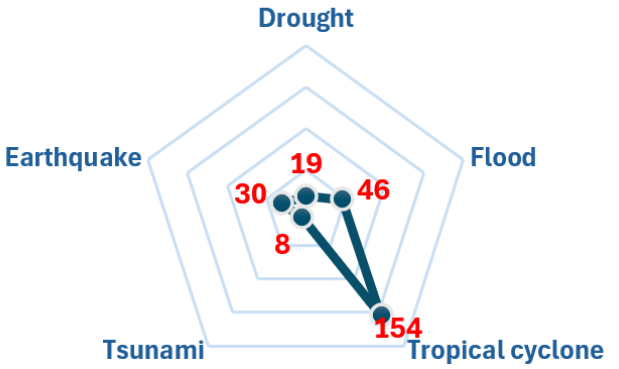
AGRICULTURE CROPS

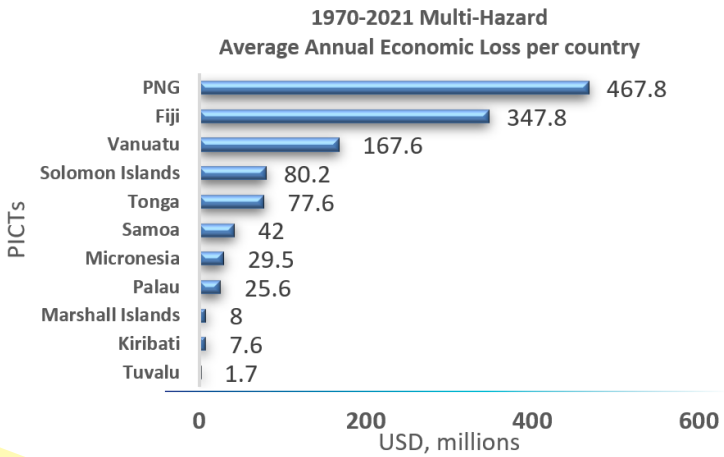
LOSS AND DAMAGE ASSOCIATED WITH CLIMATE CHANGE

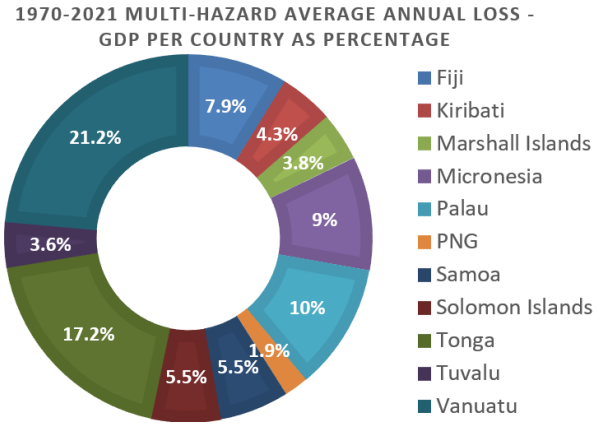
What is Loss and Damage (L&D) under climate change?

Climate change induced loss and damage can be referred to as the destructive impacts that are irreversible or unavoidable. These losses both economic and non-economic are caused by slow onset events such as sea level rise or extreme events such as tropical cyclones.

Major hazards in the Pacific Region from 1970 to 2021

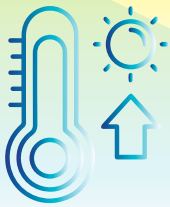




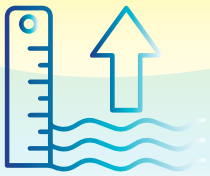


Source: https://rrp.unescap.org/country-profile

What causes climate change related L&D?



Rising temperatures brought on by the atmosphere's high amounts of greenhouse gases



Change of sea level due to changes (melting) in glaciers and ice sheets

Droughts and floods brought on by abrupt and significant changes to the hydrologic cycle

Ocean circulation patterns shifting to produce warm, saline water in the ocean's top levels.

Linkage between climate change and food crops

Factors influencing the local climate include distance from the ocean, latitude, altitude, local terrains, and surface reflectivity. Crop cultivation is suitable to the local climate. However human activities have contributed to positive climate forcing (imposed change of earth's energy balance) which exceeds the physical environment's absorptive capacity to assimilate concentrations of green-house gases emitted into the atmosphere, resulting in warming and rainfall variations. Higher temperature and year-to-year rainfall variations alter the growth, development, seasonality and distribution of various crop species, and impact pest and disease dynamics in agriculture (Taylor et.al 2016). Plant physiological systems such as photosynthesis, metabolic rate and water use efficiency all alter, mostly resulting in loss or damage of crops.

Why is L&D important for Pacific Island countries and territories (PICTs)?

Agriculture remains the backbone of the Pacific Region's economy, with 80% of the population predominantly working as subsistence or semi-subsistence farmers; yet climate change poses an existential threat to current and future lives and livelihoods.

Surrounded by the Pacific Ocean, PICTs are subject to the El Nino-Southern Oscillation (ENSO) phenomenon, one of the key sources of climate variability that has three phases, El Nino, La Nina and Neutral. El Nino and La Nina drive seasonal, interannual and long-term climate variability that affects agriculture productivity in the Region. Future climate forecasts show that the Pacific Region will experience warmer temperatures and rainfall variability while tropical cyclones will intensify, sea level rise will continue, extreme drought and fire dangers heightened (IPCC AR6). These multiple hazards occurring simultaneously will have severe impacts on agriculture systems, resulting in continuous loss and damage and increasing complexity, social and economic costs, and risks to people's lives and livelihood

Some impacts of climate change on agriculture in different regions.

HIGHLANDS

- Loss of pristine forests, biodiversity and ecosystems services due to increasing temperature and rainfall variability
- Landslides due to soil instability
- Loss of arable land due to landslides and deforestation
- Lack of market access and economic loss
- Crop damage from drought and frost
- Loss of soil nutrient through erosion and increased sedimentation
- Changes in pest and disease load and profile
- Loss of traditional farming practices and seasonality
- Loss of indigenous crops species

LOWLANDS

- Loss of arable land due to intense land use and increased use of artificial fertilizers
- Loss of indigenous crops species
- Changes in pest and disease load and profile
- Loss of traditional farming practices and seasonality
- Soil nutrient loss due to extreme temperature and rainfall variability
- Damage to crops and agricultural infrastructure due to severe weather events
- Increase evapotranspiration due to extreme temperature

COASTAL AREAS

- Loss of arable land and ecosystems services due to sea level rise, storm surges and erosion
- Loss of crop species and varieties due to salination
- Increase evapotranspiration due to extreme temperature
- Loss of traditional farming practices and seasonality
- Soil nutrient loss due to high salinity
- Changes in pest and disease load and profile
- Damage to crops and agricultural infrastructure due to severe weather events including tropical cyclones

DID YOU KNOW CLIMATE CHANGE CAUSES DIRECT AND INDIRECT LOSS & DAMAGE?

- THE TWIN TROPICAL CYCLONES IN VANUATU IN 2023 DESTROYED CROPS VALUED AT VUV89.9 BILLION. (SOURCE: POST DISASTER NEEDS ASSESSMENT_VANUATU)

- 51 TONNES OF SOIL PER HACTARE IS LOST ANNUALLY DUE TO EXTREME RAINFALL IN FIJI

- **THE GEOGRAPHICAL DISTRIBUTION OF INVASIVE SPECIES IS INFLUENCED BY BOTH BIOTIC AND ABIOTIC FACTORS INCLUDING VARIABLE TEMPERATURES AND PRECIPITATION.**
- **COCONUT RHINOCEROS BEETLE THRIVE IN VERY WET AND DRY CONDITIONS DESTROYING IMPORTANT CROPS**
- **MULTIPLE EVENTS OCCURRING SIMULTANEOUSLY DAMAGE TRADITIONAL FOOD CROPS (FOR EXAMPLE, DROUGHT AND TARO LEAF BLIGHT).**

What are some of the ways SPC can support Pacific Island countries and territories (PICTs) in addressing, minimising and averting climate change-related loss and damage?

- Provide soil and plant nutrient analysis to support sustainable nutrient management, improve crop yields, and mitigate the risks of crop species loss
- Carry out comprehensive assessments for agriculture
- Conservation and distribution of seeds of important crops and trees upon country request
- Research in collaboration with farmers to identify challenges related to climate-resilient crops
- Application of relevant tools for example, Piloting agri-food systems and climate-explorer toolbox in Samoa
- Support biosecurity activities e.g. in Vanuatu through awareness raising and sanitation to remove and destroy excess organic matter accumulated after tropical cyclones
- Agroecological practices – organic farming, intercropping, mulching, cover cropping, agroforestry and crop diversification
- Plant Health Clinics – training of farmers and extension officers
- Mitigating soil erosion losses through nature-based solutions, such as planting Vetiver grass (*Chrysopogon zizanioides*), to effectively prevent soil loss for example, in ginger fields and to address coastal soil erosion in rice farms in Fiji.

Pacific Community
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