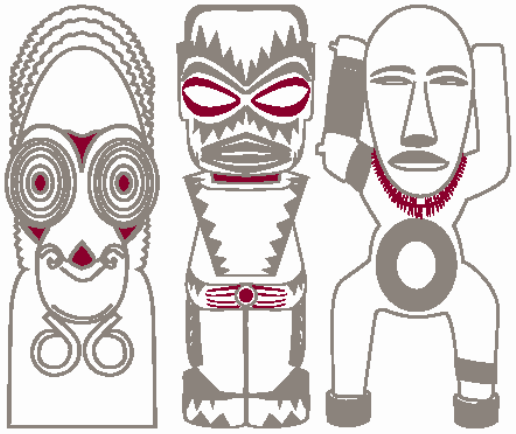


PCRAFI

PACIFIC CATASTROPHE RISK ASSESSMENT & FINANCING INITIATIVE

Disaster Risk Assessment Tools and Applications

UNFCCC expert meeting on loss and damage

9-11 November, 2012

Barbados

pcrafi.sopac.org

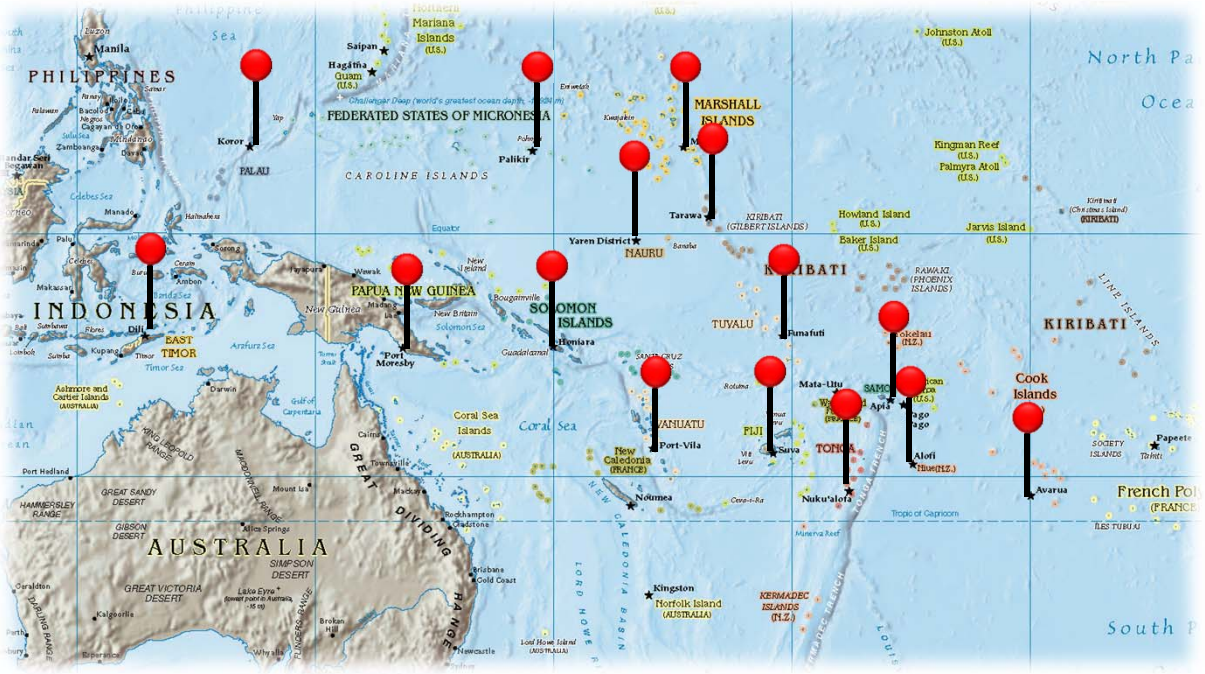
Main Outputs

Pacific disaster risk assessment

- Probabilistic assessment of major perils
- Pacific Risk Information System
- Risk based framework to direct resources of countries and development partners

Pacific disaster risk financing solutions

- Fiscal risk exposure
- Financial disaster risk management
- Regional risk pooling



Perils Modeled

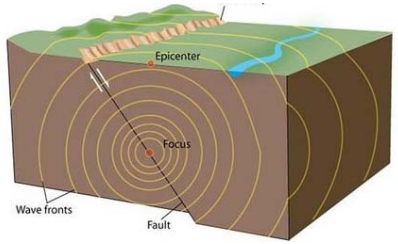
Tropical Cyclone

Wind

Flood from Precipitation

Flood from Storm Surge

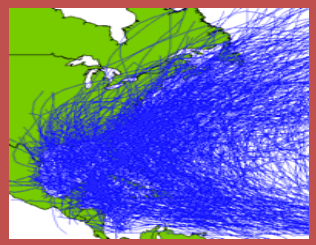
Earthquake



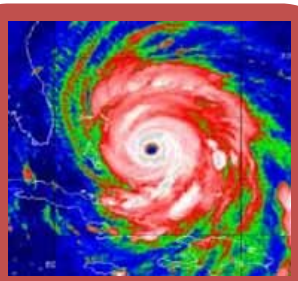
Ground Shaking

Tsunami Wave

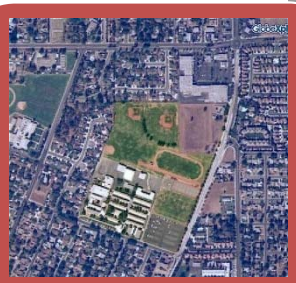
Risk Assessment



Event Generation

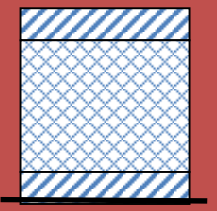


Intensity Calculation



Exposure Information

Damage Estimation



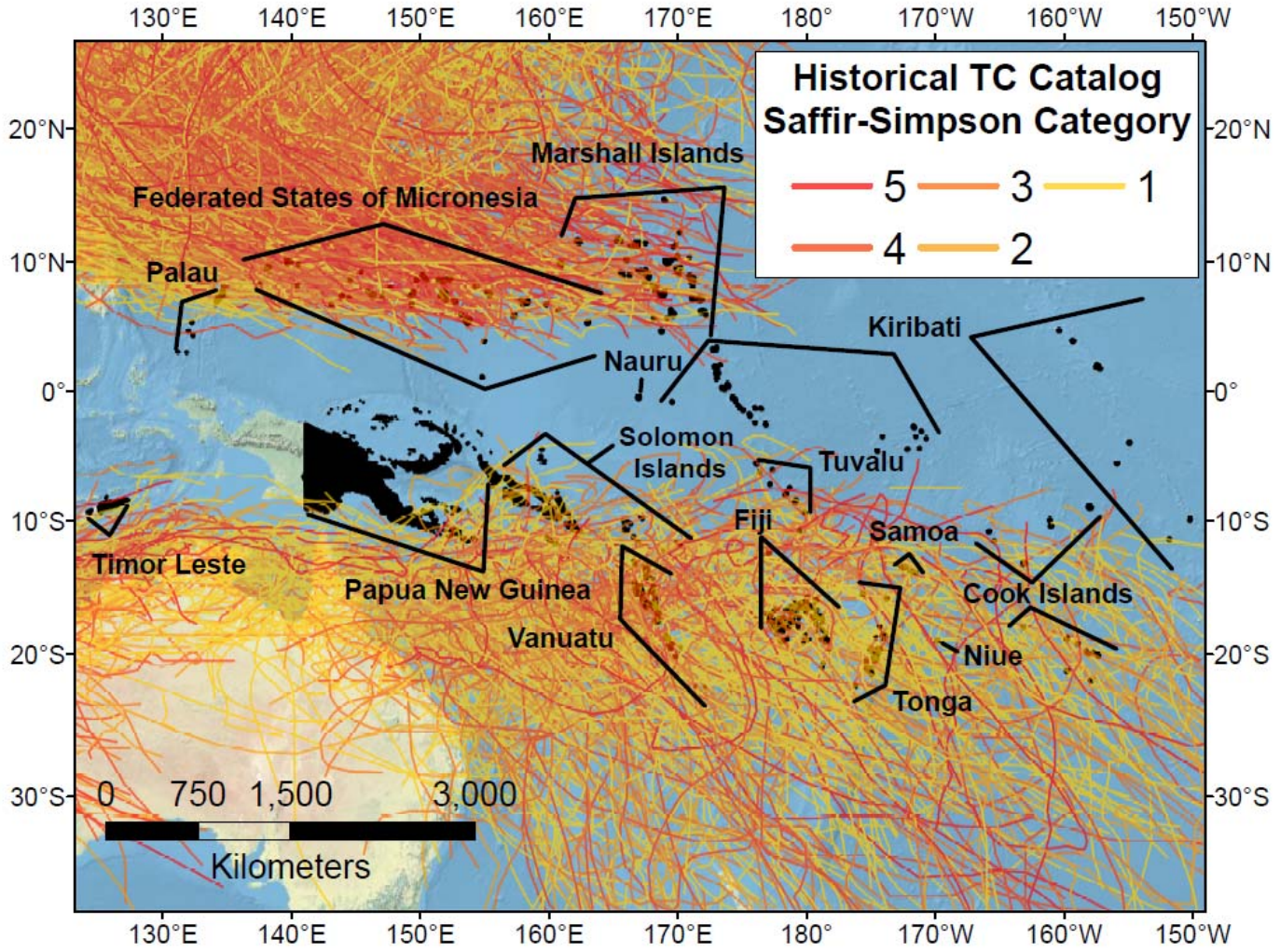
Mitigation / Policy Conditions

Loss Calculation

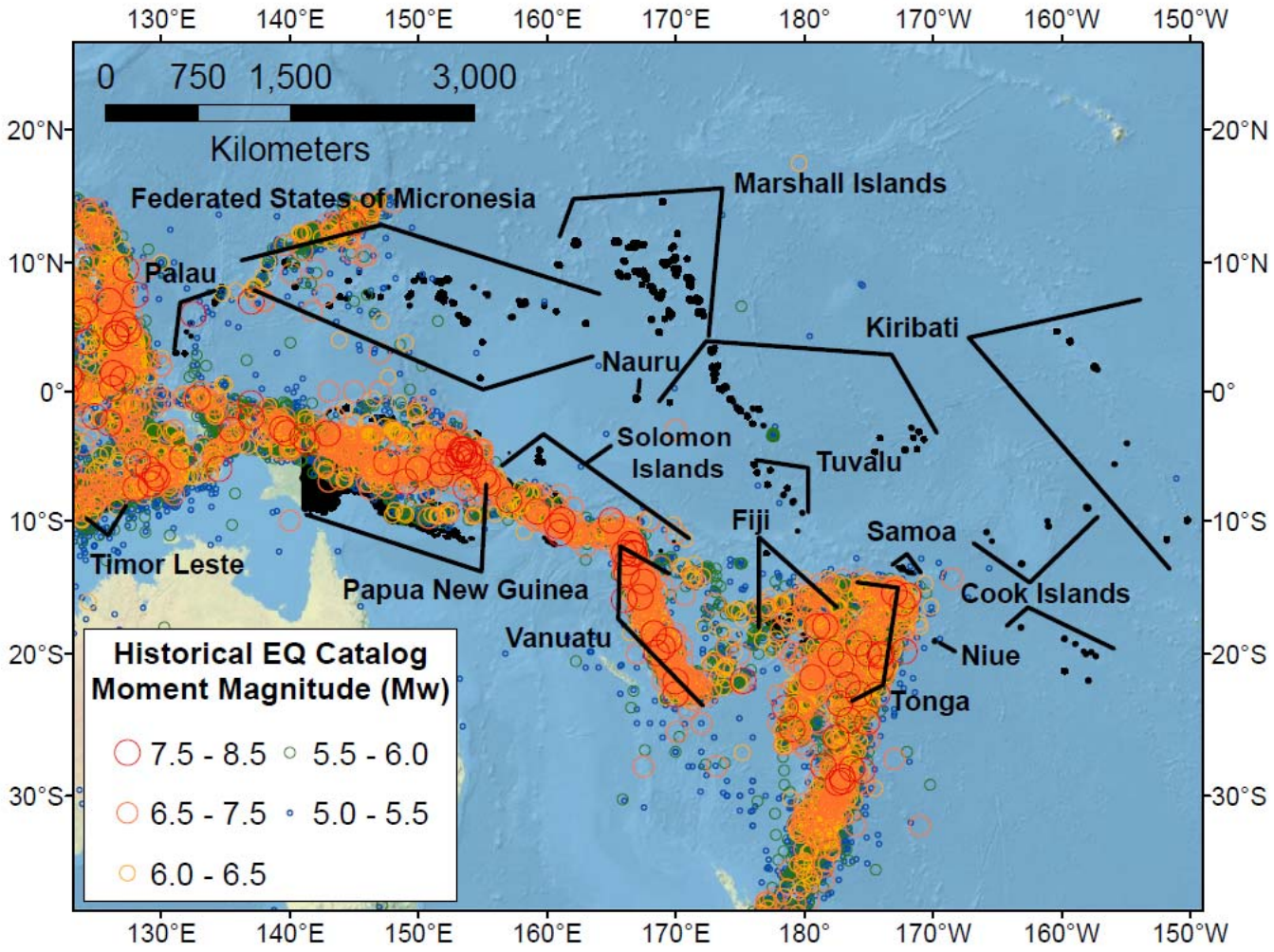
Historical Tropical Cyclones (≈1950-2008)

Raw data collected from the International Best Tracks Archive for Climate Stewardship (**IBTrACS**) project

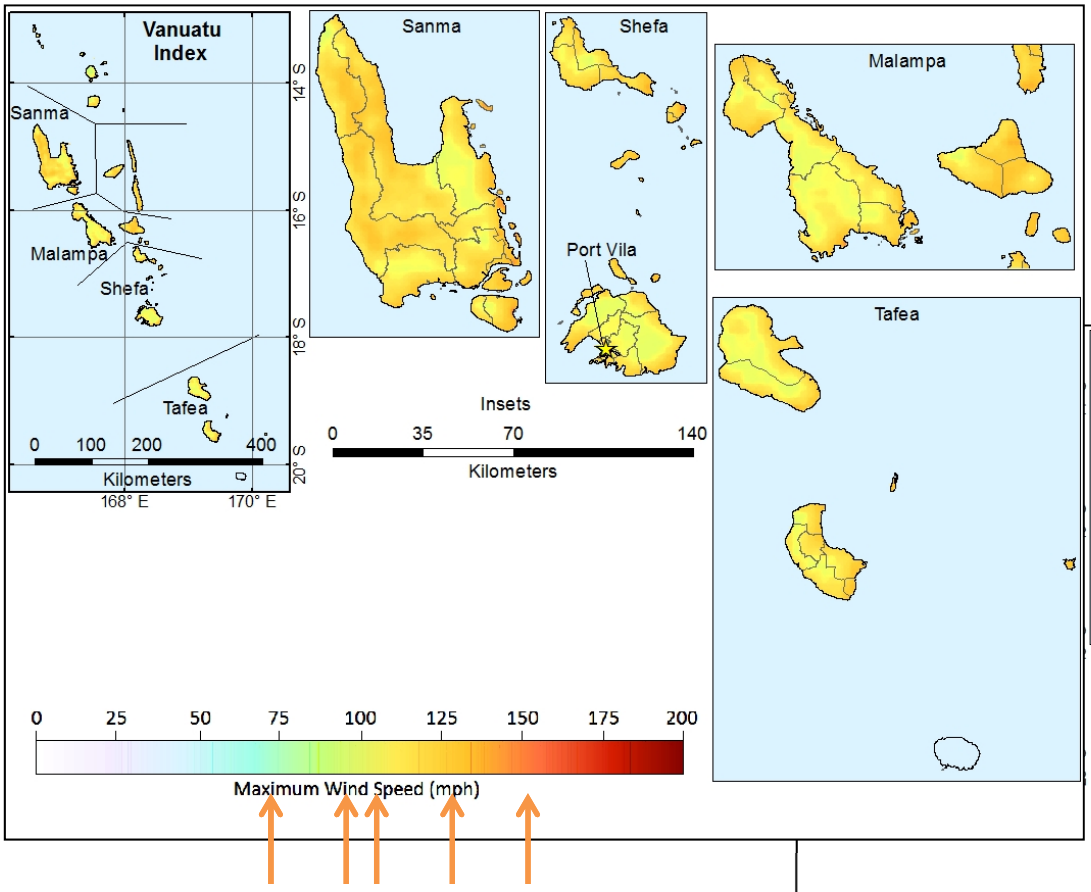
SS Storm Category	1-min Wind Speed (mph)
1	74-95
2	96-110
3	111-130
4	131-155
5	>155



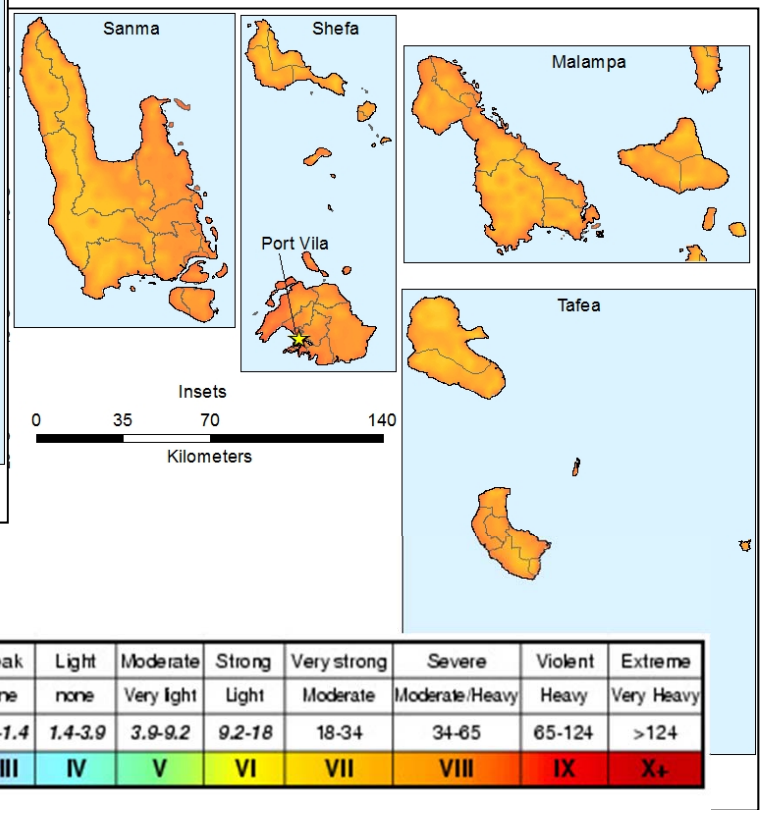
Historical Earthquakes (Mw≥5.0 from ≈1900-2009)



Hazard Maps: Applications for Planners

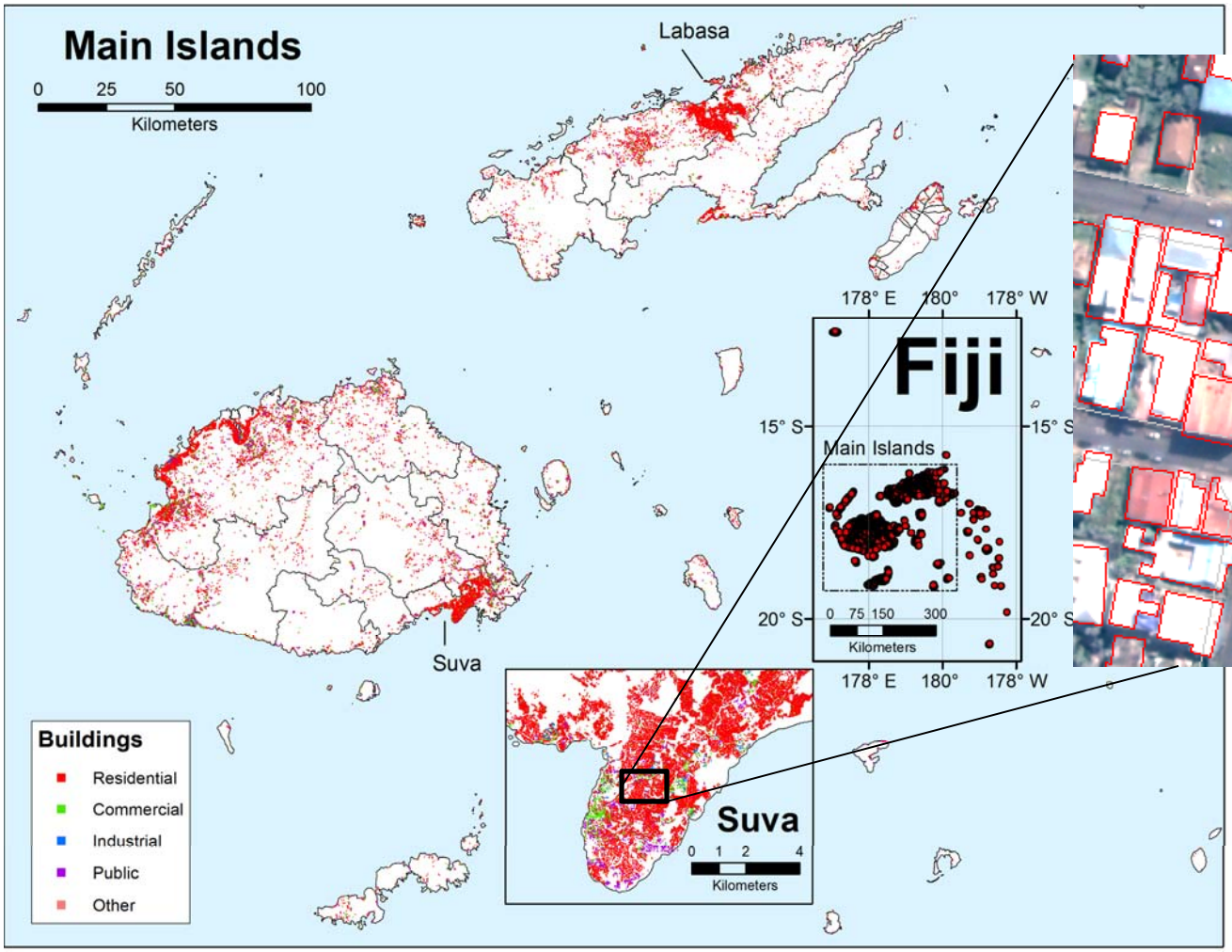


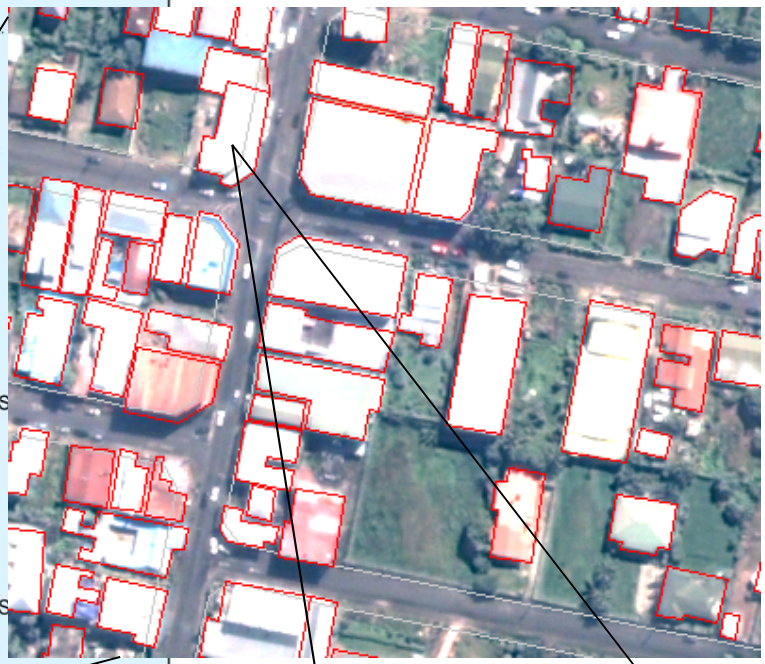
100 yr mean return period: wind speed, ground acceleration with ~40% chances to be exceeded in 50years



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

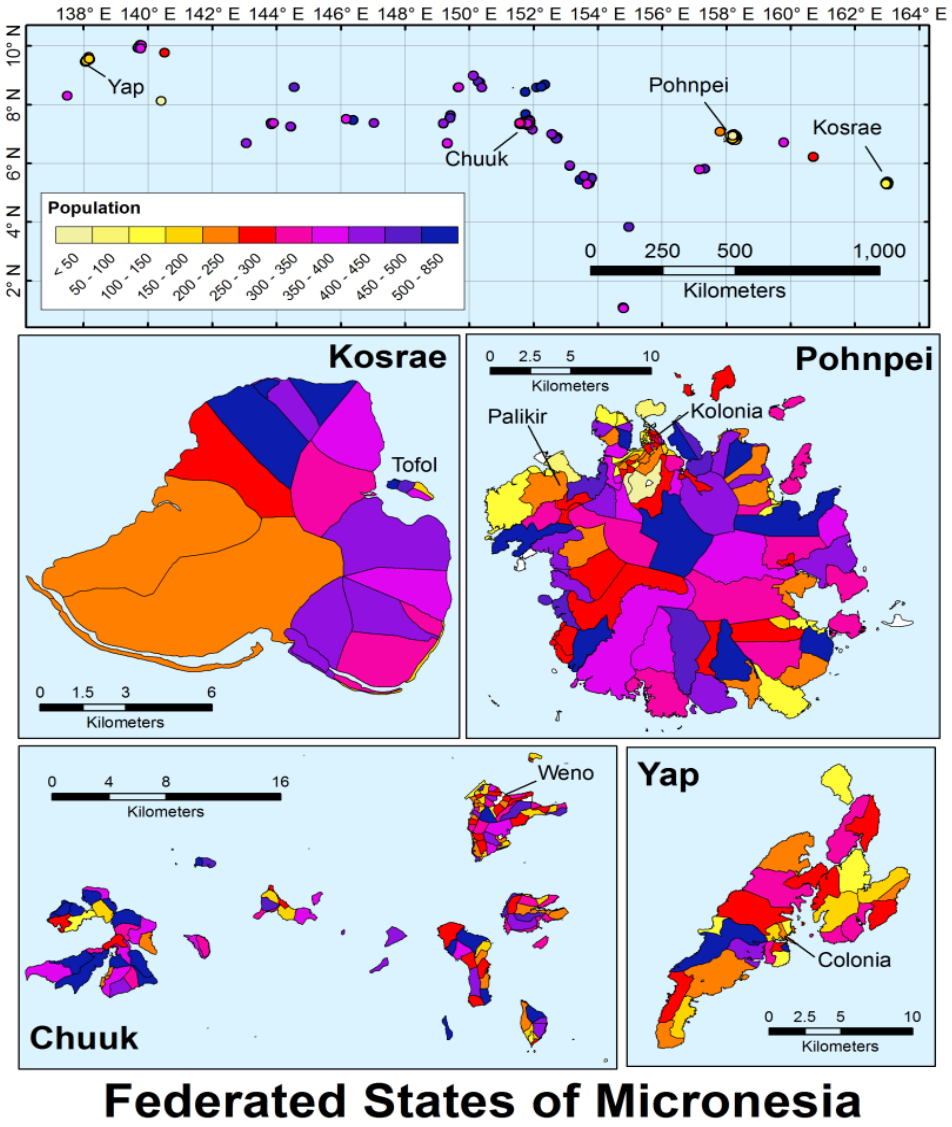
Buildings

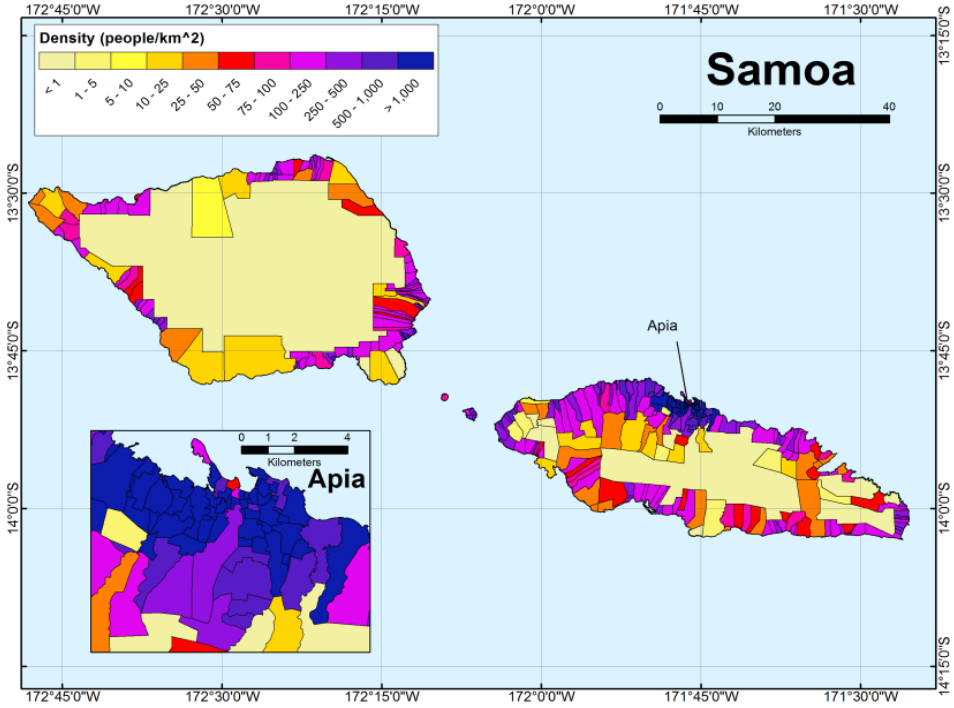




Collected in the field using template

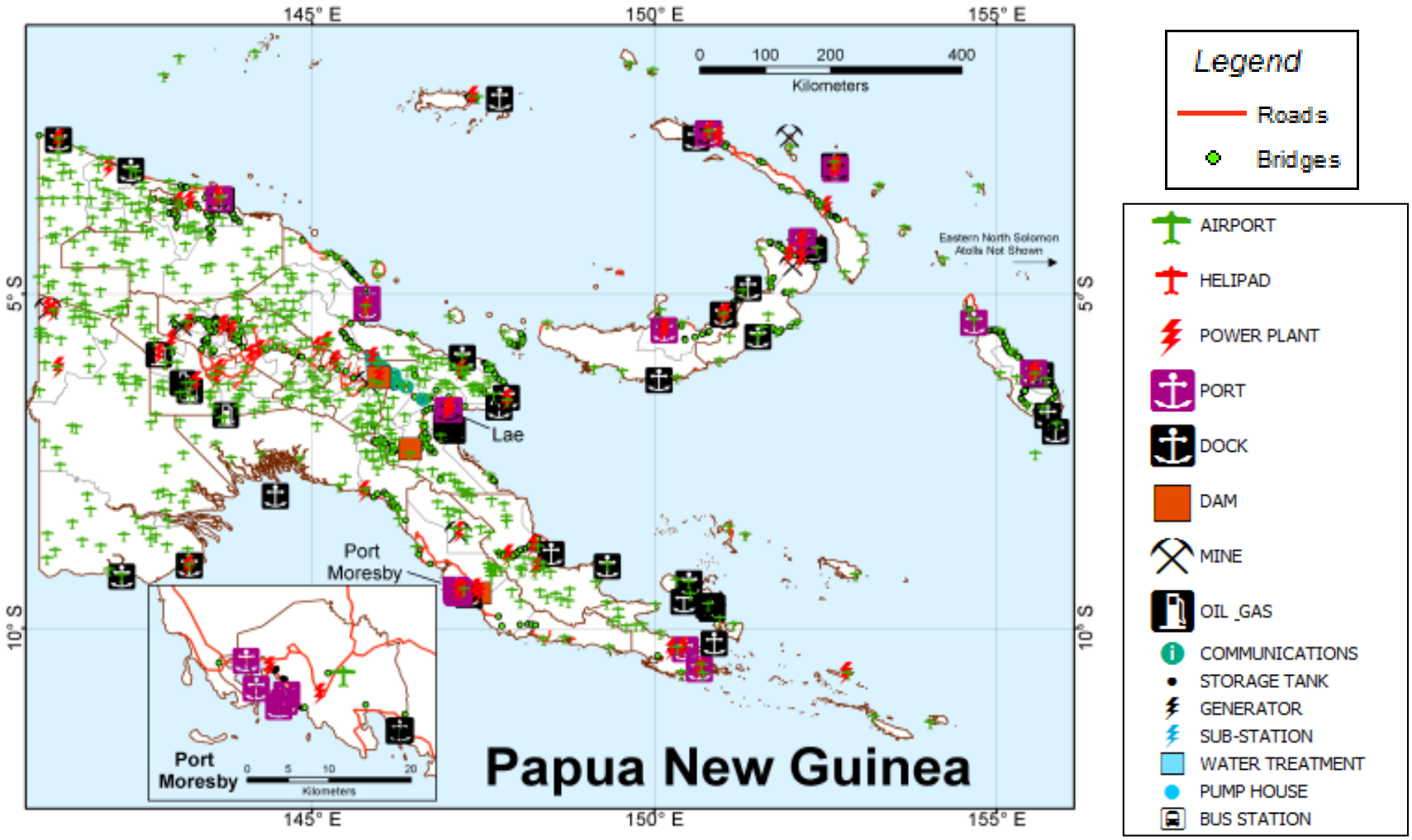
People





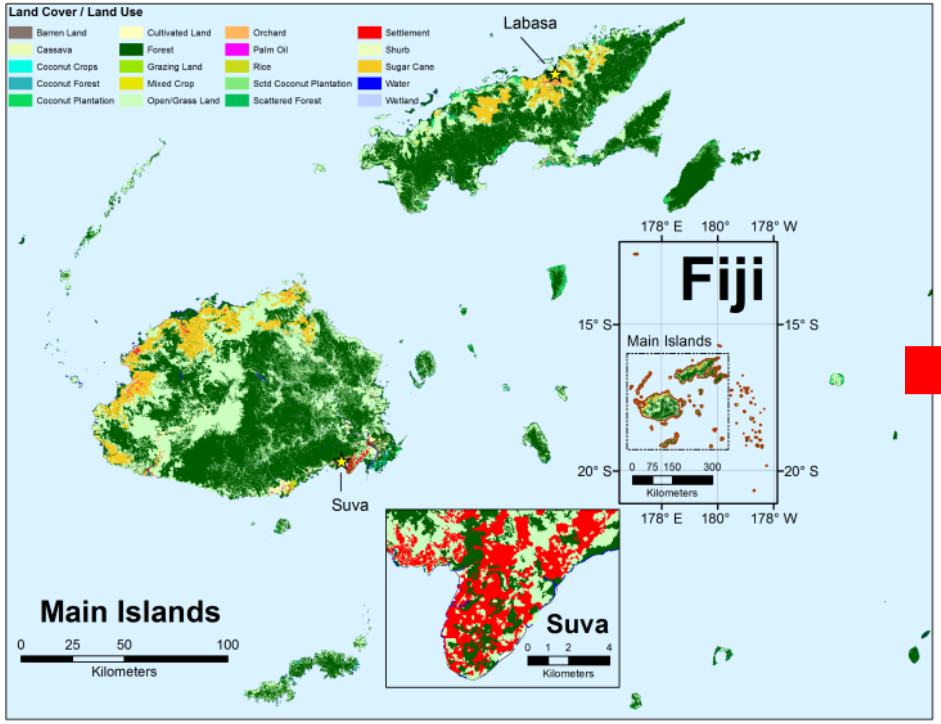
2010 projections based on national census information and PopGIS

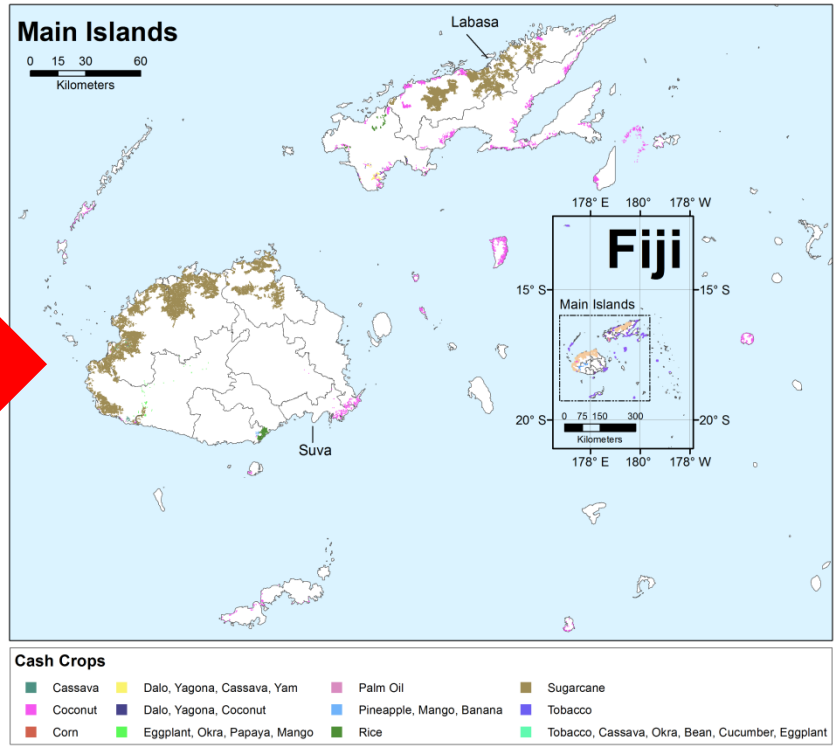
Major Infrastructure

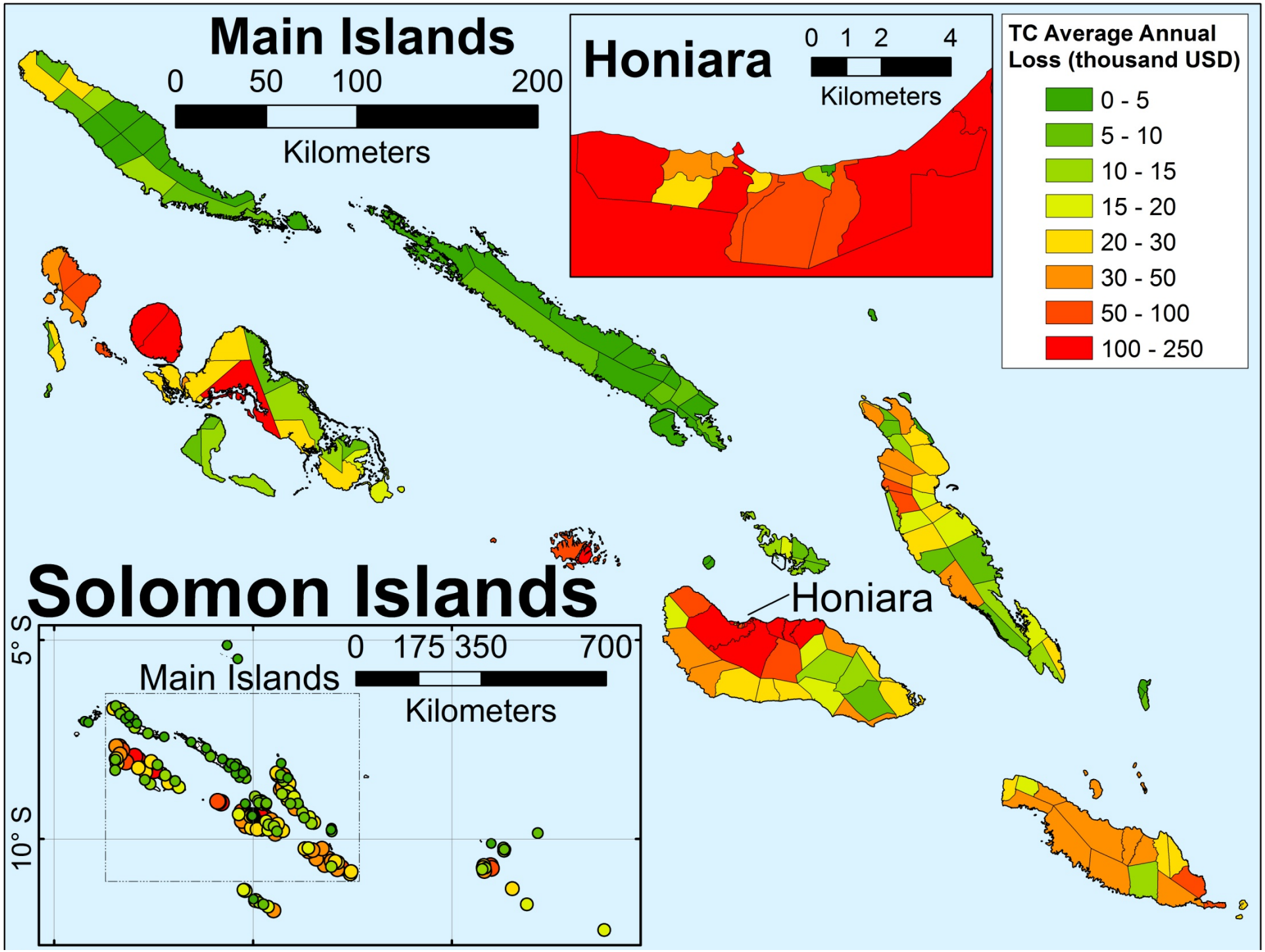


Land Cover/Land Use Map → Crop Exposure

Major crop location extracted from Land Use/Land Cover (LULC) Maps

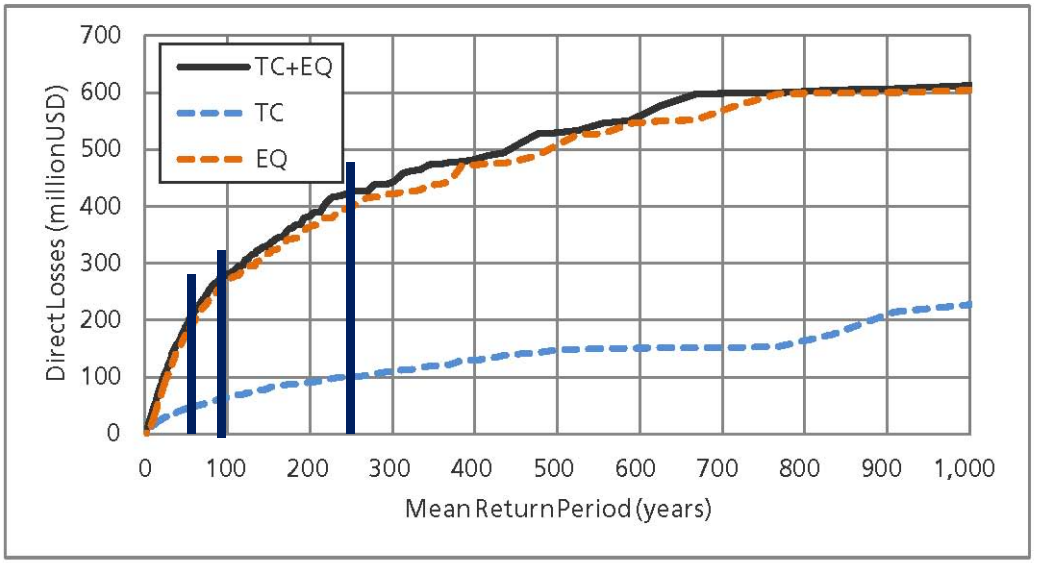


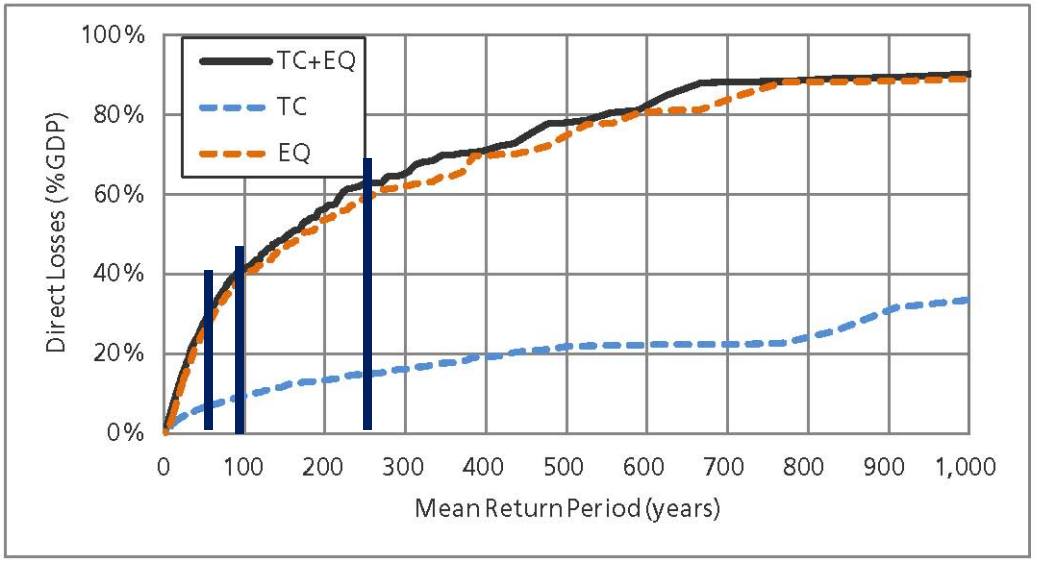



Main Islands
0 50 100 200
Kilometers
Honiara
0 1 2 4
Kilometers
TC Average Annual Loss (thousand USD)
0 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 50
50 - 100
100 - 250
Solomon Islands
Honiara
5° S
10° S
0 175 350 700
Main Islands
Kilometers

Country risk profiles
Illustration with Solomon Islands

TABLE 2: Estimated Losses and Casualties Caused by Natural Perils				
Mean Return Period (years)	AAL	50	100	250
Risk Profile: Tropical Cyclone				
Direct Losses				
(Million USD)	5.8	44.5	63.9	101.5
(% GDP)	0.9%	6.6%	9.4%	15.0%
Emergency Losses				
(Million USD)	1.3	10.2	14.7	23.4
(% of total government expenditures)	0.5%	3.6%	5.2%	8.2%
Casualties	63	489	691	1,019
Risk Profile: Earthquake and Tsunami				
Direct Losses				
(Million USD)	14.7	175.3	268.7	400.8
(% GDP)	2.2%	25.8%	39.6%	59.1%
Emergency Losses				
(Million USD)	0.0	28.2	43.7	65.3
(% of total government expenditures)	0.0%	10.0%	15.4%	23.1%
Casualties	96	1,043	1,780	3,106
Risk Profile: Tropical Cyclone, Earthquake, and Tsunami				
Direct Losses				
(Million USD)	20.5	189.6	280.6	426.2
(% GDP)	3.0%	27.9%	41.4%	62.8%
Emergency Losses				
(Million USD)	3.8	32.8	46.6	68.6
(% of total government expenditures)	1.3%	11.6%	16.4%	24.2%
Casualties	159	1,234	1,914	3,246





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Pacific Catastrophe Risk Assessment & Financing Initiative

liteab (Change password | Log

Home Data Maps Partners Profile Admin

English

Explore Maps

Explore pre-made maps, and those made by website users, on such things as earthquake intensity, flood hazards, topography, road networks, buildings, bridges, and much more.

Explore Maps

Create Maps

Using the same raw data used to create other maps on the site, PaRIS lets you compose and share your own maps. Create a map with our cartography tool to develop new insights and track changes over time. Save, print and share these maps if you wish!

Create Map

Search for Data

PaRIS lets you access and browse geospatial data. Search for data that is valuable to you in a number of geospatial formats.

Search

View All

Upload data

PLEASE NOTE: These data layers have been derived from georeferenced satellite imagery. The data layers may appear misaligned when viewing over other base layers eg google earth

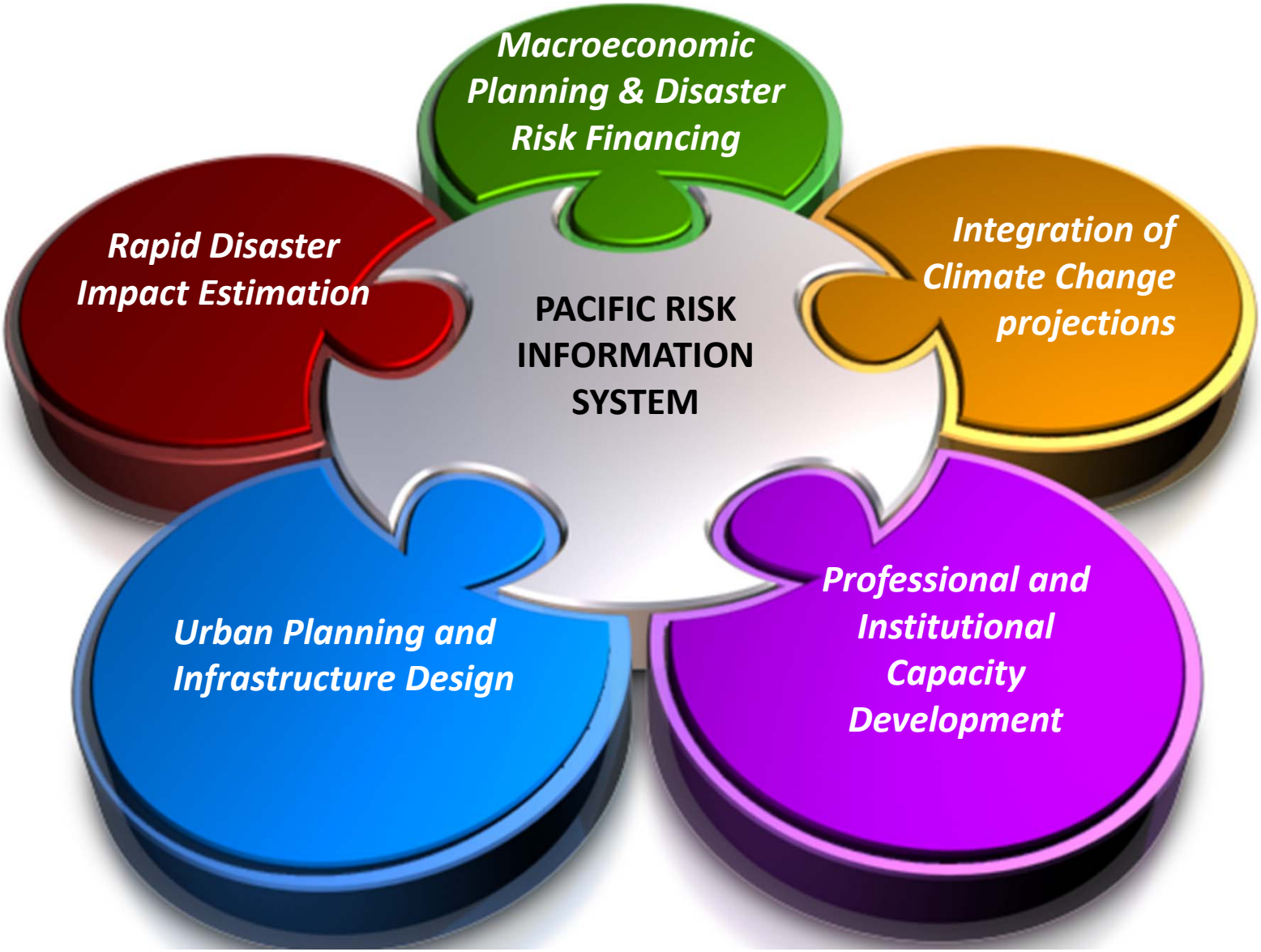
About

Pacific Risk Information Systems (PaRIS) i one of the largest collections of geospatia information for the Pacific island region. contains information and data layers on:

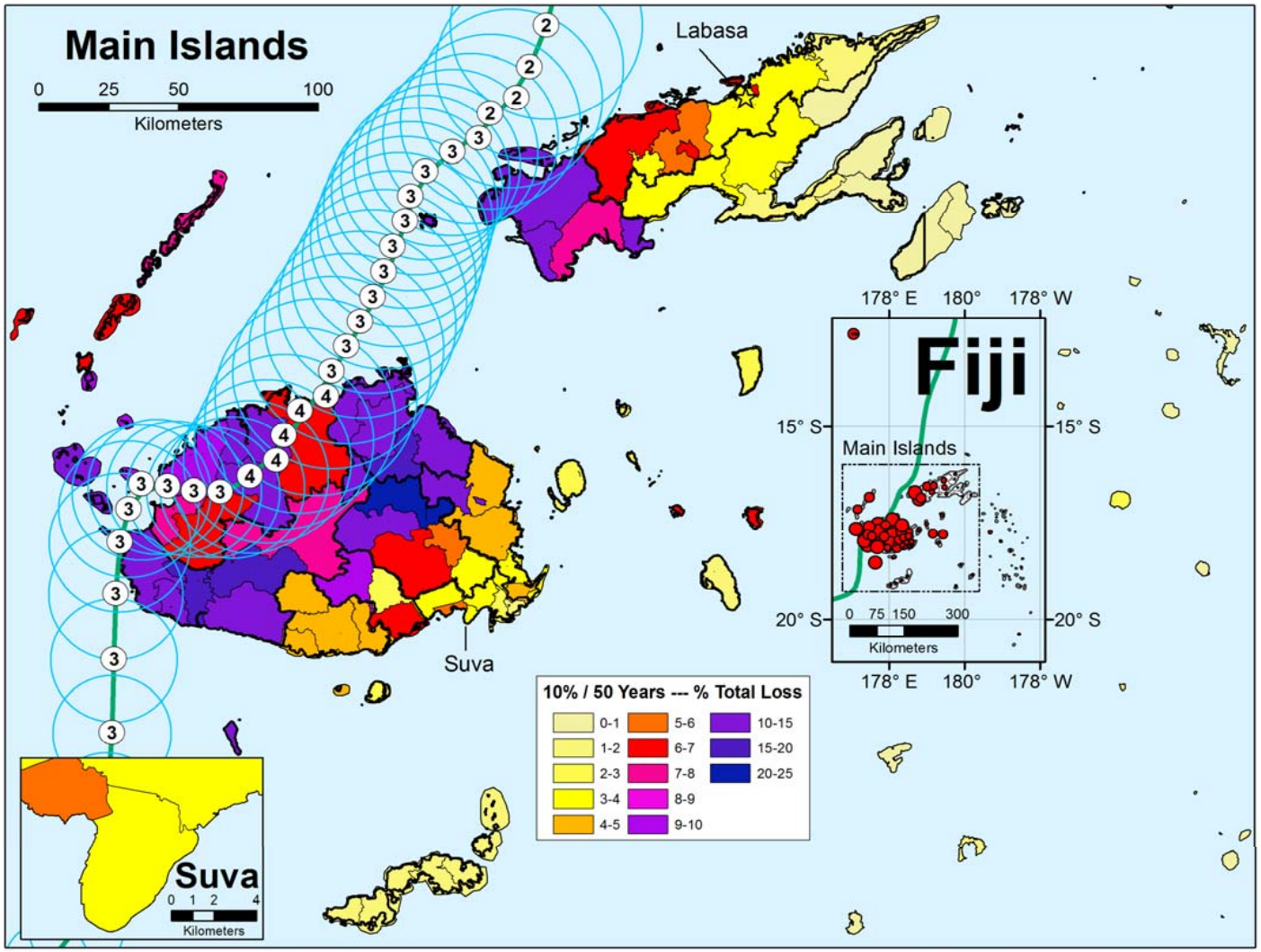
- Base maps
  administrative boundaries, topography, bathymetry, land use cover, surface soil , geology
- Hazard maps
  tropical cyclone, earthquakes
- Field Survey Results
  building, infrastructure - partial coverage
- Risk exposure
  population, buildings, infrastructure, crops
- Risk and loss maps
- Historic event and disaster impact catalogues

PaRIS was assembled to provide detaile probabilistic risk information for 15 Pacifi island countries for a range of decision maker including disaster risk management agencies The perils covered are tropical cyclones (winc storm surge and rain) and earthquake (ground shaking, tsunami). The countrie covered are Cook Islands, Fiji, Kiribati, Marsha Islands, Federated States of Micronesia, Nauru

Applications – PCRAFI Phase 3



Post-Disaster Loss Calculation



Post-Disaster Real Time Loss Assessment - Tropical Cyclones and Earthquakes

- CAT models do not typically use any direct field observation of damage, loss, or disaster intensity
- The accuracy of the loss estimates improves if field observations are taken into account

Pre-disaster Loss Assessment

- Feasibility study for the development of a system that, in real time, forecasts the impact of tropical cyclones as they build on any of the 15 PICs
- AIR has extensive experience in such systems in the Atlantic Ocean in the North Pacific Ocean for certain countries
- Such systems are feasible but their application to the region of the PICs needs to be studied further

Pacific Disaster Risk Financing and Insurance Solutions

Increasing financial resilience against natural disasters

Institutional Capacity Building

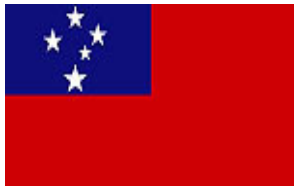
- TA to MoF to develop integrated disaster risk financing strategy
- TA to MoF to develop risk-based financial planning

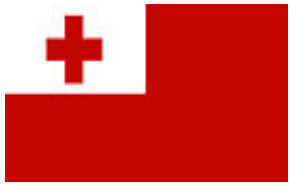
Pacific disaster risk insurance market development

- Refine cat risk models for market-based transactions
- Build capacity of private market players (e.g., insurers)
- Develop prototype parametric insurance products

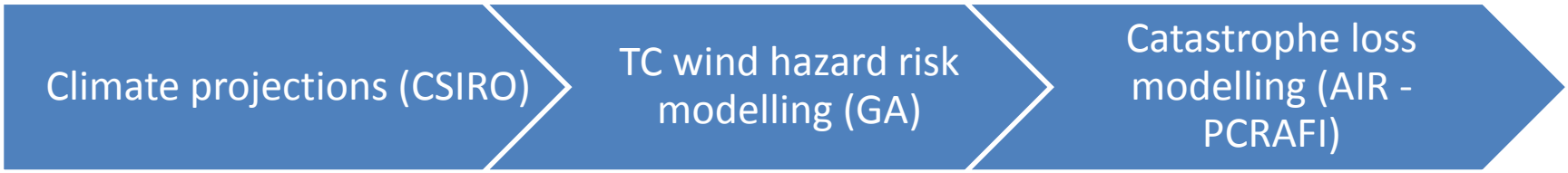
Pacific disaster risk insurance pilot

- Test the credibility of Pacific cat risk models on reinsurance markets
- Assess the risk appetite of reinsurers for Pacific disaster risk
- Test the viability of Pacific disaster risk insurance



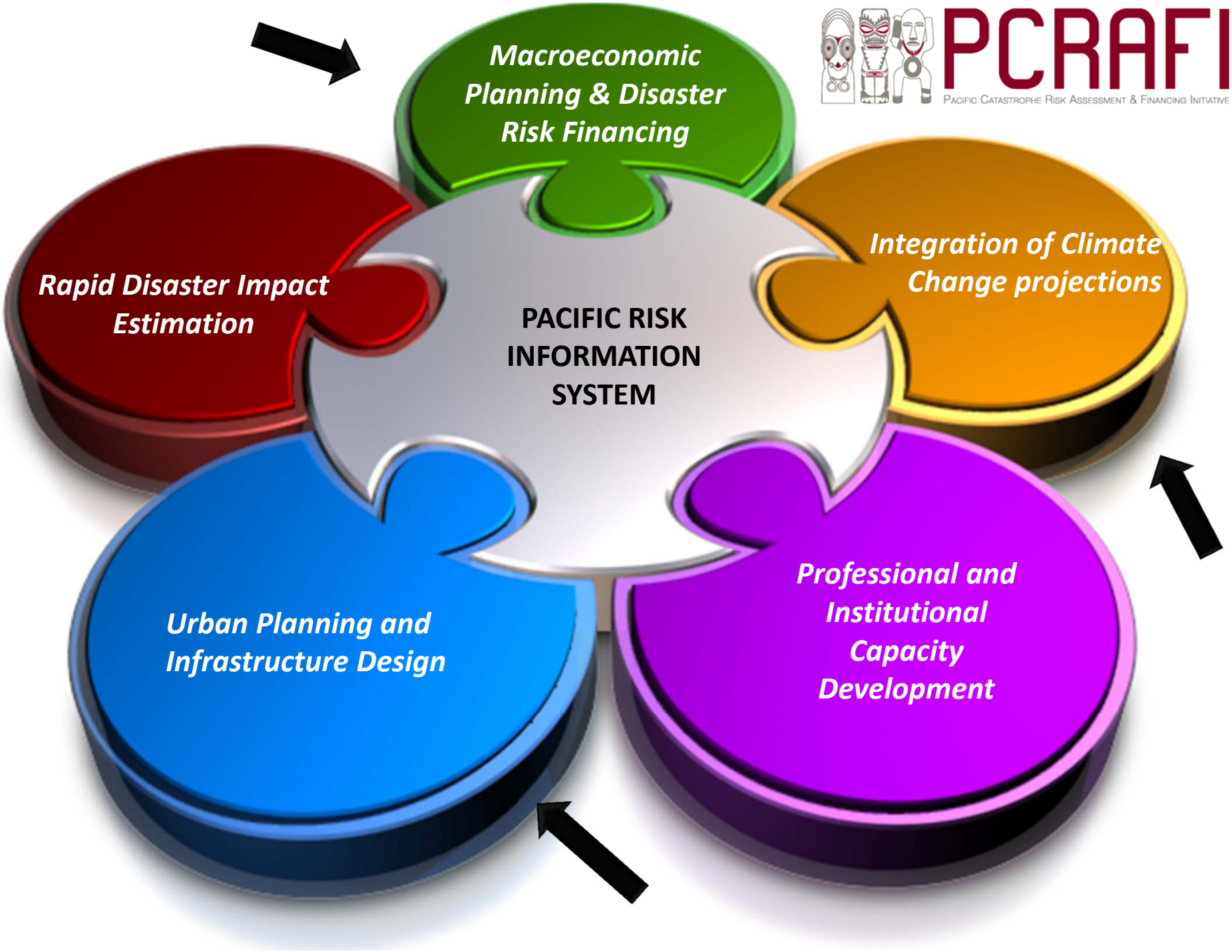

Integrating PACCSAP TC projections with PCRAFI risk modeling



Objective: a regional assessment of potential future tropical cyclone risk to critical assets in Pacific island countries with climate change.

Outcome:

1. understand the changing nature of tropical cyclone risk to infrastructure assets
2. consider the future implications in terms of loss and damage
3. assess the effectiveness of current planning and design standards against future needs


PCRAFI
Pacific Catastrophe Risk Assessment & Financing Initiative
Macroeconomic Planning & Disaster Risk Financing
Rapid Disaster Impact Estimation
PACIFIC RISK INFORMATION SYSTEM
Integration of Climate Change projections
Urban Planning and Infrastructure Design
Professional and Institutional Capacity Development