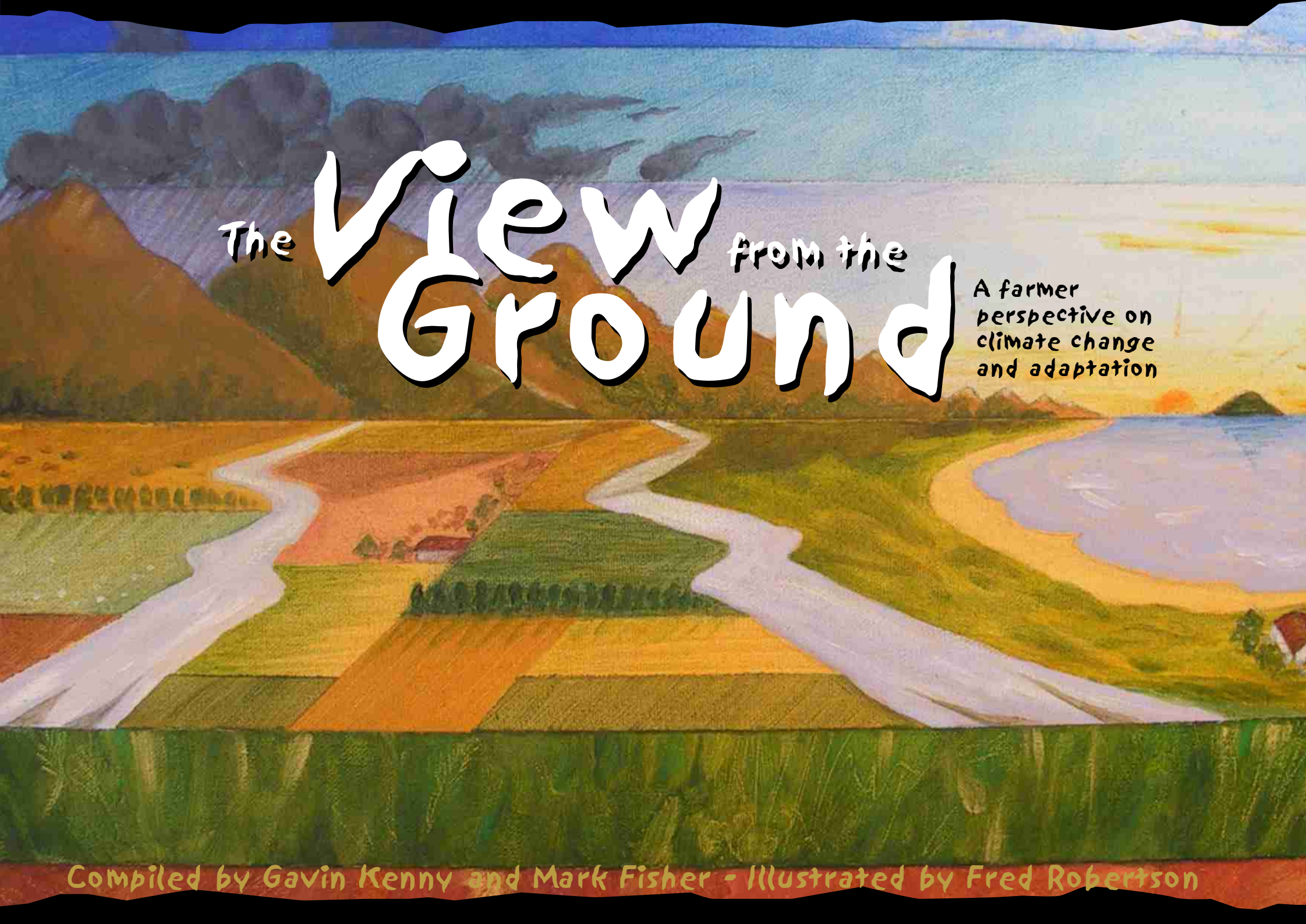
The View from the Ground
A farmer perspective on climate change and adaptation
Compiled by Gavin Kenny and Mark Fisher - Illustrated by Fred Robertson

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This publication is the result of the first phase of a 2-year project 'Adapting to climate change in eastern New Zealand' funded by: MAF Sustainable Farming Fund, AGMARDT, Climate Change Office/Ministry for the Environment, Hawke's Bay Regional Council, Environment Bay of Plenty, Environment Canterbury, and Merino NZ Inc.

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The view from the ground
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***Dedicated** to Dr Neil Cherry (1946-2003) whose mentoring at Lincoln helped spark the journey that led to this work.*
– Dr Gavin Kenny, Hastings, 2003

'Death is just another horizon'
Fred Robertson

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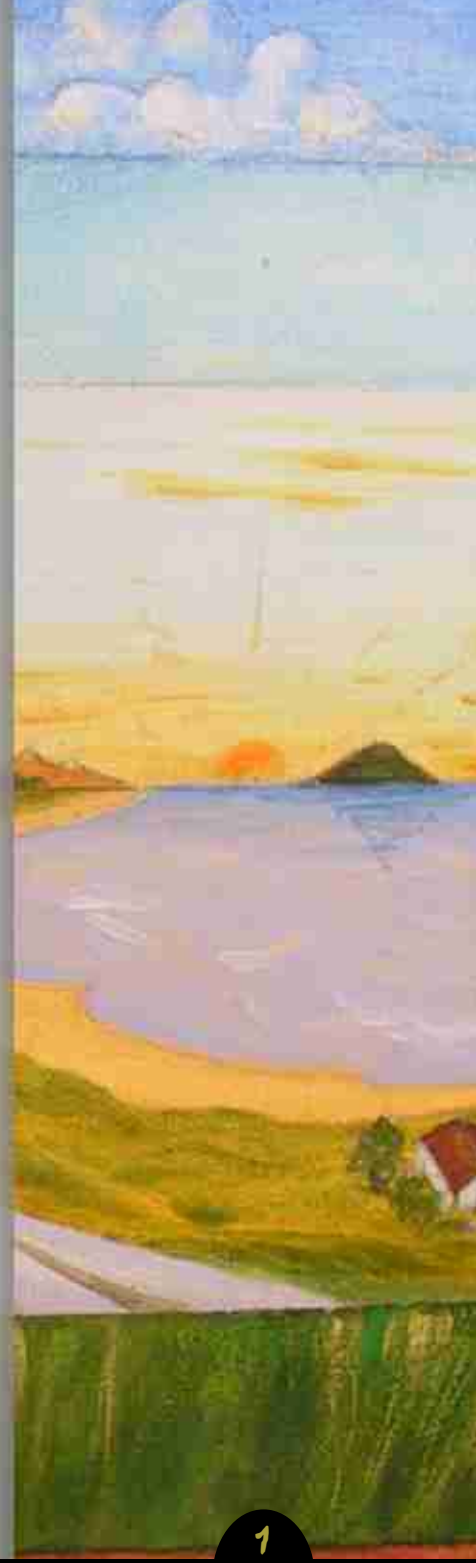
Ode to Adaptation



Introduction

Variations in climate have the single greatest influence on year-to-year variations in New Zealand agricultural production. Farmers are good adaptors to the effects of varying climate, although extremes such as droughts and storms can still have severe effects. However, with global warming, climate is expected to change more rapidly than in the past, and it may vary more dramatically. Climate change will lead to changing seasonal weather patterns and more extremes might be experienced. This means farmers will face more and different challenges and opportunities. Scarce water resources might represent one of the biggest challenges in eastern New Zealand. Farmers will have to continue to adapt to climate change as part of the bigger, on-going, picture of change that many are already facing in a very positive and proactive manner. The future viability of farming depends greatly on this adaptability, as does the future of the New Zealand economy, environment and society. Farmers are the managers of a significant portion of our land and water resources – the direct and indirect value of which is immense.

"keep farming vibrant and viable and farmers healthy"

This publication offers 'a view from the ground', a farmer perspective on climate change and adaptation. The view provided here has been shared by farmers through a series of workshops along New Zealand's eastern regions from the Bay of Plenty to South Canterbury. It is a very positive and proactive view – farmers collectively have a lot of capacity to adapt to climate change. However, this adaptive capacity is qualified by a need for a more cooperative environment in which a strong sense of community is needed along with greater communication between farming and non-farming communities. Resilient farming systems that 'keep farming vibrant and viable and farmers healthy', and provide benefits to all, for present and future generations, are a paramount goal.

Some definitions

Climate change – our climate can change naturally over timescales ranging from decades to millennia. However, we're interested here in climate change resulting from human activities (burning of fossil fuels and so on) over the last 100 years or so and continuing through the 21st century.

We know that:

- Greenhouse gases such as carbon dioxide, methane and nitrous oxide have increased in the earth's atmosphere and are continuing to increase due to human activities.
- Global temperatures have risen (up to 0.7°C in New Zealand over the last 100 years) and are continuing to rise.
- The rate of change expected over the next 100 years is unprecedented due to the build-up of greenhouse gases.

Climate variability - we experience climate through the seasonal and year-to-year variability. There are also fluctuations such as El Niño and La Niña events and a 20-30 year cycle called the Interdecadal Pacific Oscillation which leads to patterns of higher or lower rainfall in New Zealand. These collectively form the climate variability which are the natural fluctuations that are superimposed on the underlying trend of climate change.

Mitigation – what we do to try and reduce the quantities of greenhouse gases in the atmosphere. Most farmers are aware of this through the Kyoto protocol.

Adaptation – what we do to live and respond to climate change, present and future. Adaptation is the principal focus of this publication.

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The Project and Workshops

This publication has resulted from the first phase of a 2-year project "Adapting to climate change in eastern New Zealand. The principal focus of this project is to develop a grassroots perspective on adapting to climate change, draw relevant information together and share it more widely.

Six farmer workshops were run in April/May 2003. Workshops were run to the following common format, with farmers working together in small groups:

1) Mapping exercise to identify main regional features (climatic and non-climatic).

2) Identification of climate-related issues – those that were shared in common and those that were unique to each farm.

3) What will be the future impacts of climate change? A simple scenario was used for the year 2050 – up to 1°C warmer, up to 10% drier, more extremes (e.g. droughts and floods), which is applicable to many eastern regions of New Zealand.

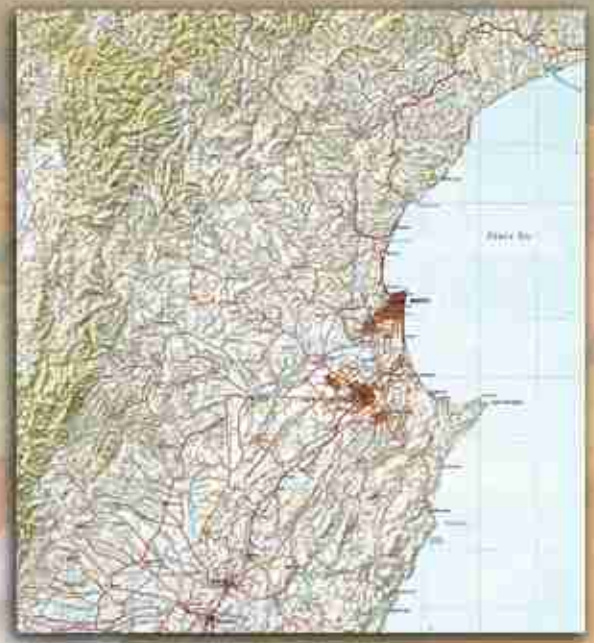
4) You are the adaptors – scope out your ideal farm, what you are already doing towards this ideal, what else you need to be doing towards this ideal.

5) Collective priorities (5-6 key statements) for the development of resilient farming systems.

The remainder of this publication shares a farmer perspective on adapting to climate change.

Workshop 1

Maraetara, Hawke's Bay



Features

Drying NW winds in late spring

Extremes of dry and temperature on some properties

High intensity rainfall events

Wet easterlies

Unreliable streams and rainfall patterns

Rain shadow of Kawekas

Water from streams, dams, bores, springs

Contour creates challenges

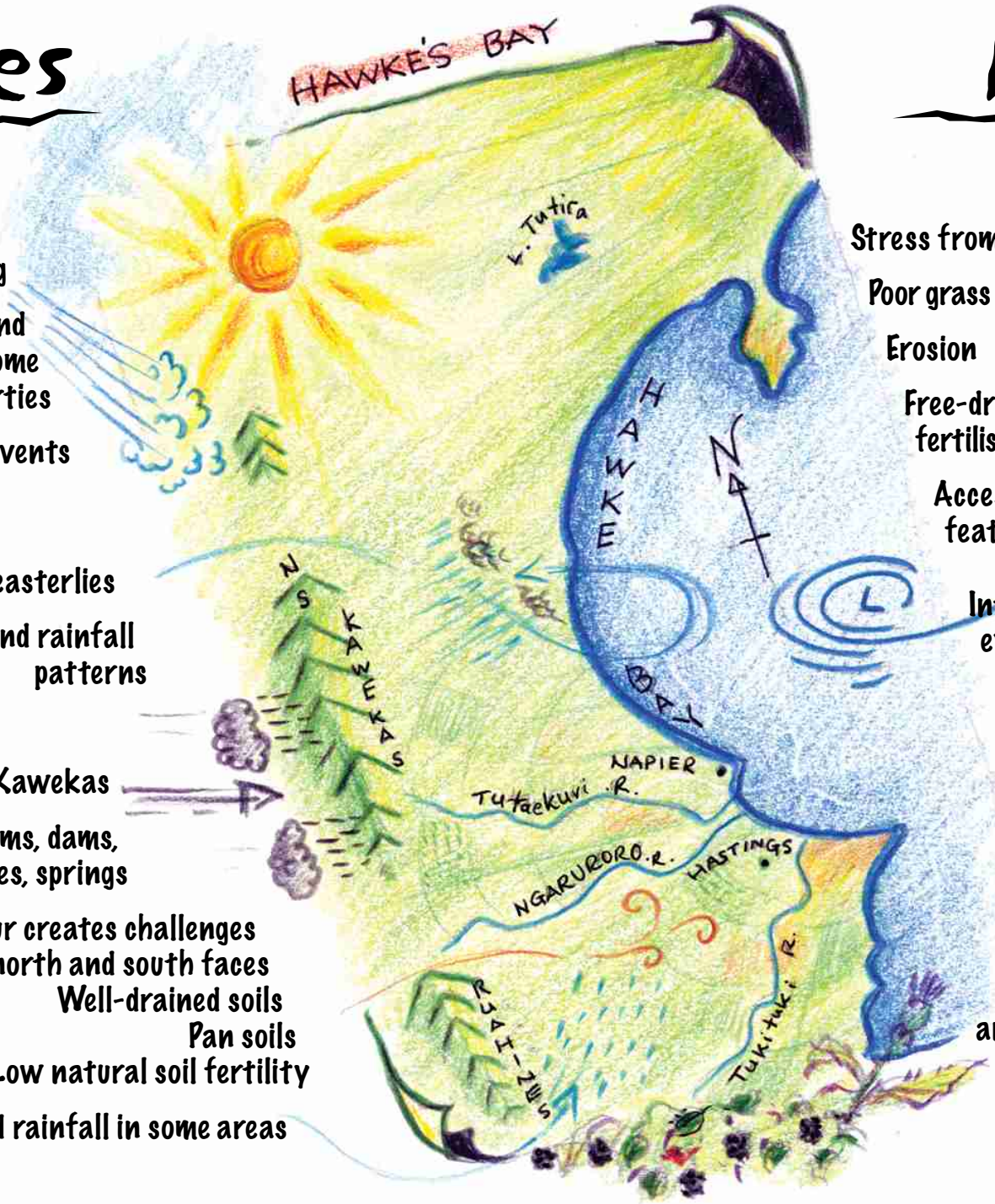
Balance between north and south faces

Well-drained soils

Pan soils

Low natural soil fertility

Reliably spread rainfall in some areas



Issues

Stress from drying NW winds

Poor grass growth on exposed N/NW faces

Erosion

Free-draining soils – response to fertiliser is dependent on slope & aspect

Accessibility – a major limiting feature

Infrastructure damage in cyclone events

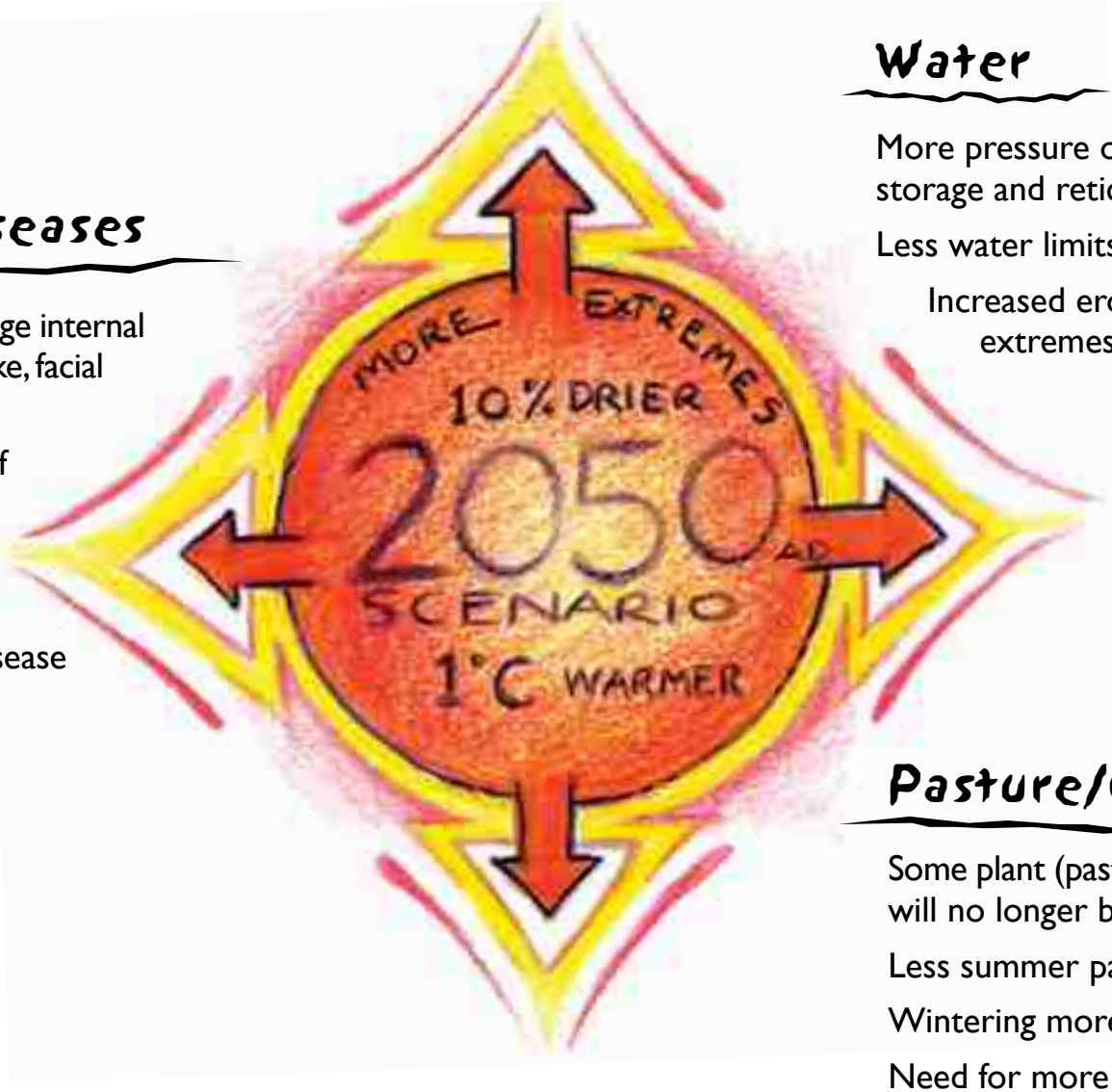
Pasture opens up in summer

Water short on coastal hills and hill tops

Internal parasites, weeds and pests

Impacts

Higher highs and lower lows • Creates opportunities for land use change



Animal Health & Weeds/Pests/Diseases

Increased challenges to manage internal and external parasites, flystrike, facial eczema

Stress on animals because of heat

Increased animal health problems and costs

Increased weed, pest and disease problems

Water

More pressure on water supplies, storage and reticulation

Less water limits choices of land use

Increased erosion from rainfall extremes

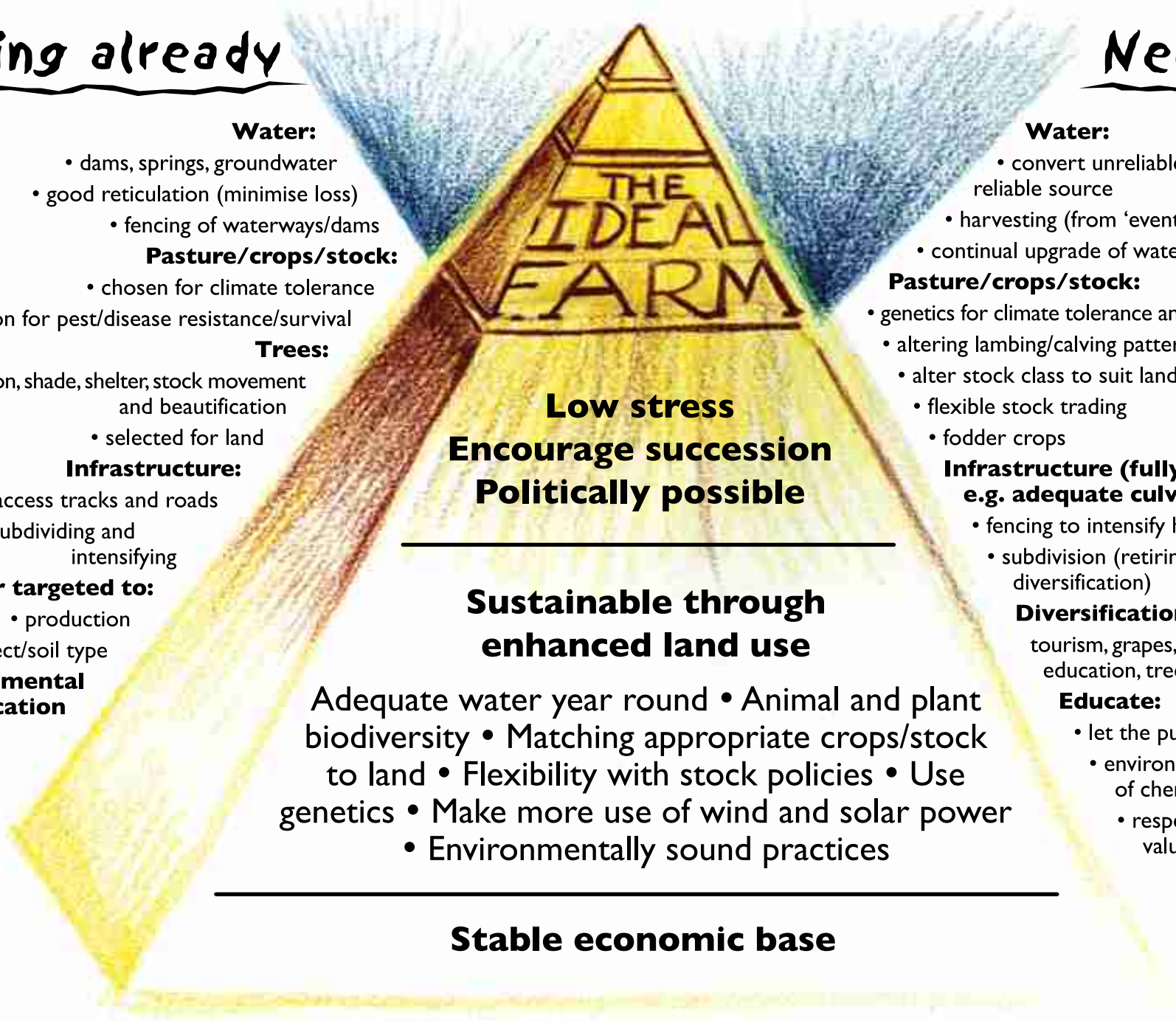
Pasture/Crops/Stock

Some plant (pasture, trees) and animal species will no longer be suitable

Less summer pasture growth

Wintering more stock

Need for more summer supplementary feed



Doing already

Water:
- dams, springs, groundwater
- good reticulation (minimise loss)
- fencing of waterways/dams

Pasture/crops/stock:
- chosen for climate tolerance
- selection for pest/disease resistance/survival

Trees:
- for erosion, shade, shelter, stock movement and beautification
- selected for land

Infrastructure:
- access tracks and roads
- fencing, subdividing and intensifying

Fertiliser targeted to:
- production
- aspect/soil type

Environmental education

Need to do

Water:
- convert unreliable rainfall pattern into reliable source
- harvesting (from 'events', springs, buildings)
- continual upgrade of water supply/reticulation

Pasture/crops/stock:
- genetics for climate tolerance and pest/disease resistance
- altering lambing/calving patterns to match feed curve
- alter stock class to suit land
- flexible stock trading
- fodder crops

Infrastructure (fully protected, e.g. adequate culverts):
- fencing to intensify high production areas
- subdivision (retiring poor areas, diversification)

Diversification:

tourism, grapes, alternative /niche crops, education, trees, forestry

Educate:
- let the public know, dialogue
- environmentally sustainable use of chemicals
- respect others values/viewpoints

Low stress
Encourage succession
Politically possible

Sustainable through enhanced land use

Adequate water year round • Animal and plant biodiversity • Matching appropriate crops/stock to land • Flexibility with stock policies • Use genetics • Make more use of wind and solar power • Environmentally sound practices

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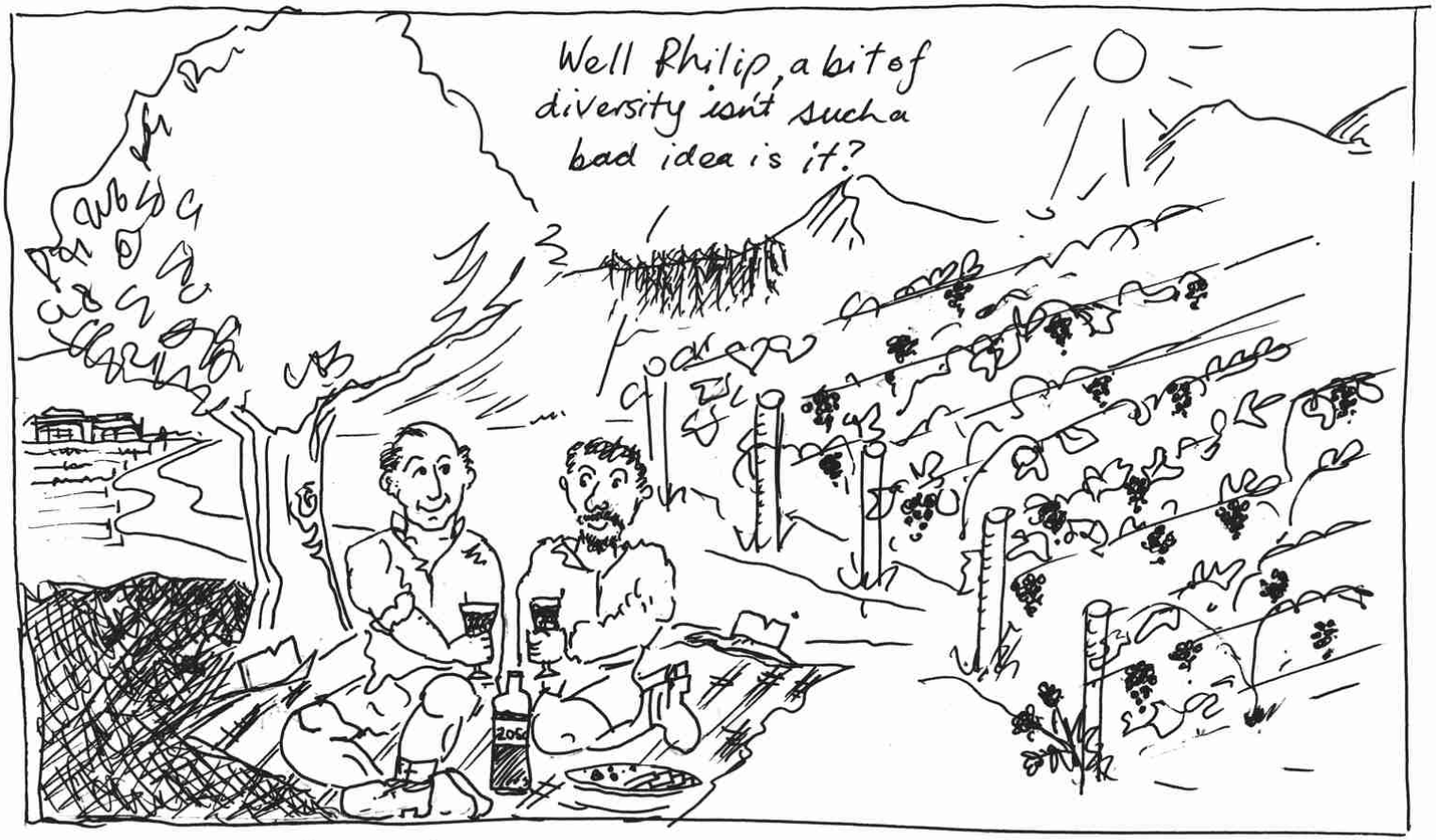
Stable economic base

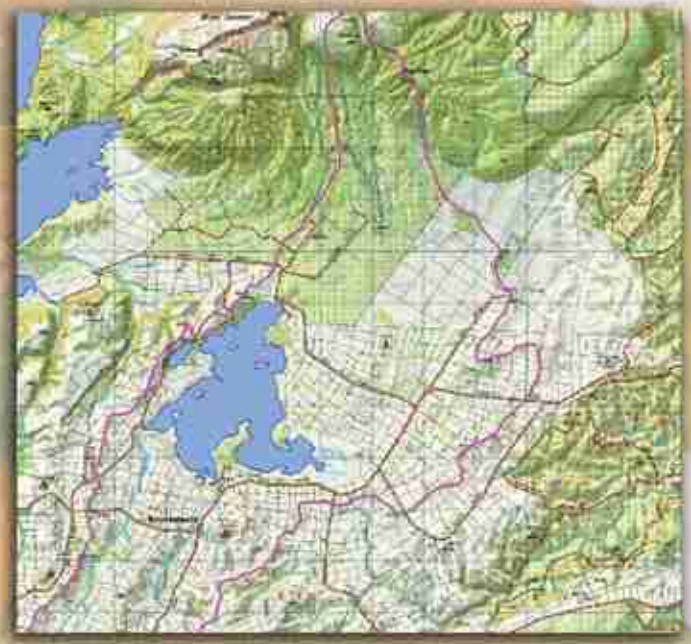
Adaptation Priorities



Maraetara Estate ~ The 2050 Vintage!
(HAWKES BAY)

Workshop 2

Lake Rerewhakaaitu, Bay of Plenty



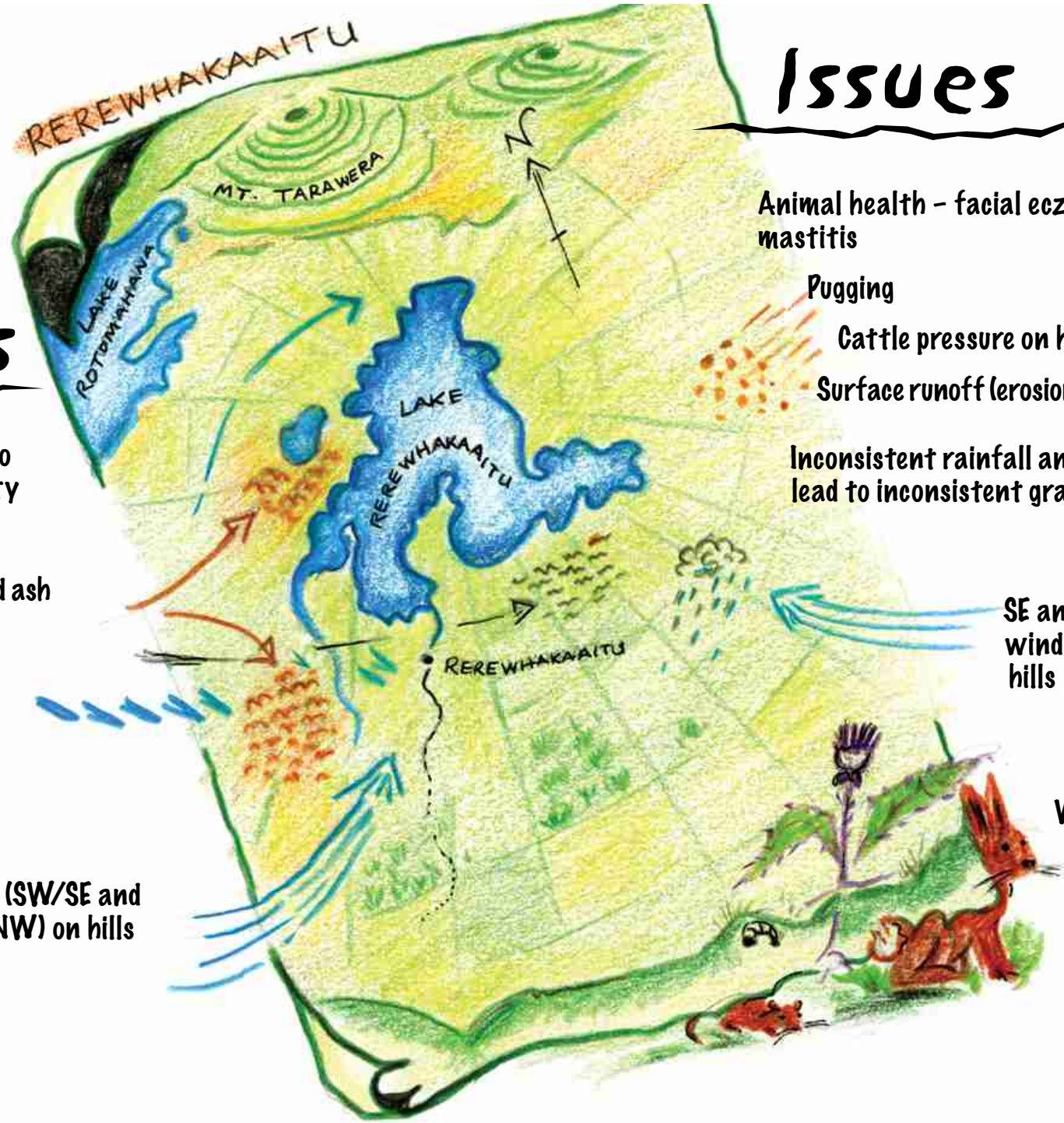
Features

The Lake is central to the community

Volcanic soils – mud and ash

Frost

Exposure to wind (SW/SE and W/NW) on hills



Issues

Animal health – facial eczema and mastitis

Pugging

Cattle pressure on hills

Surface runoff (erosion, N & P runoff)

Inconsistent rainfall and temperature lead to inconsistent grass growth

SE and W/NW winds lead to dry hills

Weeds & pests (rabbits, rats & mice, grass grub)

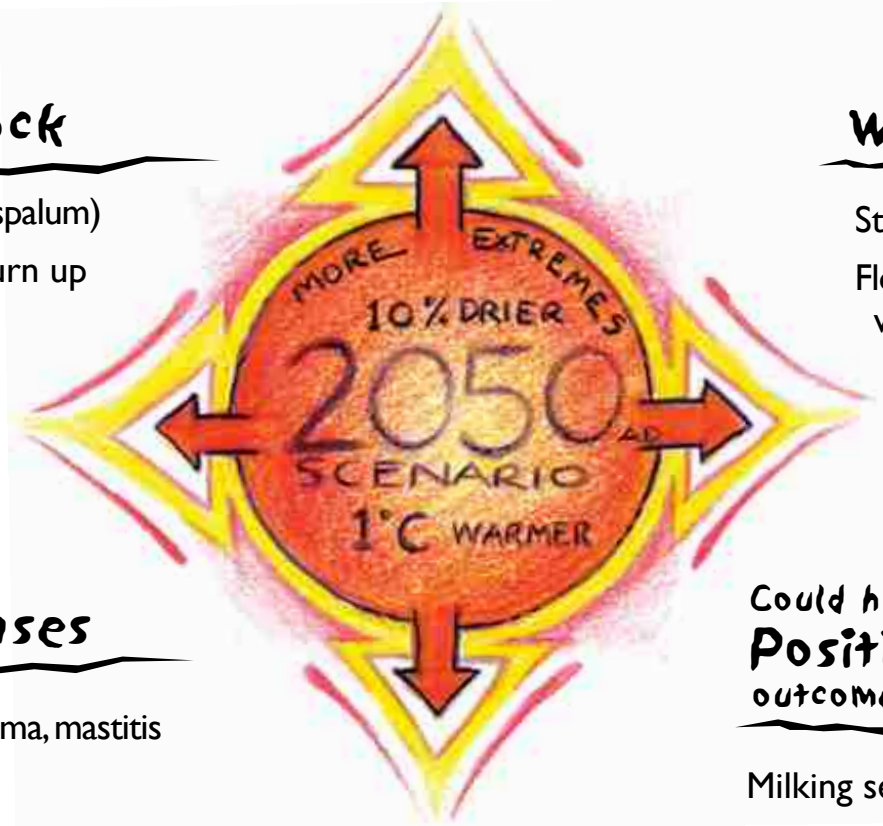
Impacts

Positives

Better and shorter winter, longer and earlier summer will mean more winter growth, early spring grass growth

Some grasses will thrive with warmer conditions, e.g. clover, fescue

Diversification – cropping, market gardening, orcharding, vineyards, more possibilities in home gardens



Pasture/Crops/Stock

More sub-tropical grasses (e.g. paspalum)

Exposed faces and ridges will burn up sooner

Water

Strain on water reserves

Flooding and erosion associated with heavy rain

Will lake survive with increased evapotranspiration?

Animal Health & Weeds/Pests/Diseases

Increase in diseases, e.g. facial eczema, mastitis

Increase in foot problems

Increased problems with pests and weeds

Could have Positive/Negative outcomes

Milking season change

Diversification – impact of rural subdivision around lake

The Ideal Farm

Doing already

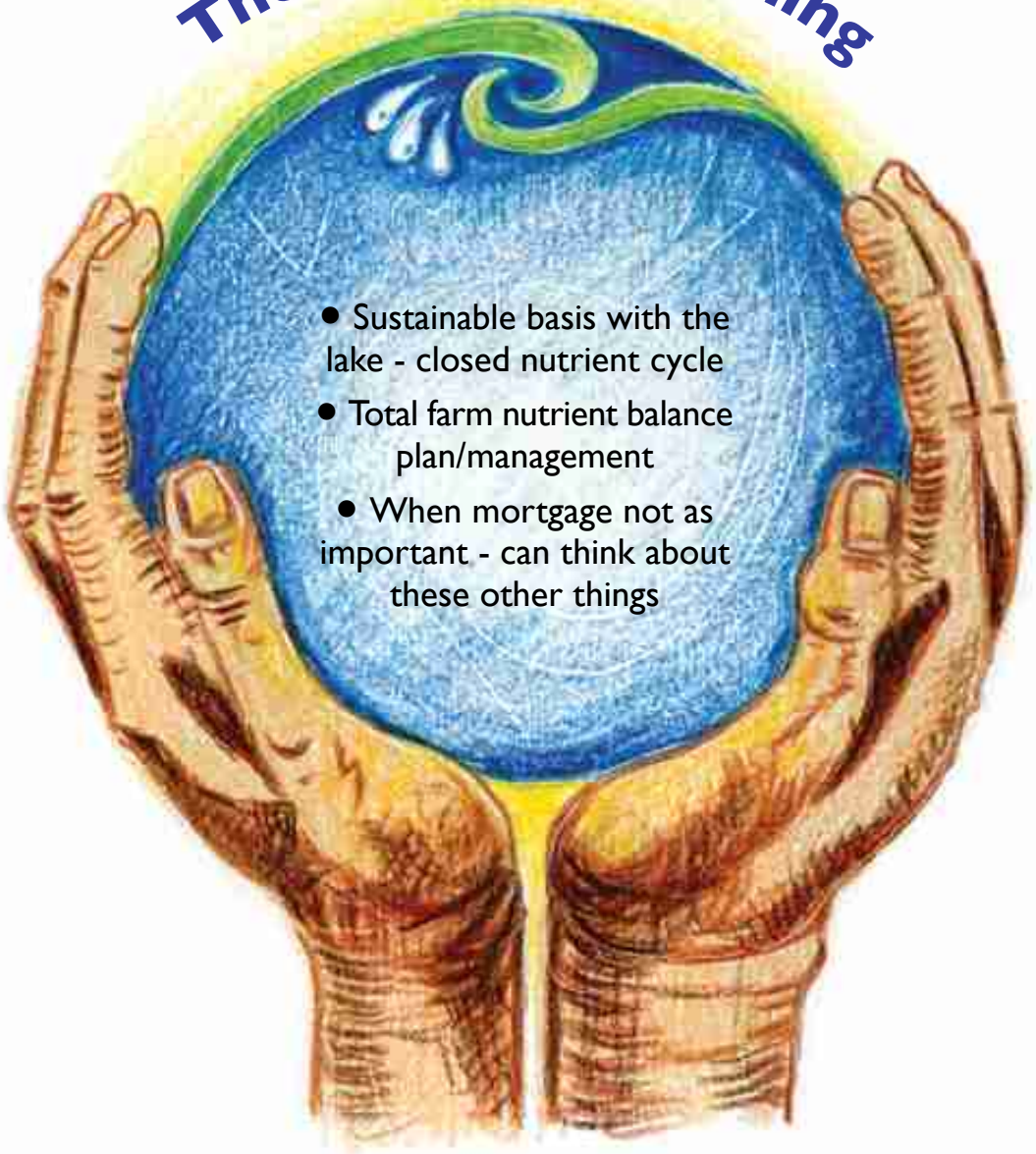
- retiring environmentally sensitive areas
- only putting in what you take out
- spreading effluent
- soil testing
- building up humus

Need to do

- plant trees for multiple benefits
- environmentally friendly dirt - more worms
- closed nutrient production system - runoff capturing
- better use of waste
- wind power, windmills for frost protection
- solar energy
- lighter stocking rate, look at stocking more efficient cows
- breeding towards facial eczema free stock
- genetic modification - specialisation
- calve earlier, milk longer?
- biological control of pests and weeds
- diversify
- plant grasses and crop types for warmer conditions
- irrigate
- on farm processing
- covered yards

Adaptation Priorities

The lake is everything



Workshop 3

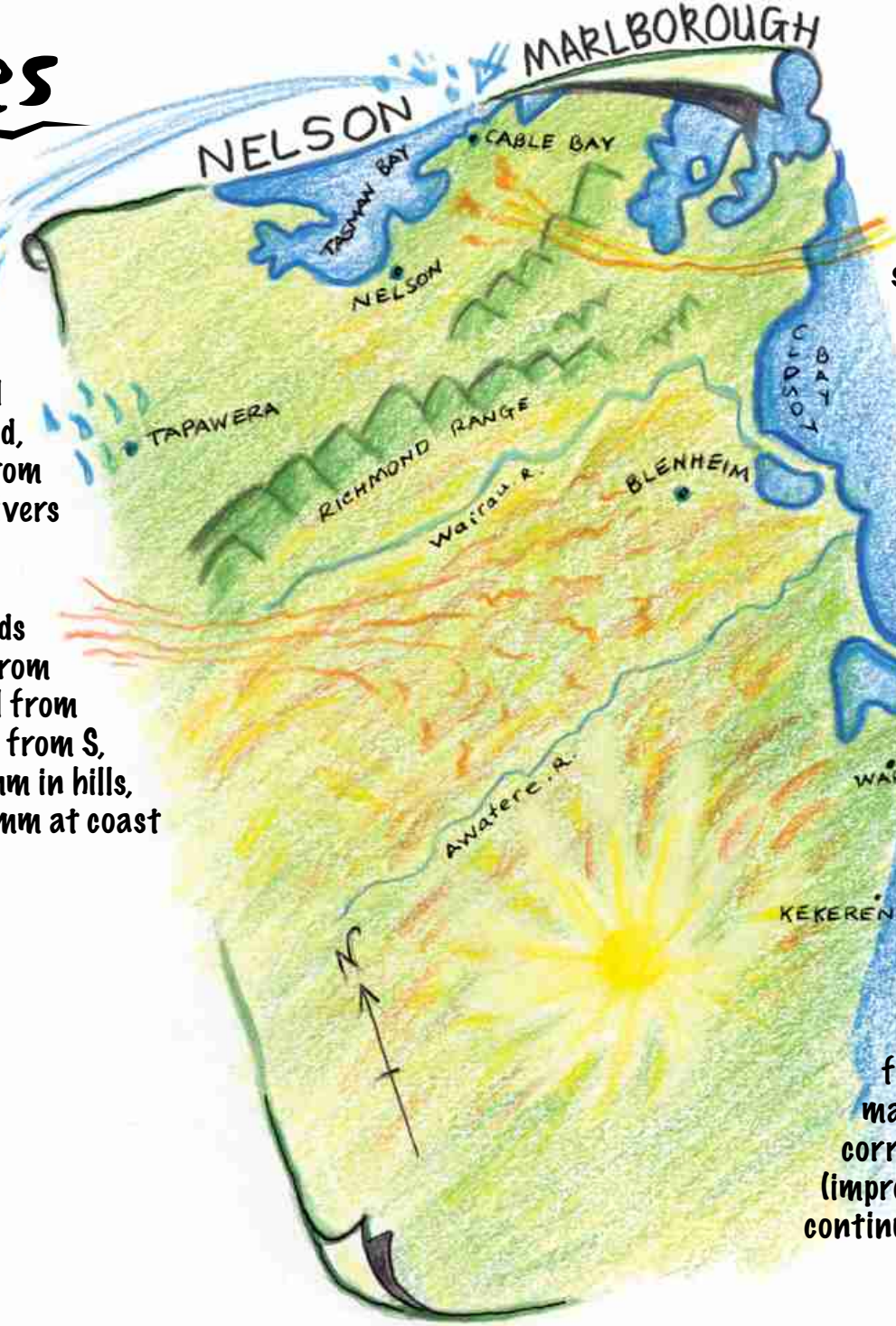
Kekerengu, Nelson/Marlborough

Features

Cable Bay – rainfall from NE or N (about 1000mm), light frosts

Tapawera – good rainfall, little wind, frosts, irrigation from rivers

Marlborough – dry winds from NW and from southerlies; rainfall from N/NE, sometimes from S, average rainfall 700mm in hills, 560mm at coast



Issues

Cable Bay – unreliable rainfall, dry summers and autumns (streams drying), heavy rainfall (causing slipping), weeds, pasture degeneration, bush dying, human stress

Tapawera – Positives are stable climate and opportunity to irrigate; Negatives are dry summers and autumns, leaching of trace elements, animal health

Marlborough – Positives are sunshine, lack of pugging, healthy stock country, relatively weed and pest free;
Negatives are wind, sporadic rainfall, water availability, water loss/runoff from steep faces, lack of soil organic matter, surface temperature, lack of correct pasture species/management (improved species are not coping with continuously dry conditions)

Impacts

Water

Less reliable water availability

More erosion by wind and water

Social

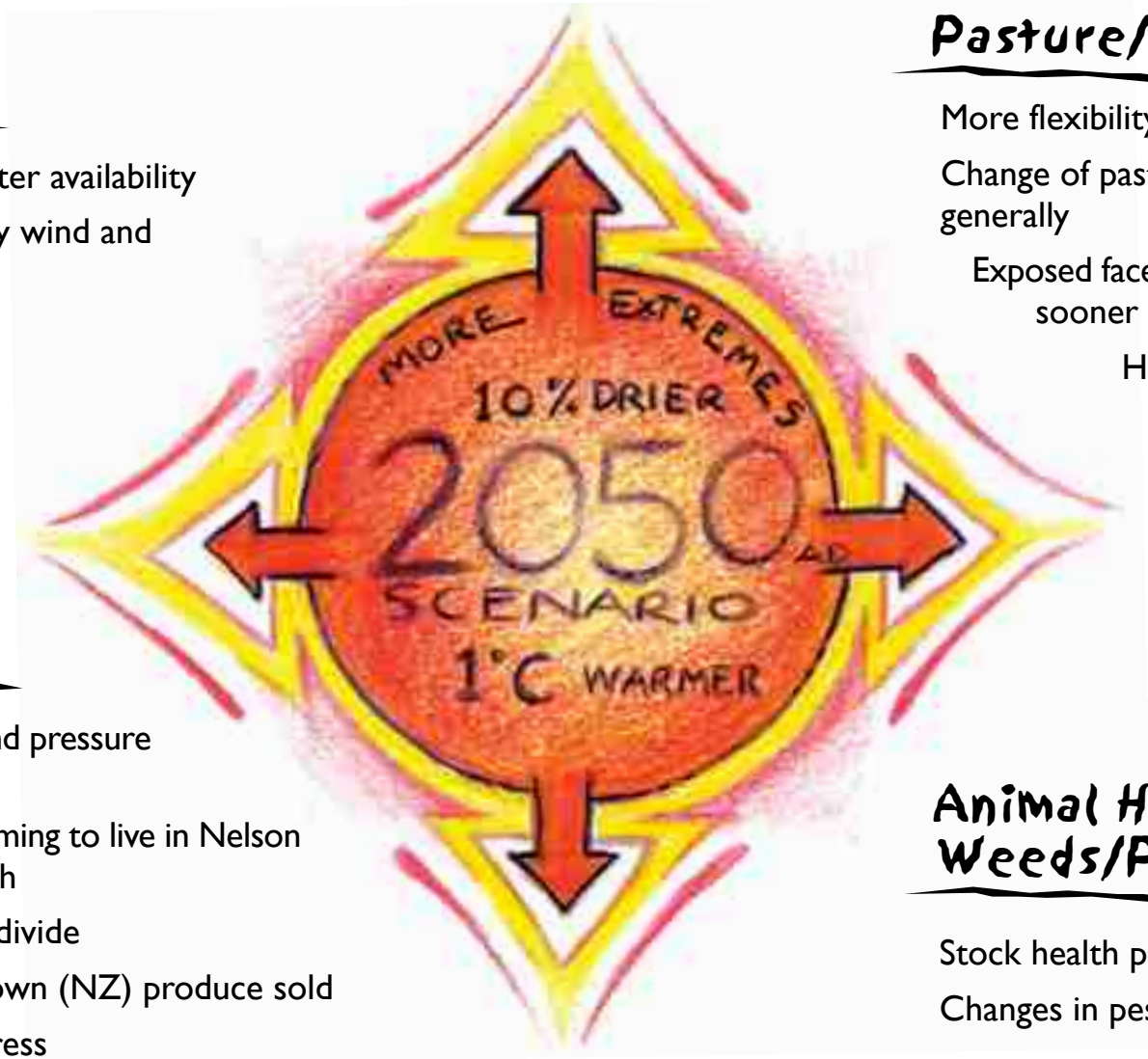
More tourists and pressure on land

More people coming to live in Nelson and Marlborough

Pressure to subdivide

More locally grown (NZ) produce sold

More human stress



Pasture/Crops/Stock

More flexibility with stocking rates

Change of pasture species and plants generally

Exposed faces and ridges will burn up sooner

Harder to fatten lambs

Less production

Animal Health & Weeds/Pests/Diseases

Stock health problems

Changes in pests and diseases

The Ideal Farm

Doing already

- subdividing blocks for pasture management
- bringing in new pasture
- use goats on weeds and for meat
- planting trees and regenerating native forest
- not focused on fattening all lambs
- de-stock early
- diversifying - e.g. tourism
- attending workshops
- listening and learning, planning and thinking

Adequate water

Healthy water courses

Pastures suited to environment and stock that are well adapted

Biologically active soil - good nutrient recycling

More trading stock

More woodlots and shade trees

Debt free

Independent power supply

Low stress lifestyle

Succession for next generation

Need to do

- water storage and harvesting
- sustainable farm management plans - building soils, good organic matter and ground cover, protecting unique features, increasing biodiversity
- best practice animal management and welfare
- better genetics
- specialised operations, partnerships between breeding and fattening units
- selected pastures and trees for shade, feed crops, aesthetics and/or harvesting
- capitalise on carbon credits
- production of end-use driven quality products
- quality assurance and traceability systems embraced on farm
- capitalise on population growth by providing recreational opportunities
- share farming with family and others

Adaptation Priorities

Work together more

- Farmers and rural communities need to work together more
- Water storage and harvesting (dams, improving water cycling) to provide more options
- Planting trees for shade and shelter, erosion protection, harvesting
- Whole farm management plans, to turn dryland farming to an advantage -- with sustainable and flexible management systems, and monitoring
- Exploring other opportunities, e.g tourism, access to technology and greater varieties of land use
- Keeping farming vibrant and viable and farmers healthy through accepting change and knowing that adversity provides opportunities.


Hey Bert have you seen my new stock?
You have to adapt you know. Hey Mustaph leave my hat

Workshop 4

Methven, Canterbury

Features

Droughts

Extremes of temperature and rainfall

Rainfall gradient from foothills to coast

Long winter and later spring

Snow

Winds – NW, drying; SW, rain in foothills

Issues

Foothills

Compliance with regulatory issues, especially the Resource Management Act

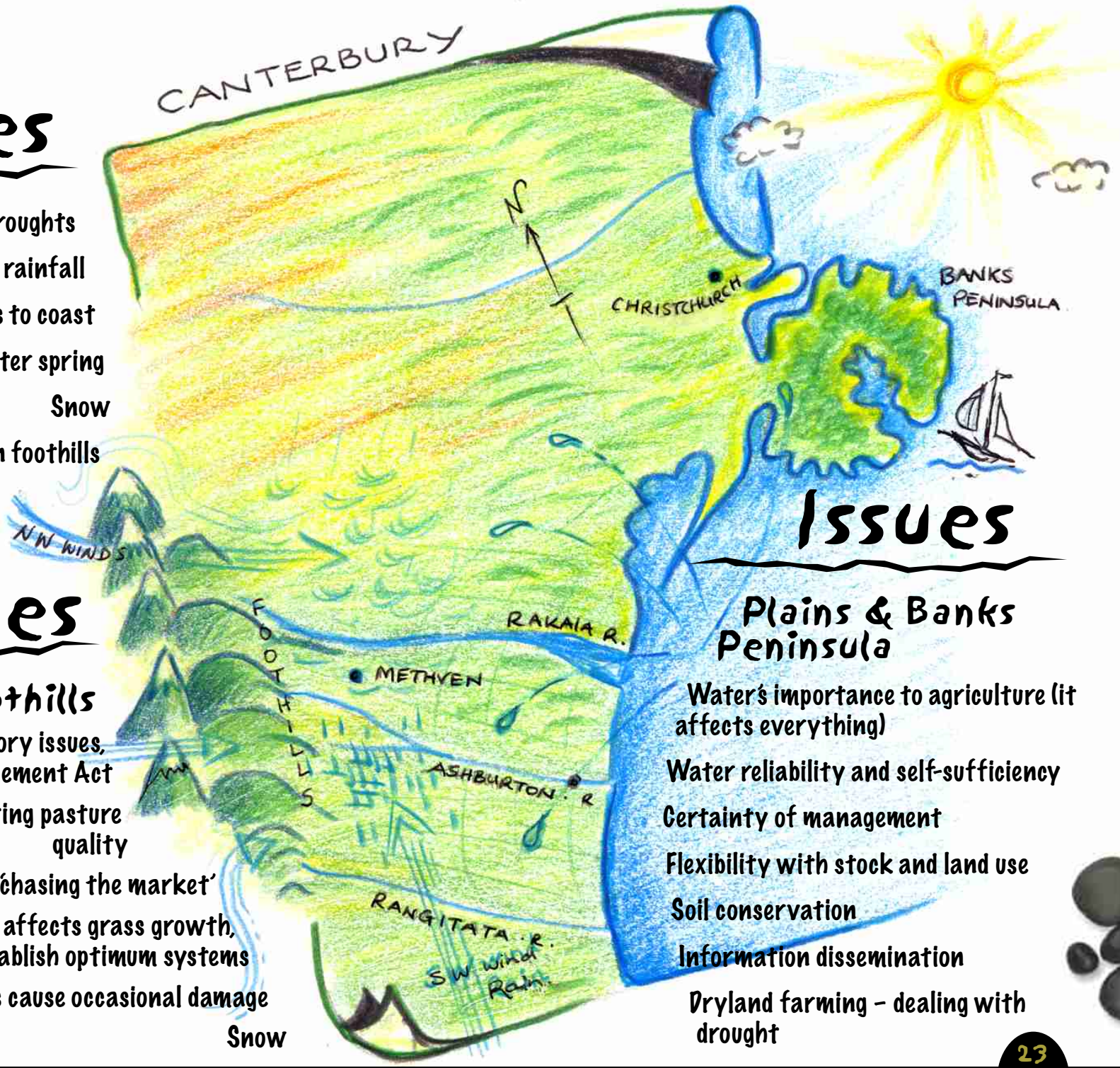
Potential summer dries affecting pasture quality

Late growing season leads to 'chasing the market'

Big variance between seasons, affects grass growth, therefore difficult to establish optimum systems

Gale force winds cause occasional damage

Snow



Issues

Plains & Banks Peninsula

Water's importance to agriculture (it affects everything)

Water reliability and self-sufficiency

Certainty of management

Flexibility with stock and land use

Soil conservation

Information dissemination

Dryland farming – dealing with drought

Impacts

Positives

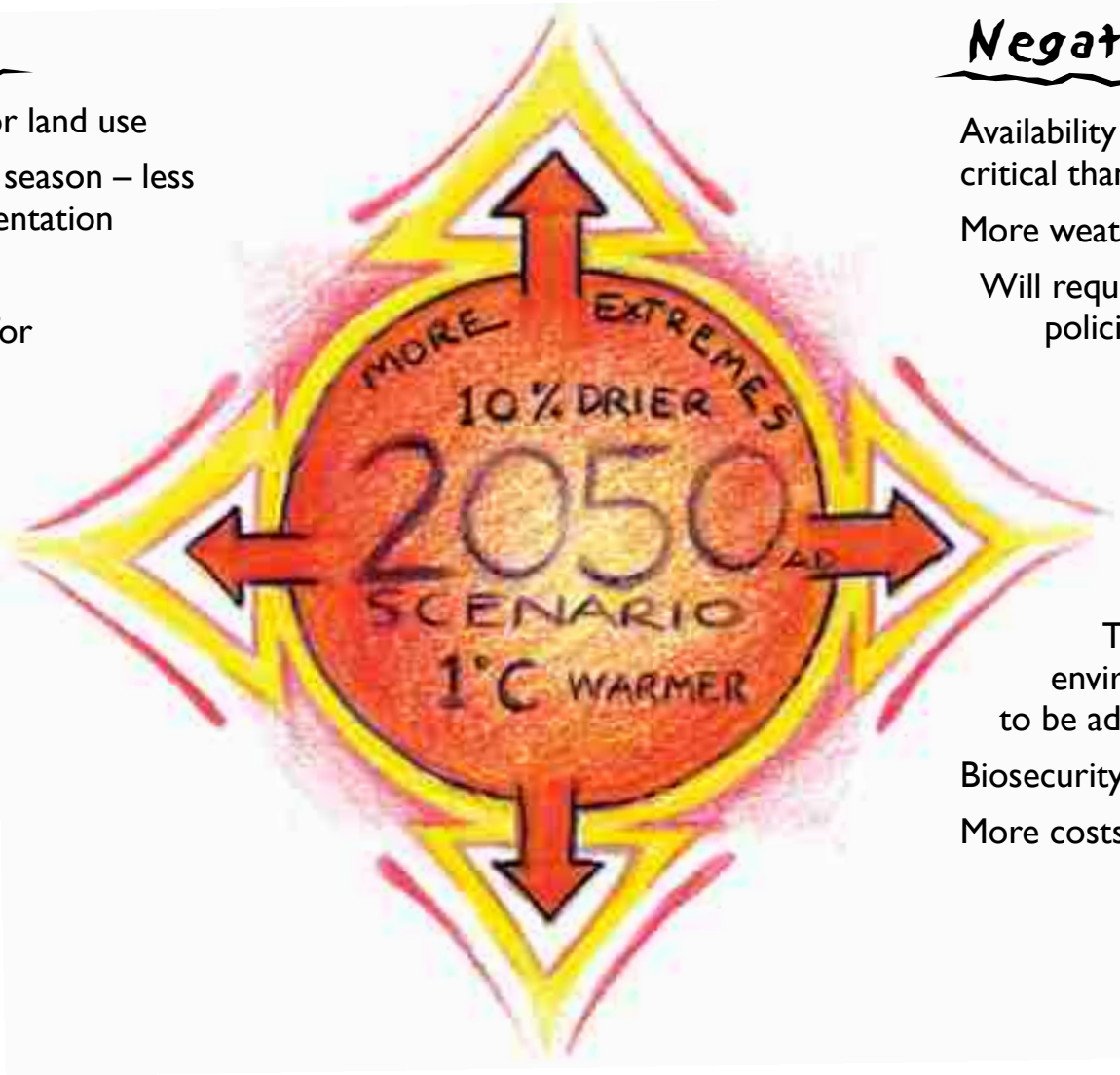
More options for land use

Longer growing season – less winter supplementation

Less snow

Kinder climate for man

Less energy demands within systems, e.g nitrogen, heating



Negatives

Availability of water will be even more critical than now

More weather extremes, e.g. drought

Will require more flexibility in stock policies

More threat from weeds and pests

Social/economic changes

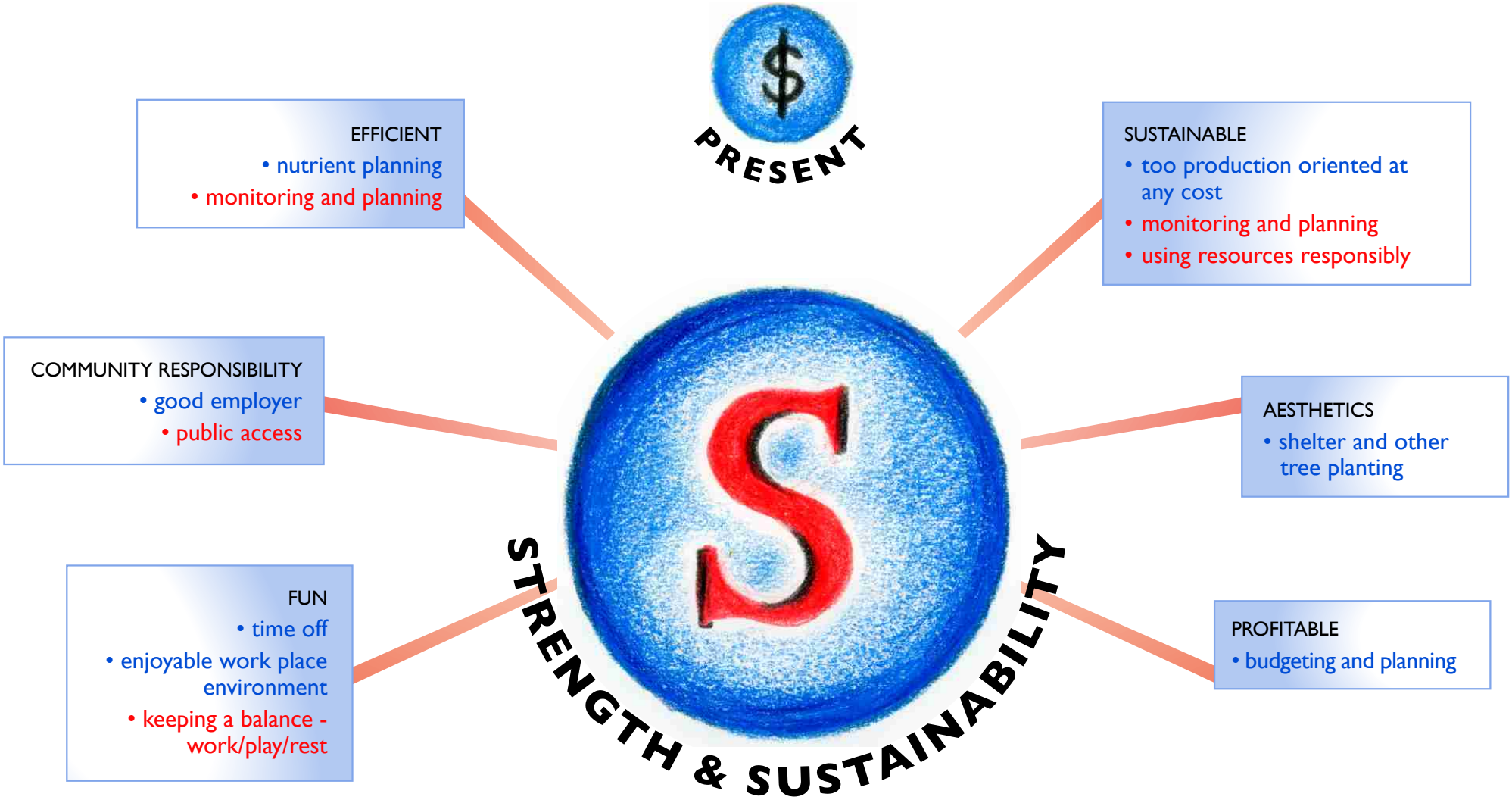
Higher temperatures will mean lower pasture quality

There will be a range of environmental issues that need to be addressed

Biosecurity issues will increase

More costs

The Ideal Farm



Doing already Need to do

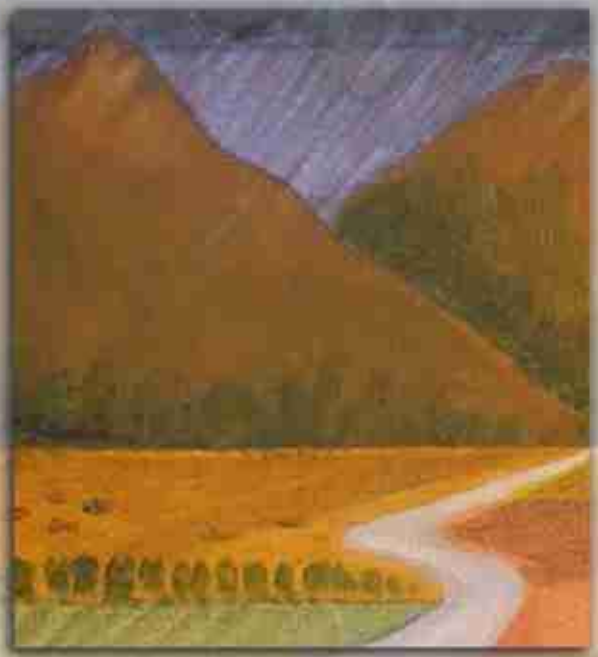
Adaptation Priorities

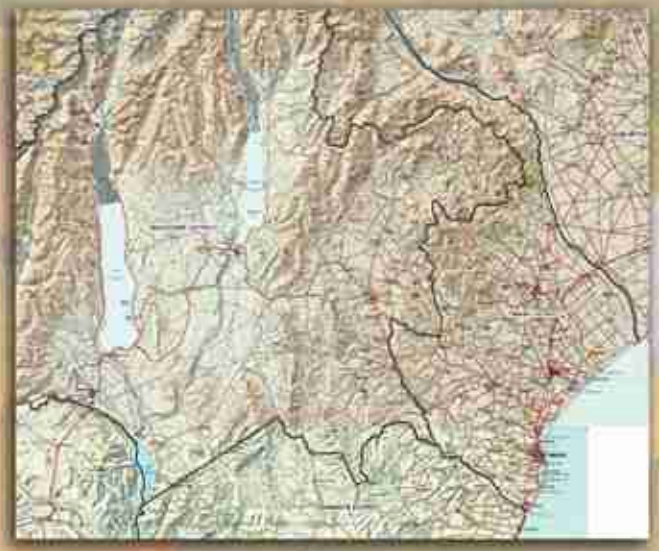
People to drive adaptation

- Sustainability – financial, environment, and social (enjoyment)
- Monitoring and planning of today's farming systems is needed, so adjustments can be made for the future (not just climate)
- Communities need to be better informed and working together for responsible resource use
- Need for flexibility to look ahead and act – need to be less regulated

Workshop 5

Fairlie, South Canterbury





Features

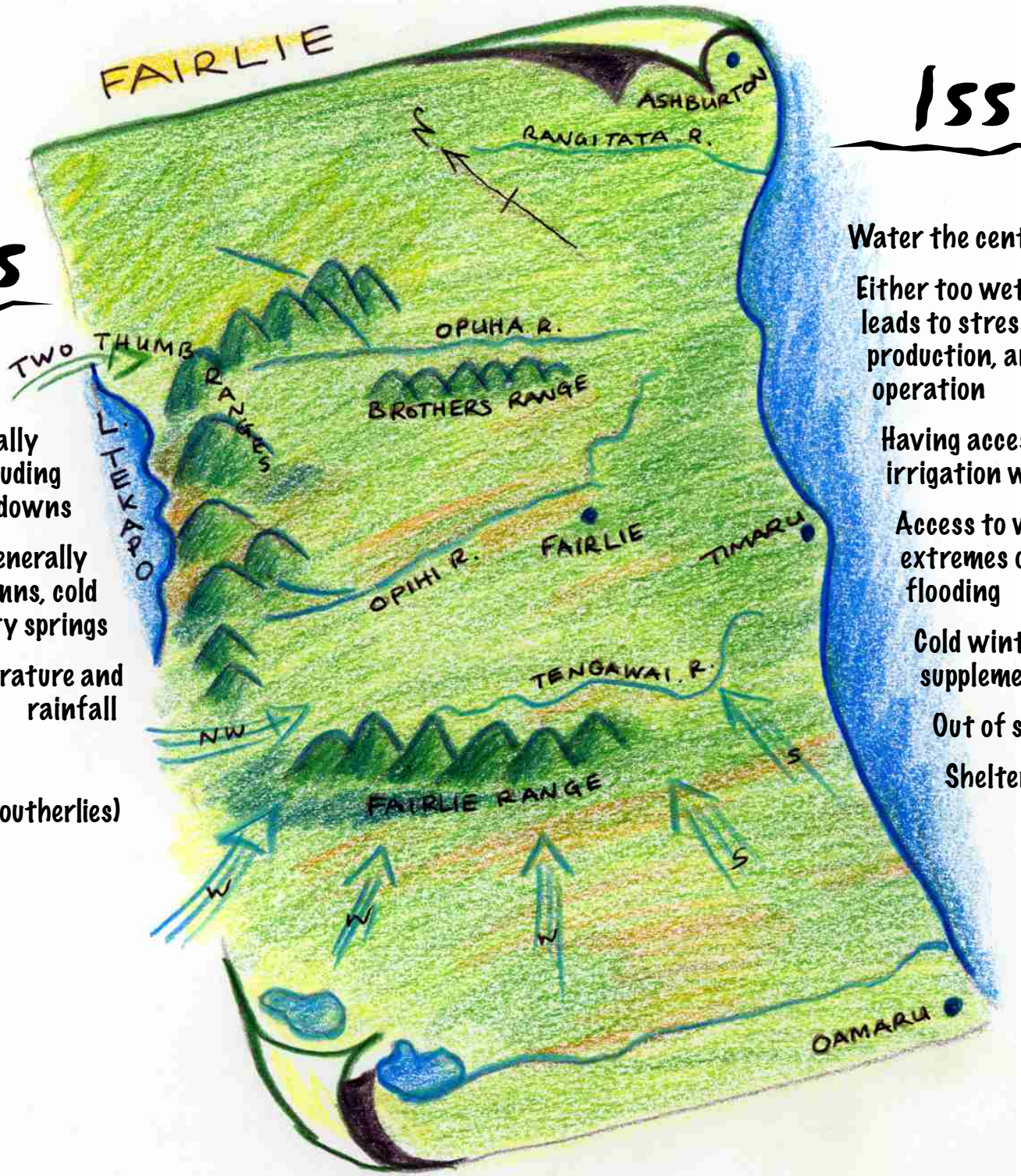
Bound by ranges

Range of generally fragile soils – including stony, clay-based downs

Summer droughts, generally reliable autumns, cold winters, and cold/dry springs

Extremes of temperature and rainfall

Wind (W/NW and Southerlies)



Issues

Water the central issue

Either too wet or too dry, which leads to stress on animals, crop production, and overall farm operation

Having access to reliable irrigation water

Access to water resolves extremes of drought and flooding

Cold winter – need supplements

Out of season frosts

Shelter from wind

Impacts

Positives

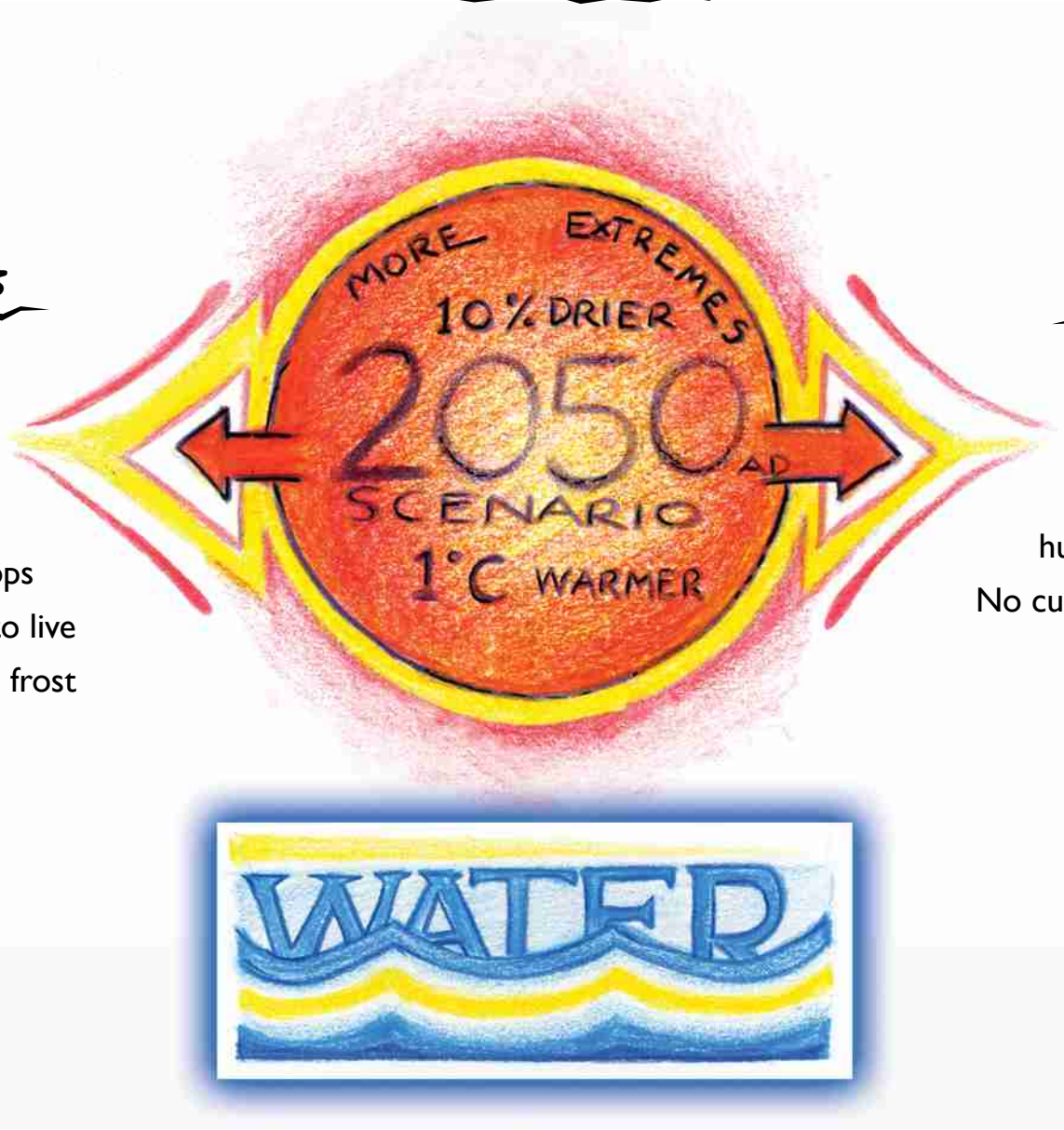
Longer growing season

More growing degree days

More options – new crops

Better place to live

Less snow and frost



Negatives

Flooding/droughts/wind

Change in farming patterns

Stress on animals & plants, humans

No curling!

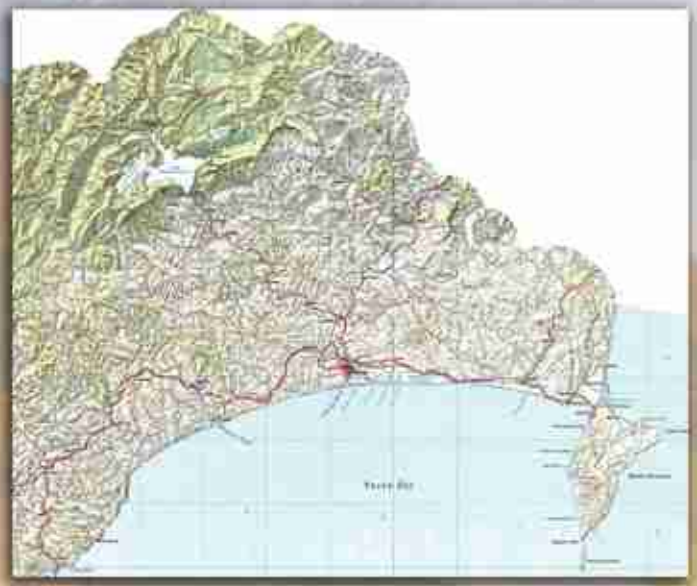
Whether impacts are positive or negative will depend on securing water.

Adaptation

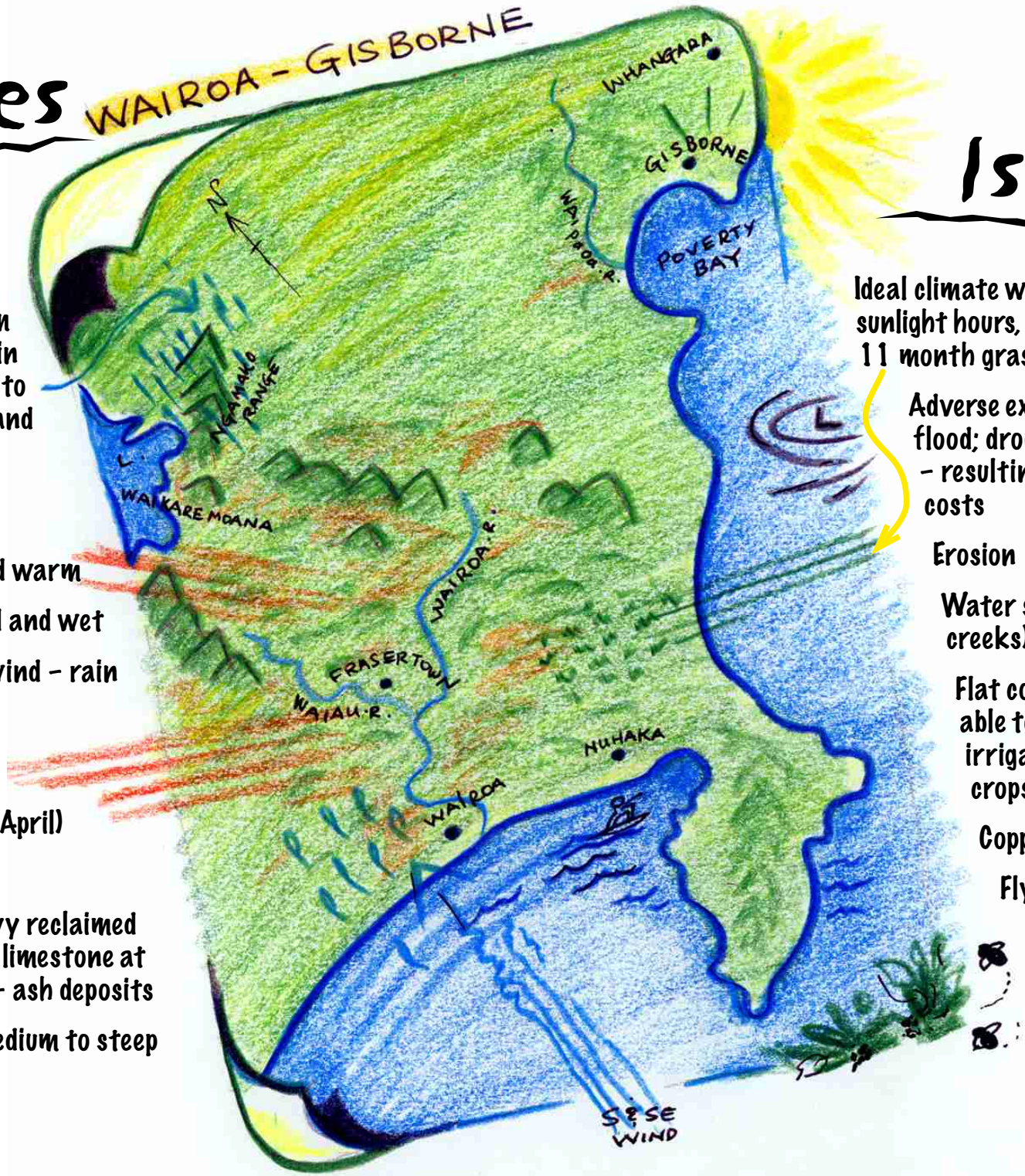
Ideals & priorities

Workshop 6

Frasertown, Wairoa/Gisborne



Features



Rainfall – ranges from 1000 – 1500mm in coastal/lowland regions to 2000mm or higher inland

W/NW wind – dry and warm

S and SE wind – cold and wet

E/NE wind – rain

Summer dry (January to April)

Wairoa soil type – heavy reclaimed swamp, mudstone hills, limestone at back, flats – ash deposits

Hill country – medium to steep

Issues

Ideal climate without the extremes – good sunlight hours, warm soil temperature, good 11 month grass growth

Adverse extremes – subject to cyclones; flood; drought; winds; intense rainfall – resulting in stress, lost $, labour costs

Erosion

Water supplies (e.g. dams, springs, creeks) are unreliable in droughts

Flat country – same issues though able to control drought through irrigation and drought tolerant crops

Copper for animal health

Flystrike

Weed control all important

Subdivision

Impacts

Positives

Greater crop and grass varieties

Animal diversification

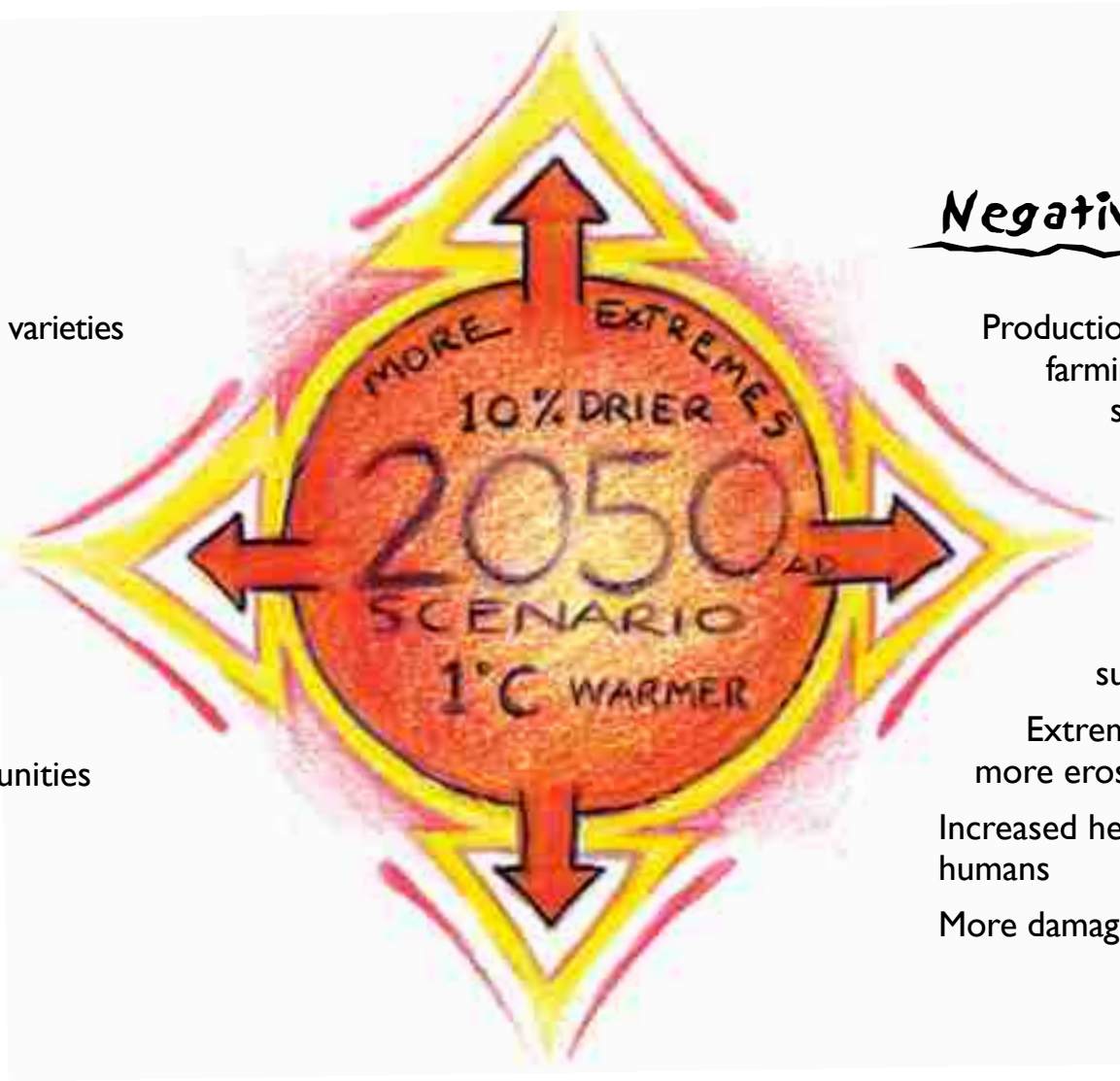
East coast winter production will increase

Timber production will increase

Site selection of tree species will increase

More tourism opportunities

Will adapt to change



Negatives

Production – foresee problems with farming current animal and plant species (i.e. may require new tree, grass and animal species)

Water – the viability of farms will be affected by drier conditions and subtropical effects

Extreme climate will result in more erosion

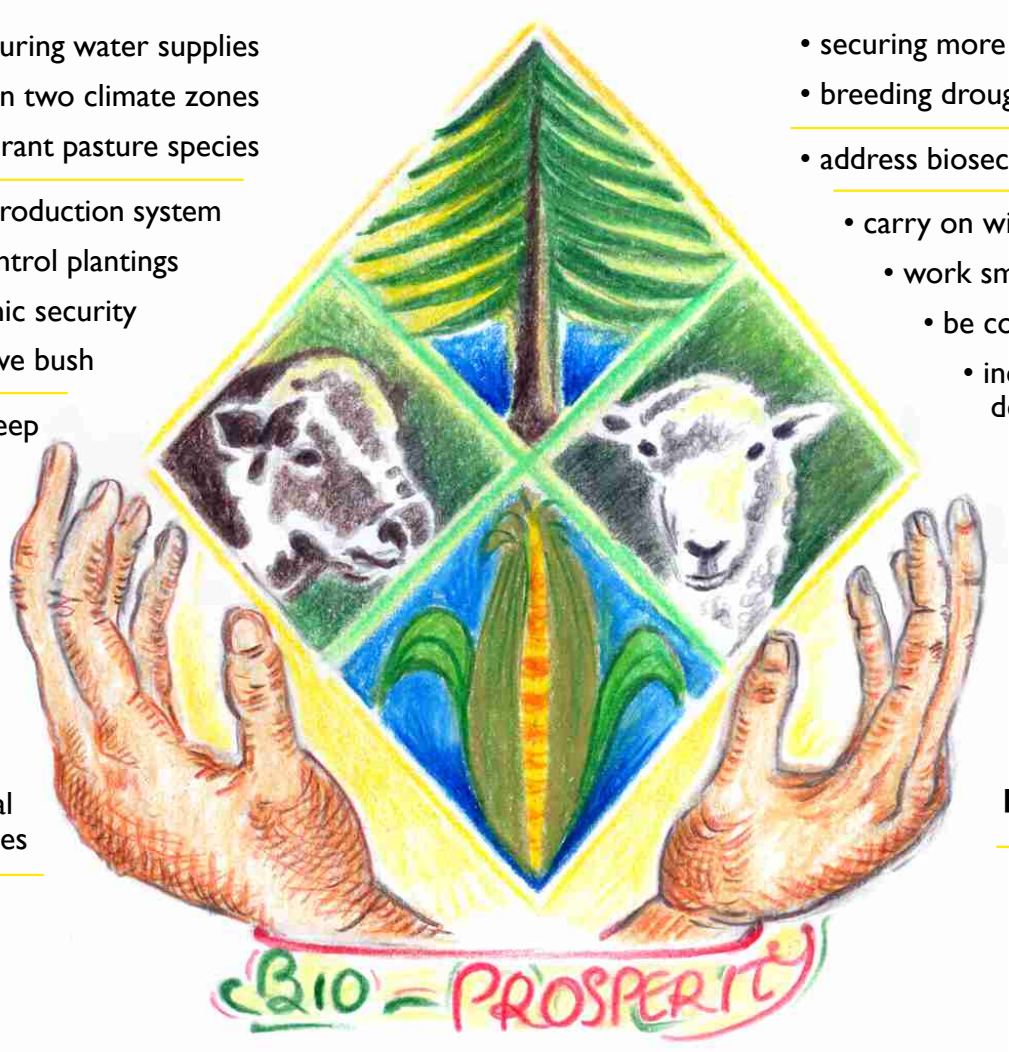
Increased health risks to animals and humans

More damaging insects and new weeds

The Ideal Farm

Doing already

- securing water supplies
- farming in two climate zones
- planting dry tolerant pasture species
- closed canopy - perennial plant production system
- erosion control plantings
- plantation forestry for economic security
- preserving native bush
- breeding eczema resistant sheep
- improving animal genetics
- high yielding cash crops
- improving subdivision and access
- developing tourism opportunities
- developing educational opportunities



Need to do

- securing more water supplies
- breeding drought resilient stock
- address biosecurity
- carry on with what we are doing
- work smarter not harder
- be comfortable in adapting to change
- incorporating proven research and development into farm management systems
- receiving benefits of Kyoto agreement
- improving rural political clout
- education of non-farming community

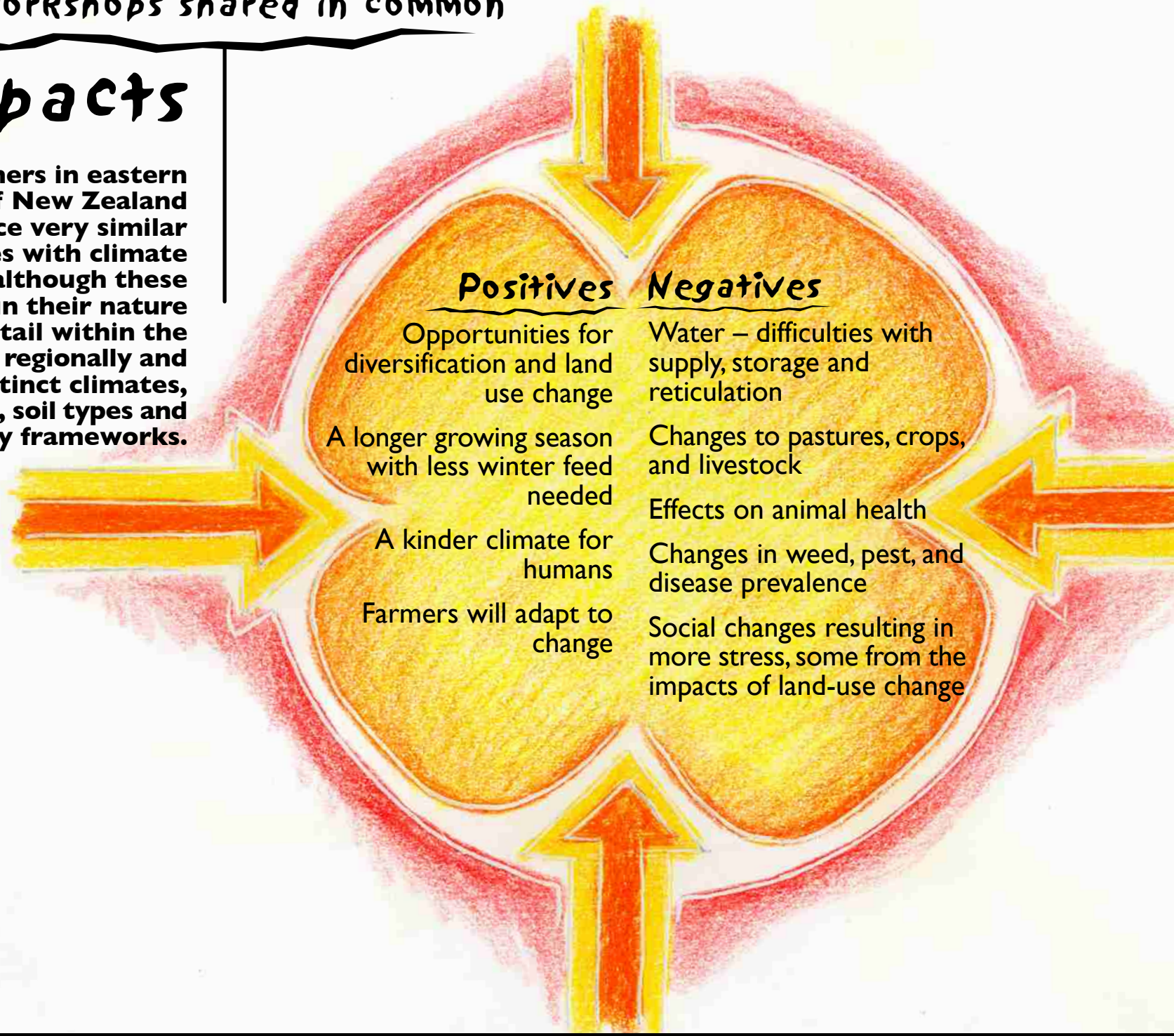
Need to be positive and profitable

Adaptation Priorities

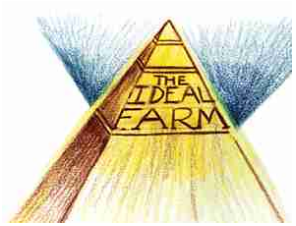

It's not the climate change
that worries me, its the "Bureaucratic
Bog"!
KYOTO

Impacts

Farmers in eastern regions of New Zealand will face very similar issues with climate change – although these will vary in their nature and detail within the context of regionally and locally distinct climates, land forms, soil types and regulatory frameworks.



Adaptation



Farmers are the real adaptors to climate change
People on the ground need to drive adaptation
– but need support through incentives rather than regulations

Profitable production

1. Individuals need to be able to enhance production through improvements in biodiversity, animal and plant genetics and breeding, and knowledge of the best systems (including diversifying) to be able to best adapt to climate change.
2. They also require practical research support (i.e. producing beneficial and doable outcomes), which needs to be expressed/transferred in a simple form.
3. Changes have to be economically viable and profit driven, but also take into account environmental and social factors. Need to consider the consequences of farming more intensively versus retaining flexibility and building resilience in the farming system. The apparent tension between ecology and economy needs to be resolved – 'there is no reason why they can't be compatible.'

Sustainable production

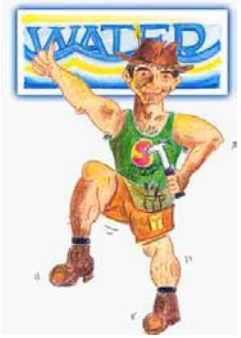
1. The availability, harvesting, storage and reticulation of water is a crucial issue affecting adaptation.
2. Trees are seen as an important means of adapting in that they provide multiple benefits, including economic returns from timber, shade and shelter for livestock, help manage erosion, and provide aesthetic satisfaction.
3. Whole-farm system planning and design, monitoring and management is required to make the best or wisest use of the land resources.

Environmentally safe production

1. Protecting the farm's resources, and the environment, through wise land use, was a common theme.

At various workshops the potential for diversification, capturing run-off (especially nitrogen), understanding effects of climatic extremes, diversity of plants to capture important minerals, building soil as a buffer against extremes (through biological farming, holistic management), and alternative sources of energy generation were raised.

2. Farmers feel they need incentives and partnerships, rather than regulations to act as environmental stewards. This partly reflects their need to increasingly react to multiple interests (e.g. commercial models, farm requirements, water scientists, meteorologists, environmentalists, recreational users, etc).
3. Biosecurity will continue to have to be addressed. Versatility of plant and animal species and genotypes is needed and biodiversity should be tailored to the location and use of the land.



Satisfaction of human needs

1. It is critical that farming remains vibrant and viable and farmers are healthy.
2. Farmers are accepting of change, but continue to require help and support to adapt. This means good strong communities to deal with personal and community stress.
3. The land is a community resource and its use must be integrated with other land users – e.g forestry, tourism, horticulture. There is a need for flexibility and greater co-operation between people, sharing the costs, benefits and risks of adaptation.

A socially just and fair system

1. A fair and equitable allocation of the costs and benefits of resources, adaptation to climate change, bureaucracy, and expectations of farming and the environment, was a strong theme in many workshops. Farmers want to be doing the right things without feeling that they have their backs to the wall.
2. Education and support for innovation and change is required (e.g. the blueprint for water allocation should be available now). This also requires establishing a dialogue with the general community to appreciate and prepare fully for the effects of climate change, be it the allocation of water, or the costs of extreme events.
3. Regulations need to be flexible so that farming communities can readily adapt rather than contest bureaucratic delays and decisions. There is a need for leadership and vision to achieve this for the country, not just for farming.

Where to next?

It is intended that the information presented here will provide a platform for further work, which will focus on three key areas: more in-depth workshops; an adaptation resource kit; and dissemination. The following are thoughts shared by workshop participants on how this work might be put in place.

More in-depth workshops

- Work with existing networks (e.g. Farm Forestry Association; Landcare groups)
- Focus on a few key things that are of practical benefit

An adaptation resource kit

- Keep things simple and eye catching, and let people decide what they are going to farm to
- Bring the science and practical views together (the farming community want both)
- Bring farmer stories forward more for councils and 'Wellington people' to see
- Look at individual farm models and case studies for different areas or regions
- Produce something concise and practical (act as a filter) – e.g. a list of researchers, who is doing what, significant trends, practical innovations
- Give us a one-page resource kit!

Dissemination

- Use existing networks, discussion groups, monitor farms
- Have a website, a regular newsletter – do this through regional councils
- Publish in popular farm journals

For more information about this project,
contact the
Hawke's Bay Climate Change Adaptation Group
C/- Dr Gavin Kenny
709a Duke Steet
Hastings, New Zealand
Tel. (06) 870 8466
Email: gavinkenny@clear.net.nz

Ode To Adaptation

Climate Change - capricious daughter of Mother Nature and Modern Man (or person)
Surfing free on a wave of gaseous carbon on parole
Born of fossil fuels, and fires and fart, which worsen
The Greenhouse Effect, Her revenge, Her warning, Her steaming vitriol

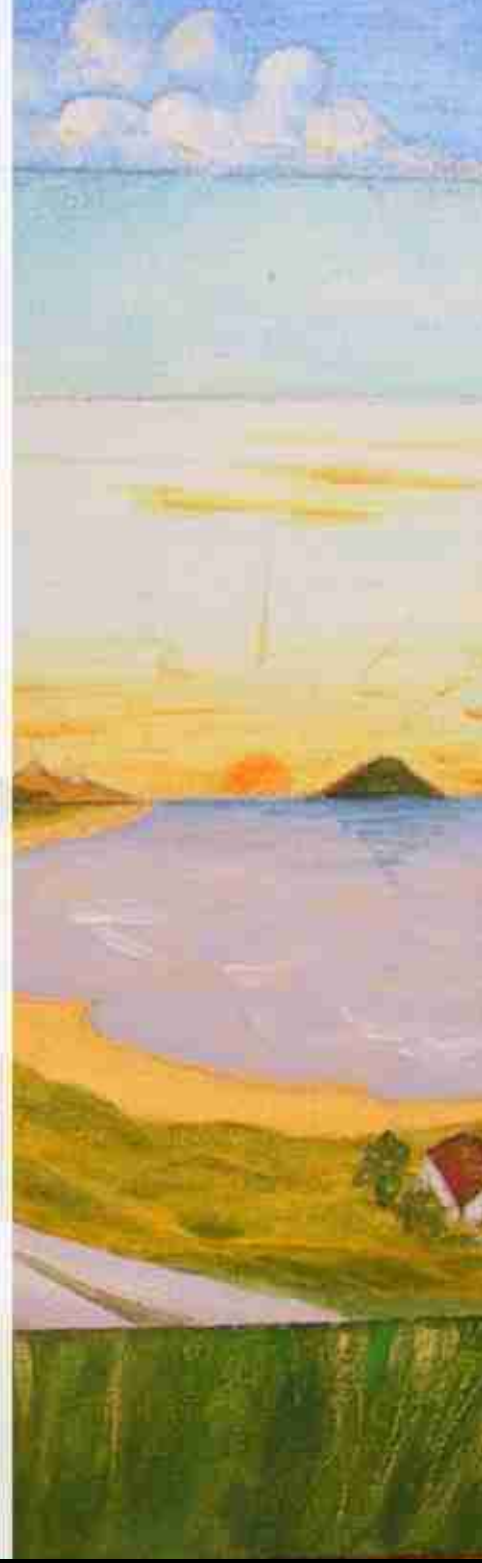
And here on Eastland's green and pleasant farms, do we detect a warming?
Water getting short too oft', a timely subtle warning?

So take heed you gentle burghers of the coast
Mother Nature's humour's double edged, and quick
Olives in Dunedin and bananas in Waipawa might be your boast
But also marching south are temperate pests, paspalum, and the cattle tick

Future-proof your farm for one hundred, nay a thousand years
When water will be treasured friend and feared foe in turn
Plant trees! Our carbon-sucking, water-storing beautiful engineers
That lock and hold and shade the fold, before they finally burn

So here on Eastland's green and pleasant lands, shall we make a stand?
The problem and the answer's in our hands

Alec Olsen and Heather Bell
Farmers, 'Valhalla', Napier
July 2003



The View from the Ground

A farmer perspective on climate change & adaptation

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