



World Food Programme

SAVING LIVES
CHANGING LIVES

CLIMATE CHANGE OVERVIEW, MARCH 2023

WFP SAO TOME AND PRINCIPE (STP)

- STP experienced an increase in temperature over the past years. Since the 1970s, average temperatures increased by 0.67°C. This accelerated since the 2000s.
- The country experienced an increase in precipitation since the 1950s, particularly over the last 30 years.
- Sea level rise has been continuous since 1993, with tides affecting the coast line. Sea level rise varies from 10 m to 70 m, affecting almost 1,200 inhabitants.
- Over the next years, STP is likely to experience heating, with changes in temperature reaching +2.5 ° C or more depending on the scenario.



COUNTRY CONTEXT

Sao Tome and Principe (STP) is located in the Gulf of Guinea and is composed of two islands and various smaller islands and islets, with a total area of 1,001 km². The country's population stands at about 215,000 people, with 65% of the population living below the poverty threshold and about 30% living without electricity [1]. In 2019, the unemployment rate was close to 13.4%, while GDP growth stood at 4.5%, underlining its insufficiency in fulfilling the developmental needs [1].

Agricultural land accounts for about 46% (44,000 ha) of the country's total land area, with average land access of 3ha per farmer. Agriculture employs about 19% of the total population [2, 3] and represents 22.5% of the STP's gross domestic product [4]. Due to its insularity and geographical location, STP is prone to climatic shocks and natural disasters.

STP is particularly threatened by increasing temperatures, changes in precipitation patterns, sea level rise, and extreme weather events [5].

Human Development Index (HDI) 2021 [a]	ND-GAIN Index for climate vulnerability 2022 [b]	Gini Index 2017 [c]	GDP per capita 2021 [c]	Poverty headcount ratio 2017 [c]	Prevalence of undernourishment 2020 [c]
0.618 138 out of 191 (0 = low, 1 = high)	41.7 126 out of 182 (0 = bad, 100 = better)	40.7 (0–100; 100 = perfect inequality)	1,692.4 USD (constant 2015 USD)	15.6 % (at 2.15 USD a day, 2017 PPP) ¹	14 % (of total population)

Table 1: Quality of life indicators (Data source: [a] UNDP, [b] ND-GAIN, [c] World Bank)

CLIMATE PROFILE

STP is located in the Gulf of Guinea, 350 km off the West coast of Africa [6]. Its climate is tropical, with a rainy season from September through May, an average annual rainfall of 2,184 mm, and a mean number of annual wet days of 163 days.

A three-month dry season takes place between June and August, when a decrease in precipitation and temperature occurs, with winds blowing from the South-Southwest quadrant [7]. Mean temperatures vary little during the year, fluctuating between 22 °C and 26 °C.

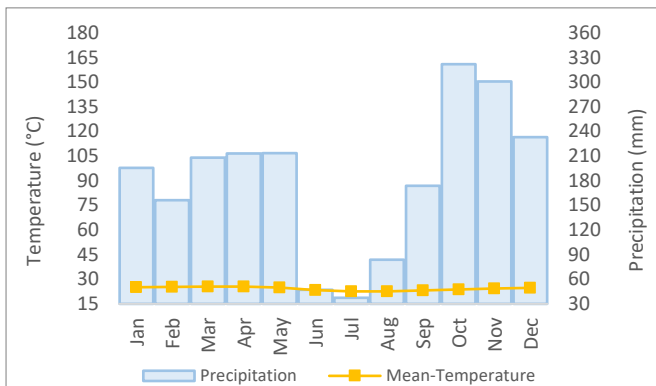


Fig. 1: Change Monthly climatology of mean-temperature and precipitation from 1991-2020 [8]

Temperature trends

The country experienced an increase in temperature in recent years. Since the 1970s, average temperatures have increased by about 0.67°C. This upward trend has accelerated strongly since the early 2000s. Between 2000 and 2021, average temperatures on the island have increased by 0.5°C. Compared to the long-term average (1980-2009), the average temperatures of the period 2010-2021 have increased by 0.34°C. The 2010 decade was the warmest on the island since the 1970s.

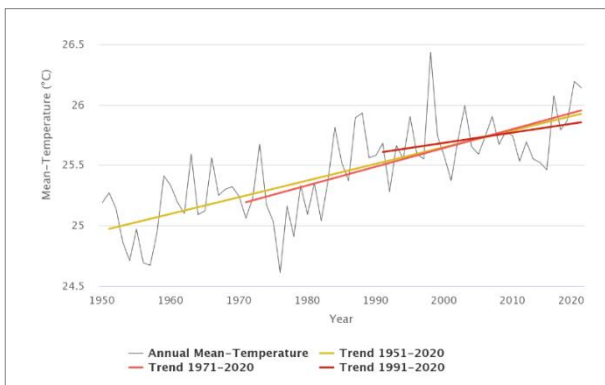


Fig. 2: Mean-temperature annual trends with significance of trend per decade [8]

Precipitation trends

STP has experienced a slight increase in precipitation since the 1950s. This seems to be particularly true during the last 30 years. Despite this increase, the maximum number of consecutive wet days and dry days decreased strongly since 1950. However, the number of consecutive dry days remained stable since the last 30 years. This means that the precipitation increase seems to be related to more intense rainfall events, especially during the last 30 years.

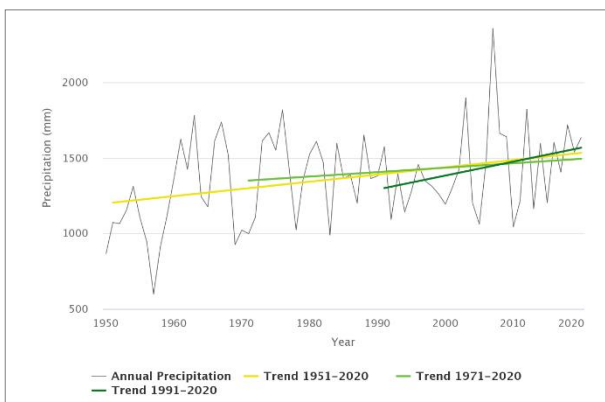


Fig. 3: Precipitation annual trends with significance of trend per decade [8]

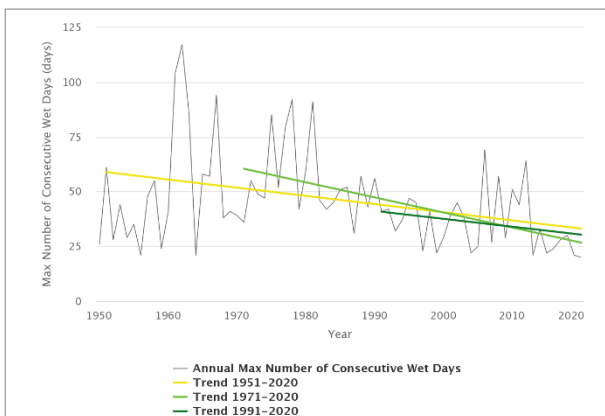


Fig. 4: Maximum number of consecutive wet days annual trends with significance of trend per decade [8]

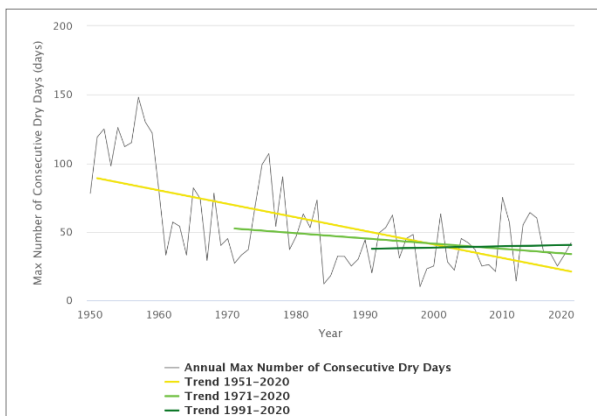


Fig. 4: Maximum number of consecutive dry days annual trends with significance of trend per decade [8]

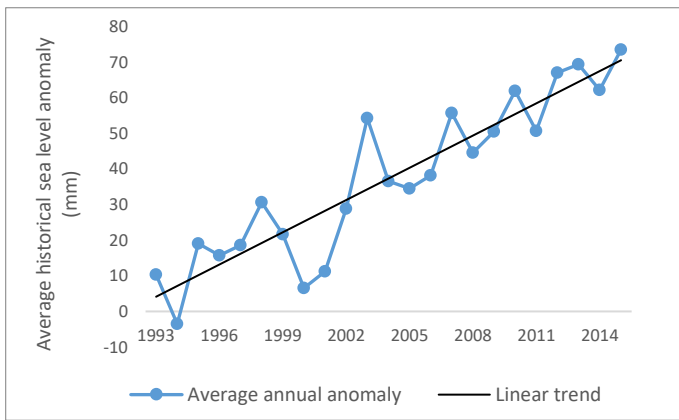


Fig. 6: Historical annual sea level for coastal Sao Tome and Principe, 1993-2015 [8]

Sea level rise

Sao Tome and Principe is experiencing continuous sea level rise since 1993. The coastline is affected by the effects of tides and by sea level rise, varying from 10 m to 70 m, and affecting almost 1,200 inhabitants [9]. This situation increases the impacts of floods each year. Floods affect on average about 700 people per year in the country, or about 0.36% of the total population [7]. The local economy is heavily exposed to floods. On a yearly average, the areas that are affected by floods produce about 1.42% of the national GDP, which corresponds to about 5 million USD per year [7].

CLIMATE PROJECTIONS

Box 1: Greenhouse Concentration (GHG) scenarios and climate projections

The current GHG concentration scenarios proposed by the Intergovernmental Panel on Climate Change (IPCC) are called RCPs (Representative Concentration Pathway - IPCC, 2013). These scenarios consist of different trajectories of GHG concentration as of 2006, with four concentration trajectories assumed: RCP8.5, RCP 6.0, RCP4.5 and RCP2.6. These trajectories of GHG concentration were constructed from socioeconomic models that evaluate in an integrated way the demographic growth, the use of the land and the new technologies of generation of energy. Projections for climate change were produced for the future period from 2041 to 2070, targeting the central period from 2050 to 2060. These projections of local climate change were based on the simulated climate for the period 1971-2000. Projections in two greenhouse gas emission scenarios were produced, an intermediate emission scenario (RCP4.5) and a high emission scenario (RCP8.5) [9].

Temperature changes

It is projected that, for the period 2041-2070, STP will experience heating, more distinctly between the months of October to May. During the dry season, the warming will be higher in the central part of Sao Tome Island, where the highest altitudes are located. The heating pattern in both scenarios (RCP4.5 and RCP8.5) is quite similar, with the most intense temperature increase in RCP8.5.

Changes in temperature in both islands reach values of about 2.5 °C in RCP4.5 and 3 °C in RCP8.5, both in the rainy season and in the dry season. Therefore, the local scale projections do not indicate changes in the annual temperature cycle in the islands [9].

Precipitation

In the RCP4.5 scenario, the climate will be rainier from October to May and slightly drier and/or normal conditions in the other months of the year. The highest precipitation increases (+150 mm/month) will occur in the Southwestern part of Sao Tome Island.

In the RCP8.5 scenario, the projections indicate otherwise, with a precipitation reduction occurring in both the rainy and dry periods. However, monthly changes indicate that December and January present an increase in precipitation in scenario RCP8.5. The reduction of precipitation in this emission scenario is most marked in the month of April, reaching the rate of -100mm/month [9].

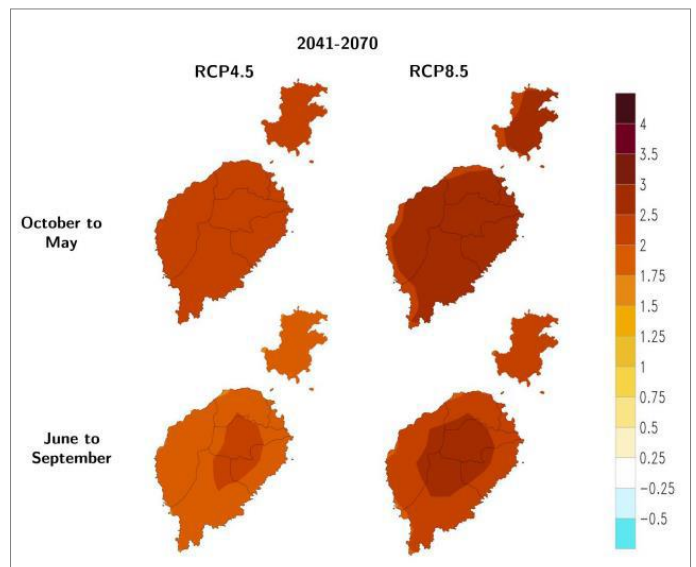


Fig. 7: Temperature changes from October to May and from June to September, projected for the period 2041-2070 in the RCP4.5 and RCP8.5 for the period 1971-2000 [9]

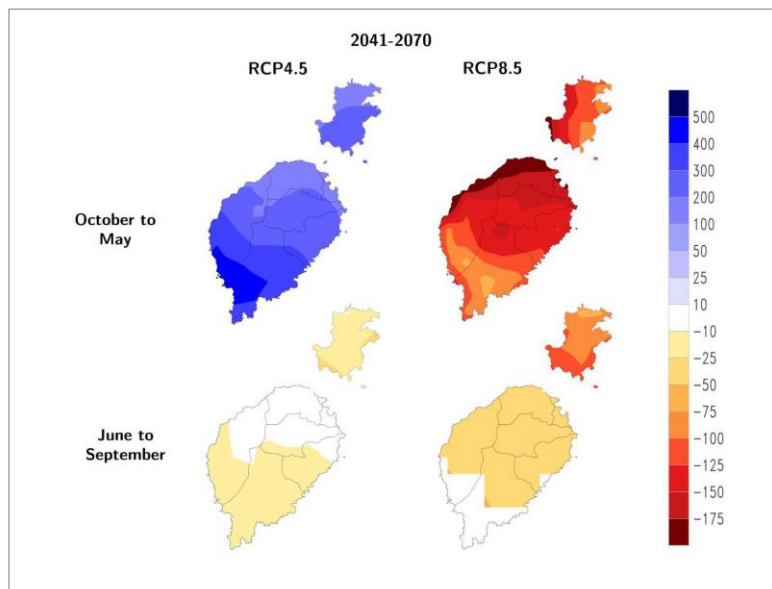


Fig. 8: Change in cumulative precipitation (mm) from October to May and from June to September, projected for the period 2041-2070 in the RCP4.5 and RCP8.5 for the period 1971-2000 [9]

VULNERABILITY

- STP is vulnerable to diseases that are influenced by climatic factors. Indeed, floods pose problems for malaria incidence, which could increase and cause significant human losses. Additionally, ocular diseases typically increases during drought periods and may become epidemic in proportion [8].
- Floods frequently affect the island nation and increases in sea levels are expected to exacerbate these extreme events along the coasts of the islands and disturb many towns and communities. Heavy rainfall events and storms also contribute to floods and cause soil erosion, landslides, increasing the risk of waterborne diseases and decreasing crop production [8].
- The projections of the RCP4.5 and RCP8.5 scenarios indicate a high to very high level of risk for the cultivation of most of the important crops, such as taro, maize, cocoa, chili in STP. This risk is higher in the RCP8.5 scenario, due to higher temperatures that will be favorable to the development of crop diseases [9].
- Climate change is likely to exacerbate the triple-burden of malnutrition and the metabolic and lifestyle risk factors for diet-related non-communicable diseases (NDCs). It is expected to reduce short- and long-term food and nutrition security both directly, through its effects on agriculture and fisheries, and indirectly, by contributing to underlying risk factors, such as water insecurity, dependency on imported foods, urbanization, migration, and health services disruption [5].

References

- [1] Sao Tome and Principe (2021), Nationally Determined Contributions (NDC-STP) Updated, São Tomé. (consulted at this link: [Updated_NDC_STP_2021_EN_.pdf \(unfccc.int\)](#))
- [2] FAO, IFAD, UNICEF, WFP, WHO (2021), The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all. Rome, FAO. <https://doi.org/10.4060/cb4474en>
- [3] International Labour Organization, displayed by World Bank. 2021. <https://data.worldbank.org/indicator/SL.AGR.E MPL.ZS?locations=ST>
- [4] AfDB, OECD, UNDP (2014), African Economic Outlook 2014: Global Value Chains and Africa's Industrialisation, OECD Publishing, Paris, <https://doi.org/10.1787/aeo-2014-en>
- [5] WHO, UNFCCC (2021), Sao Tome and Principe: Health & Climate Change country profile 2021, WHO, <https://www.who.int/publications/i/item/WHO-HEP-ECH-CCH-21.01.05>
- [6] Costa Resende Ferreira, N., Martins, M., da Silva Tavares, P. et al., (2021), Assessment of crop risk due to climate change in São Tome and Príncipe. *Reg Environ Change* 21, 22. <https://doi.org/10.1007/s10113-021-01746-6>
- [7] UNDRR and CIMA (2019), São Tomé and Príncipe Disaster Risk Profile. Nairobi: United Nations Office for Disaster Risk Reduction and CIMA Research Foundation.
- [8] Climate Change Knowledge Portal for Development Practitioners and Policy Makers, World Bank, *Sao Tome and Principe - Summary | Climate Change Knowledge Portal (worldbank.org)*, consulted on 22/02/2023
- [9] Sao Tome and Principe (2019), Third National Communication of Sao Tome and Principe within the UNFCCC, Sao Tome and Principe, <https://unfccc.int/documents/200696>, consulted on 27/02/2023

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