IRRIGATION NZ

"Promote Excellence in Irrigation"

- Advocacy & Leadership
- Education & Training
- Research & Innovation

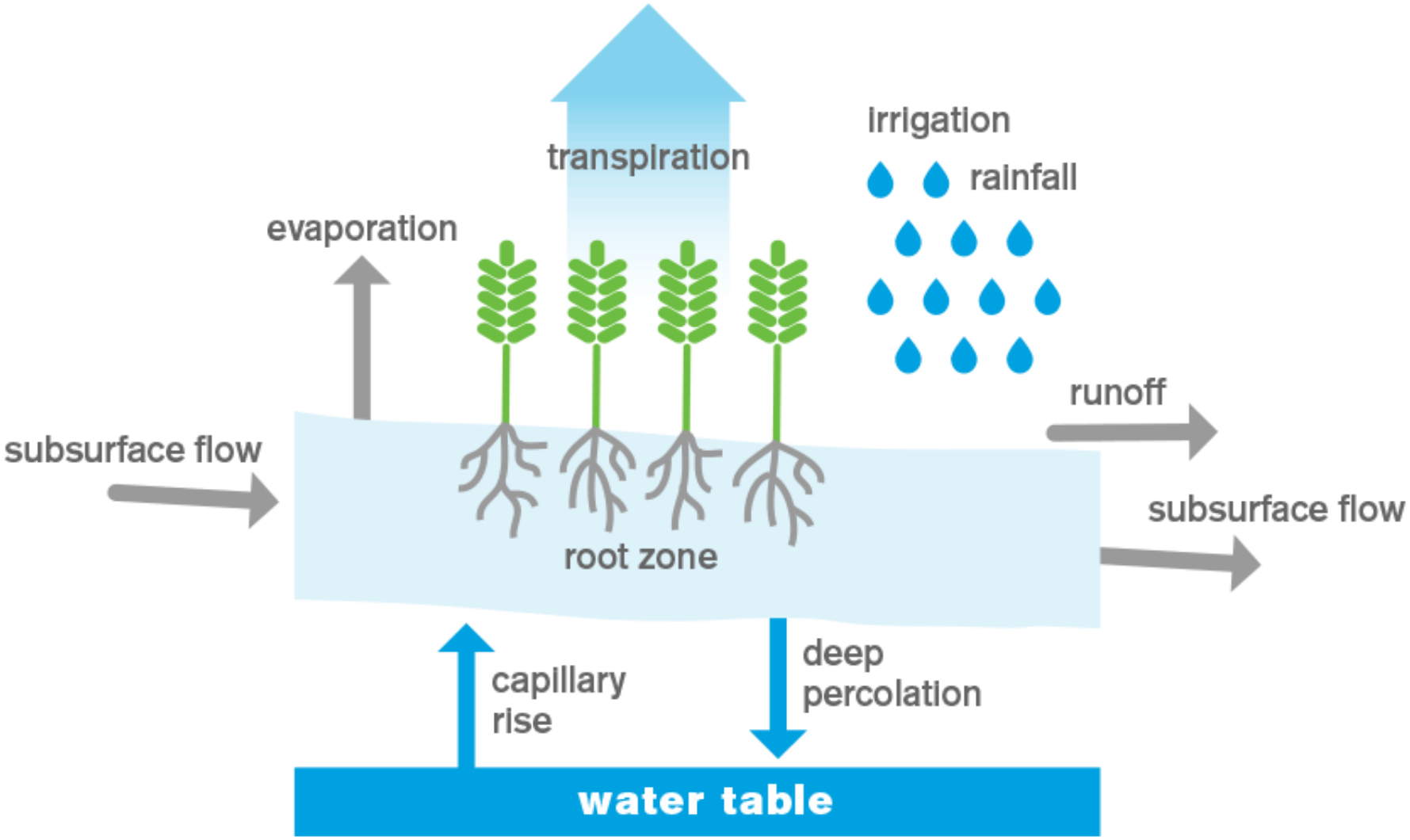
Membership

Schemes, User Groups & Individual Irrigators –
60% of NZ's irrigated area (720,000ha)

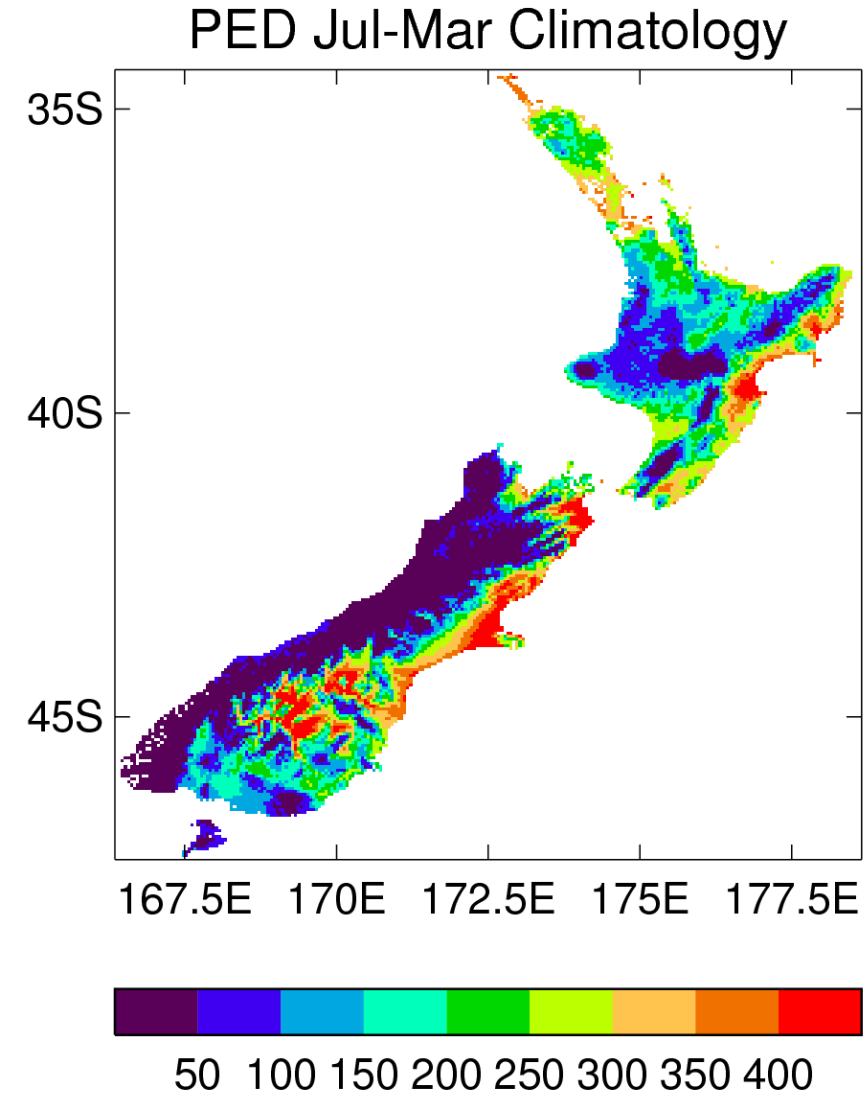
Technical & Trade –
Over 150 service industries (& government)

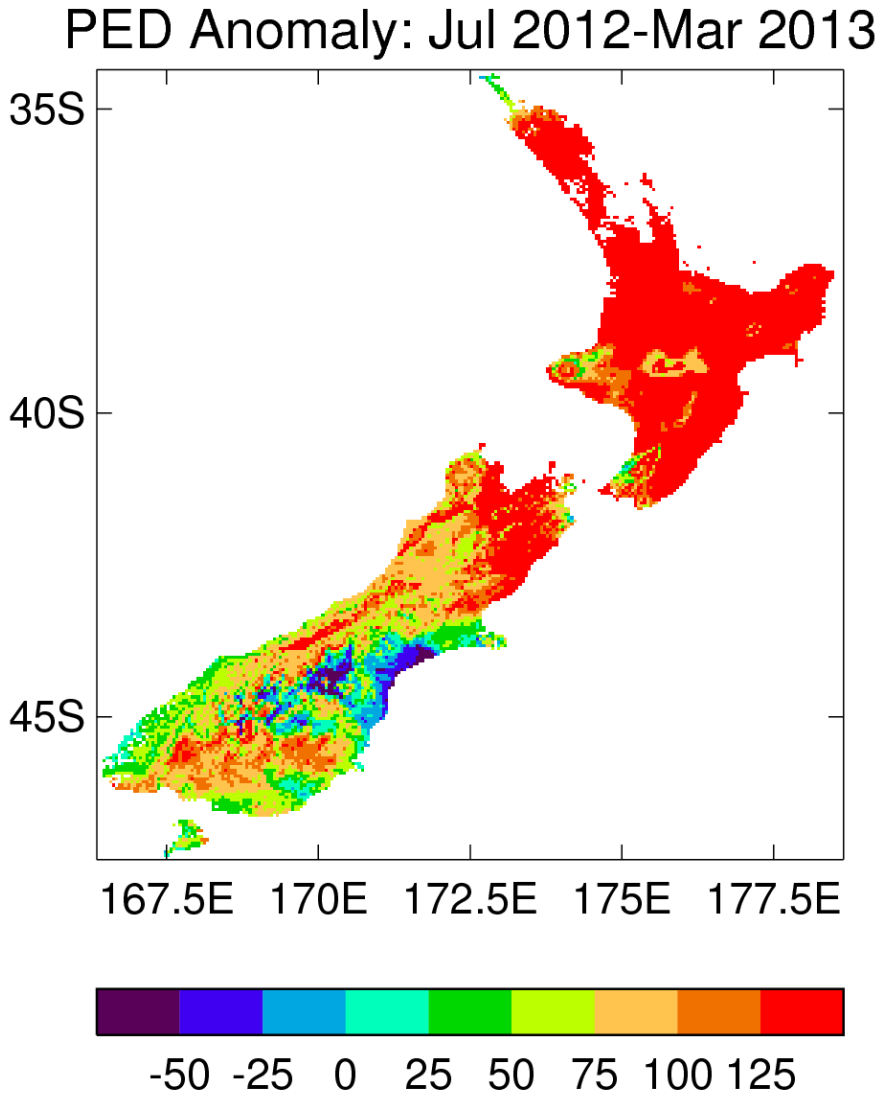
IRRIGATION NEW ZEALAND

WHY WE IRRIGATE

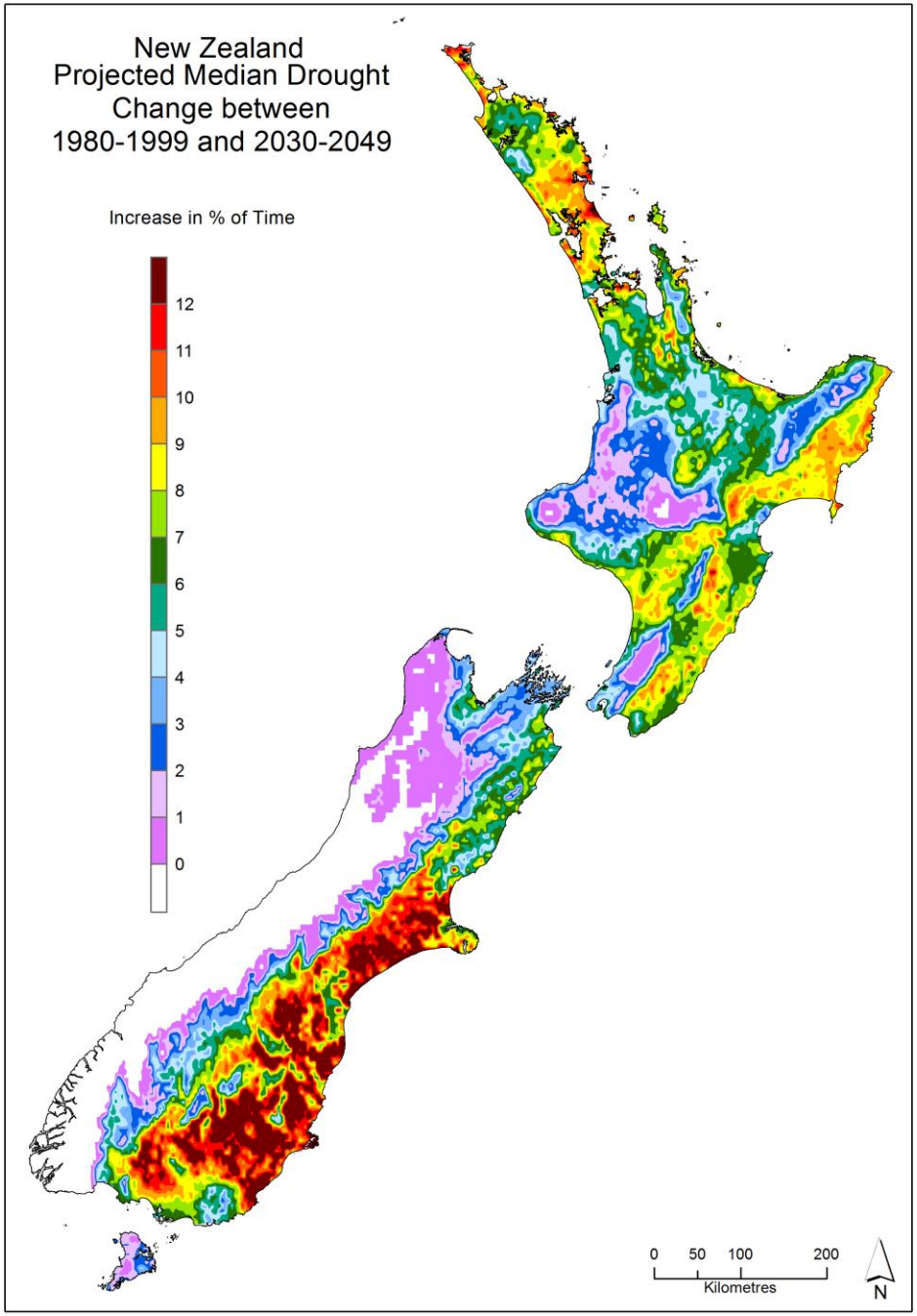


WHERE WE IRRIGATE





CLIMATE CHANGE & DROUGHT



Drought Change
1980-1999 to 2030-2049

"Long, dry spells are forecast to double by 2040 as temperatures continue to rise and New Zealand heads towards a more Mediterranean climate". NIWA 2013

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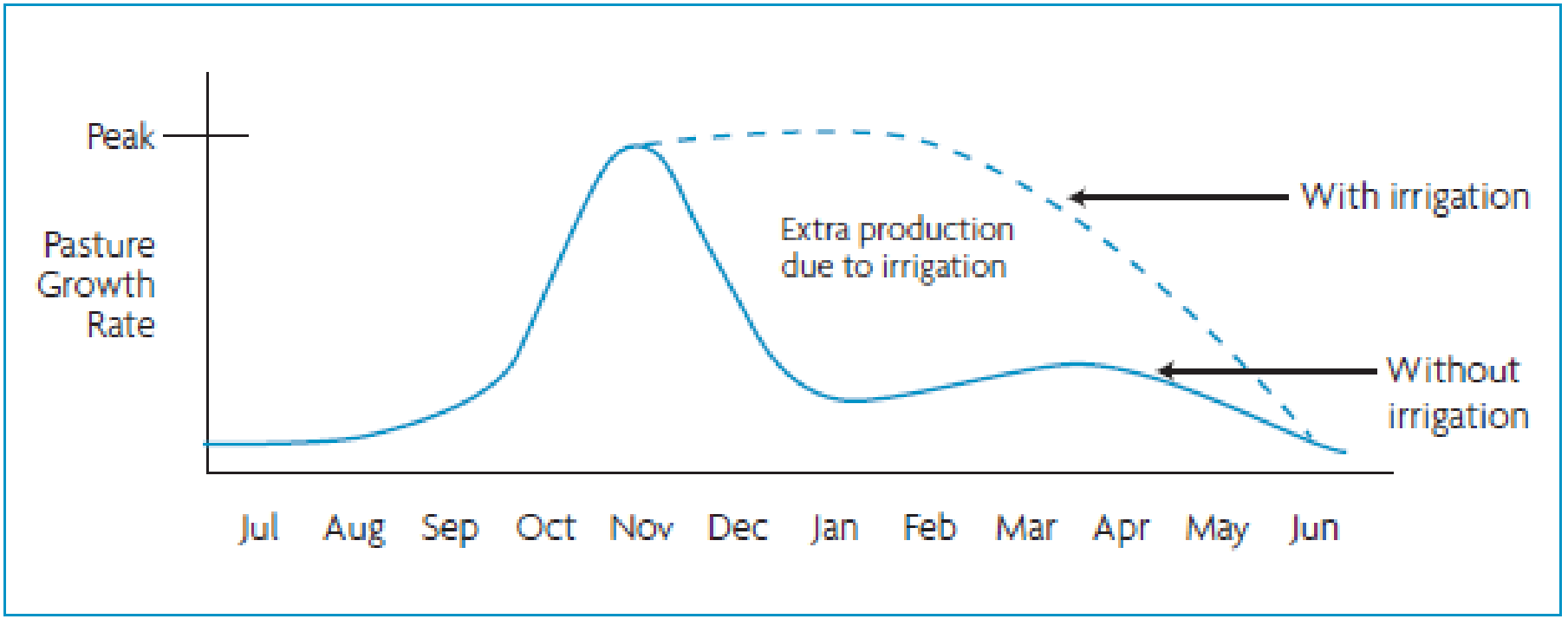
PROFITABILITY = RESILIENCE



Essential *versus* Risk Management

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THE SOCIO-ECONOMIC OPPORTUNITY

- Current 720,000ha -
  - *19% farmgate GDP*
  - *2% national GDP*
- Productivity -
  - Irrigated : Dry land – 3 : 1
- Flow-on -
  - $1 Private = $3 - $6 Public
- Increase by 350,000ha = 1million
  - GDP +0.8%
  - Exports +$4billion
  - Consumption +$2 billion

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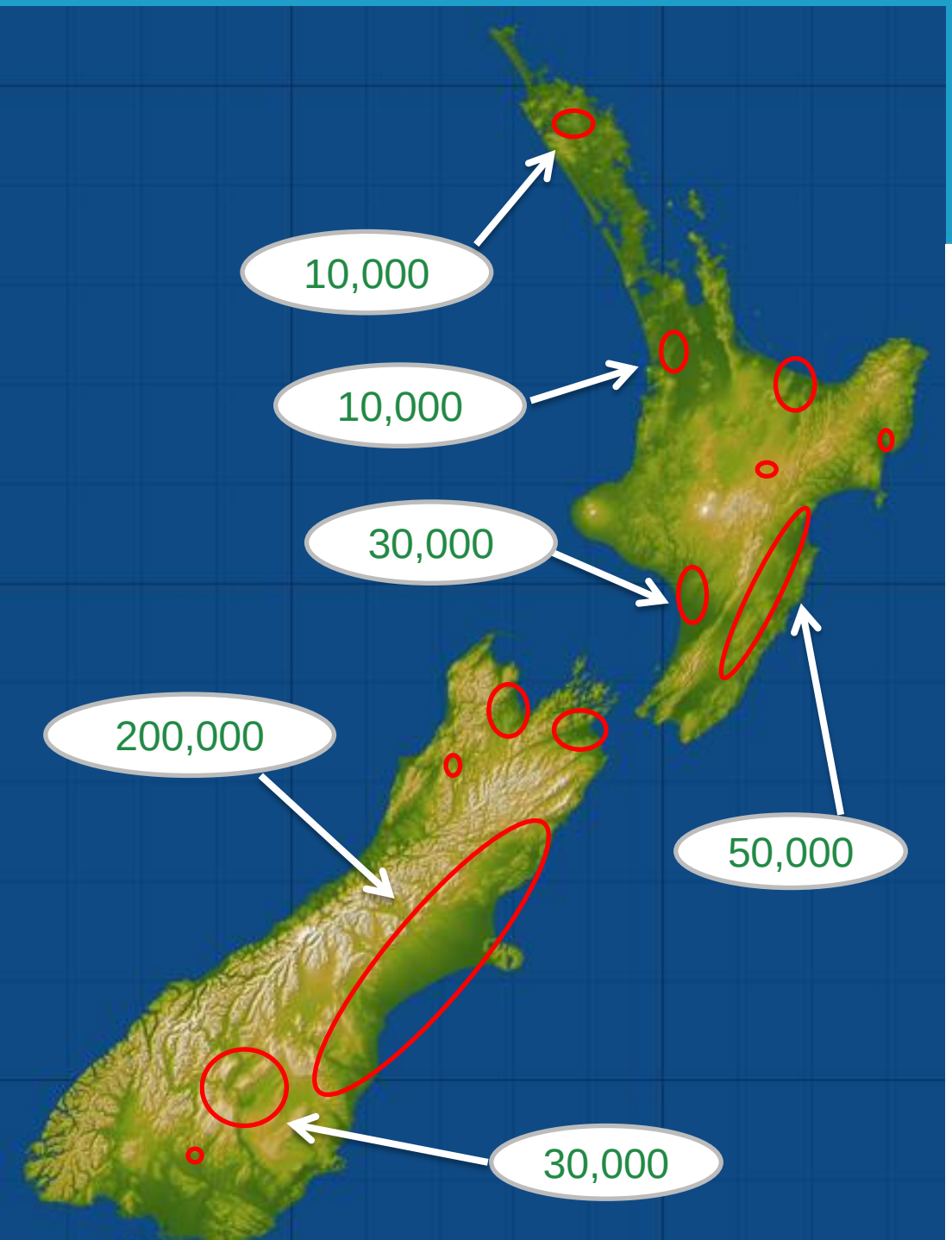


NZ IRRIGATION

Existing = 720,000ha

Canterbury – 65%

Otago – 18%

Hawke's Bay

Marlborough

Tasman

Wairarapa

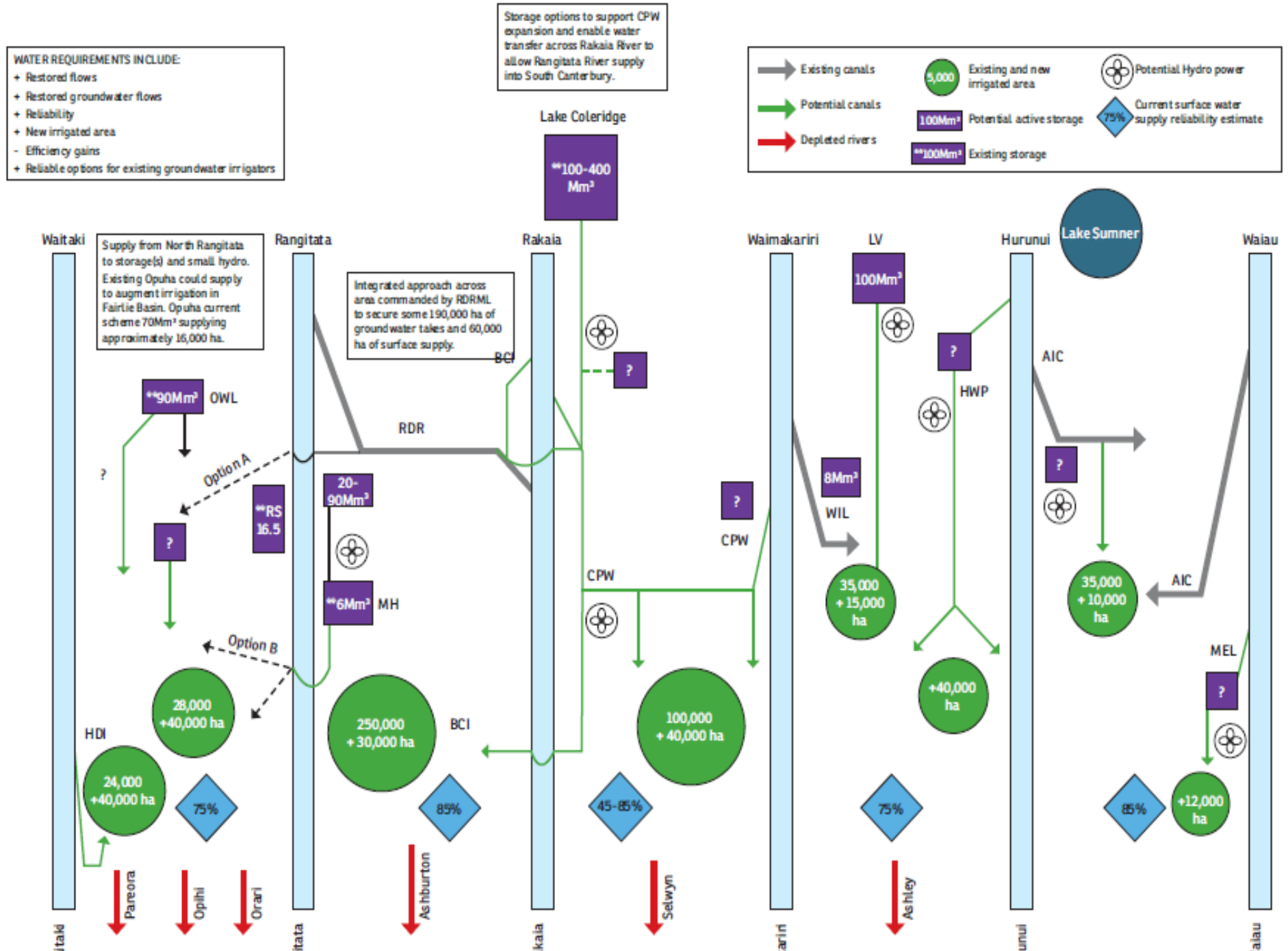
Bay of Plenty

Northland

Pukekohe

Gisborne

Manawatu


WATER REQUIREMENTS INCLUDE:
+ Restored flows
+ Restored groundwater flows
+ Reliability
+ New irrigated area
- Efficiency gains
+ Reliable options for existing groundwater irrigators
Storage options to support CPW expansion and enable water transfer across Rakaia River to allow Rangitata River supply into South Canterbury.
Existing canals
Potential canals
Depleted rivers
5,000 Existing and new irrigated area
100Mm³ Potential active storage
**100Mm³ Existing storage
Potential Hydro power
75% Current surface water supply reliability estimate
Lake Coleridge
**100-400 Mm³
Waitaki
Supply from North Rangitata to storage(s) and small hydro. Existing Opuha could supply to augment irrigation in Fairlie Basin. Opuha current scheme 70Mm³ supplying approximately 16,000 ha.
Rangitata
Integrated approach across area commanded by RDRML to secure some 190,000 ha of groundwater takes and 60,000 ha of surface supply.
Rakaia
Waimakariri
LV
Hurunui
Lake Sumner
Waiau
**90Mm³ OWL
RDR
BCI
?
Option A
**RS 16.5
20-90Mm³
**6Mm³ MH
Option B
HWP
AIC
8Mm³ WIL
CPW
35,000 + 15,000 ha
35,000 + 10,000 ha
+40,000 ha
MEL
HDI
28,000 +40,000 ha
24,000 +40,000 ha
250,000 + 30,000 ha
100,000 + 40,000 ha
+12,000 ha
75%
85%
45-85%
Pareora
Opihi
Orari
Ashburton
Selwyn
Ashley

IRRIGATION ENERGY USE – TOTAL NZ

Sector and system specific estimates

Barber (2005) - 2002-03 irrigated area

- 165,800 MWh/pa arable & vegetable
- 305,500 MWh/pa dairy industry

Bloomer (2008)

- 225,700 MWh/pa centre pivot & linear move irrigators

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IRRIGATION ENERGY USE – INZ ESTIMATE

700,000ha = 1.3million MWh/pa = 3% generation

- Dairy, Dairy support, sheep & beef
  (2.0 MWh/ha/pa, 450,000ha) = 900,000 MWh
- Arable & vegetable
  (1.7 MWh/ha/pa, 200,000ha) = 340,000 MWh
- Wine
  (1.4 MWh/ha/pa, 25,000ha) = 35,000 MWh
- Orchards
  (1.0MWh/ha/pa, 25,000ha) = 25,000 MWh

1millionha = +690,000 MWh/pa

10% summer generation

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TYPICAL IRRIGATION ENERGY USE

Capacity requirements kw/ha &

- 0.4 - 0.5 for 0-10m lift
- 4.0 for 80m

Energy use kwh/m^3

- 0.15 for surface pumps
- 0.75+ for bores or lifts of 80 m

Considerable variation - efficiency of setup and system type

Cost per m^3 *(much variance based on pricing plan)*

- $0.05 - 0.10 for surface water
- $0.15 – 0.24+ for bores depending on lift

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SYSTEM DIFFERENCES

AREA	FLOW RATE (l/s)	AREA SERVED (ha)	POWER DRAW (kW)	kW/Ha
Pivot 1	70	110.5	45	0.41
Pivot 2	60.8	99.5	45	0.45
West Sprinklers	12	36	18.5	0.51
Ocmis Gun	15	30	60	2.00
East/Gallery Sprinklers	N/A	30	22	0.73

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IS THERE AN OPPORTUNITY FOR WIND?

- Irrigation needs a reliable energy supply – ‘as and when’ crucial
- Peak demand January - ‘A stunning summers day’
- Can wind provide this?

WIND – DOES IT STACK UP?

Direct water supply scenario

Income

- Summer offset pumping gain
- Winter sell back to grid?

Expenditure

- Turbine Installation cost
- Turbine upkeep cost
- Cost of back-up supply (line charges)
- Cost of capital

INZ keen to explore if viable?

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WIND – DOES IT STACK UP?

Indirect water supply scenario

WIND – DOES IT STACK UP?

Low pressure irrigation systems in remote farming areas

- Water supply – small constant take
- Topography – dam site available
- Electricity – no grid connection

INZ keen to explore if wind viable?

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