Pacific Application of Earth Observation

Kaliopate Tavola
Pacific Community (SPC)

The Pacific Community (SPC)

Who are we ?

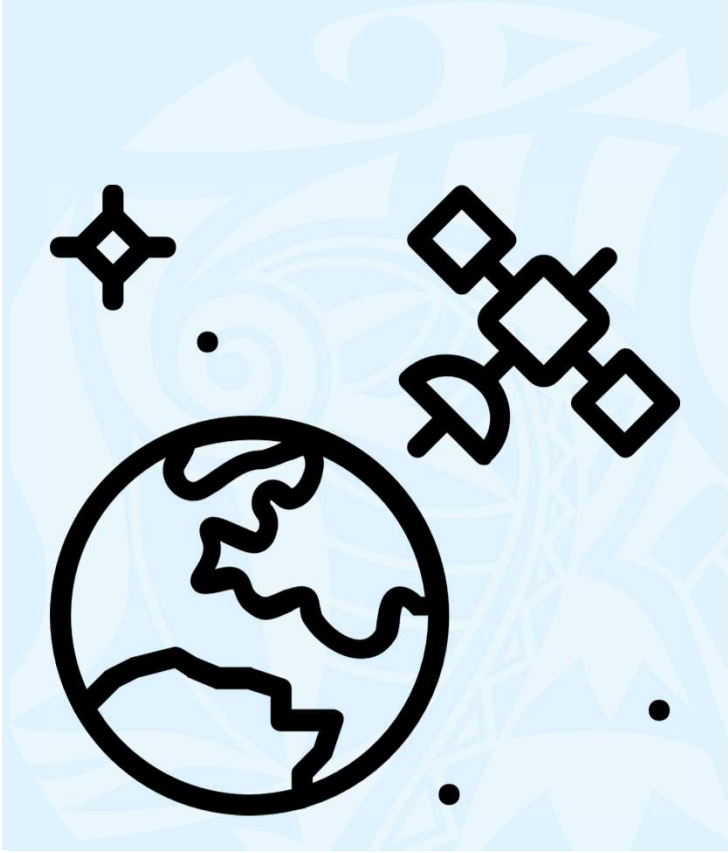
The Pacific Community (SPC) is the principal scientific and technical organization in the Pacific region, proudly supporting development since 1947.

We are an International development organization owned and governed by our 27 country and territory members coordinating regional disaster risk management activities in the Pacific.

Who am I ?

My name is Kaliopate Tavola, and I have been working for SPC for the last 1 year and 5 months as a Technical Data Assistant for the Disaster & Community Resilience Programme under the Geoscience, Energy & Maritime Division.

Objectives



- Earth Observation in the Pacific Region
- Application in Disaster Management
- Challenges and Limitations
- Opportunities
  - Digital Earth Pacific (DEP)
  - Capacity Building
  - Asset Inventories to inform Risk Assessment
  - Urban Planning
  - Post Disaster Needs Assessment
- Case Study

Earth Observation in the Pacific

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Why is Earth Observation crucial in the Pacific region?

The Pacific region is susceptible to a variety of natural disasters including hydrometeorological hazards such as tropical cyclones, floods, droughts, and geophysical hazards such as volcanoes, earthquakes, and resulting tsunamis and landslides.

Earth Observation is an essential tool that address some of the unique challenges and opportunities in the Pacific region such as disaster management, climate change and food security

Application in Disaster Management

- SPC requests emergency observation for affected areas post disaster to Sentinel Asia for the Pacific Region an example of this was the Tropical Cyclone Judy and Kevin that affected Vanuatu early march this year
- Guide government decisions during an emergency response
- Impact based forecasting to determine the level of exposure and vulnerability for the Pacific
- Standardize baseline exposure data to support risk informed planning and financing in the Pacific

Application in Disaster Management

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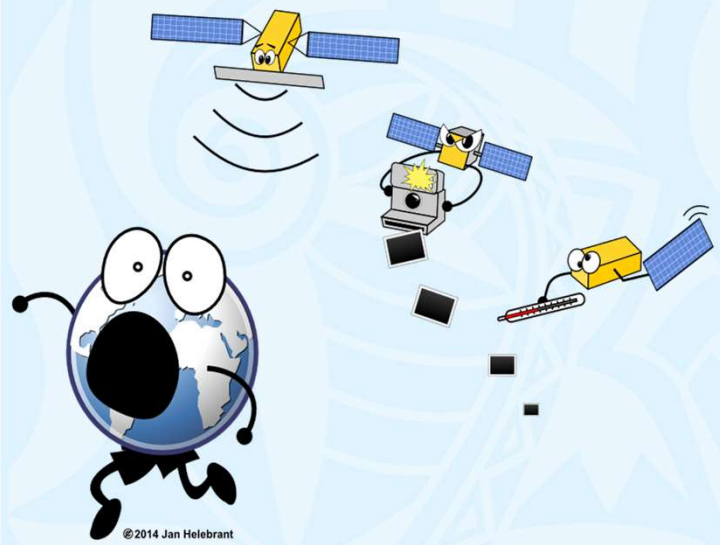
- Develop risk profiles for the Pacific
- Strengthen the capacity of key agencies to use and apply the disaster risk modelling products in policy and investment decisions
- Support and inform Post Disaster Needs Assessment in the Pacific

Challenges and Limitations

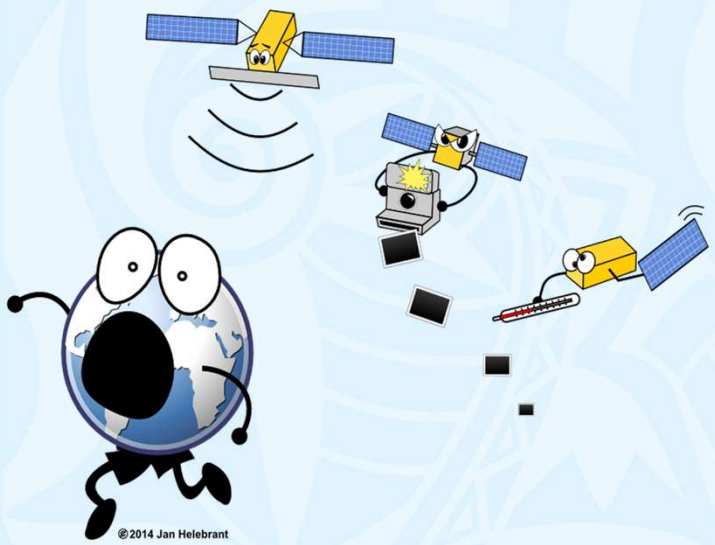


Cloud cover is a major problem in the Pacific (only a few months of useable imagery for major islands in some cases)

Accessibility to readily available earth observation products and budget allocation for EO products

Lack of analytical capabilities, specialized software/hardware for large-scale analysis of tempo-spatial data within Pacific Island countries; especially for continuous monitoring.

Challenges and Limitations



- Data sharing amongst government ministries and stakeholders
- Limited technical capacity for applying earth observational data to national development priorities and sustainable development
- IT Infrastructure to support data access, storage and processing

Opportunities - Digital Earth Pacific

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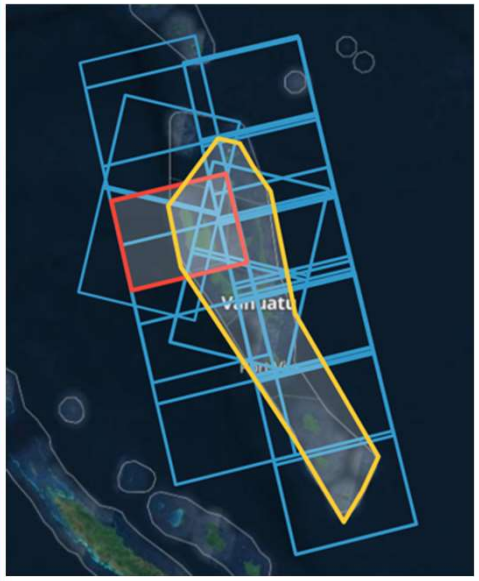
Digital Earth PACIFIC



An operational earth observation system that takes decades of freely available data Will allow SPC's 26 Member States to make better-informed decisions to address the challenges to development. For instances related to climate change, food security, and disasters

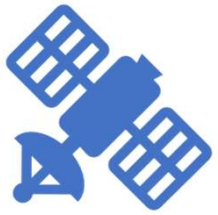
It will help Pacific Island countries understand the changes in the environment including the impact of sea-level rise, planning for disaster preparedness, response and recovery, and productivity of agricultural fields

A platform to bridge the EO data science-to-policy gap.

Opportunities - Capacity Building

Capacity-building delivered to support and upskill government officials and stakeholders

Exposure data collection using KoboToolbox, an Introduction to Risk Assessment training, basic and advanced training in Geographic Information System (GIS) using QGIS



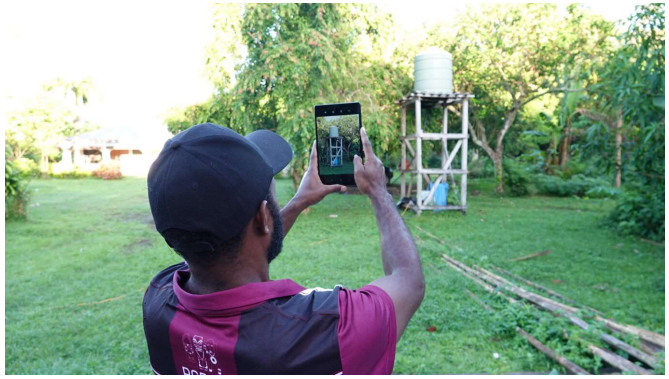
Utilize open earth observation products and applications to strengthen government capacity.

Capacity Building - Partner Countries

Opportunities - Asset Inventories

- Asset exposure data collected from partner countries is uploaded to the exposure database
- Exposure data includes:
  - Buildings
  - Infrastructure: Bridge, Airport, Fuel, Port, Roads, Telecommunication
  - Utilities: Electricity, Water
  - Crops
  - Livestock
- The exposure database is called Pacific Risk Information System or PacRIS and is available to access online via https://risk.spc.int/

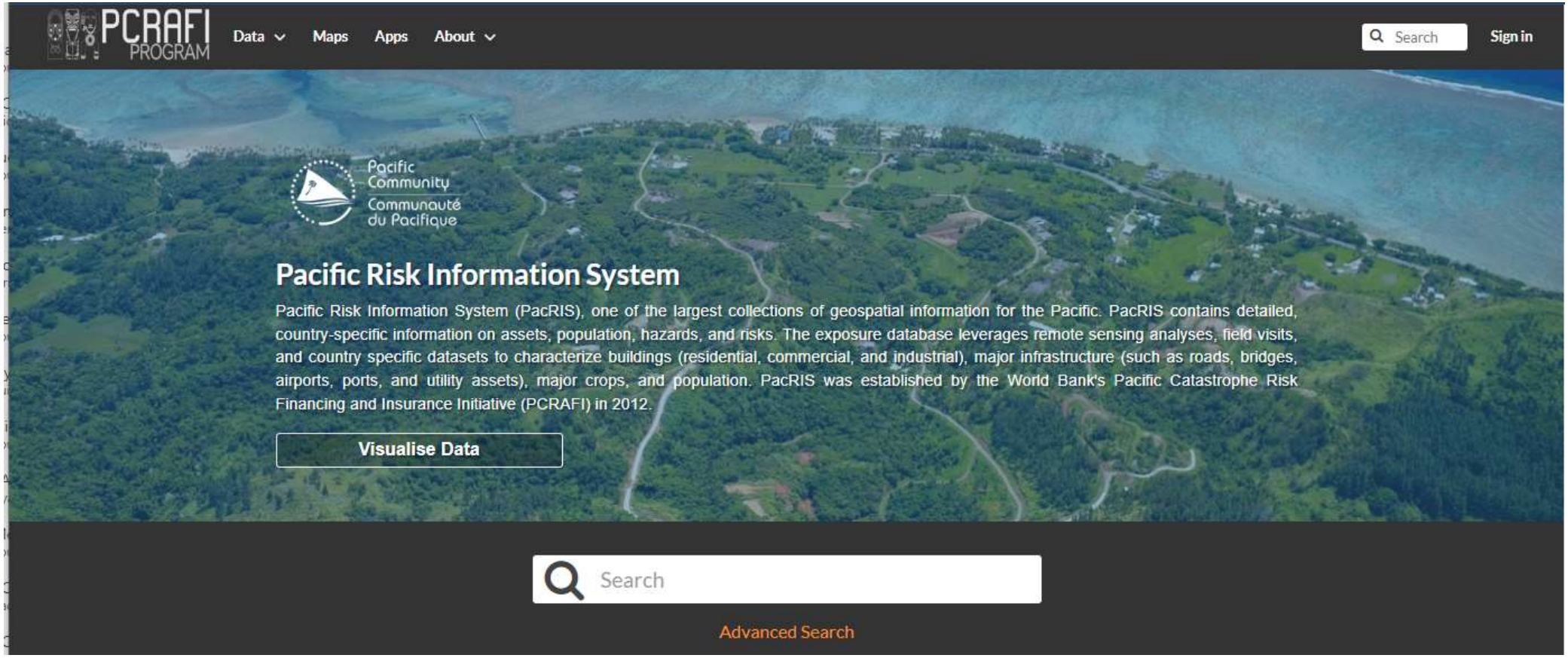
Exposure Data Survey



Lenakel, Vanuatu.
2022 Exposure Data Survey

Exposure Database

PacRIS – Pacific Risk Information System



Opportunities - Urban Planning

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The asset exposure data provides the latest baseline to enable urban planners to carry out effective risk-informed planning

Exposure database are overlaid with hazard layers to identify exposed assets and determine risk levels based on risk assessment process

Government development priorities are in the process of adopting a risk-informed approach to sustain and improve their investment commitments

Opportunities - Urban Planning

Extracted building footprints (manual) from earth observation have been validated on the ground and surveyed collecting critical baseline information about buildings, infrastructure, and utilities to inform urban planning

Expectation towards Sentinel Asia is to provide higher resolution imagery for clear extraction of building footprints across the Pacific region.

Building Footprint Extraction

Opportunities - Post Disaster Assessment

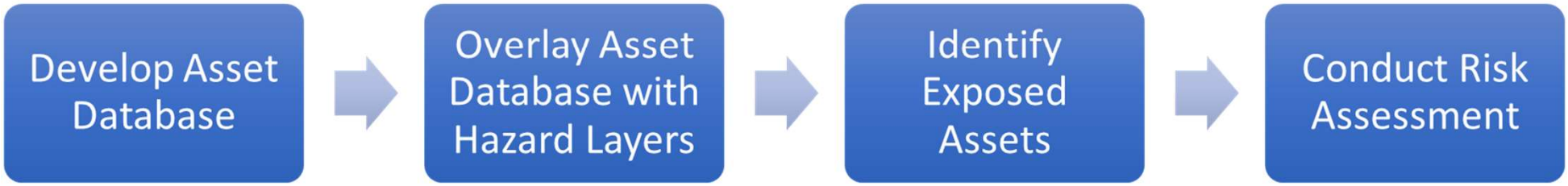
- Emergency observation requests are sent from SPC to Sentinel Asia for affected areas post-disaster to assist with assessment
- Part of the work done by SPC is to estimate the unit cost of construction for all the buildings that were collected in the asset exposure survey from participating countries based on certain building typologies, these countries include Tonga, Vanuatu, Samoa, Solomon Islands, and Cook Islands

- The unit cost of construction per building will estimate the replacement cost of the building and will inform risk financing aspect of the country

Case Study - Vanuatu

- A natural hazard risk assessment was conducted in Vanuatu for the two townships of Lenakel and Lakatoro on both Tanna and Malekula islands of Vanuatu.
- The objective of the assessment is to develop risk-based town plans for resilient investments to support safe and orderly urban growth.

Risk Assessment Method Overview



Case Study – Multi-hazard map of Lenakel & Lakatoro

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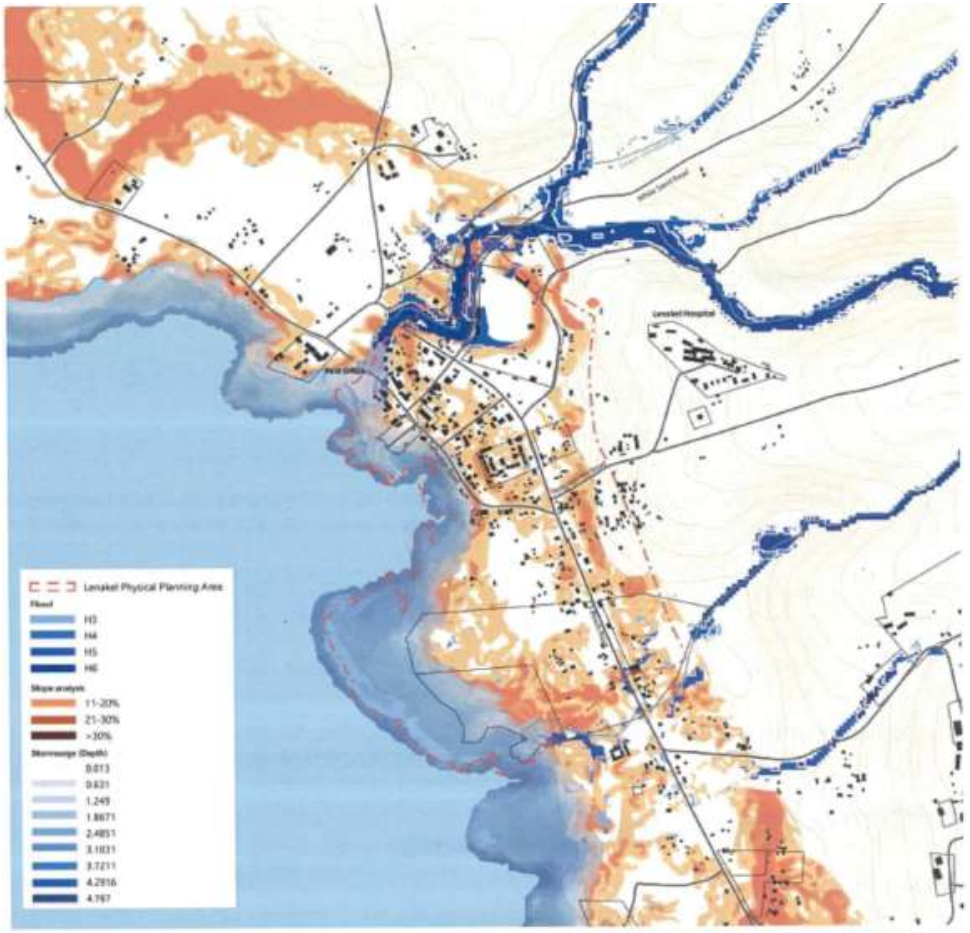

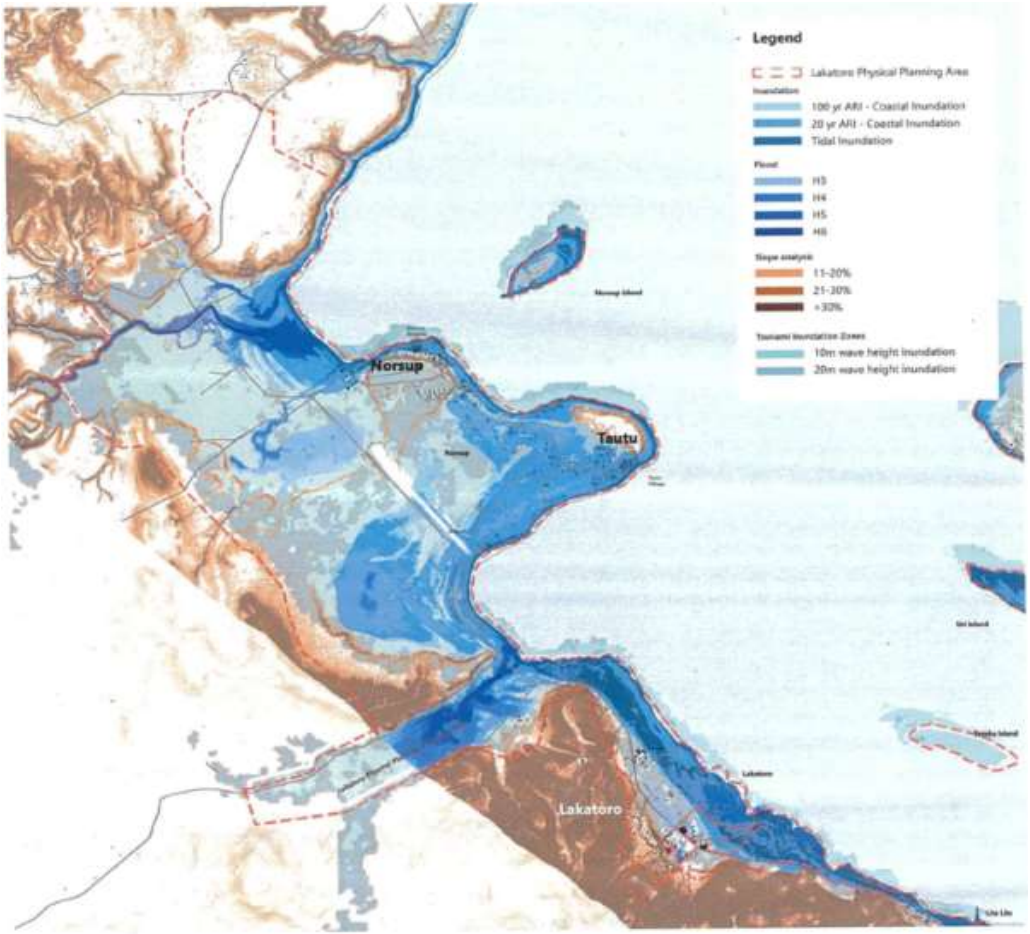

Conclusion

- Highlighting some of the use cases and application of earth observation in the pacific region provides an opportunity for stakeholders and regional partners to build and strengthen disaster management

- Regional development priorities should adapt a risk-informed approach to inform sustainable development and resilient investment

- Earth Observation plays a pivotal role in the pacific, leveraging this technology will allow the development of decision-ready products that will support concise and analysed information for decision makers whilst providing needed data and information to support regional and global commitments such as the 2050 Strategy for the Blue Pacific Continent, the Paris Agreement , Sendai Framework and the Sustainable Development Goals.

Any Question ?

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