

Impacts, vulnerability & adaptation approaches



Reflections from two examples

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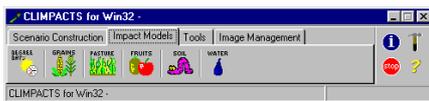


Integrated models for impact and V&A assessment: the CLIMFACTS approach

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The purpose of CLIMFACTS



- To develop an integrated model for examining effects of climate variability and change in New Zealand, *at a range of temporal and spatial scales*

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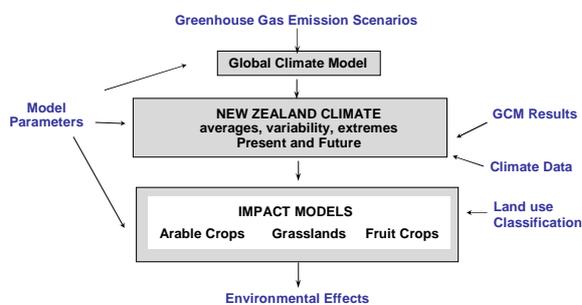
Collaborative research

- Multiple partners
 - Two Universities
 - Five Crown Research Institutes
- 8+ years of development
- Several million dollars of government investment

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CLIMFACTS model structure



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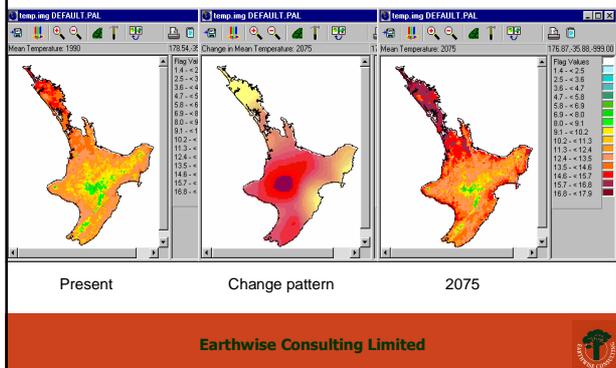
CLIMFACTS model structure Global Climate Model



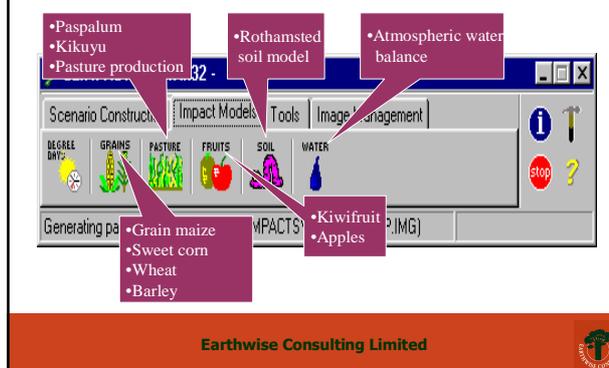
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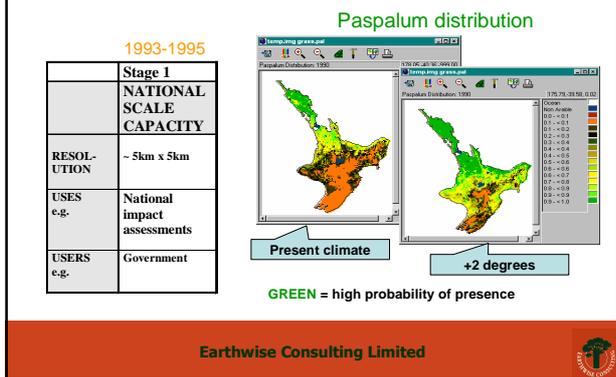
Present and future climate



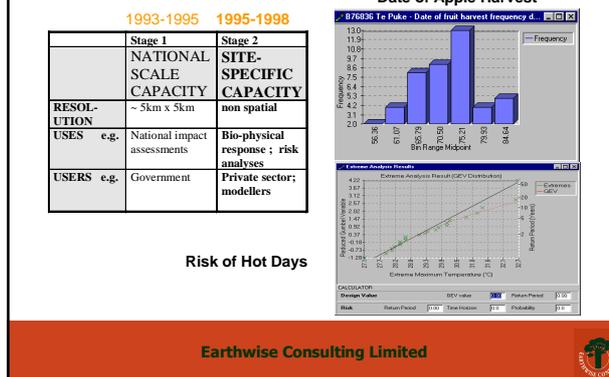
Impact models



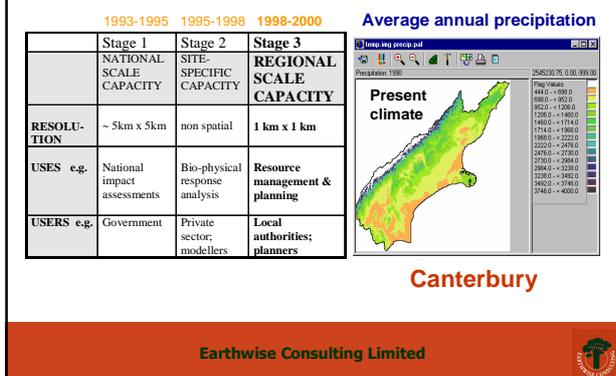
Stages of CLIMPACTS Development



Stages of CLIMPACTS Development



Stages of CLIMPACTS Development



CLIM-CLONES

- CLIMPACTS model structure adapted for development of:
 - BDCLIM, an integrated model for Bangladesh
 - VANDACLIM (Version 1 and 2), a training tool
 - PACCLIM, a climate change scenario generator for the Pacific Island region
 - CANCLIM, a prototype scenario generator for Canada
 - FIJICLIM, a prototype integrated model for Fiji
 - REGCLIM, a regional version of CLIMPACTS
 - TOPOCLIM, an evaluation tool for Topoclimate South

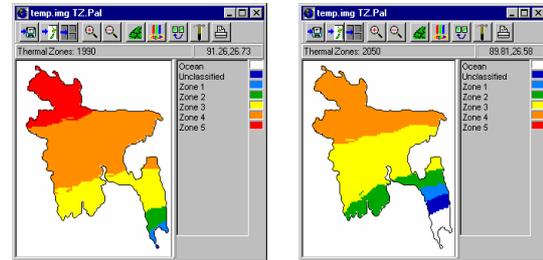
BDCLIM

- An integrated model for assessing impacts of climate and sea level change on Bangladesh
- Work funded by the Ford Foundation in the mid 1990s
- Subsequently used as part of an economic evaluation

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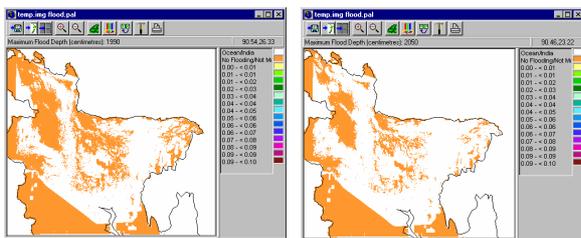
Change in agroclimatic (*thermal*) zones for 2050, relative to 1990



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Changes in flooded area



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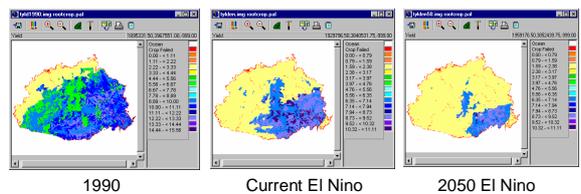
FIJICLIM

- Developed out of the Pacific Island Climate Change Assistance Programme in the late 1990s
- Used to contribute to a World Bank adaptation study "Cities, Seas and Storms"

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Effects of intensified El Nino drought on dalo



1990

Current El Niño

2050 El Niño

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Advantages

- Quantitative analysis
- Quick running and flexible
- Spatial and temporal analyses
- Multi-scale - national, regional, sites
- Examination of uncertainties
- Instructional, training tool

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Disadvantages

- Linear assessment
- Narrow focus on available models and parameters
- Often not connected to real world situations
- Can be expensive
- Limited use and uptake despite considerable investment

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Brief background



- Previous research focused on effects on 'Hayward' kiwifruit. Principal adaptation response considered to be southward relocation
- Huge change in the industry since early 1990s with KiwiGreen programme, restructuring, 'Hort16A', frost risk
- First serious work on adaptation in 2006

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November 2006 workshop



- Climate change is an issue that the industry needs to take seriously, but talking needs to be translated into action
- Use existing growers as role models
- Resolve water issues
- Coordination is needed between different parties

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MAF project (2008)



- Focus on in-depth consultations with key growers
 - Current climate challenges
 - Management responses
 - Climate change challenges and opportunities
 - Adaptations
 - Industry and government responses

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Current climate challenges

"It seems to be getting harder each year to manage the climate"



- More chaotic weather in last 5 years
- Late spring frosts
- Warmer autumns and winters
- Hail
- Wind in late spring and early summer
- More variable rainfall
- Increased challenges mean increased costs

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Management responses

"If you don't try things you don't know"



- Frost protection
- Irrigation
- Changes to shelter
- Biennial cropping
- Canopy management
- Girdling
- Soil biological management
- Look and learn from others
- People management
- Field storage
- Cool store design and management

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Climate change projections



- Temperature increases of about 1°C by 2040 and 2°C by 2090
- Temperature changes are non-linear
- Increased westerly winds in winter and spring
- More rainfall in the west, drier in the east and north
- Decreased frost risk, increased frequency of higher temperatures, increased frequency of extreme daily rainfalls

Source: Climate Change Effects and Impacts Assessment, A Guidance Manual for Local Government in New Zealand 2nd Edition (NIWA Ltd, MWH NZ Ltd, Earthwise Consulting Ltd)

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Climate change challenges and opportunities



- More extreme weather events
- Less winter chill
- Warmer autumns, challenges at harvest
- Increased rainfall variability, protect water
- Salt water intrusion near the coast
- Pests and diseases, biosecurity
- Warmer spring and summer good for dry matter
- Warmer climate and higher CO₂ good

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Future adaptations



- Increased plantings of Gold
- New varieties
- Biennial cropping
- Shelter developments
- HC substitutes
- Biological management, shift to more organic-type approaches
- Water
- Better coolstore design
- Use Kerikeri as "benchmark" for the Bay of Plenty
- Smaller, marginal, growers exiting industry
- Rationalisation to larger professional operators and highly skilled smaller-scale operators

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Murray McBride, Paengaroa



"Previously we were bogged down with all the negatives and the whole focus on managing carbon. We need the motivation to focus on adaptation."

- Gold
- Biennial cropping
- Water harvesting
- Overhead shelter

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James Trevelyan, Te Puke



"What happens in the orchard, how growers respond and adapt and the returns to growers are fundamentally important to the packhouse operation."

- Organic grower
- Energy efficiency
- Insulation

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Bert van Heuckelum, Katikati

"On our property I would say I am not able to viably fight all of the challenges. I can not justify making the same investments as some people do in better locations."

- More corporate growing
- Still a place for small growers



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Planned adaptation



- Industry needs to be proactive in maximising opportunities
- Integrate adaptation into evolving sustainability focus
- A united approach is very important
- Bring key growers together
- Focus on education and communication
- Basic research is needed
 - Plant breeding
 - Crop protection
 - Water use
- Water issues still need to be resolved
- Protection of single desk

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Advantages

- People focused
- A whole industry/sector approach
- Draws on existing knowledge and expertise
- Supported by the industry and growers

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Disadvantages/challenges

- Can be time consuming
- Potential to reinforce existing actions rather than face the future
- Requires commitment to on-going engagement in change processes

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Summary

- Focus on people
 - Human behaviour is the source of both the problems we are dealing with and the solutions
- Keep things as simple and doable as possible
- Use local (in-country) knowledge and expertise as much as possible
- Use quantitative assessment approaches selectively and cautiously
- Identify and work with innovators
 - If you want action you need to work with the doers

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