Food security

David Lergessner
“EARTH PROVIDES ENOUGH TO SATISFY EVERY MAN’S NEEDS, BUT NOT EVERY MAN’S GREED.”

-MAHATMA GANDHI
The Green Economy as a New Frontier: Is it happening?

By Peter Newman
Professor of Sustainability, Curtin University Sustainability Policy (CUSP) Institute, Fremantle.
Three follow-on goals

1. How are we doing globally along the lines of the Caritas approach
2. What are cities doing?
3. What more can be done through the field of geographical education?
1798 Thomas Malthus predicted that world population would outgrow world food production with drastic consequences.

Thomas Malthus didn't coin the term ‘food security’ but it was certainly in the back of his mind.
What is ‘food security’?

The ability of all people at all times to access enough food for an active and healthy life.
FOUR DIMENSIONS OF FOOD SECURITY

AVAILABILITY
- production
- distribution
- exchange

ACCESS
- income
- food aid

STABILITY
- supplies
- access

UTILIZATION
- nutrient content
- food safety
- human health

FOOD SECURITY
A World Demanding More

By 2050 the world's population will likely increase by about 35 percent.

To feed that population, crop production will need to double.

Why? Production will have to far outpace population growth as the developing world grows prosperous enough to eat more meat.

<table>
<thead>
<tr>
<th>Increase in daily protein demand</th>
<th>Per capita by 2050</th>
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<tr>
<td>Developed countries</td>
<td>15.3%</td>
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<td>103.6%</td>
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<tr>
<td>Least developed countries</td>
<td>69.2%</td>
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SOURCE: DAVID TILMAN, UNIVERSITY OF MINNESOTA
The Millennium Development Goals

- set by the United Nations in 2000
- targets to be reached by 2015.

In relation to hunger, the target was to

**Halve, between 1990 and 2015, the proportion of people who suffer from hunger**

*Prevalence of underweight children under five years of age*

*Proportion of population below minimum level of dietary energy consumption*
Prevalence of undernourishment in the population (percent)
in 2012-14

Legend
<5% • Very low
5% ➔ 14.9% • Moderately low
15% ➔ 24.9% • Moderately high
25% ➔ 34.9% • High
35% and over • Very high
Missing or insufficient data

Sources
Undernourishment data: UN Food and Agriculture Organization (FAO)
Modelling undernourishment: The University of Sydney and CSIRO

Notes
The map shows the prevalence of undernourishment in the population of developing countries as of 2012-14. Undernourishment is defined as the consumption of an amount of dietary energy which is insufficient to maintain physical fitness and a normal diet for an active and healthy life.

Data for South Sudan and Sudan for the years 2010-11 are not available, and are not reported.
Dimensions of food security

Evolution of food security dimensions in the developing regions

Comparative analysis across regions:
- Northern Africa
- Sub-Saharan Africa
- Caucasus and Central Asia
- Eastern Asia
- South-Eastern Asia
- Southern Asia
- Western Asia
- Latin America
- Caribbean
- All Developing Regions

Indicators:
- Availability
- Stability
- Access
- Utilization

Data points indicate trends from 1994-96 to 2012-14.
### Table 1: Undernourishment around the world, 1992–92 to 2012–14

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Notes: * Projections.  
Source: FAO.
Dilemma:

How do we teach students about food security if students don’t know

1. where food comes from?

2. how food is grown?

3. how people provide food for themselves in different parts of the world?
Where does food come from?
Fortunately the ACARA Curriculum: Geography has a Year 9 unit which assists:

There are two units of study in the Year 9 curriculum for Geography:

*Biomes and food security*

and

*Geographies of interconnections.*

This session will concentrate on *Biomes and food security.*
Biomes and food security focuses on investigating the role of the biotic environment and its role in food and fibre production.

This unit examines

- the biomes of the world,
- their alteration and significance as a source of food and fibre,
- and the environmental challenges and constraints on expanding food production in the future.

These distinctive aspects of biomes, food production and food security are investigated using studies drawn from Australia and across the world.
IN SUMMARY  *Biomes and Food Security*

The unit content includes:

1. Biomes in Australia and throughout the world
2. Food and fibre production from biomes in Australia and throughout the world
3. Environmental effects of human alteration to biomes for food and fibre production in Australia and throughout the world
4. How can food and fibre production be increased to sustainably provide for future populations in Australia and throughout the world?
5. Potential links to interconnections and interdependencies
Biomes refer to the world-wide grouping of plant and animal communities which have adapted to inhabit particular parts of the Earth’s surface.
WHAT ARE THE WORLD’S BIOMES AND WHERE ARE THEY?
How to approach the teaching of biomes given that the emphasis must be on

• managing change in these environments

• using biomes to provide food security

There is a clear link back to the Yr 8 Unit *landforms and Landscapes*.

**PROVIDED** that Rainforests were a major part of the unit.
WHY RAINFORESTS?

• students are familiar with rainforests

• rainforest destruction features regularly in the media

• rainforest provide food security for so many people on the Earth’s surface in so many different ways.
How are rainforests used to provide food?

In the Australasian region, rainforests are used right across the spectrum from providing basic human needs to providing the economic necessities which allow a person/family/group to purchase the necessities of life.
On the Fly River in Papua-New Guinea, the Suki people hunt and gather their basic needs from the surrounding rainforest.
The Suki have an impact on forest products and wildlife BUT usually live in harmony with the environment.

Their numbers were small but the arrival of outsiders including missionaries has had an impact on this way of life and that impact will have wider implications for food security as the population increases.
Aboriginal and Torres Strait Islander legend about food security relevant to hunters and gatherers has been provided by the team at Crackerjack Education.

There is an interesting link to a 6 minute video showing how an indigenous tribe befriended dolphins and called them to provide fish for the group.

On www.crackerjackeducation.com.au is a dreaming called the legend of Kwilena - which is a coastal dreaming story from WA.

The Maori have a legend of Whaitere the enchanted stingray. Whaitere was concerned that people fishing in her bay were rapidly reducing the number of fish in the bay. She was taken to the underworld where she met her parents who were among the fish who had been killed. She was given magical powers and returned to communicate with the people to stop the fishing in her bay.

At a more sophisticated level of rainforest use is the shifting cultivator.
Shifting cultivation is a cycle of agricultural land use where fields are rotated over a period of time. Fields are usually abandoned after 3-4 years and may not be revisited for another 16-20 years.

Rainforest is cleared and burned. The area will eventually return to rainforest IF sufficient time is allowed between clearing.
Slash and burn cycle of cultivation

First clearing

Second clearing

Third clearing

Fourth clearing

Relocate after 3 – 4 years

Possibly return to original clearing after 16-20 years

Relocate after 3 – 4 years

Relocate after 3 – 4 years
Shifting cultivators clear the forest and plant a variety of crops. This ensures that if one crop fails, there will still be another source of food.
Karongo Local Village Tourism Refreshment Centre

Include:
- Local handi craft
- Souvenir
- Turtle Feeding
- Photo shooting

East Estate Island Dress Shopping Centre

Tel: 5928270

Sunday - Friday
8am - 4pm
Shifting cultivation has become unsustainable in many parts of the world.

Early control of shifting cultivation was quite drastic. Shifting cultivators were turning rainforest into grassland in some areas through over-use of an area.

In the Philippines, laws were introduced making it illegal and people caught could be condemned to death.

Fortunately this approach was replaced by a more conciliatory one.

In some areas, new agricultural practices have been put in place.
In order to recover previously farmed areas, different vegetation schemes have been introduced aimed at recovering the lost agricultural land.

*Ipil-ipil (Leucaena glauca)* was one plant introduced.
*Ipil-ipil* is a quick growing legume. It will shade out the blady grass and has economic value:

It can be used for

- firewood
- parts of the plant – roots and seeds - have medicinal value
- minor construction
- furniture making
- frame for climbing plants such as flying yams
- cover crop as a starter for larger forest trees.

It provides a cash crop which people can use to purchase food.

NB. *Ipil-ipil* (*Leucaena glauca*) grows wild in streams of the Northern Territory where it is considered a weed.
In the next layer of the hierarchy, rainforest is also cleared in S. E. Asia for upland rice production.

Again the rainforest is cleared and burnt BUT

only one crop is planted - rice.

That crop is planted for barter or for sale.

Upland or dry rice farming represents about 13% of the area of rice planted annually in SE Asia but only produces 4% of the total rice crop.
Dry rice farming depends on regular rainfall to water the crop.
The forest is cleared and burnt.
The soil is poor.
Eventually, as with the shifting cultivator, the plot is abandoned.
Blady grass *Imperata cylindrica* often takes over the abandoned sites. The shifting cultivator does not have the tools to fight this nor does the upland rice farmer. Burning only increases the growth of the grass.
At the top of the hierarchy of clearing rainforest for food production is the clearing of rainforest for wet rice cultivation. This may be for subsistence purposes but it is more often for sale.
Seed plots are carefully nurtured.
The land is carefully terraced so that maximum flow of water is obtained. The fields are known as paddies.
Technology is now playing a larger role in food production.
Much of the planting and harvesting involves manual labour.
Geese and ducks are also kept. Fish may also be kept in the paddies.
Harvest time is a community affair.
In the most fertile areas, as much of the land is farmed as possible.
Technology is taking over in some areas.
But in many places urban areas are extending into rice fields. This places pressure on food production.
This area was rice terraces in 1974. Today it is part of Ubud’s urban footprint.
In the 1970s, the Monkey Forest in the background was far from Ubud. Today the Monkey Forest is IN Ubud.
A ‘BIG PROJECT’ in Asia and South-East Asia after World War 11 was concerned with increasing rice production to feed the increasing population to provide ‘food security’.
Thomas Malthus could not have predicted the changes which would occur in the coming centuries in relation to

• changing attitudes in relation to the need for large families

• government intervention in relation to population growth

• scientific advances in food production.
South East Asia embarked on a series of plans to improve food production after WW11.

Double-cropping was introduced in areas where two crops could be obtained for the one field each year. Sometimes the second crop was another rice crop and sometimes another crop like chick peas.

Scientists began work on genetically engineering rice. They worked on producing a rice plant which would grow throughout South East Asia at any time of the year. In 1962, American researchers produced IR8 or what became known as ‘miracle rice’.

This was part of what became known as the ‘Green Revolution’. Miracle rice would supply enough food for the world’s population.
Miracle rice raised crop yields in the Philippines from 1 ton/ha to 9.4 tons/ha.

In Indonesia rice yields were doubled BUT

‘miracle rice IR8’ suffered from three problems:

- it was susceptible to drought
- it was susceptible to pests
- it was tasteless.

To overcome the pests, farmers had to outlay money on pesticides.

BUT

the pesticides entered the food chain through fish and crabs raised in the paddies.

Pesticides also reached the surrounding ocean where they impacted on coral reefs.
Many farmers did not like miracle rice but preferred the ‘old’ rice.

Older rice varieties

• stored better
• were naturally resistant to pests
• were not as sensitive to drought
• tasted better
• and were worth more when sold.

Back to the genetic engineers.

New varieties were developed. The current variety being used is IR72.
Even today a new type of rice being cultivated by the University of Agricultural Sciences in Bangalore, India, has many advantages over typical rice varieties -- it requires less water to grow, it's higher in protein and it emits less methane over its life cycle.

This rice is

• **not genetically modified** but a hybrid crop,
• uses 60 percent less water than conventional rice crops
• only needs to be watered once a week even in arid climates and can go as long as 15 days without water.
• has 14 to 15 percent protein compared to seven to eight percent in conventional rice and
• can be harvested more quickly with a similar yield to conventional rice

So far, only about five percent of rice fields are using this new type of rice but researchers are hopeful that as word spreads about this approach to rice, it will spread to more areas.

( via DNA India )
The ‘new’ rice is described as ‘aerobic’ rice and is being developed in China, Brazil and India.

In China the rice is known as Han Dao 502

In India there are several varieties – MAS 946-1 and MAS 26.
Fig 1. Water Use Efficiency in Various Rice Cultivation Technologies
A dry seeded aerobic rice field

A ripening aerobic rice field

Dibbling aerobic rice seeds

Aerobic rice growing side by side with soy bean

Target areas for ‘aerobic’ rice

Aerobic rice can be found, or can be a suitable technology, in the following areas:

“Favorable uplands”: areas where the land is flat, where rainfall with or without supplemental irrigation is sufficient to frequently bring the soil water content close to field capacity, and where farmers have access to external inputs such as fertilizers.

Fields on upper slopes or terraces in undulating, rainfed lowlands. Quite often, soils in these areas are relatively coarse-textured and well-drained, so that ponding of water occurs only briefly or not at all during the growing season.

Water-short irrigated lowlands: areas where farmers do not have access to sufficient water anymore to keep rice fields flooded for a substantial period of time.
Management

The usual establishment method is dry direct seeding. Aerobic rice also allows practices of conservation agriculture as used in upland crops, such as mulching and minimum tillage.

Aerobic rice can be rainfed or irrigated. Irrigation can be applied through flash-flooding, furrow irrigation (or raised beds), or sprinklers. Unlike flooded rice, irrigation—when applied—is not used to flood the soil but to just bring the soil water content in the root zone up to field capacity.

Site-specific nutrient management (SSNM; http://irri.org/ssnm/) can be used to determine the optimal management of fertilizers. In the absence of knowledge on SSNM, 70-90 kg N ha\(^{-1}\) could be a useful starting point to obtain a yield of 4-6 t ha\(^{-1}\). The first split can best be given 10-12 days after emergence, the second at active tillering, and the third at panicle initiation. The application of fertilizer P can be more critical for aerobic rice than for flooded rice.

Rice fields that are not permanently flooded tend to experience more weed growth and more species of weeds. Appropriate herbicide use, plus additional manual or mechanical weeding in the early phases of crop growth, is therefore needed to control weeds.

Soil-borne pests and diseases such as nematodes, root aphids, and fungi are known to occur more in aerobic rice than in flooded rice, especially in the tropics. It is recommended to grow aerobic rice in rotation with upland crops suitable in the area.
Learn about best practices in rice farming

Pre-planting  Growth  Postproduction

Rice Knowledge Bank showcases rice production techniques, agricultural technologies, and best farming practices based on International Rice Research Institute’s pool of knowledge from research findings, learning and media resources, and in-country projects.

Read more »

http://www.knowledgebank.irri.org/
Elsewhere.... Mt Batur is erupting.... 1976
Mt Batur Sept 14.
Here is the first stage of farming on a recent lava flow circa 2009. Small pockets of fertile soil have developed on the lava flow and they are being used to produce food - tomatoes. In time...????? This may be providing food security for one farmer and his family.
Multicropping Sept 14
In South East Asia, there is a clear hierarchy of use of the rainforest biome.

The hierarchy commences with people who depend on the surrounding forest for their food security. These people have little impact on their environment BUT are impacted on by other users of the forest who need to clear more and more of the forest.

First of the forest clearers are the shifting cultivators who can sustainably use the forest if the forest has enough time to regenerate.

Second are the upland or dry rice farmers.

Finally are the wet rice farmers where the rainforest biome has all but been obliterated in the quest for food either at a subsistence or commercial level.
Extensions on this unit might look at the role of plantation agriculture in clearing rainforests for cash crops – rubber, palm oil.

Clearing for palm oil production is the major issue in relation to destruction of the rainforest biome in South east Asia today BUT that could change.

In the Indonesian part of Borneo alone, there are eight million ha of blady grass *Imperata cylindrica* and in the whole country over 25 million ha on which it is believed oil palm plantations could easily be established.

There are clear links here with the ‘Interconnections’ unit in terms of

- links to Institutes and Universities in terms of developing better rice varieties
- links to Institutes and Universities in terms of developing more equipment for use in the paddies
- international trade in rice.
On the Australian scene, in 1788, the First Fleet brought sugar cane to Sydney.
It was not until 1862 that sugar cane was introduced into river valleys around Brisbane. From there, it rapidly spread north.
Sugar cane growing was considered too strenuous for ‘white’ people and labourers were brought in from nearby Pacific islands.

These workers were known as ‘kanakas’.
Today, Australia’s Sugar Industry is very capital – intensive.
Machinery has restricted the growing of cane to flat land.
Improved harvesters have removed the need to burn fields before harvesting. This reduces greenhouse gas emissions and the amount of soot in the air around harvest time.
BUT the cane growing areas of north Queensland are under threat.

New residential areas spreading along the highway south of Cairns are at the expense of former sugar cane farms.
This new housing estate on the NW of Cairns was once sugar fields.
The estate continues to push into the cane growing area.
As a response, a new area opened up to cane growing is on the Atherton Tablelands west of Cairns. Many of these farms grew tobacco in the past. Sugar cane was a saviour for many of these farmers but required significant capital outlay for irrigation as the area is in a ‘rain shadow’.
On December 4, 2003, the Nambour Mill was closed down considered to be uneconomic
Mourilyan closed following Cyclone Larry 2008 as the damage was too great to consider repairs.
The Babinda sugar mill closed in 2011.
The long term future of the sugar industry in north Queensland may be bleak especially when farmers are being blamed for impacts on the Great Barrier Reef from sediment and farm chemicals.
Largest producers of raw sugar as percentage of world production, 2007-12

- Brazil 22%
- India 15%
- Others 24%
- EU-27 10%
- China 8%
- Thailand 5%
- US 5%
- Mexico 3%
- Australia 3%
- Pakistan 3%
- Russia 2%

Source: USDA FAS Sugar: World Markets and Trade, May 2012
Ownership of Australian Mills

Based on tonnages processed by mills in 2010

Back to the issue of ‘food security’.

The World Health Organisation believes food security is a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment, and trade.

Debate around food security involves the following:

There is enough food in the world to feed everyone adequately; the problem is distribution.

Future food needs may or may not be met by current levels of production.
The positive approach to the future is that

• science will provide acceptable food sources sufficient to feed the world’s population

• the rising growth of middle class attitudes in developing countries will naturally curb population growth.

The flip side of the coin is that rural-urban drift will be so great there will be no one left on the farm to produce the food and that is not only a developing world problem.
Émer Hickey, Ciara Judge and Sophie Healy-Thow, 16 year olds from Cork, Ireland, won the 2014 Google Science Fair for their research on the use of beneficial bacteria to increase food production. Their project boosted cereal crop yields by up to 70% without the addition of chemical fertilizers.
Potential Australian approaches to biomes and food security

• improve the productivity of the Murray-Darling basin

• implement the Bradfield Scheme

• develop the Carpentaria food bowl
The Bradfield Scheme proposed in 1947 was ahead of its time. It proposed diverting the flow of north Queensland rivers from the coast and the Gulf to irrigate central and western Queensland.
The aim of the Carpentaria Food Bowl scheme is to capture the monsoonal run-off from this area and use it for providing irrigated pastures for beef for the Asian market plus cotton for the world market.

THREE major issues:

1. The country is flat. Any dams would be on the scale of the Aswan Dam.

2. The nutrient run-off from these rivers supports an important fishing industry.

3. Monsoon rains are irregular.
What can the vast number of the world’s population living in cities do to help provide food security?

At present, people living in cities in Australia and New Zealand are highly dependent on food produced in other parts of the world.
Where did the food on my shelves come from?
Was this always the case?

For many of the older people amongst us the answer would be a resounding ‘NO.’
Case study:

44 Jardine Street, Kedron, Brisbane

Latest Google image
Flowers

Citrus trees

Bananas

Paw paws

Loquat tree

Chook house

Main garden – strawberries and vegetables – carrots, peas, beans, beetroot, potatoes

1970 map of property
What went wrong between 1970 and 2015?

What are the implications of the changes?
IN OUR SOCIETY GROWING FOOD YOURSELF HAS BECOME THE MOST RADICAL OF ACTS.
IT IS TRULY THE ONLY EFFECTIVE PROTEST.
ONE THAT CAN--AND WILL--OVERTURN THE CORPORATE POWERS THAT BE.
BY THE PROCESS OF DIRECTLY WORKING IN HARMONY WITH NATURE, WE DO
THE ONE THING MOST ESSENTIAL TO CHANGE THE WORLD...
WE CHANGE OURSELVES
--JULES Dervaes

GROW FOOD... NOT LAWNS
Established in 1994, Northey Street City Farm (NSCF) is a non-profit community organisation for people of all ages and backgrounds to learn the principles of Permaculture through hands-on experience. Join an enthusiastic, passionate group of people to work on one of Australia’s largest city farms; a certified Organic Permaculture site on 6 acres, established kitchen and market gardens as well as orchards and wood lot, plus Brisbane’s only certified Organic Markets. NSCF is also a community hub that facilitates the development of social connections and new skills for volunteers and participants in a variety of programs.
Many people are taking to the idea of permaculture and growing their own food.
$52/year + membership fee.
What can urban dwellers do to reduce food miles?

I want to grow my own food, but I can't find any bacon seeds.
Geelong Mayor Darryn Lyons hailed today’s announcement of a giant sustainable vegetable farm as an outstanding vote of confidence in Geelong’s future.

The Sustainable Farms proposal is a $320 million project to be built on a 371 acre site near the Princes Highway at Avalon.
A green roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems.
City hall Chicago

Planned for Singapore – Floating Responsive Agriculture

When oranges are *out of season* in summer in Australia, most come from the USA. How are the oranges transported?

Source: Hema World Maps: map-centre.com.au
# Seasonal foods in SEQ

<table>
<thead>
<tr>
<th>Season</th>
<th>Fruits</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>autumn</strong></td>
<td>strawberry, grapes, lemon, limes, mango, honeydew, rockmelon, nectarine, orange, passionfruit, peach, pears, plums, mandarin, kiwifruit, tomato</td>
<td>asian greens, avocados, beans, capsicum, celery, cucumber, eggplant, lettuce, onions, peas, pumpkin, silverbeet, corn, sweet potato, zucchini, broccoli, brussel sprout, cabbage, ginger, garlic, mushrooms, beetroot, carrot</td>
</tr>
<tr>
<td><strong>winter</strong></td>
<td>custard apple, grapefruit, kiwifruit, lemons, limes, mandarin, pears, orange, papaya</td>
<td>asian greens, avocados, beetroot, broccoli, brussel sprout, cabbage, carrots, cauliflower, celery, garlic, ginger, artichokes, onions, peas, pumpkin, silverbeet, sweet potato.</td>
</tr>
<tr>
<td><strong>spring</strong></td>
<td>grapefruit, lemon, mandarins, oranges, pineapple, strawberry, mango, rockmelon</td>
<td>artichoke, asian greens, asparagus, avocados, beans, broccoli, cabbage, carrot, cauliflower, garlic, ginger, lettuce, mushrooms, onion, peas, pumpkin, silverbeet, cucumber.</td>
</tr>
<tr>
<td><strong>summer</strong></td>
<td>apricot, raspberry, strawberry, cherry, currants, lemon, lychee, mango, honeydew, rockmelon, watermelon, orange, passionfruit, pineapple, nectarine, nectarine, grapes, pears, plums, tomato</td>
<td>asparagus, avocado, beans, capsicum, celery, choko, cucumber, eggplant, lettuce, onion, peas, corn, zucchini, chilli.</td>
</tr>
</tbody>
</table>

**all year round!**: bananas, apples and potatoes
Tips for buying in season foods with lower food miles:
→ Shop at your local markets
→ Check when your favourite fruits and vegetables are in season
→ Buy Australian products
We use the money from producing our crops for both our children to be in primary school and to build a new home and put in electricity.

By importing food we generate large amounts of CO2 causing global warming. The countries that will be most effected are those we import from. Many African countries will have drought and not be able to farm any more.

Producing this food has transformed communities. Now young people want to stay in farming because there is money and a future in it. They can have smart phones and good clothes by living here not in a city.
What do Europeans want – to see us all stay in poverty, to come to Europe looking for jobs? By exporting these crops we can earn more and invest in better lives and future developments.

By travelling by car to supermarkets we are contributing to global warming so in the future many areas may become flooded while others become desertified.
Our farming contributes little to global warming. We use people to weed fields not tractors. I wonder whether stopping the export of our produce to Europe would stop the planes flying and whether that would really reduce the carbon emissions?

Food transported across the world burns up a lot of fossil fuel and contributes to global warming.
Only 1% of Australia's population lives in the YELLOW zone. Interesting to think of how much these people contribute to Australia and how much more could be contributed if the percentage of the population was raised to 2%.
"It's the fastest way to sequester carbon, collect solar energy, and rebuild soil. Grazing is truly amazing."

Joel Salatin
IN 50 YEARS, ONE TREE:
RECYCLES MORE THAN $37,000 WORTH OF WATER
PROVIDES $31,000 WORTH OF EROSION CONTROL
PROVIDES $62,000 WORTH OF AIR POLLUTION CONTROL
PRODUCES $37,000 WORTH OF OXYGEN
0.45kg of honey requires 1,152 bees to travel over 180,000kms.
SYNGENTA & BAYER SUED THE EUROPEAN COMMISSION TO OVERTURN A RECENT BAN ON THE NEONICOTINOID PESTICIDES THAT ARE KILLING MILLIONS OF BEES.

SHOULD WE SAVE THEIR POISON PROFITS?
OR SHOULD WE SAVE THE BEES?

SAVE THE BEES.

WWW.FACEBOOK.COM/OCUPYMONSANTO
IT TAKES 17 MILLION BARRELS OF OIL EACH YEAR TO MAKE WATER BOTTLES FOR THE U.S. MARKET.

That is the equivalent of fueling over 1 million cars per year!
RADICAL
CIVILLY-DISOBEDIENT
SOLAR-POWERED
LAUNDRY DRYING
APPARATUS
If it can't be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned or removed from production.

-Pete Seeger
For more link to my Facebook page and then ‘like’
Teaching Geography in the National Geography syllabus

David Lergessner
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Faculty of Education
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