Diploma Programme
Programme du diplôme
Programa del Diploma

Environmental systems and societies
Higher level
Paper 1 – resource booklet

30 April 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

2 hours

Instructions to students

- Do not open this booklet until instructed to do so.
- This booklet contains all the resources to answer paper 1.

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19 pages

Figure 1(a): World map showing the location of the island of Mauritius

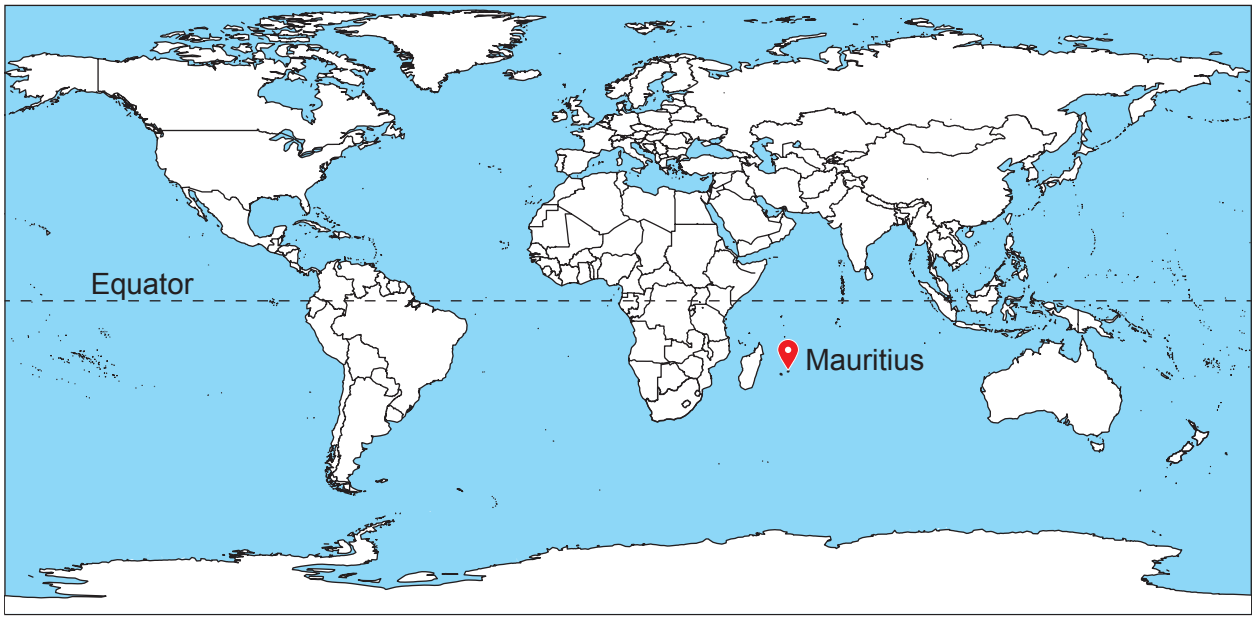

Figure 1(b): Topographic map of the island of Mauritius

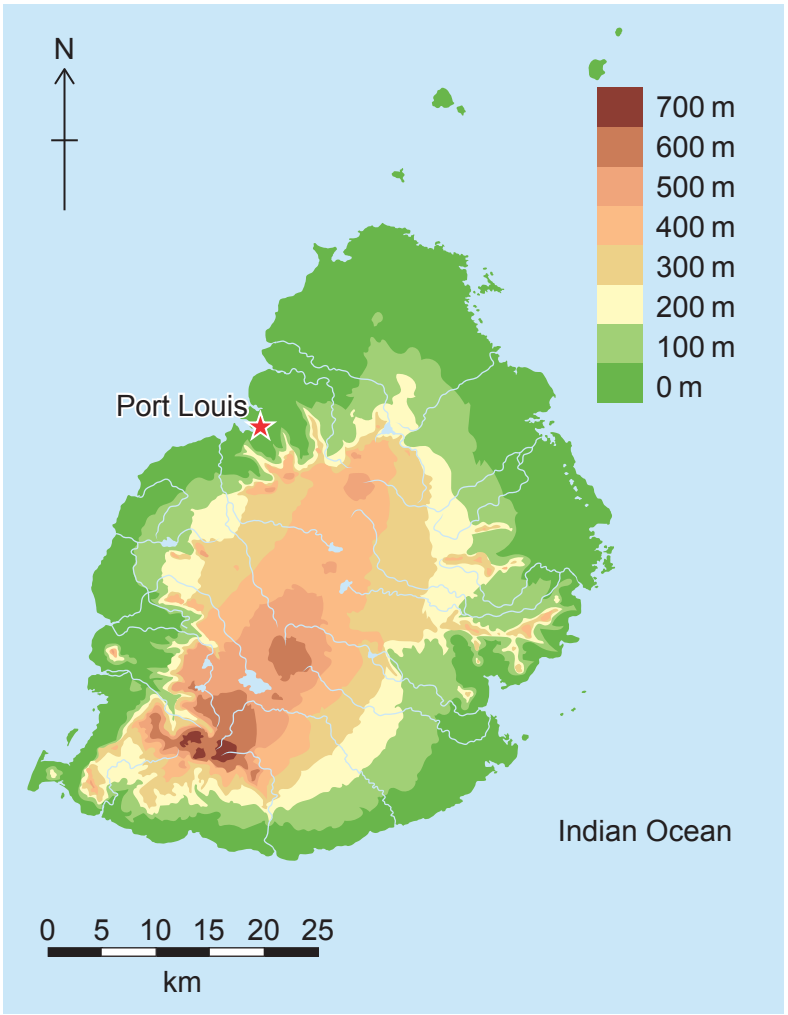

Figure 1(c): Fact file on the island of Mauritius

- Mauritius is a tropical island 2000 km off the south-east coast of Africa, with an area of about 1865 km^2 surrounded by coral reefs.
- It was formed by volcanic eruptions approximately 10 million years ago.
- Over the last 400 years, people from Europe, Africa, India and China have settled in Mauritius, resulting in the diverse range of customs and traditions that make up Mauritian culture.
- Forest cover is about 25 % of the land area (both plantation and natural forest), of which roughly 2 % is native. About 43 % of land is used for agriculture; 28 % is built-up areas.
- Economy is based on agriculture, financial services and tourism.
- Main exports include sugar, processed fish, textiles and clothing.
- Main imports include refined petroleum, coal and manufactured goods.

Figure 1(d): Climate graph for the island of Mauritius

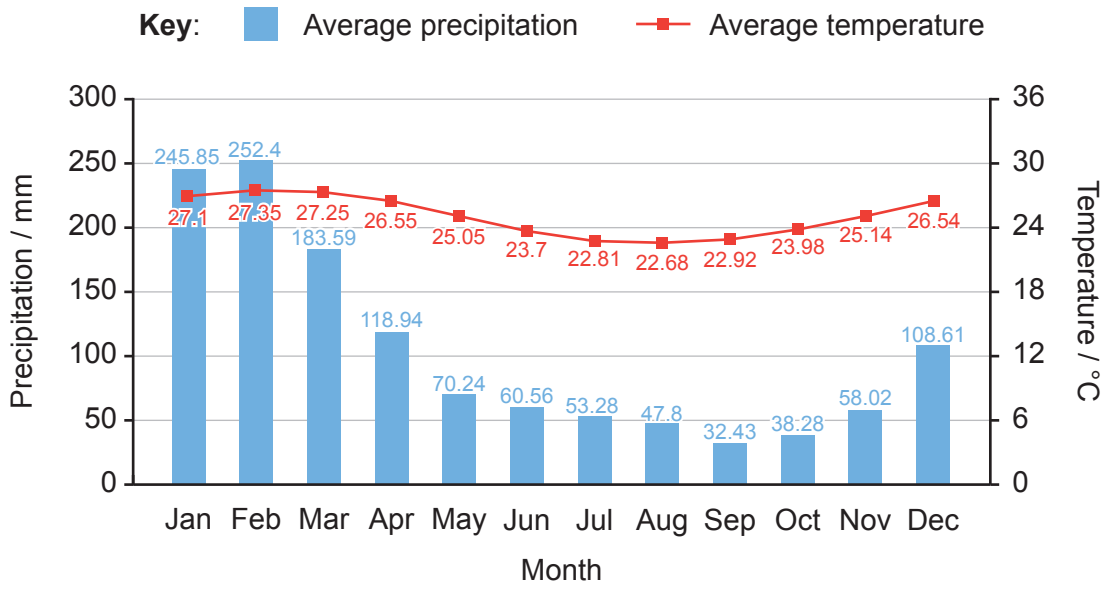

Figure 2(a): Fact file on biodiversity of Mauritius

- Mauritius is famous for the extinct dodo (*Raphus cucullatus)*, a flightless bird.
- The flora and fauna of the island show a high level of diversity and endemism.
- Major threats to biodiversity include habitat degradation and loss, invasive alien species, pollution, pests, disease and climate change.
- National parks and marine reserves have been set up to conserve biodiversity.
- Within conservation areas, habitat restoration schemes have involved the removal of invasive alien species such as rats, rabbits, feral pigs, goats and deer.
- Conservation efforts have involved local communities and included educational campaigns on the importance of biodiversity conservation.

Figure 2(b): Number of native, endemic[1] and extinct species within terrestrial species groups in Mauritius

Species group	Total number of native species	Number of endemic species	Number of extinct species
Flowering plants	691	273	61
Mammals (bats[2])	5	1	2
Land birds	28	19	16
Reptiles	17	16	5
Butterflies	30	5	4
Snails	125	81	43

[1] endemic: native species not found anywhere else
[2] bats: the only mammals native to Mauritius are bats

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Figure 2(c): Human population growth and change in native forest cover in Mauritius, 1600–1997

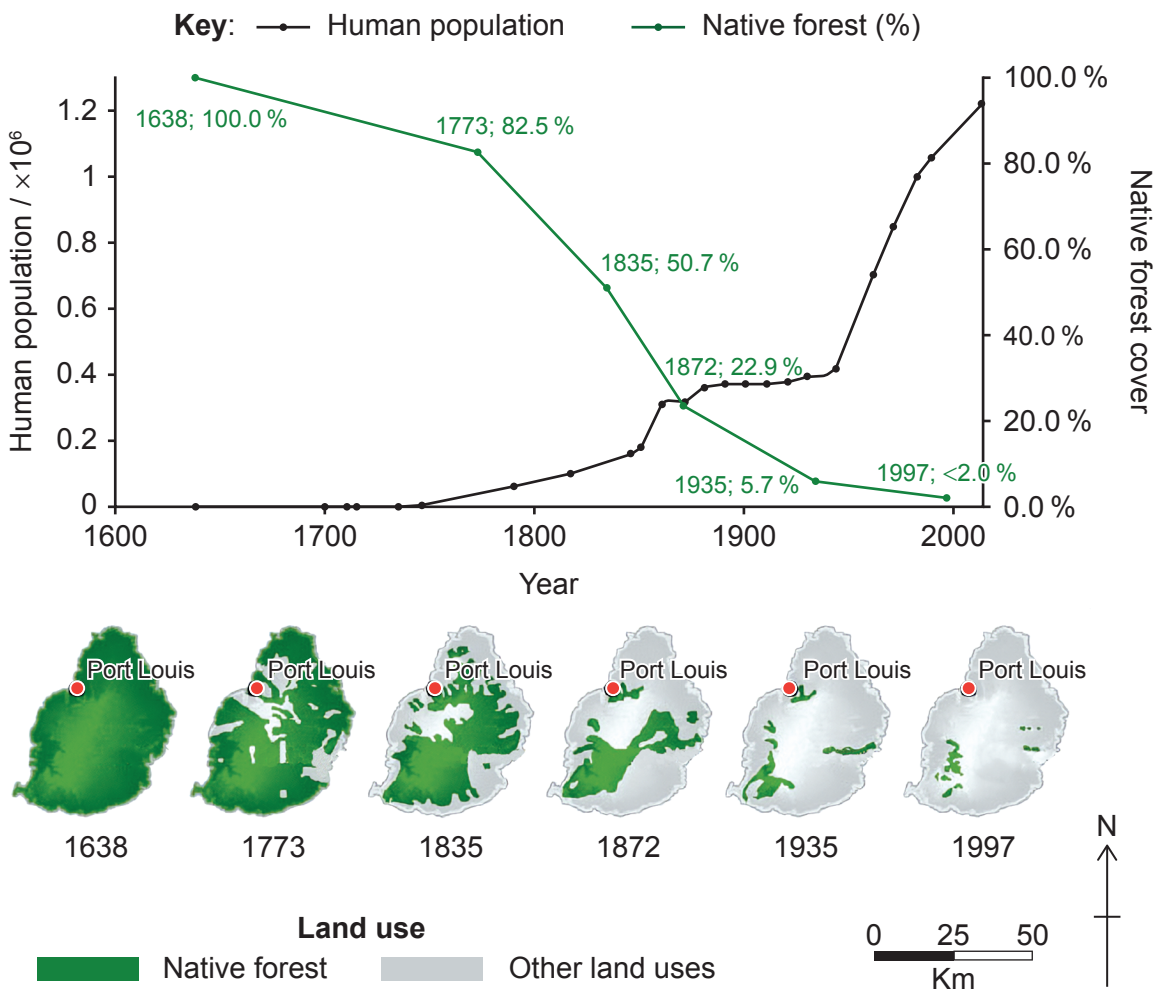


Figure 3(a): Relationship between coral reefs, seagrass and mangrove ecosystems in Mauritius

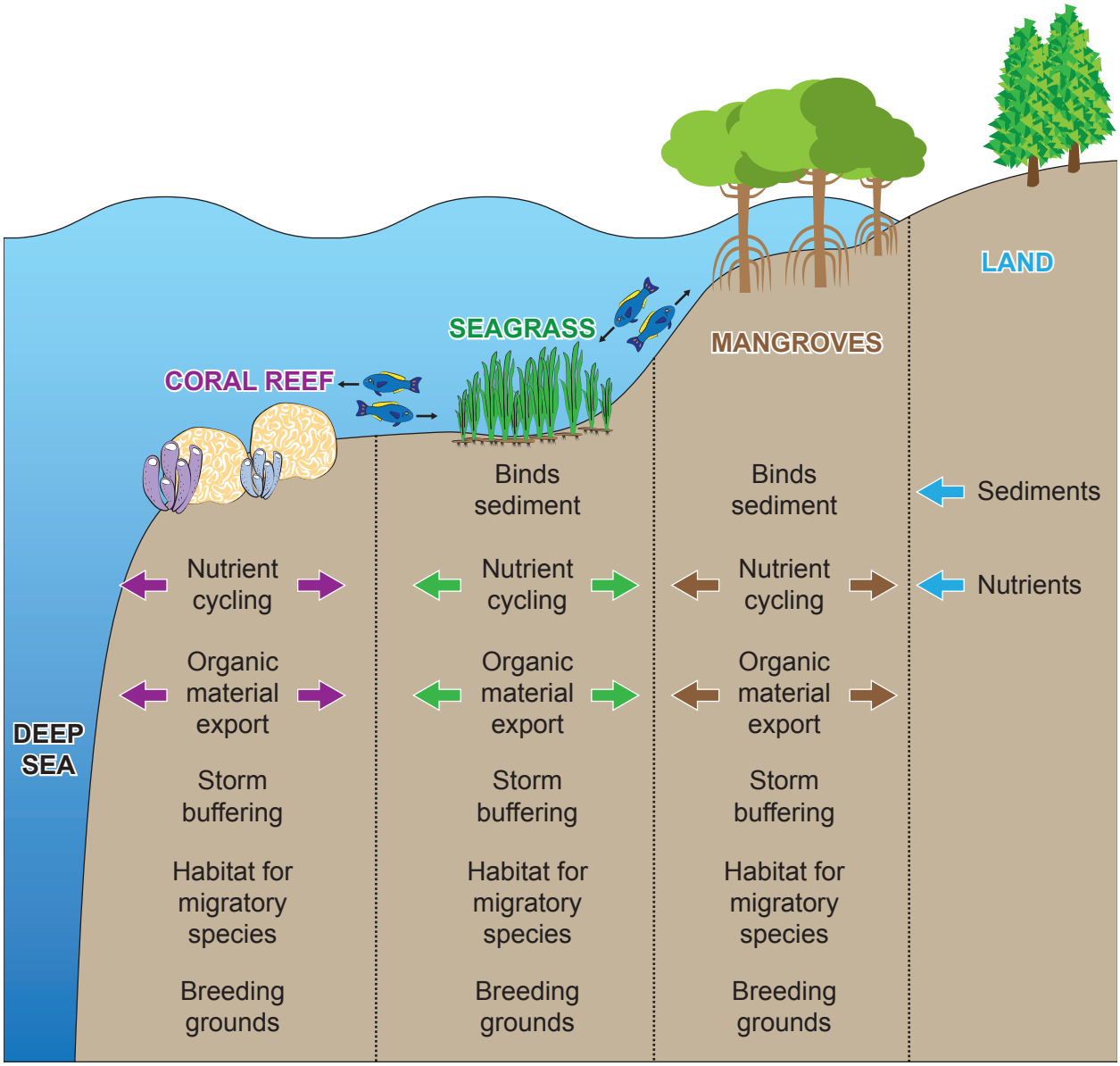


Figure 3(b): Location of coral reefs around the island of Mauritius

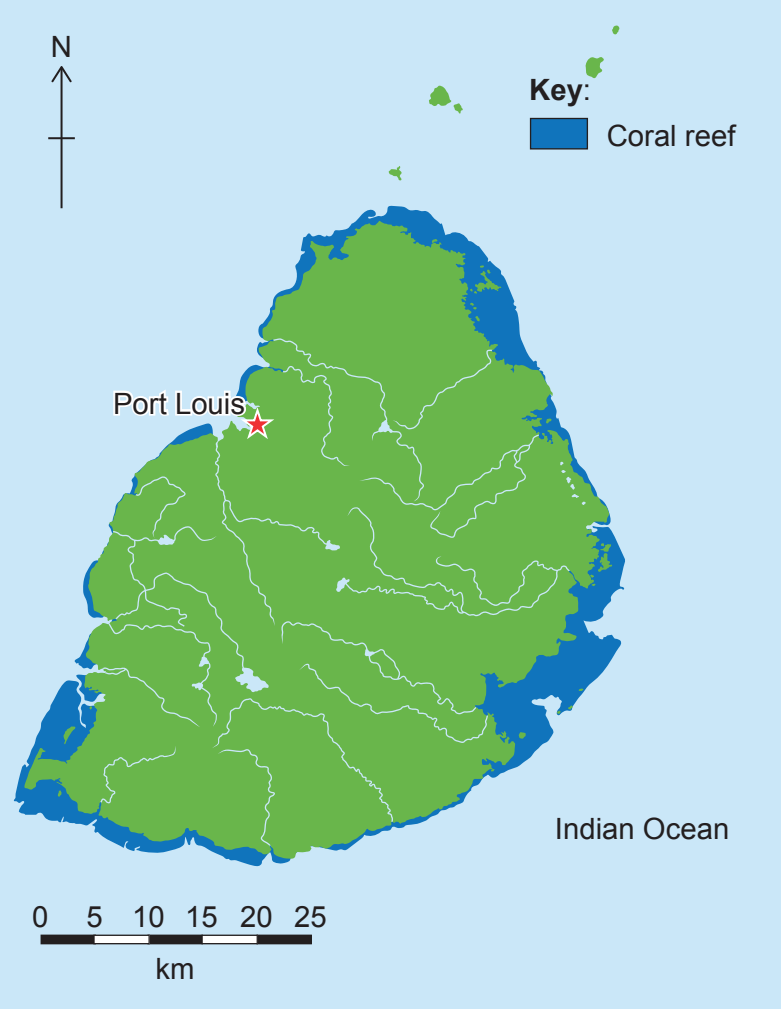


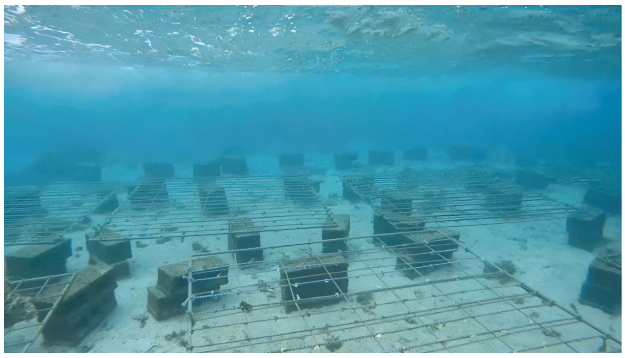
Figure 3(c): Fact file on coral reefs in Mauritius

Corals are damaged by:

- tourist snorkelling, diving, trampling and boat anchors
- pollution including from sewage and agricultural run-off
- overfishing and use of destructive fishing practices
- increases in water temperatures, ocean acidification and sea-level rise
- increases in number and intensity of storms and cyclones
- extensive predation by crown-of-thorns starfish and *Drupella* sea snails.

Figure 3(d): Coral restoration project in Mauritius

- This project was undertaken to transplant coral fragments (grown in coral nurseries) into degraded sites.
- In August 2023, 25 000 coral fragments were transplanted to 20 km^2 of degraded reef at Pointe aux Feuilles.
- “Before” and “after” photographs of coral regeneration in a seabed nursery:



Before

After

Figure 4(a): Fact file on demography of Mauritius, 2024 est.

Total population	1.3 million
Birth rate	9.8 births per 1000 people
Death rate	9.0 deaths per 1000 people
Total fertility rate	1.36 children per woman
Life expectancy	75.4 years
Urban population	40.9 % (for 2023)
Population growth rate	0.07 %

Figure 4(b): Age–sex pyramid for Mauritius, 2023

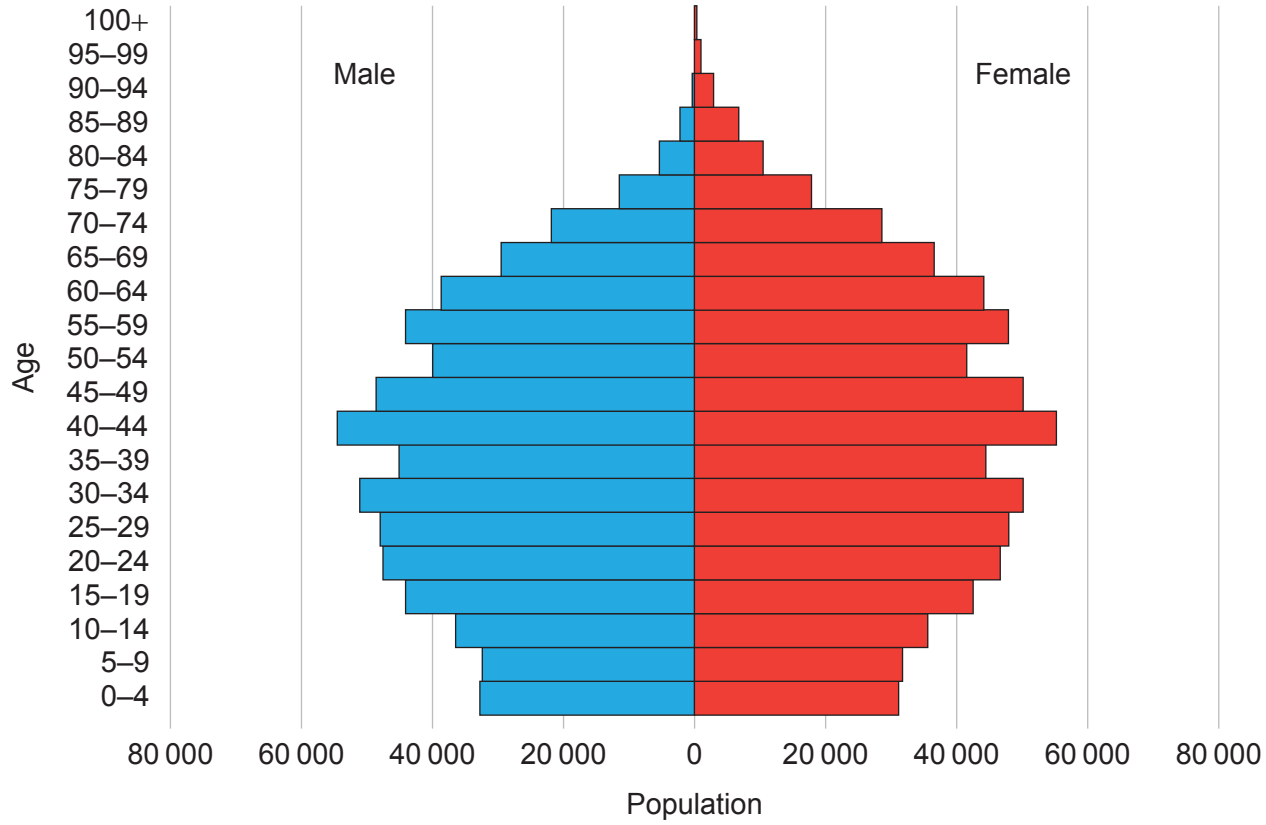


Figure 5(a): Economic activity and land use in Mauritius

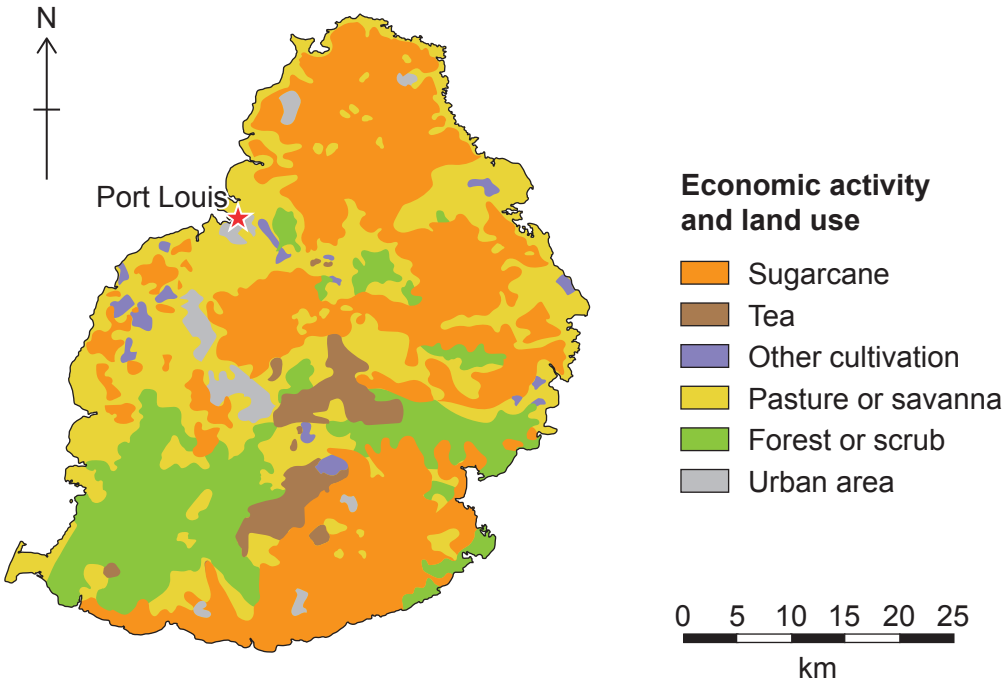
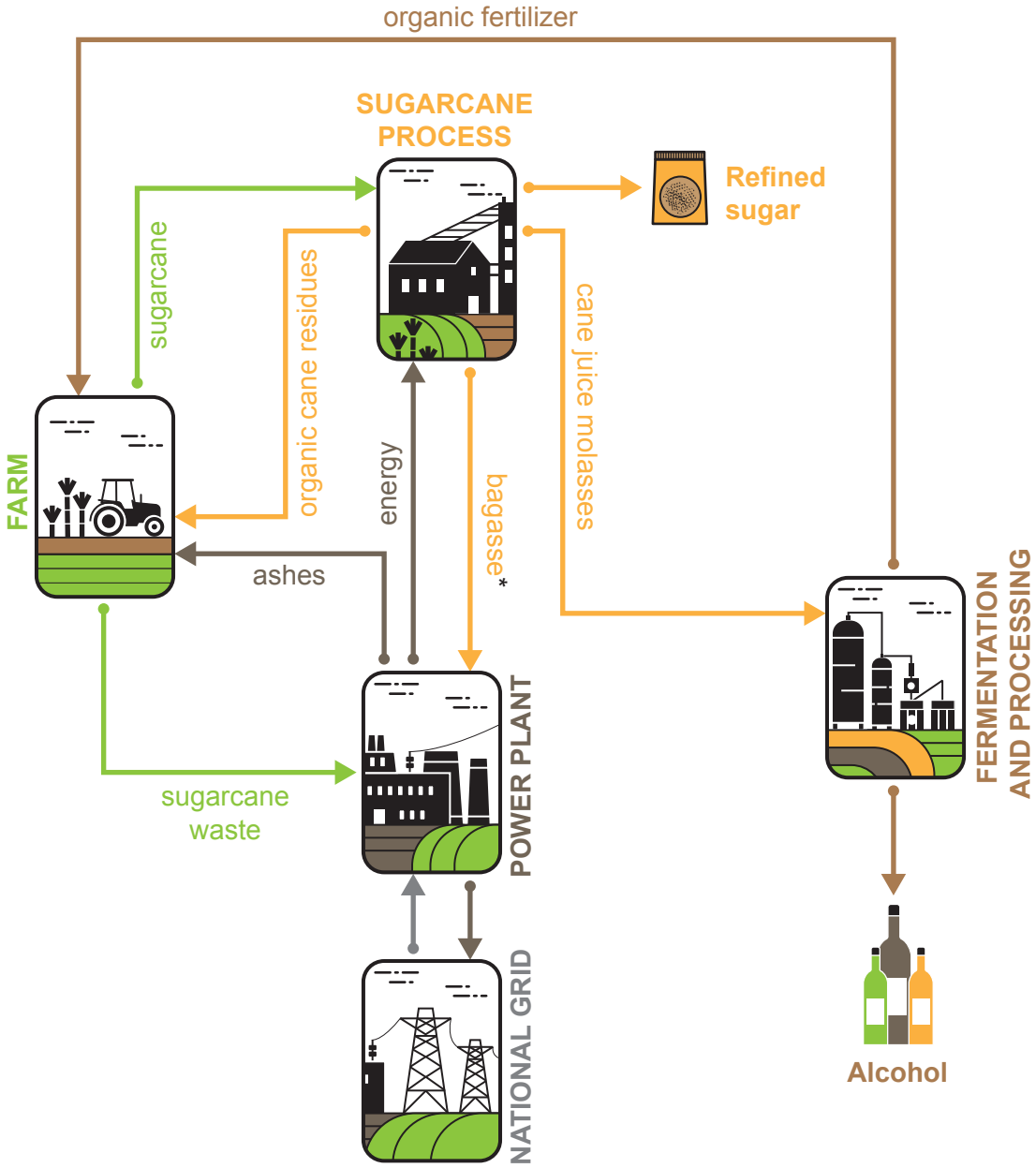


Figure 5(b): Fact file on agriculture in Mauritius

- In 2024, Mauritius produced about 30 000 metric tonnes of sugarcane.
- The refined sugar produced is exported across the world.
- Sugarcane is a water-intensive crop. In some regions within Mauritius, rainfall is sufficient throughout the year for sugarcane growth. However, in other regions, surface water or groundwater is needed to irrigate the crops.
- Reductions in the price of sugarcane (since 2006) have led to changes to other agricultural uses by some small-scale farmers.
- Sugar mills are used to refine the sugar. They have also diversified to include electricity generation and ethanol production.
- Although Mauritius also grows other vegetables and fruit, it imports most of its food.

Figure 5(c): Sugarcane processing in Mauritius



* bagasse: dry fibrous material left after crushing sugarcane, used as biofuel for production of heat and electricity

Figure 6(a): Fact file on the blue economy of Mauritius

- The World Bank defines the blue economy as “the sustainable use of ocean resources for economic growth, improved livelihoods and jobs while preserving the health of ocean systems.”
- The blue economy of Mauritius includes:
  - coastal tourism
  - fishing
  - seafood processing
  - seaport activities.

Figure 6(b): Number of tourist arrivals to Mauritius, 2001–2023

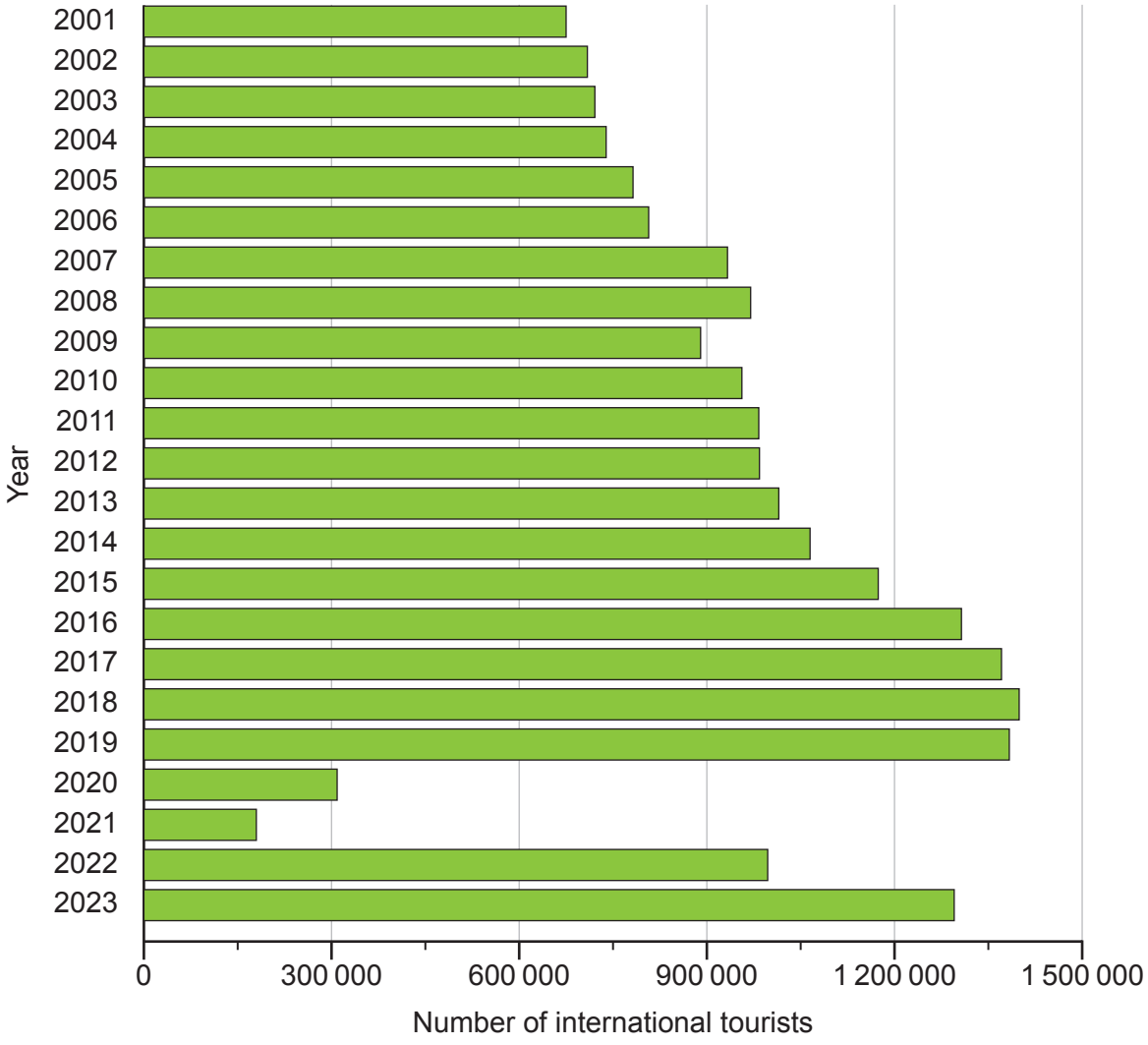


Figure 6(c): Fish production in Mauritius, 2010–2021

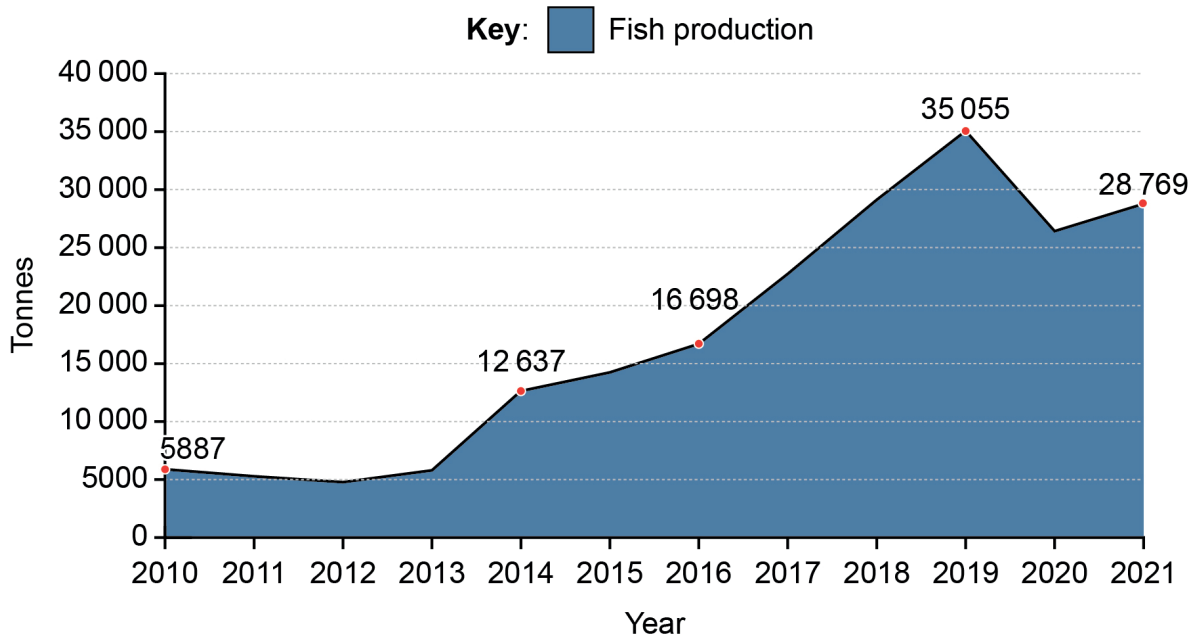


Figure 7(a): Aerial view of Port Louis

Figure 7(b): Monthly average values of PM2.5 levels in the city of Moka, near Port Louis, Mauritius, 2023

The World Health Organization's guideline limit for PM2.5 is 5 micrograms per cubic metre (µg/m³).

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
PM2.5 µg/m³	4.2	3.7	3.6	3.8	3.6	2.7	2.6	2.4	4.3	5.5	2.6	2.6

Figure 7(c): Greening the city of Port Louis

- Green spaces in Port Louis are being expanded, with parks and gardens being renovated.
- The government is encouraging the installation of green walls and green roofs through tax breaks and subsidies.
- Restoration projects in the city include the Citadelle Native Re-vegetation Project, where an area has been restored to a dry forest using endemic plant species.

Figure 8(a): Electricity production in terawatt hours (TWh) by source in Mauritius, 2000–2022

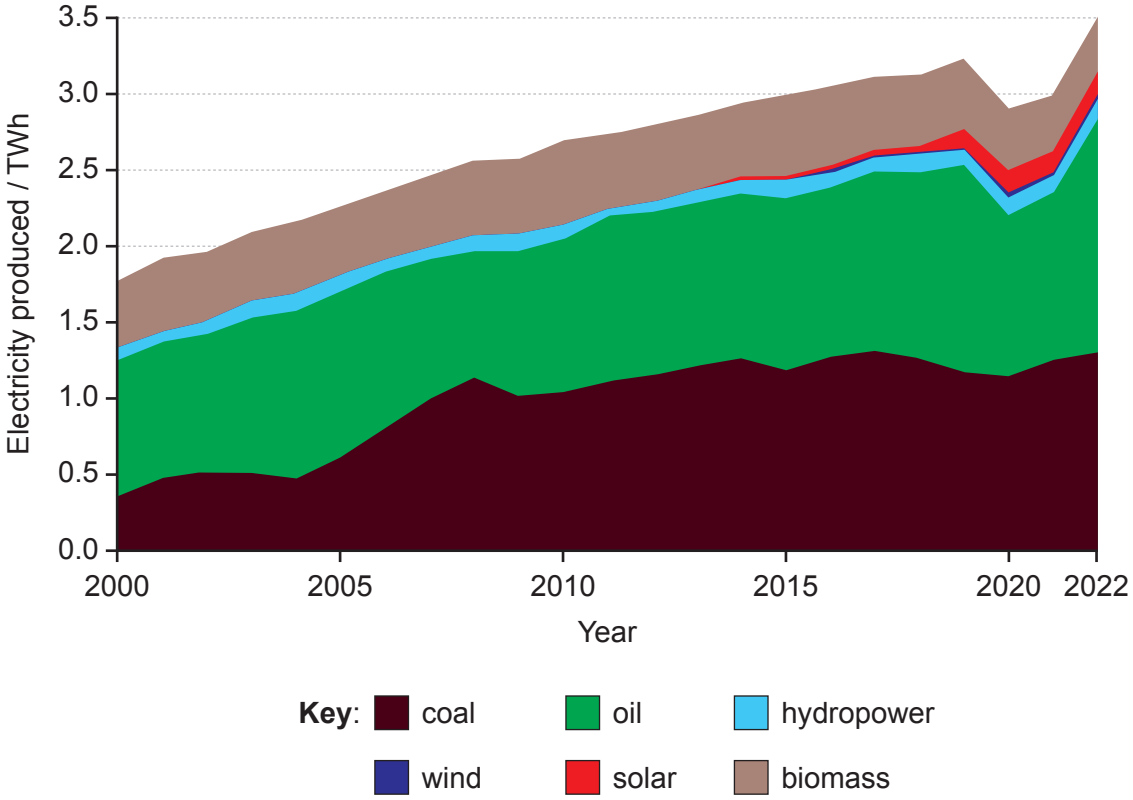


Figure 8(b): Fact file on electricity production in Mauritius

The Renewable Energy Roadmap 2030 was set out by the government in 2021, with the aim to:

- increase the use of renewable energy in the production of electricity to 60 % by 2030
- phase out the use of coal in electricity production by 2030
- increase energy efficiency by 10 % by 2030 (compared with 2019 levels).

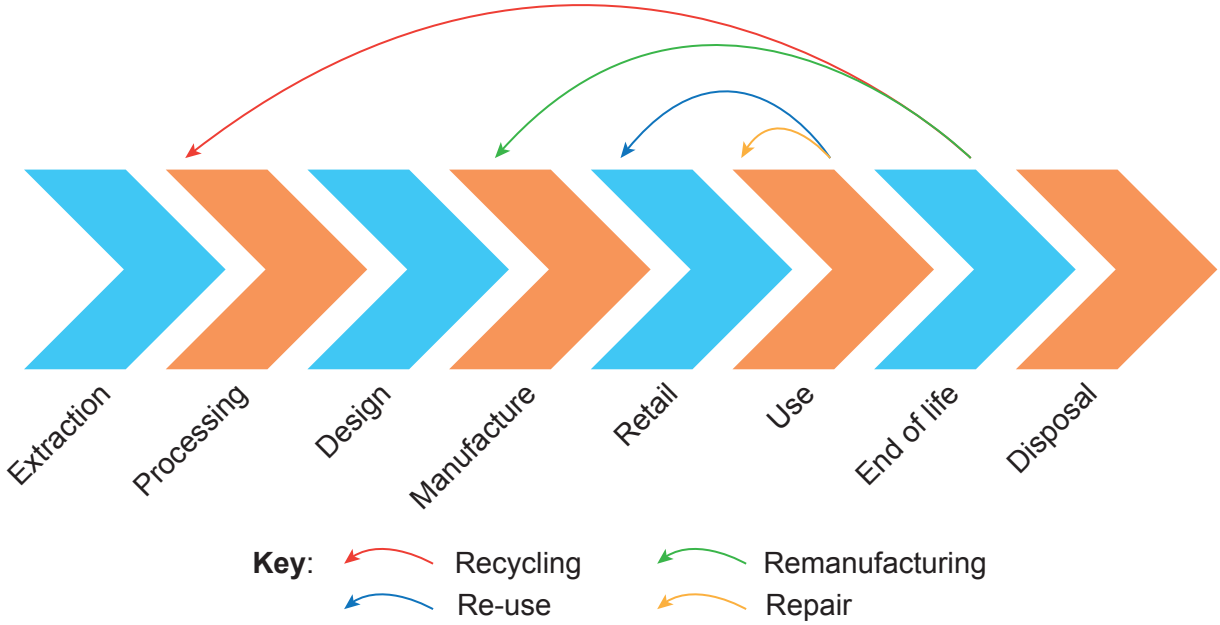
Figure 9(a): Fact file on waste management in Mauritius

The Mauritius National Solid Waste Management Strategy and Action Plan includes:

- plans to separate waste at the source, to recover reuseable and recyclable materials
- plans to set up regional sorting and composting sites
- plans to reduce the volume of waste going to landfill by 70 %.

Mauritius is also aiming to move to a more circular economy, as well as to become plastic-free by 2030, with a ban in place for the use of some single-use, non-biodegradable plastics.

Figure 9(b): An example of plastic waste management in a circular economy



Circular options for plastic	
Recycled	Waste plastic can be turned into jars, carpet, clothing, industrial strapping, rope and automotive parts, for example
Remanufactured	Turned into pellets and used to remanufacture containers
Re-used	Re-use of bottles is possible if the latter is designed for reuse
Repaired	Bottles if conceived for reuse can be repaired

Figure 10(a): Carbon dioxide emissions (tonnes of CO_2 per year) by sector in Mauritius, 1990–2020

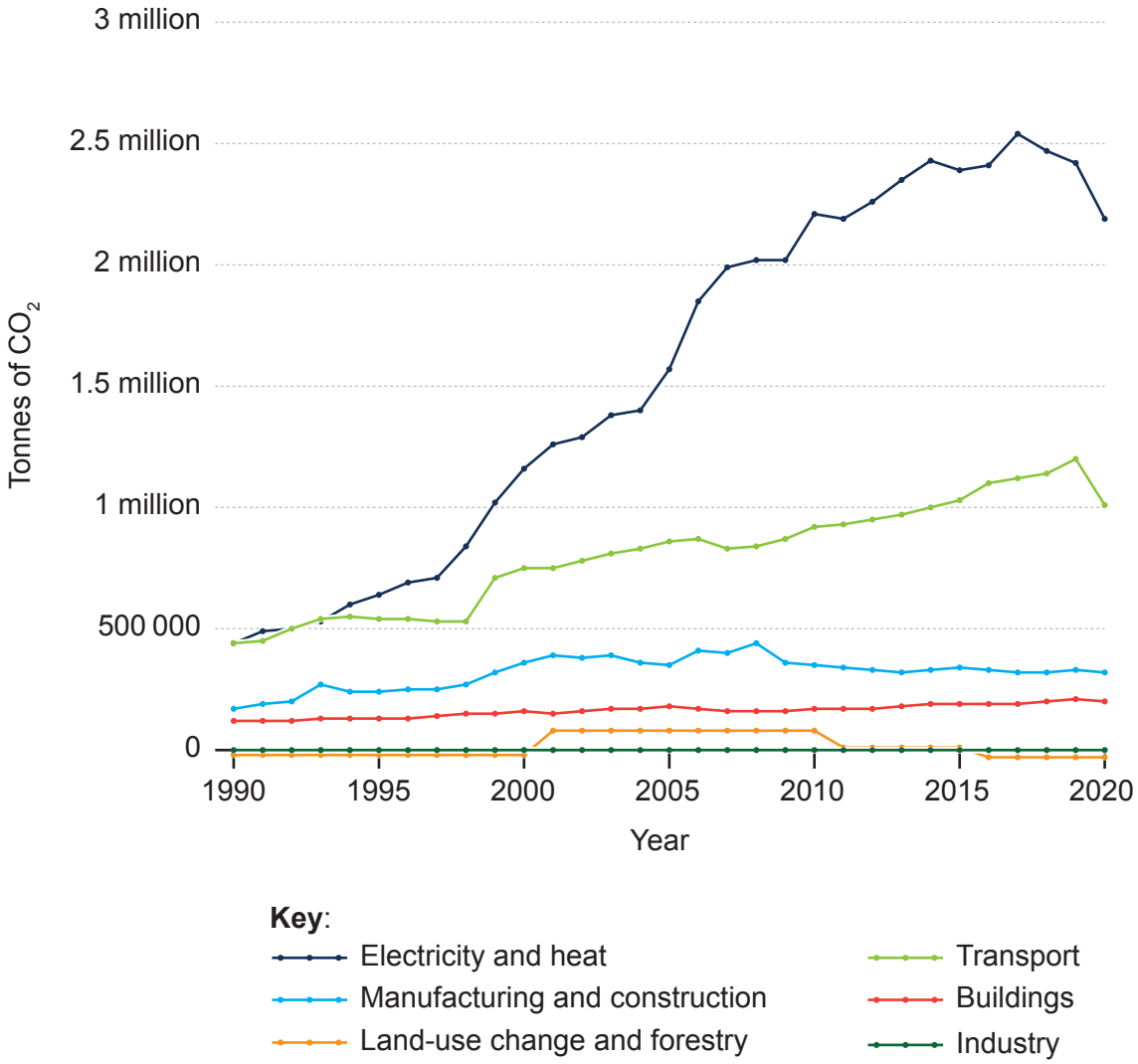


Figure 10(b): Cyclones in Mauritius

- Cyclones are tropical storms which feature strong winds, heavy rainfall and high waves.
- The cyclone season in Mauritius is between November and May, with an average of five cyclones per year.
- Cyclone Belal was the strongest cyclone to land in Mauritius in recent years. In January 2024, winds reached velocities of 148 km per hour and led to floods and damage in Port Louis.

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Figure 11: Ecological footprint and biocapacity for Mauritius, 1961–2022

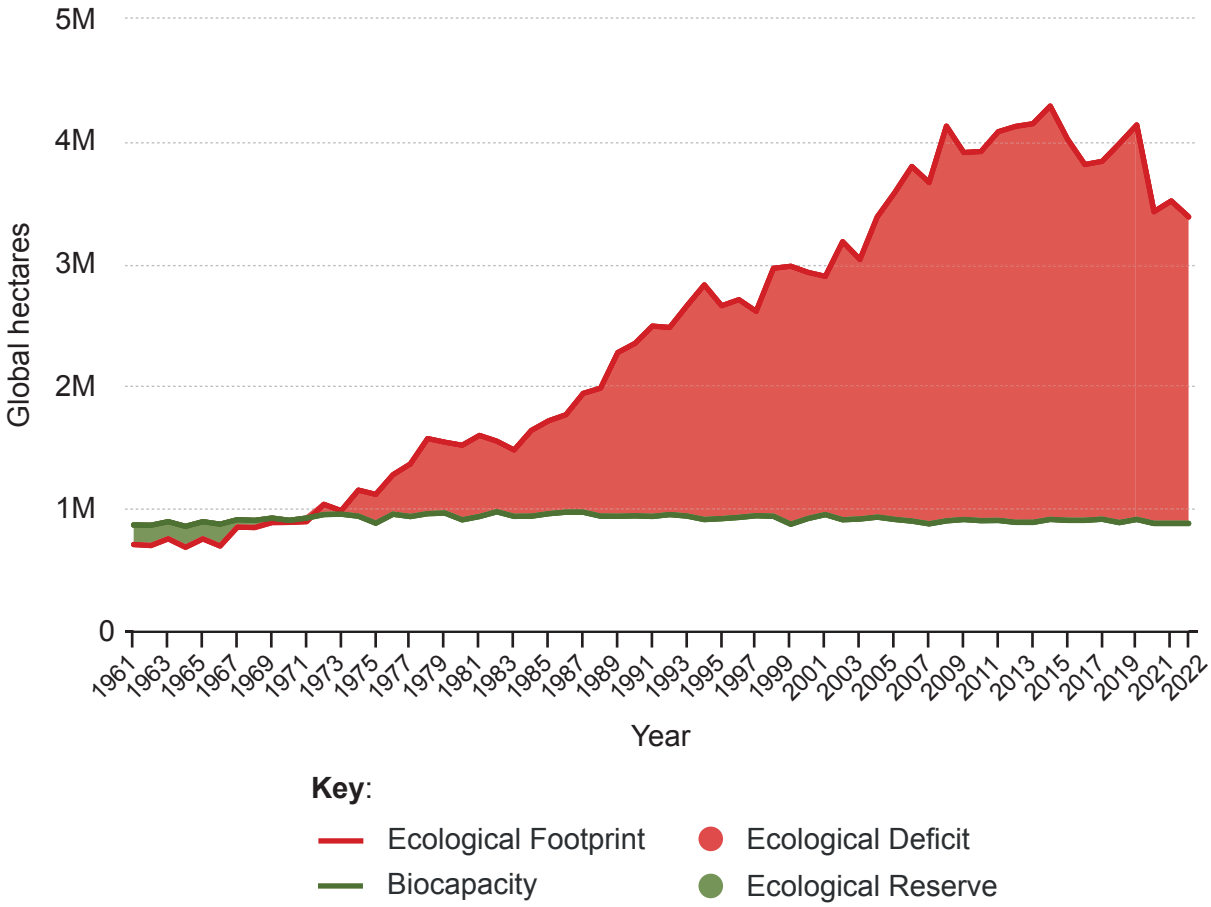

Figure 12: Fact file on environmental funding for Mauritius

- Mauritius is a Small Island Developing State (SIDS).
- SIDS are a group of low-lying developing nations with similar issues (such as small size, geographical remoteness, limited resources and exports and high vulnerability to economic and environmental crises).
- SIDS are at high risk from the impacts of climate change (including sea-level rise, coral bleaching, coastal erosion, drought and flash floods).
- In 2022, the government of Mauritius approved a national strategy to become more environmentally sustainable and resilient to climate change within 10 years.
- The cost of implementing this plan was then estimated at 2.3 billion USD (US dollars).
- The government of Mauritius has committed to paying 35 % of the cost but hopes the remainder will be paid by programmes such as the United Nations Environment Programme's (UNEP) Environment Fund.
- Contributions to the UNEP Environment Fund are to be made by the 193 member states of the United Nations. However, some member countries are not fulfilling their original commitments.
- As a result, Mauritius and other SIDS are having difficulties in implementing necessary changes.

References:

Figure 1(b): Freeworldmaps.net, n.d. *Physical map of Mauritius - major physical features of Mauritius*. [image online] Available at: https://www.freeworldmaps.net/africa/mauritius/ [Accessed 3 September 2024]. Source adapted.

bogdanserban, 2023. *Mauritius islands physical map*. [image online] Available at: https://www.gettyimages.co.uk/detail/illustration/mauritius-islands-physical-map-royalty-free-illustration/1492846421?adppopup=true [Accessed 30 September 2025]. Source adapted.

Figure 2(c): Norder, S.J, Seijmonsbergen, A.C., Rughooputh, S.D.D.V., van Loon, E.E., Tatayah, V., Kamminga, A.T., and Rijsdijk, K.F., 2017. Assessing temporal couplings in social–ecological island systems: historical deforestation and soil loss on Mauritius (Indian Ocean). *Ecology and Society* Vol. 22, No. 1, March 2017. Available at: https://www.ecologyandsociety.org/vol22/iss1/art29/ [Accessed 3 September 2024]. p. 4. Source adapted.

Figure 3(a): Earp, H.S., Prinz, N., Cziesielski, M.J. and Andskog, M. https://commons.wikimedia.org/wiki/File:Interdependencies_of_coral_reef,_seagrass_and_mangrove_ecosystems.png. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/deed.en. Source adapted.

Figure 3(b): Marsala, V.; Galli, A.; Paglia, G.; Miccadei, E. Landslide Susceptibility Assessment of Mauritius Island (Indian Ocean). *Geosciences* **2019**, *9*, 493. https://doi.org/10.3390/geosciences9120493. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.

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Figure 3(d): With permission from EcoMode Society.

Figure 4(a): Central Intelligence Agency, 2024. *Mauritius — People and Society*. The World Factbook. [online] Available at: https://www.cia.gov/the-world-factbook/countries/mauritius/ [Accessed 3 September 2024]. Public domain. Source adapted.

Figure 4(b): Central Intelligence Agency, 2024. *Mauritius — Age structure*. [image online] The World Factbook. Available at: https://www.cia.gov/the-world-factbook/countries/mauritius/ [Accessed 3 September 2024]. Public domain. Source adapted.

Figure 5(a): Mauritius - Economic Activity and Land Use map. https://maps.lib.utexas.edu/maps/mauritius.html. Courtesy of the University of Texas Libraries, The University of Texas at Austin. Source adapted.

bogdanserban, 2023. *Mauritius islands physical map*. [image online] Available at: https://www.gettyimages.co.uk/detail/illustration/mauritius-islands-physical-map-royalty-free-illustration/1492846421?adppopup=true [Accessed 30 September 2025]. Source adapted.

Figure 5(c): With permission from Mauritius Sugar Syndicate.

Figure 6(a): Jongman, B., Goizueta, G.G., van Zanten, B., and Reguero, B.G., 2021. Blue barriers: A nature-based solution to build resilience. Development and a Changing Climate, World Bank Blogs [blog] 24 February. Available at: https://blogs.worldbank.org/en/climatechange/blue-barriers-nature-based-solution-build-resilience [Accessed 21 October 2025]. Source adapted.

Figure 6(b): The World Bank Group, 2025. *International tourism, number of arrivals — Mauritius*. [online] Available at: https://data.worldbank.org/indicator/ST.INT.ARVL?end=2020&locations=MU&start=1995&view=chart [Accessed 3 September 2024]. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.

Figure 6(c): Senedhun, V., Fujimori, Y., Tojo, N., Tomiyasu, M., Nazurally, N., Emrith, V., & Ruttanah, A. (2026). Evolving Fisheries in Mauritius: Regulatory Advances, Challenges, and the Path to Sustainability. *Western Indian Ocean Journal of Marine Science*, 25(1), 63–76. https://doi.org/10.4314/wiojms.v25i1.5. Open access article under CC CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.

Figure 7(a): fredsebowa, 2023. *Aerial view of Port Louis, Mauritius*. [image online] Available at: https://www.gettyimages.co.uk/detail/photo/aerial-view-of-port-louis-mauritius-royalty-free-image/1490418453 [Accessed 30 September 2025]. Source adapted.

Figure 7(b): IQAir, 2024. *World's most polluted cities 2017–2024*. Available at: https://www.iqair.com/gb/world-most-polluted-cities?continent=59af92713e70001c1bd78e4e&country=SafFXFYDC3JjGpJSJ&state=&sort=-rank&page=1&perPage=50&cities= [Accessed 30 September 2025]. Source adapted.

Figure 8(a): Hannah Ritchie and Pablo Rosado (2025) - "Energy" Published online at OurWorldinData.org. Retrieved from: 'https://ourworldindata.org/profile/energy/mauritius' [Online Resource]. Data source: Ember (2026); Energy Institute - Statistical Review of World Energy (2025). Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.

Figure 9(b): OECD (2019), Business Models for the Circular Economy: Opportunities and Challenges for Policy, https://www.oecd.org/en/publications/business-models-for-the-circular-economy_g2g9dd62-en.html. This is an adaptation of an original work by the OECD. The opinions expressed and arguments employed in this adaptation should not be reported as representing the official views of the OECD or of its Member countries.

Figure 10(a): Hannah Ritchie and Pablo Rosado (2025) - "CO_2 and Greenhouse Gas Emissions" Published online at OurWorldinData.org. Retrieved from: 'https://ourworldindata.org/profile/co2/mauritius' [Online Resource]. Data source: Climate Watch (2026). Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted

Figure 11: Footprint Data Foundation, York University Ecological Footprint Initiative, and Global Footprint Network: National Footprint and Biocapacity Accounts, 2025 edition. Downloaded [3 September 2024] from https://data.footprintnetwork.org. Licensed under CC BY-SA 4.0 https://creativecommons.org/licenses/by-sa/4.0/. Source adapted.