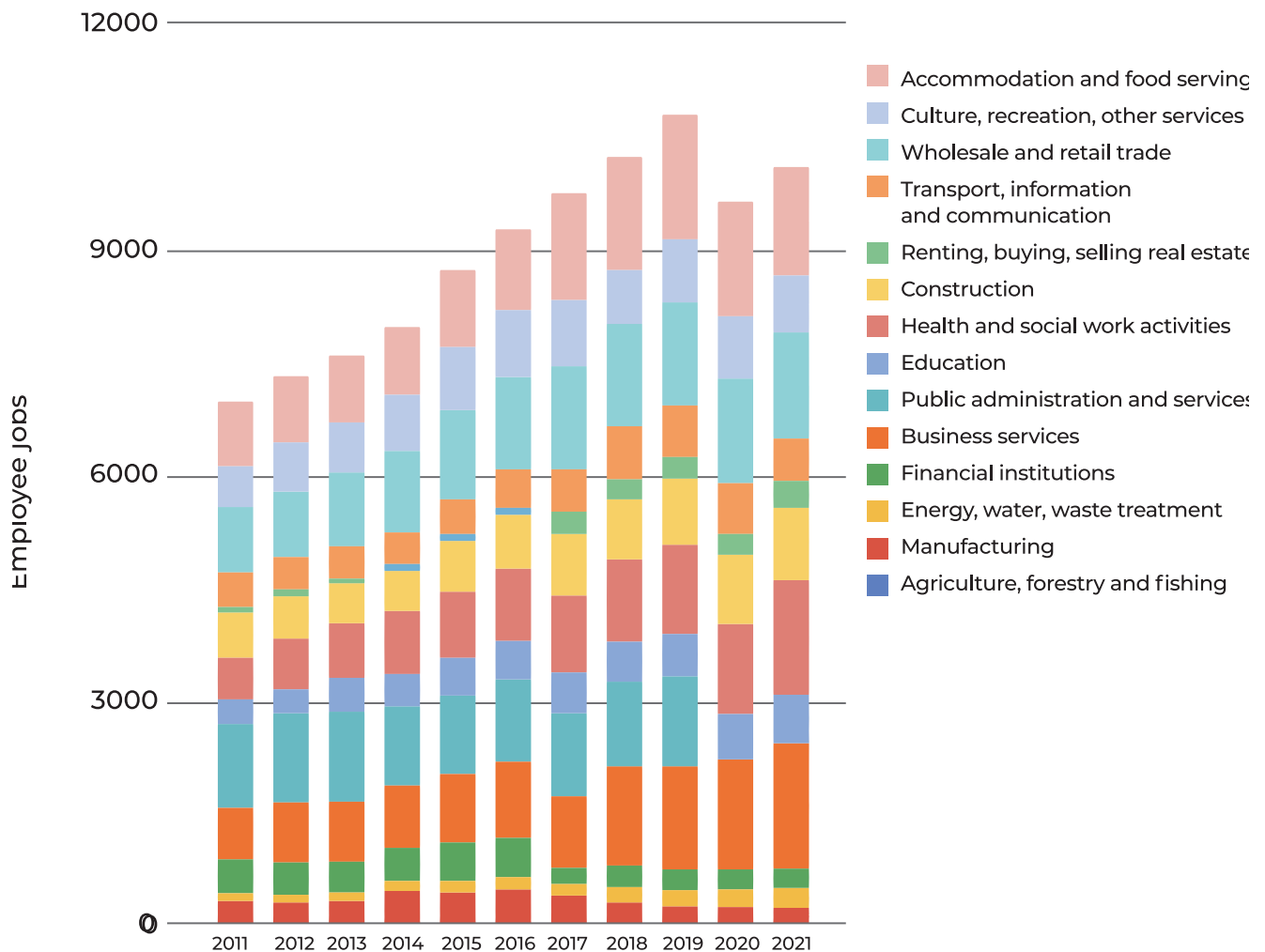
The number of jobs rose by 3,828 (55 percent increase) between 2011 and 2019. According to CBS, tourism and population growth are key drivers of the increase in jobs. Between 2011 and 2021, the number of jobs in the accommodation and food services sector increased by 67 percent, from 860 to 1140. Sectors directly related to tourism accounted for more than half of the

employment on Bonaire in 2021. Between 2011 and 2019, employment in the two main tourism sectors grew by 79 percent. Additionally, the workforce in the construction sector continued to expand despite the pandemic—from 600 in 2011 to 960 in 2021 (CBS 2023). Figure 3 shows the contribution of each of those sectors to labor demand.

2. Two industries almost entirely dependent on tourism are "Accommodation and food service activities" and "Culture, recreation, and other services." The economic sectors "Wholesale and retail trade," "Transport, information and communication," "Real estate activities," and "Construction" are also directly exposed to tourism but to a lesser extent.



Figure 3: Employment on Bonaire by economic sector, 2011–2021



Source: CBS (2022a)

Note: Values are the number of employee jobs.

**The low unemployment rates of the last few years have created a tight labor market.** This situation has especially become a concern in construction and tourism (hotels and restaurants) and the public sector. In 2018, 297 work permits (tewerkstellingsvergunning)<sup>3</sup>

were given out to positions related to the construction sector. Employers in the tourism sector have indicated that they fill many of their open positions with interns from the European Netherlands (ROA-CN 2019).

Table 3: Unemployment rates, 2012–2020

	2012	2014	2016	2018	2020
<b>Unemployment rate</b>	5.80%	6.40%	6.70%	3.20%	4.60%
<b>Number of unemployed people</b>	550	680	770	370	550

Source: CBS Netherlands

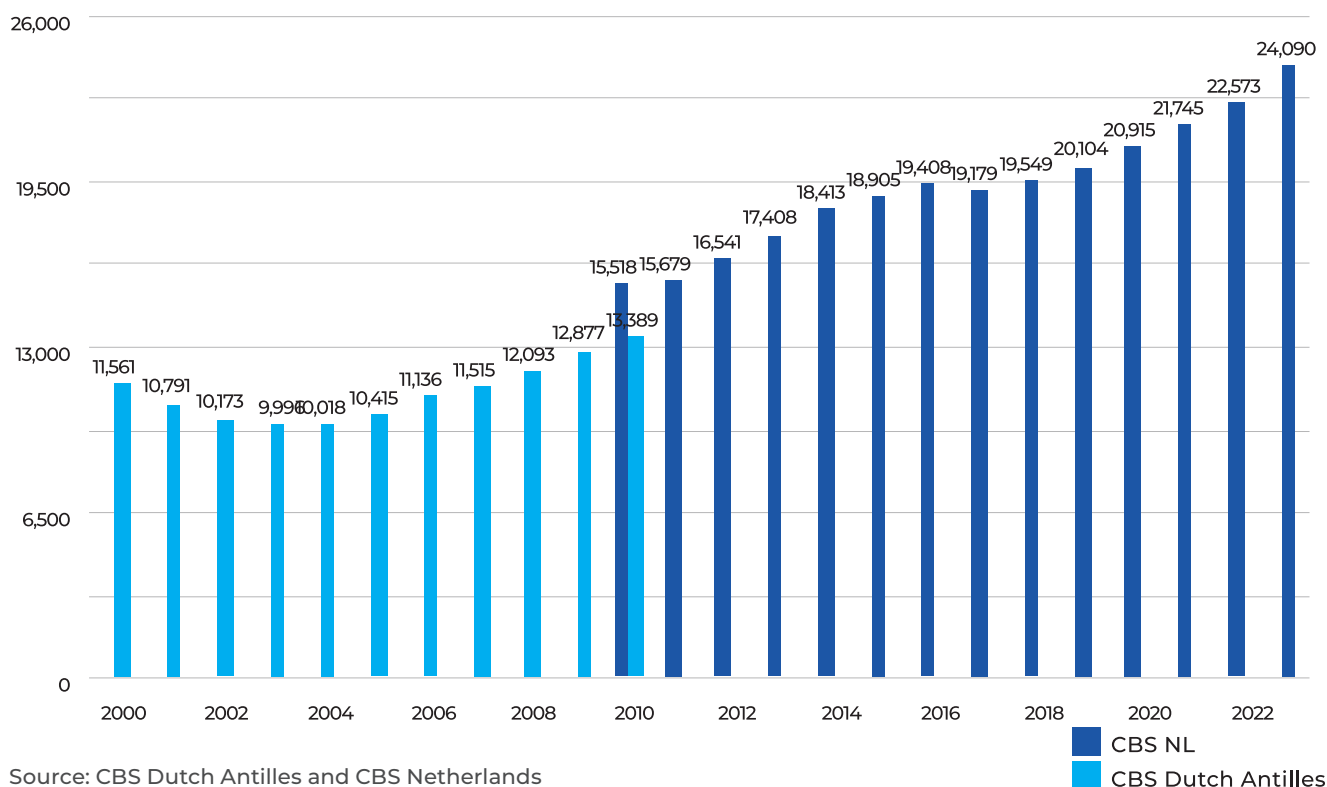
3. A work permit, or tewerkstellingsvergunning, is needed for hires that are not Dutch or US citizens.



## Resident population development

**The population of Bonaire has almost doubled since 2000.** In the year 2001, the census counted 10,791 persons. In the next two years, the island experienced a dip in population, but in 2004, the population was back to 2000 figures. Between 2001 and 2010, CBS Dutch Antilles calculated the population at the beginning of the year by processing changes (births minus deaths and migration balance) to the 2001 census population count. In 2010, CBS Netherlands changed the methodology to counting the number of people included in the population register. By the CBS Dutch Antilles' methodology, the population in 2010 was 13,389, but 15,518 by CBS Netherlands' methodology (difference of 16%)<sup>4</sup>. The compound annual growth rate (CAGR) between 2010 and 2022 was 2.9 percent.

Figure 4: Population of Bonaire, 2010–2023



4. <https://www.cbs.nl/nl-nl/cijfers/detail/80539ned#shortTableDescription>





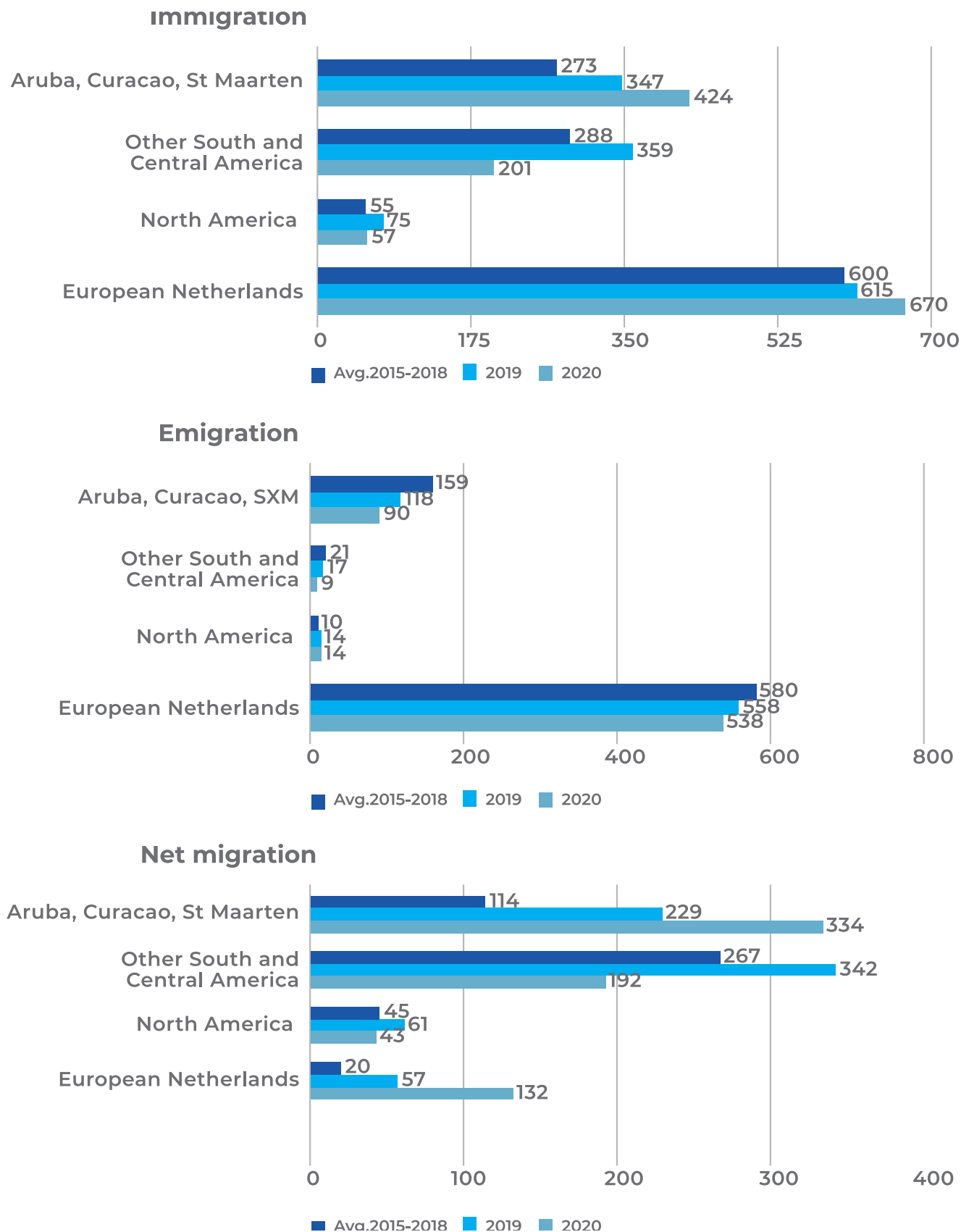
**The increase in population over the last ten years is mainly caused by a migration balance of 4,900 between 2012 and 2022, and less by natural growth.** The balance between births and deaths was just 1,100 between 2012 and 2022. In 2022, net migration was 1,403, more than double than each of the previous three years

In 2020, during the pandemic, the trend of increasing numbers of migrants from South, Central, and North America slowed. However, the growing trend of migrants from the European Netherlands, Curacao, Aruba, and St. Maarten continued. For each region, the net migration flow was positive, that is, more people entered than left Bonaire. The positive balance was substantial from Curacao, Aruba, and St Maarten, and South and Central America.



Kralendijk  
PICTURE BY: Tourism Bonaire  
Bonaire's Media Hub

Figure 5: Migration into Bonaire, by region of origin



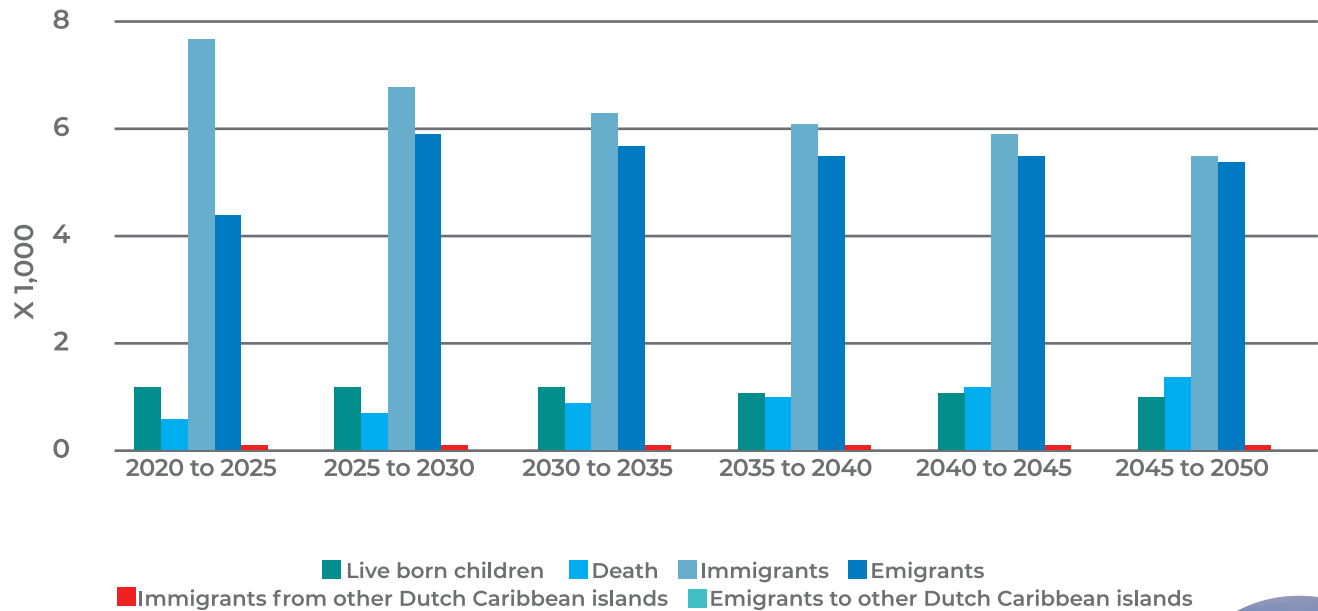
Source: CBS Netherlands



The migration balance is forecasted to decrease gradually to zero between 2030 and 2050. Based on data from previous years, CBS estimates that across the Caribbean Netherlands (Bonaire, Saba, St. Eustatius), 91 percent of immigrants born in the European Netherlands, 66 percent of those born in

Aruba, Curaçao or St Maarten, and 76 percent of those from other countries will eventually leave. Of the emigrants born within the Caribbean Netherlands, 54 percent are expected to return (CBS 2022b).

**Figure 6: Migration balance Bonaire, 2020-2050**



Source: CBS Netherlands

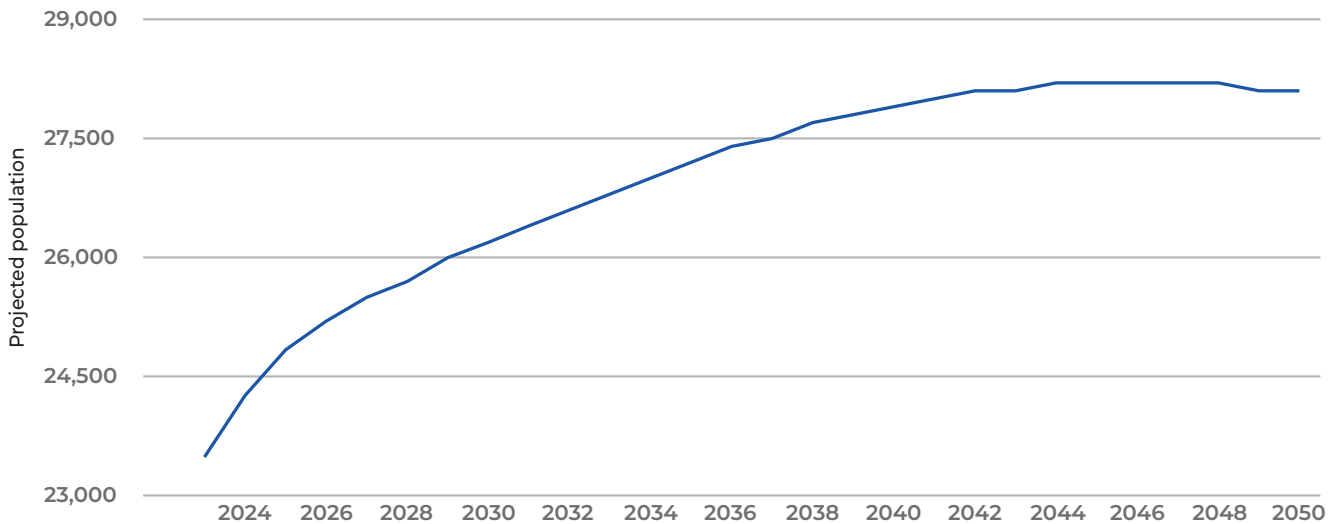
The actual number of people living on the island at a given time is expected to be higher than the official population count. European Dutch and Dutch from Curacao, Sint Maarten, and Aruba can stay on Bonaire for a period of a maximum of 180 out of 365 days without the need to register. If they work, they can stay for a maximum period of 90 days before they need to request residence. All people that received a residence permit as well as those (Dutch and US citizens) who stay more than four months out of a six-month period on Bonaire are required to officially move to the island by registering into the population register.

Washington Slagbaai National Park  
 PICTURE BY: We Share Bonaire pictures  
 Bonaire's Media Hub



**Resident population growth and projections** Between 1 January 2010 and 1 January 2023, Bonaire's population rose from 15,518 to 24,090—averaging 3.4 percent per year. In 2022, CBS had estimated a population of 26,192 by 2030. According to the CBS forecast, the growth rate after 2030 will decrease further and halt around 2050, at an estimated 28,100. This estimate is slightly higher than was predicted in 2021 due to both higher expected migration balance and higher numbers of live births (CBS 2022b).

**Figure 7: Population forecast for Bonaire, 2023–2050**

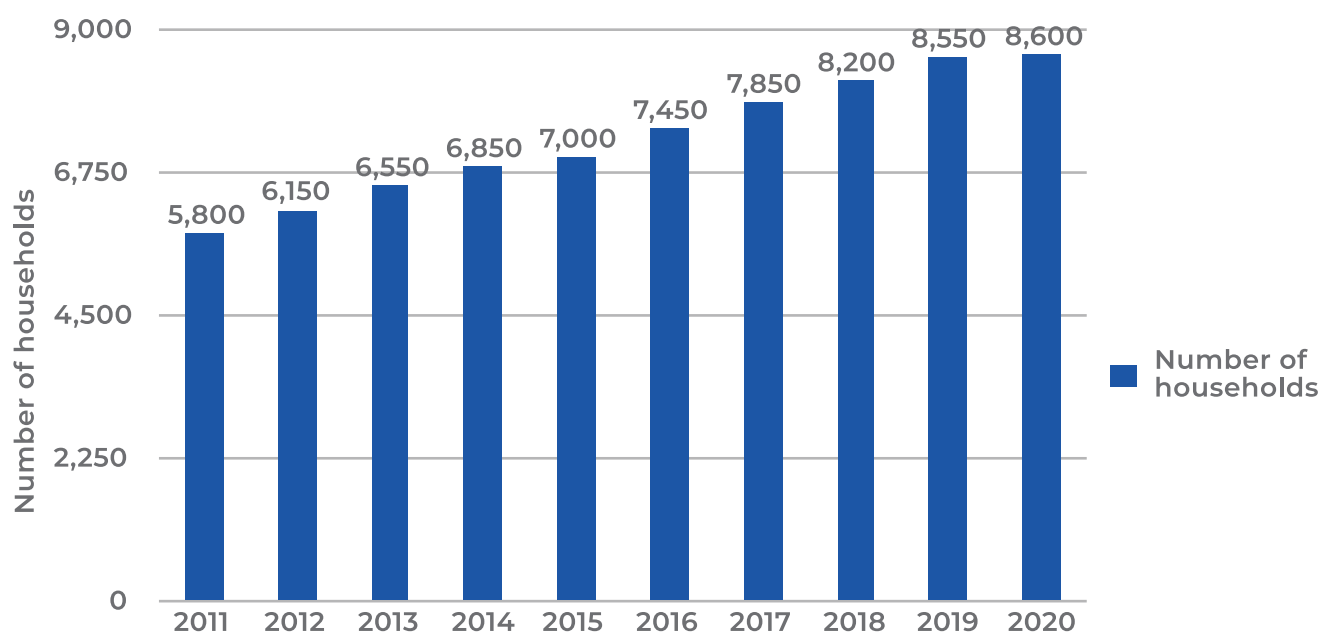


Source: CBS Netherlands

### Number of households

Between 2011 and 2020, the number of households rose by 48.3 percent, while the population increased by 32.1 percent. In 2011, the average number of people per household was 2.73 people; in 2020 it had dropped to 2.43.

**Figure 8: Number of households, 2011–2020**



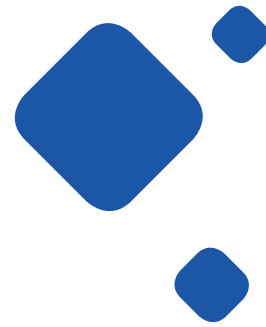
Source: CBS Netherlands





**Washington-Slagbaai National Park**  
**PICTURE BY: RTP**  
**Bonaire's Media Hub**





## **Tourism development**

**The demand for Bonaire as a tourist destination has tripled over the last two decades.** The sector initially developed based on the scuba diving market but has also started to attract the non-dive market over the years. While Bonaire received 59,000 non-resident air arrivals in 1995 (Tourism Planning and Research Associates 1997), this increased to 157,800 in 2019. The COVID-19 pandemic caused a drop in arrivals in 2020 and 2021. In 2022, Bonaire received 170,194 non-resident international visitors by air. The accommodation supply kept

pace with the growing demand, and the total room inventory increased from 1,122 in 1997 to 2,182 in 2021. Also, more cruise lines started to include Bonaire in their itineraries and, over the years, with larger ships. The average number of passengers per ship increased from 1,590 in 2015 to 2,548 in 2019. In 1995 just 11,000 cruise passengers visited Bonaire. In 2019—24 years later—this had increased to 457,700 passengers (CBS 2021). In 2022, Bonaire received 304,298 cruise passengers.

### **Stay-over tourists**

The number of non-resident visitors arriving by air rose from 127,600 in 2012 to 157,800 in 2019, an increase of 25 percent. While between 2012 and 2017, demand showed limited and inconsistent growth, the number of arrivals increased significantly in 2018 and again in 2019. In 2020, due to the pandemic, the number of visitors dropped by 58 percent compared to 2019. By 2021 the demand experienced some recovery, and the annual number of visitors reached 70 percent of the 2019 level. In 2022, Bonaire received 170,194 non-resident visitors by air, an increase of 7.9 percent compared with 2019. While during the summer months of 2022, there were still slightly less non-resident visitors arriving by air, compared to 2019, by the end of 2022, Bonaire experienced record growth. In December 2022, the number of non-resident visitors arriving by air increased by 23 percent compared to the same month in 2019. ForwardKeys noticed a trend toward more affluent visitors; stating that in the third quarter of 2022, premium cabin travel to Bonaire was up by 110 percent (ForwardKeys, 2022).

In 2019, 35 percent of arrivals originated from the European part of the Netherlands, 25 percent from the US, and 22 percent from Aruba, Curacao, or St. Maarten. In 2020 and 2021, the share of visitors from the European part of the Netherlands increased (CBS 2022a). During the second half of 2022, 47 percent of arrivals originated from the Netherlands, 26 percent from the US,

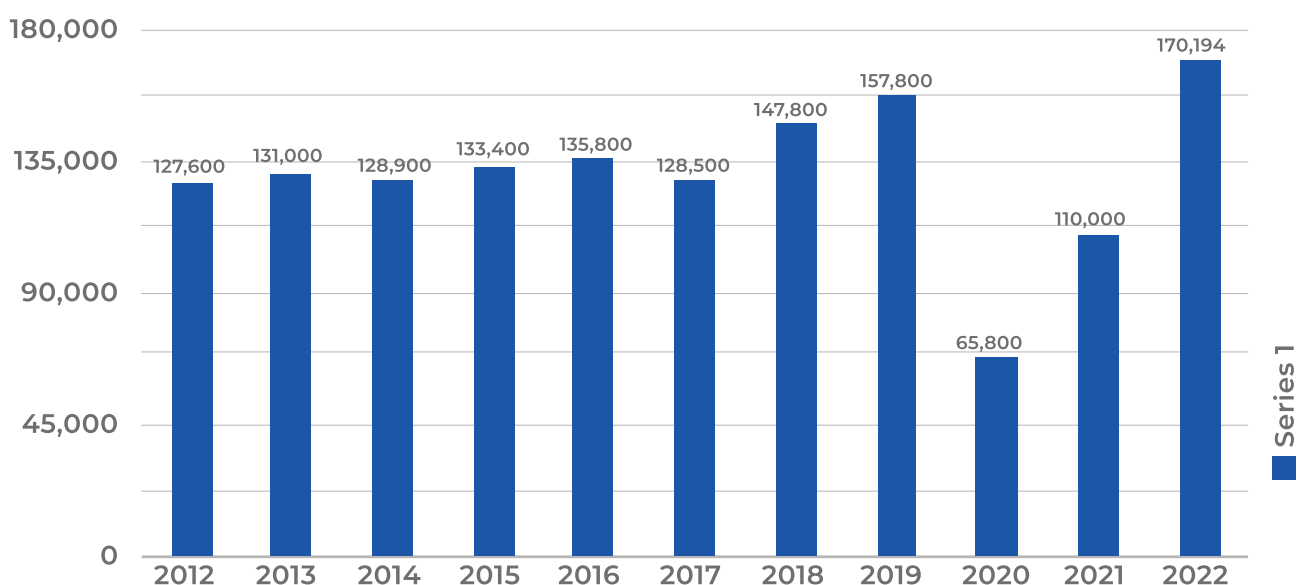
2. TCB has a partnership with ForwardKeys, an international travel data provider that helps destinations understand their performance in the market.

and 12 percent from Curacao. Visitors from the United States stay an average of 7 nights, while those from the Netherlands stay an average of 14 nights. Furthermore, most Americans are middle-aged or older (55+), while most Dutch are (45+). A tourism exit survey conducted in fall of 2021 showed that almost 60% of visitors are repeat visitors of which 39% visited Bonaire more than twice. The majority of the US visitors indicated that the main reason for their visit is diving (90%), followed by rest and relaxation (75%), while for the Dutch visitors; rest and relaxation (90%) was the most important reason to visit followed by diving (30%) and other water-based activities (30%). Visitors from the US spend an average of US\$ 297 per day excluding ticket and accommodation. The average expenditure per day for the Dutch is US\$ 130 excluding ticket and accommodation. The US market is spending significantly more on their accommodation. While the average stay is seven days, they spend an average per person of US\$ 1471 per stay on their accommodation. The average Dutch visitor stays for 14 days and spends US\$ 799 on accommodation during their stay (TCB 2022a).

While the majority of non-resident air arrivals can be considered tourists, the number of stay-over tourists counted at the border also includes people who are not official residents but who do stay on the island for longer periods of time. Examples of these are interns originating from the European Netherlands who stay between 3-6 months, people who come to stay for several months and work remotely as well as retirees who come to Bonaire to escape the cold winter months in their home country and who rent or own a temporary home on the island. There are also short-term visitors from the other neighboring islands (Curacao and Aruba) that come to Bonaire for work on a daily or weekly basis accounted for in the non-resident air arrivals statistics.

On average, 80 percent of non-resident air arrivals stay overnight in hired tourism accommodations (TCB 2023). The Bonaire Hotel and Tourism Association (BONHATA) reported in December 2022 that the annual average hotel occupancy rate was 66 percent in 2022, the same rate as in 2019. The average daily rate per room (ADR) increased from US\$194 per room per night in 2019 to US\$234 in 2022 (Bonaire.nu 2022a).

**Figure 9: Non-resident air arrivals, 2012–2022**



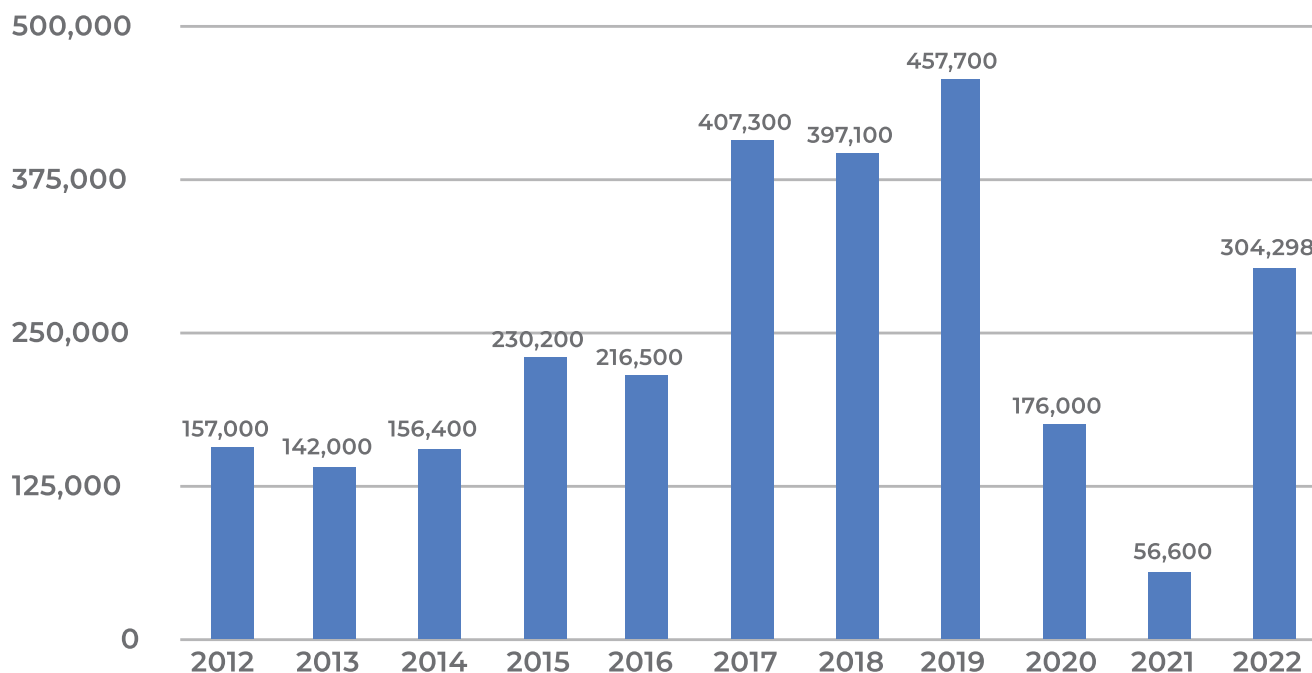
Source. CBS (2022a) and TCB (2023)

## Cruise ship tourists

**Between 2012 and 2019, the number of cruise passengers nearly tripled.** Cruise tourism in the Caribbean is seasonal, and the primary season typically lasts from November until March. In 2019, during the high season, several large cruise ships would dock at Bonaire simultaneously.

That year, the number of cruise passengers arriving on Bonaire reached a record, at almost 460,000 passengers<sup>6</sup>. After the pause in the cruise industry in March 2020, it restarted slowly by the end of 2021. In 2022, the cruise sector reached 66 percent of pre-pandemic levels as the island received 304,298 cruise passengers in that year<sup>7</sup>.

**Figure 10: Number of cruise ship passengers, 2012–2022**



Source: CBS (2022a) and TCB (2023)

In line with the Tourism Recovery Plan prepared in 2021 the government has increased the taxes of every cruise passenger arriving on Bonaire. (TCB 2021). Since January 1, 2023, cruise passengers pay \$10 per person, replacing the previous \$3.50 per person tax. The cruise lines will collect this new tax (Bonaire 2022). The recovery plan also stated that there should be more focus on smaller luxury cruise ships (100–1000 passengers) that stay in port for a few days and limiting cruise ship visits to several days per week and only one vessel per day (Bonaire 2021). That “one ship policy” was first mentioned to the FCCA and Cruise lines during meetings in Miami in June 2021. It was explained that, in line with the new vision of Bonaire, quality above quantity, 2 ships visiting Bonaire on the same day was against this vision. Cruise line companies generally agreed with this. Since June 21, 2021 this was announced on Island as well, but realizing

that this cannot be implemented over a short period, the Executive Council adopted the policy officially in July 2022. In October 2022 all ships that were scheduled to arrive on the same day received a letter requesting to move to available dates to avoid cancellations in October 22. The Harbor master offered help to avoid cancellation where possible. The last double ship in port (in April 2023) was announced in a press release in February 2023.

Under this policy, only one large cruise ship at a time is permitted in port. Smaller ships with fewer than 700 passengers will be allowed as a second ship (Bes Reporter 2023). A negative impact on cruise arrivals has yet to be observed. According to the number of port calls already confirmed as of November 2022, cruise tourism arrivals are expected to be 520,000 by 2025 (a 14 percent increase over 2019).

6. The number of cruise ship passengers reported is equal to the number of passengers on the ship; the number of passengers that disembark has historically not been reported.

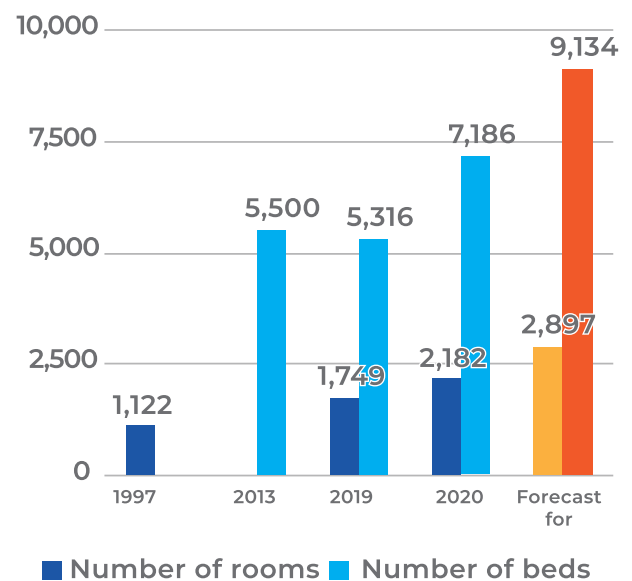
7. The number of cruise passengers that actually disembark is unknown. The reported number corresponds to the capacity of the ships arriving at port.



## Tourism Room Development Growth and Pipeline

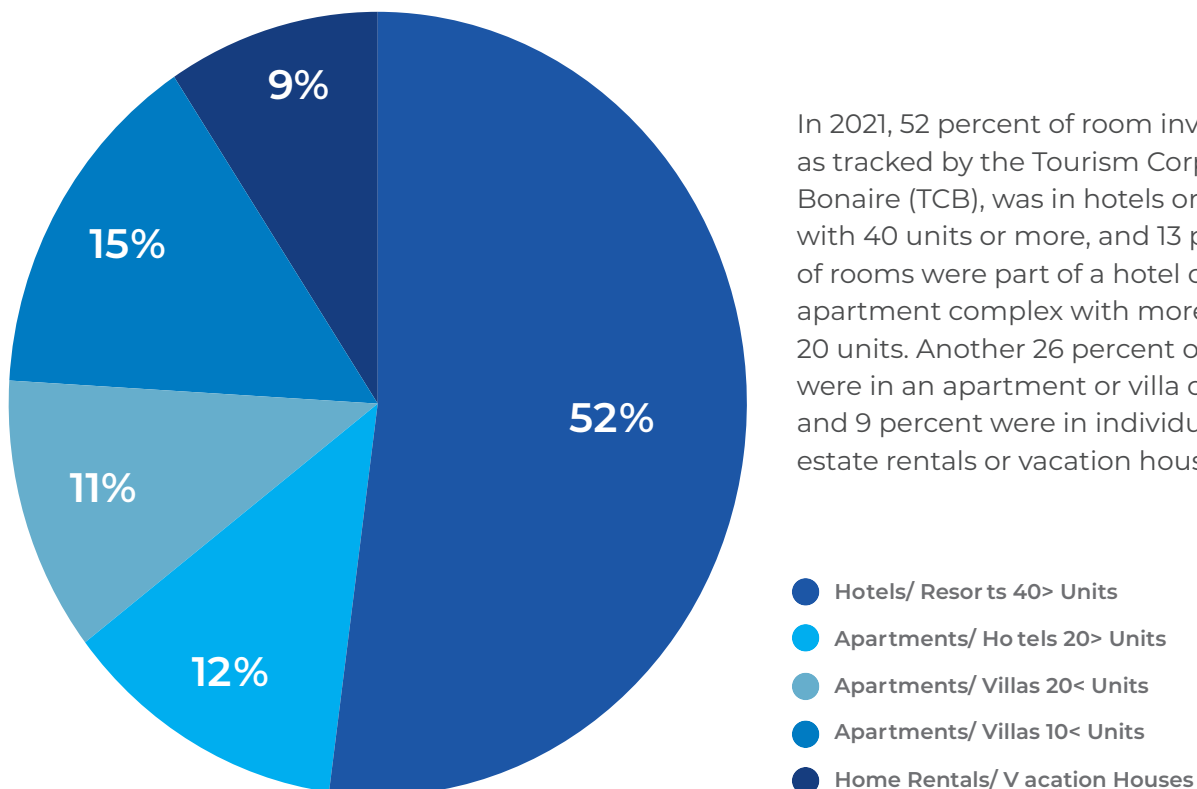
The number of rooms expanded significantly, from 1,749 in 2019 to 2,182<sup>8</sup> in 2020, an increase of 433, or 25 percent. Data collected in August 2021 by TCB suggest that another 715 tourism rooms with 1,948 beds were in the planning pipeline back then. These planned rooms include new hotels and resorts and existing hotel expansion plans. A large share of these 715 rooms has been realized since 2021, including the 200-room Chogogo Hotel and the 64-room Bloozz Resort, both new properties. The 2017–2027 Strategic Tourism Master Plan (STMP) proposed adding 600 additional rooms between 2017 and 2027, all in four and five-star hotels (Croes et al. 2017). However, this target has already been exceeded, as at least 697 rooms of unknown categories were added between 2019 and 2022.

Figure 11: Number of tourism rooms/beds, 1997–2020



Source: TCB, Tourism Planning and Research Associates (1997), CBS (2014) and Dossier Koninkrijksrelaties (2021)

Figure 12: Rooms by type of accommodation, 2021



Source: TCB, 2022

8. This number of rooms includes only accommodation that is known to TCB and does not include all of the rooms and beds that are available for recreational purposes year round or for part of the year.



## ***Resident Sentiment Survey Results***

### ***Introduction***

As a critical input to the analysis, the World Bank, in cooperation with Openbaar Lichaam Bonaire (OLB), conducted a resident survey between August 2 and September 3, 2022. Conducted online and in person, the survey focused on identifying the impact that urban development and tourism growth have had on residents' quality of life and how the residents would like the island to develop. The survey was available online in English, Papiamentu, Dutch, and Spanish through a link widely circulated and advertised by OLB through social media and an SMS blast. A local enumeration team conducted face-to-face surveys during public events and near supermarkets across all neighborhoods. The survey was completed by 777 respondents (357 online and 420 in person). See Appendix B for more details on the methodology.

## Respondent Profile

Of the 777 participants, 49.9 percent are female, 49.3 percent are male, and the rest responded “other.” Figure 13 shows the age distribution of the respondents. Most of the sample (41.3 percent) are between 40 and 59. Respondents between 20 and 39 make up 29.7 percent of the sample. Figure 15 shows that most respondents are born in the European part of the Netherlands (32 percent). Of all respondents, 55.5 percent have lived on Bonaire for over 10 years (Figure

14). Respondents born on Bonaire make up 29 percent of the sample. According to figures published by CBS, Bonaire’s population in 2022 was composed of 35 percent Bonaire-born, 15.9 percent European Netherlands-born, 20.7 percent Dutch Caribbean-born, and 28 percent born in other parts of the world. The survey’s sampling was weighted to ensure that the sample is representative of the Bonaire population. In the survey results section, the total score refers to the weighted average of the survey sample.

Figure 13: Age distribution

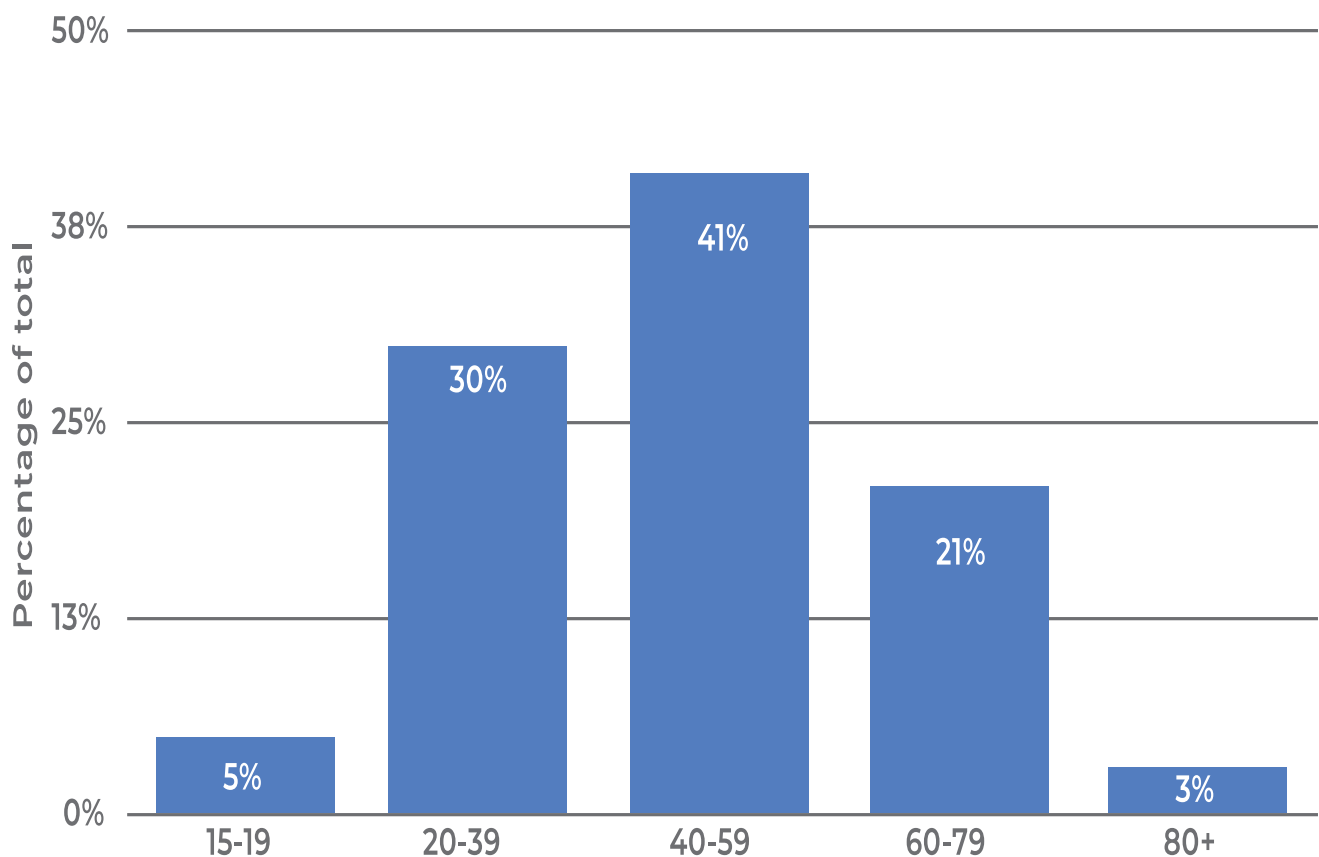




Figure 14: Years living on Bonaire

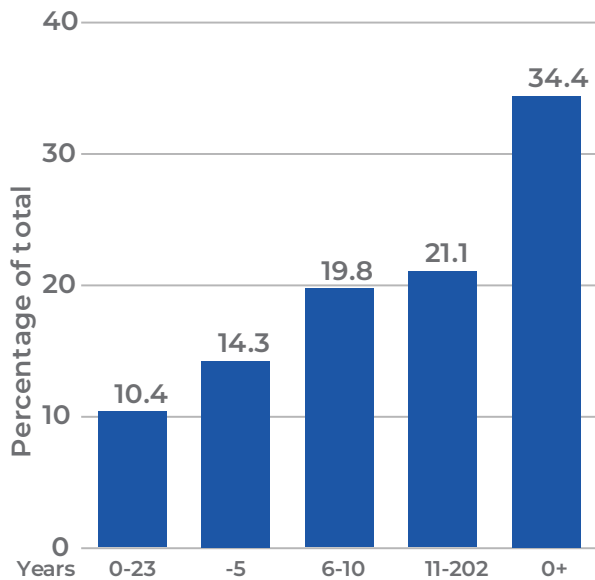
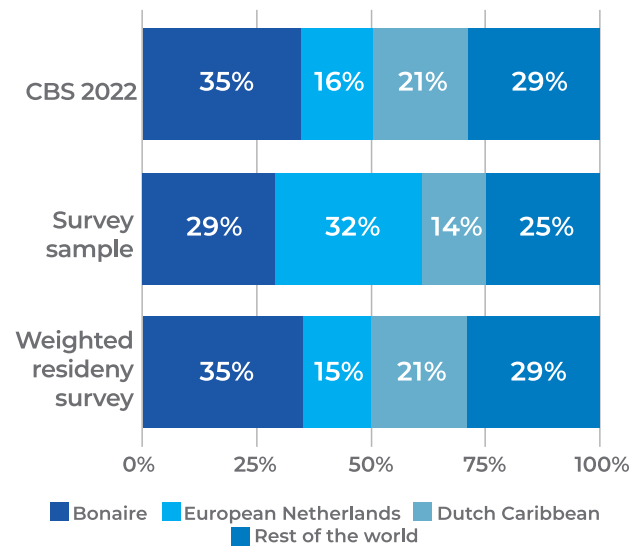
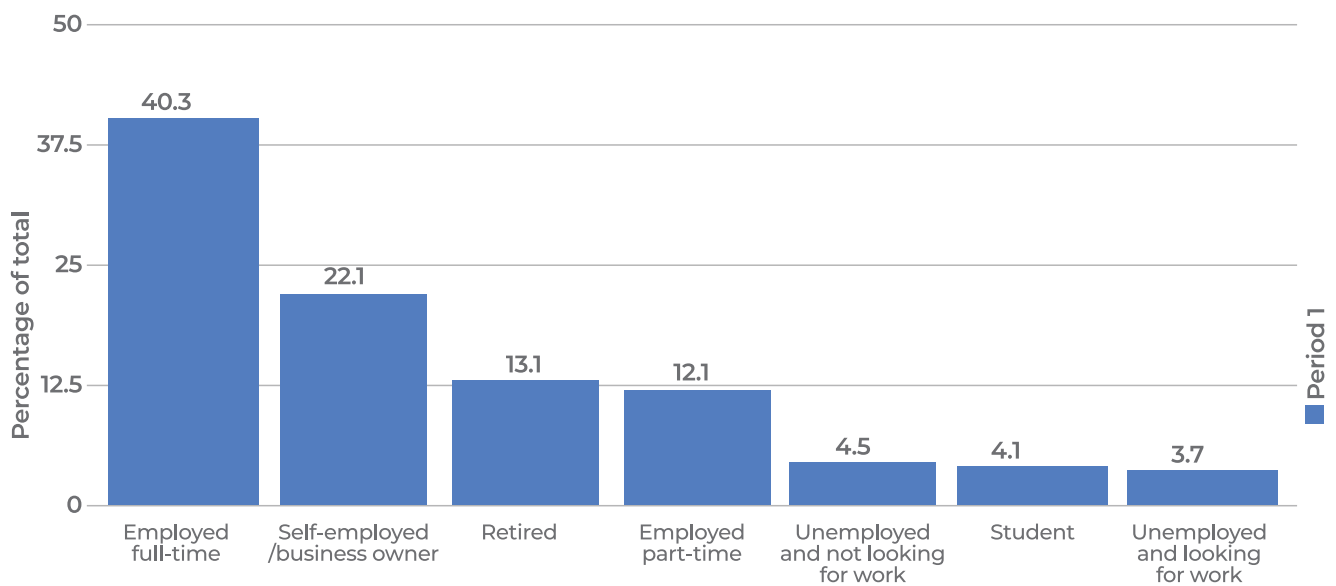


Figure 15: Place of birth



Additionally, the respondents were asked about their employment status. The top 3 statuses were full-time employment (40.3 percent), self-employed/business owner (22.1 percent), and retired (13.1 percent) (Figure 16).

Figure 16: Employment Status



## Survey Results

The survey comprised three sections. The first two sections consisted of statements where the respondent was asked to rate each statement. The topics covered in the first section included general statements about living on Bonaire. In the second section, the respondents were asked about the importance of specific actions and how well Bonaire performed on each of those actions. Finally, the third section consisted of two open questions about the residents' concerns and their vision for the future. The following sections discuss the main survey results. A complete overview of the results, disaggregated by place of birth, is presented in Appendix C.



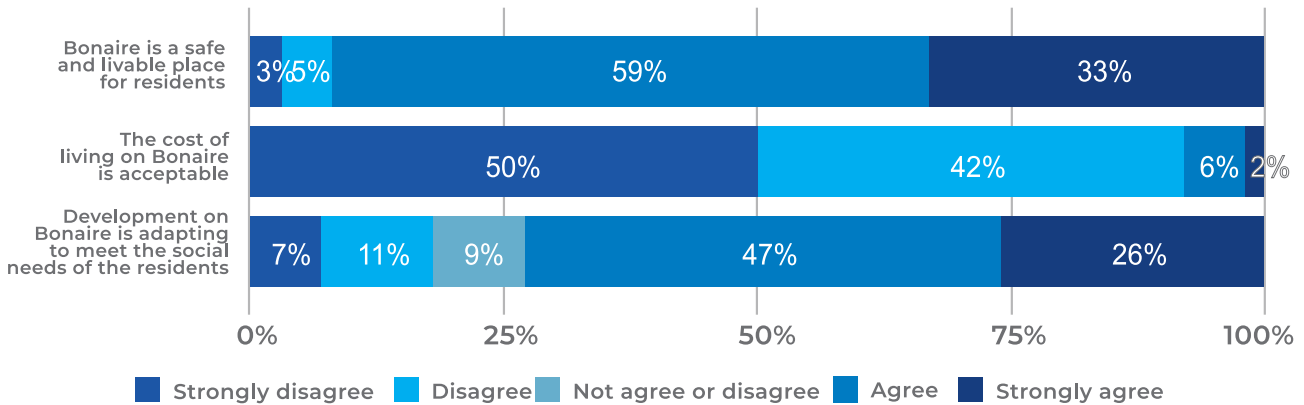
## Section 1: Sentiment about living on Bonaire

### Quality of Life

Figure 17 shows that, when looking at the total score, 92 percent of the respondents agree or strongly agree that Bonaire is a safe and livable place for residents. Also, almost all (92 percent) of respondents disagree or strongly disagree that living costs are acceptable. When asked about the country's devel-

opment, 73 percent of respondents agree or strongly agree that development on Bonaire is adapting to meet the social needs of the residents. There are no significant differences between respondents' birthplaces or other demographic profiles for these three statements, and this suggests that the different sub-samples share similar perspectives on these issues.

**Figure 17: Sentiment about living on Bonaire**

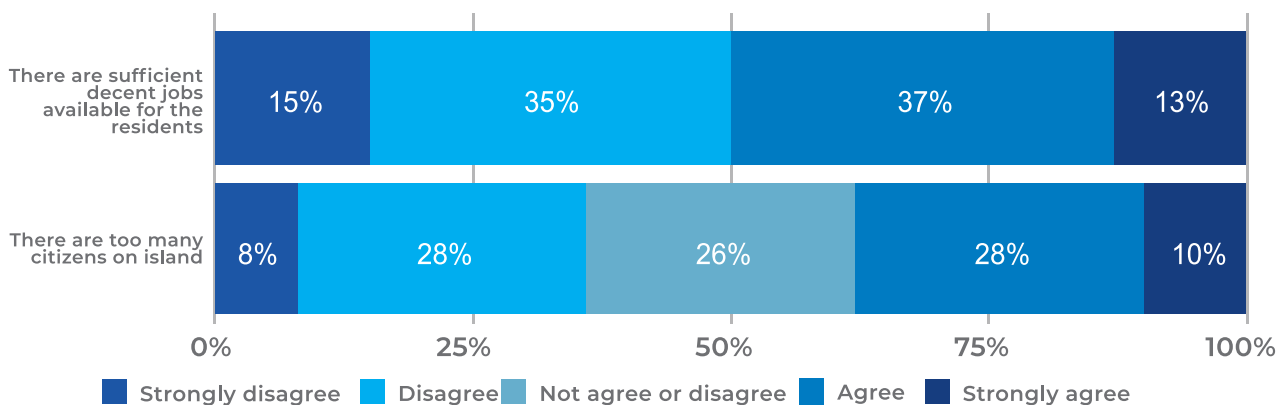


Source: Resident sentiment survey

Sentiment on the availability of decent jobs is more divided across the different resident profiles. The total score of the sample shows that 50 percent agree or strongly agree that enough decent jobs are available. Of those born on Bonaire, just 45 percent agree or strongly agree with the statement, while 54 percent of the non-Bonaire-born residents feel that way.

When asked about the number of citizens on the island, just over a third (38 percent) of the sample agrees or strongly agrees that there are too many residents on the island. Of the Bonaire-born residents, 45 percent expressed that there are too many residents, while 34 percent of the non-Bonaire-born feel that way. This shows that residents born on Bonaire are more concerned with the growing population than those who are not.

**Figure 18: Sentiment about available jobs and size of population**



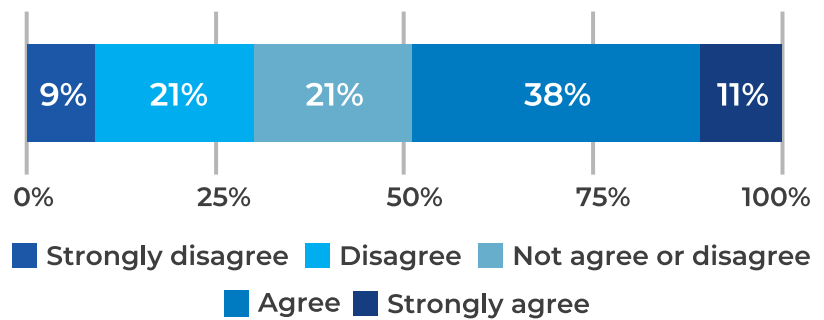
Source: Resident sentiment survey

### Tourism development on Bonaire

When asked about the impact of tourism, the total score for respondents are split as 49 percent agree or strongly agree that, in general, the positive effects of tourism on Bonaire outweigh the negative effects. Respondents born in the European part of the Netherlands slightly less agree with this statement than those born on Bonaire or elsewhere in the Dutch Caribbean.

Figure 19: Sentiment about impacts of tourism development

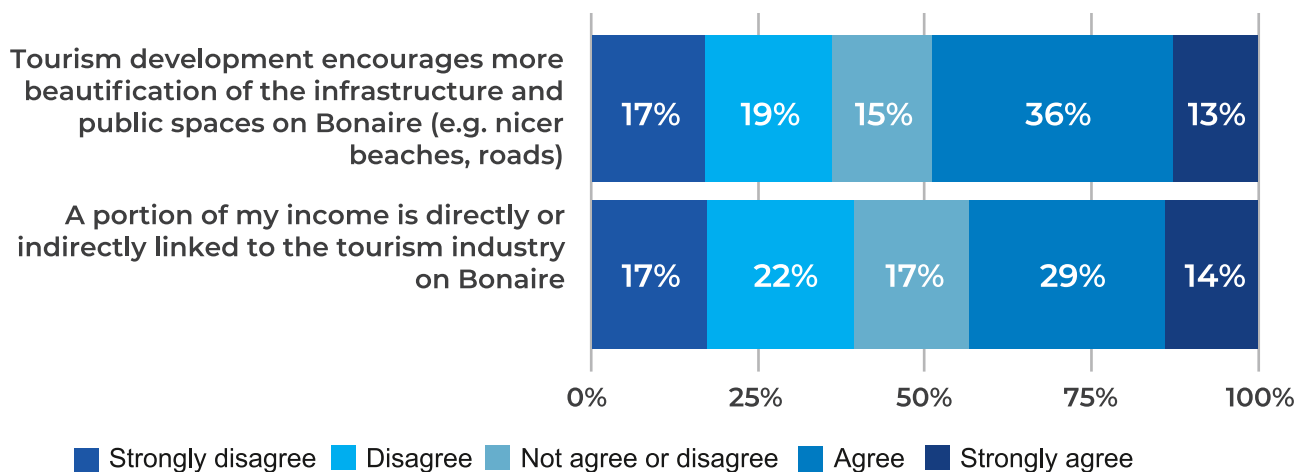
**In general, the positive impacts of tourism on Bonaire outweigh the negative impacts**



Bonaire-born (51%) feel slightly stronger that tourism development encourages more beautification of the infrastructure and public spaces on Bonaire than the total average (49%). The share of respondents that indicated that a portion of their income is directly or indirectly related to the tourism industry is similar among

the different sub-groups. 43% of Bonaire-born agree or strongly agree that a portion of their income is linked to the tourism industry on Bonaire. Of the respondents born in the European Netherlands, 40% agree or strongly agree with the statement.

Figure 19: Sentiment about tourism and public spaces and tourism and personal income

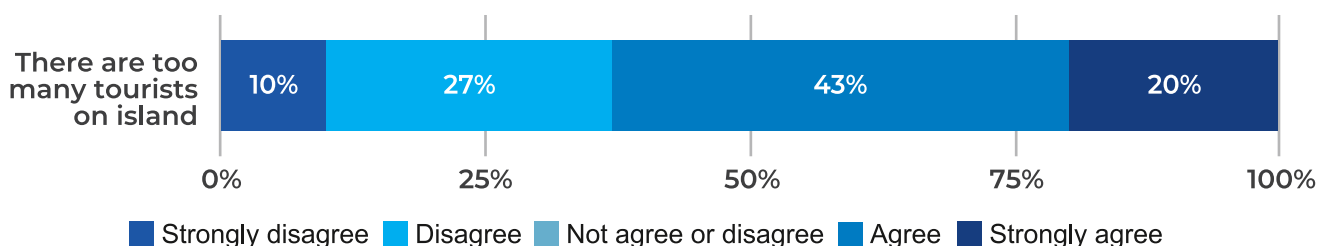


Source: Resident sentiment survey

The survey results indicate a clear difference in sentiment on the number of tourists among residents. More than half (63 percent) of respondents agree or strongly agree that there are too many tourists on the island. However, of the Bonaire-born, only 51

percent agree with this statement, while this is 69 percent for the remaining sample. The difference shows that those born on Bonaire are less concerned about tourism growth than residents born outside the island.

Figure 21: Sentiment about the number of tourists



## Section 2: Important actions and Bonaire's Performance

The top six most important actions for respondents across the different respondent profiles of the survey are:

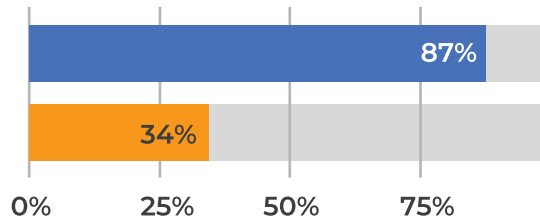
1. Improving road infrastructure
2. Protecting Bonaire's natural areas and biodiversity
3. Ensuring the availability of affordable and decent homes for residents
4. Improving public infrastructure (such as utilities, waste collection, and street lighting)
5. Greater involvement and role by residents in deciding what happens on the island
6. Ensuring greater safety and less crime

The respondents were asked to personally rate each of these actions' importance<sup>9</sup>. For each of the actions, respondents were also asked to rate how well Bonaire is doing at meeting the needs of residents<sup>10</sup>. See Annex B and C for the score of all actions and how well Bonaire is considered doing at meeting the need of these actions.

Improving the road infrastructure is at the top of the agenda as it is important or somewhat important for 87 percent of the survey respondents. For those who have lived on Bonaire for over 20 years, it is even more important (92 percent) than those born on Bonaire (86 percent). Only 34 percent of respondents feel that Bonaire is doing good or very good in improving the road infrastructure.

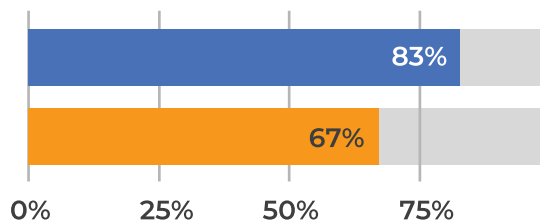
Think is Important Think is doing well at meeting the need

**Figure 22: Improving the road infrastructure**



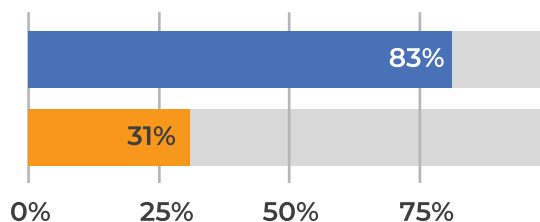
Protecting Bonaire's natural areas and biodiversity is the second priority for the survey respondents. Of all respondents, 83 percent indicate that it is important or very important to them. Of those respondents born on Bonaire, 76 percent state that it is important, while this is the case for 87 percent of respondents born elsewhere. Bonaire receives the second-highest score compared to the other actions in terms of performance, as 67 percent feel that Bonaire is doing good or very good at protecting the environment.

**Figure 23: Protecting Bonaire's natural areas and biodiversity**



According to the survey respondents, just as important as the natural environment is ensuring the availability of affordable and decent homes for residents, which is important or very important to 83 percent of the respondents. This action is equally important among all demographics. It is the action where Bonaire scores lowest in meeting the needs, as just 31 percent of respondents feel that Bonaire is doing good or very good at ensuring affordable housing availability.

**Figure 24: Ensuring the availability of affordable and decent homes for residents**



The fourth most pressing issue is Improving public infrastructure (such as utilities, waste collection, and street lighting), as 82 percent of respondents feel this is important or very important. Interestingly, 79 percent of Bonaire-born respondents think this is important or very important to them, against 84 percent of non-Bonaire-born respondents. Bonaire is doing relatively well at meeting the needs around improving public infrastructure, as 61 percent feel that Bonaire is doing good or very good at addressing the needs.

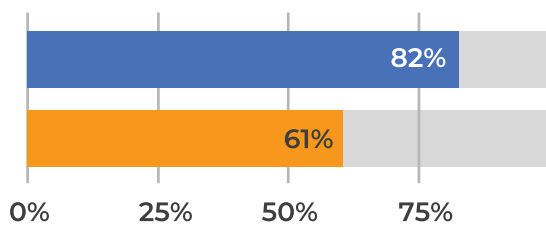
Extremely or somewhat important  
Neutral or unimportant  
Very good, good or satisfactory  
Poor or very poor

9. Please rate how important these actions are to you, using a 5-point scale where 1 = not important and 5 = extremely important.

10. Please rate how well Bonaire is doing at achieving this action, using a 5-point scale where 1 = very poor and 5 = very good.

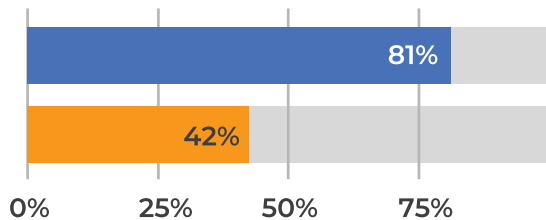
■ Think is Important ■ Think is doing well at meeting the need

**Figure 25: Improve public infrastructure (such as utilities, waste collection, and street lighting)**



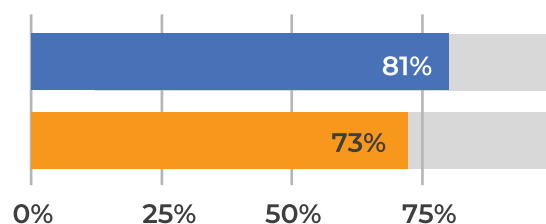
Greater involvement and role by residents in deciding what happens on the island ranks as the fifth most important action according to the respondents; 81 percent found this important or very important. Only 42 percent feel that Bonaire is doing good or very good at meeting the needs of greater involvement and role by residents.

**Figure 26: Greater involvement and role by residents in deciding what happens on the island**



Ensuring greater safety and less crime action is slightly more important for non-Bonaire born (81 percent) than Bonaire-born (79 percent) and for those that have been on the island more than 20 years (83 percent) than those who have been on the island less than 20 years (80 percent). Of all actions, Bonaire received the highest score on meeting the needs of greater safety and less crime, as 73 percent felt Bonaire scored good or very good.

**Figure 27: Ensuring greater safety and less crime**



■ Extremely or somewhat important  
 ■ Neutral or unimportant  
 ■ Very good, good or satisfactory  
 ■ Poor or very poor

### Section 3: Open-ended questions

The first open-ended question asked respondents about their concerns about Bonaire's current developments. The open question had 565 responses, and the responses were separated into different categories (see Table 4).

The concerns that were mentioned most by respondents had to do with the pressure of tourism and new developments on the island. Examples are the growing number of cruise passengers and the recent development of large resorts. The second concern is the cost of living and income. Respondents noted that it is difficult to have a decent standard of living and that many people need to work multiple jobs. The third category of concern is the need for infrastructure improvements on the island to meet the growing demand. This includes road infrastructure but also electricity and sewage systems. Many respondents indicated affordable housing is a significant concern, especially for existing residents. Inequality across different subpopulations on Bonaire is another important concern. It was mentioned that there are fewer opportunities for Bonaire-born residents, and newcomers would have easier access to higher-paying jobs and other economic opportunities. Immigration numbers are considered out of balance, with new residents taking jobs and reducing the share of the Bonaire-born population. There are also worries about the environment and the impact of growth on nature. Respondents also note a need for more policy and clear direction on where Bonaire is going.

**Table 4: Categories of concerns**

Category of concerns	Count
Too much tourism / new development	141
Cost of living / income	128
Infrastructure	93
Affordable housing	76
Inequality	69
Environment	63
Policy (unspecified)	57
In-out group	45
Migration	44
Type of tourism	35
Culture	35
Services	29
Lack of participation/accountability	22
Corruption	20
Security	17
Economy	15
Too little tourism / new development	8
Other	61



The second open-ended question asked respondents about their vision for Bonaire in the future. Respondents noted a variety of different views. Many noted that they would like to see a reduction in the number of cruise ships and a halt to new tourism development. Others emphasized the need for the preservation of nature and culture. One of the respondents noted the following:

*“Like Pourier’s vision: while preserving culture and nature. All beaches are public and accessible for free, with no exceptions. No further coastal development, no development in areas designated for nature, open landscape, or water (and no change of use)—more quality homes for current residents. Kunuku area is developed (agriculture, but also ecotourism). No more goats and donkeys everywhere, which means more nature. Greener in the city and along the roads with local species. Also, on resorts, local species of nature. Moreover, new buildings, including resorts, must fit into the architectural style of Bonaire.”*

Many respondents emphasized that further economic development benefits the residents through better jobs and other economic opportunities but needs to be balanced. These respondents hope to see the future as follows:

*“Un paraiso den kua bienestar di hende i desaroyo ekonomiko ta den harmonia” (A paradise where well-being and economic development are in harmony). “Infrastructura na ordu i acceptabel, kas y tereno pagabel pa nos mes hendenan. I chens pa trabow pa nos mes hendenan”. (The infrastructure is in order and acceptable, and houses and land are affordable for our people. A chance to work for our people).*

Many respondents mentioned a cap on population growth and a stricter immigration policy. Some mentioned the need for a clear path and direction. One respondent mentioned:

*“That there is at least a clear plan behind it. And follow that plan. No mass hotels and mass tourism. No cruise boats. Low-rise buildings, small-scale accommodations, and the protection of nature come first. Limits may be set for both construction (private and project developers) and tourism. And above all: sustainability.”*

# Bonaire Urban Carrying Capacity Challenges

## *Fragmented Development Policy*

**The Island Council of Bonaire currently has a number of different strategic plans (for example, tourism, environment, and culture), but these are separate and not combined into one strategic master plan. For example, the growth scenario laid out in the STMP is not linked to an overarching island development and strategic growth plan. The latest master plan dates from 2010, yet a clear choice was never made on which of the four long-term development paths the plan should follow. This has led to fragmented institutional visioning and a need for more unified and clearer policies.**

The local democratically elected representative assembly, the Island Council (Dutch: Eilandsraad), is the highest administrative body in a public entity responsible for local legislation. The Island Council is elected every four years by the inhabitants of Bonaire and has 9 Island Council members. The executive power rests with the island Governor (Dutch: gezaghebber) (appointed by the King), and commissioners (appointed by the island council) that together form the Executive Council (Dutch: Bestuurscollege, BC)<sup>11</sup>.

The Executive Council is responsible for Bonaire's day-to-day governance and implementation of the decisions of the Island Council. At the start of every four years, the Executive Council develops a government plan (Dutch: bestuursprogramma) in which it presents the priorities for the next

four years. The Executive Council changed after the elections from March 2023 and has not yet released their new plan. The last government plan (2019–2023) is titled “From us all, by all of us, and for everyone” (Dutch: Van ons allemaal, door ons allemaal en voor ons allemaal) and includes six programs (OLB, 2019). In the area of sustainable economic development, two strategic planning priorities are identified:

- 1. Develop an integrated master plan for Bonaire 2030**
- 2. Develop a strategic tourism plan as well as the “Blue Destination” concept**

### **Bonaire Master Plan**

The last government plan states:

In the past, decisions about the future of Bonaire have been mostly made ad hoc and sectoral. Given the need to make well-considered, integrated, and broadly supported choices, the Executive Council will draw up a Bonaire 2030 master plan in consultation with stakeholders. This master plan will be the roadmap based on which the Executive Council makes decisions that determine the future of Bonaire. The kickoff of the master plan will take place in November 2019. (Bonaire 2019, p. 19)<sup>12</sup>.

11. Public Entities Act Bonaire, Sint Eustatius and Saba, <https://wetten.overheid.nl/BWBR0028142/2023-01-01>.

12. In Dutch: “In het verleden zijn besluiten over de toekomst van Bonaire veelal ad hoc en sectoraal genomen. Gezien de noodzaak weloverwogen, integrale en breed gedragen beleidskeuzes te maken, zal het Bestuurscollege in afstemming met stakeholders een Integraal Masterplan Bonaire 2030 opstellen. Dit masterplan zal de roadmap zijn op basis waarvan het BC besluiten neemt die bepalend zijn voor de toekomst van Bonaire. De kickoff van het masterplan vindt in november 2019 plaats.”

Although community engagement activities around the plan's development took place in November 2019, the Masterplan Bonaire 2030 has not been publicly shared (Bes Reporter 2020)

The current master plan (2010–2025) identifies the following four challenges (Van Werven, Jepma, and Bakker 2010):

1. The fast-growing tourism sector
2. The fast-growing population
3. Limited policy on spatial development and lack of a land policy plan
4. Fragmentation of the social structure and loss of culture.

Twelve themes were identified and elaborated on to address these challenges in a 115-point action plan. A few strategies and main action points under each of the four challenges are as follows:

**Fast-growing tourism sector.** The scope of all different segments of tourism activities and their growth should be limited by policy. This implies a limitation of the increase in overnight capacity and the number of accepted charters; this may mean that no permits are issued for touristic plans. For diving tourism, this limitation means that by the latest 2012, a set maximum quota has been determined. This level is based on the natural limit of the relevant ecosystems. By 2012, the maximum number of cruise ships and passengers allowed to arrive should be determined. This limit should be based on the available mooring capacity, handling capacity, the absorption capacity of the business community, and environmental and reputational effects. If Bonaire continues to permit cruise tourism at, for example, a maximum of 100,000 visitors per year, then there may be a need to invest in expanding facilities, such as handling and mooring capacity. The capacity should be improved and expanded if enough market demand and the social benefits demonstrably outweigh the social costs.

**The fast-growing population.** Immigration is limited, and remigration is promoted so that Bonaireans always constitute a good majority of the population. This implies that from a specific population level onwards, policies should balance the numbers of returning Bonaireans and newly settling non-Bonaireans.

**Limited policy on spatial development and need for a land policy plan.** The integrated spatial development plan for Bonaire dates from 2010 and will be updated in 2023. Building heights vary by area. The highest allowed on Bonaire is a maximum gutter height of 12 meters with maximum building height, or ridge height of 15 meters. This is equivalent to 4 stories with a roof. The open spaces along the coastline need to be preserved so that all residents of Bonaire keep the entrance to the coast accessible. There will be a strict policy for the entrance of new retiree or “pensionados” and others who do not work, as well as second-home owners who want to take residency. The starting point will be that their arrival should not fundamentally affect the housing options for Bonaireans. The Land Policy Plan has been submitted multiple times by the Executive Council since 2017 but is not yet approved by the Eilandsraad.

**Fragmentation of the social structure and loss of culture.** There will be programs on cultural identity and history in elementary schools and higher education. Immigrants will be actively supported with their integration into society through a (non-compulsory) integration program. A course in Papiamentu will be part of this.

The 2010–2025 Master Plan also identifies four development scenarios (Table 5). However, no decision has been made on which scenario to follow, and no policies that control population growth have been developed (WODC 2018).

13. Pensionado is an expression referring to a healthy and wealthy senior, fully living in pension life. Often owner of second home and seasonal visitor/resident to Bonaire.



**Table 5: Four Development Strategies from the Masterplan Strategische Ontwikkeling Bonaire 2010-2025**

	Autonomous development	The green island An oasis for the	elderly All aspects of	sustainability are central
<b>Strategy</b>	Facilitating and supporting market-driven growth.	<ul style="list-style-type: none"> <li>• Protect and strengthen the green character, natural values, and the ecosystem.</li> <li>• The whole of Bonaire, except for the urban area, is a national park.</li> <li>• All intended economic activities are tested against ecological criteria; the investment level is capped.</li> <li>• Growth is entirely aimed at increasing well-being.</li> </ul>	<ul style="list-style-type: none"> <li>• Positioning Bonaire as an attractive residential island for the elderly.</li> <li>• Systematically upgrading the level of service, care, and health services.</li> <li>• Conscious policy to involve Bonaireans in the higher service segment.</li> </ul>	<ul style="list-style-type: none"> <li>• The development comprehensively and systematically focused on all sectors' sustainability (balance between economy, ecology, and culture) in all sectors.</li> <li>• The focus is on the tourist segment looking for a combination of rest, sports, nature, education, gastronomy, and care.</li> <li>• Bonaire developed as an education and knowledge center in energy and sustainability.</li> <li>• The most extensive possible participation of Bonaireans in economic development.</li> </ul>
<b>Population</b>	Population of 30,000 by 2025.	A few thousand more by 2025.	Population of at most 20,000 by 2025; influx of about 3,000 retirees by 2025.	Population of at most 20,000 by 2025; no more than 1,000 retirees by 2025.
<b>Immigration</b>	Doubling employment in favor of imported labor means that the share of Bonaireans in the total population becomes a minority.	The majority of the population is of Bonairean descent.	A minimum of 50% of the population is of Bonairian descent.	Bonaireans should be the largest possible share of the population, but at least 50% in 2025.
<b>Investments and economic growth</b>	Real economic growth of an average of 7% per year.	Limited growth in terms of investment and employment.	Investments in services and luxury condominiums.	A steady stream of coming and going student interns and teachers.

### Tourism Strategy

The 1992 “Rapport Pourier” sets the guidelines for tourism development on Bonaire. The report provided clear guidance on the island's carrying capacity and advocated for a strong focus on the natural environment and sustainable development (De Commissie Integrale Sociaal-Economische Aanpak Bonaire 1992). The 1997 Bonaire Tourism Strategic Plan followed the recommendations of the “Rapport Pourier” and recommended maximum accommodation capacity and product diversification (Tourism Planning and Research Associates, 1997). The most recent tourism strategic plan, the STMP, was presented to the Eilandsraad

on January 5, 2018 (Croes et al. 2017). A Dick Pope Sr. Institute for Tourism Studies team at the Rosen College of Hospitality Management at the University of Central Florida prepared this plan in 2017. During the process, the team met with 200 stakeholders and administered seven surveys with the participation of nearly 3,000 respondents, including residents, tourism employees, and visitors (actual and prospective). The 2019–2023 government plan stated the following about the strategic tourism plan: “The Executive Council has taken the reins of the implementation of the STMP and will undertake this together with the stakeholders, including the Blue Destination concept” (Bonaire 2019, p.20).

### The STMP states:

While Bonaire has struggled with the growth concept, it is clear that the local people would like continued tourism development. The residents expressed that they would like this growth to occur in pace and level. A primary reason why tourism is the right choice for Bonaire is that the industry can deliver increased economic gains with a focus on soft tourism products (experiences) as opposed to severe infrastructure development, the environmental consequence of which concerns many Bonaireans. Thus, the tourism industry can contribute to the welfare of the island without Bonaireans having to sacrifice their inherent interest in protecting their natural environment. (Croes et al. 2017, p.2)

**The STMP aimed to increase air arrivals from 140,000 in 2017 to 200,000 in 2027.** The plan suggests that for Bonaire to take the “measured growth objective,” 60,000 other arrivals are necessary. This arrival goal covers the individual quality-of-life requirement (30,000 arrivals) and the “Strong Hotel Performance” objective based on 40,000 arrivals. The attraction of these additional 60,000 new arrivals should support the goal of converting Bonaire into a high-value destination, meaning that at least 20,000 arrivals should stay at four-star hotels on the island. These four-star hotels should include at least 600 new hotel rooms. The STMO estimated that by 2021, tourism would contribute 45 percent of the GDP. The STMP estimated that “the expected direct and indirect jobs created by the 600 new hotel rooms would amount to 2400 new jobs: one per room, one in another tourist activity, and two in the private and public sectors” (Croes et al. 2017, p.74).

The STMP focuses on economic impact, but more insights into the broader impact of the proposed sector growth are needed. The plan states that the path proposed is possible without sacrificing environmental protection. However, it should have addressed the impact of increased population and the additional infrastructure, services, and housing tourism that growth implies.

In April 2022, OLB launched the Tourism Recovery Plan for Bonaire, developed as a “guide to revive Bonaire’s tourism in the ‘new normal’” (OLB 2021a).

Part of the recovery plan is a review of the 2017 STMP objectives to see if they are still relevant. While most objectives remain standing during the review, the OLB shares a new stance on a few. The Recovery Plan states:

The STMP recommends targeting new market segments likely to stay in hotels and contribute more to the island economy. This part needs to be redefined: While it is important to ensure profitable occupation of current accommodation suppliers, the strategy should include innovative alternatives such as long-term occupation, as well as investing in preparation of a wider population segment to rebrand Bonaire as a high-value tourist experience.

The Plan states that the focus “ought to be on upgrading existing accommodations to boost these, rather than building new ones.” The Recovery Plan also mentions that the goal of 200,000 visitors by 2027 needs revision because of the impact of COVID-19. Unlike the STMP, the Recovery Plan includes specific guidelines for the cruise ship market as was previously mentioned in the Tourism Development section (page 20).

**In conclusion, the need for an official growth strategy for Bonaire has led to a fragmented policy, which has led to delayed or uninformed decision-making.** Consequently, the island infrastructure may need to be prepared for further growth. The resident survey shows that managing Bonaire’s growing population is important or very important to 70 percent of the respondents. Further involvement of Bonaireans is also crucial. The survey indicates that 81 percent of respondents consider greater decisional involvement by residents in what happens on the island as important or very important to them.

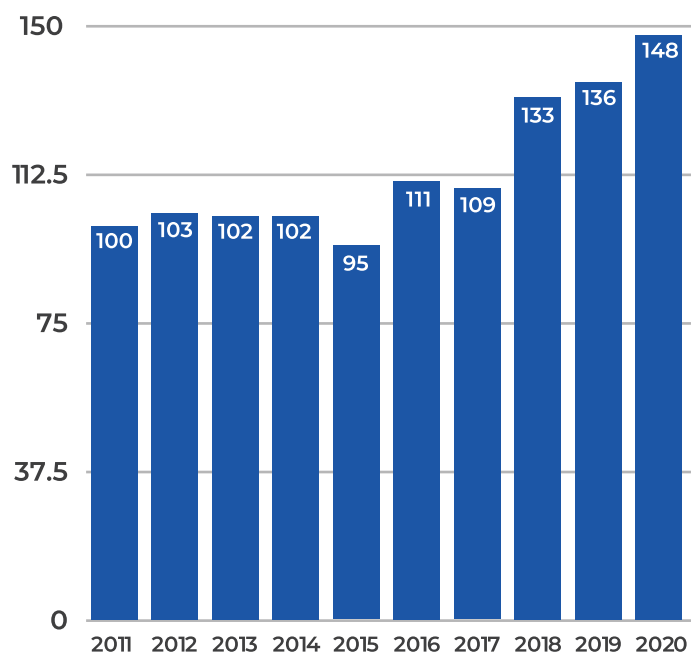
### Shortage of affordable housing supply

The home index price for Bonaire increased by 56 percent between 2015 and 2020 (CBS 2022a). In 2020, CBS counted 8,600 households on Bonaire, an increase of 48 percent compared to 2011 (CBS 2022c). The increased demand for housing affects home prices, and the resident survey shows that affordable housing is essential for Bonaireans.

## Shortage of affordable housing supply

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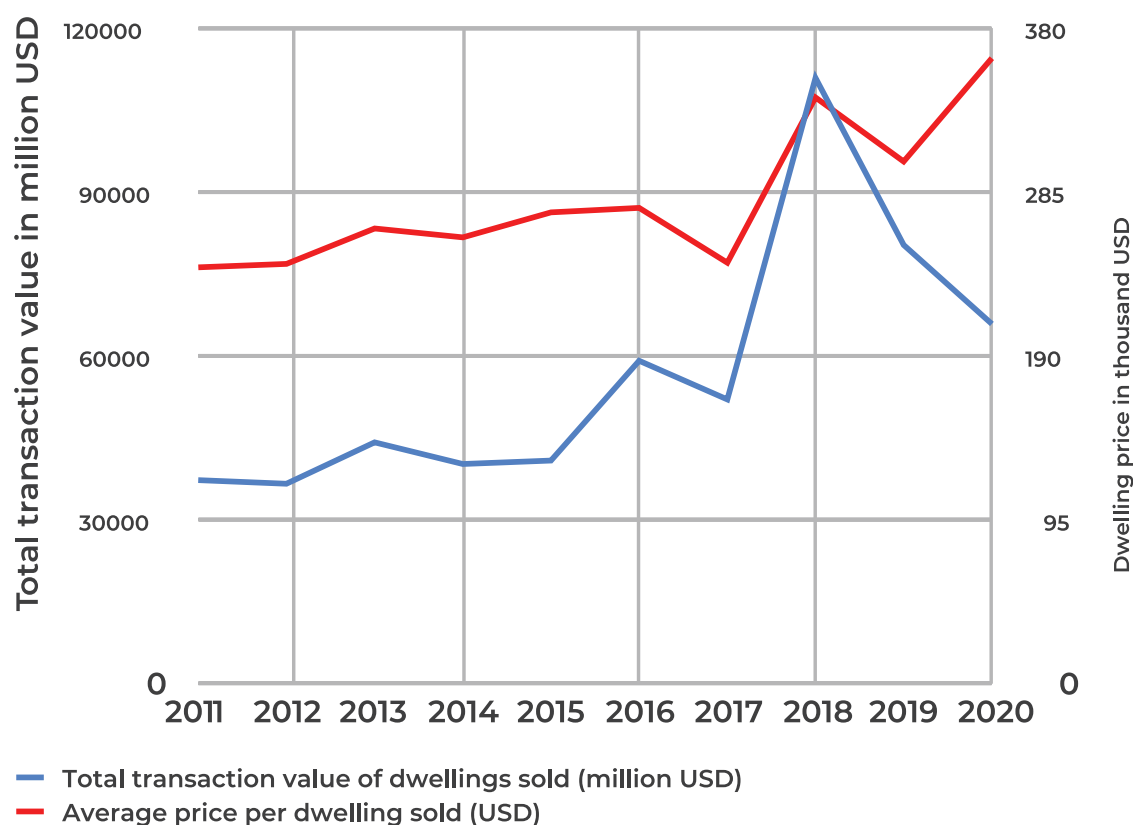
Figure 28: Home Price Index, 2011–2020



The total transaction value of dwellings sold peaked in 2018, with a total value of US\$111.1 million, primarily due to the completion of several large development projects (CBS 2022a). In 2011, the average price of a sold dwelling was US\$241,000. Nine years later, by 2020, it had increased to US\$362,000. The global prices of construction materials increased significantly in 2021 and 2022, which has likely also affected the cost of building a new house or renovating an existing home.

Source: (CBS, 2022a)  
Note: 2011=100

Figure 29: Total transaction value dwellings and average price per dwelling, 2011–2020



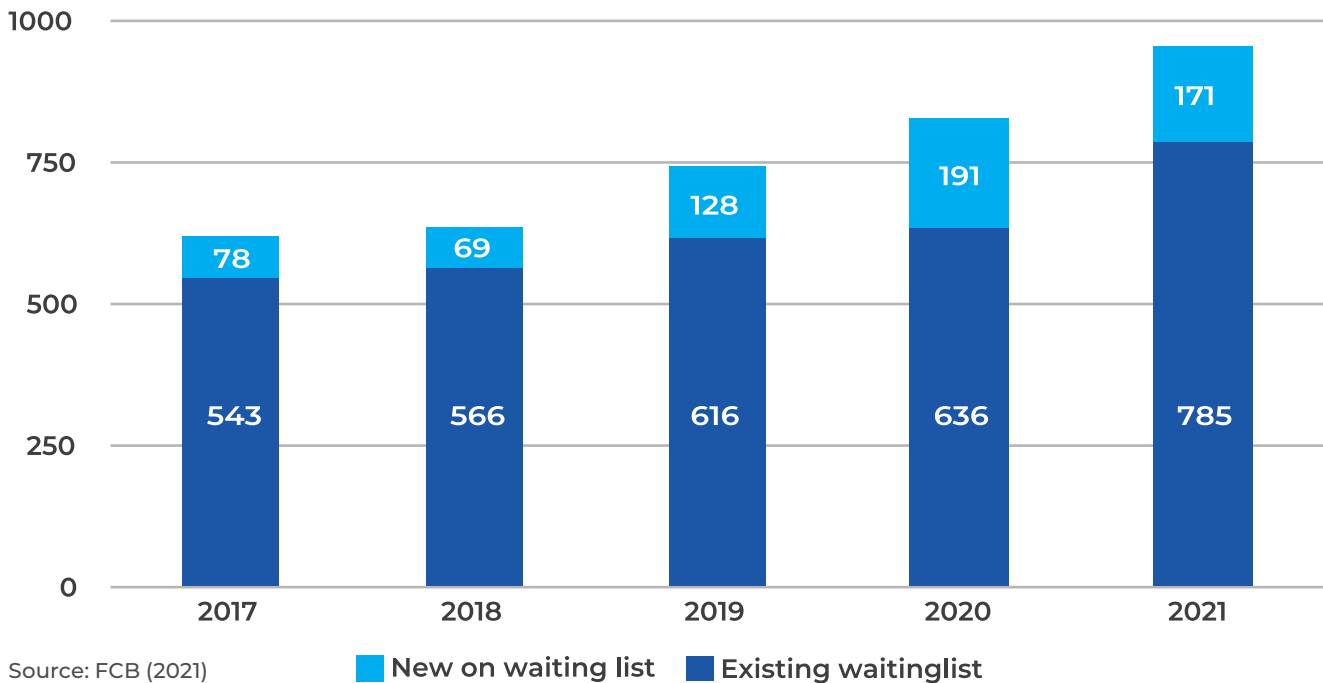
Source: CBS, 2022a



## Social Housing

As of December 31, 2021, association Fundashon Cas Bonaireano (FCB) had a total waitlist of 956 social home seekers (FCB 2021). As of December 31, 2021, the social housing (FCB) had 568 homes available. In 2021, 50 new two- and three-bedroom homes were added to the inventory. Preparation for another 204 homes has started, and 170 are in the planning<sup>14</sup>.

**Figure 30: Demand for social housing, 2017–2021**



Although the local government is revising the current spatial development plan that became the first ever spatial plan for Bonaire, approved in 2010 (in Dutch, Ruimtelijk Ontwikkelingsplan Bonaire, or ROB), a moratorium on building permits for recreational types of buildings was instituted in December 2021 (OLB 2021b). Only new development in line with the Tourism Strategic Plan 2017 will be permitted during this period, meaning only 4 and 5 stars following the accommodation criteria approved and adopted by the Executive Council.

According to the current ROB, short-term rentals are prohibited in most neighborhoods on Bonaire. Only in zoned areas “Recreatie-Verblijfsrecreatie,” “Gemengd-I,” “Gemengd-VI,” and “Gemengd-Uit te werken I” is it allowed to rent out houses and apartments for shorter than three months. In 2022, the Executive Council created a task force to reinforce the regulation. Homeowners violating the rules have been notified, and realtors and notaries

have been requested to inform their clients about the reinforcement of the rules (Bonaire.nu 2022b). Many low-income families rent a house in the private housing market because the number of available social homes does not meet demand. Rental prices have increased over the years. The influx of European Dutch is driving up rental and home prices. They often have higher disposable household income and can pay more for housing (van der Ende, van den Bergh, and Peeters 2020). The expected population growth, partly driven by economic growth in the next decade, will increase the need for dwellings on the island even more. If the supply is not increased, the growing population will likely drive up housing prices, and the availability of homes could become a more significant issue. In addition, the growing number of tourist arrivals has made it lucrative for homeowners to rent out their properties as short-term rentals, thereby reducing the inventory of long-term housing.

14. In 2019, OLB, FCB, and the Ministry of the Interior and Kingdom Relations signed an agreement to build 500 houses. ([https://www.eerstekamer.nl/overig/20190712/convenant\\_volkshuisvesting\\_bonaire/document](https://www.eerstekamer.nl/overig/20190712/convenant_volkshuisvesting_bonaire/document))



Washington-Slagbaai National Park  
 PICTURE BY: Tourism Bonaire  
 Bonaire's Media Hub

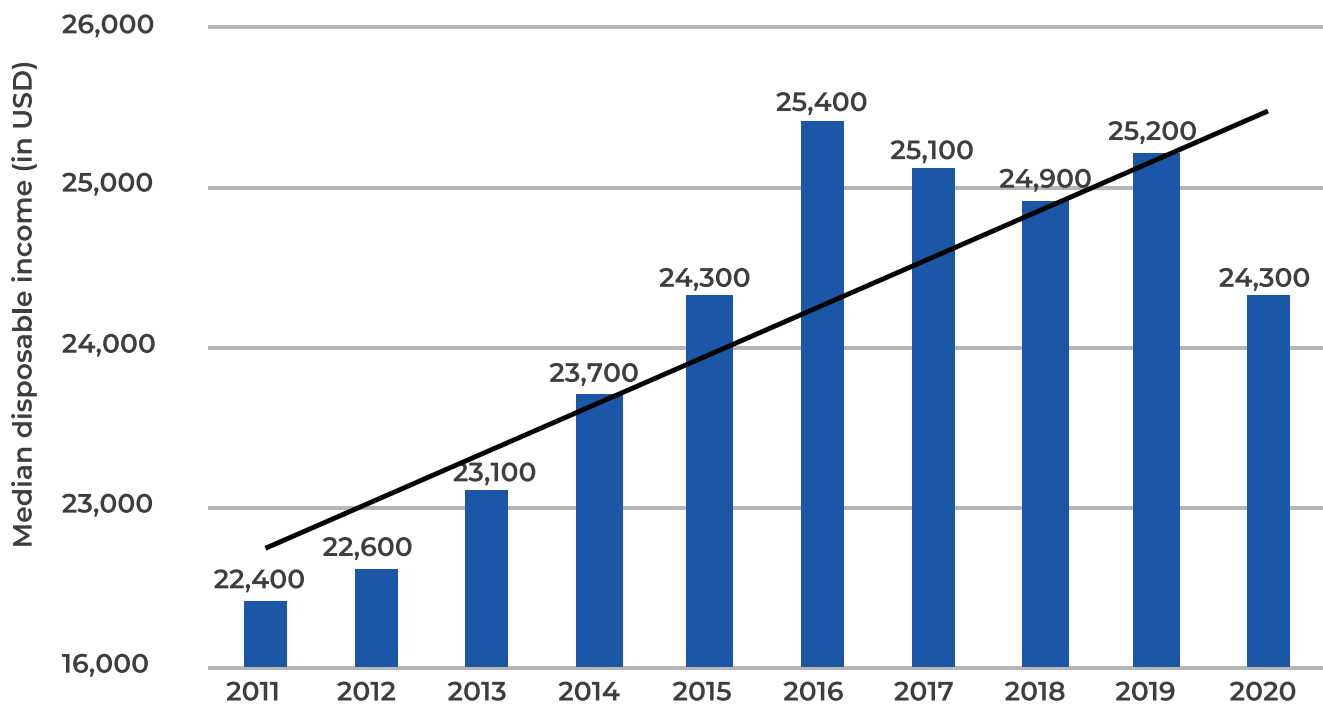
## ***Narrow distribution of economic benefits***

**Despite the solid economic growth over the last ten years and low unemployment rates, the median disposable income of Bonaire residents has increased only slightly.** While the median household income was \$22,400 in 2011, it grew to \$24,300 in 2020, an 8.5 percent increase in nine years. For many, having a job does not mean that their income can help them meet their basic needs because many workers earn close to the minimum wage; to make ends meet, many people must hold more than one job<sup>15</sup>. The data from the Regioplan report on a

benchmark for a social minimum for the Caribbean Netherlands, published in June 2018, reveal that 33 percent of households on Bonaire had an income at or below 75 percent of the estimated average budget needed for basic expenses. The report also noted that 43 percent of households had an income lower than the average monthly budget (Straatmeijer 2018). The social minimum was a reference point for targeted measures to increase benefits and the legal minimum wage in the coming years so that the legal minimum wage would exceed the social minimum and that financial aid would be adequate. However, the legal minimum wage on Bonaire needs to be at the level of the benchmark for the social minimum for a single person.

<sup>15</sup>, Dutch Human Rights Council (in Dutch, College voor de Rechten van de Mens), 2016 Annual Report.

Figure 31: Median disposable household income Bonaire, 2011–2020



#### ■ Median disposable income (in USD)

Source: CBS (2022a)

Note: Some of the income components are only observed in the income declaration data. For persons who do not (have to) file any income declaration, the observation of such components is therefore missing. This leads to underestimations, mainly of incomes from property and alimony and among lower-income households in particular.

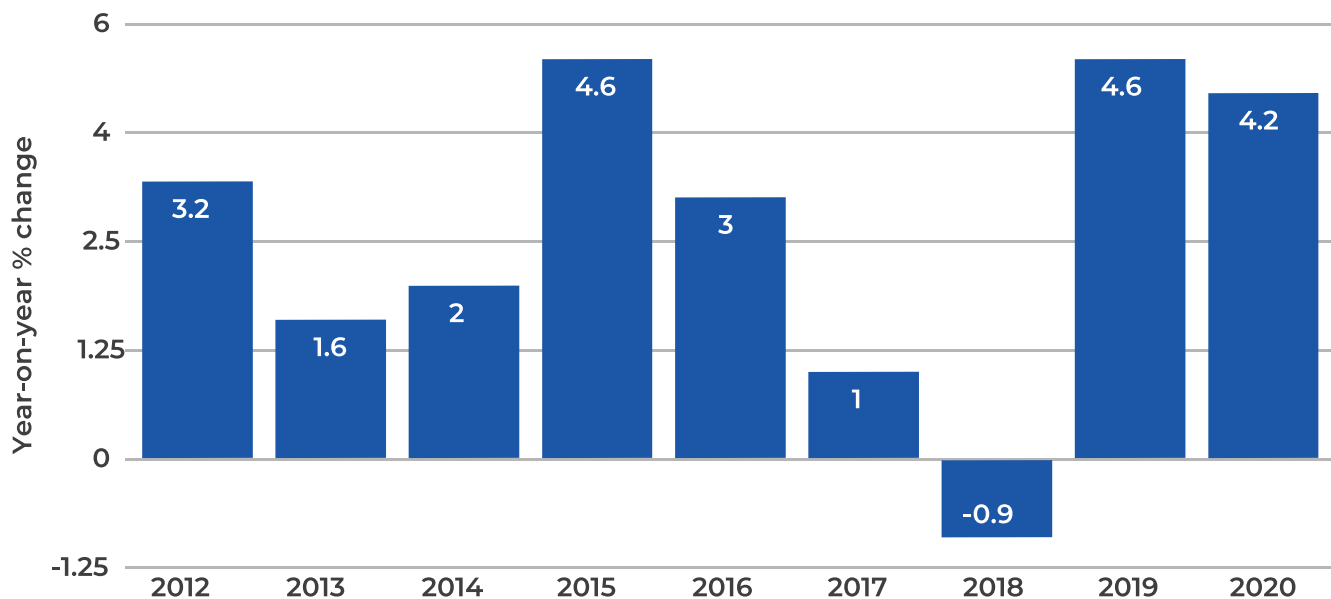
**Since 2012, the median purchasing power has increased year on year with the exception of 2018, when average prices rose more rapidly than incomes, leading to a loss of purchasing power.** In 2020, purchasing power increased despite the COVID-19 pandemic due to several economic support packages. Also, in 2020, the child benefit was raised by more than 30 percent, social benefits increased to the minimum wage, and the statutory minimum wage increased by 6.2 percent (RCN 2019).

As of January 1, 2022, the minimum wage was increased by an additional 10 percent, and retirement income and other social benefit plans were also increased by 10 percent (RCN 2021). Starting from January

1, 2023, the statutory minimum wage was increased by 18.3 percent, social benefits increased by 22.2 percent, and child benefits increased by \$20 a month. For employed persons ages 21 and above, the minimum wage for a 40-hour workweek in 2023 is \$1,236 per month. The child benefit per child is \$131 monthly, and retirement income is \$1,047 monthly. Welfare (in Dutch, *onderstand*) is \$826 monthly for a single person and \$1,142 for a couple (RCN 2022). Minimum wage and social benefit plans will continue to increase in incremental steps until 2025, as the Dutch Ministry of Kingdom Affairs clarified in July 2022 (Dossier Koninkrijksrelaties 2022a). By then, the minimum monthly wage should be at \$1,350 (Rijksoverheid 2021).



Figure 32: Median purchasing power development, 2012–2020

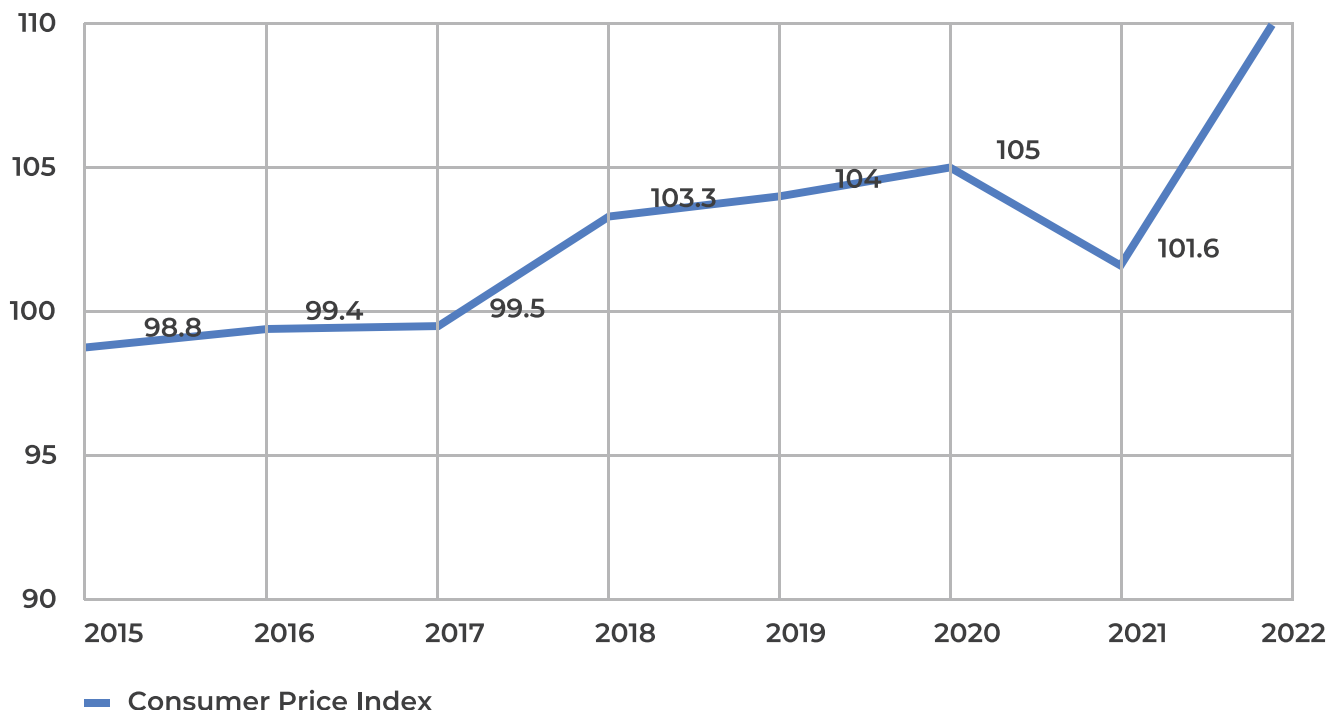


Source: CBS (2022a)

Note: Purchasing power is the equivalized household income adjusted for price developments based on the consumer price index (CPI).

The increase in the minimum wage is barely keeping up with inflation. The latest data on the Consumer Price Index shows that in Q3 of 2022, consumer goods and services were up 12.2 per cent from Q3 in 2021. According to CBS, the increase is mainly due to food, electricity, and fuel prices, and this trend is following global consumer prices.

Figure 33: Consumer price index for Q1, 2015–2022

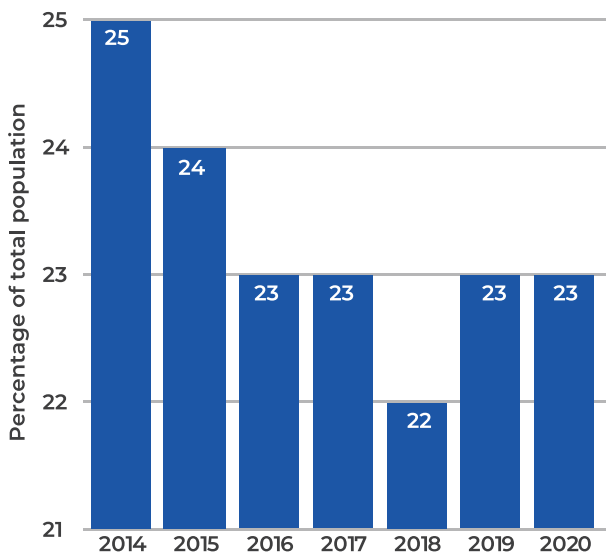


Source: CBS (2022a)

### Inequality

Relative poverty in Bonaire, the share of people whose income is below 60% of the median income, has only slowly decreased since 2014. In 2020, 23% of people lived below the poverty line, down from 25% in 2014.

Figure 34: Relative poverty on Bonaire, 2014–2020



Source: CBS (2022a)

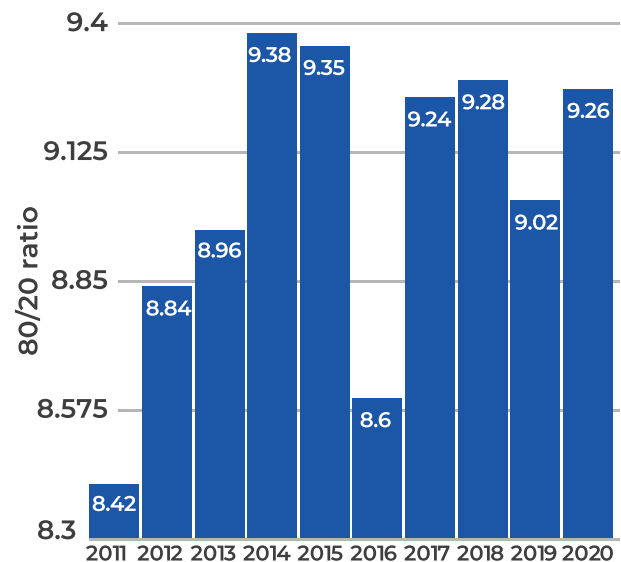
Note: The poverty line is at 60 percent of the median income of the population.

In 2020, households in the lowest 25 percent income bracket had a median equivalized income of \$6,600; the second 25 percent had an income of \$14,300; the third 25 percent an income of \$21,400; and the highest 25 percent income bracket a median income of \$36,800.

Also, in 2020, the wealthiest 20 percent of the population earned 9.3 times as much as the poorest 20 percent. The trend is stable and has not shown much movement. By comparison, in the Netherlands, the highest 20 percent earns 4.4 times as much as the lowest 20 percent, on St. Eustatius, 10.3 times, and on Saba, this is 6.5 times.

**A 2020 report by the National Ombudsman of Bonaire concluded that young people who grow up in poverty are trapped in a vicious circle that is very difficult to break.** Children from low-income families live in poor housing situations. They have less access to healthy food, which affects their health, education, and labor market prospects (Nationale Ombudsman 2020). According to the most recent information from a foundation that provides school-aged children with breakfast at school, 572 children currently receive a free meal every school day (Voeding op school programma 2023). Since 2020, the minimum wage and social security have increased. Data on the effect of this increase on average and median disposable incomes, purchasing power, and relative poverty are not yet available.

Figure 35: Income distribution, 2011–2020



Source: CBS (2022a)

Note: The ratio 80/20 is a measure of income inequality. Presenting the ratio between the total income of the highest and lowest income quintile.

**In 2019, Bonaire's Gini coefficient was 0.39.** The Gini coefficient measures the dispersion or distribution of income, and hence the inequality levels in a country. The higher the coefficient, the greater the inequality. This was lower than Costa Rica's (0.48) or St. Lucia's (0.51) but much higher than that of the Netherlands, with a Gini of 0.29 in 2019.

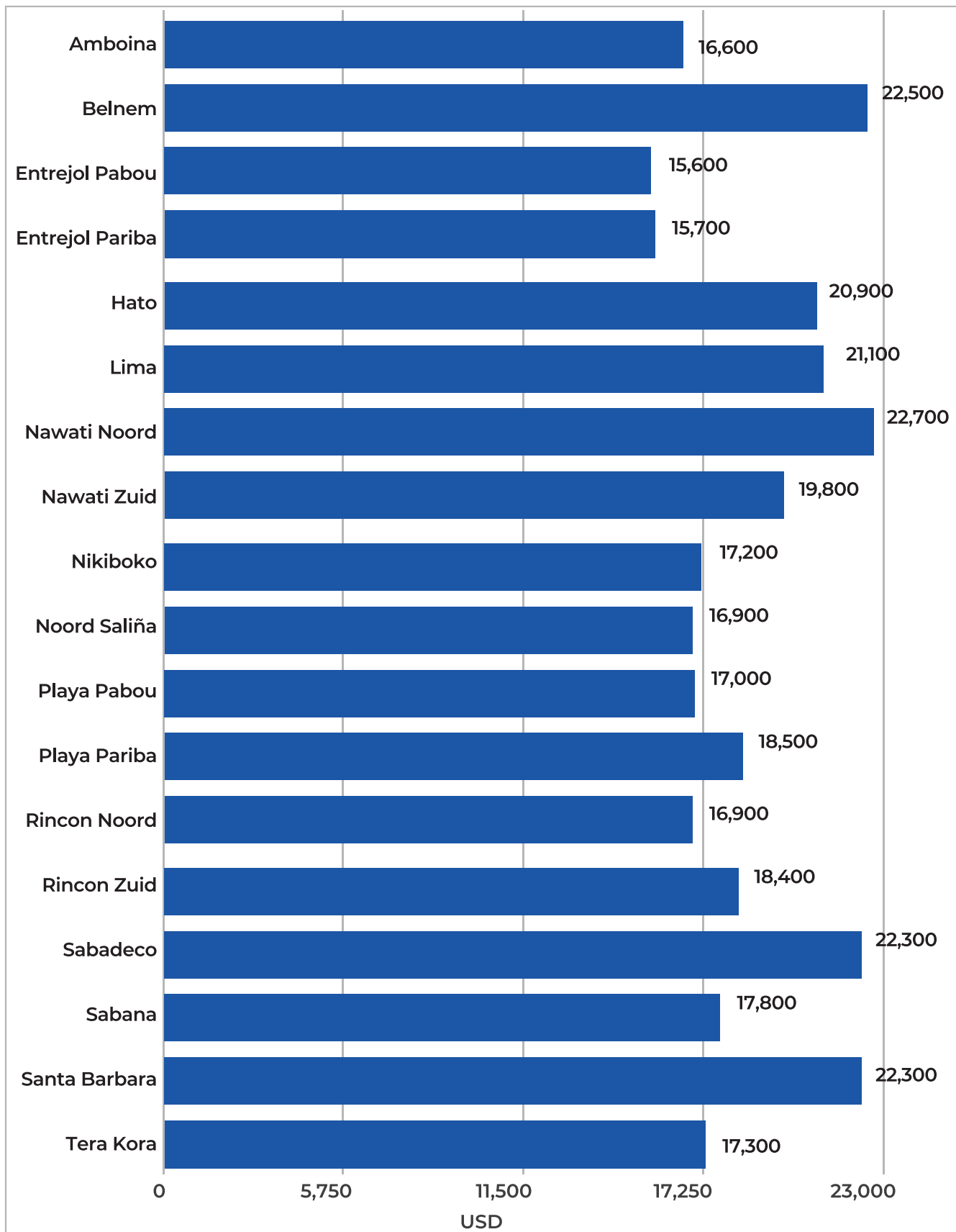
Table 6: Gini coefficient, 2019

Country/Territory	Year	Gini coefficient
<b>BONAIRE</b>	<b>2019</b>	<b>0.39</b>
<b>SINT EUSTATIUS</b>	<b>2019</b>	<b>0.41</b>
<b>SABA</b>	<b>2019</b>	<b>0.38</b>
<b>THE NETHERLANDS</b>	<b>2019</b>	<b>0.29</b>
<b>THE DOMINICAN REP.</b>	<b>2019</b>	<b>0.42</b>
<b>COSTA RICA</b>	<b>2019</b>	<b>0.48</b>
<b>ST. LUCIA</b>	<b>2016</b>	<b>0.51</b>

Source: CBS (2022a) and World Bank, Poverty, and Inequality Platform

There is a wide disparity in income among the different neighborhoods. As mentioned earlier, in 2020 the median, equalized, disposable income on Bonaire was \$17,500. Areas with a higher share of Bonaire-born residents, such as Antriol, Rincon, and Tera Kora, have a lower median income (Figure 36). There are high concentrations of European Dutch living in Lima (61 percent), Sabadeco (53 percent), and Santa Barbara (53 percent). These neighborhoods have median incomes of \$21,100, \$22,300, and \$22,300, respectively.

Figure 36: Equalized median income by neighborhood, 2020



Source: CBS (2022a)

**While Bonaire's economy has grown over the last few years, not everyone has benefited equally.** Wages have not kept up with rising inflation, and consumer purchasing power for some groups has been nearly stagnant. Overall, residents have captured only a small share of the economic opportunities, while newcomers with more skills, experience, and assets have been able to take advantage of them. The result of this uneven access to opportunities and the lack of inclusive growth is that economic growth is unevenly distributed, and this disparity has not changed significantly over time. More must be done to provide opportunities to a broader swathe of Bonaire society.





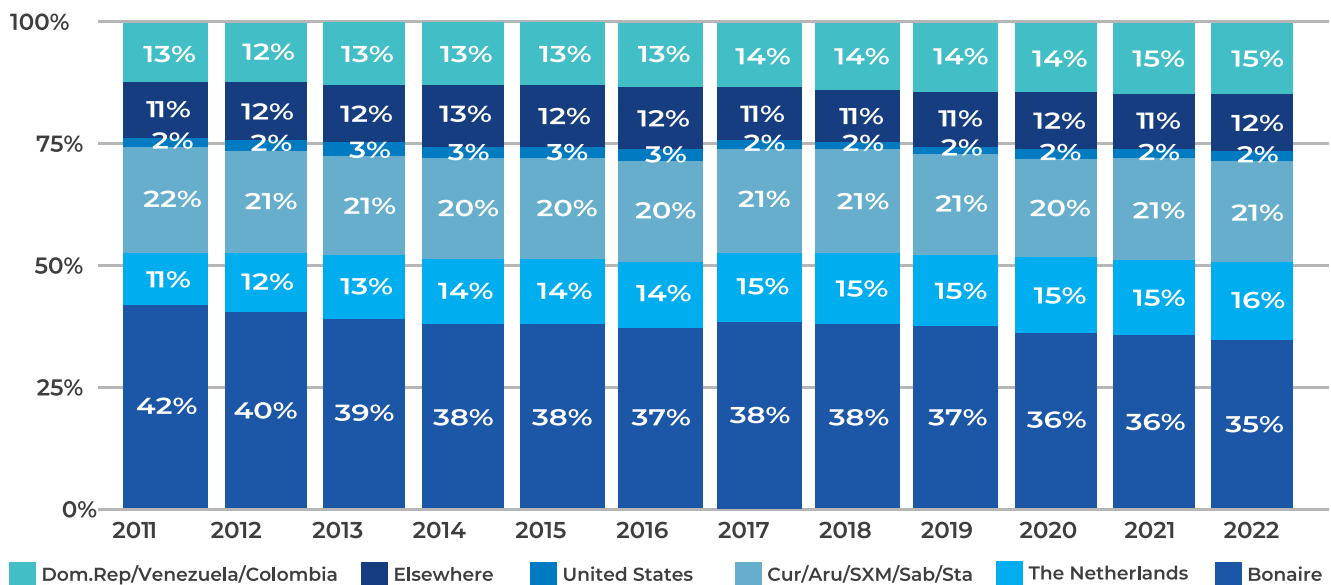
Washington-Slagbaai National Park  
PICTURE BY: Tourism Bonaire  
Bonaire's Media Hub



## Loss of cultural identity and cohesion

In 2011, 42 percent of the population was born on Bonaire, and CBS estimates that by 2022 this had dropped to 35 percent. The share of residents born in the Netherlands increased from 11 percent to 16 percent during the same period. The percentage of residents born in the Dominican Republic, Venezuela, or Colombia has risen from 13 percent to 15 percent over the last 12 years. Population growth, fueled mainly by immigration, can affect an area's cultural development, sense of authenticity, and identity.

Figure 37: Population by country of birth, Bonaire, the share of the total, 2010–2022

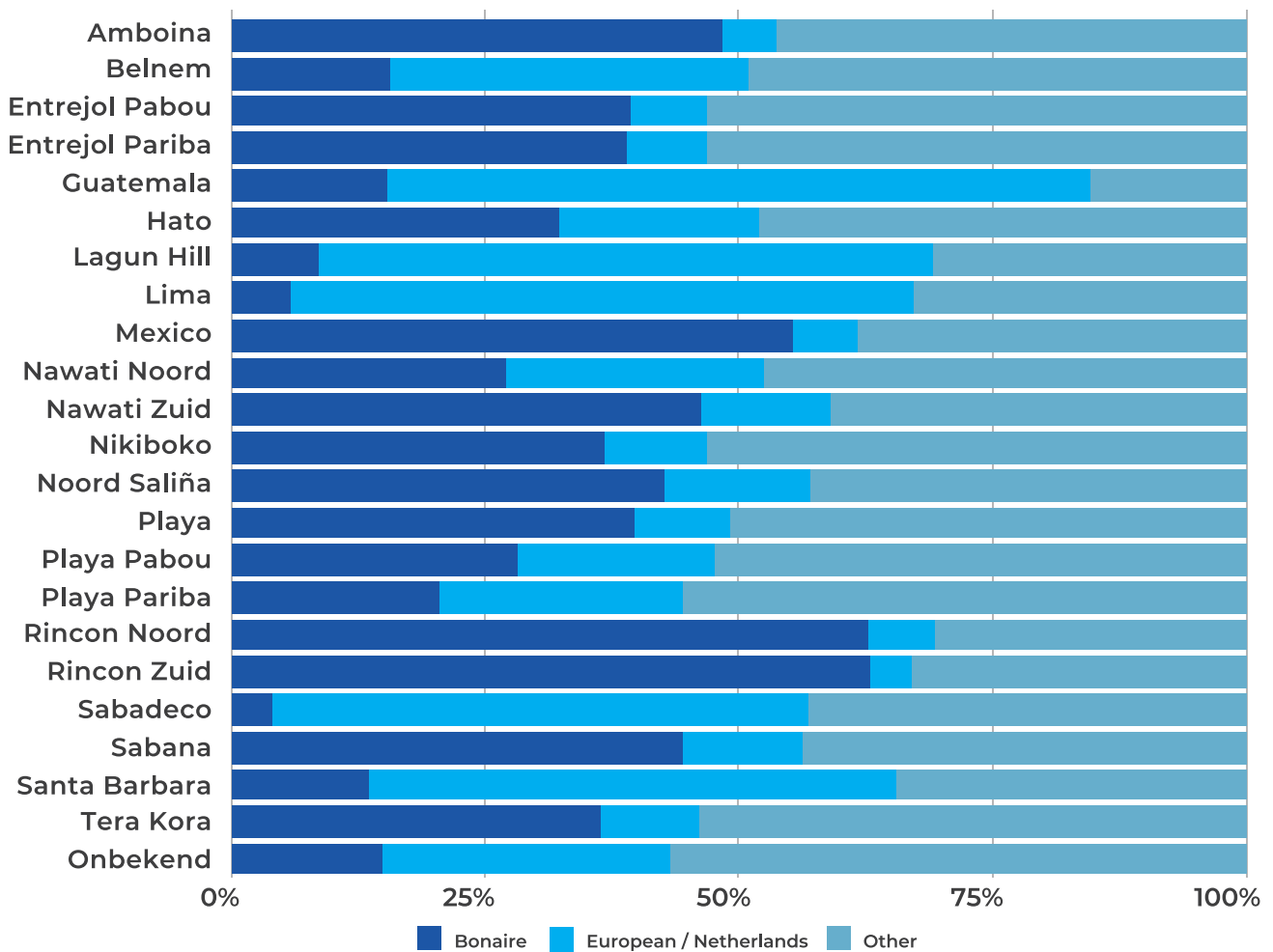


Source: CBS (2022a)

Neighborhoods in Bonaire are highly segregated. Data on the inhabitants by country of birth for the different neighborhoods show that the share of Bonaire-born residents differs by area. While in Rincon, 65 percent of residents were born on Bonaire, and 5 percent in the European Netherlands, in neighborhoods such as Lagun Hill, Lima, and

Sabadeco, the share of Bonaire-born residents is less than 10 percent. These dynamics show the concentration of individuals in neighborhoods by ethnicity and/or socio-economic conditions, often leading to cultural and social segregation. The consequences of these dynamics can have long-term effects that can lead to a polarized society.

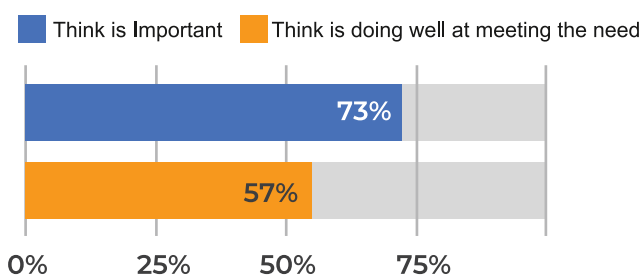
Figure 38: Share of inhabitants by country of birth and neighborhood, 2020



Source: CBS (2022a)

The Resident Survey showed that ensuring a strong sense of community is important to all residents, including those who immigrated to Bonaire. While this is very important to residents, they feel that Bonaire needs to do better at building this sense of community.

Figure 39: Survey results on Ensuring there is a strong sense of community among residents



Source: Resident Sentiment Survey

Note: Please rate how important these are actions to you, using a 5-point scale where 1 = not important and 5 = extremely important. Please rate how well Bonaire is doing at achieving this action, using a 5-point scale where 1 = very poor and 5 = very good.

The Resident Survey also found that preserving the local culture is an essential action point for respondents. There is, however, a considerable gap between how important this is to residents and the rate at which it is being achieved.

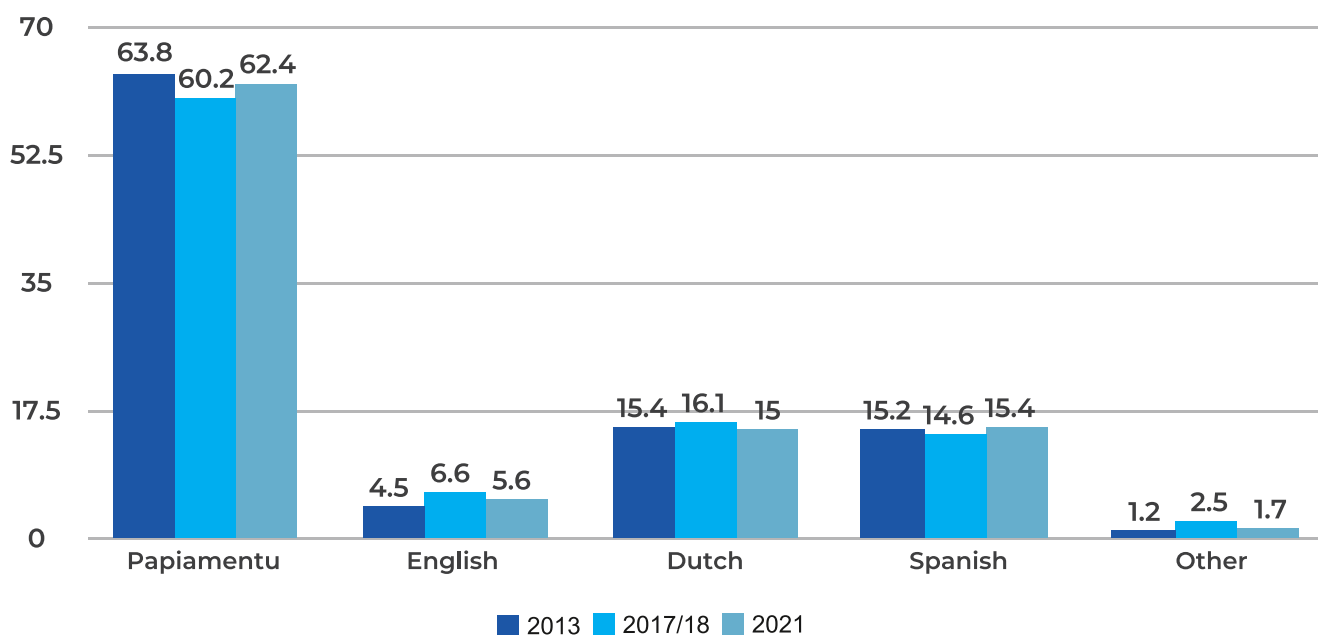
In 2010, the Government of Bonaire presented a policy brief on the culture of Bonaire (OLB 2010). It lays out the strategies, goals, and action points for the main elements of Bonaire's culture. The responsibilities around culture lie with the municipality, while Dutch law provides the legal framework. The legislation and the possible stakeholders for the different cultural areas are described in "Cultuur Handreiking for Bonaire" (RCN 2018).

In order to protect it the Dutch Government to officially recognize Papiamentu as an official language. Bonaire became a

special municipality of the Netherlands in 2010 the decision to protect the local language occurred in March of 2021 (BZK 2021). Despite this delay, the language is still widely used. A CBS resident survey in 2021 indicated that 88 percent of

Bonaire's population speaks Papiamentu<sup>16</sup>, and Figure 40 shows that Papiamentu continues to be the primary language of almost two-thirds of the island's population—63.8 percent in 2013 and 62.4 percent in 2021.

**Figure 40: Main language spoken by share of the total population, 2013, 2017/18, and 2021**



Source: CBS (2022a)

The growing population, driven mainly by immigration, is starting to impact the island's cultural identity. While there are ongoing small initiatives to preserve traditions, cultural heritage, and the language, the fact that Bonaire-born residents now represent a minority has led to the resident backlash towards further immigration. Some of the responses to the open-ended questions in the Resident Survey alluded to this by saying, for example:

There is development for only a small group of people, and most of the population is declining<sup>17</sup>.

And

There are too many inhabitants for such a small island, and the government must only accept immigrants when a certain number of inhabitants are reached. There are too many people on the island; however, it seems that many more people are migrating (in), which is becoming too much. Having too many people affects many things, such as limited job opportunities and higher prices because of supply and demand. Moreover, the effect on our environment<sup>18</sup>.

16. The survey, however, did not ascertain the level of proficiency.

17. In Papiamentu: "Ku tin desaroyo pa un grupo di chikitu i ku mayoria di e poblashon ta bayendo atras."

18. In Papiamentu: "Tin muchu habitante pa un isla asina chikitu. Mester yega un kaminda ku gobiernu ta stop di tuma imigrante ora ku yega un sierto kantidat di habitante. Tin hopi hende kaba aki. Pero ta manera hopi mas ta imigra bin aki. Anto e ta bira di mas. Di mas hende tin efekto riba hopi kos. Kupo limitá; di trabou, preisnan mas haltu pasobra tin hopi mas vraag dan aanbod. Efekto riba nos medio ambiente."



## Limited productive infrastructure

The two aspects of infrastructure under review as part of this assessment are (i) transport, including the airport, seaport, and roads, and (ii) utilities, including electricity, water, waste management, and telecommunications. Public transportation services are not available on the island.

**Due to limited local production, there is a significant dependence on imported goods on Bonaire.** The imported goods arrive at the airport and seaport. The total value of goods imported in 2021 was estimated at \$292 million (CBS 2022a). Over the past five years, the import value of goods has increased significantly, averaging 8 percent per year (CBS 2022a).

### Airport

The Flamingo International Airport, or Bonaire International Airport (BIA), is the largest in the Caribbean Netherlands. Owned by OLB, the airport can handle wide-body aircraft that operate scheduled flights to Bonaire, including American Airlines, Delta, United, KLM, and TUI Netherlands. The airport can be operational 24 hours a day. Either three code C aircraft (US carriers) or two code E aircraft (KLM and TUI) are parked simultaneously on the platforms during peak hours. In 2019, according to BIA records, the airport handled 472,340 arriving, departing, or transiting passengers and more than 600,000kg of cargo, mainly incoming.

The airport is beginning to reach the upper limits of its total capacity, especially during peak hours such as Saturday afternoons. An expansion is needed to efficiently accommodate passenger traffic growth (interview with Jos Hillen; NACO 2020). The total number of aircraft movements in 2019 was 16,698. The 2040 Airport Masterplan forecasts 22,506 aircraft movements by 2040 (NACO 2020), including 2,360 widebodies, 943 narrowbodies, 19,411 turboprops, and small regional jets.

## Seaports

**The maritime infrastructure is also critical to Bonaire and plays a significant role in supplying food and nonperishable goods to the island.** Bonaire has limited agriculture and horticulture because the semi-arid climate does not lend itself to farming, necessitating the import of many food products.

Kralendijk is the main public port on the island, receiving both cargo and passengers, often competing for the space. The Department of Ports and Pilotage of the OLB supervises the seaports and enforces port regulations. The OLB owns the port infrastructure (for example, the grounds and piers in Kralendijk).

There are four other piers for cargo vessels: Hato, on the site of the water and electricity company WEB; the Oil Trading Bonaire jetty that provides the airport with its needed fuel; Cargill, which has a landing site for salt operations on the southern end of the island; and Bonaire Petroleum Corporation (BOPEC), which has two jetties for loading and unloading of liquid bulk goods (petroleum and its products). The BOPEC jetties have been out of business since the site's closure in 2019.

Most ships arrive at the port of Kralendijk. In 2019, Bonaire received 726 freight and cruise ships port of call. Compared to 2018, this was a slight decrease. The port welcomes Ro-Ro containers and multipurpose, bulk, and cruise ships. Almost one-third of the calls at Kralendijk consisted of cruise ships (187 ships) in 2019. The port has three piers, the North Pier, used mainly for cruise ships, yachts, coastguard boats, pilot boats, car carriers, and tugs; the Middle Pier, used for the transshipment of goods (Ro-Ro ships); and the South Pier, which handles cargo ships and larger cruise ships.

Although the overall number of cargo ships entering Bonaire declined from 2015 to 2019, this can almost entirely be attributed to the

cessation of operations at the BOPEC terminal north of Bonaire. From 2015 to 2019, the number of cruise ship ports of call to Bonaire rose from 146 to 187, and the average number of passengers per ship increased from 1,590 to 2,548. This totaled 230,200 passengers in 2015 and 457,700 in 2019. The decision in the 2021 Tourism Recovery Plan to allow no more than one large cruise ship per day is enabling cargo ships to moor and reducing the pressure on inland infrastructure. Additionally, in January 2023, the head tax was increased from \$3.50 to \$10. Despite these restrictive policies, cruise ship arrivals are expected to increase. Cruise ship ports of call that are already scheduled for 2023 and 2024 anticipate 485,000 and 520,000 passengers, respectively.

**OLB has stated that it wants to separate cargo and passenger activities at the port.**

With the growth of cargo and passenger port activity, the pressure on port infrastructure is rising. Moreover, the unloading of cargo ships has a substantial effect on the immediate environment of the center of Kralendijk and the marine ecosystem. In the past few years, several studies have been undertaken to determine the most favorable location of a new cargo port outside the center of Kralendijk, and OLB has designated Hato as the preferred site, on the basis of nautical characteristics and a preliminary socioeconomic cost-benefit analysis. However, an Environmental Impact Assessment (EIA) must be executed and integrated into this socioeconomic analysis. The EIA is being prepared, and the outcomes are expected in 2023. The selection of Hato as the site of choice is also included in the Cooperation Agreement between the Minister of Infrastructure and the Environment and the OLB<sup>19</sup>.

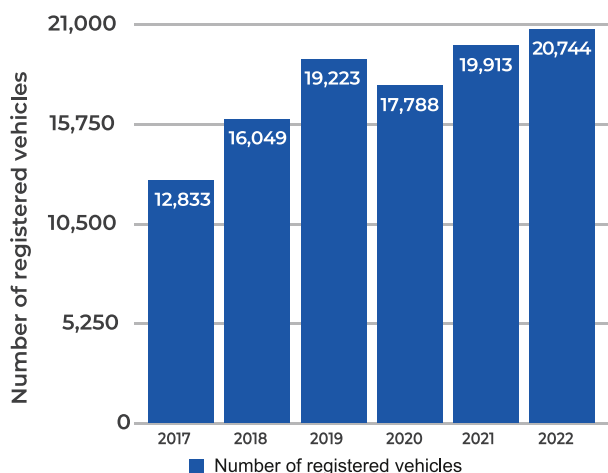
## Roads

**Most roads do not have drainage to discharge rainwater, which damages roads and causes unsafe driving conditions.** Bonaire has 212km of paved and 130km of unpaved roads. Most paved roads are in the island's central area (Kralendijk) and the area toward the north (Rincon). There are no traffic lights, and the island has only five roundabouts. There is an ongoing multi-year program (2021–2023) to improve the roads funded by the infrastructure fund Bonaire, Sint Eustatius en Saba (BES). These funds are available until 2023. The road program is planned to continue for the period 2024–2027 depending on funding. Additional funds are requested to construct access roads for better traffic circulation around schools, to reconstruct (primary) roads, and to pave dirt roads.

**Registered vehicles have increased by about 10 percent each year since 2017 and in 2022 totaled 20,744.** Adding pressure to the already deficient road infrastructure. In 2022, the Department for Spatial Planning started collecting data, including traffic counts, to inform a new traffic master plan (DRO 2022).

19. Samenwerkingsconvenant Zeehavens Bonaire ( <https://zoek.officielebekendmakingen.nl/stcrt-2020-15790.html>)

Figure 41: Number of registered vehicles, 2017–2022



Source: Openbaar Lichaam Bonaire

### Potable water production and distribution

**Bonaire relies solely on producing and distributing desalinated seawater.** Natural freshwater on Bonaire is scarce because groundwater tends to be brackish. Until the 1960s, the drinking water supply relied on a few freshwater wells, but population growth exceeded their capacity.

Founded in 1963 and owned by the OLB, Water-en Energiebedrijf Bonaire N.V. (WEB), the public water and electricity company, is an “exclusive” company responsible for the production and distribution of sustainable, reliable, and affordable drinking water and the distribution of electricity. ContourGlobal Bonaire (CGB) produces electricity and operates the wind farm, the solar farm, and the generators at Karpata. Certain aspects of the production and distribution of power and drinking water on Bonaire are regulated by the BES Electricity and Drinking Water Act, enacted in July 2016. The WEB team consists of 132 staff.

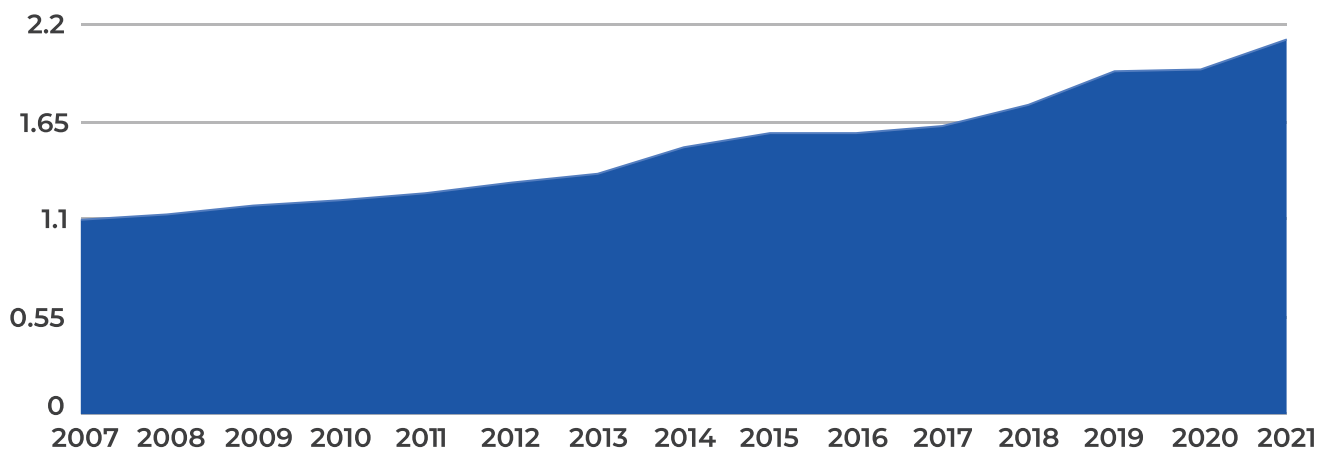
**Daily water production averaged 5,800 m<sup>3</sup> per day in 2021, versus an installed production capacity of 7,200 m<sup>3</sup> per day.**

Water production occurs at a relatively new facility in Hato, launched in December 2021, that produces up to 5,600 m<sup>3</sup> per day, and a slightly older (2015) facility that produces up to 1,600 m<sup>3</sup> per day. According to WEB, the daily production and consumption of water are expected to reach 6,400 m<sup>3</sup> in 2024 and 8,800 m<sup>3</sup> in 2030 (Slijkerman, van der Geest, and Mùcher 2019). If and when demand exceeds 12,000 m<sup>3</sup> per day, WEB will need to find a new location to complement or replace the main production site in Hato. The energy consumption of the new desalination plant, at 2.59 kWh/ m<sup>3</sup>, is relatively low.

**Currently, the salt brine from the plant is still discarded through a surface outlet at the sea side of the production plant in Hato; directly affecting the natural marine ecosystem.** After 2024, the plant will be chemical-free and obliged to discard hypersaline water (brine) at a depth of around 60 meters to reduce the ecological impact on the reef (Slijkerman, van der Geest, and Mùcher 2019).

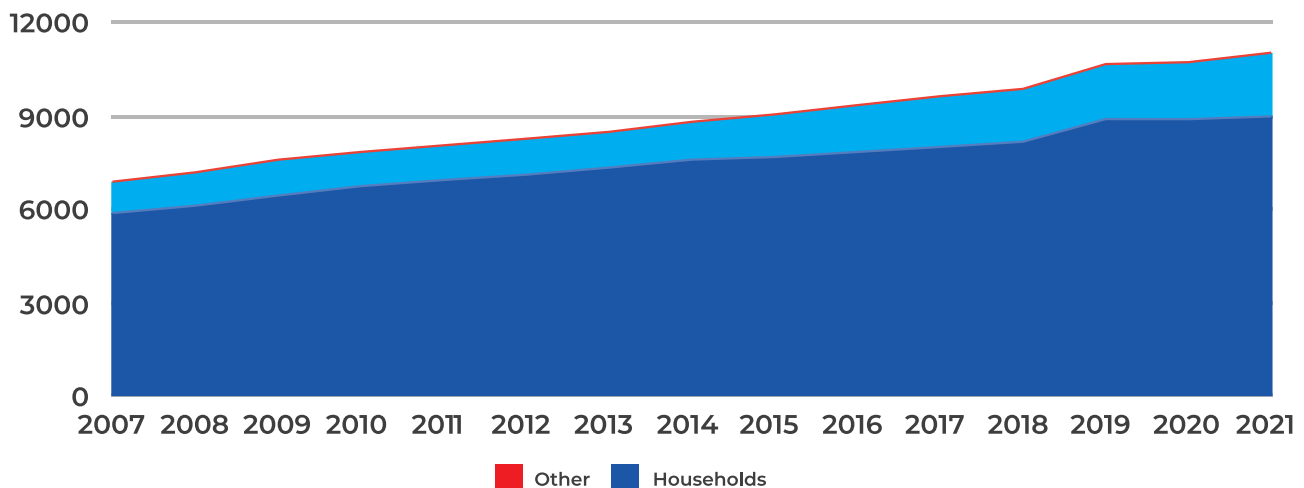
To distribute potable water from the storage tanks, WEB uses a main transport line of 141km and a service line of 284km. At the end of 2021, WEB had 11,048 active water connections. Households that are not connected to the service line are served using trucks. On average, water usage per capita per day is 150 liters, and WEB estimates the consumption of a tourist per day at 500 liters. The average retail price of water in 2022 was \$4.90<sup>20</sup> per m<sup>3</sup>.

20. The maximum utility cost rates for drinking water are set by the Authority for Consumers and Markets. These are deemed to be cost-covering tariffs. Based on statutory provisions, the water rates to be charged to the customer are determined by OLB. With the tariff support of the Ministry of Infrastructure and Water Management, any operating deficit is financed to enable WEB to apply reduced (non-cost-covering) rates.

Figure 42: Water production (in million m<sup>3</sup>), 2008–2021

Source: CBS (2022a)

Figure 43: Number of water connections, 2007–2021



Source: CBS (2022a)

### Wastewater Management

Since March 2013, WEB's services have included collecting and treating wastewater, managing the wastewater treatment plant, and distributing irrigation water. The wastewater treatment plant's capacity is 1,400 m<sup>3</sup> per day. The current sewage system network on the coastal strip of Kralendijk includes only 8.2 percent of the households, 102 hotels and apartments, and 62 restaurants. Trucks transport wastewater from septic tanks and cesspits to the treatment facility.

Connection to the sewage system is mandatory for households and businesses on the coastal strip from Hato to Punt Vierkant and about 330 meter inland. In urban areas, the OLB is obliged to collect wastewater with tank trucks (WEB 2023).

**In 2021, 85 percent of the wastewater was discharged without treatment.** Untreated wastewater and the run-off from roads and roofs pose significant environmental threats, specifically to the marine park. Analyses of water quality conducted between 2011 and 2013, as well as in 2020, found that nutrient concentrations on the reefs were slightly below the levels that can cause an increase in algae and cyanobacteria. This suggests that the water quality may deteriorate over time (Slijkerman et al. 2013; Foekema et al. 2022). Critically, no further information is available concerning the bacteriological levels of surface water at critical locations or of the sewage system effluents.

The Ministry of Infrastructure and Water Management is working with local parties on a program to improve surface water



quality, expected to be implemented by 2024. The collection of measurements on water quality started in 2022. In another project, the Ministry is working with OLB, WEB, and other local organizations to test decentralized wastewater treatment facilities. Finally, since January 2023, there has been a tax on waste water for businesses, such as restaurants and hotels.

## Energy

The total installed energy capacity on Bonaire is 37.56MW. CGB is responsible for electricity production on Bonaire since 2013. In 2019, CGB invested in five diesel generators and a new set of containerized batteries and replaced the energy management system with a power management system. A power management system is a tool by which CGB manages frequency and voltage fluctuations. The electricity production system on Bonaire currently uses seven diesel generators and 13 wind turbines. There are 12 wind turbines east of Rincon with a capacity of 900KW each, and a wind turbine of 330KW near Lac Bay.

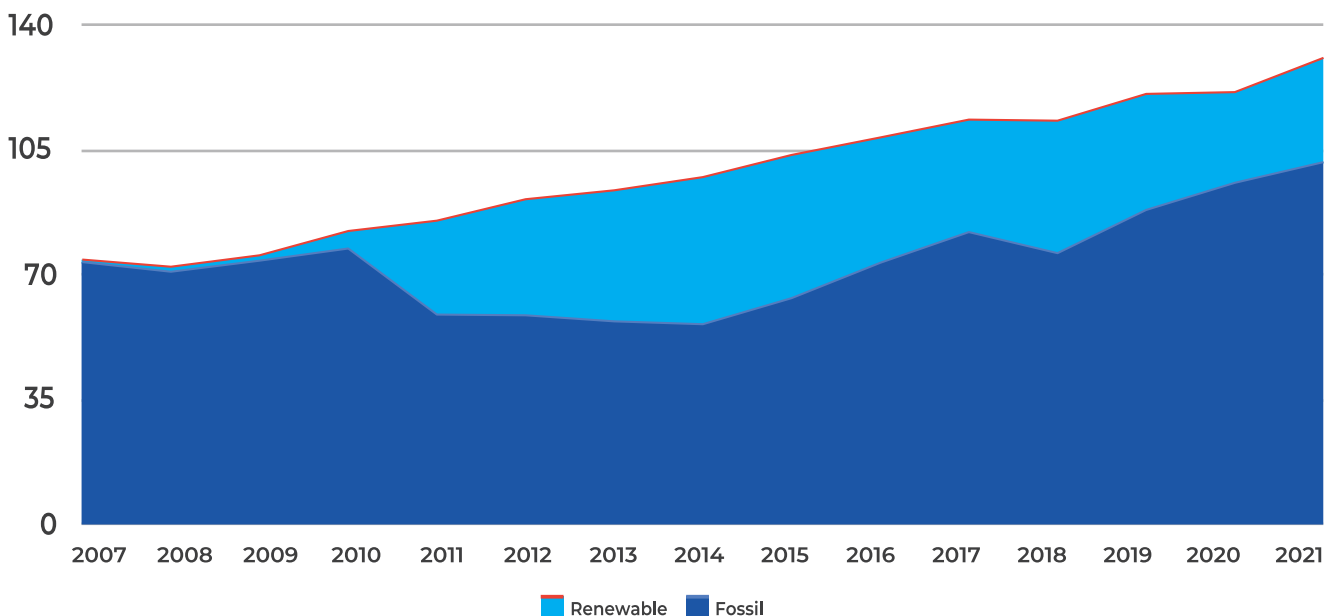
**In 2021, Bonaire produced 130.6 million kilowatt hours (kWh) of electricity. Of the total production, 29.2 million kWh (22 percent) came from renewable**

**sources.** Production followed the increasing trend in energy consumption. There were 12,022 connections in 2021, including both households and businesses. The average price of electricity is \$0.50 per kWh as of August 2022.

To increase the rate of sustainable energy to 60 percent in 2025, CGB has commissioned a project to build 10,816 solar panels (Dossier Koninkrijksrelaties 2022b). These are planned to be functional by the end of 2023 and have a total capacity of 10MW, equivalent to the consumption of 5,000 households. CGB is also planning to replace the wind turbines at Morotin, a project expected to be realized in 2025.

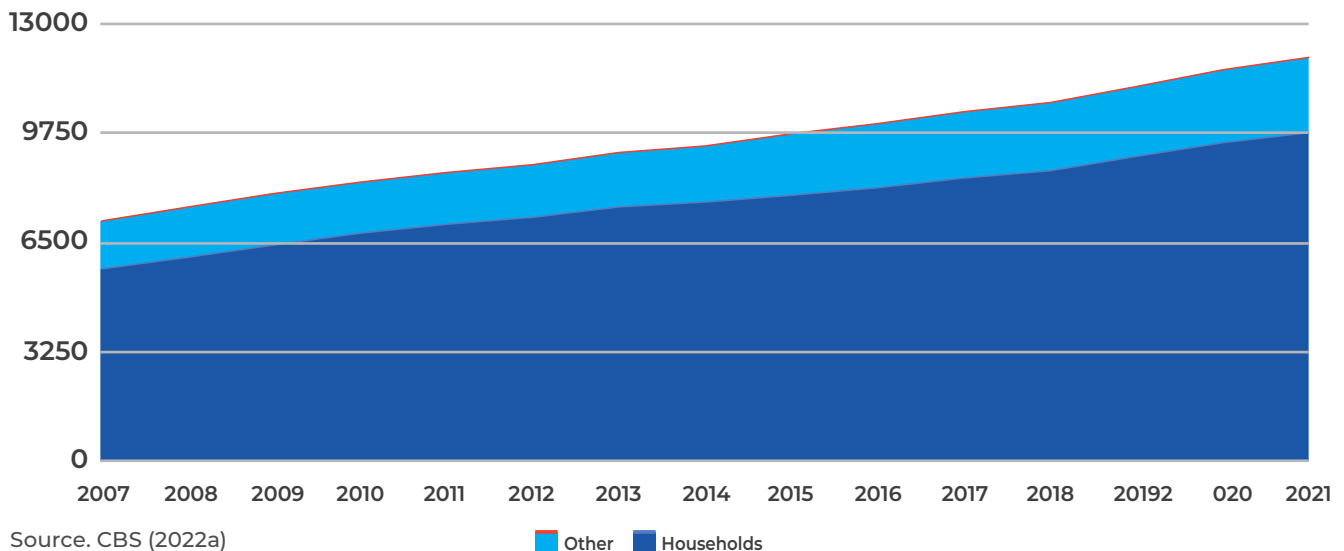
The BES Electricity and Drinking Water Act allows WEB customers to invest in sustainable energy solutions such as solar panels. After inspection and approval of their installations, these customers can send unused electricity back to the grid. The total solar panels of approved installations are estimated to be around 1.5MW.

Figure 44: Electricity production (in million kWh), 2007–2021



Source. CBS (2022a)

Figure 45: Number of electricity connections, 2007–2021



### Solid Waste Management

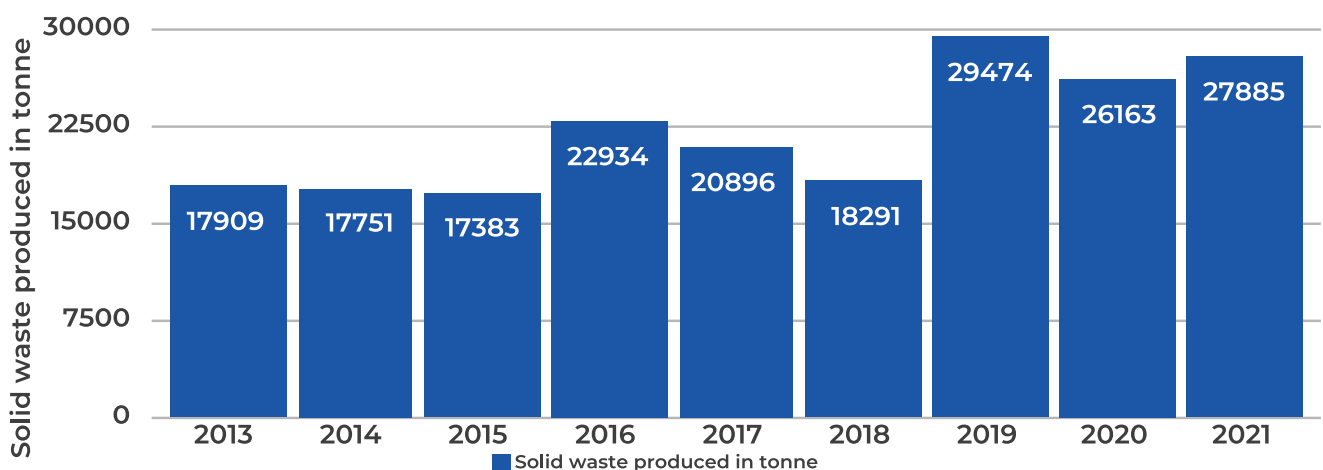
The only landfill on the island, near Lagun on the island's west coast, has reached about 75–80 percent of its capacity. The amount of solid waste generated on Bonaire rose from about 10,000 in 2013 to 27,885 tonnes in 2021 (Figure 46). Currently, only 5 percent of the waste is recycled, and none of the organic waste is composted. Pollution from land-based sources, particularly plastic, has become a significant threat to open water environments.

Selibon N.V. is a government-owned, private company responsible for waste management on Bonaire. Selibon aims to increase recycled and compost organic waste to 10 percent and 3 percent, respectively, but an exact target date has yet to be defined. Currently, biomedical and organic waste is incinerated. Cardboard, glass, cans, and other metals and plastics can be brought in separately and packed and shipped or kept apart on the landfill until processed.

Glass is expected to be pulverized and recycled in construction materials in 2023. Action against illegal waste dumping is a high priority in Bonaire's environmental and enforcement plans for 2023.

The current waste management improvement program (Afvalbeheer op Maat – AoM) aims to facilitate the transition from waste collection and landfill use to waste processing and to develop Selibon into a self-supporting waste management organization. Created by the Ministry of Infrastructure and Water Management to be administered by OLB, through Selibon, between 2013 and 2026, this 10 million EUR program has 21 projects. The projects, which are at various stages of development and implementation, fall in the areas of waste prevention, reuse, recycling, separation, processing, education, and awareness as well as the finishing and sustainable integration of the landfill in the landscape.

Figure 46: Solid waste produced (in tonnes), 2013–2021



## Depletion of high-value natural ecosystems

Bonaire has two protected areas: the Washington Slagbaai National Park (WSNP) and the Bonaire National Marine Park (BNMP), which includes the sea around Bonaire and the uninhabited island of Klein Bonaire. The island government has commissioned Stichting Nationale Parken (STINAPA) Bonaire, a nongovernmental, not-for-profit foundation, to manage both parks. The WSNP covers 5,853 hectares, approximately 17 percent of the island. BNMP area covers 2,845 hectares and includes all the waters surrounding Bonaire and the uninhabited island of Klein Bonaire, from the high tide mark to 60 meters (200 feet) in depth. The lagoon LacBay is also part of the underwater park. Bonaire has four Ramsar sites<sup>21</sup> that have a total area of 10,310 hectares.

**Table 7: Ramsar Sites**

Area	Size in hectares	Managed by STINAPA
WASHINGTON SLAGBAAI/GOTO LAKE	5,853	YES (WSP)
LAC BAY	1,550	YES (BNMP)
KLEIN BONAIRE ISLAND AND ADJACENT SEA	1,295	YES (BNMP)
PEKELMEER	1,612	NO

Source. STINAPA (2021)

**In the four years preceding the pandemic, WSNP received between 41,000 and 61,000 local and international visitors annually.**

The park encompasses the northwest tip of Bonaire and is the oldest and one of the largest terrestrial protected areas in the Dutch Caribbean. The park's most popular activities are hiking, mountain biking, birdwatching, snorkeling, and scuba diving. Several shore-line access points provide access to the sea.

**BNMP sold between 58,000 and 77,000 dive and other user tags annually from 2016 to 2019.**

Popular dive sites are on the west coast and around Klein Bonaire. The marine park offers a wide range of recreational activities on which the island's tourism-driven economy is heavily dependent. BNMP is on the tentative list of United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage sites.

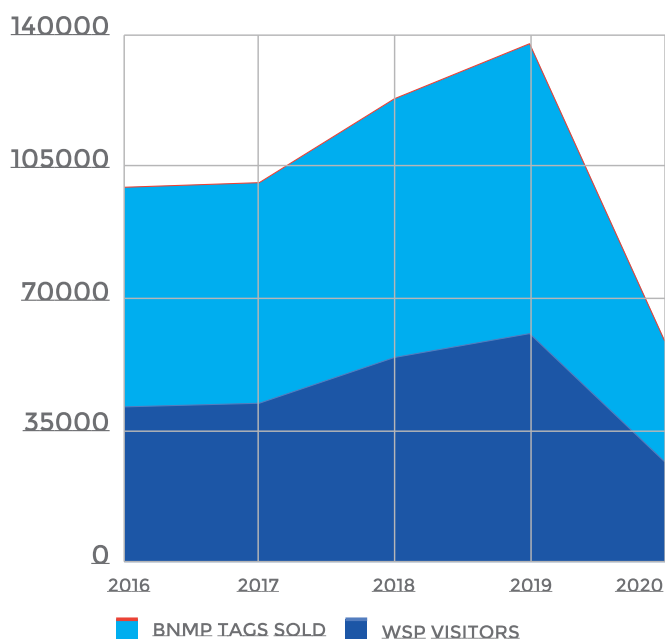
21. A Ramsar site is a wetland site that has been designated as being of international importance under the UNESCO Ramsar Convention on Wetlands.

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**Figure 47: Number of National Park visitors, 2016–2020**



Source: STINAPA

In 2021, the Bonaire Palm, native solely to Bonaire, was added to the critically endangered list of terrestrial species, with only 25 mature individuals left. The National park's dry forest, cactus, scrub, and wetland habitats provide a safe habitat for the island's native terrestrial species, such as parrots, flamingos, parakeets, iguanas, and many other species of birds and reptiles. There are 236 terrestrial species of conservation interest and 10 marine species on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Table 6).

**Ten species that live in the Bonaire Marine Park, and that are considered critically endangered in the IUCN red list, include different types of coral, groupers, sharks, sawfish, and turtles.**

The marine park includes various ecosystems such as coral reefs, seagrass beds, and mangrove forests. In total, there are 416 terrestrial species of conservation interest. Seventy-five are on the IUCN Red List of Threatened Species (Table 6).

**Table 8: IUCN red list of threatened species**

Category	Terrestrial	Marine	Total
CRITICAL	1	10	11
ENDANGERED	2	21	23
VULNERABLE	7	44	51
TOTAL	10	75	85

Source: MacRae and De Meyer (2020)

Pekelmeer is a Salt Lake that runs along the southern portion of Bonaire's southern wetlands. These wetlands cover a land area of 4,480 hectares and are ecologically diverse. The site includes caves and karst, groundwater reservoirs, dry tropical forests, limestone coastal zones, salt pans, lagoons, and mangroves. What little development there is in the southern wetlands is limited mainly to the salt production operations of Cargill. Most southern wetlands have been identified as important bird and biodiversity areas.

The southern wetlands are popular with residents and visitors for water sports, tours, beach visits, and other recreational activities such as jogging and cycling. Vigorous human interaction with these areas threatens the integrity of these fragile ecosystems. Information on the pattern and number of users should therefore be collected and monitored.

In 2022, Bonaire developed management plans for Washington Slagbaai National Park (Crestian et al. 2022), Bonaire National Marine Park (De Meyer et al. 2022), and Bonaire's Southern Wetlands (Engel et al. 2022). These plans provide complete overviews and management strategies for the respective areas.



## The status of the environment

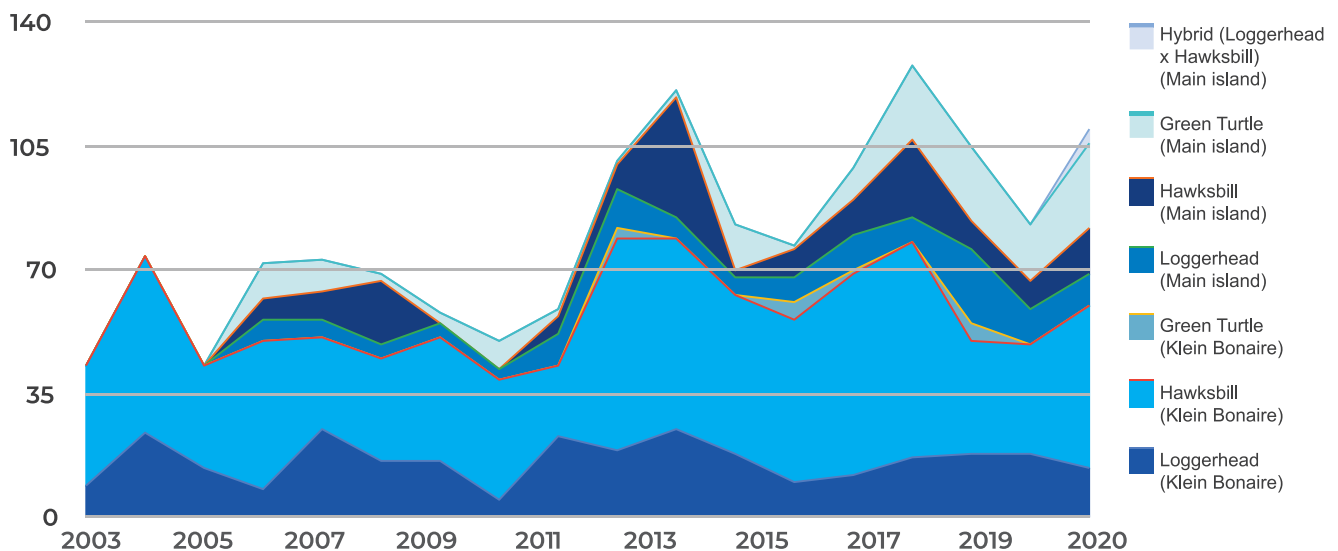
**Exact figures on the current boundaries and quality of Bonaire's natural habitats are scarce (Debrot, Henkens, and Verweij 2018). Most of the available data need to be updated.**

**The degradation of the dry tropical forest is mainly the result of overgrazing. Urbanization, caused by population growth and growing tourism, also threatens the dry tropical forest (Debrot 2018).** Less ground cover means that less sediment is anchored through root systems, causing high sediment inputs into coastal waters (Roberts et al. 2017). Increased sediment input leads to higher rates of coral reef death, slower growth, shifts in species composition, and changes in fish populations. Additionally, land degradation leads to less water retention and temperature increases.

**Bonaire has dry and wet caves that are under threat from human disturbance, and from soil and groundwater contamination from sewage and oil leakage.** The water caves are located mainly in the lower parts of the island, and there are also sea caves with underwater entrances. Caves are home to unique life forms and provide critical habitats for at least five species of bats. Unlike many habitats in Europe, caves in the Caribbean lack internationally protected status as a habitat of unique fauna.

**Bonaire's beaches are under severe pressure from climate change, tourism development, population growth, invasive species, pollution, and illegal removal of sand for commercial building construction.** The beach habitat provides various ecosystem benefits (for example, coastal protection and habitat for turtles and birds). It is also a key tourism market attraction and an important income source for Bonaire. Conservation efforts in the last decade have increased the number of turtle nesting sites in Bonaire.

**Figure 48: Number of turtle nests, 2004–2020**



Source: CBS (2022a) – Sea Turtle Conservation Bonaire and Dutch Caribbean Biodiversity Database

**Mangrove forests on Bonaire are primarily found in Lac Bay, Lagun, and Pekelmeer. Lac Bay and Pekelmeer are protected Ramsar areas and are classified by World Wildlife Fund (WWF) as critical/threatened (WWF 2017).** Mangroves provide essential ecosystem benefits such as coastal protection, nurseries, and nursing areas for fish and crustaceans. They also form a catchment area for nutrients and foreign substances and thus play a vital role in protecting other habitats, such as seagrass beds and coral reefs. They are important feeding and resting areas for various bird species (Debrot, Henkens, and Verweij 2018).

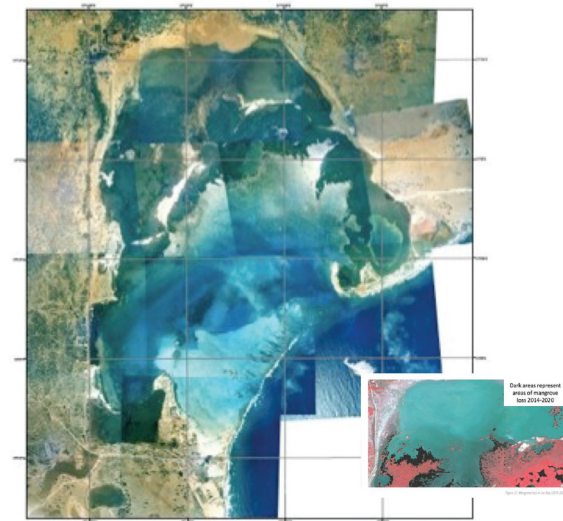
The Lac Bay's mangrove area has decreased in recent decades. Between 1969 and 1996, it shrunk by more than two hectares per year. Critical threats that likely have caused this decline include overgrazing by introduced species, sedimentation (due to erosion), and reduced freshwater supply due to the construction of small dams, originally for livestock and agriculture (OLB 2020). The increasing influx of Sargassum seaweed has added another major threat to the mangroves. The mangrove forest in Lac Bay is a natural drainage area and, therefore, a collection point for polluted groundwater and washed-off sediment from land degraded through erosion. This leads to the accumulation of pollutants, eutrophication, silting, and landslide of the mangrove forest in Lac Bay. In addition, the mangroves are under pressure from tourist-recreational and other urban developments. Litter and oil pollution that wash ashore from the sea also threaten this habitat.

Because of factors such as fertilizer run-off into rivers such as the Amazon River, the yearly influx of Sargassum seaweed, a macroalgae that grows rapidly, has exploded in the past few years. Besides being a threat to nature, it also threatens tourist areas. When washed ashore, the algal bloom, which can grow into island-size masses, decomposes within a few days, creating a toxic environment for the marine ecosystem, particularly mangroves. Via an early-warning system with satellites, webcams, and patrols, Stinapa and OLB are preparing to launch large-scale operations to get the Sargassum from sea to shore in a controlled way. Teams of Stinapa Rangers are trained to coordinate and support these actions, and contractors are lined up to add material and human resources. Research and small-scale experiments are being done on the effects of Sargassum on mangroves and the use of Sargassum as fertilizer.

Using satellite images, the proportion of remaining healthy mangroves in 2012 was estimated at 56–60 percent of the total mangrove area (Steneck et al. 2015). Since 2020, over 1500 mangroves have been planted along the southwest coast of Bonaire. A

new collaborative project monitored and mapped these newly planted mangroves (DCNA 2022). A healthy, fringing mangrove forest will provide new habitats, nurseries, foraging grounds, and a vital line of coastal defense for the southern wetlands.

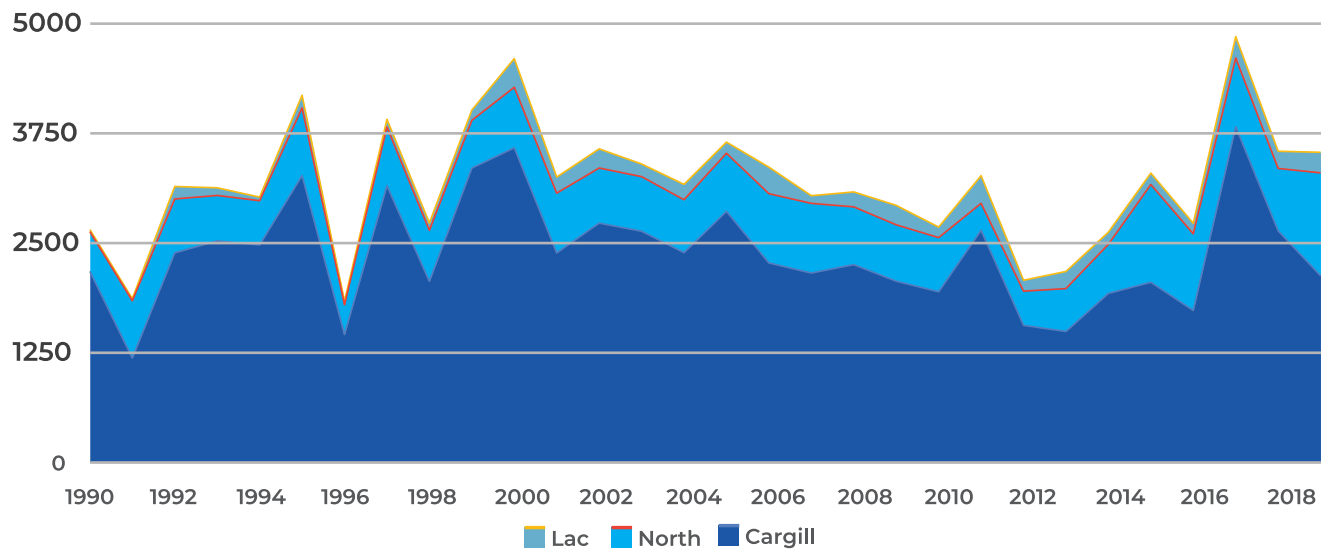
**Figure 49. Mangrove loss in Lac Bay (2014-2020)**



Source: De Meyer et al, 2022 Bonaire National Marine Park Management Plan 2023

In 2019, a BEST 2.0 grant was awarded to the Reef Renewal Foundation Bonaire. This grant promotes biodiversity conservation and sustainable use of ecosystem services, including an ecosystem-based approach to climate change adaptation and mitigation, in Overseas Countries and Territories (OCTs). The Mangrove Restoration Project Bonaire was selected, focusing on the island's four main mangrove restoration areas (Mangrove Maniacs 2023). The project is in execution and driven by the volunteer-based Mangrove Maniacs Bonaire Foundation in coordination with Stinapa. In 2022 a Resilience, Sustainable Energy and Marine Biodiversity Programme (RESEMBID) fund was granted to realize a blue economy on Bonaire, to restore marine biodiversity, and promote sustainable recreation in Lac Bay (RESEMBID 2023).

Run-off of sediment from degraded land causes silting of the salt pans and salt lakes (saliñas), resulting in loss of surface. Urbanization around Kralendijk is causing the loss of saliñas there. Near Kralendijk, a large area (Salina di Vlijt) has already virtually been lost in recent years due to urbanization. Saliñas are shallow, semi-enclosed saltwater bodies mainly associated with coastal drainage basins and are the primary breeding habitat for several ground-nesting seabirds, notably terns and sandpipers. They are also crucial for (migratory) birds, such as the Caribbean Flamingo. Disruption from recreation is likely to adversely affect the breeding success of terns and the foraging success of the Caribbean flamingo. The presence of the flamingo is an important indicator of habitat quality and has been tracked since 1990. (Debrot, Henkens, and Verweij 2018).

**Figure 50: Flamingo abundance (yearly average), 1990–2020**

Source: Dutch Caribbean Biodiversity Database

**Seagrass beds are at risk due to urbanization threats, such as sediment runoff from land, eutrophication, pollution, and damage from tourism activities.** Seagrass beds are an essential nursery, growing area, and feeding area for numerous fish species, such as parrotfish, surgeonfish, and seabreams. Queen conches hide in the sand around the seagrass field for the first year before they start using the seagrass field as a habitat. Seagrass beds, a crucial feeding area for green sea turtles, provide many other ecosystem services, such as sediment and carbon dioxide (CO<sub>2</sub>) storage. In Lac Bay, a decrease in the cover ratio of native species in seagrass beds was observed between 1999 and 2007 (Engel 2008) and again between 2011 and 2013 (Engel 2013). This decrease coincided with increased coverage of the invasive seagrass *H. stipulacea*. In 2011, *H. stipulacea* covered 6 percent of Lac Bay seagrass beds; by 2013, that number had jumped to 14 percent (Engel 2013).

**Global climate change, tourism, unsustainable overfishing, and land-based pollution from human activity threaten the health of the coral reef around Bonaire. Other threats include tropical storms, coral disease outbreaks, invasive species, marine debris, and vessel damage. Local stressors are overgrazing-induced terrestrial erosion**

**and urban development, causing sediment and nutrient run-off into coastal waters, associated with coral mortality and changes in benthic<sup>22</sup> community composition.**

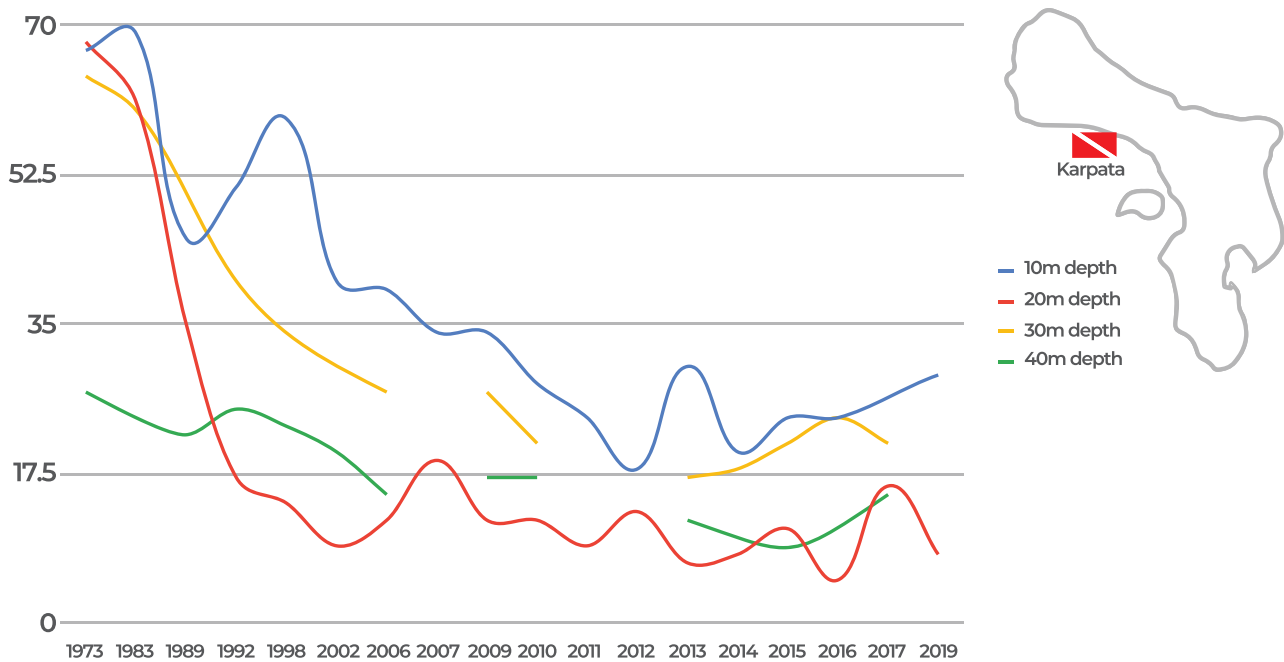
Improving water management by building and maintaining dams, run-offs, water storage areas, and sediment traps is on the agenda again since several flooding and sediment sheds in the ocean in 2022. Steps are being made for an integrated water management plan for Bonaire. In November 2022, a report was presented for Integral Water Management on Bonaire (Waterschap Rijn en IJssel 2022). This report advises short- and long-term actions to improve the water management systems and infrastructure on Bonaire.

Based on the Reef Health Index (RHI)<sup>23</sup>, most reef sites of Bonaire are in reasonable to bad condition. In 2017, the average score was 2.69 (fair). The covering of living coral has declined by more than 50 percent over the past half-century. Figure 51 shows that even at a relatively healthy location, such as Karpata—Bonaire's northernmost snorkeling spot and one of the best dive sites on the island—the living coral cover has decreased from around 70 percent to below 30 percent of the reef (Debrot, Henkens, and Verweij 2018).

22. The benthic zone is the ecological region at the lowest level of a body of water, such as an ocean floor or a riverbed.

23. The RHI is constructed from coral cover, macroalgae cover, biomass of key herbivorous fish, and biomass of key commercial fish. See Diaz-Perez et al. (2016) for more details about this index.

Figure 51: Living coral cover at Karpata, 1973–2019



Source: Dutch Caribbean Biodiversity Database. Data analysis by Bak et al. (2016).

However, Bonaire has shown progress since 2015: biennial monitoring shows an increase in coral cover and density of juvenile corals and a decrease in macroalgal cover, which inhibits coral growth. In a 2021 report on the status of coral worldwide, the Global Coral Reef Monitoring Network named the Bonaire National Marine Park (BNMP) one of three successful coral rehabilitation case studies. Financing the BNMP coral reef restoration project is uniquely linked to tourism arrivals. Most of its

income comes from the \$45 nature entrance fee non-resident visitors pay to enter the park.

**Bonaire has been named the number one destination for offshore diving. In the event of a further decline in coral cover, essential ecosystem services such as tourism, fisheries, and coastal protection are in danger of declining sharply in the coming years.**

## Climate change

Various aspects of Bonaire will continue to be affected by climate change. Beukering et al. (2022) examine the impact on the economy, health, infrastructure, and cultural heritage. The findings indicate that in all the climate scenarios assessed, the island's southern region is at risk of experiencing flooding due to sea level rise and severe storms. Moreover, the decline in healthy coral reefs increases the likelihood of flooding and storm impact, as coral reefs function as natural barriers.

The wave-breaking coral reefs' degradation and worsening storms will likely contribute to more storm-related damage to infrastructure and tangible cultural heritage on the coast. Additionally, medical experts suggest that climate change could result in more deaths and illnesses due to rising heat waves.

**Only under the most optimistic climate scenario of limiting warming to 1.4 degrees Celsius there will be no significant impact on coral reefs by 2050. However, dive sites could dwindle from 86 to 13 in the most extreme climate scenario within the next three decades. This would lead to a decline in diving tourism and have a considerable economic impact.**

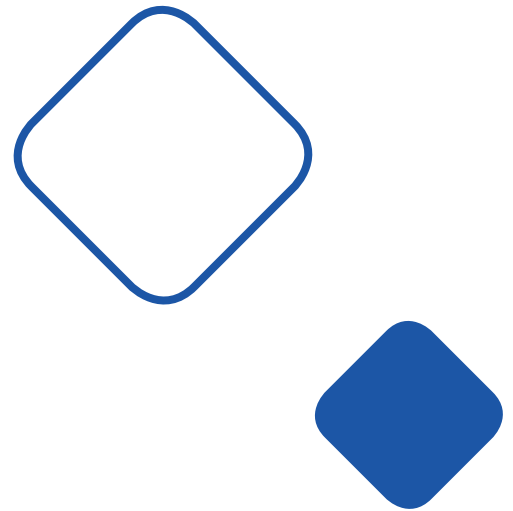




PICTURE BY: Lorenzo Foto's  
Bonaire's Media Hub



# Island Population Growth Scenarios

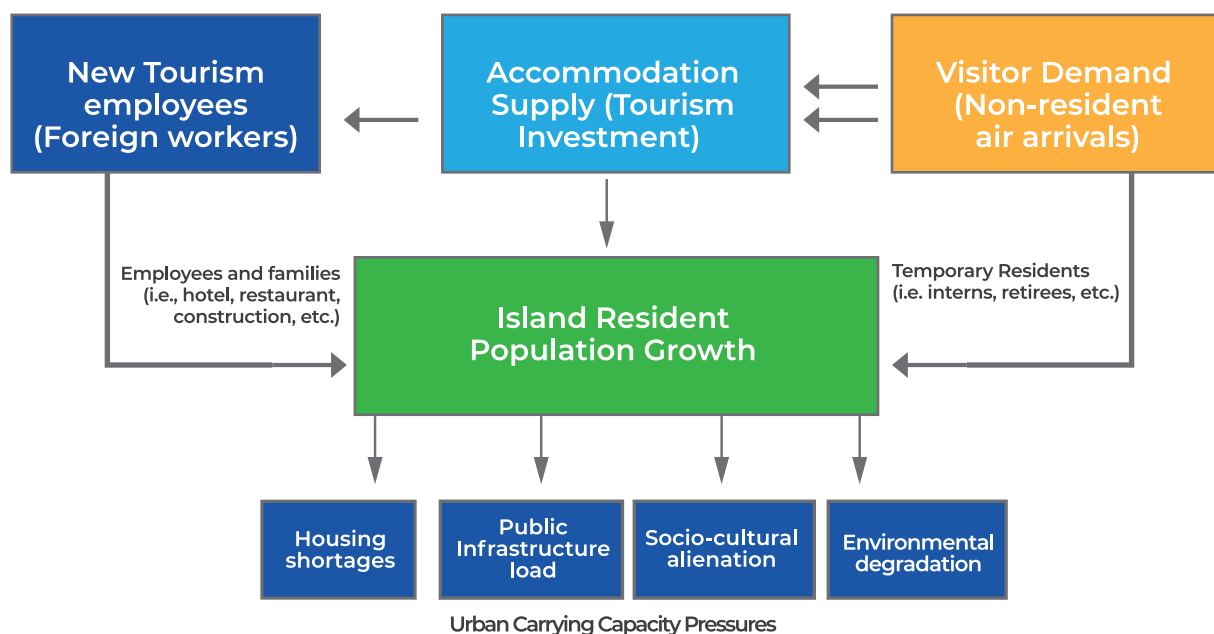


## Introduction

Based on the identified challenges to the island's carrying capacity, the World Bank team developed econometric models to assess the impacts of short-term visitors and long-term population historical trends on economic, social, and environmental indicators. The resulting model was used to project the effects of future population growth up to 2027. Three growth model scenarios are compared: **status quo, accelerated growth, and slow growth.**

All three models predict inevitable growth in 2023 attributable to the rebound of the tourism industry, the island's main economic driver. Bonaire already doubled the accommodation supply, by adding 880 new tourism rooms between 2020 and 2023. This new supply will pull additional visitor demand as well as tourism employees from abroad. In turn, these dynamics lead to population growth and carrying capacity pressures. See Figure 52 for a theoretical description of the dynamics described.

**Figure 52 Theoretical framework for Bonaire growth model scenarios**



## Model scenarios

In order to fill the new supply, the simulated growth models assume an initial 16 percent growth in non-resident air arrivals in 2023, compared to pre-pandemic numbers (2019 baseline). Growth rates for each of the three scenarios, from 2024-2017, will be:

• **Status quo:** the most likely growth scenario if business as usual is continued on Bonaire - tourism investment, arrivals, and population growth returns to pre-pandemic dynamics.

- o 121 tourism rooms added per year
- o 4 percent growth per year in air tourism arrivals
- o 4.4 percent population growth per year•

**Accelerated growth:** Bonaire prioritizes rapid economic growth by continuing to exponentially increase the tourism accommodation supply to attract more overnight tourism visitors.

- o 226 tourism rooms added per year (2024–2027)
- o 8 percent growth per year in air tourism arrivals
- o 6.9 percent population growth per year

**Slow growth:** Bonaire prioritizes a higher-value, lower-impact economic development approach, where social and environmental capacity is equally prioritized<sup>24</sup>.

- o 30 tourism rooms added per year (2024–2027)
- o 1 percent growth per year in air tourism arrivals
- o 2.7 percent population growth 2.7% CAGR per year



Goto Lake  
PICTURE BY: Casper Douma  
Bonaire's Media Hub

## Model inputs

The growth model indicators related to the challenges identified through expert workshops, town hall meetings, interviews, desk research, and a resident sentiment survey as described in the previous chapters. The relationship among these indicators was modeled using a regression approach and a minimum time frame of 8 years, 2011–2019; excluding 2020-2021 due to unusual covid19 pandemic dynamics. The model assesses the elasticity of population and visitor arrivals growth on a set of economic, social, and environmental carrying capacity impact indicators. See Appendix D for further explanation of the methodology.

24. In line with the nature-inclusive vision of the Bonaire report by Wageningen University & Research (Verweij et al. 2023).

The key variables of the model are defined as follows:

- **GDP:** The island's total gross domestic product expressed in real terms (constant prices).
- **Visitor arrivals (by air):** The number of non-unique, non-resident air visitors to the island. These include overnight and day visitors that arrive by air (excluding cruise passengers day-visitors)<sup>25</sup>.
- **Population:** The total population of the island's permanent residents by year.
- **Tourism rooms:** The supply of visitor accommodation room facilities available for hire, including hotels, resorts, bed and breakfasts, lodges holiday apartments, villas, and houses.
- **Tourism employees:** The number of direct employees in the tourism sector (accommodation and food serving).
- **Vehicle licenses:** The total number of active vehicle license permits on the island per year, including trucks, vans, cars, motorcycles, and rental car fleets.
- **Average price of sold dwelling:** The average cost of sold homes registered by the Land Registry on Bonaire. Includes all transactions of residences on the island, new and existing, whether bought or sold by a private individual, corporate party, or otherwise. Bonaire has been measuring the dwelling price index since 2011 (2011=100).

#### The results of the elasticity model show:

- Visitor arrivals, of which 80 percent constitute overnight tourists, contribute positively to the island's economic activity. An increase of 1 percent in tourism arrivals results in a 0.76 percent increase in GDP.
- Visitor arrivals contribute significantly to direct tourism jobs. An increase of 1 percent in tourism arrivals results in a 2.60 percent increase in direct tourism jobs.
- Visitor arrivals contribute to an increase in population growth. A rise of 1 percent in tourism arrivals results in a 1.1 percent increase in population.
- A rise of 1 percent in population growth leads to a 1.73 percent increase in the average price index of dwellings sold.

- Population growth significantly impacts the number of vehicles licensed on the island. An increase of 1 percent in population growth leads to a 2.68 percent growth in the number of vehicles circulating on the island.

Additional impact indicators were included in the three growth scenarios, based on the following assumptions:

- One tourism accommodation supply generates 56 overnight visitor arrivals a year. Derived using current occupancy rates and the average length of stay (TCB 2023)
- At least 633 new tourism rooms were added to the accommodation supply between 2020 and 2022, and an additional 247 new rooms will open in 2023 (TCB 2023).
- The current hotel occupancy rate is 68 percent and is expected to reach 75 percent by 2027, per TCB's tourism strategy (TCB 2023).
- Of the non-resident air arrivals, 80 percent are overnight visitors that stay in hired accommodation facilities, reaching 90 percent by 2027 (TCB 2023).
- The average length of stay of tourism overnight arrivals remains constant, at 8.8 days, per Bonaire tourism statistics (TCB 2023).
- The Bonaire-born resident population grows organically at a 1.65 percent annual growth rate, as derived using CBS data. Any additional population growth is attributed to net migration (CBS 2023).
- An overnight visitor uses 500 liters per day, and a resident uses 150 liters per day, as derived using WEB data (WEB 2022).
- Solid waste production per overnight visitor is 2kg per day, and per resident is 3kg per day; both of these rates are produced in Aruba and used as a benchmark for Bonaire
- One ton of solid waste landfilled generates three metric tons of Carbon Dioxide Equivalent (CO<sub>2</sub>e) per year. One gasoline-powered passenger vehicle produces 4.6 metric tons of CO<sub>2</sub>e per year. The estimates are based on the United States Environmental Protection Agency greenhouse gas equivalencies (GHG) calculator.

25. This scenario analysis excludes the impact of cruise tourism because there is a lack of data on the number of cruise visitors who disembark, and on the island's current visitor flow and visitor activities.





Lac Bay  
 PICTURE BY: Jan Wachtmeester  
 Bonaire's Media Hub

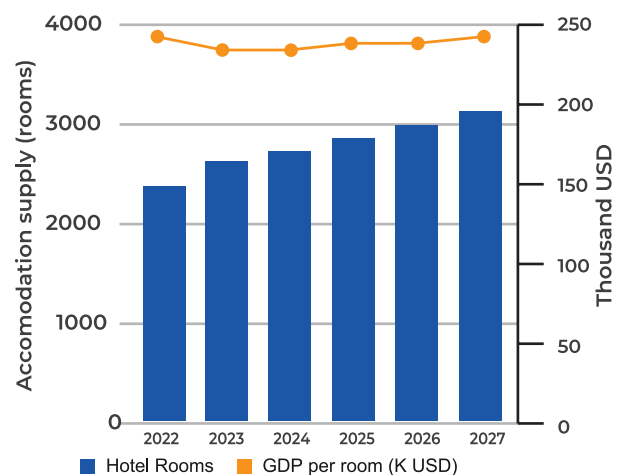
## Status Quo growth model

The simulated Status Quo model expects 742 new tourism rooms to be added by 2027 (31 percent increase), from 2,382 in 2022 to 3,124 rooms by 2027. The GDP per room is expected to remain constant, at US\$241,000 per year over five years.

The expansion in tourism room inventory drives additional visitor overnight demand. These new facilities will also directly increase the job market in both the construction and the tourism sectors, and in a tight labor market, will result in a need to bring in workers from outside the island<sup>26</sup>.

Furthermore, operations of the new accommodation facilities will increase the load on the already limited capacity of the public and utility infrastructure.

Figure 53: Status Quo model: tourism rooms vs. GDP per room growth, 2022–2027

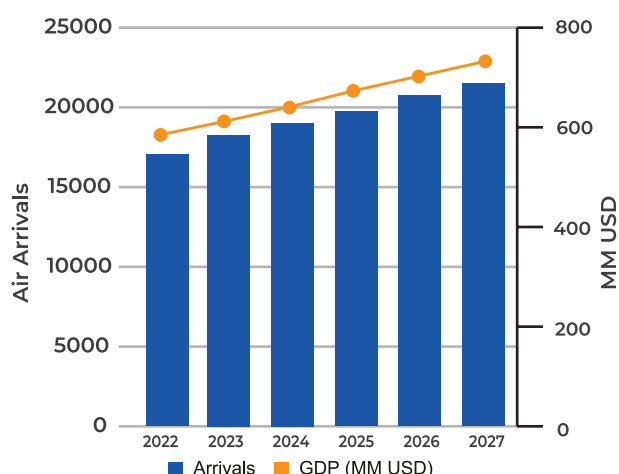


26. For example, the 2017 Tourism Strategic Plan calculated that for each additional four-star hotel room, four new jobs (one in the hotel, one in the tourist sector, and two in the private and public sectors) would be created.

The added tourism supply will drive a 27 percent increase in visitor arrivals, reaching 215,928 by 2027. This will stimulate additional investment in tourism-related goods and services (such as restaurants and car rentals), resulting in higher visitor exports.

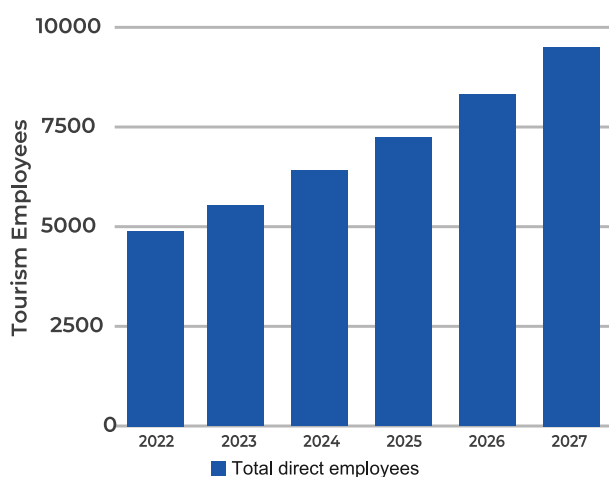
The augmented tourism dynamics will expand GDP by 22 percent, from US\$582 million in 2022 to US\$703 million by 2027.

**Figure 54: Status quo model: Visitor tourism arrivals vs. GDP growth, 2022–2027**



To service the new accommodation supply and provide additional tourism food services, the tourism job market will double from 4,925 employees in 2022 to 9,483 by 2027. The steep rise in new positions will put pressure on an already tight labor market.

**Figure 55: Status quo model: Direct tourism employees vs. labor productivity growth, 2022–2027**



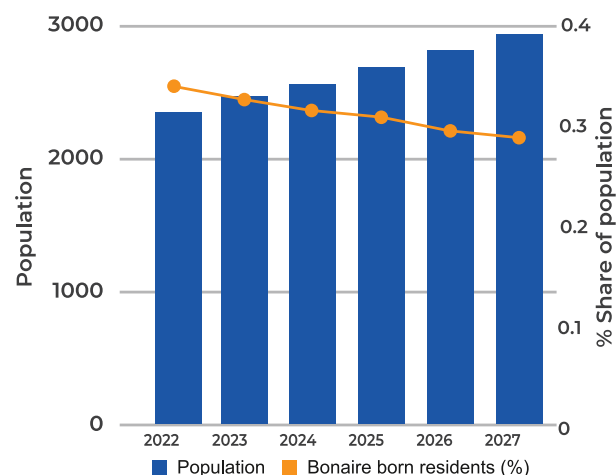
With the gain of foreign workers and their families, and the already ongoing, continuous, non-tourism-related net migration, the island's population will rise by 33 percent over five years, from 22,573 in 2022 to 31,880 by 2027.

The upsurge in population will augment the need for additional housing, schools, hospitals, and other social services and facilities, as well as add pressure on the public infrastructure (roads, imports, and food supply, among others) and on utilities (water, sewage, waste, and energy). Such a load will require additional measures to protect the environment from pollution and encroachment.

With the increase in foreign-born residents outpacing the organic growth of Bonaire-born residents, the share of the Bonaire-born population will fall. In 2022, Bonaire-born residents represented 34 percent of the population; by 2027, they will represent 27 percent.

This dynamic will have further implications of alienating the local community and threatening the preservation of Bonaire's culture and language.

**Figure 56: Status quo model: Total population vs. Bonaire-born population ratio, 2022–2027<sup>27</sup>**



The average price per dwelling will rise with the increased need for housing. This dynamic will increase the average price per dwelling by 46 percent, from US\$401,500 in 2022 to US\$587,600 by 2027. In turn, the housing price ratio (average price/GDP per capita) increases by 41 percent in the same period.

Price-to-income ratio is normally measured as the ratio between the price of a median home to that of the median annual household

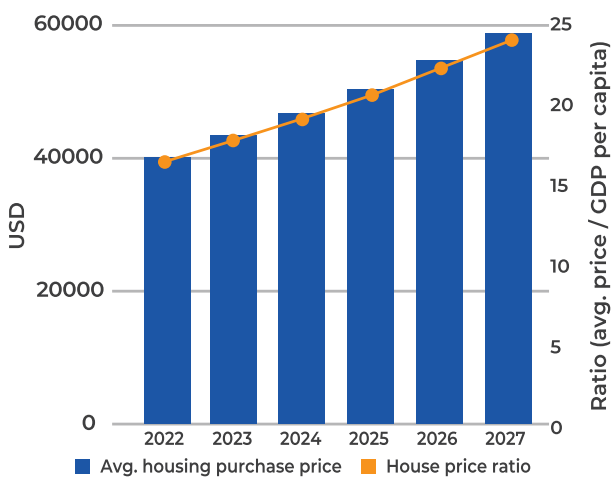
27. The available data does not distinguish between individuals born in Bonaire itself and those born in other Caribbean locations for medical reasons.



income. This indicator measures the long-term affordability of homes in a region and is used by banks and financial institutions to assess the attainability of the house by the loan seeker. When homes are becoming less affordable, the price-to-income ratio goes up.

The additional population will lead to a higher cost of living and limited access to affordable housing, directly impacting residents' quality of life.

**Figure 57: Status quo model: Average house purchase price vs. house price ratio, 2022–2027**



Licensed road vehicles will increase by 78 percent, from 19,993 in 2022 to 39,716 in 2027, worsening traffic congestion and air pollution, and affecting road maintenance and waste management (car oil, tires, parts).

The solid waste sent to landfills will surge by 25 percent from 28,000 tonnes to 35,000 tonnes annually. The current landfill in Lagun is close to capacity and at risk of impacting the health of residents and the environment; any additional load aggravates those risks.

Desalinated water consumption will increase by 26 percent from 2 million m<sup>3</sup> to 2.5 million m<sup>3</sup> yearly—almost the maximum capacity of the current desalinated water production facility, which is 2.6 million m<sup>3</sup> annually. There are additional energy consumption implications for the disposal of brine waste from the facility, as well as the sewage management associated with the increase of black and gray water.

Furthermore, estimated greenhouse gas emissions from vehicles and landfill gasses on Bonaire will increase by 46 percent in this five-year timeframe—from 142,000 to 207,000 metric tons of CO<sub>2</sub>e released into the air per year<sup>27</sup>. It takes one year for 100,000 hectares of conserved primary forest to absorb 207,000 MT CO<sub>2</sub>e.

**Table 9: Status quo model: Physical-environmental indicators (vehicles, waste, water, CO<sub>2</sub>e)**

Year	Vehicles license plates	Waste generated (tons/year)	Water consumption (m <sup>3</sup> /yr)	TOTAL CO <sub>2</sub> e MT
2022	22,341	28,565	2,040,938	142,218
2023	25,066	29,970	2,162,990	153,327
2024	28,122	31,317	2,256,917	165,101
2025	31,551	32,725	2,354,939	178,000
2026	35,399	34,196	2,457,234	192,147
2027	39,716	35,733	2,563,989	207,679

## Growth model scenario comparisons

All three growth model scenarios derived, as explained at the beginning of this section, expect the same growth between 2022-2024. By 2027, the differences between each approach will become more apparent. Therefore, for this study, the following tables compare the resulting values of the impact indicated on the final year of the 5-year growth projection model. The economic, socio-economic, and physical-environmental indicators are grouped, and the resulting differences' impact is compared below.

**Table 11: Socioeconomic indicators scenario analysis 2027**

	Air tourism arrivals 2027	CAGR (2022-2027)	GDP (mln USD) 2027	CAGR (2022-2027)	Tourism Rooms 2027	CAGR (2022-2027)	GDP per Room 2027	CAGR (2022-2027)	Tourism Employees 2027	CAGR (2022-2027)
Status Quo	215,928	5.38%	753	5.29%	3,124	5.30%	241	-0.00%	3,161	14.00%
Accelerated growth	252,535	8.20%	878	8.01%	3,653	8.60%	240	-0.58%	4,564	21.20%
Slow growth	190,000	3.20%	667	3.14%	2,748	2.60%	242	0.50%	2,327	8.33%

### Visitor arrivals

The target of 200,000 air tourism arrivals by 2027, set by the STMP, is surpassed in both the status quo and the accelerated growth scenario, while the slow growth scenario adheres to the nature-inclusive vision for Bonaire.

### GDP

Though the Accelerated growth model appears more favorable, growing the economy at a 6% rate year over year, can lead to reduced labour productivity and inflation rates. While the slow growth scenario supports a healthy 2.43 percent GDP growth per year.

### Tourism rooms

The accelerated growth model would double the tourism room inventory in 8 years. Given that occupancy rates are already lower than ideal, 68 percent vs 80 percent, the increase in room supply can lead to unhealthy price competitiveness, ultimately causing a decline in tourism quality and less income per tourist. Therefore, the GDP target could only be met by mass tourism.

In contrast, the slow-growth scenario would curb new developments to 30 rooms per year. These 30 rooms could represent the addition of small high-quality boutique hotels that attract higher-value tourism attracted to the pristine nature of Bonaire. During this time, a higher focus can be given to increasing the quality of the current outdated supply, and improving services and occupancy rates. Therefore, this route can lead to expanding the economic contribution of tourism and labour productivity.

### Tourism employees

The slow growth scenario leads to 887 new tourism jobs, while the accelerated growth model leads to more than 3,124 new jobs, compared to the number of tourism jobs in 2021. This difference is drastic, and in a tight labour market, it has direct implications for the local population, as workers need to be imported. Noting that in the slow-growth model, if a high-value or luxury market is sought after, additional jobs per room will be needed. Therefore, careful consideration should be given when defining a tourism market strategy.

**Table 11: Socio-economic indicators scenario analysis 2027**

	Resident population 2027	CAGR (2022-2027)	Resident population Born in Bonaire (%) 2027	CAGR (2022-2027)	Average price per dwelling sold (USD) 2027	CAGR (2022-2027)	House Price to income ratio	CAGR (2022-2027)
Status Quo	29,478	4.55%	29.57%	-4.46%	587,652	7.90%	23	7.20%
Accelerated growth	33,662	6.89%	25.89%	-7.39%	733,785	11.98%	28.1	10.82%
Slow growth	26,493	2.70%	32.90%	-1.74%	490,332	4.71%	19.5	4.26%



### Resident population

All three scenarios will exceed CBS's current population projection of 26,000 by 2030. Yet, the slow-growth model is more closely aligned with the CBS forecasts. Both the status quo and accelerated growth present high population growth scenarios adding additional pressure to the island infrastructure and society.

### Resident population born on Bonaire ratio

Unless the net migration is equal to the net birth/death rate ratio, the share of the population born in Bonaire will continue to decrease. The share of the Bonaire-born population will be the least affected in the slow-growth scenario. In this

scenario, the island can focus on integrating the already existing foreign-born population and implementing cultural conservation measures.

Average price per dwelling sold

All three scenarios predict an increased cost of living, indicated in the hike of the average price per dwelling sold. The average prices derived by all three models may not be realistic because, beyond a certain threshold, the cost will dissuade newcomers to the island from coming. The 4.7 percent increase in the slow-growth scenario is, of the three, the most favorable. The slow-growth scenario allows time to introduce housing regulations to favor local residents.

**Table 12: Physical-environmental indicators scenario analysis 2027**

	Vehicles circulating 2027	CAGR (2022-2027)	Desalinated Water consumption (m3) 2027	CAGR (2022-2027)	Solid Waste to landfill (MT) 2027	CAGR (2022-2027)	GreenHouse Gas emissions (MT Co2)	CAGR (2022-2027)
Status Quo	39,716	12.19%	2,563,989	4.67%	35,733	4.6%	207,679	7.9%
Accelerated growth	55,037	18.46%	2,954,142	7.37%	40,900	7.01%	261,945	12.2%
Slow growth	30,308	7.25%	2,286,508	2.53%	32,050	2.66%	172,831	4.5%

### Vehicle licenses

The current absence of a public transportation system on the island increases the need for private transportation, both for local residents as well as car rentals for visitors. All three scenarios can expect a high increase in road vehicles.

### Desalinated Water Usage

In the accelerated growth scenario, the island's water consumption will exceed the current desalinated water production capacity of 2.6 million m3. And it will come to near capacity in the status quo model. Since the sewage system is already suboptimal, any growth scenario poses a high risk to the ecosystem.

### Solid Waste to landfill

Given the landfill is already close to capacity and the health risks it already poses for residents all scenarios pose a solid waste management challenge.

### GreenHouse Gas emissions

The resulting greenhouse gas emissions from vehicles and landfill surpass the emissions of even other Caribbean islands with a higher population. For example, Dominica, with a population of 72,000, emits 185,000 MT of CO<sub>2</sub>e; Aruba emits 286,000 MT of CO<sub>2</sub>e with a population of 101,000; and St. Kitts and Nevis emits 203,000 MT of CO<sub>2</sub>e with a population of 52,000. (Worldometer 2023).

### Scenario analysis conclusions

The slow and controlled growth model is Bonaire's most sustainable growth option. This model prioritizes healthy economic growth while investing in public infrastructure to meet the needs of a growing population, mitigating environmental risks while promoting a stronger, more vibrant, and thriving society.

**Table 13: Slow-growth scenario targets**

	Growth rate (2023-2027)	Ideal Condition (2027)
GPD	3.14%	667
Population	2.70%	26,493
Air tourism arrivals	3.20%	190,000
Hotel rooms	2.63%	2,748
Tourism employees	8.33%	2,327

Under a coherent vision for growth, Bonaire can manage its current carrying-capacity constraints. The next section will present recommended interventions that will allow Bonaire to increase its carrying capacity potential and achieve sustainable growth.

# Urban Carrying Capacity Potential

PICTURE BY: Lorenzo Foto's  
Bonaire's Media Hub



The following recommendations would mitigate the urban carrying-capacity challenges and increase Bonaire's development potential, by reducing the pressures of population and visitors growth and increasing public infrastructure capacity. The section presents a mixture of both new and existing programs to be implemented, expanded, or enforced.

Appendix E presents a detailed summary table describing the recommended interventions, organized by identified carrying-capacity challenge theme and subtheme. The strategic implementation stakeholders are identified as the existing policies and programs, possible implementation risks, and additional considerations.

## 1. Cohesive development policy

### Rationale

Bonaire has different strategic plans (for example, tourism, nature, environment, and culture), but these are separate and not aligned under one strategic master plan for Bonaire. This has led to fragmented institutional visioning and a need for more specific and harmonized policies.

### Desired outcome

One vision and roadmap aligning all island stakeholders, plans, and projects on growth and development critical for the local community.

### Actions

To address this constraint, the following highest-priority strategic planning and policy tool, currently on hold, should be finalized:

#### 1.1 The Sustainable Development Master Plan

**(SDM):** Development of an overarching plan that sets forth island goals, objectives, policies, and investments needed for community growth and development over the next 10–20 years. It should provide a unified vision and roadmap aligning all island stakeholders, plans, and projects.

Once the master plan is validated, the following two planning tools currently under development should be revised to align with the set vision:

#### 1.2 The Spatial Development Plan Bonaire

**(ROB):** Development of an overarching spatial urban planning vision and strategy based on nature, growth, environment, and economics analysis. This tool provides guidance on a more rational territorial organization of land uses and the linkages between them to balance demands for development with the need to protect the environment and achieve social and economic objectives.

#### 1.3 The Strategic Tourism Master Plan (STMP):

Creation of a tourism development vision and roadmap to guide strategic decisions in product development and its investment needs in physical infrastructure, transportation, business development, and impact management.

To operationalize the master plan vision, the following governance programs should be implemented:

#### 1.4 A Sustainable Development Master Plan

**Office:** Expand the current Project Implementation Office (Het Project Uitvoeringsbureau; PUB) to become the Sustainable Development Master Plan office responsible for the planning and execution of various strategic and complex projects and programs.

### 1.5 (NEW) Neighborhood Council Associations:

Create a new, non-governmental body to promote citizen participation in local government decisions, directly involving communities in managing neighborhood projects and facilities.

## 2. Access to affordable housing

### Rationale

The expected population growth, partly driven by economic growth in the next decade, will increase the need for additional dwellings on the island even more. The burgeoning population will likely affect house prices if the supply is not increased, and the availability of homes will become a more significant issue. In addition, the growing number of tourist arrivals has made it lucrative for homeowners to rent out their property as a short-term rental, thereby reducing the inventory for long-term housing.

### Desired outcome

To increase access to affordable housing, improved equal opportunities, poverty alleviation, quality of life of residents, and guarantee sustainable growth.

### Actions

To better regulate the housing market, the following policy reforms and regulation tools should be implemented and enforced:

**2.1 Land-value and property tax reform:** Reform the current terms on second-home property tax and land value tax to limit demand, control housing prices, and disincentivize second-home ownership.

**2.2 Rental market regulation:** Revision of the rent regulation system of laws with an aim to ensure affordable housing and affordable tenancies on the rental market.

**2.3 (NEW) Housing permit policy:** Definition of housing purchasing and building permit requirements to favor residents.

**2.4 (NEW) Tourism rental licenses:** Increase housing availability for Bonaire residents by limiting the number of rental properties set aside for tourism-designed purposes by implementing and enforcing a licensing requirement when renting for short-term purposes, following the STMP and ROB guidelines.

To support residents' accessibility to housing and homeownership, significantly expand the following programs:

**2.5 Social housing projects:** Expansion of the socially affordable housing development to meet social housing needs.



**2.6 Bonaire Mortgage Guarantee (Hypotheek Garantie Bonaire, HGB):** Expansion of the national mortgage guarantee loans program to support Bonaire residents seeking to purchase a home.

### 3. Wide and fair benefit distribution

#### Rationale

Although Bonaire's economy has grown over the last few years, not everyone has benefited to the same degree. Inflation has been rising but wages have not kept up, and consumer purchasing power for some groups is nearly stagnant. Residents have captured only a small share of the economic opportunities, while newcomers with more skills, experience, and assets have been able to take advantage of the economic opportunities. The result of this uneven access to opportunities, and the lack of inclusive growth, is that economic growth is unevenly distributed, and this disparity has not changed significantly.

#### Desired outcome

To ensure equitable resource distribution, fair wages, access to jobs, quality education and services; allowing all citizens the opportunity to become economically successful and improve their quality of life.

#### Actions

The following policy reforms will help reduce and control the influx of new residents:

**3.1 Immigration law reform:** Review all exceptions to the immigration and entry requirements by nationality.

**3.2 Work visa:** Review the foreign employment act exemptions to favor residents' access to competitive job placements.

Decrease poverty levels and increase the well-being and self-support of the community by addressing wages.

**3.3 Minimum wages:** Raise the minimum wage to match the inflation rate.

Invest in education and skills development to help improve recruitment of qualified locals, increase the salary potential of resident youth, and stimulate job retention and professional growth in the tourism sector:

**3.4 Tourism scholarships:** Expand the Bonaire Tourism Scholarship program by funding individual professional development courses and full-time academic courses in all areas of hospitality, hotel, and tourism management.

**3.5 (NEW) Internship exchange program:** Create a formal exchange program that brings students from abroad and sends out Bonaire students to study and work overseas.

**3.6 Adult vocational training and job placement:** Expand vocational training and apprenticeship placements.

Stimulate new product development and improve the quality of tourism goods and services by supporting local entrepreneurship:

**3.7 Business incubator and innovation center:** Expand the resources and reach of the BusinessSpark Playa organization, which helps local entrepreneurs develop their businesses by providing a range of services, including management training, office space, and venture capital financing.

### 4. Social equity and cultural integration

#### Rationale

The growing population, driven mainly by immigration, is starting to impact the island's cultural identity. While there are ongoing initiatives to preserve traditions, cultural heritage, and the language, the fact that Bonaire-born residents now represent a minority is creating a resident backlash against further immigration.

#### Desired outcome

To strengthen social cohesion and foster a sense of community that celebrates diversity while revitalizing the uniquely Bonarian cultural heritage values and expressions.

#### Actions

To improve awareness of local heritage, art, and history and promote community cohesion and cultural pride, expand the cultural content and education programs such as these:

**4.1 National Culture Funds:** Use the national culture funds and cultural coaches to develop a robust cultural heritage and creative arts agenda for the local community.

**4.2 Bonaire cultural education:** Strengthen the cultural heritage school curriculum (elementary and secondary) and compulsory teacher training program.

**4.3 (NEW) Papiamentu classes:** Provide ongoing and widely available Papiamentu classes for all ages and levels.

Increase the quality of the tourism experience and raise awareness of local cultural heritage and cultural pride by developing rich cultural tourism offerings:



#### 4.4 Cultural tourism products and services:

Strengthen cultural, heritage, and community-based tourism products, itineraries, interpretations of tourism assets and sites, and associated goods and services.

#### 4.5 Tour guide cultural training:

Strengthen tour guiding cultural tourism training program.

Stimulate community cohesion through programs that connect people from different backgrounds and cultures through meaningful interactions, such as:

**4.5 (NEW) Kunuku gardens program:** Promote community gatherings and activities in traditional kunuku<sup>28</sup> recreational community gardening and gastronomic experiences, while encouraging local food production, healthy eating, and community cohesion.

## 5. Affective productive infrastructure

### Rationale

Bonaire's productive infrastructure is currently limited. There is no public transport system, and the airport and seaport have limited capacity, which poses a risk to food security because there is a heavy dependence on imported goods. The road network is in poor condition and lacks a proper drainage system, reducing the safety of the roads and posing a threat to the environment. The utilities are also under pressure due to the rapidly growing population and overnight visitors. Because of the lack of freshwater sources, the island completely depends on desalinated water production. There is limited recycling, and the landfill is close to capacity, posing a risk to people's health and the environment. Finally, wastewater treatment is practically non-existent, which poses a threat to community health and environmental risks.

### Desired outcome

To deliver sustainable infrastructure systems that improve productivity, and efficiency, increase consumer welfare, creates more business opportunities, and drives innovation.

### Actions

To improve road safety and residents' quality of life, the government should invest in the road and transportation system in the following ways:

**5.1 Multi-year road program – Meerjarenprogramma Wegen Bonaire (MJOP):** Implement a road renovation program.

**5.2 (NEW) Public transportation system:** To reduce the number of vehicles, residents' transportation costs, traffic congestion, carbon footprint, and solid waste (in the form of used tires, oil, old cars, and so on), invest in a public bus transportation system.

Effectively manage wastewater and solid waste to reduce the risk of contaminating the environment with harmful pathogens that affect human health and contribute to environmental degradation, by operationalizing and expanding the following programs:

**5.3 Wastewater vision and management:** To achieve decentralized wastewater treatment and operationalize the wastewater vision of the Nature and Environment Policy Plan (NMBP) as defined in the Water Circles program and its five pilots.

**5.4 Wastewater treatment plant expansion:** Operationalize the NMBP Sewage Expansion and Connections program by increasing the sewage treatment plant's capacity and expanding the household connections network.

**5.5 Sustainable waste management:** Expand the current waste management improvement program (Afvalbeheer op Maat – AoM) to improve waste processing, reduce waste generation at the source, and implement recycling programs. Prioritize enforcement of waste management regulations and illegal dumping of waste in *mundi*<sup>29</sup> and in mining quarries.

Engage the community in waste management and infrastructure development to encourage awareness and accountability:

**5.6 (NEW) Home sewage treatment:** For houses that cannot connect to the sewage plant, develop a program that systematically retrofits old cesspools with modern septic tanks. Project 17 within the NMBP program will result in research on this substitution project.

**5.7 (NEW) Neighborhood/community infrastructure funds:** Develop a grants mechanism for community-led projects for neighborhood-specific infrastructure development uses, such as regenerating community centers, roadwork, parks, SME grants, and charities, among others.

**5.8 (NEW) Sustainable private sector water management:** Subsidize audits of water-use efficiency of homes, businesses, and industrial plant subsidized programs. Include incentives to encourage the replacement of plumbing fixtures and appliances with water-efficient models.

28. Means plantation (field, farmland, or arable land) in Papiamentu.

29. Outback in papiamentu

**5.10 (NEW) Rainwater harvesting:** Introduce a rainwater harvesting system in the building codes for new construction to increase rainwater storage at home for non-drinking purposes (cleaning, gardening, and so on).

**5.11 Safe disposal of marine vessel wastewater:** Enforce the disposal of yacht wastewater outside the marine park or via a collection system.

**5.12 Single-use plastic ban:** Enforce a ban on single-use plastic and expand the list of banned plastic products.

## 6. Protection and Conservation of natural resources

### Rationale

Bonaire has a unique and fragile environment. The entire coastline of the island is a designated marine sanctuary. Bonaire is home to one of only four nesting grounds for the Caribbean flamingo. The island harbors ten critically endangered marine species and one terrestrial species, the native Bonaire Palm or Bonairean Sabal. Exact figures about the current boundaries and quality of natural habitats are scarce; most of the available data are outdated. However, there are enough data to attribute the degradation of the various fragile ecosystems (dry tropical forest, dry and wet caves, salinías, mangroves, seagrass beds, and the coral reef) to urban sprawl, pollution, and human interaction. In the event of a further deterioration of the coral reef, essential ecosystem services such as tourism, fisheries, and coastal protection are in danger of declining sharply in the coming years.

### Desired outcome

To protect and conserve Bonaire's high-value ecosystems from overconsumption and pollution and guarantee the longevity of a healthy community and thriving economy.

### Actions

To build a resilient ecosystem that allows the sustainable use of resources, the following nature plans and programs should be fully executed:

**6.1 Nature and Environmental Policy Plan:** Implement the Nature and Environmental Policy Plan for the Caribbean Netherlands (NMBP-CN), establishing an integrated framework that assigns clear responsibilities, defines policy targets, and spells out legal obligations related to the management of the natural environment.

**6.2 Washington Slagbaai National Park Management Plan:** Implement the National Park management plan, including available scientific knowledge on the area's geology, ecology, and history, identification of the main threats, incorporating advice from stakeholders, and proposing actions to safeguard the natural and cultural heritage of the national park.

**6.3 Bonaire Marine Park Management Plan and Bonaire's Southern Wetlands Management Plan:** Implement the Marine Park management plan and Bonaire's Southern Wetlands Management Plan, setting out a roadmap that balances fishing, marine conservation and restoration, and sustainable recreational use while mitigating and preventing

the negative impacts of urban development and population growth.

**6.4 (NEW) Water quality research program:** Create a permanent monitoring and reporting program for water quality and sedimentation in coastal waters to determine the impact of urban development on coastal water quality for human bathing and for the health of marine species.

Create environmental awareness and generate commitment from a range of different stakeholders to implementing and expanding the following programs:

**6.5 The Bonaire bond passport pledge:** Expand the visibility of, and strengthen the commitment to, the Bonaire bond pledge by integrating it with passport control and immigration, and by monitoring the impact of the program.

### 6.6 (NEW) Marine Park permits:

Adjust the volume and boundaries of marine park permits for activities in vulnerable areas based on a carrying-capacity study of the park.

**6.7 Ban on coral unfriendly sunscreen:** Implement and enforce a ban on sunscreens that contain chemicals harmful to coral reefs in combination with an awareness and communication plan.

**6.8 (NEW) Regulating fish quotas:** Introduce a fish quota system for local anglers and charter ships for tourists.

### 6.9 (NEW) Building codes update and enforcement:

Prevent illegal construction that could harm the coastal ecosystem by updating building code ordinances for coastal areas and strengthening enforcement mechanisms.

**6.10 Junior Rangers Program:** Expand the STINAPA Junior Rangers educational program on nature conservation for young Bonaireans. Impart knowledge and develop attitudes, skills, and a sense of responsibility that empower and enable Bonairean youth to take proactive steps toward preserving nature and its components.

### 6.11 Nature conservation awareness campaigns:

Expand the reach of the Boneiru Duradero (WWF-NL Dutch Caribbean marine program), creating awareness campaigns and free online training programs for the public to learn about nature protection and conservation initiatives and projects.

**6.12 Tour guide's environmental training:** Strengthen the environmental awareness content of the tour guide training program.

**6.13 Reforestation Program:** Expand programs that involve the local community in managing and restoring the dry forest. Raise awareness about the dry forest's importance, its vulnerability, and the implications of its degradation; restore the natural habitat of endangered species that are losing space to urban development.

# Concluding Remarks

The main objective of this study was to provide the information and tools necessary to inform Bonaire's growth strategy. The findings of the resident survey showed that people living on Bonaire recognize the tourism sector as an important driver of economic growth but also expressed their concern about the lack of inclusiveness of economic development on the island. There are also worries about the recent growth in population and the associated risk of loss of culture and the impact of development on the natural environment. Desk research, interviews, and focus groups indicated that there had been multiple studies and reports over the years. However, a cohesive road map for development that aligns all the Island stakeholders, plans, and projects is lacking. While there has been no shortage of studies, the lack of human and financial resources is partly the problem causing implementation issues of these plans. The same lack of resources also contributes to the lack of reinforcement of policies and regulations. Ensuring that Bonaire has access to the required resources will then also be key to the future of the island. Another issue is the lack of timely and detailed information needed for evidence-based decision-making. There is a need to collect data on indicators that measure the broad economic, social, and environmental aspects of the island on a regular basis. This study lays out three different growth scenarios for the next five years. Which scenario will be Bonaire's future can be controlled by making a clear decision that is followed through by implementation and reinforcement of the policies and regulations that are guided by the chosen development path.

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# APPENDICES

## APPENDIX A

### BONAIRE CARRYING CAPACITY FRAMEWORK - ECONOMIC INDICATORS

INDICATORS	BASELINE	SOURCE
<b>Macro</b>		
Real GDP per capita (\$)	27,000 US dollars	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/85251ENG/table?ts=1658408261487">https://opendata.cbs.nl/statline/#/CBS/en/dataset/85251ENG/table?ts=1658408261487</a>
Real GDP per room (\$)		
Real GDP growth last 5 years (%)	18.7% (2015-2019)	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/84789ENG/table?ts=1658408412933">https://opendata.cbs.nl/statline/#/CBS/en/dataset/84789ENG/table?ts=1658408412933</a>
Real GDP growth last 10 years (%)	9.8% (2012-2019)	
Poverty rate (% of households/pop living below national poverty line) (Poverty line of SCR 4,673 per adult)	Not available	
Gini Coefficient (%)	39	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83552ENG/table?ts=1658409754607">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83552ENG/table?ts=1658409754607</a>
Tourism direct contribution to GDP in 2019 (\$)	\$56 million (Accommodation and food serving)	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>
Tourism direct contribution to GDP in 2019 (%)	10.9% (56/516)	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>
Tourism total contribution to GDP in 2019 (\$)		
Tourism total contribution to GDP in 2019 (%)		
Travel & Tourism investment (\$)		
Construction industry direct contribution to GDP 2019 (\$)	\$37 million	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>
Construction industry direct contribution to GDP 2019 (%)	7.2%	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>



INDICATORS	BASELINE	SOURCE
Financial services direct contribution to GDP 2019 (\$)	\$28 million	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>
Financial services direct contribution to GDP 2019 (%)	5.4%	<a href="https://www.cbs.nl/en-gb/figures/detail/84769ENG">https://www.cbs.nl/en-gb/figures/detail/84769ENG</a>
Travel & Tourism investment in % in 2019		
T&T Government Expenditure (% of govt. budget)		
Public investment in productive infrastructure		
Foreign direct investment (FDI)		
<b>Employment</b>		
Direct employment in travel & tourism (#) in 2019		
Direct employment in travel & tourism (%) in 2019		
Total employment in travel & tourism (#) in 2019		
Total employment in travel & tourism (%) in 2019		
Employees hotels and restaurants (#)	1480 (2020); 1600 (2019)	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/82519ENG/table?ts=1658410409473">https://opendata.cbs.nl/statline/#/CBS/en/dataset/82519ENG/table?ts=1658410409473</a> Bonairean employees in T&T (#)
Expatriate employees in T&T (#) in 2019		
Female participation in the workforce (ratio to men)	0.91	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658411411897">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658411411897</a>
Unemployment rate (%) in 2019	3.2	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658420304935">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658420304935</a>
Rate of youth unemployment (20-29 years old) 2019 (%)	7.5	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658420304935">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83165ENG/table?ts=1658420304935</a>
Average wage (\$) Includes average of all 3 main sectors (Government, private & parastatal)	\$25,520 average; \$17,070 HORECA	<a href="https://www.cbs.nl/nl-nl/cijfers/detail/82519NED">https://www.cbs.nl/nl-nl/cijfers/detail/82519NED</a>
Average wage growth (%) between 2015 and 2019	1.15%	<a href="https://opendata.cbs.nl/#/CBS/nl/dataset/82519NED/table">https://opendata.cbs.nl/#/CBS/nl/dataset/82519NED/table</a>

INDICATORS	BASLINE	SOURCE
Tourism labor productivity (tourism real GDP / aggregated hours in T&T labor)		
Tourism labor productivity growth YOY 2019-2019		
<b>Visitors</b>		
Total international arrivals (#) in 2019	157,800	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83104ENG/table?ts=1658425192757">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83104ENG/table?ts=1658425192757</a>
Total arrivals Dutch (Europe) non-residents (#) in 2019	55,230	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/83191ENG/table?ts=1658425343239">https://opendata.cbs.nl/statline/#/CBS/en/dataset/83191ENG/table?ts=1658425343239</a>
20 year CAGR in international arrivals (%) 2000 - 2020	2000-2020 is 1.2%; 2000-2019 is 5.8%	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>
20 year CAGR in Dutch non-residents arrivals (%) 2000 - 2020		
Visitor exports (\$) in 2019	\$229 million (2016)	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>
Stayover visitors in 2019	157,800	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>
Average stayover visitor spend in 2019	\$220 per day for people staying in hotels; \$191 per day for people staying in apartments; \$98 per day for overnight visitors staying with friends or family. On average people from the Netherlands spend \$192 per day and \$1,918 per trip. From North America \$285 per day and \$2,424 per trip (2017 data)	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>
Average length of stay International arrival (# of days) in 2020	8.8 days (2017)	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>
Average length of stay Dutch non-residents (# of days) in 2019	Netherlands 10 days; North America 8. days; Others 11.4 days (2017)	<a href="https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf">https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf</a>

INDICATORS	BASELINE	SOURCE
Cruise passengers (#) in 2019	457,700	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/85007ENG/table?ts=1658424972880">https://opendata.cbs.nl/statline/#/CBS/en/dataset/85007ENG/table?ts=1658424972880</a>
Yacht arrivals in 2019	3,000	<a href="https://opendata.cbs.nl/statline/#/CBS/en/dataset/85015ENG/table?ts=1658425522606">https://opendata.cbs.nl/statline/#/CBS/en/dataset/85015ENG/table?ts=1658425522606</a>
Other day visitors in 2019	None	

### Hotel Performance

Average hotel occupancy rate in 2019 68% (2017) <https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf>

Distribution of bed occupancy by accommodation type

Average daily rate

Revenue per Available room (RevPar)

### Visitor satisfaction

Visitor satisfaction (survey data) % by visitor groups / by sites or motivations See latest exit survey in drive TCB

Likelihood to return to Bonaire (%) 69 (2017 data) <https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf>

Visitor sentiment of natural sites %

Visitor main motivation to visit Sun and ecotourism 34.5%; diving 50.9%; windsurfing 7.4%; VFR 13%; business 10.2%; culture 9% (2017 survey) <https://www.tourismbonaire.com/includes/strategic-tourism-plan.pdf>

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Consumer Price Index for housing, water and energy 96.9 (Q4, 2020) <https://longreads.cbs.nl/ticn2021/bonaire/>

**APPENDIX A****BONAIRE CARRYING CAPACITY FRAMEWORK - SOCIO CULTURAL INDICATORS**

<b>INDICATORS</b>	<b>BASELINE</b>	<b>SOURCE</b>
<b>Population</b>		
Total population (#)	22573	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15">https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15</a>
Total population in 2025 (projection) (#)	23,900	<a href="https://www.cbs.nl/en-gb/custom/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/custom/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Total population in 2030 (projection) (#)	25,900	<a href="https://www.cbs.nl/en-gb/custom/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/custom/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Bonaire-born population (#)	7866	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84712NED/table?dl=6BB17">https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84712NED/table?dl=6BB17</a>
Bonaire-born population in 2025 (projection) (#)	x	<a href="https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Bonaire-born population in 2030 (projection) (#)	x	<a href="https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Foreign-born population (#) - including dutch born	14707	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15">https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15</a>
Foreign-born population in 2025 (projection) (#)	x	<a href="https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Foreign-born population in 2030 (projection) (#)	x	<a href="https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050">https://www.cbs.nl/en-gb/background/2020/41/population-forecast-caribbean-netherlands-2020-2050</a>
Bonaire-born / Foreign-born population ratio	53%	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15">https://opendata.cbs.nl/statline/#/CBS/nl/data-set/84757NED/table?dl=6BB15</a>
Bonaire-born / Foreign-born population ratio in 2025	x	
Bonaire-born / Foreign-born population ratio in 2030	x	



INDICATORS	BASELINE	SOURCE
Population density (people/km <sup>2</sup> )	60	<a href="https://www.rijksoverheid.nl/onderwerpen/carib-ische-deel-van-het-koninkrijk/vraag-en-antwoord/waaruit-bestaat-het-koninkrijk-der-nederlanden">https://www.rijksoverheid.nl/onderwerpen/carib-ische-deel-van-het-koninkrijk/vraag-en-antwoord/waaruit-bestaat-het-koninkrijk-der-nederlanden</a> ; <a href="https://data.humdata.org/dataset/worldpop-population-density-for-bonaire-sint-eustatius-and-saba">https://data.humdata.org/dataset/worldpop-population-density-for-bonaire-sint-eustatius-and-saba</a>
Beach density (m/person)	x	
Visitor per resident ratio	7.85	<a href="https://www.cbs.nl/en-gb/news/2021/49/more-visitors-to-bonaire-in-third-quarter">https://www.cbs.nl/en-gb/news/2021/49/more-visitors-to-bonaire-in-third-quarter</a>
<b>Housing</b>	Not really sure where to find this or who to ask this	
Population aged 25 and over (#)	16669	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83698NED/table?dl=6BB16">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83698NED/table?dl=6BB16</a>
Households (#) - per district and by bonaire / foreign born	20,915	<a href="https://worldbankgroup-my.sharepoint.com/mcas.ms/:x:/r/personal/sleeffers_worldbank_org/_layouts/15/Doc.aspx?sourcedoc=%7B0CEB5552-887E-4900-B3DC-20B650443CE4%7D&amp;file=Buurtcijfers_bonaire_2018_2019_2020.xlsx&amp;action=default&amp;mobiledirect=true">https://worldbankgroup-my.sharepoint.com/mcas.ms/:x:/r/personal/sleeffers_worldbank_org/_layouts/15/Doc.aspx?sourcedoc=%7B0CEB5552-887E-4900-B3DC-20B650443CE4%7D&amp;file=Buurtcijfers_bonaire_2018_2019_2020.xlsx&amp;action=default&amp;mobiledirect=true</a>
Households in social homes (%)	544 houses	2.60%
Average home price/rental	price per m <sup>2</sup> (\$) - per district	x
House prices/Gross Household Income	x	
Average home price/rental price growth (%), last 5 years	56%	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D</a>
House price index	148.1	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D</a>
Interest rate for new unsubsidised loans (%)	x	
Loan/value ratio (LTV) (%)	x	
New loans (LTV) > 80% (%)	x	

<i><b>INDICATORS</b></i>		<i><b>BASELINE</b></i>	<i><b>SOURCE</b></i>
Houses purchased transactions (notarized, registered)	182		<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/83396NED/table?dl=2997D</a>
Residential investment (\$)	x		
Number of dwellings	x		
Number of dwellings per households	x		
Percentage of dwellings that are primary/secondary/unoccupied and other	x		
Percentage of main dwellings that are owner-occupied/rented/free let and other	x		
<b>Health</b>		Received from Dr. Daniel van leerdam (OLB)	
Life expectancy at birth (years)	80.2		<a href="https://www.cbs.nl/en-gb/news/2015/04/life-expectancy-in-the-caribbean-netherlands-approximately-the-same-as-in-the-netherlands">https://www.cbs.nl/en-gb/news/2015/04/life-expectancy-in-the-caribbean-netherlands-approximately-the-same-as-in-the-netherlands</a>
Maternal mortality ration (per 100,000 live births)			
Infant Mortality Rate (per 1000 live births)	N/A		
Under-five mortality (per 1000 live births)	N/A		
Mortality from non-communicable diseases (% of all deaths)	N/A		
Hospital beds/1,000 residents	x		<a href="https://www3.paho.org/salud-en-las-americanas-2012/index.php?option=com_docman&amp;view=download&amp;alias=139-netherlands-antilles-139&amp;category_slug=hia-2012-country-chapters-22&amp;Itemid=231&amp;lang=en">https://www3.paho.org/salud-en-las-americanas-2012/index.php?option=com_docman&amp;view=download&amp;alias=139-netherlands-antilles-139&amp;category_slug=hia-2012-country-chapters-22&amp;Itemid=231&amp;lang=en</a>
Physicians/1,000 pop	x		
TB incidence (per 1000 population)	N/A		
Consult with dentist during last 12 months (% of population)	46.4% (2017)		<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82293NED/table?ts=1658742072953">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82293NED/table?ts=1658742072953;</a>

INDICATORS	BASELINE	SOURCE
Consult with primary care physician during last 12 months (% of population)	74.2% (2017)	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82293NED/table?ts=1658742072953;">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82293NED/table?ts=1658742072953;</a>
Other Self-reported health indicators	x	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82291NED/table?ts=1658742006878">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82291NED/table?ts=1658742006878</a>
Covid-19 deaths per capita	12	<a href="https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Bonaire">https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Bonaire</a>
Population vaccinated for covid (%)	64.4% for BES	<a href="https://news.google.com/covid19/map?hl=en-US&amp;state=7&amp;mid=%2Fm%-2F0rdr4&amp;gl=US&amp;ceid=US%3Aenap?hl=en-US&amp;state=7&amp;mid=%2Fm%-2F0rdr4&amp;gl=US&amp;ceid=US%3Aen">https://news.google.com/covid19/map?hl=en-US&amp;state=7&amp;mid=%2Fm%-2F0rdr4&amp;gl=US&amp;ceid=US%3Aenap?hl=en-US&amp;state=7&amp;mid=%2Fm%-2F0rdr4&amp;gl=US&amp;ceid=US%3Aen</a>
% of population with hypertension	47.10%	Nota Volksgezondheid Bonaire (Health Study 2017)
% of population with overweight / obesitas	31% / 30,4%	Nota Volksgezondheid Bonaire (Health Study 2017)
% of population with daily consumption fruit / vegetables	33%	Nota Volksgezondheid Bonaire (Health Study 2017)
% of population with diabetes	8.10%	Nota Volksgezondheid Bonaire (Health Study 2017)
Incidence STI's	N/A	Department of public health is currently gathering data
HIV incidence	0,5% (of population)	Nota Volksgezondheid Bonaire (Health Study 2017)
Number of SDG indicators available		
<b>Education</b>		
Literacy rate by population - age group - gender (%)	x	
School enrollment (primary, secondary) (#)	prim: 1953, sec: 1284	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84732NED/table?dl=6BB18">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84732NED/table?dl=6BB18</a>
Average years of schooling	x	
Graduates from higher education (vocational training, university)	voc: 725	<a href="https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84732NED/table?dl=6BB18">https://opendata.cbs.nl/statline/#/CBS/nl/dataset/84732NED/table?dl=6BB18</a>

INDICATORS	BASELINE	SOURCE
<b>Safety &amp; Security</b>		
Reported police crimes per 100,000 people by type	violence (1%), vandalism (1.5%), theft (8.4%), other (3.2)	<a href="https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82559NED/table?dl=6A398">https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82559NED/table?dl=6A398</a>
Reported nuisance in neighborhood (% says it happens)	Physical degradation (38.5%), Social nuisance (28%), Traffic nuisance (53.5), Nuisance from catering establishments (6%), Nuisance from neighbors (6.3%)	<a href="https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82557NED/table?dl=6BB19">https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82557NED/table?dl=6BB19</a>
Reported car accidents per capita	673 collisions (154 with injury, 2 dead)) in 2021.	<a href="https://bonaire.nu/2022/03/16/forse-daling-verkeersongelukken-op-bonaire/#:~:text=In%202021%20zijn%20er%20op,in%20totaal%2C%20vielen%20er%20gewonden.">https://bonaire.nu/2022/03/16/forse-daling-verkeersongelukken-op-bonaire/#:~:text=In%202021%20zijn%20er%20op,in%20totaal%2C%20vielen%20er%20gewonden.</a>
Corruption Perceptions Index	x	
<b>Quality of life of residents</b>		
Happiness Index	7.7/10 for age 11-18, 8.1/10 in general	<a href="https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82866NED/table?ts=1658741822872">https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82866NED/table?ts=1658741822872</a>
Satisfaction Index	8.0/10 in general	<a href="https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82866NED/table?ts=1658741822872">https://opendata.cbs.nl/stat-line/#/CBS/nl/dataset/82866NED/table?ts=1658741822872</a>
Any resident survey data	Our own survey ;) as well 2017 survey that was part of tourism strategy	
Noise pollution	x	
<b>Cultural Heritage</b>		
UNESCO World Heritage Sites - Cultural (#)	0	
Designated Historic or Cultural Sites (#)	11	<a href="https://infobonaire.com/about-bonaire/history/bonaire-historic-monuments/">https://infobonaire.com/about-bonaire/history/bonaire-historic-monuments/</a> ; <a href="https://www.bonairepros.com/blog/dive-into-bonaire-culture-and-history-museums/">https://www.bonairepros.com/blog/dive-into-bonaire-culture-and-history-museums/</a>
Designated Historic or Cultural Sites - degraded	x	
Oral & Intangible Heritage Expressions	x	
Share of residents speaking Papiamentu (%)	87.10%	
Tourism businesses/accommodations utilizing traditional architecture (%)	3 (#)	



## APPENDIX A

### BONAIRE CARRYING CAPACITY FRAMEWORK - PHYSICAL INFRASTRUCTURE INDICATORS

INDICATORS <small>(unit), year</small>		BASELINE	SOURCE
<b>Tourism Businesses</b>			<a href="https://www.tourismbonaire.com/">https://www.tourismbonaire.com/</a>
Tour operators (# of licenses)			
Restaurants (# of licensed establishments)			
Accommodations (# of establishments)	125		TCB
Hotels (# per 100 people)			
Hotel rooms or beds (#)	7186		TCB
Breakdown of different accommodation types	See Excel file in drive		TCB
20-year Hotel rooms/beds growth YOY 2000-2019	we have a few years but not for all years		
Rooms in the pipeline (#)	715 (as per 2021)		TCB
Hotels certified sustainable (#)			
<b>Land Use</b>			Received from Roland Bruijnesteijn (OLB)
Beach zoning - depth from the coastline in meters			
Urban/built area (km2 & % of total)	35 km2 12%		educated guess, based on ROB map
Rural area (km2 & % of total)	70%		rest. Includes Salt pans
Terrestrial area protected (%), 2020	17%		Washington Slagbaai? What about Salt pans?
Natural/undeveloped area (km2 & % of total)	30km2 10%		Bolivia
<b>Real Estate</b>			Sunbelt/ Harbourtown
Number of commercial properties			
20-year properties growth YOY (2000-2020)			
Number of permits/ properties in the pipeline (#)/value			
<b>Transportation</b>			
Private cars (#)			OLB

INDICATORS		BASELINE	SOURCE
Taxis (#)			OLB
Rental cars (#)			
Buses (#) / charter companies			
Vehicle density per km <sup>2</sup>			
Road density (km of road/100 km <sup>2</sup> )			OLB - verhard en onverhard
Ground transport efficiency (score 0-7)			
Congestion - average time needed to get from point X to point Y			
Number of boats or boat seats			gunther.flanegin@bonairegov.com
Cruise dockings (#)			gunther.flanegin@bonairegov.com
Cruise ship density (ships/passengers) 2019	# cruise dockings/457,700 =		gunther.flanegin@bonairegov.com / TCB
Yachts (#)	400 (2021)		gunther.flanegin@bonairegov.com
# of ports/jetties/docks			gunther.flanegin@bonairegov.com
Capacity of ports/ jetties/docks			gunther.flanegin@bonairegov.com
Quality of port infrastructure (score 0 of 7)			gunther.flanegin@bonairegov.com
Available seat km international (millions)			
Aircraft departures/100 people	129,680		<a href="https://opendata.cbs.nl/statline/#/CBS/nl/data-set/82332NED/table?dl=6BB1A">https://opendata.cbs.nl/statline/#/CBS/nl/data-set/82332NED/table?dl=6BB1A</a>
Airport density (#/million pop)	1 airport		
Operating airlines (#)	7		

## APPENDIX A

### BONAIRE CARRYING CAPACITY FRAMEWORK - ECOLOGICAL ENVIRONMENTAL INDICATORS

INDICATORS	BASELINE	SOURCE
<b>Terrestrial ecosystems</b>		
Terrestrial area protected (%), 2020	17%	STINAPA and OLB STINAPA website
Total known species	130 endemische soorten	Staat van de natuur van Caribisch Nederland 2017 (Bijlage 1. Soorten met specifieke beleidsrelevantie in Caribisch Nederland)
Endangered or threatened species (% of total)	134 internationaal bedreigde soorten	Staat van de natuur van Caribisch Nederland 2017 (Bijlage 1. Soorten met specifieke beleidsrelevantie in Caribisch Nederland)
Tree coverage (% total terrestrial area)		
Forest cover (% change)	19.262 ha (in reality strongly degraded so total average around 16.108 ha)	Staat van de natuur van Caribisch Nederland 2017
Flora species (#)	387 vascular species	Landscape ecological vegetation map of the island of Bonaire (Southern Caribbean)
Ramsar sites (#)	4	<a href="https://rsis.ramsar.org/ris-search/bonaire?pagetab=1">https://rsis.ramsar.org/ris-search/bonaire?pagetab=1</a>
UNESCO World Heritage Sites - Natural (#)	1	<a href="https://whc.unesco.org/en/tentativelists/5627/#:~:text=The%20Bonaire%20Marine%20Park%20consists,in%20the%20entire%20Caribbean%20Sea.">https://whc.unesco.org/en/tentativelists/5627/#:~:text=The%20Bonaire%20Marine%20Park%20consists,in%20the%20entire%20Caribbean%20Sea.</a>
Environmental Performance Index	Not available for Bonaire	
Number of flamingos	2855	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
<b>Marine ecosystems</b>		
Ocean Health Index (ranking out of 220 countries)	12	<a href="https://oceanhealthindex.org/regions/bonaire/">https://oceanhealthindex.org/regions/bonaire/</a>
Ocean acidification	No baseline	
Sewage (N15 ratio)	N/A	N/A
Marine protected area (% of marine territory)	2700 hectares	<a href="https://stinapabonaire.org/wp-content/uploads/2018/10/BNMP-management-plan-part2.pdf">https://stinapabonaire.org/wp-content/uploads/2018/10/BNMP-management-plan-part2.pdf</a>
Average benthic cover (hard coral in %)	Around 20% (used to be around 60% in 1970s)	Staat van de natuur van Caribisch Nederland (figure 2.9.3)
Coral bleaching or % dead coral		

INDICATORS	BASELINE	SOURCE
Mangrove coverage?		
Total fish biomass (grams/m <sup>2</sup> )	2760 (grams/100m <sup>2</sup> )	Staat van de natuur van Caribisch Nederland (table 2.9.1 & figure 2.9.2)
Fish stock status (% of catch)		
Sea turtle nests	110	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
Marine litter items (plastics)	15,650	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
Number of species of fish	470	<a href="https://stinapabonaire.org/wp-content/uploads/2018/10/BNMP-management-plan-part2.pdf">https://stinapabonaire.org/wp-content/uploads/2018/10/BNMP-management-plan-part2.pdf</a>
Green turtle population (west coast)	550 (in 2018)	Sea Turtle Conservation Bonaire
Green turtle population (Lac Bay)	350 (in 2018)	Sea Turtle Conservation Bonaire
Hawksbill turtle population (west coast)	70 (in 2018)	Sea Turtle Conservation Bonaire
<b>Air pollution</b>		
CO2 emission (metric tons/capita)	Not available for Bonaire	
CO2 emission (metric tons/occupied room)	Not available for Bonaire	
Particulate matter concentration (micrograms/m <sup>3</sup> )	Not available for Bonaire	
<b>Solid waste disposal</b>		Selibon Shanelca Martha/Rudsel Leito
Landfill capacity (m <sup>3</sup> ) & approx % reached	75 - 80% (This is just an average. The exact percentage or m <sup>3</sup> is not available yet. We are working on it.)	Selibon NV
Annual waste produced (tons)	27885 ton (in 2021)	Selibon NV
Waste generated per capita per day (kg)	Figure not available yet	
Daily visitor waste (weight or volume per visitor or % of total daily waste weight or volume)	Figure not available yet	Selibon NV
Waste recycled (%)	5% (in 2021)	Selibon NV
Organic waste composted (%)	0% (in 2021)	
<b>Sewage treatment</b>		Received from WEB
Wastewater treatment plant capacity (m <sup>3</sup> ) & approx % reached	1400 M <sup>3</sup> /day	WEB Information
Untreated wastewater discharged (%)	85% [2021]	WEB Information
Households connected to sewage systems (%)	8.2% [2021]	WEB Information



INDICATORS	BASELINE	SOURCE
Number of Hotels & Self-Catering Connected to Sewage Treatment	102 hotels & apartments 62 restaurants [2021]	WEB Information
Bacteriological level of surface water (total or fecal coliforms/100ml) at critical locations (run offs, outlets, villages)	not available	
Bacteriological level of sewage system effluent (hotels, resorts, villages)	not available	
<b>Water</b>	Received from WEB	
Water Stress	This is not relevant. The water source is the ocean	
Water installed capacity (PRODUCED) million m <sup>3</sup>	7200 m <sup>3</sup> /day	
Water production (m <sup>3</sup> ) million	1.95 (2020), 2.12 (2021)	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
Annual water use intensity per capita (m <sup>3</sup> )	150 liter per capita per day (=0.15 m <sup>3</sup> per capita per day)	Estimation WEB 2021
Water consumption per guest night (liters)	500 liter per guest night	Estimation WEB 2021
Water Value (\$/l)	4.90 \$/m <sup>3</sup> average in 2022	<a href="https://www.webbonaire.com/wp-content/uploads/2021/12/WEB-NL-Drinkwater-tarieven-per-1-januari-2022.pdf">https://www.webbonaire.com/wp-content/uploads/2021/12/WEB-NL-Drinkwater-tarieven-per-1-januari-2022.pdf</a>
Water connected premises or pop w/ potable water access (%)	100%	
<b>Energy</b>	Received from WEB	
Energy installed capacity (MW) 37.56 MW	(Firm & Renewable capacity)	26.25 MW diesel + 11.31 MW renewable
Electricity production (x 1,000 KWH)	121.2 million in 2020 (130.6 million in 2021)	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
Annual energy consumption per capita (kWh)	avg 2940 kWh per connection	WEB Information
Energy consumption per guest night (kWh)	Not available	
Energy value (\$/?)	0.50 \$/kWh average (as of aug 1st 2022)	<a href="https://www.webbonaire.com/wp-content/uploads/2022/06/WEB-NL-Elektriciteit-starieven-per-1-juli-2022.pdf">https://www.webbonaire.com/wp-content/uploads/2022/06/WEB-NL-Elektriciteit-starieven-per-1-juli-2022.pdf</a>
Electricity connections (#) (household/other)	9483(households) 2170 (other) [2020] - 10470 (households) 1716 (other) [2022]	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>
Renewable electricity share (%)	21% (2020) - 22% (2021)	<a href="https://longreads.cbs.nl/ticn2021/bonaire/">https://longreads.cbs.nl/ticn2021/bonaire/</a>

## APPENDIX B

### Resident sentiment survey methodological approach

Since the focus of the Resident Sentiment Survey was specifically to capture the dynamics of the resident population on Bonaire, the population attributes that were monitored as strata included gender, country of birth, and region of domicile. Throughout the collection period, the proportion of each stratum was compared to the population registered by Statistics Netherlands, and the sample quota of surveyors was adjusted to stimulate a response in lagging groups.

Six surveyors undertook the face-to-face collection with proficiency in all four languages in which the survey was available and administered it at various geographically strategic and diverse locations on Bonaire. Before this, all surveyors received a briefing and a training manual covering sampling techniques, IT support, and familiarity with the survey questions and best practices.

During the survey deployment period, minor adjustments were made to the questionnaire that was deemed inconsequential to the quality of the response. Translation errors were corrected in the Dutch version of the survey, and some statements that had been formulated in an overly complex way were simplified.

The survey took approximately 12 minutes to complete and was filled out by 842 residents of Bonaire ages 15 to 80+ over an approximately 4-week period. The survey instrument asked one qualifying question about the person's resident status to exclude respondents who had been living for less than six months on Bonaire.

The survey also collected important demographic data, including age, sex, neighborhood, country of birth, and nationality. Demographic information related to education and the primary language spoken at home was also asked.

The questionnaire included Likert items to inform resident tourism and urban perception and sentiment. Some questions asked respondents to rate how strongly they agree or disagree with general statements about life on Bonaire. In addition, the survey asked respondents to rate how important and how well Bonaire is doing on cultural, environmental, physical, economic, and tourism dimensions.

Although data validation methods were designed into the survey form to mitigate against data entry errors post-collection, further data-cleaning steps were taken to ensure the validity of the responses. Incomplete submissions were removed, and the IP addresses of the online responses were filtered, limiting the submissions to a maximum of three per IP address. The first filter reduced the sample by 60 observations, while the second filter dropped another five observations.

In all, 777 valid responses were collected, significantly surpassing the initial sample target of 420 responses, with good representation according to the stratification strategy. Particular care was taken to limit statistical inference to the analysis where representativeness could reasonably be assumed.

To further ensure representativeness, the sample was weighted according to the country of birth distribution of the Bonaire population, as reported by Statistics Netherlands. The sampling weights take care of the varying probabilities of selection across different strata.

## APPENDIX C

The average score of the general statements by Place of Birth

General statements	Bonaire born Average score	Netherlands born Average score	Dutch Caribbean born Average score	Rest of the world Average score	Average weighted score
Bonaire is a safe and livable place for residents	4.21	4.09	4.10	4.18	4.23
Development on Bonaire is adapting to meet the social needs of the residents	3.72	3.66	3.89	3.72	3.81
There are too many tourists on island	3.08	3.60	3.11	3.61	3.36
In general, the positive impacts of tourism on Bonaire outweigh the negative impacts	3.26	2.92	3.35	3.25	3.26
Tourism development encourages more beautification of the	3.17	2.76	3.02	3.23	3.14
A portion of my income is directly or indirectly linked to the tourism industry on Bonaire	3.03	2.78	2.85	3.21	3.07
There are sufficient decent jobs available for the residents	2.77	3.15	2.89	3.13	3.06
The cost of living on Bonaire is acceptable	1.66	1.62	1.65	1.74	1.68

Note: 1= Strongly disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly agree

## APPENDIX C

Average score of how important the action is by Place of Birth

General statements	Bonaire born Average score	Netherlands born Average score	Dutch Caribbean born Average score	Rest of the world Average score	Average weighted score
Bonaire is a safe and livable place for residents	4.21	4.09	4.10	4.18	4.23
Development on Bonaire is adapting to meet the social needs of the residents	3.72	3.66	3.89	3.72	3.81
There are too many tourists on island	3.08	3.60	3.11	3.61	3.36
In general, the positive impacts of tourism on Bonaire outweigh the negative impacts	3.26	2.92	3.35	3.25	3.26
Tourism development encourages more beautification of the infrastructure and public spaces on Bonaire (e.g., nicer beaches and roads)	3.17	2.76	3.02	3.23	3.14
A portion of my income is directly or indirectly linked to the tourism industry on Bonaire	3.03	2.78	2.85	3.21	3.07
There are sufficient decent jobs available for the residents	2.77	3.15	2.89	3.13	3.06
There are too many citizens on island	3.19	2.92	2.78	3.09	3.04
The cost of living on Bonaire is acceptable	1.66	1.62	1.65	1.74	1.68

Note: 1= Strongly disagree; 2 = Disagree; 3= Neutral; 4= Agree; 5= Strongly agree



## APPENDIX C

How well is Bonaire doing?

General statements	Bonaire born Average score	Netherlands born Average score	Dutch Caribbean born Average score	Rest of the world Average score	Average weighted score
Ensuring greater safety and less crime	3.33 / 5	2.97 / 5	3.39 / 5	3.21 / 5	3.30 / 5
Protecting Bonaire's natural areas and biodiversity (land and marine)	3.44 / 5	2.78 / 5	3.28 / 5	3.04 / 5	3.26 / 5
Preserving Bonaire's culture and heritage (e.g., language)	2.97 / 5	2.89 / 5	3.03 / 5	3.04 / 5	3.05 / 5
improve public infrastructure (such as utilities, waste collection, street lighting)	3.00 / 5	2.57 / 5	2.94 / 5	2.98 / 5	2.96 / 5
Ensuring there is a strong sense of community among residents	2.7 / 5	2.65 / 5	2.75 / 5	2.78 / 5	2.77 / 5
Managing Bonaire's growing population	2.80 / 5	2.29 / 5	2.65 / 5	2.68 / 5	2.68 / 5
Minimizing potential overcrowding from tourism	2.76 / 5	2.19 / 5	2.71 / 5	2.53 / 5	2.61 / 5
Greater involvement and role by residents in deciding what happens on the island	2.38 / 5	2.12 / 5	2.38 / 5	2.56 / 5	2.44 / 5
Creating jobs that are more stable and provide a higher source of income	2.46 / 5	2.20 / 5	2.4 / 5	2.44 / 5	2.44 / 5
Improve road infrastructure	2.28 / 5	1.89 / 5	2.08 / 5	2.19 / 5	2.21 / 5
Ensuring the availability of affordable and decent homes for residents	2.25 / 5	1.77 / 5	1.90 / 5	2.17 / 5	2.09 / 5

Note: 1= Very Poor; 2 = Poor; 3 = Satisfactory; 4= Good; 5= Very good



## APPENDIX D

### Scenario-building methodological approach

Considering the goal of the scenarios was to measure the impact of growth and development on Bonaire, the relative responsiveness of a change in one variable (call it B) to a change in another variable (call it A) was investigated. As such, the scenarios were built using the elasticity method.

The elasticity method measures one variable's change in or responsiveness to changes in another. The goal of the scenarios was to demonstrate how one variable will change as a reaction to tourism growth on Bonaire. In addition, to measure the responsiveness of one variable to changes in another variable over time, the elasticity was calculated over the time period 2011 -2021.

The model starts by investigating the elasticity relationship between tourism arrivals and population growth for the abovementioned time period and uses this information to measure the relationship between tourism arrival's growth projections and their relationship to population growth. Then the relationship between population growth and household and registered vehicle growth was calculated. Furthermore, the elasticity between tourism arrivals and the number of workers in the tourism industry was also calculated.

Finally, the impact of tourism arrivals was calculated as a result of new rooms (new developments) and its impact on labor developments and the composition of Bonaire and Foreign born. This impact was further calculated by economic indicators such as GDP per capita, GDP per room, and labor productivity. Additionally, environmental factors such as waste and energy production as a result of growth in tourism and population were also projected.

Excluding the year 2020 - as this is considered a Covid-year.



PICTURE BY: Karenza Rannou Pictures  
Bonaire's Media Hub

**APPENDIX E**

No.	Project Name	Project Description	Objective
1.1	Sustainable Development Master Plan (SDM) Definition of an	overarching plan that sets forth island goals, objectives, policies, and investments needed for community growth and development over the next 10-20 years. One vision and roadmap aligning all island stakeholders, plans	and projects on growth development critical for the local community.
1.2	Integral long-term vision on spatial planning	Definition of an overarching spatial urban planning vision and strategy based on analysis of nature, growth, environment, and economics. Guidance on a more rational territorial organization of land	uses and the linkages between them to balance demands for development with the need to protect the environment and to achieve social and economic objectives.
1.3	Strategic Tourism Master Plan (STMP) update	Definition of a tourism development vision and roadmap that will guide strategic decisions in product development and its physical infrastructure needs, transportation needs, business development needs, and impact on management, environmental, cultural, and socioeconomic factors.	Update the strategic tourism vision to reflect current trends and dynamics.
1.4	Project Implementation Office	Creation of an office responsible for the planning and execution of various strategic and complex projects and programs.	To professionally execute the crucial large programs and projects without disrupting the daily work of the different government agencies involved and achieving visible results for the inhabitants of Bonaire.



Strategic stakeholder	Existing, on hold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB	On hold	Bonaire Master Plan 2030	Human and financial resources are needed for the plan's successful implementation.	Relaunch the masterplan development process, revisit initial findings, and re-engage with stakeholders considering the changing environment. Consider a more extended timeframe than ten years with a mid-term revision consideration. Consider the adoption of the Wageningen University Nature Inclusive Model study. Align with the Nature and Environment Policy Plan implementation (MNBP) and the Strategic Tourism Master Plan (STMP).
OLB/ RVO/ BZK, LenW	On hold	Spatial Development Plan Bonaire (ROB)	Public opinion and political choices.	Finish the SDM with all spatial planning studies incorporated. Follow up on recommendations of earlier studies on nature conservation and the environment and align with the (MNBP). Include new permits requirements for recreational accommodations.
TCB/ OLB/ BONHATA	Existing	Strategic Tourism Master Plan 2017-2027 & Tourism Recovery Plan (post-covid)	Limited capacity to implement and enforce the plan.	Alignment with the SDM. Thorough revision and update of the hotel development permits and enforcement to be fully aligned with the determined strategic goal of the STMP. Include considerations of hotel development to population growth and infrastructure capacity needs. Include hotel inventory monitoring plan.
OLB	Existing	Het Project	Uitvoeringsbureau (PUB) Limited capacity to manage programs after PUB implements projects.	Expand the program beyond execution level to include strategic planning, including a Master Plan implementation office. Increase the scope beyond pre-selected projects to include identified crucial SDM projects (current projects: Multi-year Road program, the Waste Management program, and the Nature and Environment Policy Plan implementation (NMBP)).

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No.	Project Name	Project Description	Objective
1.5	Neighborhood Councils Associations	Creation of a governmental or non-governmental body with the objective to promote citizen participation in local government decisions.	Improve community participation in government decision-making and direct involvement in managing neighborhood projects and facilities.
<b>2 Shortage of affordable housing supply</b>			
<b>Laws and regulations</b>			
2.1	Land-value and property tax reform	Definition of an overarching spatial urban planning vision and strategy based on analysis of nature, growth, environment, and economics. Guidance on a more rational territorial organization of land	uses and the linkages between them to balance demands for development with the need to protect the environment and to achieve social and economic objectives.
2.2	Rental market regulation	Revision of the rent regulation system of laws that aim to ensure housing affordability and tenancies on the rental market for dwellings.	Control house prices and increase the accessibility of affordable housing for residents.
2.3	Housing permits policy	Definition of housing purchasing and building permits requirements to favor residents.	Control house prices and increase the accessibility of affordable housing for residents.

Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB	Proposed		Meeting the human and financial resources needed for the plan's successful implementation.	Definition of council structures appropriate to the island context. Review existing structures such as centro de barrios.
OLB/ RVO/ BZK, LenW	On hold	Spatial Development Plan Bonaire (ROB)	Public opinion and political choices.	Finish the SDM with all spatial planning studies incorporated. Follow up on recommendations of earlier studies on nature conservation and the environment and align with the (MNBP). Include new permits requirements for recreational accommodations.
OLB/Min-istry of Housing, Spatial Planning and the Environ-ment	Existing	Caribbean Netherlands Rental Market Measures Act for Bonaire / Huurcommissie Bonaire	Scarcity in the housing market by discouraging private investment.	Define rental controls or rent stabilization, limiting the amount a landlord can charge. Eviction controls and codified standards by which a landlord may terminate a tenancy. Obligations for the landlord or tenant regarding adequate maintenance of the property. A system of oversight and enforcement by an independent regulator and ombudsman.
OLB	Proposed		Limited capacity to implement and enforce policies and regulations.	Study the approach from the Netherlands at the Waddeneilanden. Clear definition of what a Bonarian-resident is. An easily accessible mechanism for residents to obtain housing permits.

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No.	Project Name	Project Description	Objective
2.4	Tourism rental licenses	Property policy reform, clear community guidelines, tourism rental licenses, awareness campaigns, surveillance, and enforcement.	Control house prices and increase the accessibility of affordable housing for residents.
2.5	Social housing projects	Expansion of social affordable housing development.	Meet the demand for increasing social housing needs.
2.6	Mortgage guarantees	Expansion of the national mortgage guarantee loans program in Bonaire..	Increase accessibility for residents to buy a home.

**3 Narrow economic benefit distribution****Laws and regulations**

3.1	Work visa for foreign nationals	Review the foreign employment act which exempts some foreign nationals from requiring work permits.	Increase the opportunities for local workers to access competitive job placement.
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Strategic stakeholder	Existing, on hold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB	On hold	Spatial Development Plan Bonaire (ROB)	Effective enforcement, capacity to manage the licensing office. Introduced inequalities in tourism income and reduction of the trickle-down effect.	Finish the approval process of the ROB and convert it to enforcement plans aligned with SDM and STMP. Consider community-based tourism special permits. Launch an awareness campaign and create clear rules for obtaining a permit and a compliance grace period. Work directly with Airbnb to identify rentals that are not compliant and impose heavy fines.
Fun-dashon Cas Bonaire (FCB)	On hold	Spatial Development Plan Bonaire (ROB)	Use of social housing areas for other purposes. The increased stigma of social housing. Increasing health and safety issues if poor construction materials and designs are used as well as tenants' ability to properly maintain the property.	Alignment with ROB and SDM. Efficient design with quality materials to help reduce energy needs and secure home safety. Combine with other social-cultural programs to enhance community cohesion and a way out of poverty.
Home Ownership Guarantee Foundation (Waarborgfonds Eigen Woningen)	Existing	Bonaire Mortgage Guarantee (Hypotheek Garantie Bonaire, HGB)	Increase in home ownership defaults.	Review the success of the current pilot program, adjust it as needed, and scale it. Ensure interest rates remain affordable and accessible for residents.
RCN/ OLB	Proposed	Foreign National employment Act	Decrease in the availability of qualified workforce. Decrease in the competitiveness of tourism services and other industries.	Revisiting the foreign worker permits exemptions by nationality and increasing requirements. Align with the SDM and STMP vision.

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No.	Project Name	Project Description	Objective
3.2	Work visa for foreign nationals	Review the foreign employment act which exempts some foreign nationals from requiring work permits.	Increase the opportunities for local workers to access competitive job placement.
3.3	Minimum wage increase	Improvement in the minimum wage to match inflation.	Decrease poverty and increase well-being and self-support.
<b>Education</b>			
3.4	Tourism Scholarships	Scaling of the Bonaire Tourism Scholarship program to help fund individual professional development courses and full-time academic courses in all areas of hospitality and tourism management.	Improve recruitment of qualified locals, increase salary potential of local youth, stimulate retention and professional growth in the tourism sector, and improve the quality of tourism services provided by the local workforce.
<b>Skills development</b>			
3.5	Internship exchange program	Creation of a formal internship exchange program that brings students from abroad and sends out local students to work overseas.	Improve skills and qualifications of local students, increase employability and earning potential, and promote innovation, creativity, and cultural exchange.

Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
RCN/ OLB	Proposed	Foreign National employment Act	Decrease in the availability of qualified workforce. Decrease in the competitiveness of tourism services and other industries.	Revisiting the foreign worker permits exemptions by nationality and increasing requirements. Align with the SDM and STMP vision.
RCN/ OLB/	Ministry	Existing Minimum wage act	A decrease in people living on social welfare; a decrease in business profitability resulting in lower investments in productive industries.	Continue and expand simultaneously with an increase in educational opportunities and an expansion of the qualified local workforce.
TCB/ GGF	Existing	The Bonarian Tourism Scholarship Program, Free training offered by OLB program, Tourism Academy Plan	Students might not return after graduation.	Develop partnerships with local tourism businesses to provide competitive jobs for returning students. Expand the program to support more students in the coming years.
OLB/ TCB/ BONHATA/ ROA CN	Proposed		Financial resources are needed for the plan's successful implementation. Students might not return after graduation.	Promote equal exchanges; for every incoming intern, one local intern should go abroad. Pair foreign interns with local interns in the same job position, promoting cultural and knowledge exchanges.

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No.	Project Name	Project Description	Objective
3.6	Adult vocational training and job placement	Expansion of local island vocational training and apprenticeship places.	Improve skills and qualifications of at-risk local adults, increase salary and employability, and decrease the number of people living below the social minimum benchmark.
<b>Business development</b>			
3.7	Business incubator and innovation center	Establishment of an organization that helps local entrepreneurs develop their businesses by providing a range of services, including management training, office space, and venture capital financing.	Stimulate the local economy while diversifying products and increasing local innovation.
<b>4 Loss of cultural identity and cohesion</b>			
<b>Public Investment</b>			
4.1	Investment in cultural expressions and creative arts	Development of a robust cultural heritage and creative arts agenda and funding sources.	Increase awareness of arts and history. Promote community cohesion and cultural pride.
<b>Education</b>			
4.2	Bonaire cultural education	Development a robust Bonaire cultural heritage school curriculum (elementary and secondary) and compulsory teacher training program.	Increase knowledge of Bonaire's cultural heritage and promote cultural pride.
4.3	Papiamentu classes	Development of free Papiamentu classes for all ages and levels for residents.	Increase awareness of arts and history. Promote community cohesion and cultural pride.



Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
FORMA/ ROA CN/ plenchi di trabou	Existing	FORMA/ROA CN/ Plenchi di Trabou	Resources to fund program expansion and sufficient employers willing to mentor an apprentice.	Skills development aligned with destination needs and development vision laid out by the SDM.
OLB/ Future Islands	Existing	BusinesSpark Playa	Human and financial resources are needed for the plan's successful implementation.	Promote business development aligned with the destination needs and product development vision laid out in the SDM and STMP.
OLB/ OCW/ Hofi Kultural/ The Foundation for Art and Culture of Bonaire/ SKAL	Existing	National Culture Funds / Culture coaches	Human and financial resources are needed for the plan's successful implementation.	Support street art festivals, neighborhood festivals, monthly activities, concerts, theater, dance, storytelling, food fairs, and arts & crafts fairs. Create a monthly themed cultural program, including one significant event. Provide scholarships to identified young talent to further their craft.
RCN/ OCW / LKCA / OLB	Existing		Human and financial resources are needed for the plan's successful implementation.	In-depth research on the history of Bonaire to develop a school curriculum. Include local history curriculum at all levels of the educational system.
RCN/ OLB	Proposed		Human and financial resources are needed for the plan's successful implementation.	Conduct awareness campaigns and offer free courses year-round.

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No.	Project Name	Project Description	Objective
<b>Business development</b>			
4.4	Cultural Tourism products and services	Development of cultural, heritage, and community-based tourism products; itineraries, interpretations of tourism assets and sites; and associates goods and services.	Increase the quality of the tourism experience and raise awareness of the local cultural heritage and local cultural pride.
<b>Skills development</b>			
4.5	Tour guide cultural training	Development of a tour guide cultural tourism training program.	Increase the quality of the tourism experience and raise awareness of the local cultural heritage.
4.6	Traditional Kunuku gardens	Promotion of traditional kunuku backyard vegetable patch gardening, recreational community gardening, and gastronomic experiences	Stimulate traditional local food production, healthy eating and community cohesion
<b>5 Limited productive infrastructure</b>			
<b>Public Investment</b>			
5.1	Multi-year Road program	The planning, funding, and realization of the renovation of roads.	Improve road safety and the quality of life of residents.
5.2	Public transportation program	The planning, funding, and realization of a public transportation system.	Reduce residents' transportation costs, traffic congestion, carbon footprint, and solid waste (i.e., tires, oil, old cars, etc.).

Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB/ SKAL/ TCB/ RCN/ OCW	Proposed		Human and financial resources are needed for the plan's successful implementation.	Research Bonaire's cultural assets, history, and living cultural expressions to develop itineraries. Investment in historical site maintenance and interpretation. Work with Business Spark Playa to promote cultural goods and services in hotels and restaurants. Alignment with the STMP vision.
OLB/ TCB/ FORMA/ RCN/ OCW	Proposed		Human and financial resources are needed for the plan's successful implementation.	Develop tour guide training cultural curriculum in alignment with the cultural tourism product portfolio.
OLB/ LVV/ LNV	Proposed	Healthy Caribbean Coalition	Human and financial resources are needed for the plan's successful implementation.	Conduct awareness campaigns to offer tools, resources, and training on kunuku gardening. Promote community-level activities, backyard cooking, recipe exchanges, and cooking classes.
OLB	Existing	Meerjarenprogramma Wegen Bonaire (MJOP)	Human and financial resources are needed for the plan's successful implementation.	Continue and expand.
OLB/ I&W	Proposed		Human and financial resources are needed for the plan's successful implementation.	Public transportation planning in-line with the ROB and SDM.

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No.	Project Name	Project Description	Objective
5.3	Wastewater treatment plant expansion	Investment in increasing the sewage treatment plant's capacity and expanding the household connections network.	Increase the number of household connections to the sewage system and reduce the risk of contaminating the environment with harmful pathogens.
5.4	Wastewater vision and management	Development of a wastewater vision and five pilots for decentralized wastewater treatment.	Effectively manage wastewater to avoid polluting the natural ecosystems that cause human health issues and environmental degradation.
5.5	Sustainable waste management	Investment projects to professionalize waste management, reduce waste generation, increase recycling, and make it sustainable.	Effectively manage solid waste to avoid polluting the natural ecosystems that cause human health issues and environmental degradation.
<b>Public-private Investment</b>			
5.6	Home sewage treatment	Identification of homes that cannot connect to the sewage plant and systematically eliminate old cesspools, and retrofit to modern septic tanks.	Reduce the number of nutrients and bacteria in groundwater, reducing the harm to coral reefs.
5.7	Neighborhood/community infrastructure funds	Development of a grants mechanism for community-led projects for various neighborhood-specific infrastructure development uses, i.e., regenerating community centers, roadwork, parks, SME grants, charities, etc.	Community participation in infrastructural problems, solutions, and investments.



Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB/ WEB	Existing	Sewage expansion and connections (NMBP)	Ability to cover the salient need of a growing population and exponential new construction rate.	Sewage planning should be aligned with ROB, SDM, and STMP.
Stinapa/ WWF/ OLB/ WEB	Existing	Water Circles Bonaire (NMBP)	Financial resources are needed for the plan's successful implementation.	Alignment with the ROB, SDM, and STMP.
OLB/ Selibon/ Ministry I&W	Existing	Afvalbeheer op Maat (AoM)	Human and financial resources are needed for the plan's successful implementation. Limited capacity to implement and enforce policies and regulations.	Data collection, long-term vision, and restart of AoM with solid program management. Create an awareness campaign with clear guidelines to encourage residents to reduce, reuse and recycle solid waste.
OLB/ WEB	Proposed		Financial resources are needed for the plan's successful implementation.	Create an awareness campaign and incentives for homeowners to participate in the retrofitting program.
OLB/ Neighborhood councils associations (New)	Proposed		Human and financial resources are needed for the plan's successful implementation. Limited capacity to implement and enforce policies and regulations.	Development of grant-making process and support to neighborhood councils on grant writing.

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No.	Project Name	Project Description	Objective
5.8	Sustainable private sector water management	Development of water-use efficiency audits of homes, businesses, and industries subsidized programs. Including incentives to encourage the replacement of plumbing fixtures and appliances with water-efficient models.	Reduction of water consumption, create awareness.
<b>Laws and regulations</b>			
5.10	Rainwater harvesting	Introduction of a rainwater harvesting system in building codes for new construction.	Increase rainwater storage at home for non-drinking purposes (cleaning, gardening, etc.) and reduce desalinated water consumption.
5.11	Safe disposal of marine vessels wastewater	Enforcement of yacht disposal of their wastewater outside the marine park or via a collection system.	Effectively manage wastewater to avoid polluting the natural ecosystems that cause human health issues and environmental degradation.
5.12	Single-use plastic ban	Expansion of the list of banned plastic products.	Prevent pollution from plastic waste.
<b>6 Depletion of high-value natural ecosystems</b>			
<b>Policy and planning</b>			
6.1	Nature and Environmental Policy Plan	Development of an integrated framework addressing responsibilities, policy targets, and legal obligations related to management of the natural environment	Conservation and restoration of the unique and important nature of the island while building a resilient ecosystem, allowing sustainable use of resources, resulting in a healthy and prosperous society.

Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB/ WEB	Proposed		Financial resources are needed for the plan's successful implementation. Availability of service providers and retrofitting fixtures on island.	Availability of funding and the local goods and services to carry out the retrofitting. Create an awareness campaign to incentivize homeowners to participate.
OLB	Proposed		Speed of updating building codes.	Policy-making and awareness-raising.
Stinapa/ WWF/ OLB/ WEB	Existing	Waste water marina and yachts (NMBP)	Illegal dumping in Marine Park.	Continues investment in port and piers marine vessel saltwater sewage treatment plants and awareness campaigns for water vessel owners to comply.
OLB	Existing	SUP ban Bonaire - part 1	Illegal use and selling/providing of banned plastic products.	Availability of suitable replacements that do not harm the environment at an accessible price.
OLB / I&W / EAC / ANF	Existing	Nature and Environmental Policy Plan for the Caribbean Netherlands (NMBP-CN) 2020-2030	Human and financial resources are needed for the plan's successful implementation.	Making sure there is sufficient ongoing data collection and reporting on the impact of urban development and tourism growth on the unique and fragile ecosystems and taking effective and quick corrective measures.

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No.	Project Name	Project Description	Objective
<b>6.2</b>	Washington Slagbaai National Park Management plan	Development of the National Park management plan, including available scientific knowledge on the area's geology, ecology, and history, identification of the main threats, incorporating the advice from stakeholders, and proposing actions to safeguard the natural and cultural heritage in the national park.	To ensure the national park has a defined direction and resource for preservation and sustainable visitor use.
<b>6.3</b>	Bonaire Marine Park Management Plan	Development of the Marine Park management plan, setting a roadmap that balances marine conservation and restoration, sustainable recreational use and fishing, while mitigating and preventing negative impacts from urban development and population growth.	To ensure the longevity and integrity of the fragile marine ecosystem, protect the main economic driver of the island tourism economy, mitigate food security issues, and increase residents' quality of life.
<b>6.3</b>	Bonaire Marine Park Management Plan	Development of the Marine Park management plan, setting a roadmap that balances marine conservation and restoration, sustainable recreational use and fishing, while mitigating and preventing negative impacts from urban development and population growth.	To ensure the longevity and integrity of the fragile marine ecosystem, protect the main economic driver of the island tourism economy, mitigate food security issues, and increase residents' quality of life.
<b>Monitoring &amp; reporting</b>			
<b>6.4</b>	Water quality research program	Creation of a permanent water quality and sedimentation in coastal water monitoring and reporting program	To determine the impact of urban development on the coastal water quality for human bathing and the health of the marine species



Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
Stinapa / OLB	Existing	Washington Slagbaai National Park Management plan 2022-2028	Invasive species; irresponsible visitor behavior; overexploitation for tourism purposes	Finish Approval process and convert to projects.
Stinapa / OLB	Existing	Bonaire National Marine Park Management Plan 2022-2028	Pollution, invasive species; irresponsible visitor behavior; overexploitation for tourism purposes	Finish Approval process and convert to projects.
Stinapa / OLB	Existing	Bonaire National Marine Park Management Plan 2022-2028	Pollution, invasive species; irresponsible visitor behavior; overexploitation for tourism purposes	Finish Approval process and convert to projects.
RWS/ Stinapa/ OLB/ STCB	Proposed	NMPB - CN	Human and financial resources are needed for the program's successful implementation.	Consider applying for beach quality certification programs, for example, Blue Flag - Alignment with the NMBP and STMP.

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No.	Project Name	Project Description	Objective
<b>Laws and regulations</b>			
<b>6.5</b>	The Bonaire bond passport pledge	Inclusion of the Bonaire bond signature pledge directly onto the foreign visitor's passport during the immigration passport control process.	Create awareness and generate commitment from tourists to respect the local culture and environment and support local businesses.
<b>6.6</b>	Marine Park permits	Review Marine Park permits based on a Carrying capacity study for Marine Park	Study on the carrying capacity of the vulnerable areas as the Marine Park and adjust the volume and boundaries of permits for activities
<b>6.7</b>	Ban on sunscreen	Introduction of a ban on sunscreens that contain chemicals that harm the coral reef	Create awareness and protect the coral reef from toxic sunscreen chemicals
<b>6.8</b>	Regulating fish quotas	Introduction of a fish quota system for local fishers and charter ships for tourists.	protect fish reserves and keep them viable for the future.
<b>6.9</b>	Building codes update and enforcement	Update of building codes ordinance for coastal areas and enforcement mechanism	Prevent illegal constructions harmful to the coastal ecosystem.

Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
TCB/ OLB/ IND- CN/ Stinapa	Proposed	The Bonaire Bond	Human and financial resources are needed for the plan's successful implementation.	Define a short version of the Bonaire Bond to fit on one page of a passport. Pass immigration rule to enforce pledge signature upon arrival. Update collateral materials to include clear do's and don'ts aligned with the STMP and NMBP.
OLB/ Stinapa	Proposed	Marine park fee	Human and financial resources are needed for the plan's successful implementation.	Determine the carrying capacity of the marine park, identification of at-risk sites, and revise marine park permits regulation and the surveillance and enforcement plan - alignment with the STMP and NMBP.
OLB/ Stinapa/ TCB	On Hold	Sunscreen awareness Bonaire	Human and financial resources are needed for the plan's successful implementation.	Develop a strong awareness campaign to educate tourists, businesses, and residents about the policy on banning selling or using sunscreen products that are harmful to the coral reef. Include in the Bonaire Bond commitments. Align with STMP and NMBP.
Stinapa/ OLB	Proposed		Cultural resistance, commercial resistance	Develop an awareness campaign accessible to all levels of the local society, economic backgrounds, and cultures (i.e., languages, diversity; and a surveillance and enforcement mechanism—alignment with the NMBP.
OLB	Proposed	Island Ordinance on regulations pertaining to building and housing (Building and Housing Ordinance 1999)	Human and financial resources are needed for the plan's successful implementation. Finish Approval process and convert to enforcement plans	Bonaire Bond commitments. Align with STMP and NMBP.

**APPENDIX E**

No.	Project Name	Project Description	Objective
<b>Laws and regulations</b>			
<b>6.10</b>	Juniors Ranger Program	Awareness, education, and hands-on program on nature conservation for young Bonairians.	Impart knowledge and develop attitude, skills, and a sense of responsibility that enables local youth to take necessary actions towards preserving nature and its components.
<b>6.11</b>	Nature conservation awareness campaigns	Creation of awareness campaigns and free online training programs for the general public to learn about nature protection, local initiatives, and how to get involved.	Public awareness and involvement in nature protection and conservation initiatives and projects.
<b>6.12</b>	Tour guides environmental training	Development of a tour guide environmental awareness tourism training program.	Increase the quality of the tourism experience and raise environmental awareness and conservation of local resources and ecosystems.
<b>6.13</b>	Reforestation Program	Restoration of the local dry forest, involving the local community in the management and results of these reforestation areas	Raise awareness about the dry forest's importance, degradation, and vulnerability; restore the natural habitat of endangered species losing space to urban development.



Strategic stakeholder	Existing, onhold, or proposed	Name of related programs	Possible risks	Implementation considerations
OLB/ Stinapa	Existing	Junior Rangers Program Stinapa	Human and financial resources are needed for the plan's successful implementation.	Ensure equity and accessibility to youth from all economic backgrounds and cultures.
WWF/ OLB/ Stinapa/ Selibon/ Sea Turtle Conservation Bonaire/ Clean Coast Bonaire/ the Dutch Caribbean Nature Alliance	Existing	Boneiru Duradero (WWF-NL Dutch Caribbean marine program)	Reaching all levels of society and cultural backgrounds	Ensure each campaign collaterals and distribution channels reach all levels of the local society, economic backgrounds, and cultures (i.e., languages, diversity)—alignment with the NMBP.
Stinapa/ Forma	Existing		Unlicensed instructors and guides operating	Develop tour guide training environmental curriculum in alignment with the STMP and NMBP.
OLB and NGO's (Terra Barra, Echo, Mangrove Maniacs, San Jose, Seru Langu, Barcade-ra)	Existing	My Bonaire Tree / NMPB-CN	Free-roaming animals eating and trampling seedlings	Generate awareness across residents of all economic backgrounds and cultures (i.e., languages, diversity)—alignment with the NMBP. Generate awareness and attract tourism support (eg. help them protect the critically endangered endemic Bonaire palm, with only 25 mature individuals left) - alignment with the STPM.



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