PARTneR
Pacific Risk Tool for Resilience

Welcome

- Who is here?
- Experience with Risk Assessments

# PARTneR: Pacific Risk Tool for Resilience

Advanced Training on Risk Tools for Disaster Management

By the end of the training, participants will be able to:

- collect and download data into RiskScape using the RiACT application

- create a disaster and mitigation scenario

- apply risk tool information for decision making and disaster risk programme management

Agenda

- Introduction
- Session 1: Review of DRM terms
- Session 2: Risk Assessment and review of RiskScape features
- Session 3: Tsunami scenario development
- Session 4: Collect new asset data and enter into RiskScape
- Session 5: Entering data into RiskScape
- Session 6: Modifying data using the asset modification tool
- Session 7: Feedback on RiskScape and the workshop
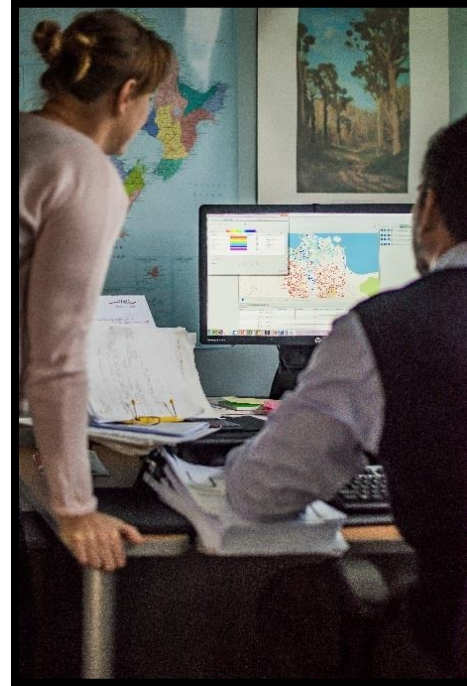
Training materials

- Worksheets and tutorials
  - Write your name on them
  - Contains note-taking spaces
- Presentations
  - Will be shared with all participants

PARTneR Project Outputs

Outputs

Pacific risk mapping and decision support tool developed

Data collation and management system developed

Risk tool training developed and applied

Sustainable partnership model developed and rolled-out

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Five partner organisations

2 Pacific Island Countries

NZ Aid funding

3 year pilot project

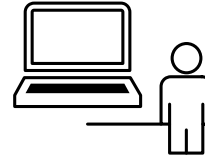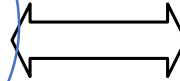**PARTneR** – Pacific Risk Tool for Resilience
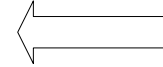
Who else is involved?

Wider users receive basic training disaster risk assessment and management
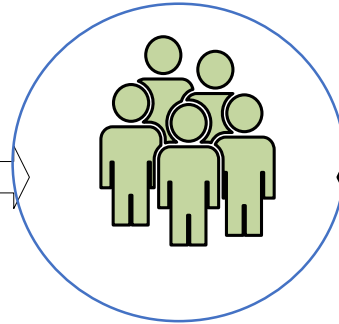
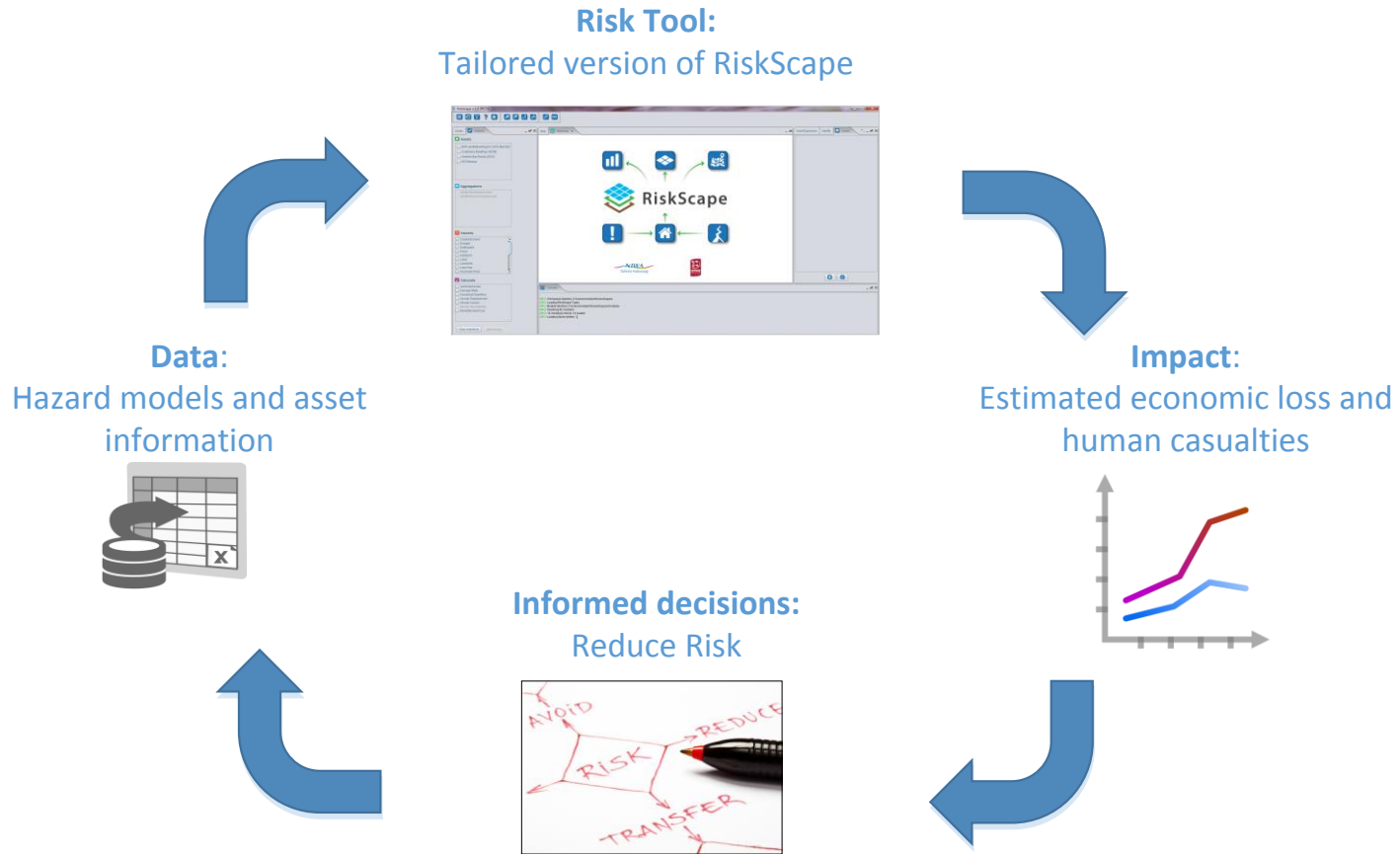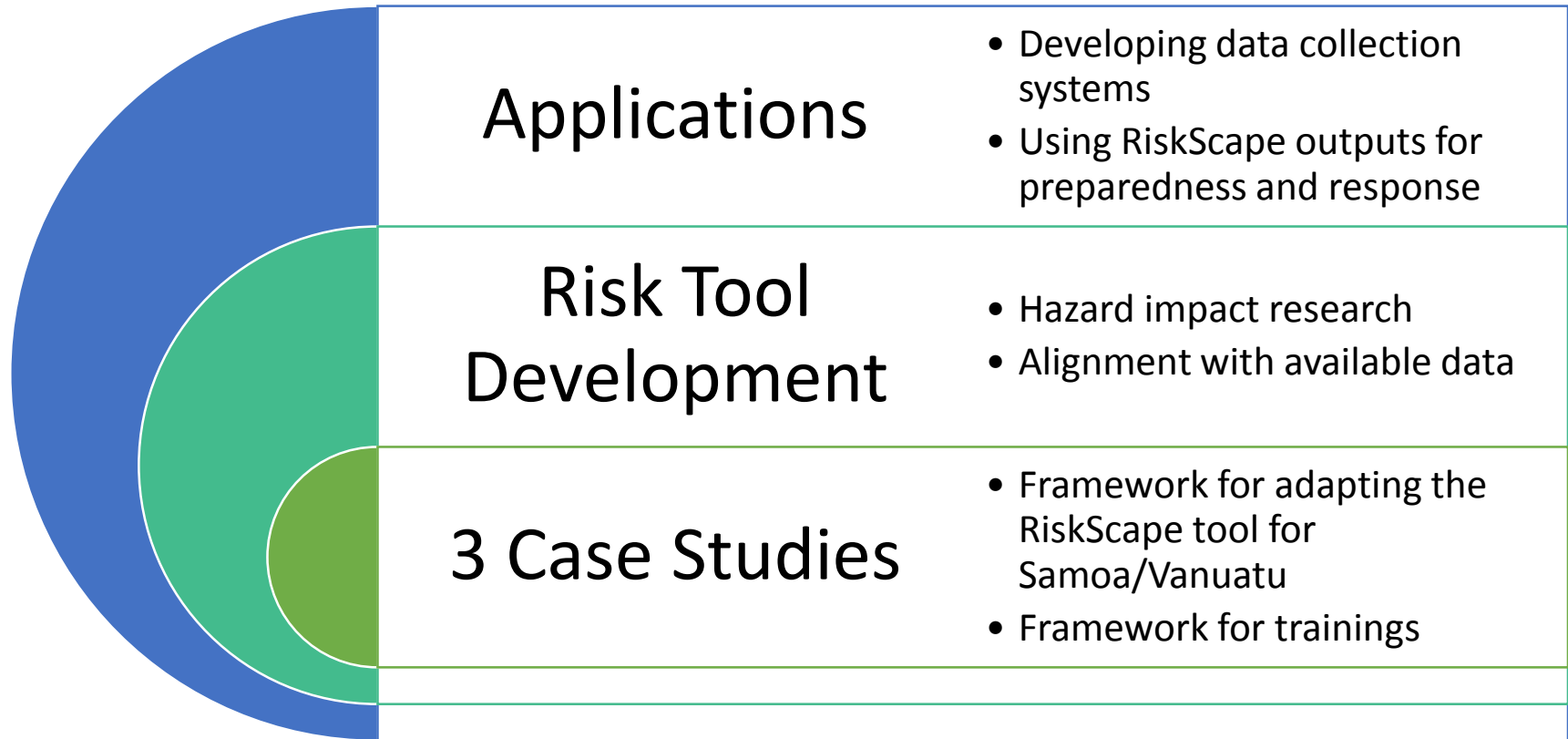Community of Practice receive risk modelling and data management system training

Advanced users receive vocational training and mentoring

NIWA, GNS and SPC technical advisors

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Goal: Risk informed decision making

Risk Tool:
Tailored version of RiskScape

Data:
Hazard models and asset information

Impact:
Estimated economic loss and human casualties

Informed decisions:
Reduce Risk

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Applications
- Developing data collection systems
- Using RiskScape outputs for preparedness and response

Risk Tool Development
- Hazard impact research
- Alignment with available data

3 Case Studies
- Framework for adapting the RiskScape tool for Samoa/Vanuatu
- Framework for trainings

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SESSION 1: Review of DRM terms

- DRM Concepts and basic terminology
  - DRM
  - Risk
  - Asset
  - Attribute
  - Hazard
  - Vulnerability
  - Exposure
  - Aggregation



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Disaster Risk Reduction

Disaster Risk Reduction is a systematic method of assessing the HAZARDS, VULNERABILITY and CAPACITIES of a region and then designing and implementing appropriate mitigation measures.

Definition of DRR according to the UNISDR (International Strategy for Disaster Reduction):

- *"**Action taken to reduce the risk of disasters** and the adverse impacts of natural hazards, **through systematic efforts to analyse and manage** the causes of disasters"*
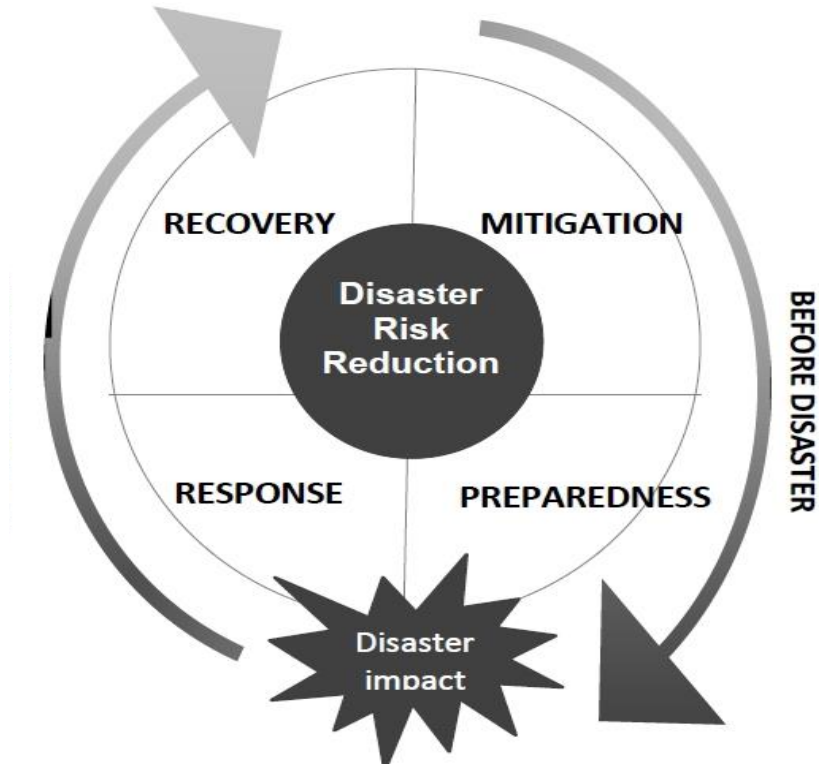
The ultimate objectives of DRR are to

- Protect life, property, and way of life;

- Mitigate the extent of impacts;

- Promote resilience and recovery;

- Reduce human contributing factors to disasters.

What are the problems that result in disasters?

- New development in areas exposed to hazards

- Inadequate construction or design

- Reliance on emergency response rather than DRR.....
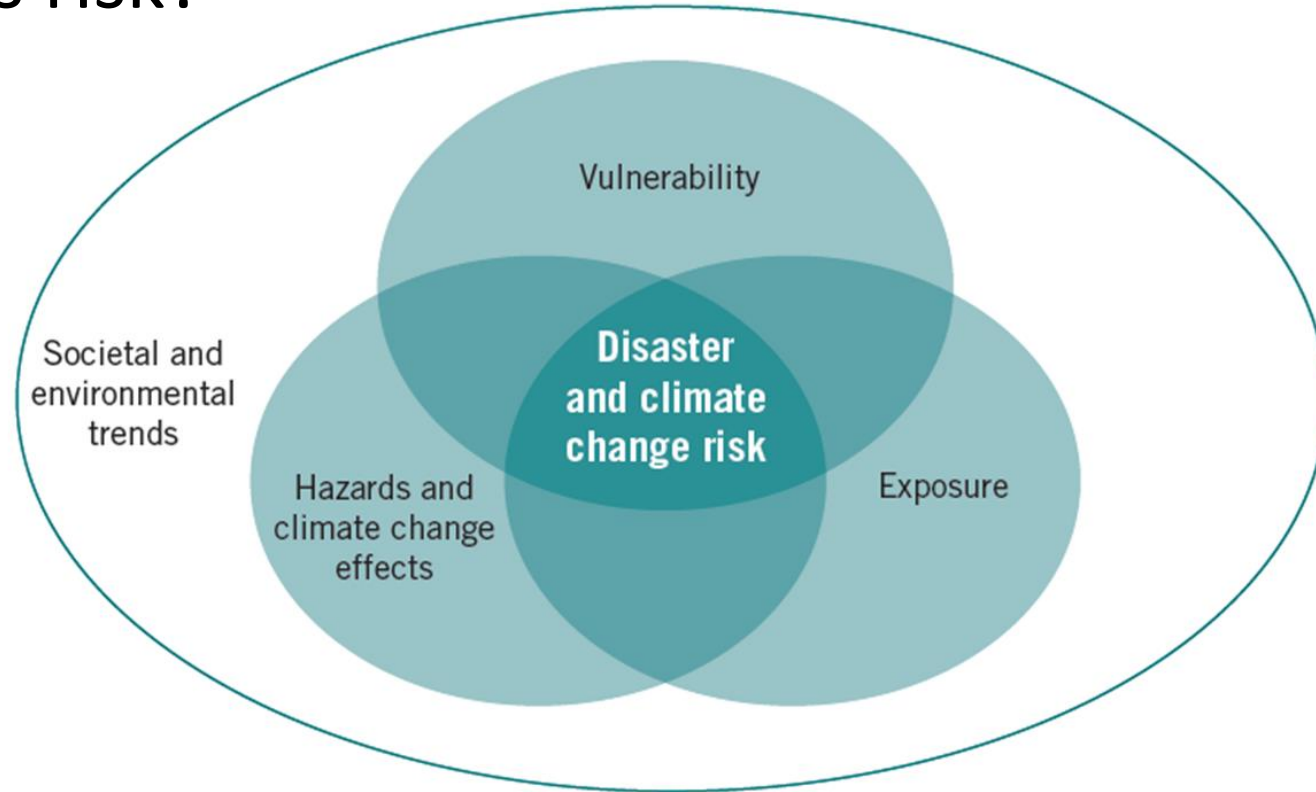
- Lack of planning for disasters

Activity 1:

What are the major issues and barriers, in terms of risk reduction and emergency management, that result in poor planning/ decision making?

i.e. Lack of risk data

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What is risk?

Source: Towards Resilience: A guide to DRR and CCA

Activity 2: Examples of terms

Risk=

**The combination of the likelihood of an event and its negative consequences**

Hazard x Vulnerability/Exposure = Risk

Example:

i.e. chance of your house being damaged by a 1:100 year flood

Hazard

- A process, phenomenon or human activity
  - that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

- Example:
- i.e. flood, cyclone, tsunami
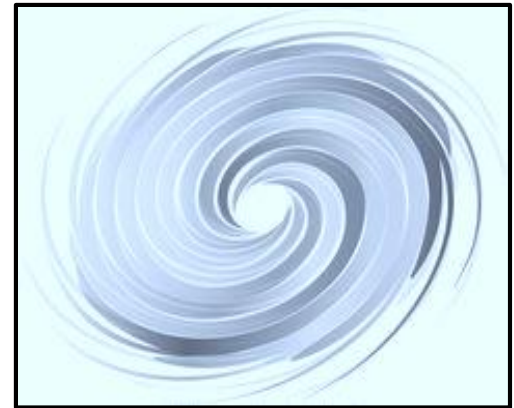
Asset

- A person or man-made or natural resource that has a tangible or intangible value.

- Example:

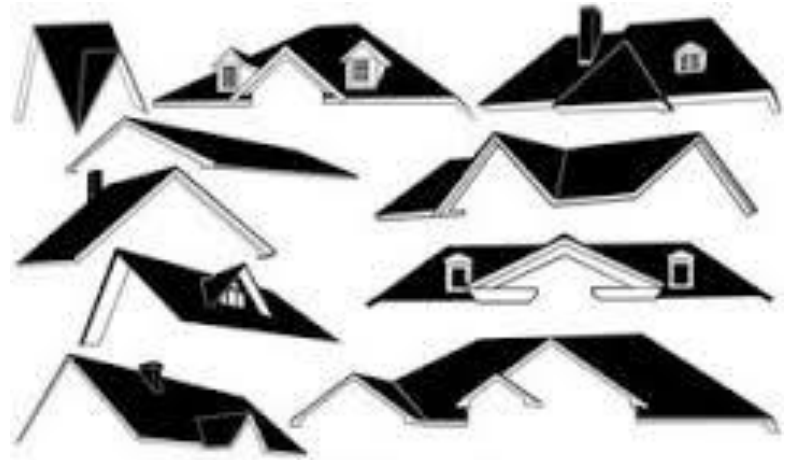- i.e. people, buildings, roads

Exposure

- Assets that will be impacted by a hazard event or scenario

- Example:
- i.e. buildings along a coast are exposed in a tsunami

Attribute

- Characteristics of an asset that may affect its vulnerability

- Example:
- i.e. a thatch vs. corrugated iron roof

Vulnerability

- The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

- Example:

- i.e. community has an evacuation shelter, a building has been built nearby a river

Aggregation

- Area or location for calculating hazard impacts.

- Example:
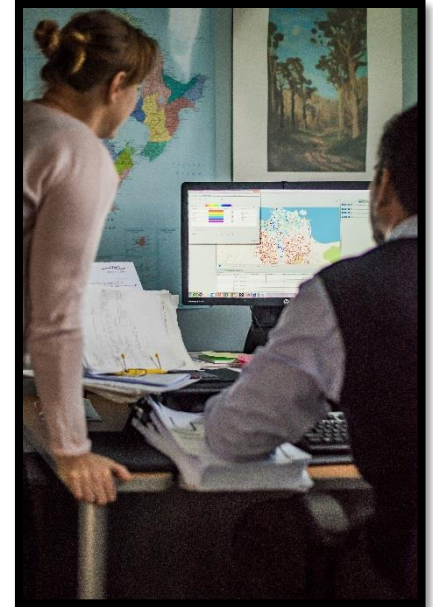- i.e. islands, provinces, town/village boundaries

Activity 3

- Scenario: There is a category 4 cyclone headed this way and we are all stuck in this building.

    - Name the hazard(s)
    - Identify the assets
    - Identify what assets are exposed
    - List the attributes that make this building vulnerable/ not vulnerable
    - What aggregation unit are we located in?
    - Is the risk high, medium or low?
    - What other information would be useful to assess the risk?

SESSION 2: Risk Assessment and Risk Tools

- Risk assessment
- Risk matrix
- Risk tools
- Review of RiskScape features

Risk assessment steps

Step 1
- Identify the hazard

Step 2
- **Identify the people and assets who might be harmed and why**

Step 3
- **Evaluate the risk and decide on precautions**

Step 4
- Review, record and adjust

Developing risk scenarios and comparing risk

- Disasters are unique
- There are multiple scenarios that could occur
- Carrying out a risk assessment requires you to consider a range of possible hazard magnitudes, locations etc.....

	Impact →				
Likelihood	Negligible	Minor	Moderate	Significant	Severe
Very Likely	Low Med	Medium	Med Hi	High	High
Likely	Low	Low Med	Medium	Med Hi	High
Possible	Low	Low Med	Medium	Med Hi	Med Hi
Unlikely	Low	Low Med	Low Med	Medium	Med Hi
Very Unlikely	Low	Low	Low Med	Medium	Medium

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Land Use Planning

- Evidence to inform conversations with community, politicians and officials regarding <u>ACCEPTABLE</u> levels risk

		Impact			
	Negligible	**Minor**	**Moderate**	**Significant**	**Severe**
Very Likely	Low Med	Medium	Med Hi	High	High
Likely	Low	Low Med	Medium	Med Hi	High
Possible	Low	Low Med	Medium	Med Hi	Med Hi
Unlikely	Low	Low Med	Low Med	Medium	Med Hi
Very Unlikely	Low	Low	Low Med	Medium	Medium

Likelihood
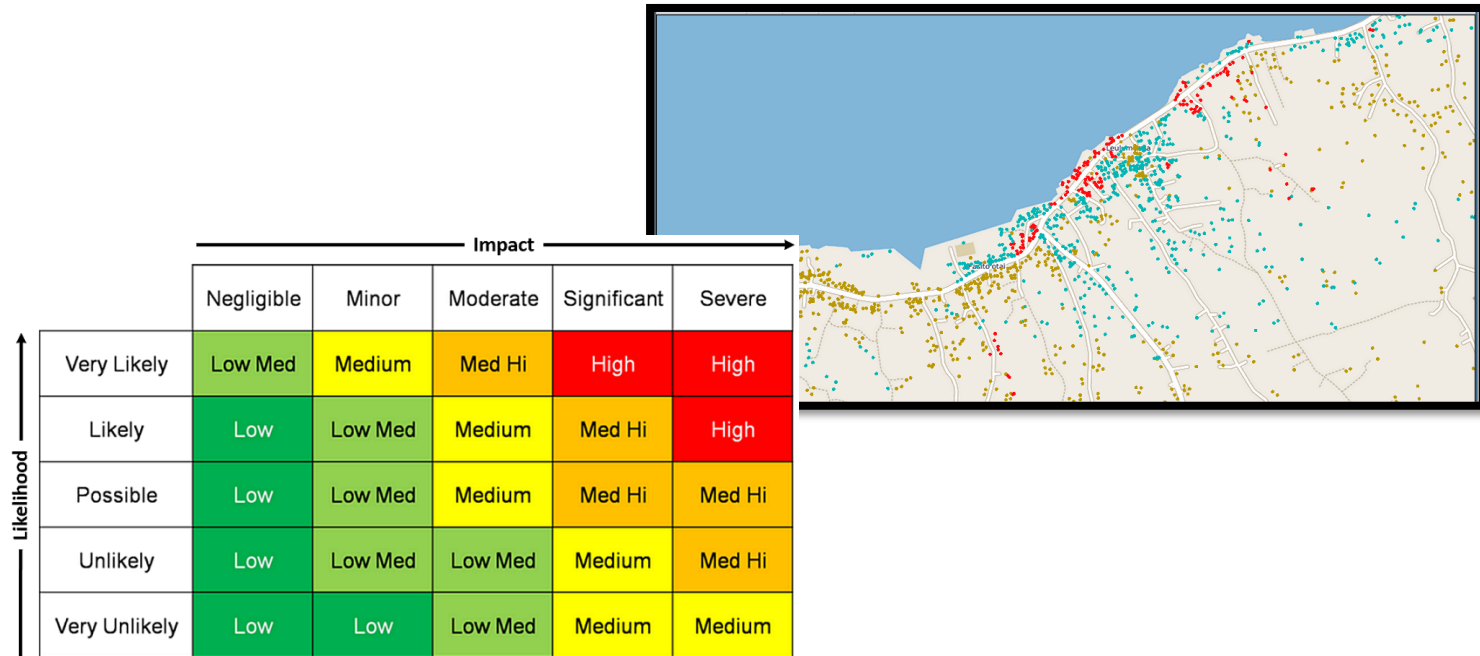
What are risk tools?

- Risk modelling software helps people understand the impact from hazard events.

- The software is designed to perform a complex calculation simply and quickly without needing specialist modelling knowledge.

Why are they useful?

- They can create disaster scenarios and produce estimates of :

- Number of people exposed
- Number of buildings exposed

- Degree of damage to buildings and infrastructure
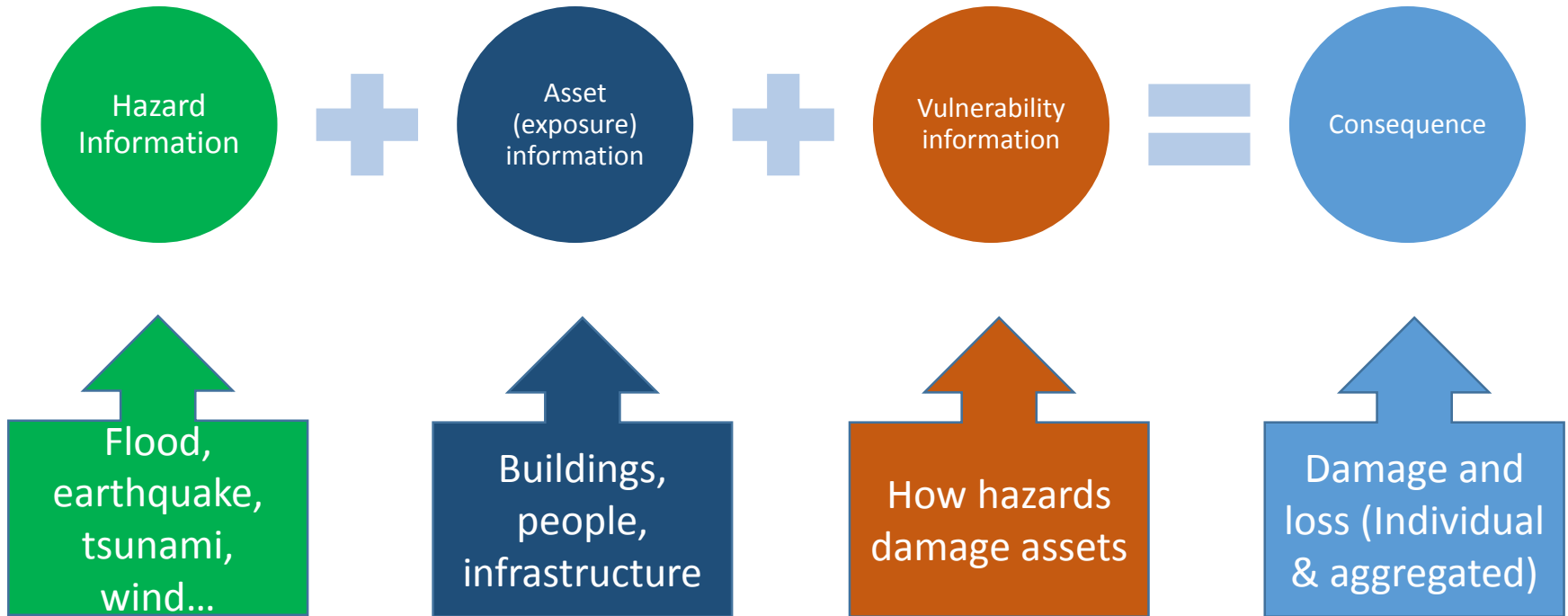- Indirect impacts such as clean up costs, economic losses…

What is RiskScape?

- Designed for New Zealand originally
- Used to support land use planning risk assessment and emergency preparedness, response and recovery.
- Software that is free to use

- This project aims to use RiskScape for Samoa and Vanuatu
- Tailor the tool to your needs
- Use case studies as a way of testing and tailoring the tool
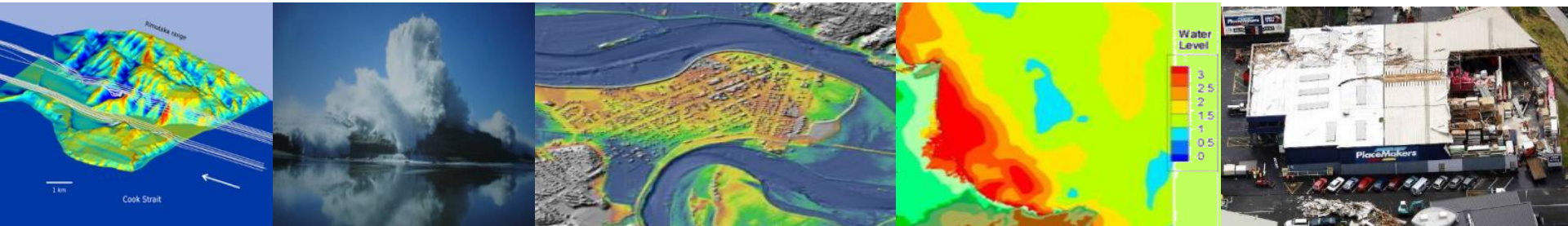
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How does RiskScape work?

Hazard Information + Asset (exposure) information + Vulnerability information = Consequence

Flood, earthquake, tsunami, wind…

Buildings, people, infrastructure

How hazards damage assets

Damage and loss (Individual & aggregated)

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RiskScape Hazards

Volcanoes

Tsunami

Floods

Earthquakes

Storm surge

Wind

Calculating exposure

No cursor   x=[-171.79, -171.73] y=[-13.86, -13.82]   EPSG:4326

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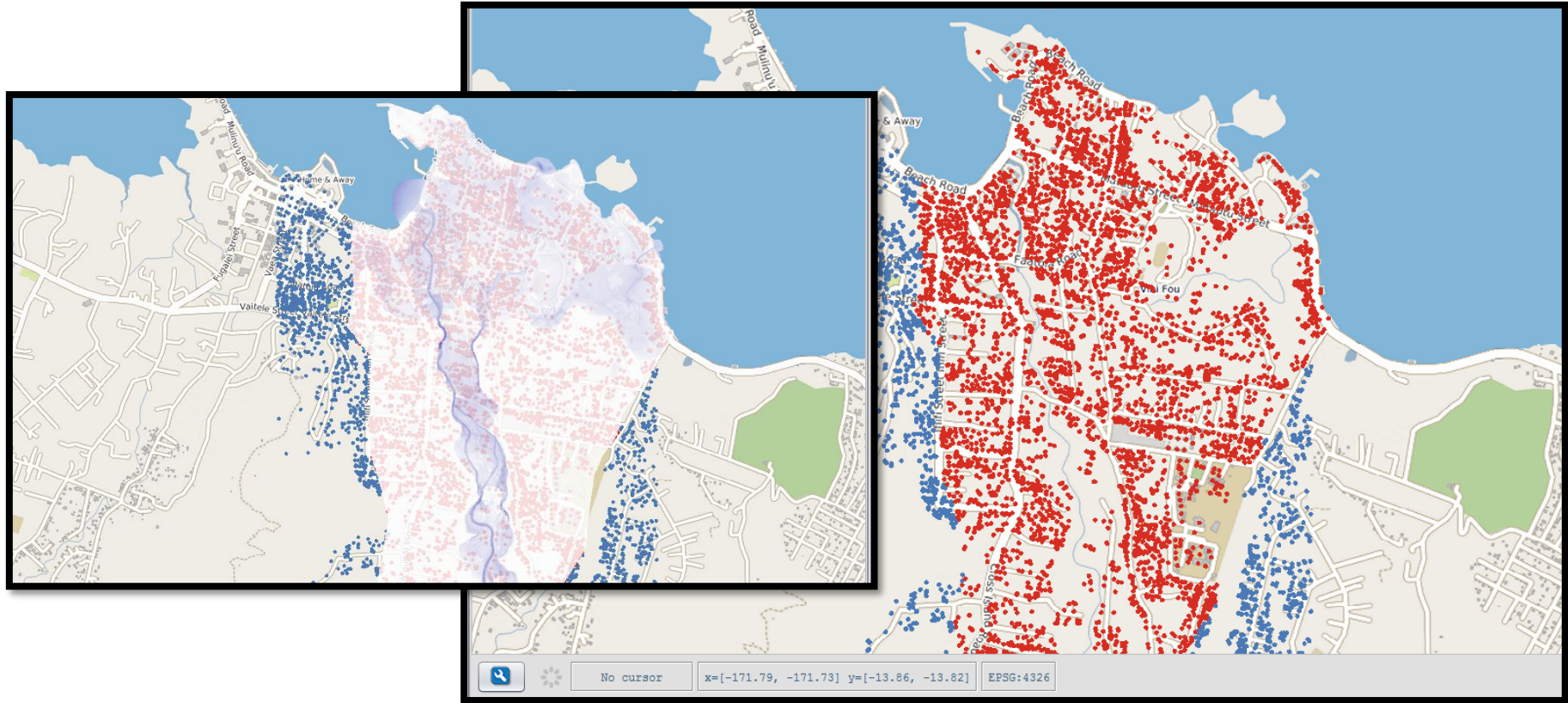
Calculating vulnerability

- The software is like a big calculator using calculations that represent what happens during a disaster event

- These calculations are based on observations of real events

  - E.g. Researchers measure the water depth and estimate building damage and look for patterns

- Called vulnerability functions

Vulnerability model

Damage and loss

1 in 100yr flood

Damage State - Buildings
- 0
- 1
- 2
- 3
- 4
- 5

Vaisigano flood 1 in 100 yr flood (m)
- 0.000000
- 0.801725
- 1.603450
- 2.405175
- 3.206900

0   500 m

Reinstatement Costs WST
- 0 – 133933
- 133933 – 482457
- 482457 – 1264698
- 1264698 – 2445616
- 2445616 – 5183386

Return Period	Damages (Tala) Reinstatement cost
1 in 1	23,323,115.06
1 in 5	46,263,499.63
1 in 20	116,872,231.79
1 in 100	247,821,814.69

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Human casualty

No. of injured people

	1 in 1	1 in 5	1 in 20	1 in 100
No. of injured people	7	14	34	102

Recurrence interval

Estimated number of people

Direct and Indirect

- **Direct damage** – information about type of asset and its vulnerabilities

- **Indirect damage** – information about assets function, cost, value, occupancy, household income…

RiskScape outputs can be individual or aggregated
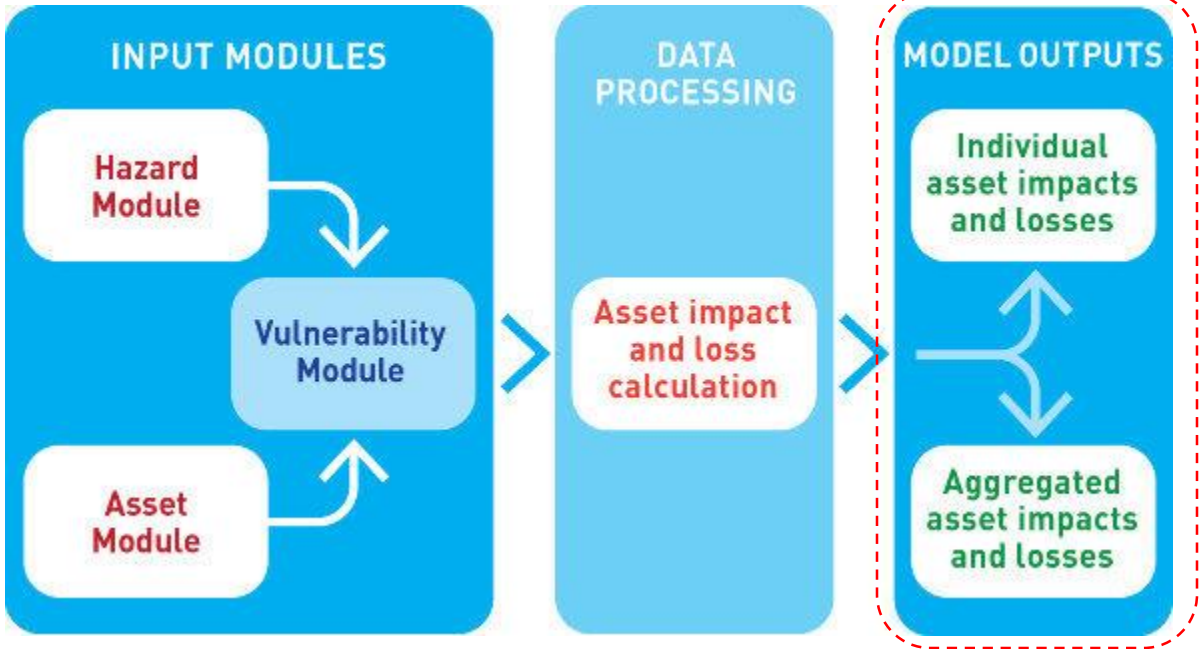
Support using RiskScape

- **RiskScape wiki**
- **RiskScape in-country project coordinators**

Samoa:

Mr. Titimanu Simi

MNRE-DMO, Apia, Samoa

Phone: +685-67200

Email: titi.simi@mnre.gov.ws
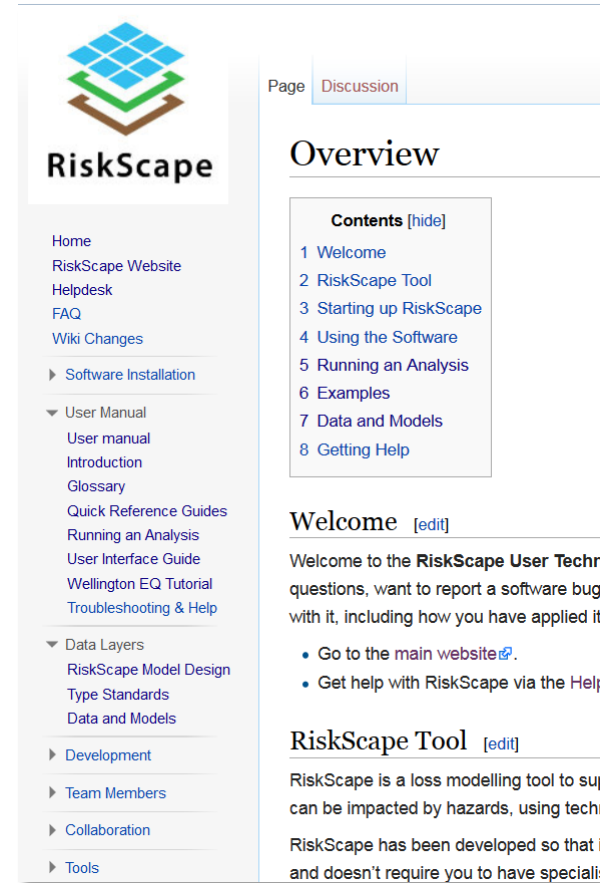
Vanuatu:

Mr. Johnny Tarry Nimau

National Disaster Management Office (NDMO), Port Vila, Vanuatu

Phone: +678-22699

Email: tarijohnny@gmail.com

RiskScape interface

Online Help

Filter Manager

Repository

Preferences

Library Tab
Your simulations will appear on this tab

Analysis Tab
*Select an option from each of the four panels

*Use the module manager to load more modules

Add to Library Button
(available when four valid options are selected)

Helpdesk and Bug Reporting

Builder tools

Asset Aggregation Hazard

Add Resource Map

File Conversion Tool

Asset Modification Tool

Metadata Editor

User Interface - Quick Reference guide

Select, Zoom, pan & more map functions on the **Map Menu Bar**

Layers Tab

Hidden Tabs
Asset exposure
Attribute statistics
Identify

Active layers appear here
Toggle buttons & right click for more options

Map info bar
*cursor position
*map extent
*coordinate system

Hide/show all layers

Coordinate settings

Messages to User

Do you need more help? Visit the wiki for more detailed instructions

RiskScape

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SESSION 3- RiskScape tutorial

- Create a tsunami scenario
- Run the calculations
- Explore the results

Tutorial One: Tsunami exposure and impact

Key questions:

- How many buildings are lightly damaged?

- Where is the worst damage expected?

- Other questions under Activity 4

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SESSION 4: Asset data collection

- Data requirements

- Assets

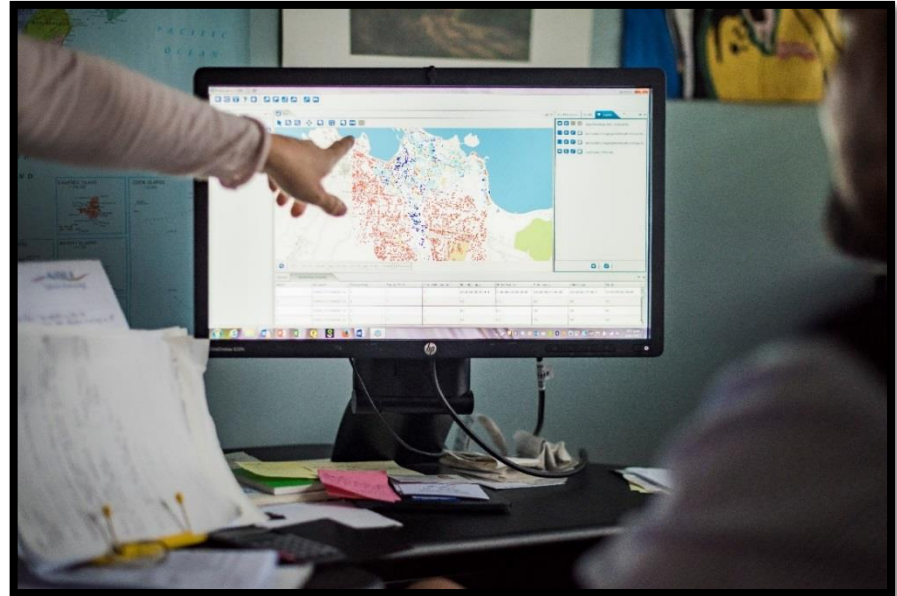- Overview of RiACT

- Field trip logistics- collect new data

The Importance of Data

RiskScape can estimate impacts:

- damage state,

- human loss,

- replacement costs,

- displacement….

But like any risk assessment framework it requires data.

Data requirements

- RiskScape is just a framework it requires you to input data.

Data includes:

- Asset - buildings, infrastructure

- People – occupancy

- Hazards – hazard parameters e.g. depth, velocity, shaking

- Geospatial - aggregation e.g. village boundary or city boundary

- Vulnerability model – calculation

Assets

- How a building reacts to different stresses depends on its construction.

- Therefore attributes of buildings need to be recorded.

Source: metro.co.uk

Assets – buildings survey template

We therefore need building data that includes:

- Location
- Use category
- Construction type
- Etc.

Roof cladding

Ground floor height

Foundation type and materials
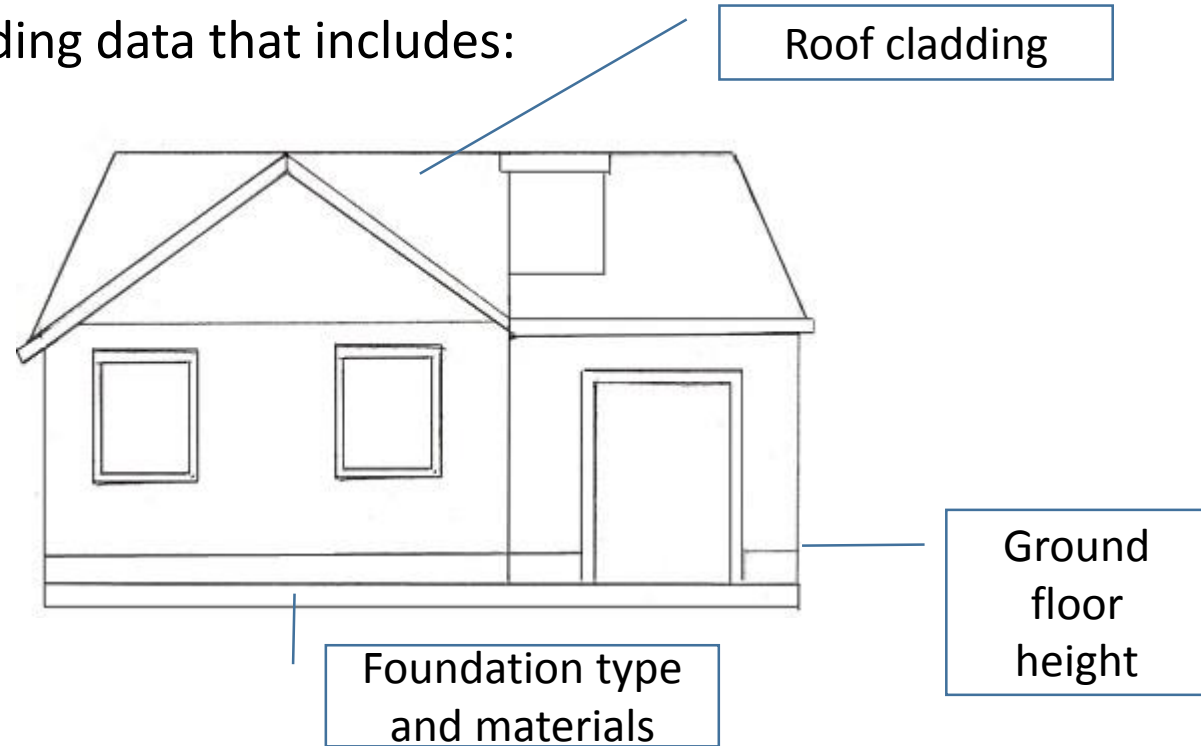
Assets and attributes

Assets can be buildings, infrastructure or people

Attributes are the characteristics of that asset

Each attribute relates to a vulnerability model requirement

	A	B	C	D	E	F	G	H	I	J	K	L
1	FID	RISK_ID	NZTME	NZTMN	BLD_QUAL_N	CONSTRUCTI	CONTENTS_V	CNTS_VAL_R	CNTS_VAL_F	NZDEP06	EMPL_DAILY	BLDG_FLOC
2	0	90108672	1899167	5698830	1	5	11100	3330	3330	9	0	3
3	1	90110616	1900124	5688063	2	5	15000	4500	4500	10	0	5
4	2	90110617	1893163	5691161	1	5	15000	4500	4500	10	0	5
5	3	90110618	1892390	5691315	1	5	15000	4500	4500	10	0	5
6	4	90110619	1892153	5691519	1	5	6600	1980	1980	9	0	2

Conventional exposure data development

Exposure data development framework

RiskScape

EARTHQUAKE-PRONE BUILDINGS
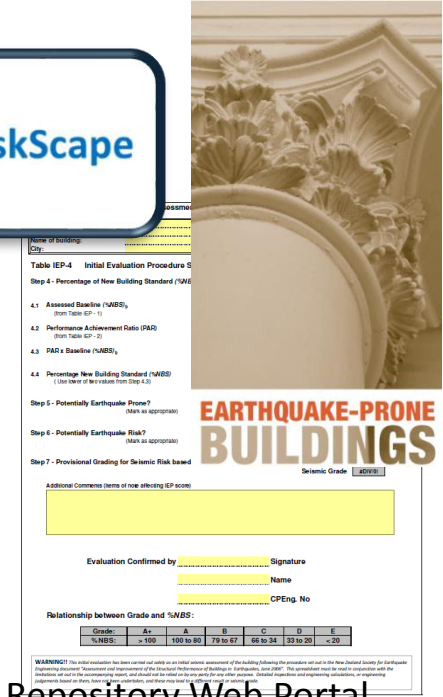
Asset Repository

Sync

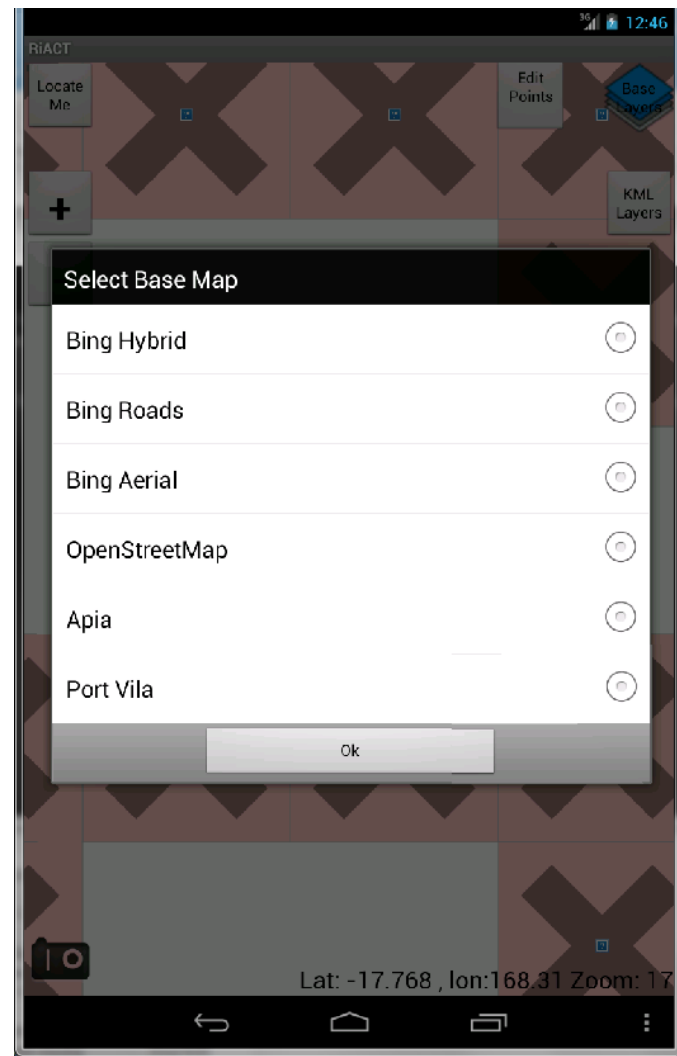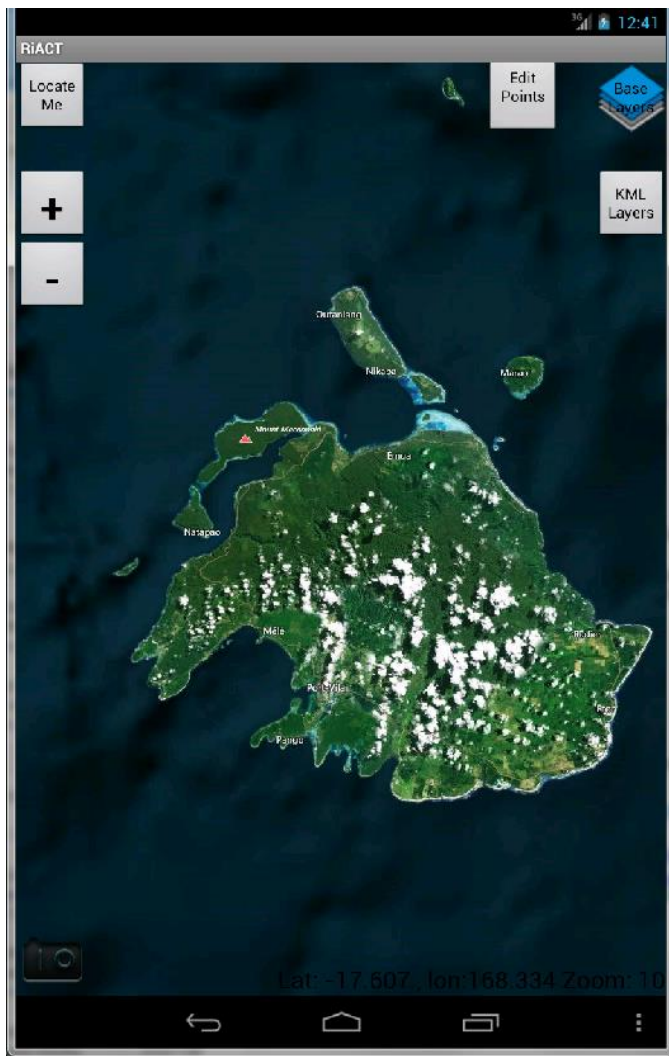**Sync**

Asset Repository Web Portal
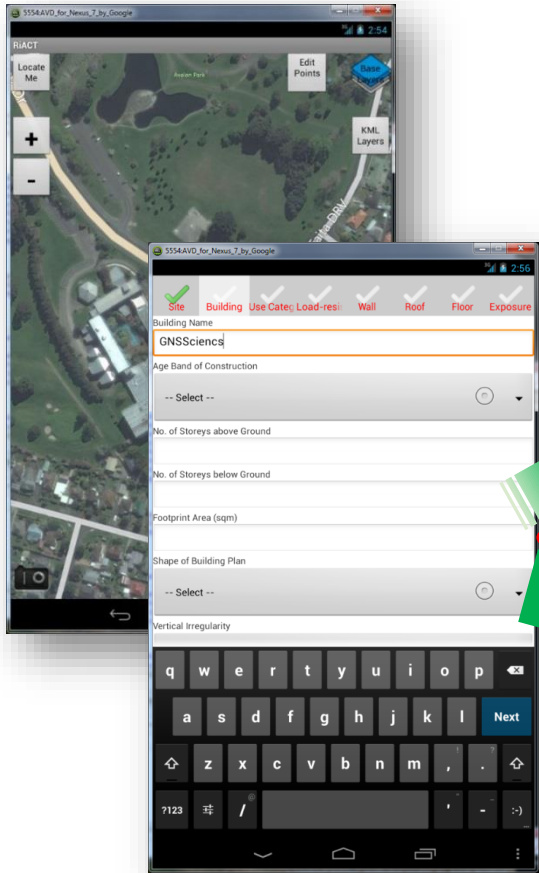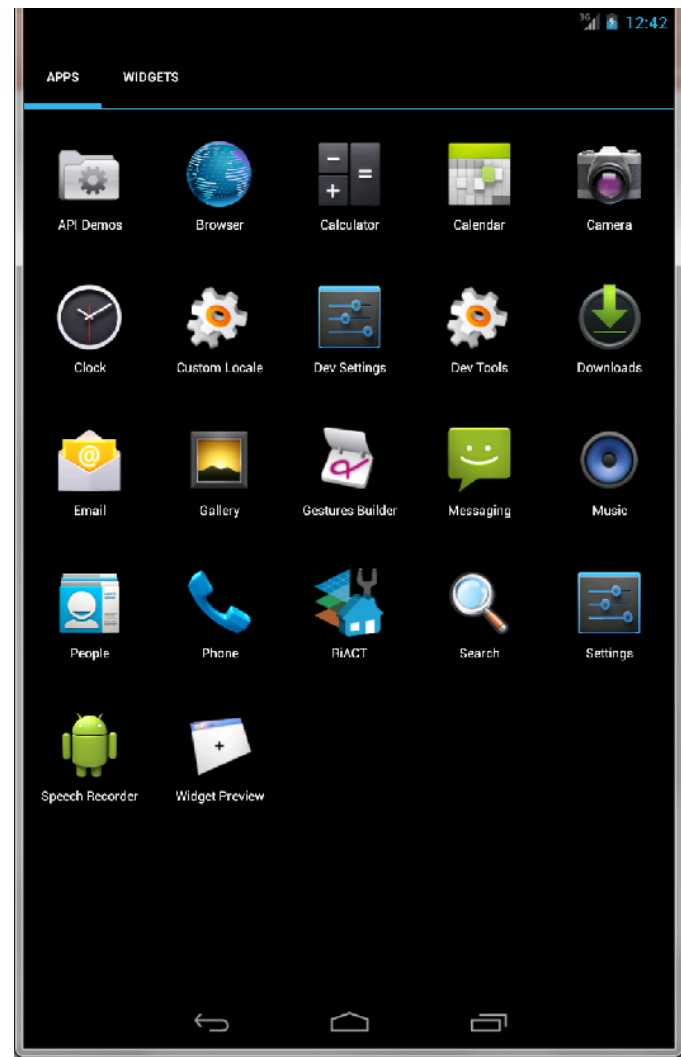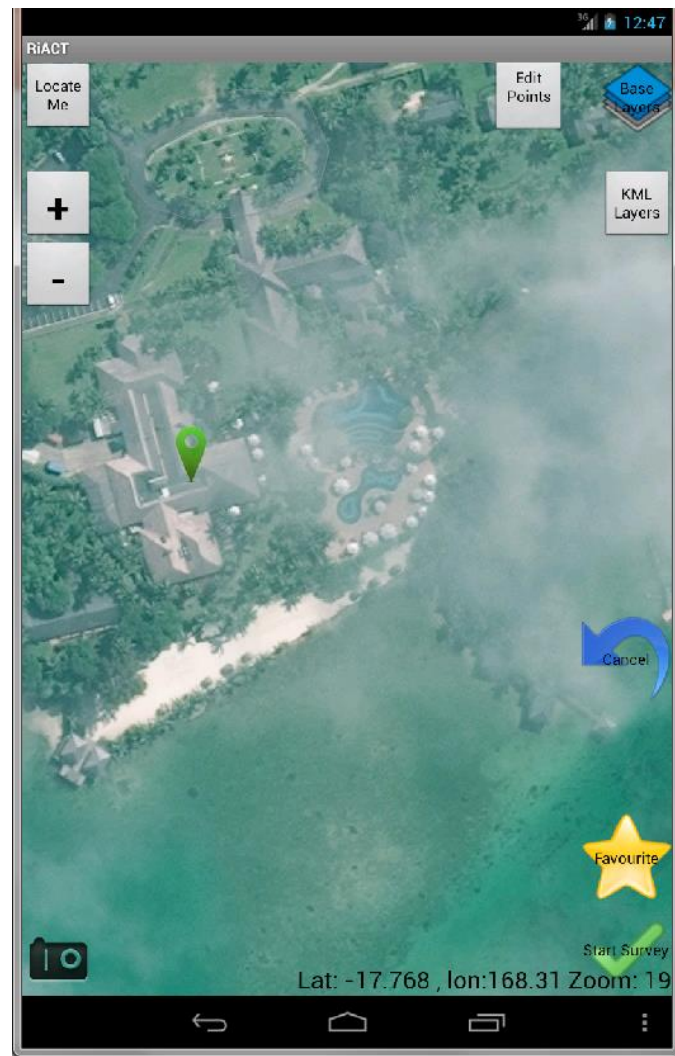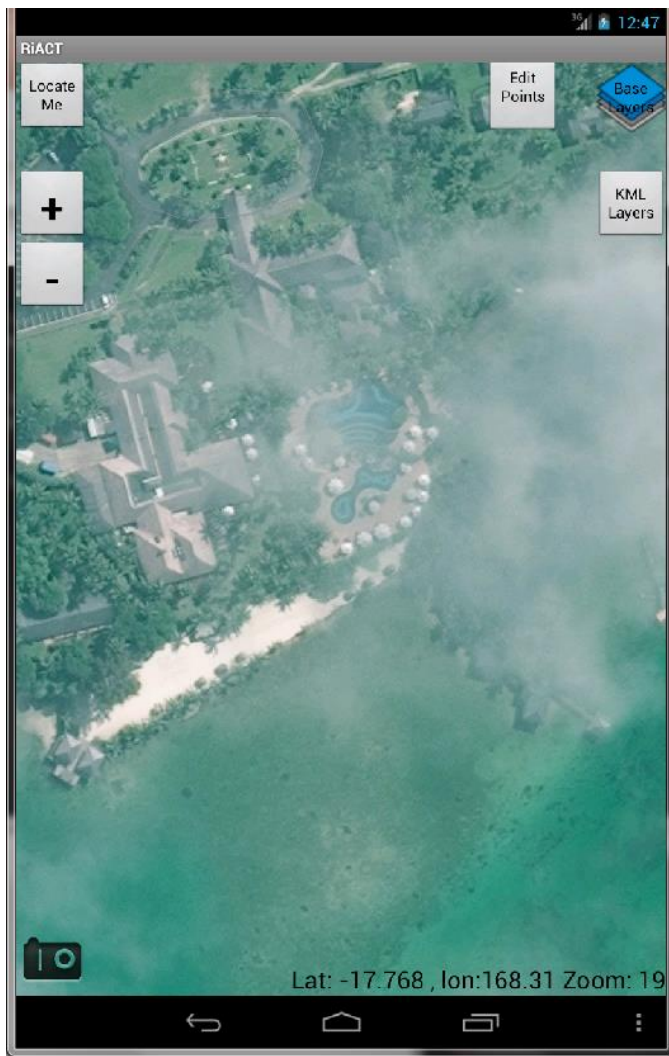
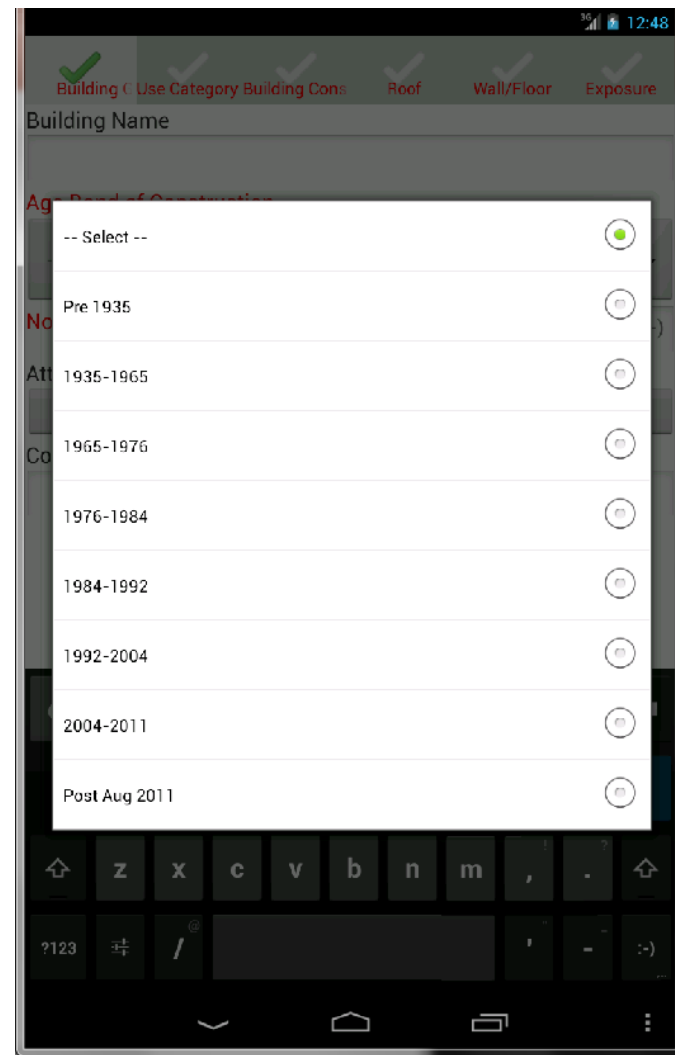Real-time Individual Asset Attribute
Collection Tool (*RiACT*)

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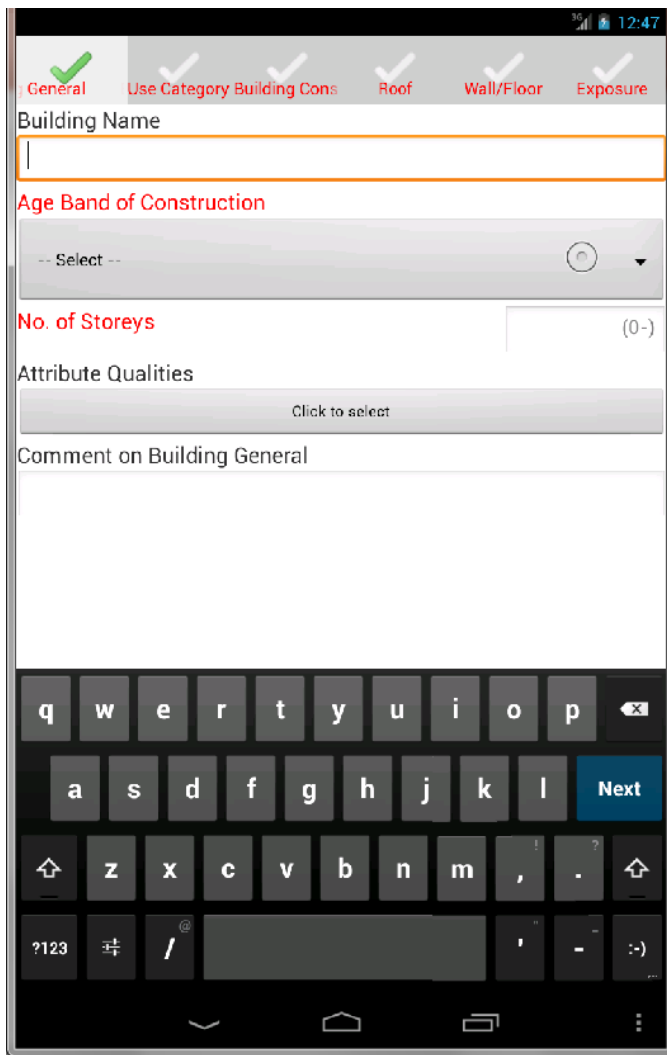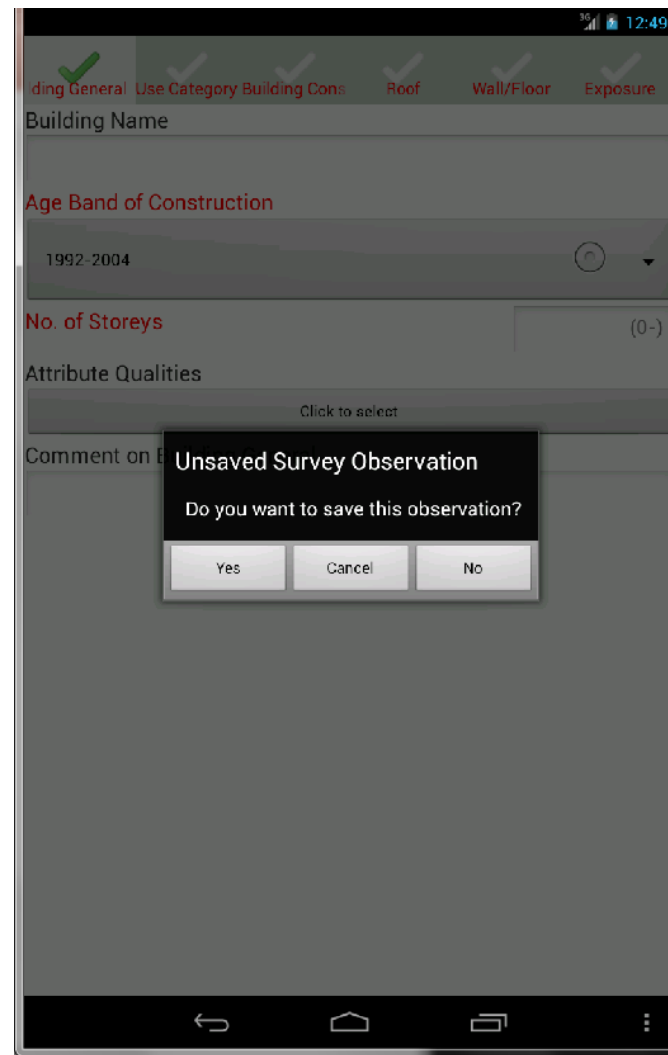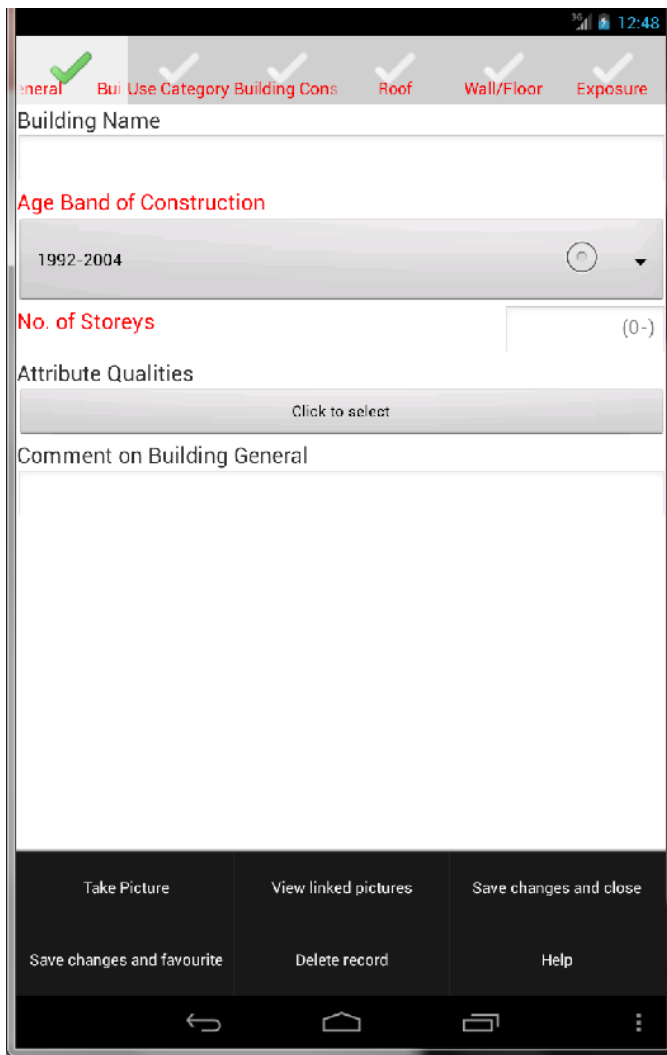
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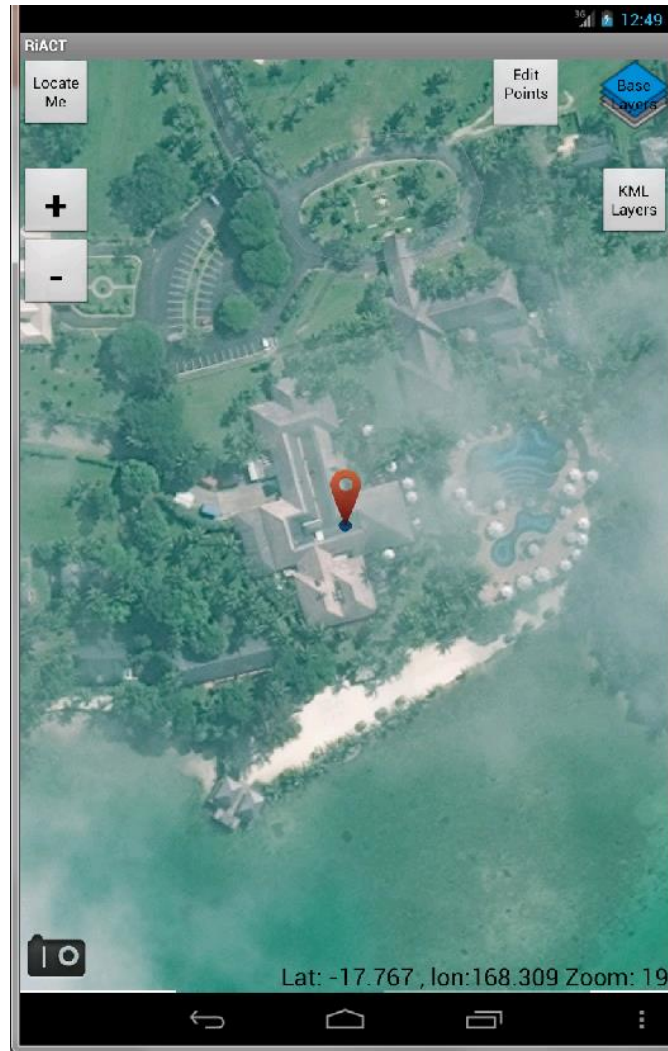# PARTneR – Pacific Risk Tool for Resilience

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Asset Repository

Welcome, info@riskscape.org.nz. Please select one of the options below.

Datasets
View the datasets available in the asset database and upload or download data

Users
View and Edit Users

Organisations
Manage Organisations and User Access

Templates
View and edit templates installed into the Asset Editor

Asset Repository

HOME

Available Datasets

Filter by name | All asset types ▼

Create a new dataset

Page 2 of 2 (Items 11 - 17 of 17)   ‹‹ ‹ → ››

SRD2
Type: Buildings
Organisation: <public>

KaikouraEQ
Type: Buildings
Organisation: <public>

DamageSurvey_KaikouraEQ
Type: Buildings
Organisation: <public>

AoG
Type: Buildings
Organisation: <public>

RSK_CCC_14
Type: Buildings
Organisation: <public>

Flood_BoP_2017
Type: Buildings
Organisation: <public>

PARTneR Prj
Type: Buildings
Organisation: <public>

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Collect new asset data using RiACT

- 2 people per group- collect data on one building
- Use both tablet and pen and paper

- Bring:
- Tablets
- Pen and paper
- Water

- Know who your team is
- Stay safe and be aware of traffic
- Do not enter property
- Speak to own owners if they are there.

Lunch break!

SESSION 5: Entering data into RiskScape

- Add to the spreadsheet of asset data

- Asset builder tool

- Damage state of new assets

Tutorial Two: Manually add new assets

- Examine the spreadsheet of asset data.
- Add the new data
- Create an asset layer in RiskScape using the builder tool

	A	B	C	D	E	F	G	H	I	J	K	L
1	FID	RISK_ID	NZTME	NZTMN	BLD_QUAL_N	CONSTRUCTI	CONTENTS_V	CNTS_VAL_R	CNTS_VAL_F	NZDEP06	EMPL_DAILY	BLDG_FLOC
2	0	90108672	1899167	5698830	1	5	11100	3330	3330	9	0	3
3	1	90110616	1900124	5688063	2	5	15000	4500	4500	10	0	5
4	2	90110617	1893163	5691161	1	5	15000	4500	4500	10	0	5
5	3	90110618	1892390	5691315	1	5	15000	4500	4500	10	0	5
6	4	90110619	1892153	5691519	1	5	6600	1980	1980	9	0	2

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SESSION 6: Asset modification in RiskScape

- Adjusting the assets using the asset modification tool
- What if scenarios

Adjusting the assets

- The RiskScape tool is a simple framework

- If you change the assets you can change the results

- How might you reduce the impacts of a tsunami?
  - Consider what makes a building vulnerable to a tsunami and what can you adjust?

Adjust the assets to test out different hypothesis

- What if ….a new development is planned, what will be the impact of a tsunami on that development?
- What if….we prioritised the development of an early warning system for tsunami?
- What if….we need to plan the best evacuation route or access routes during a tsunami?
- What if….we need to plan for the impacts of future climate change?

Tutorial Three: Use the asset modification tool

- If you using RiskScape or other closed data, then you will need to use the asset modification tool….

- The tool creates a new modified layer for you.

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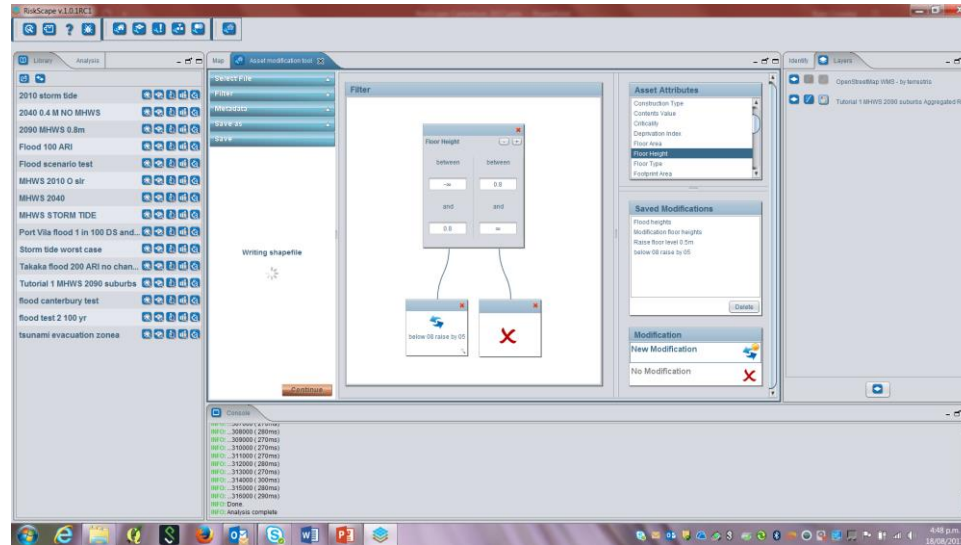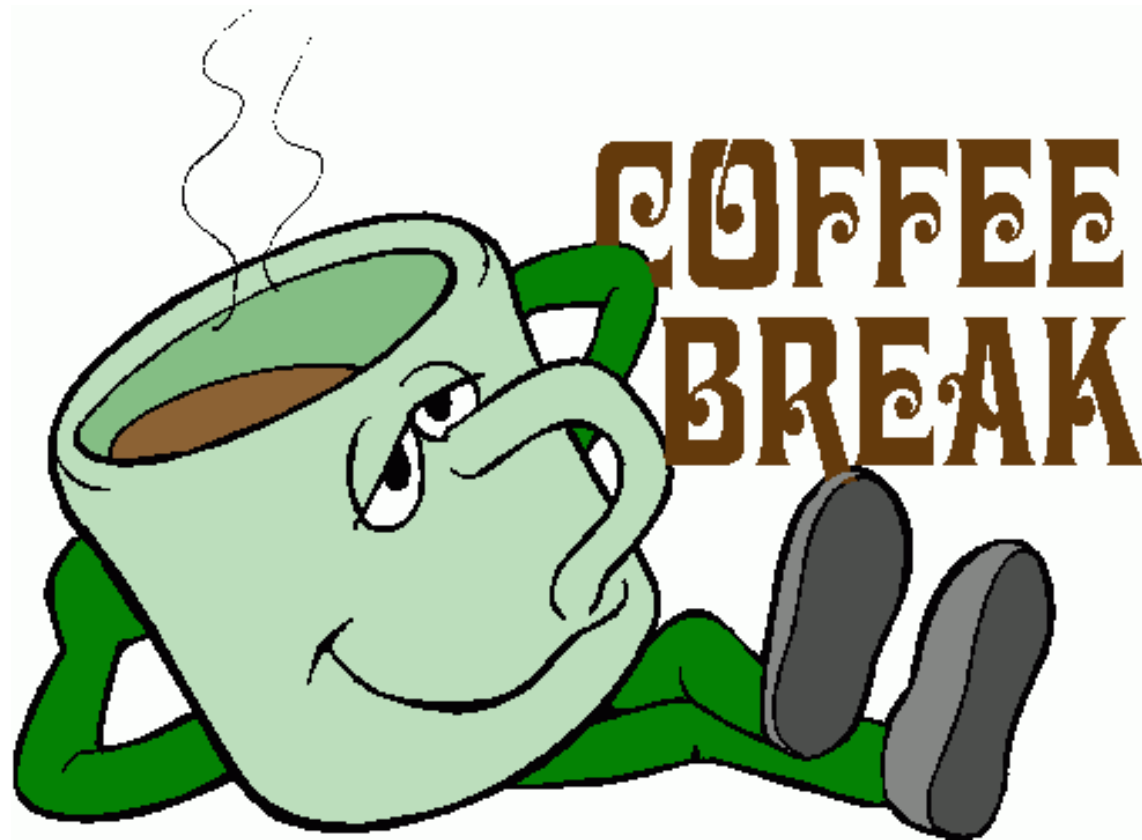
SESSION 7: Feedback and Evaluation

- Feedback on RiskScape interface
- Evaluation of the workshop

Activity 6- RiskScape Feedback

Make a list of the positive and negative aspects of the RiskScape tool for the following components:

- Overall user interface

- Running a scenario

- How the results are formatted?

Tankiu tumas!

Please fill out the workshop evaluation before you leave.

Contact Us Via:

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NDMO

+678 22699

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