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Climate Change Impacts in Fiji

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Fiji

- Location: Southwest Pacific Ocean- Longitudes 175° East and 178° West and latitudes 15° and 22° South
- Islands: 332 (100 occupied)
- Population: 884,887 (based on 2017 census)
- Main islands: Viti Levu and Vanua Levu
- Major industries: sugar, tourism, mining, fishing and logging

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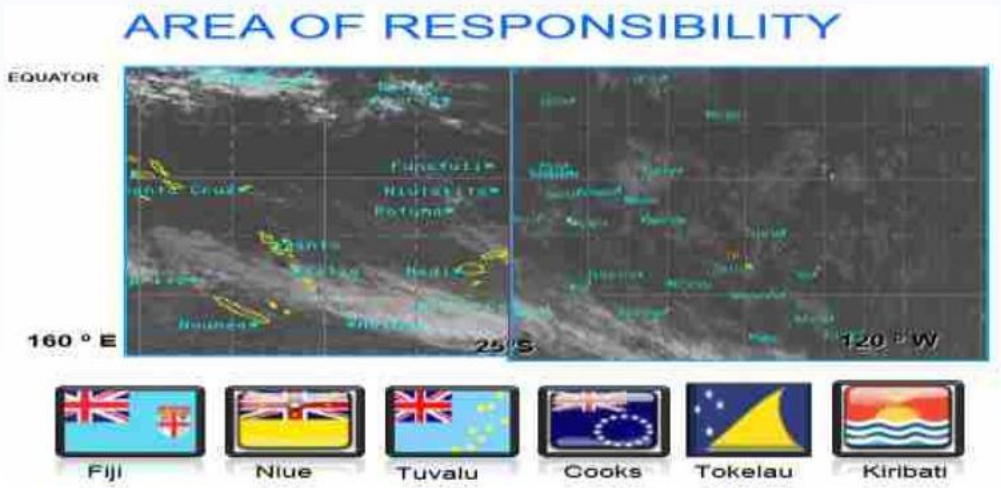
FIJI METEOROLOGICAL SERVICE

- Responsible for providing weather, hydrological and climate service to Fiji.
- Serves on a regional scale providing weather forecasting and tropical cyclone warning services to many other countries and a vast area of the tropical South-west Pacific.



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Climate of Fiji

- Fiji has a warm tropical climate.

✓ All months have mean temperatures warmer than 18 °C.

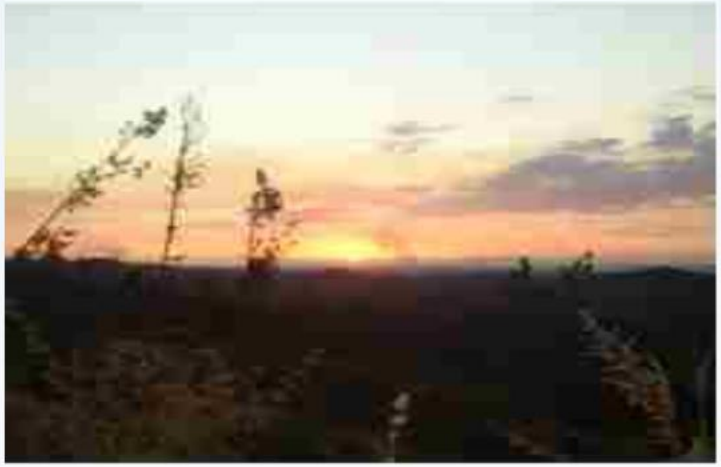
- Average night-time temperatures can be as low as 18 °C around the coast and may drop even lower in the interior of the larger islands.

- Average maximum day-time temperatures can be as high as 32°C.

- Two distinct seasons

✓ A warm wet season from November to April

✓ A cool dry season from May to October



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Drivers of Fiji's Climate

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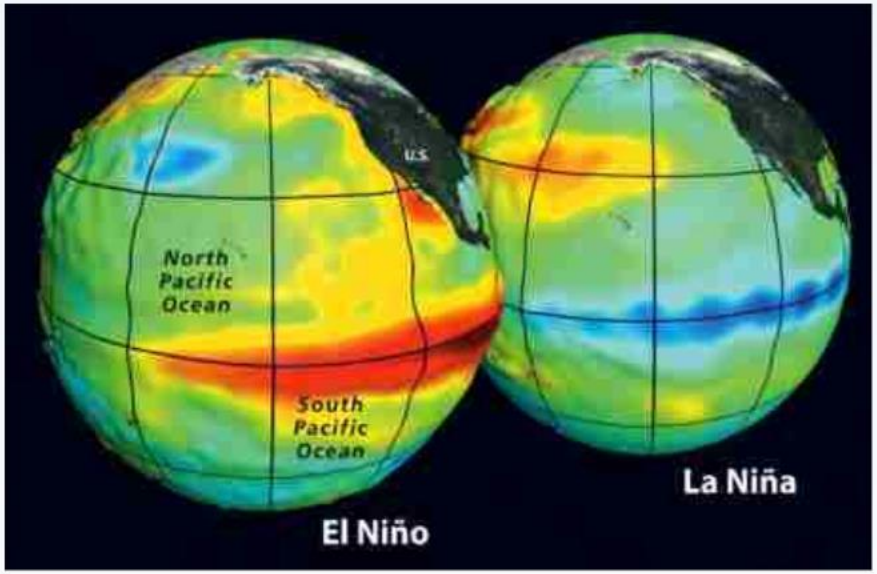
El Niño Southern Oscillation

- Most important driver of the year to year variability of Fiji's climate
- 2 extreme phases : El Niño and La Niña.
- Affects the year to year risk of droughts, floods, tropical cyclones and sea levels.
- La Niña event usually brings wetter than normal conditions
- El Niño event usually brings drier than normal conditions



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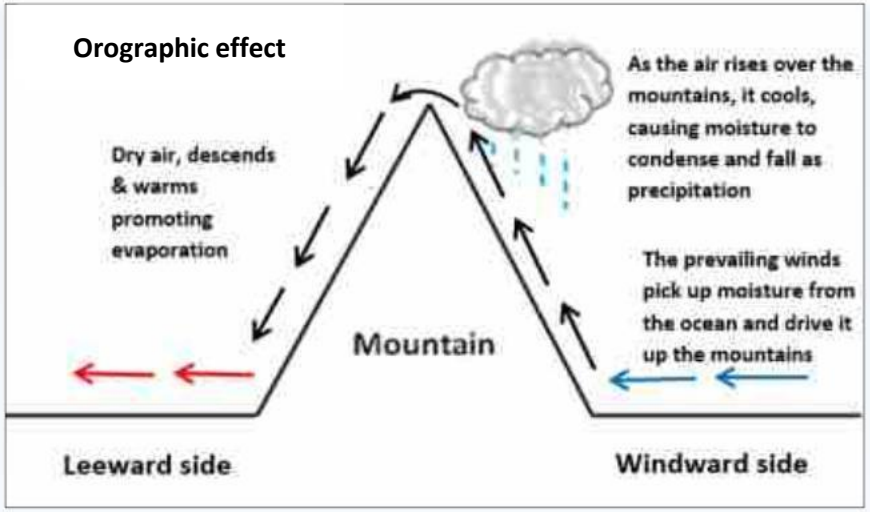
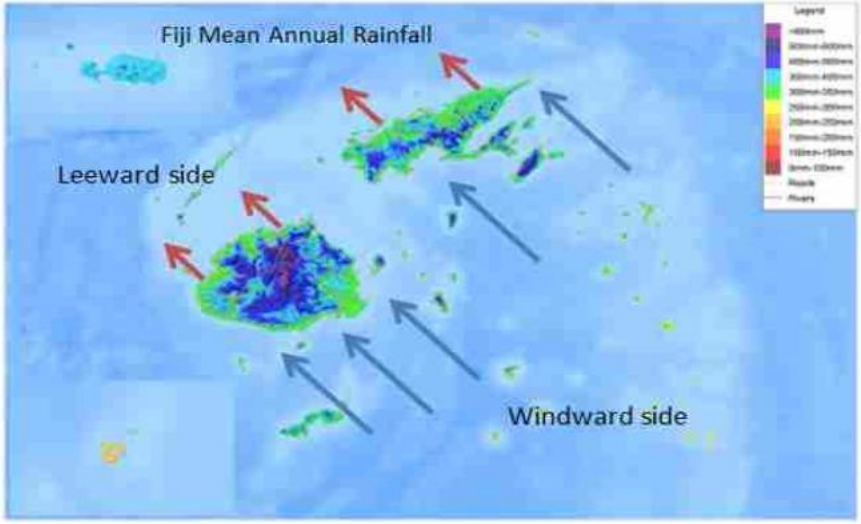
Orographic Rainfall

- Rainfall is highly variable and mainly orographic (influenced by the mountains and the prevailing south- east trade winds)
- The mountains of Viti Levu and Vanua Levu create wet zones on their windward sides and dry zones on their leeward sides.
- Windward (south-eastern) parts on main islands receive mean annual rainfall >3000mm.
- Leeward (north-western) sides of the main islands receive mean annual rainfall <2000mm.





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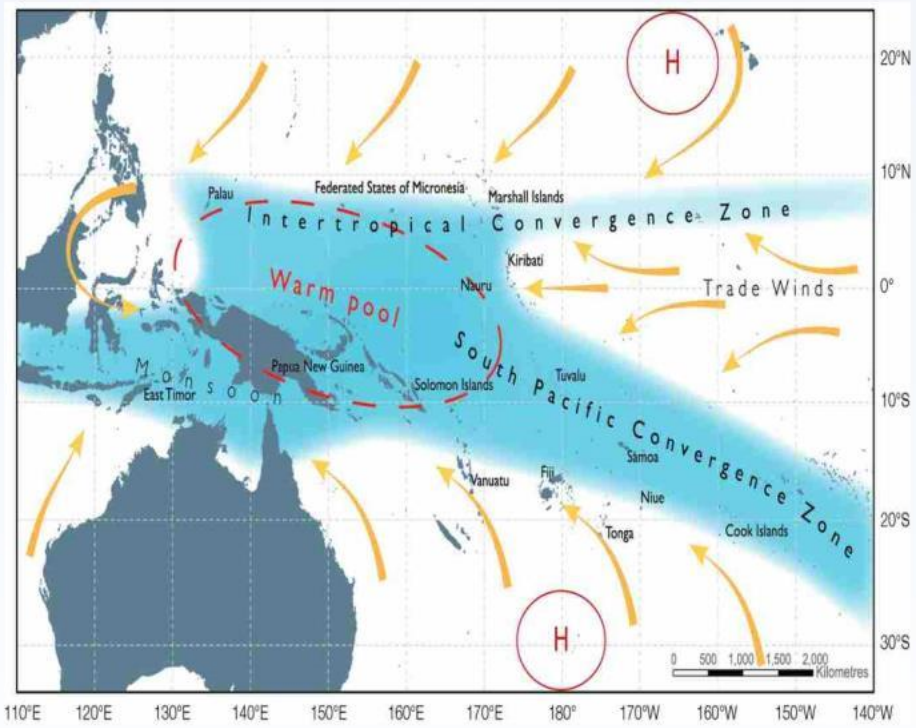
Movement of South Pacific Convergence Zone (SPCZ)

- South Pacific convergence zone (SPCZ) is the main rainfall producing system for region
- SPCZ is a band of heavy rainfall
- It extends from the Solomon Islands to the east of cook Islands
- Much of Fiji's rainfall is associated with the movement of the SPCZ
  - ✓ In wet season SPCZ lies over Fiji
  - ✓ In dry season it moves a few hundred kilometres north east and weakens



Climate Trends

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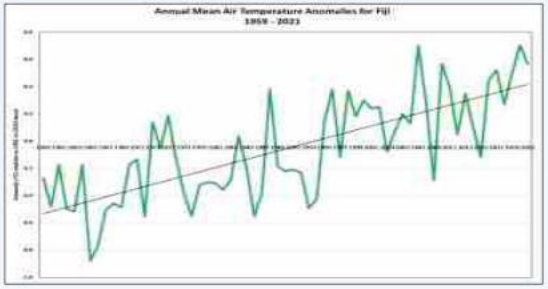
Mean Air Temperature

- National mean annual air temperature has increased by *1.0°C* between 1959 and 2022.

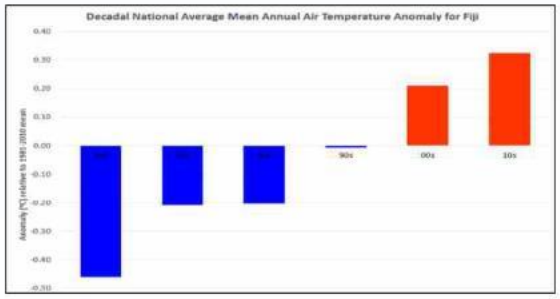


Time series of national average mean annual air temperature anomaly relative to 1981-2010 mean together with the associated trend.

- The year 2022 was warmest year on record in Fiji
- National average mean air temperature during 2022 was 26.5°C (*0.9°C warmer than the normal*)

Top 10 warmest national average mean air temperatures for Fiji.

- The most recent decade ending in 2020 was warmest on record in Fiji.



Decadal national average mean annual air temperature anomalies for Fiji.

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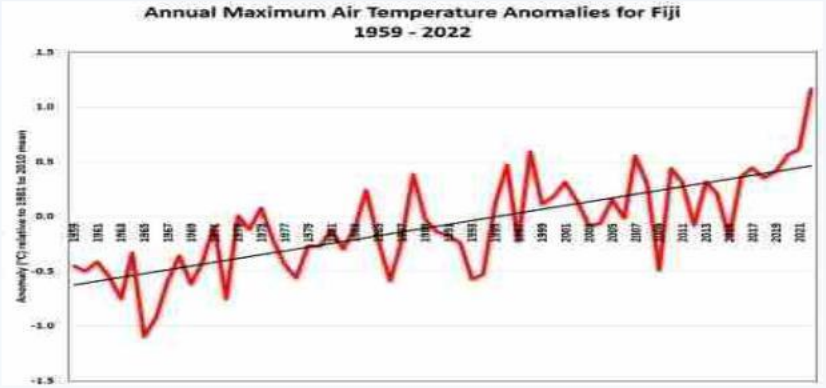
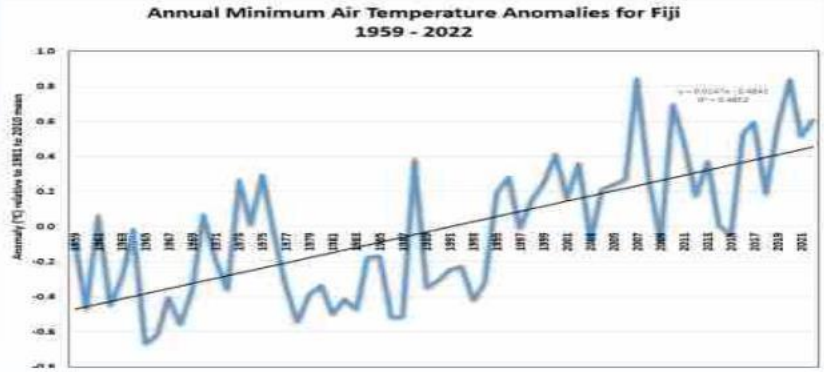
Maximum & Minimum Air Temperature

- National average maximum air temperature has increased by *1.1°C* between 1959 and 2022.
- National average annual maximum air temperature during 2022 was 30.4°C (*1.2°C warmer than the normal*)
- Warmest national annual maximum air temperature since 1959.



Time series of national average annual maximum air temperature anomaly relative to 1981-2010 mean together with the associated trend.

- National average minimum air temperature has increased by *0.9°C* between 1959 and 2022.
- National average annual minimum air temperature during 2022 was 22.6°C (*0.6°C warmer than the normal*)
- 4th warmest annual minimum air temperature on record since 1959.



Time series of national average annual minimum air temperature anomaly relative to 1981-2010 mean together with the associated trend.

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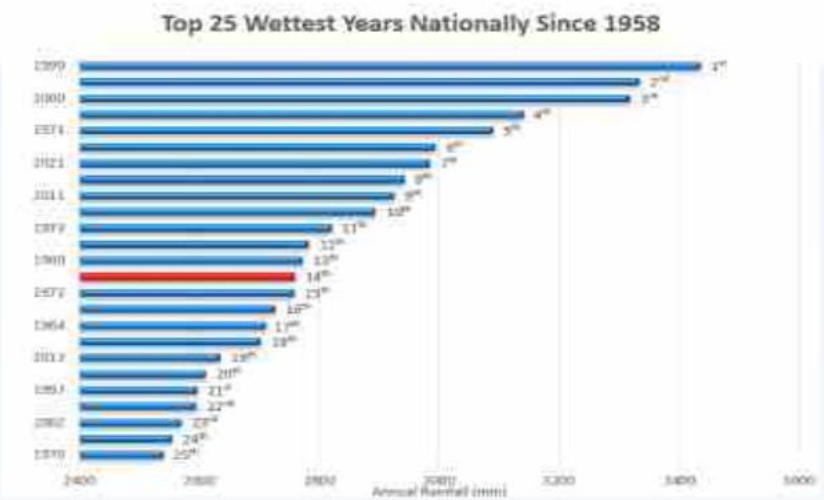
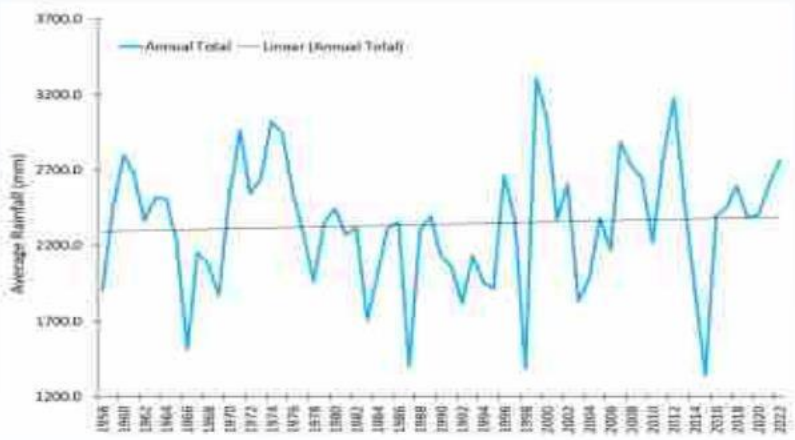
Rainfall

- National average rainfall for 2022 was 2759mm (122% of the long term average)
- 14th wettest year in 65 years of record.



National average annual rainfall ranking.

- Annual average rainfall is not showing any significant increasing or decreasing trend between 1958 to 2022.
- Large year-to-year variability associated with the El Niño and La Niña events.



Time series of national average annual rainfall from 1958 to 2022

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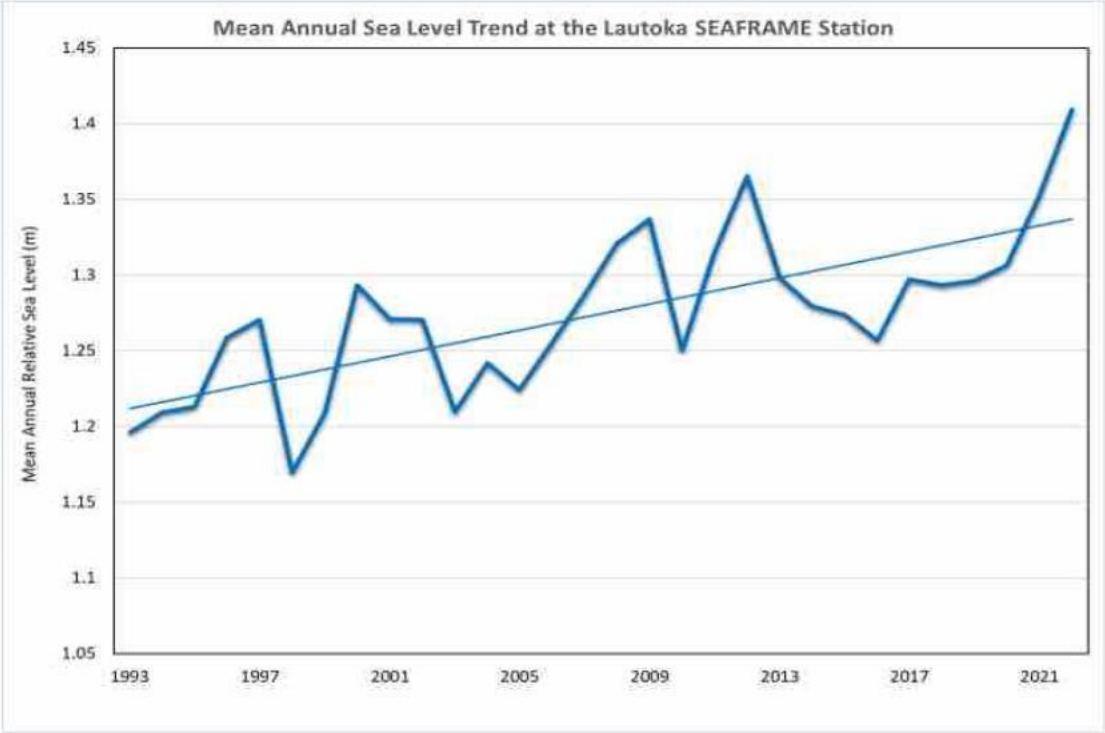
Sea Level

Sea level monitoring station at the Lautoka Wharf had a sea level trend with 4.3mm/year between 1993 to 2022.



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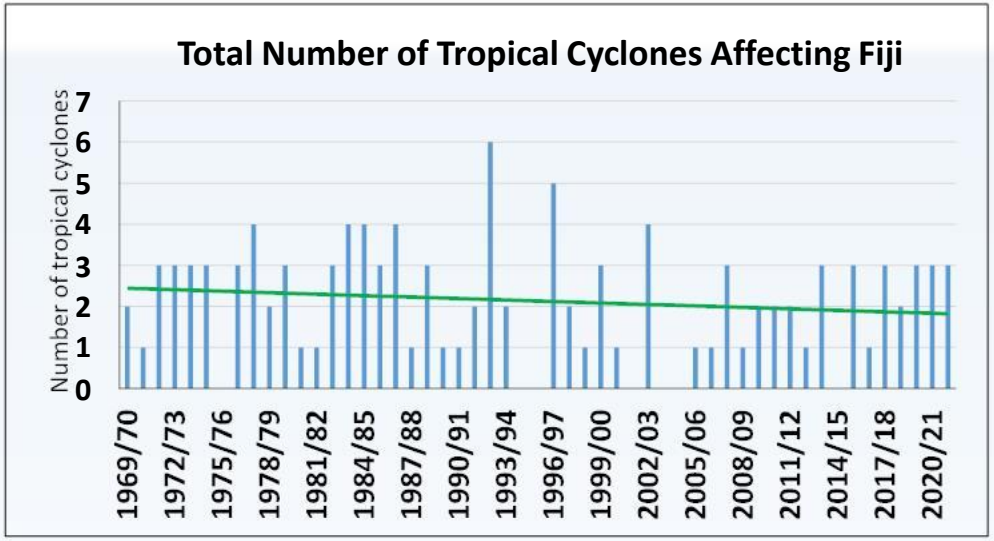
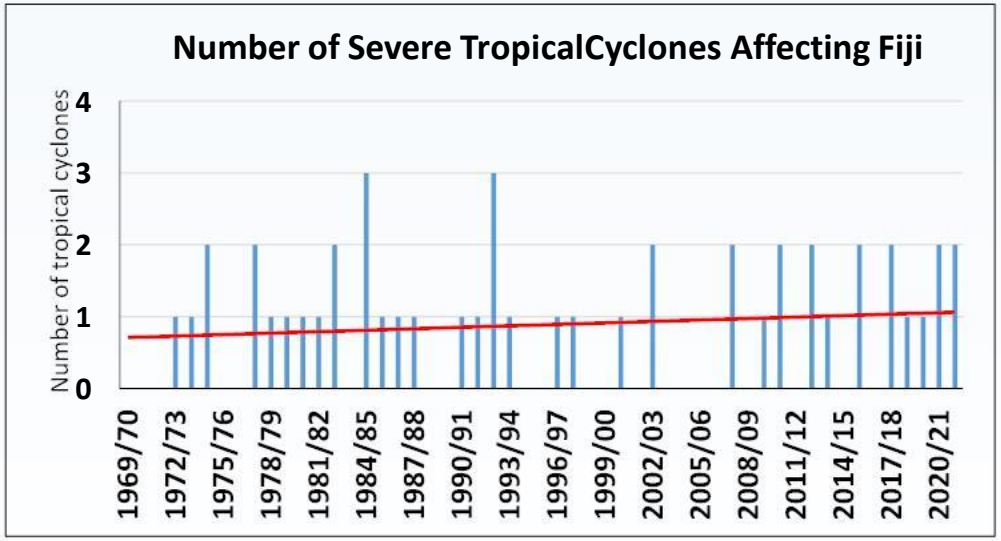
Tropical Cyclones

- On average, 1 to 2 cyclones affect some part of Fiji every season.
- The total number of tropical cyclones have decreased from 1969/70 to 2021/2022 seasons.
- The number of severe tropical cyclones (Cat 3- Cat 5) have increased from 1969/70 to 2021/2022 seasons.





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Climate change & its impact on Fiji

Fiji is among the most vulnerable countries to the adverse impacts of climate variability and climate change.

Vulnerability results from:

- geographic: low elevation and small size
- demographic: high population densities, household size
- socio-economic: low income, educational & occupational level

It is projected that Fiji will suffer from the following effects, due to global warming:

- sea level rise
- increasing temperatures
- more frequent strong tropical cyclones
- ocean acidification
- more drought and extreme rainfall

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Sectors likely to be affected by climate change

Climate change has already started to affect several sectors in Fiji. Here are some of the sectors that have experienced or are likely to experience impacts:

1. Agriculture: faces challenges from climate change, droughts, floods, changes in growing seasons, impacting crop yields, livelihoods and food security due to changes in rainfall, temperatures, and extreme weather events.

2. Fisheries and marine resources: coral reefs are damaged by rising ocean temperatures and coral bleaching, affecting marine biodiversity and fish populations, negatively impacting the fishing industry and economy.

3. Water resources: impacted by changing rainfall patterns and higher temperatures, causing droughts, flooding, and contamination, affecting availability, sanitation, and quality.

http://www.radionz.co.nz/international/pacific-news/284634/thousands-affected-by-fiji-drought

https://mission-blue.org/2016/08/coral-reef-recovery-in-fiji/

https://earth-chronicles.com/natural-catastrophe/flooding-in-fiji.html

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Sectors affected by climate change

4. Coastal and infrastructure: Rising sea levels, coastal erosion and storm surges cause land loss, infrastructure damage and threats to coastal communities, affecting agriculture, settlements, and infrastructure like roads and buildings.

5. Tourism: Fiji's tourism industry relies on natural attractions like coral reefs, beaches, and scenic landscapes. Coral bleaching, coastal damage, and extreme weather events could impact tourism, revenue, employment, and economy.

6. Health: Climate change impacts Fiji's public health indirectly through increased temperatures, precipitation patterns, and disease spread, while natural disasters and extreme weather events pose risks to safety and public health.

7. Energy: Changes in rainfall patterns can impact hydroelectric power generation, while increased energy demand for cooling during hotter periods can strain electricity supply and infrastructure.

https://www.nbcnews.com/news/world/fiji-cleans-after-cyclone-winston-kills-17-flattens-villages-n523246

https://earth-chronicles.com/natural-catastrophe/flooding-in-fiji.html

https://asiapacificreport.nz/2023/04/26/conserve-energy-plea-to-fiji-as-monasavu-nadarivatu-dams-run-low/

Experiences & Practices

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Vunidogoloa Village

- Vunidogoloa was the first Fijian village to experience the impacts of climate change.
- 26 houses and 32 families
- In 2006 - floods and erosion caused by both sea-level rise and increased rains, started to become stronger, reaching homes and destroying crops.

In 2014, Vunidogoloa village (approximately 153 villagers) in Fiji was the first village to be relocated under Fiji's Climate Change Programme.

Remnants of broken seawall due to sea level rise in Vunidogoloa

Repeatedly destroyed makeshift walkway from catastrophic waves.

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Veivatuloa Village

- More than 20 houses by the shoreline were hugely impacted by the inundation of sea water into the village**.**

https://fijisun.com.fj/tag/veivatuloa-village/

- Old seawall built by villagers could no longer protect the village from the rise in sea water levels which broke through the structure.

- High tide, water would come into the village at **50** to **75** metres inland.

https://www.fijitimes.com.fj/its-a-hard-life-district-rep-requests-pm-for-sea-wall/

The villagers identified a piece of land to relocated. The Fijian Government assisted the families to move (relocate) further inland to build their houses. Villagers were reminded that, those who intend to build their homes are to do so on higher grounds.

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1997-98 Drought

Agriculture

- Staple crops such as taro, cassava and yams were badly affected
- In 1997, only 347,000 tons of sugar were produced, the lowest production since 1985.

https://fijisun.com.fj/2015/07/26/its-a-drought-not-climate-change/

Income and employment

- Sugarcane production, employment opportunities on cane farms, at the sugar mills and their supporting services industries were severely limited.

https://fijisun.com.fj/2017/05/20/old-style-politics-in-cane-fields-is-losing-out/

Health

- Health risks - skin diseases, respiratory infections, asthma attacks, dengue fever, allergies

http://www.wananavukadavu.org/news/tag/drought

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Severe Tropical Cyclone Winston

- Severe TC Winston - most intense tropical cyclone in the Southern Hemisphere (wind speed – 285km/h)
- 44 deaths, 130 injured, 45 hospitalized, 131,000 Fijians homeless
- Water-borne disease cases increased, and had a bad influence on the water and sanitation infrastructure, hygiene, and food production

https://www.newscientist.com/article/2078365-record-global-temperatures-bring-strongest-ever-cyclone-to-fiji/

https://www.rnz.co.nz/international/pacific-news/324544/fiji-to-mark-cyclone-winston-anniversary

- *Remove dying trees near the house and anchor removable objects which can fly in cyclonic winds.*
- *Keep dry non-perishable food ready for emergency.*
- *Built houses that can withstand Category 5 cyclones.*

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Challenges & Initiatives

Fiji faces several challenges related to climate change, but the government and various stakeholders have taken initiatives to address these challenges. Here are some of the key challenges and initiatives related to climate change in Fiji:

Challenges:

1. Limited resources and capacity: Fiji is a small island nation with limited financial and technical resources to tackle the wide-ranging impacts of climate change. Building capacity and securing adequate funding for adaptation and mitigation efforts is a significant challenge.
2. Vulnerability to extreme weather events: Fiji is highly susceptible to the impacts of tropical cyclones, floods, and storms. The frequency and intensity of these events have increased due to climate change, posing risks to infrastructure, livelihoods, and human lives.
3. Relocation of communities: Rising sea levels and coastal erosion are leading to the need for the relocation of vulnerable communities. This process presents challenges related to land availability, social disruption, cultural preservation, and ensuring the well-being of relocated communities.
4. Limited access to clean water: Changes in rainfall patterns and saltwater intrusion pose challenges to water resources in Fiji. Ensuring access to safe and clean water for drinking, agriculture, and other purposes is a significant concern, particularly in drought-prone areas.
5. Agriculture and food security: Climate change impacts, including changing rainfall patterns and increased frequency of extreme weather events, affect agricultural productivity and food security in Fiji. Adapting farming practices, diversifying crops, and enhancing resilience are critical challenges.

Initiatives:

1. National climate change policies: Fiji has implemented national policies and frameworks to tackle climate change, including the National Climate Change Policy and Fiji Climate Change Act, guiding adaptation and mitigation efforts.
2. Renewable energy transition: Fiji has made efforts to transition to renewable energy sources to reduce reliance on fossil fuels and decrease greenhouse gas emissions. This includes promoting solar energy, wind power, and hydroelectricity, with a target of achieving 100% renewable energy by 2030.
3. Adaptation and resilience-building: The Fijian government has prioritized climate change adaptation and resilience-building initiatives. This includes strengthening infrastructure, implementing early warning systems, developing climate-resilient agriculture practices and promoting sustainable land and water management.
4. International climate advocacy: Fiji has played a prominent role in international climate negotiations, advocating for stronger global climate action and highlighting the needs and vulnerabilities of small island developing states (SIDS). Fiji chaired the United Nations Climate Change Conference (COP23) in 2017, emphasizing the importance of "Talanoa" dialogue for inclusive and collaborative climate action.
5. Community-based initiatives: Local communities in Fiji have been actively engaged in climate change adaptation and mitigation efforts. These initiatives involve traditional knowledge, community-based resource management and sustainable livelihood practices to enhance resilience and protect natural resources.

Despite the challenges, Fiji's government and communities are committed to addressing climate change. Collaboration with international partners, innovative solutions and community participation are crucial elements in Fiji's efforts to mitigate the impacts of climate change and build a more resilient future.

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Thank you for your attention!