

Modelling dengue potential in NZ under various  
climate change scenarios

Interactive web interface for end users

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**Specialist Science Solutions**

Manaaki Tangata Taiao Hoki  
protecting people and their environment through science

# HAIFA – Health Analysis Information for Action

- NEW ZEALAND Web based spatial resource system
- Presents modelled output for six infectious diseases,
  - campylobacteriosis,
  - cryptosporidiosis,
  - meningococcal disease,
  - influenza,
  - Ross River fever &
  - Dengue
- Enables users to:
  - plan responses to the impacts of climate variation and change
- 5x5 km spatial scale;
- Three time and three climate scenarios (A1b, A2, B1 X 2015, 2040, 2090)
- Three CRIs (ESR, Landcare Research and NIWA).
- Two NZ universities (Massey and Waikato)

# Climate Modelling

Downscale Global → Regional → 5km grid → Local projections (A1b, A2, B1) NIWA

World Climate Research programme - Coupled Model Intercomparison Project phase 3  
WCRP CMIP3 dataset.

24 Atmosphere–ocean general circulation models for twentieth- and twenty-first-century

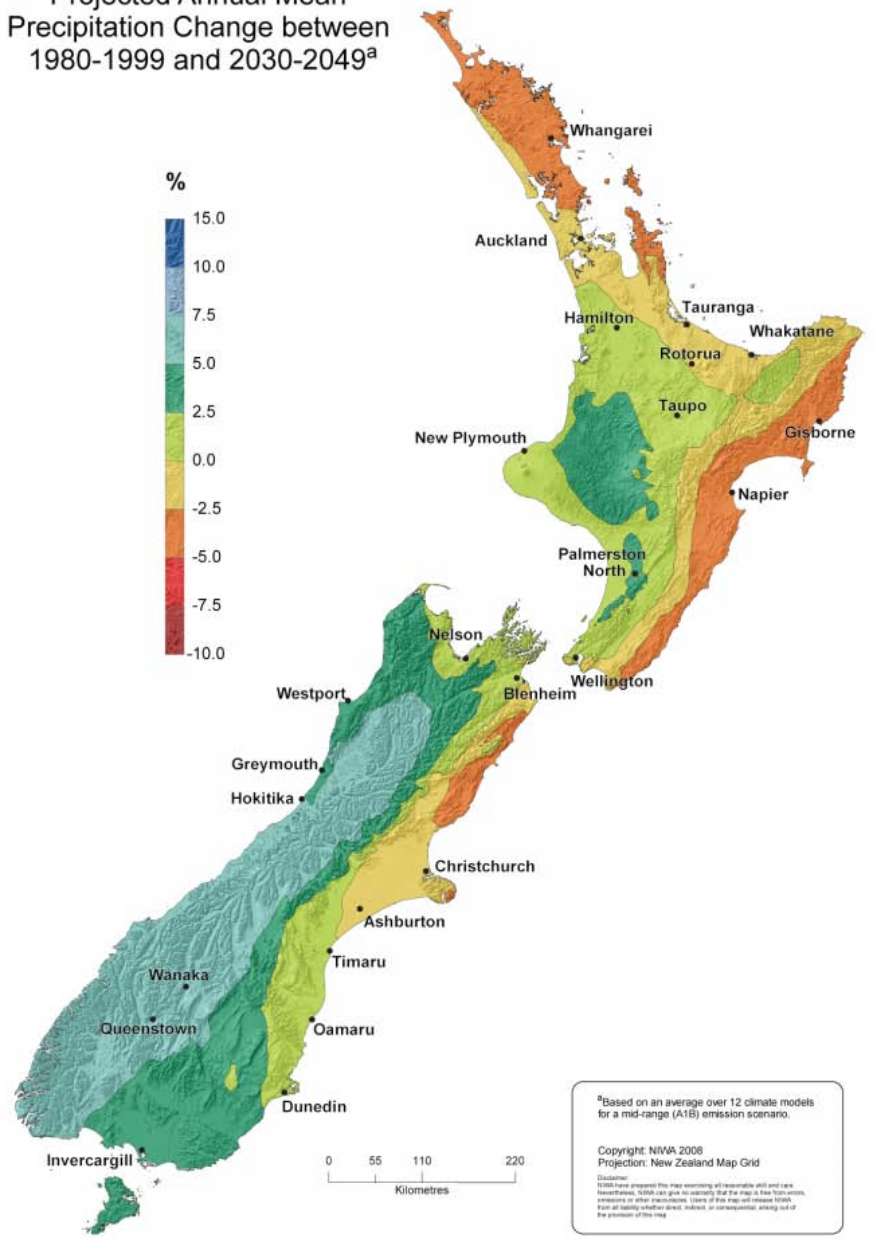
Select best models for New Zealand

Adjust for local shape and topography

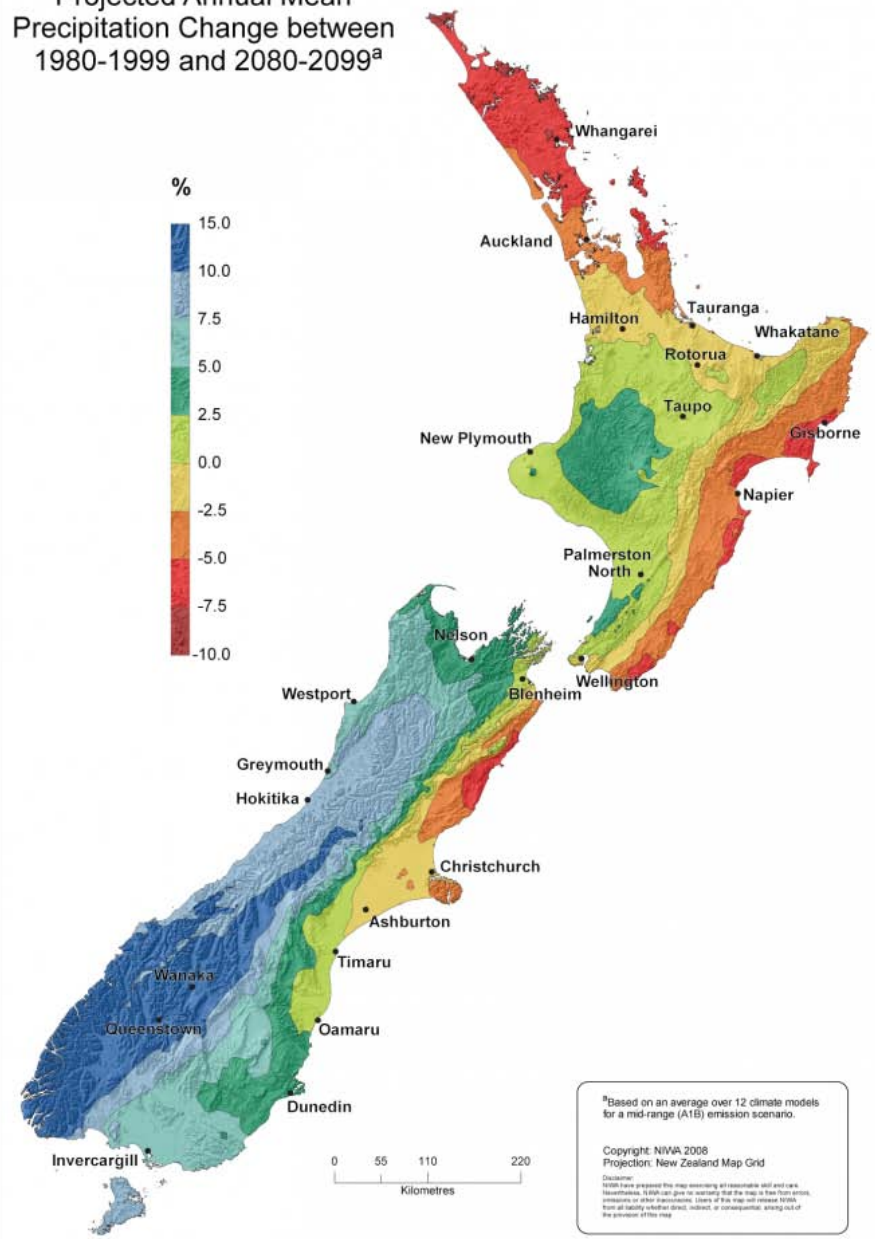
Scenarios used were

- A2 Divided world, population keeps rising
- A1b Balanced energy sources. Integrated efficient world, pop peaks 9 billion 2050
- B1 Integrated, eco-friendly, efficient, global solutions.

Projected Annual Mean  
Precipitation Change between  
1980-1999 and 2030-2049<sup>a</sup>



Projected Annual Mean  
Precipitation Change between  
1980-1999 and 2080-2099<sup>a</sup>



A1 downscaled and localized precipitation % change

# Modelling Dengue potential at edge of climatic envelope

Dengue Potential not Dengue risk

*Ae. Aegypti* potential distribution

1 Temperature suitability index

2 Climatic suitability: (mid-winter temp; Degree-days, Cold stress, Min and max rainfall)

3 Habitat suitability: (Land-cover; Topography; Elevation exclusion).

HOTSPOTS (Neil de Wet et al, 2005)

Statistical and biological approaches to model potential distribution of six exotic mosquitos in New Zealand

# Presenting model results to end users – Webtool

## Health info for action - HAIFA

*Aedes :  
aegypti,  
albopictus  
polynesiensis.*

**Filters**


Dengue Fever Potential ▾


Year 2015 ▾

Scenario Medium Emission ( ) ▾


Species ▾ Aedes aegypti ▾


Show full background image


 Search


 Grid

**Tools**

 Legend

 Spatial Query

 Print

 Compare

← 2015, 2040, 2090

← A1B, A2, B1

Coming soon  
[www.esr.cri.nz/HAIFA](http://www.esr.cri.nz/HAIFA)

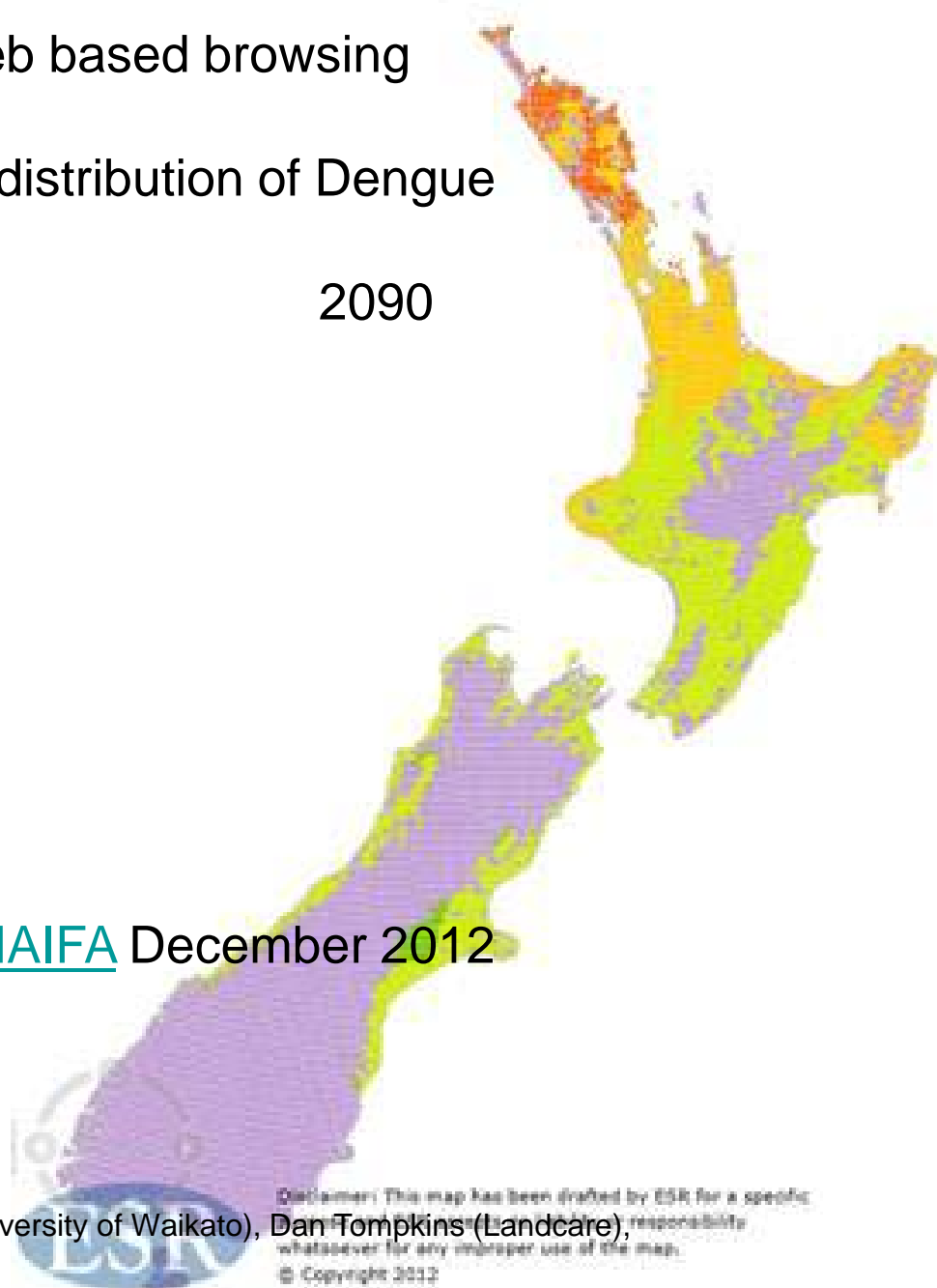
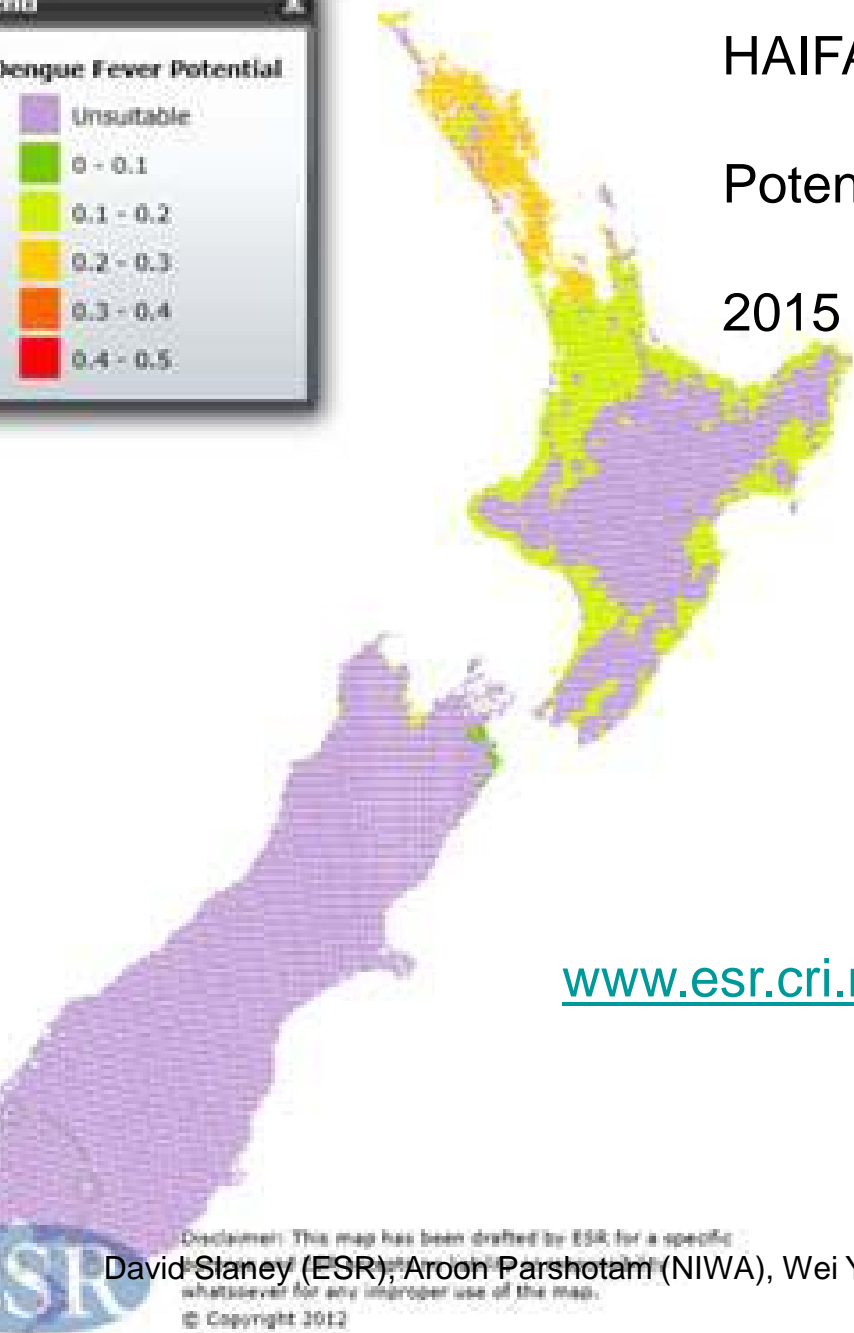


HAIFA web based browsing

Potential distribution of Dengue

2015

2090



[www.esr.cri.nz/HAIFA](http://www.esr.cri.nz/HAIFA) December 2012