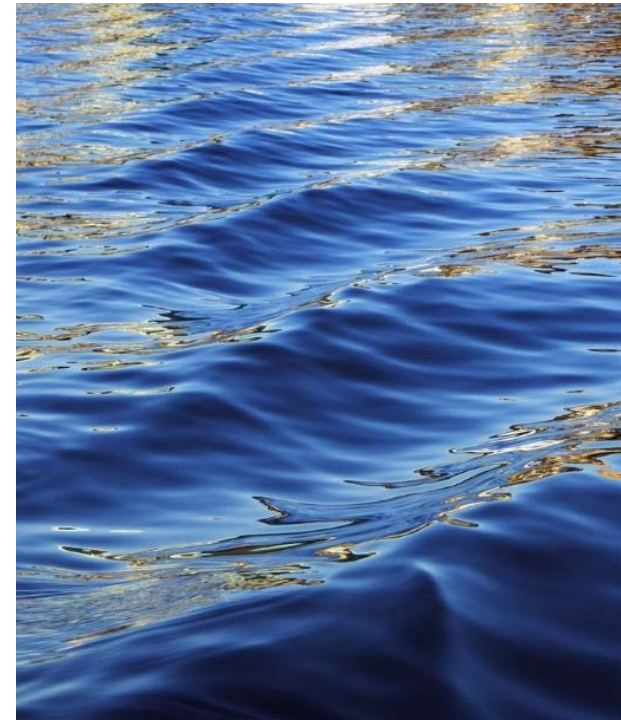


Sustainable Biomes

Master class - GTANSW

Drew Collins

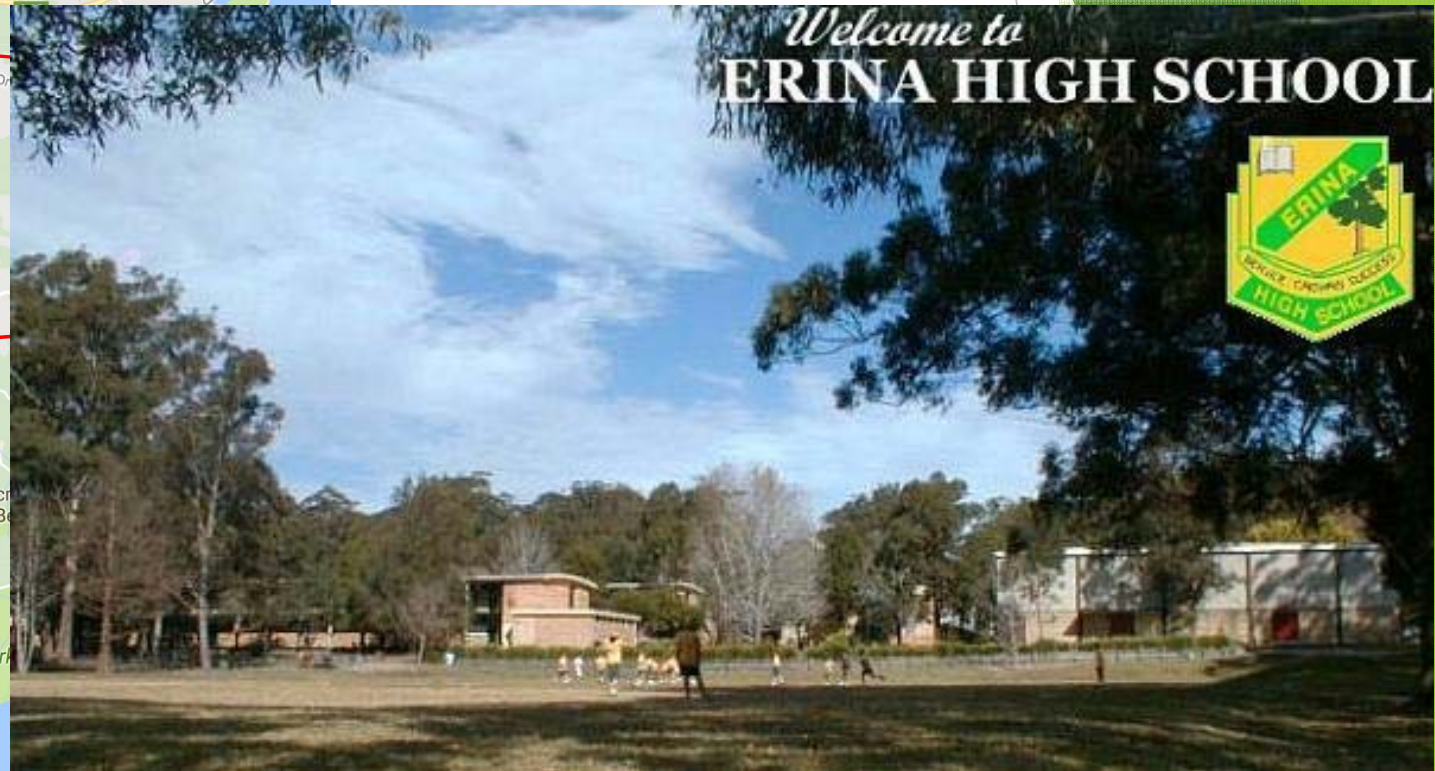
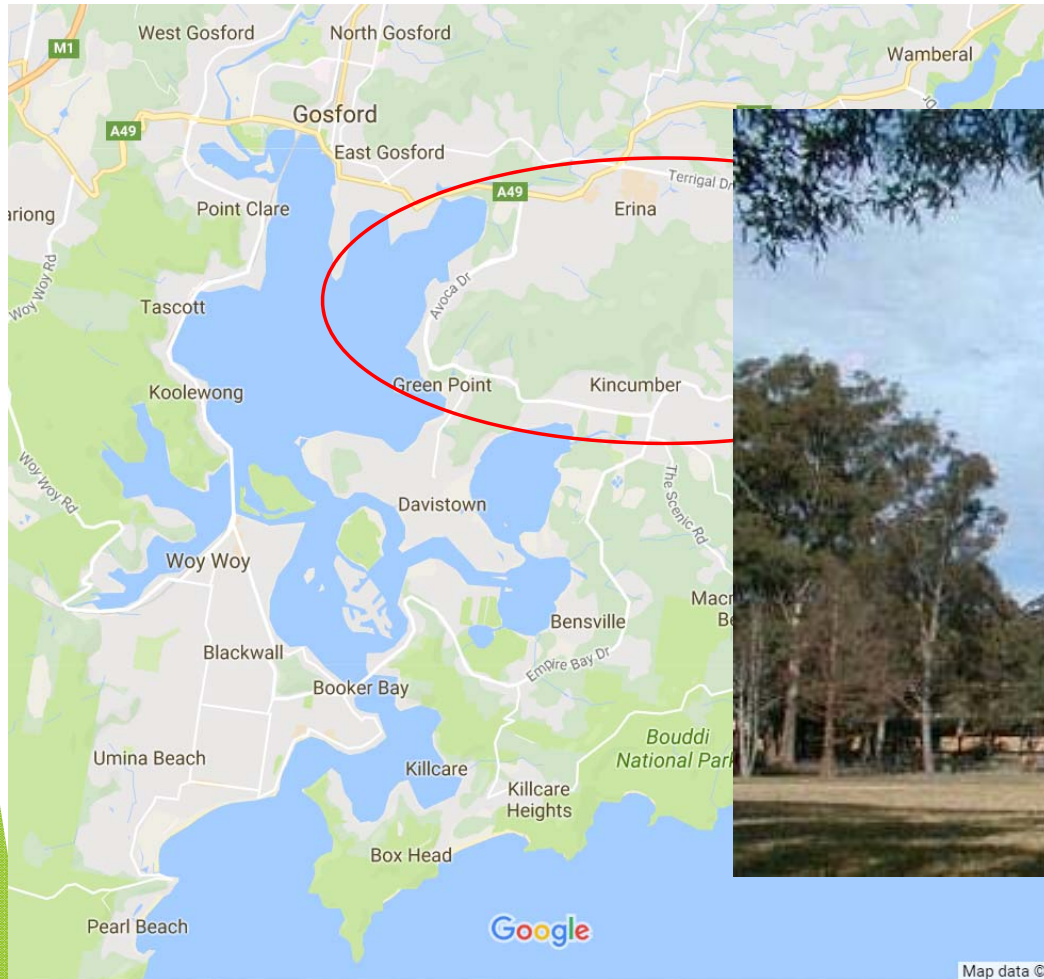
Head of Geography at The King's School
HSC Examination Writer and Marker
Co-Author of Insight Geography Series



Where I've come from...



Grew up and schooled here



Uni here



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Bit of work here



TEA GARDENS · KINCUMBER

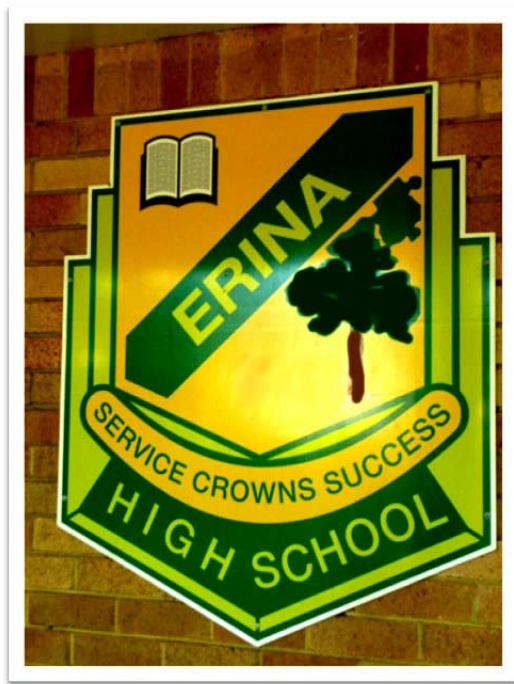


Back here



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Started my career here



Then really 'cut my teeth' here



THE
COMPTON SCHOOL
National Teaching School
"Outstanding" Ofsted



After that travelled here



Source: Pinterest > [tradeandexportme.com](https://www.pinterest.com/tradeandexportme/)



Then back here



Really felt strong about my career here



Pittwater House



Things got really serious here!



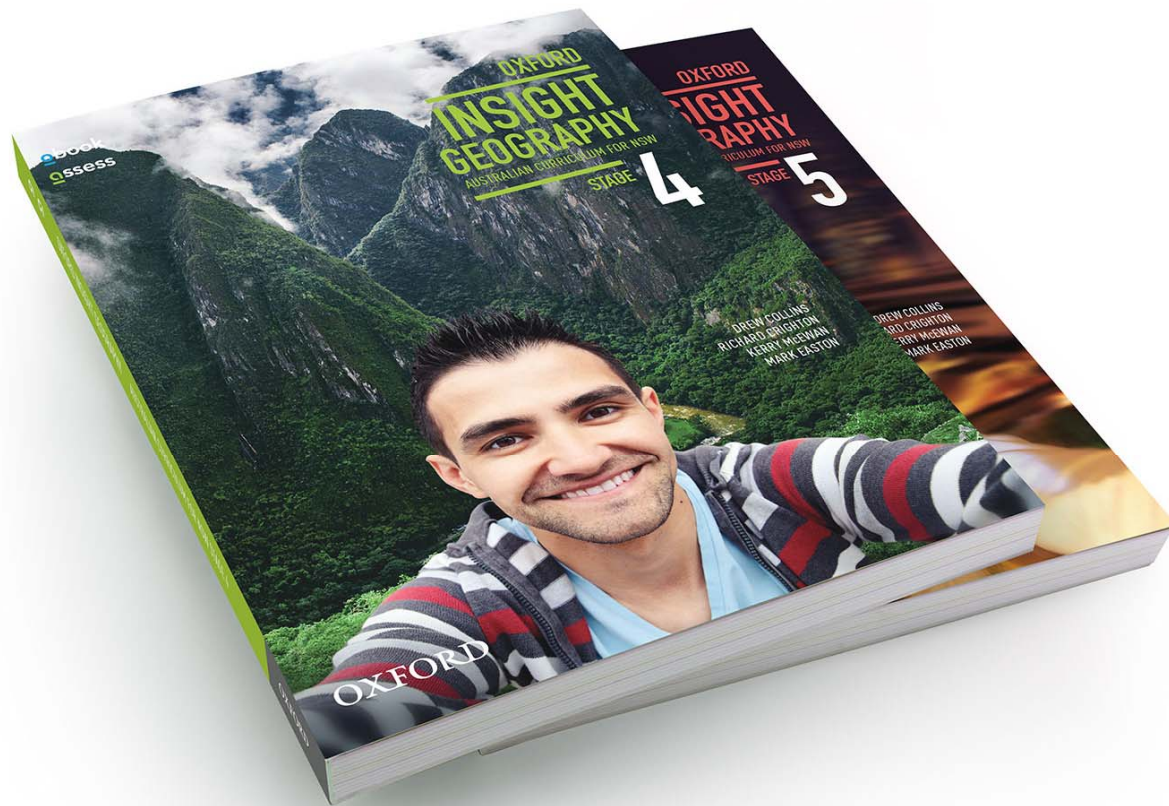
Found my way here



Then these came along



Opportunity to help out on those



Along the way I've seen this much



Asia:8	25.81%
Africa:12	21.43%
Europe:30	62.5%
Middle East:1	4.76%
North America:2	50%
Pacific:4	20%
South America:2	15.38%
Total Visited:59	27.31%

Source: TravelTip.org

This IS what shapes us and what shapes
our teaching.

Now the greatest external force shaping
our classrooms is the NEW AC.

How are we going?



NSW Educational Standards Authority

(BOSTES)



- ▶ Syllabus Outcomes
- ▶ Key Inquiry questions

- ▶ Reflect on the old biomes unit (Stage 4)
- ▶ Improve on with a wealth of resources

- ▶ Embed change through **investigative nature**

Syllabus Outcomes

OUTCOMES

A student:

- › explains the diverse features and characteristics of a range of places and environments
GE5-1
- › explains processes and influences that form and transform places and environments GE5-2
- › analyses the effect of interactions and connections between people, places and environments GE5-3
- › assesses management strategies for places and environments for their sustainability GE5-5
- › acquires and processes geographical information by selecting and using appropriate and relevant geographical tools for inquiry GE5-7
- › communicates geographical information to a range of audiences using a variety of strategies GE5-8

Related Life Skills outcomes: *GELS-1, GELS-2, GELS-3, GELS-5, GELS-7, GELS-8*

But what are we teaching...?


KEY INQUIRY QUESTIONS

- What are the main characteristics that differentiate the world's biomes?
- How do people use and alter biomes for food production?
- Can the world's biomes sustainably feed the world's population?
- What strategies can be used to increase global food security?

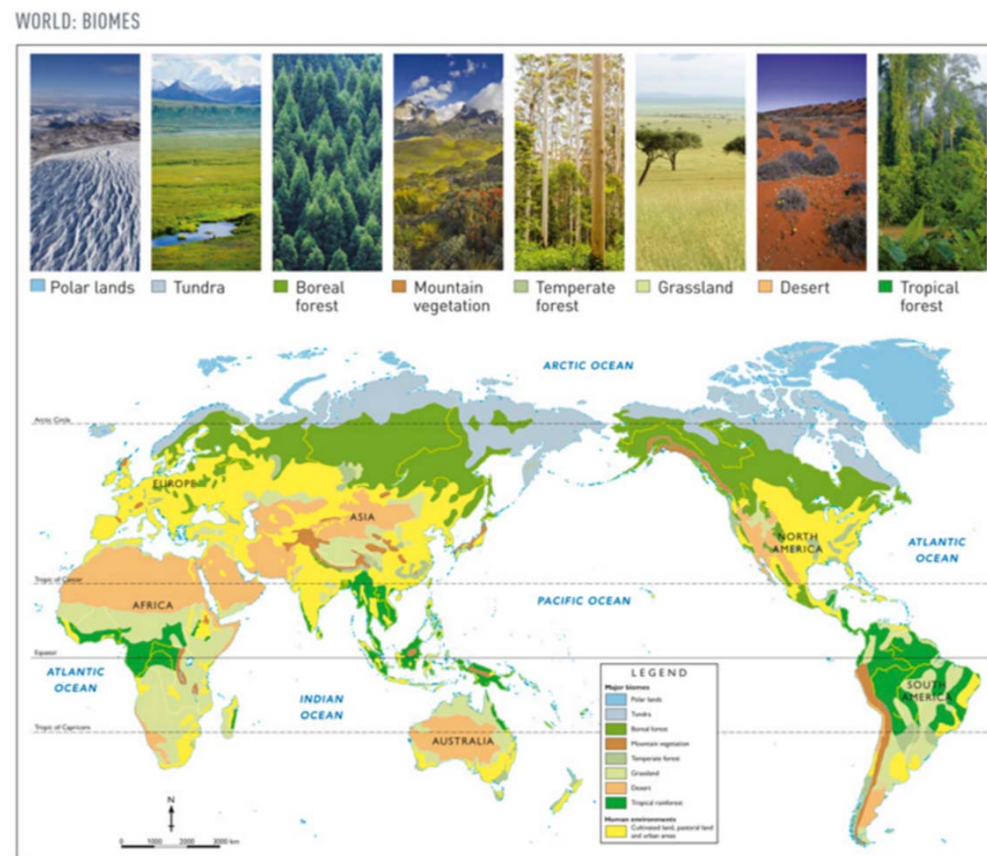
CONTENT

Biomes

Students:

- investigate the distribution and physical characteristics of biomes, for example: (ACHGK060)
 - examination of the spatial distribution of biomes **MST**
 - identification of biomes used to produce food, industrial materials and fibres **VR** 

What are the main characteristics that differentiate the world's biomes?



Source: Oxford Insight Geography

worldbiomes.com



[home](#)

[aquatic](#)

[desert](#)

[forest](#)

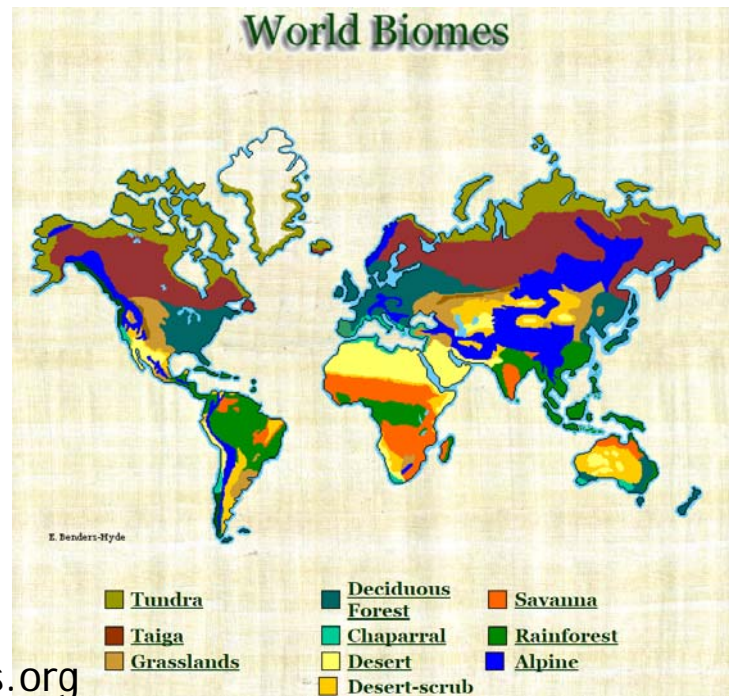
[grasslands](#)

[tundra](#)

[eco-news](#)

[links](#)

[faq](#)



[blueplanetbiomes.org](#)

Encounter Geosystems

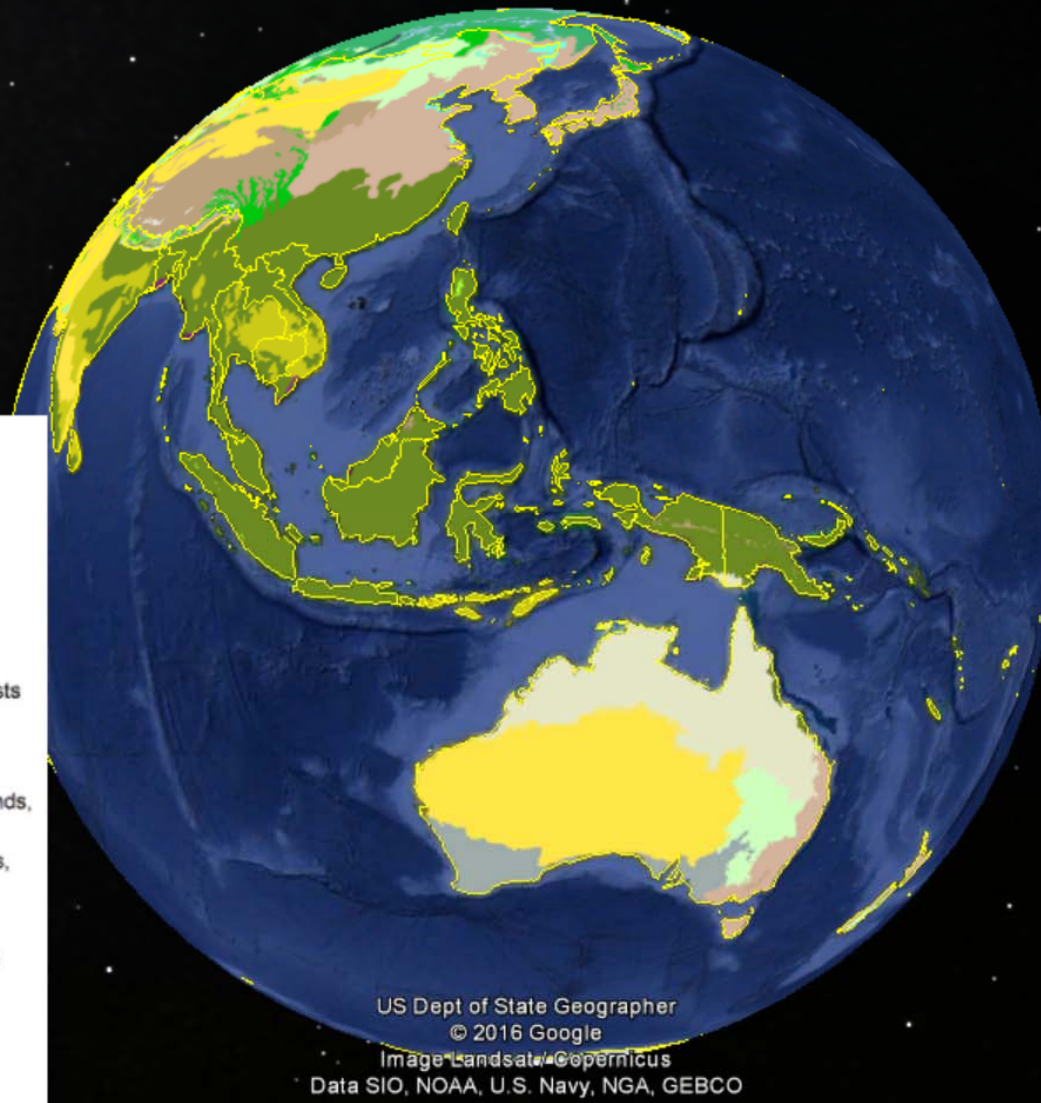
Interactive exploration of Earth
Using Google Earth™



Thomasen
Christopherson

Terrestrial Biomes

-  Tropical, Subtropical Moist Broadleaf Forests
-  Tropical, Subtropical Dry Broadleaf Forests
-  Tropical, Subtropical Coniferous Forests
-  Mangroves
-  Temperate Broadleaf/Mixed Forests
-  Temperate Coniferous Forests
-  Boreal Forests/Taiga
-  Tropical and Subtropical Grasslands, Savannas, and Shrublands
-  Temperate Grasslands, Savannas, and Shrublands
-  Flooded Grasslands, Savannas
-  Montane Grasslands, Shrublands
-  Mediterranean Forests, Woodlands, and Scrub
-  Deserts and Xeric Shrublands
-  Tundra



US Dept of State Geographer
© 2016 Google
Image Landsat/Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google earth



Freshwater Ecosystems



Copyright



Topics A-Z

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Find Resources

Play Games & Explore

Join in

Biomes



Search Results for Biomes

86 items

Show 6 results of 86

Search filters

Reset filters

Choose your year(s)

- Foundation (0)
- Year 1 (0)
- Year 2 (0)
- Year 3 (2)
- Year 4 (9)
- Year 5 (7)
- Year 6 (7)
- Year 7 (28)
- Year 8 (22)
- Year 9 (84)
- Year 10 (37)

Choose learning area(s)

- English (0)
- Mathematics (0)
- Science (10)
- History (0)
- Geography (85)
- STEM (0)
- The Arts (0)
- Technologies (11)



The future of food

Source: Education Services Australia Ltd and ABC | 7-Apr-2014

Producing enough food to sustain the Earth's population is becoming more of a challenge. As environmental constraints keep tightening, technological i... Read more>



RESOURCE

GEOGRAPHY

Secondary: Years 9



Peak phosphorus

Source: ABC Catalyst | 17 March 2011

Did you know all living things need phosphorus to survive? This is why phosphorus is mined and sold as fertilisers to help grow crops. What will happen... Read more>



VIDEO: 6 mins 8 secs

GEOGRAPHY

Secondary: Years 9



Cotton on to why the Aral Sea is disappearing

Source: ABC Foreign Correspondent | 9-May-2001

The Aral Sea began to disappear after rivers were diverted to provide water for cotton irrigation schemes in Central Asia. In this clip you will learn... Read more>



VIDEO: 1 min 23 secs








GEOGRAPHY

Secondary: Years 9, 10

CONTENT

Changing biomes

Students:

- investigate the human alteration of biomes to produce food, industrial materials and fibres and the environmental effects of these alterations, for example: (ACHGK061)
 - examination of human alterations to the physical characteristics of biomes eg vegetation removal, agriculture, land terracing, irrigation, mining **VR**  
 - assessment of environmental impacts of human alterations to biomes eg habitat and biodiversity loss, water pollution, salinity **GS ST**  
 - discussion of successful sustainability strategies that minimise environmental impacts   

How do people use and alter biomes?

Bingham Canyon Copper Mine,
Salt Lake City, Utah



Oxford Insight Geography



Libya

Source: Greenprophet

Image © 2016 CNES / Astrium

4.52 km

Image © 2016 DigitalGlobe

Google earth

Desertification

Desertification means land **degradation** in arid, semi-arid and dry sub-humid areas resulting from **various factors** including **climatic variation and human activity**. It affects the **livelihoods** of rural people in drylands, particularly the poor, who depend on livestock, crops, limited water resources and fuel wood.

UN Convention to Combat Desertification



Earth From Space -
Imperial Valley
(Southern California)



Japan's four-tonne
ALOS Earth
observation satellite



ESA - European space agency (Earth From Space)



CONTENT

Biomes produce food

Students:

- investigate environmental, economic and technological factors that influence agricultural yields in Australia and across the world, for example: (ACHGK062)
 - examination of how environmental factors influence agricultural yields eg temperature, water availability, soil, topography **F**

discussion of economic factors affecting agricultural yields eg global trade, commercialisation of agriculture **GS** 📊 ⭐

explanation of how technology is used to increase agricultural yields eg innovations and advancements in farming practices **VR** 🎓

Can the world's biomes sustainably manage the world's population?



every year around the globe

1.3 BILLION TONNES OF



is
lost or wasted

that is

1/3 OF ALL FOOD
PRODUCED FOR
HUMAN CONSUMPTION



Food and Agriculture Organization
of the United Nations

Food loss and waste comes in different shapes



In developing countries
40% of losses occur during
harvest and **processing level**



In industrialized countries
40% of losses happen at the
retail or **consumer level**

Source: www.fao.org

The lost opportunity to feed the world

USD 1 trillion in **economic costs**, around USD 700 billion in **environmental costs** and around USD 900 billion in **social costs**

\$680 billion in industrialized countries

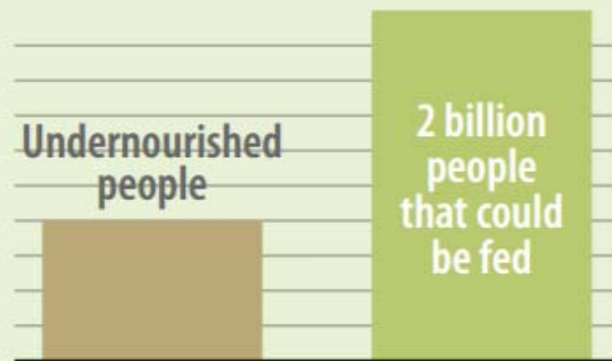


\$310 billion in developing countries

Source: www.fao.org

Cutting food loss and waste

reduces **poverty** and **hunger** and fights **climate change**



Safe and nutritious food that is lost, discarded and wasted can feed some **2 billion people**, or more than double the number of undernourished in the world



If we save **one fourth** of the food currently lost or wasted, we can feed **870 million hungry people**

Source: www.fao.org



18% of **cropland**



21% of **landfill volume**



19% of all **fertilizer**










21% of all **fresh water**

Food loss and wastes consumes

CONTENT

Challenges to food production

Students:

- investigate environmental challenges to food production for Australia and other areas of the world, for example: (ACHGK063)
 - description of the impact of water scarcity and pollution on food production **VR**  
 - discussion of the impact of land degradation and competing land uses on food production eg urban expansion, biofuel production **FST**  
 - assessment of the extent to which climate change can affect the capacity of countries to increase food production **GS**   

What are the environmental challenges to food security?

www.waterfootprint.org

► Water



Mekong River Basin

Move your mouse to the centre of the carousel to rotate it.



Coffee

Coffee

Global average water footprint: 130 litres for 1 cup of coffee.

About 18900 litres of water are needed to produce 1 kg of roasted coffee. For a standard cup of coffee (125 ml) we require 7 gram of roasted coffee, so that a cup of coffee costs 130 litres of water.

The global sum of international virtual water flows related to trade in coffee in the period 1996-2005 was 85 billion m³/yr, which was 3.7% of the total international virtual water flows related to trade in agricultural and industrial products in the world (Mekonnen and Hoekstra, 2010, 2011).

Global average water footprint

132 litre per cup of 125 ml

96% green, 1% blue, 3% grey

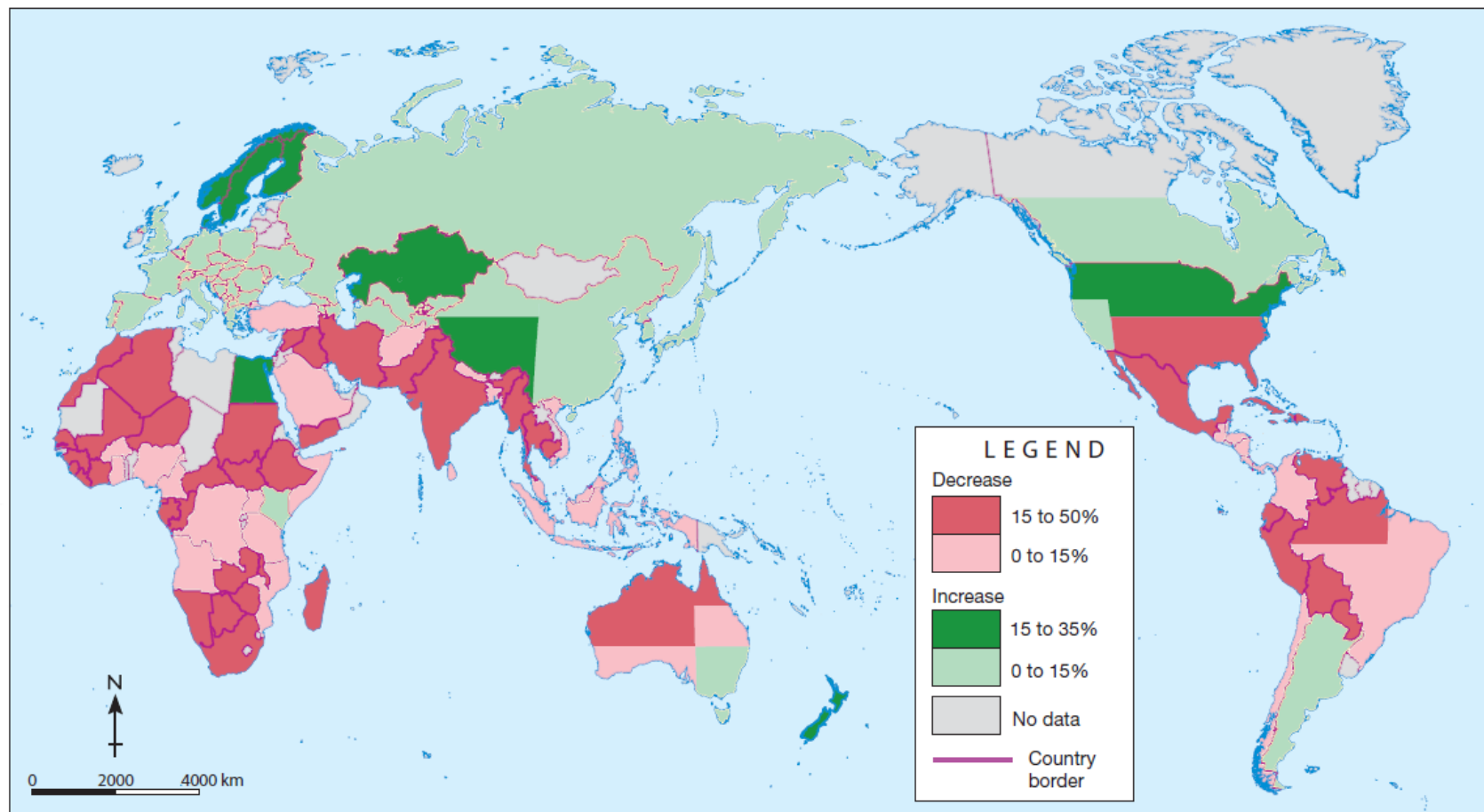


What are the environmental challenges to food security?

- ▶ Water
- ▶ Climate Change



WORLD: PREDICTED CHANGES IN FOOD PRODUCTION BY 2080



Source: Oxford Insight Geography

What are the environmental challenges to food security?

- ▶ Water
- ▶ Climate Change
- ▶ Introduced Species





Varroa mite



Source: Geosciences Australia



Locusts swam in the Philippines

Source: Kids Britannica

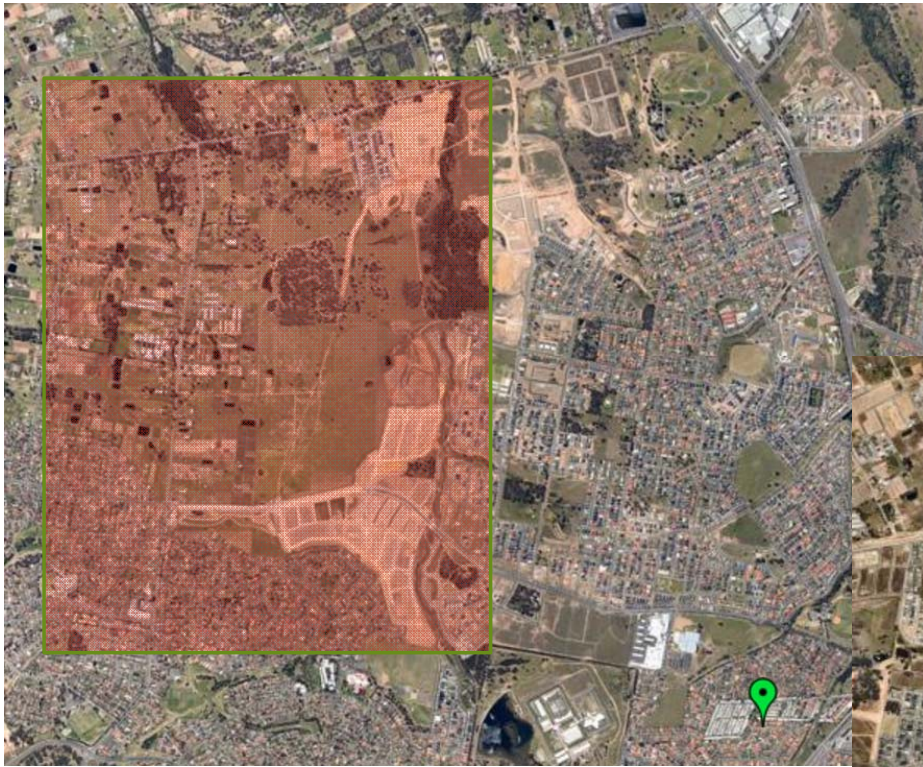
Larger Grain Borer



What are the environmental challenges to food security?

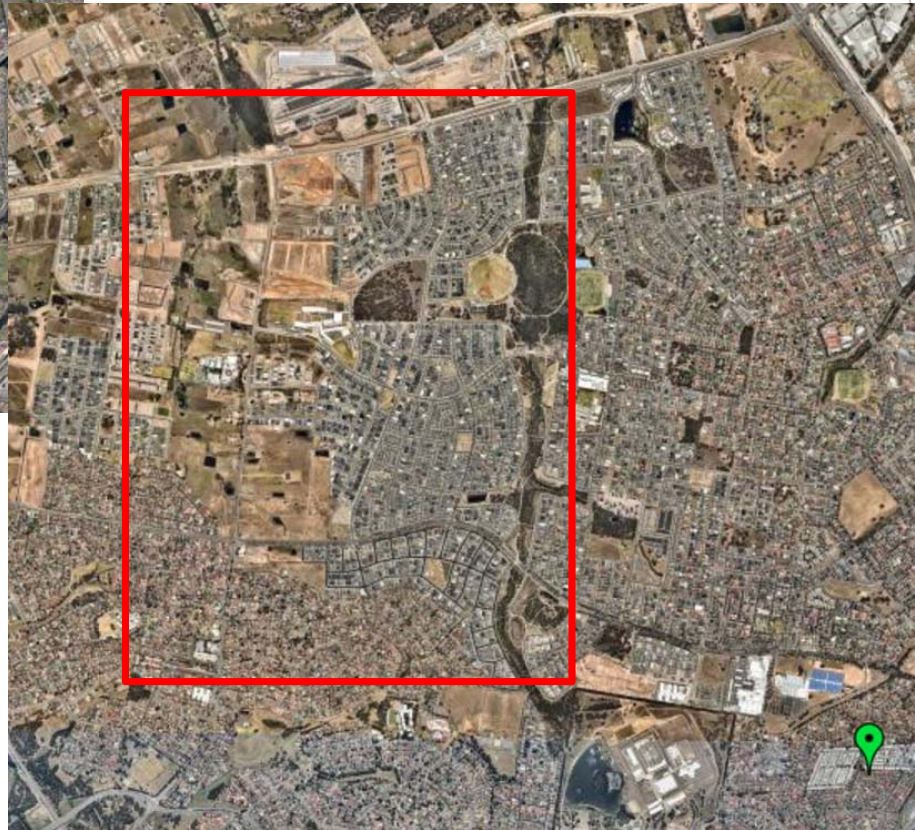
- ▶ Water
- ▶ Climate Change
- ▶ Introduced Species
- ▶ Competition for land





2009

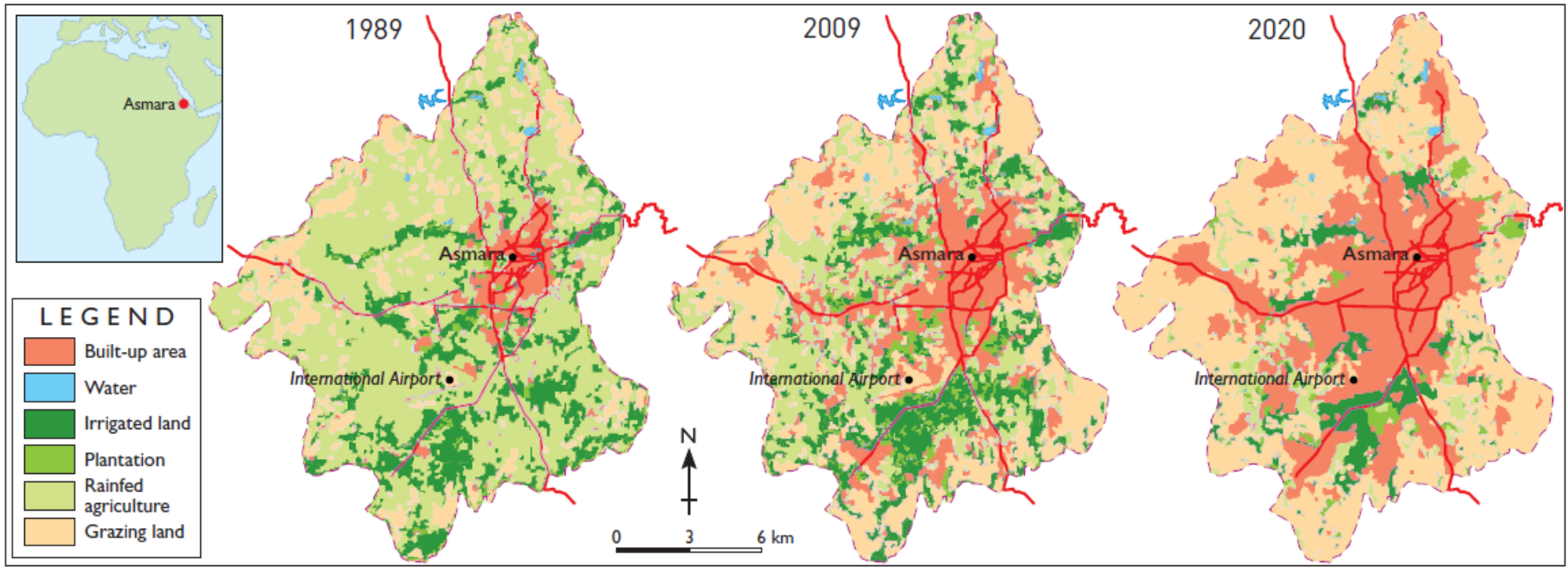
Stanhope Gardens (NW Sydney)



2016



ASMARA: URBAN GROWTH 1989-2020



What are the environmental challenges to food security?

- ▶ Water
- ▶ Climate Change
- ▶ Introduced Species
- ▶ Competition for land
- ▶ Fuel instead of food





FEED THE STARVING MILLIONS, OR FEED THE FOUR-WHEEL-DRIVE?

TAMBERG

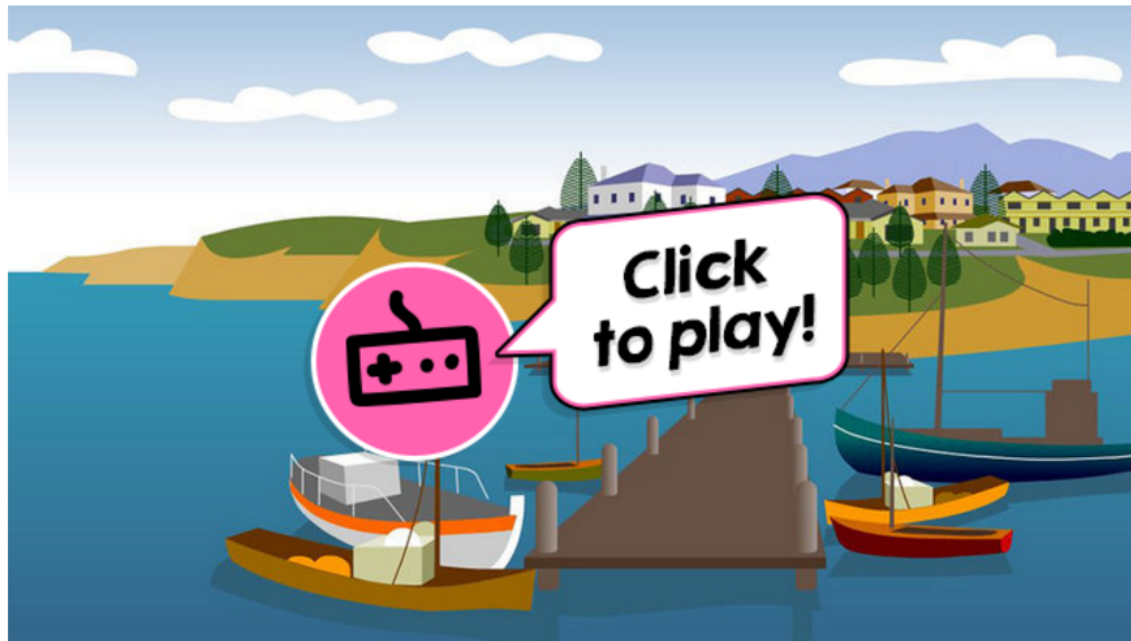
What are the environmental challenges to food security?

- ▶ Water
- ▶ Climate Change
- ▶ Introduced Species
- ▶ Competition for land
- ▶ Fuel instead of food
- ▶ Conflict



Local market and refugee food queue
Mogadishu (Somalia)





Diminishing fish stocks: three points of view

Overview

For Teachers

Education Services Australia Ltd











Subject: Geography

Year: 9

CONTENT

Food security

Students:

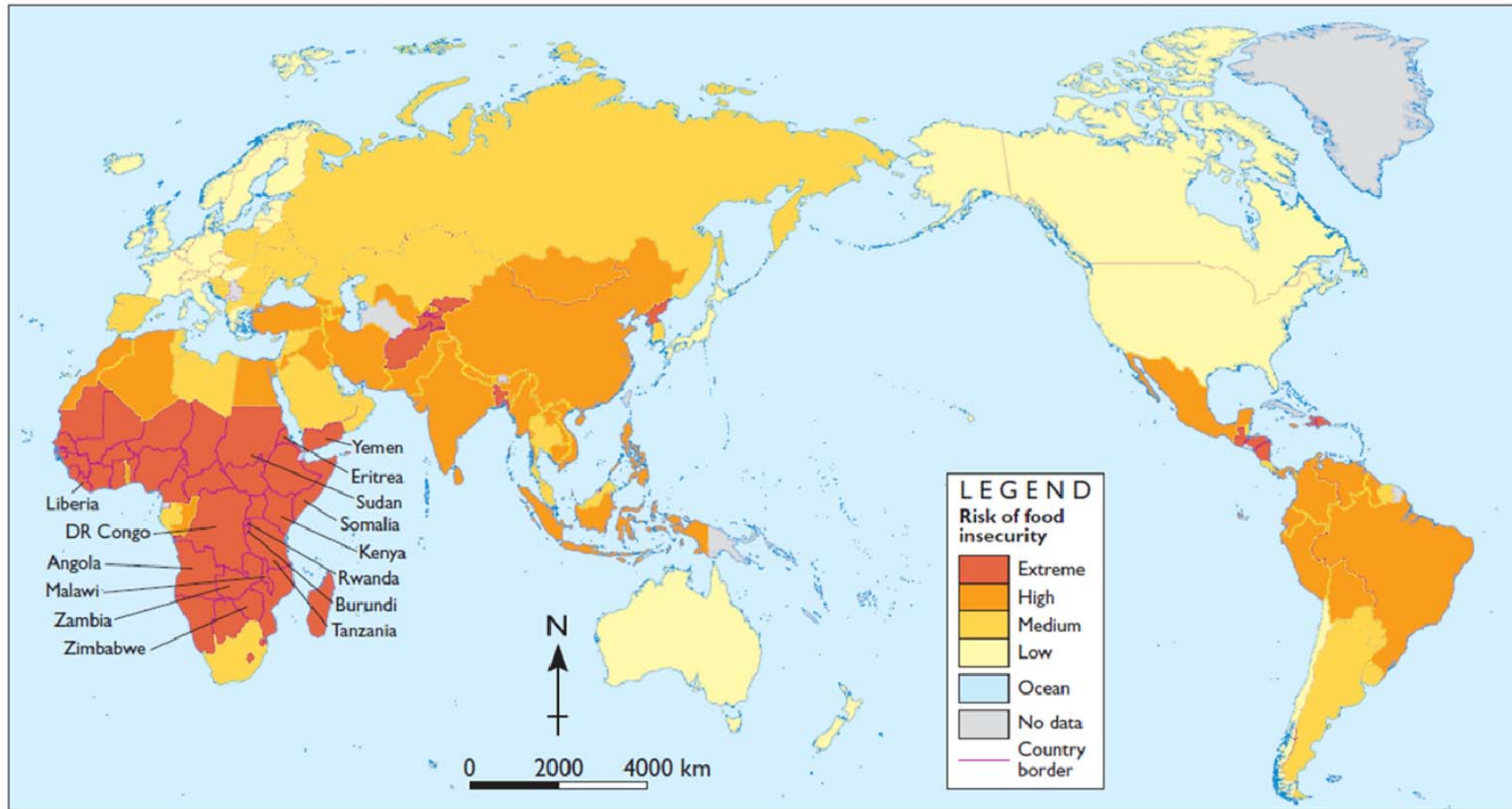
- investigate the capacity of the world's biomes to achieve sustainable food security for Australia and the world, for example: (ACHGK064) 
- assessment of the capacity of biomes to produce food into the future  
- analysis of population projections to predict future demand for food **MGS**   
- examination of sustainable practices used to achieve food security **VR** 
- discussion of the potential for Australia to contribute to global food security   

What strategies can be used to increase the world's food security?



WORLD: FOOD INSECURITY LEVELS

Source: Oxford Insight Geography



Local Foods – using food appropriately



Hákarl (rotting shark) - Iceland

Fried spider - Cambodia



Jing leed (Grasshoppers) - Thailand



Source: hostelworld

ABC 4/3/17

The Cravo House is climate-controlled retractable roof panels and walls which shield vulnerable crops from volatile and destructive weather, or open them up to sun and rain.



PHOTO: Farmers say the cost of the house is a "necessary investment". (ABC Landline)

GM Food – is this the answer?

Pest resistance
Crops can be modified so that they can resist pests such as insects.



Disease resistance
GM can help plants resist fungi, viruses and bacteria.




Nutrition
Minerals lacking in human diets can be introduced into food plants making them more nutritious.



The main benefits of GM food production

Cold tolerance
Plants affected by frost can be modified to help them survive the cold.




Drought resistance
Genes from plants that grow in arid areas can help make other plants survive droughts.



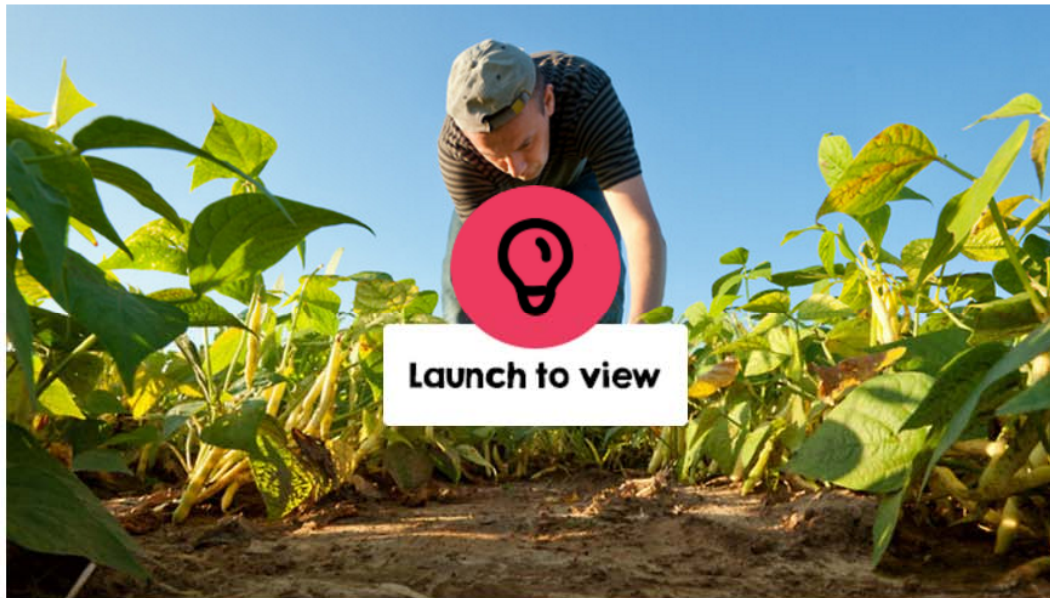
Source:
Oxford
Insight
Geography

▶ \$250K
COW



 The impressive calf just prior to sale.

STOCK & LAND



The future of food

[Overview](#)[For Teachers](#)

Education Services Australia Ltd
and ABC

What to view next

- The future of food
by Education Services Austr
- Where are cocoa bean
by ABC Local
- Chocolate and sustaina
by ABC Local
- GM genes fight fruit dise
by BBC
- Organic farming succee
by ABC Landline
- How organic fertilisers w
by ABC Landline

[+ Favourites](#)[43](#)[Share](#)

Related Keywords

[Crop yields](#) | [Agricultural production](#) | [Climate change](#) | [Food availability](#) | [Ethiopia](#) | [East Timor](#) | [Timor-Leste](#) | [Australia](#)

Subject: Geography

Year: 9



SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

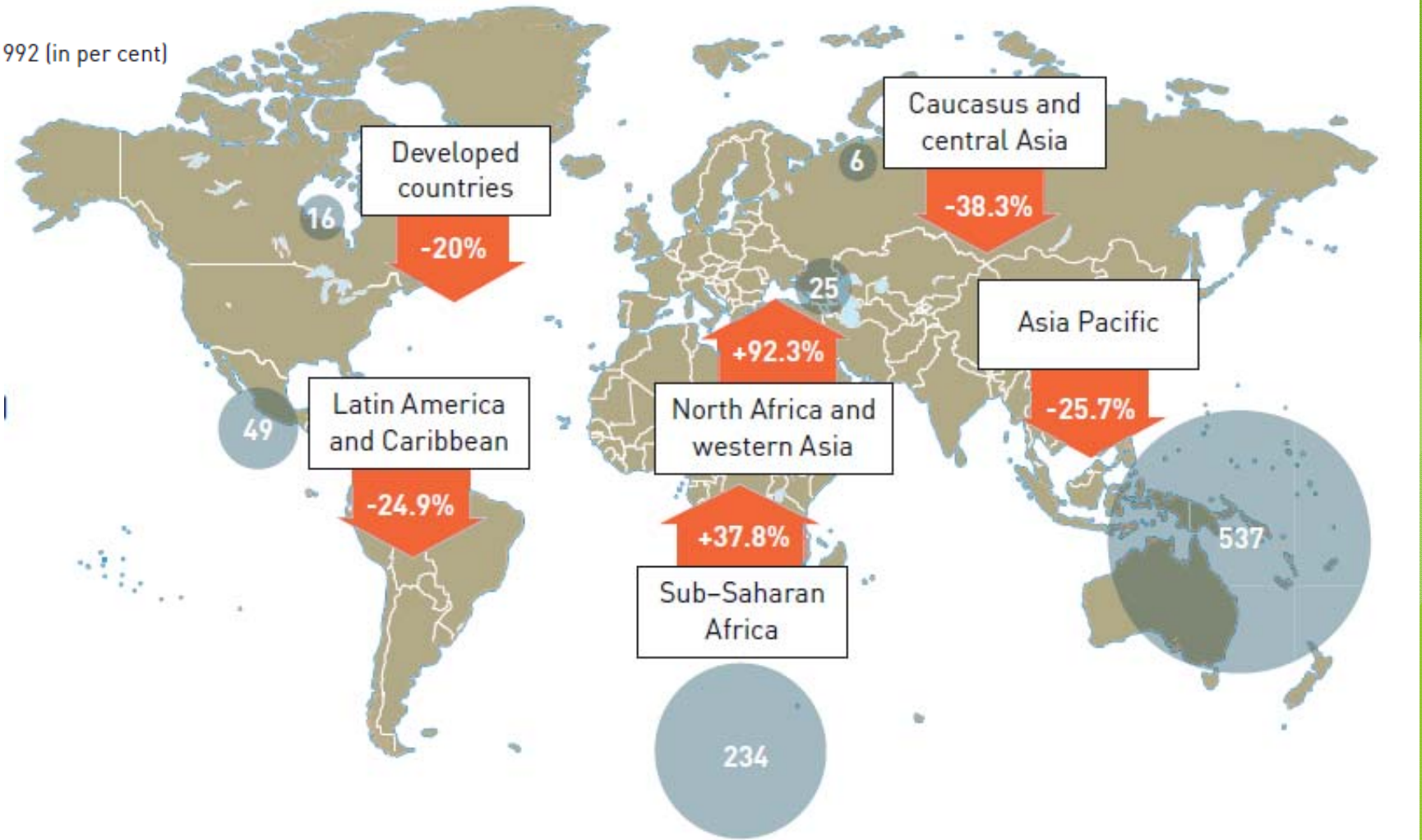
[HOME](#) [ABOUT](#) [SECRETARY-GENERAL](#) [GOALS](#) [TAKE ACTION](#) [KEY DATES](#) [MEDIA](#) [WATCH AND LISTEN](#)

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture



● Number of chronically undernourished people in 2010–2012 (in millions)

▼ Change since 1990–1992 (in per cent)



Source:
FAO (UN)

What else.....

WORLD: ORIGIN OF SOME COMMON SUPERMARKET FOODSTUFFS



1 Cornflakes, Wales



2 Apple sauce, Belgium



3 Chocolate hazelnut spread, Germany



4 Strawberry spread, Poland



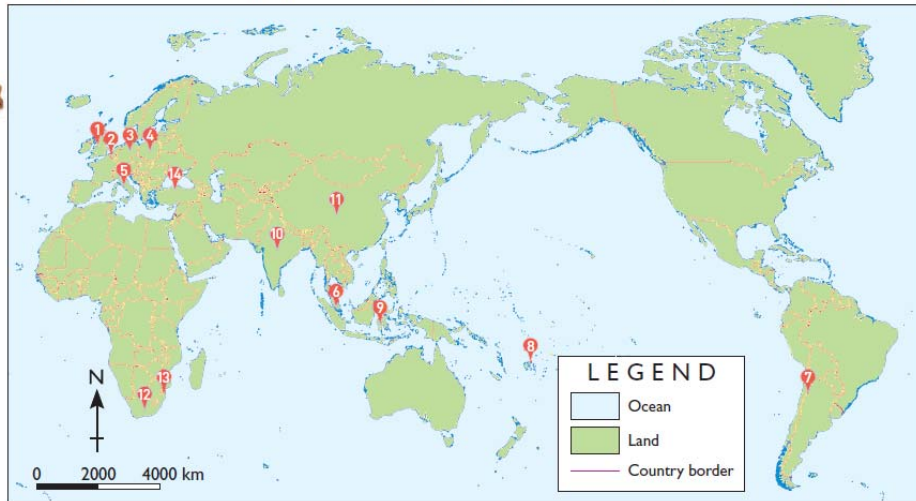
5 Baked beans, Italy



14 Dried sultanas, Turkey



13 Fruit salad, Swaziland



6 Instant noodles, Malaysia



7 Peach halves, Chile



12 Crumbed fish fillets, South Africa



11 Frozen cut beans, China



10 Pickled onions, India



9 Pineapple slices in natural juice, Indonesia



8 Choc mint slice biscuits, Fiji

PORTION SIZE COMPARED



TWENTY YEARS AGO
5 cups = 270 calories



TWENTY YEARS AGO
333 calories



TWENTY YEARS AGO
500 calories



TODAY
Tub = 630 calories



TODAY
590 calories



TODAY
850 calories

Source: therunnersfuel

Source: Oxford Insight Geography

The “Food is Free” Movement

Ballarat’s Lou Ridsdale runs the first Australian Food is Free project, part of a global movement for gardeners to give away their excess produce.



Urban Food Street: Verge Gardening

Urban Food Street acts as a blueprint for the nation to give purpose to the great Australian nature strip.



**Better
Homes**
and Gardens

What about their own garden

- ▶ School / community garden
- ▶ Multiple Intelligences (Gardner)
- ▶ Cross curricular links
 - ▶ Science
 - ▶ Agriculture
 - ▶ Technology
 - ▶ Home Economics



Edible School Gardens



www.thegreatnzedibleschoolgarden



Source: Pinterest



Let's Share

▶ PADLET

▶ https://padlet.com/dnc/gtansw_susbiomes

And remember the story of my timeline
which has shaped me...?

That 'shaping' started with L Chaffer!





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@collinsgeoTKS

LinkedIn

