Food security: fueling the world's population.

Dr Alison Gates

Outline

1. Overview of the content descriptions for year 9 unit 1
2. A big picture introduction to the food crisis
3. The biofuel dilemma
4. Food security and what it means
5. Some of the solutions

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Year 9 Unit 1: Biomes and food security

* The distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivity
* The human alteration of biomes to produce food, industrial materials and fibres, and the environmental effects of these alterations
* The environmental, economic and technological factors that influence crop yields in Australia and across the world
* The challenges to food production, including land and water degradation, shortage of fresh water, competing land uses, and climate change, for Australia and other areas of the world
* The capacity of the world's environments to sustainably feed the projected future population to achieve food security for Australia and the world

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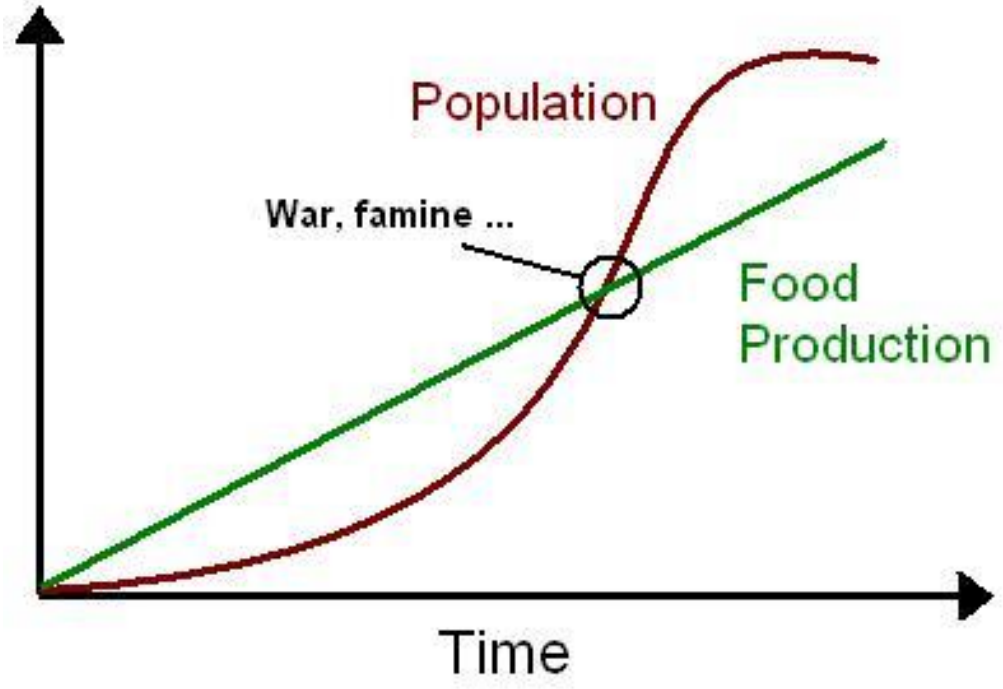
"Over the coming decades, feeding a growing global population and ensuring food and nutrition security for all will depend on increasing food production. This, in turn, means ensuring the sustainable use of our most critical finite source water"

Ban Ki-moon

UN Secretary General

The inevitable conflict

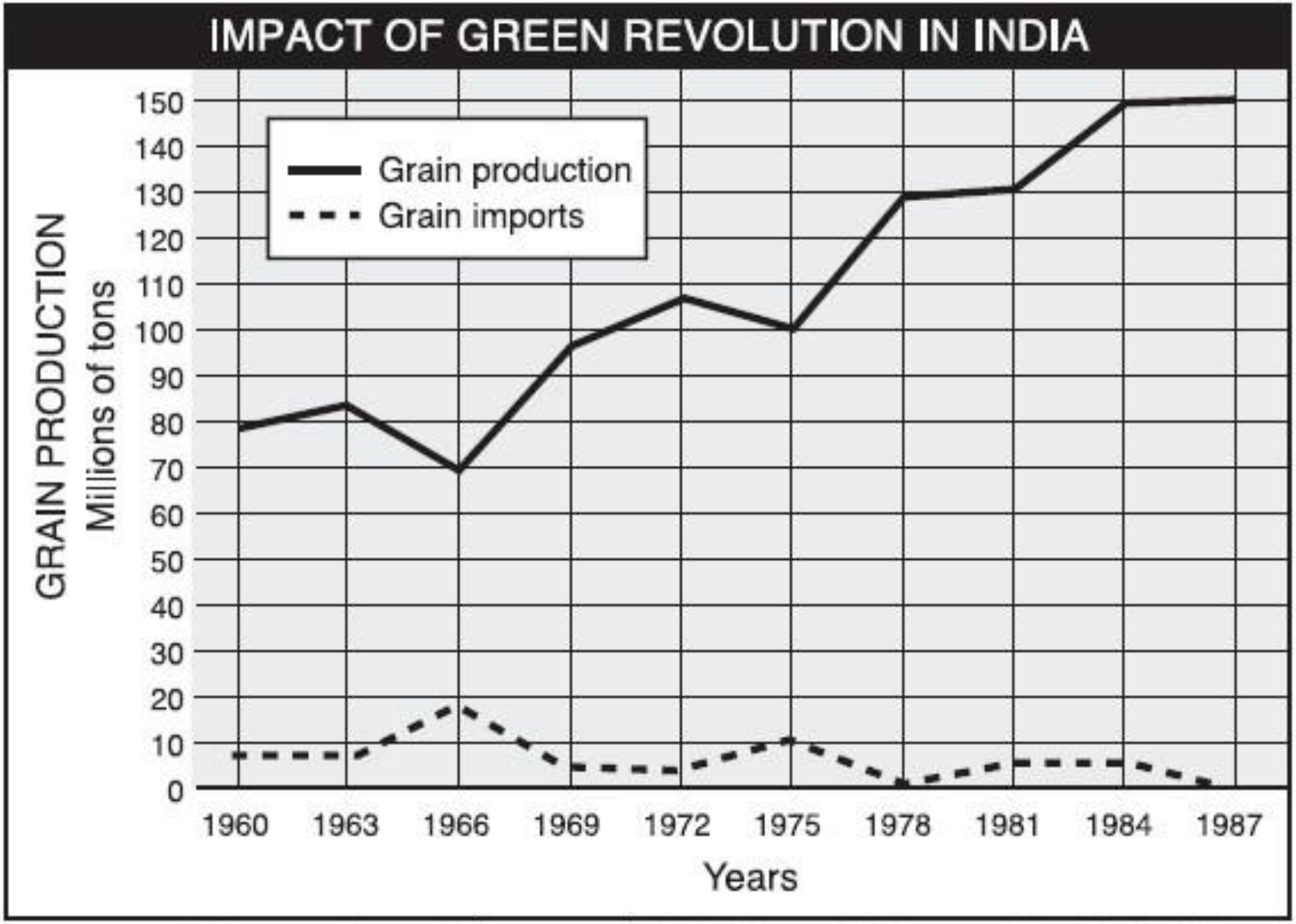
Thomas Malthus
1798



The 1st green revolution

The 3 strands of the Green Revolution

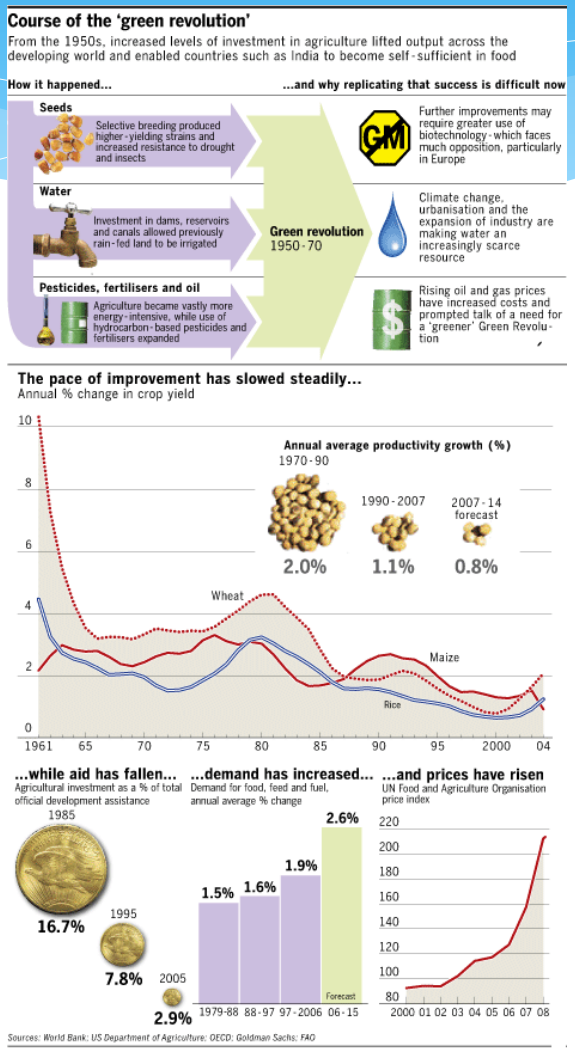
Type of change	Biochemical	Mechanical	Social
Innovations	Hybrid seed selection, use of fertilisers, herbicides and pesticides	Diesel and electric pump powered irrigation, mechanisation, transport improvements	Land reforms, loans, changes in distributive system
Consequences	Increased yields, weeds and pests controlled, increased costs for farmer, possible environmental degradation	Water supply controlled, less labour needed, increase in arable area, increase in access to markets	Farm consolidation, better seeds and other inputs available to poor farmers.

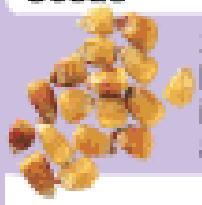


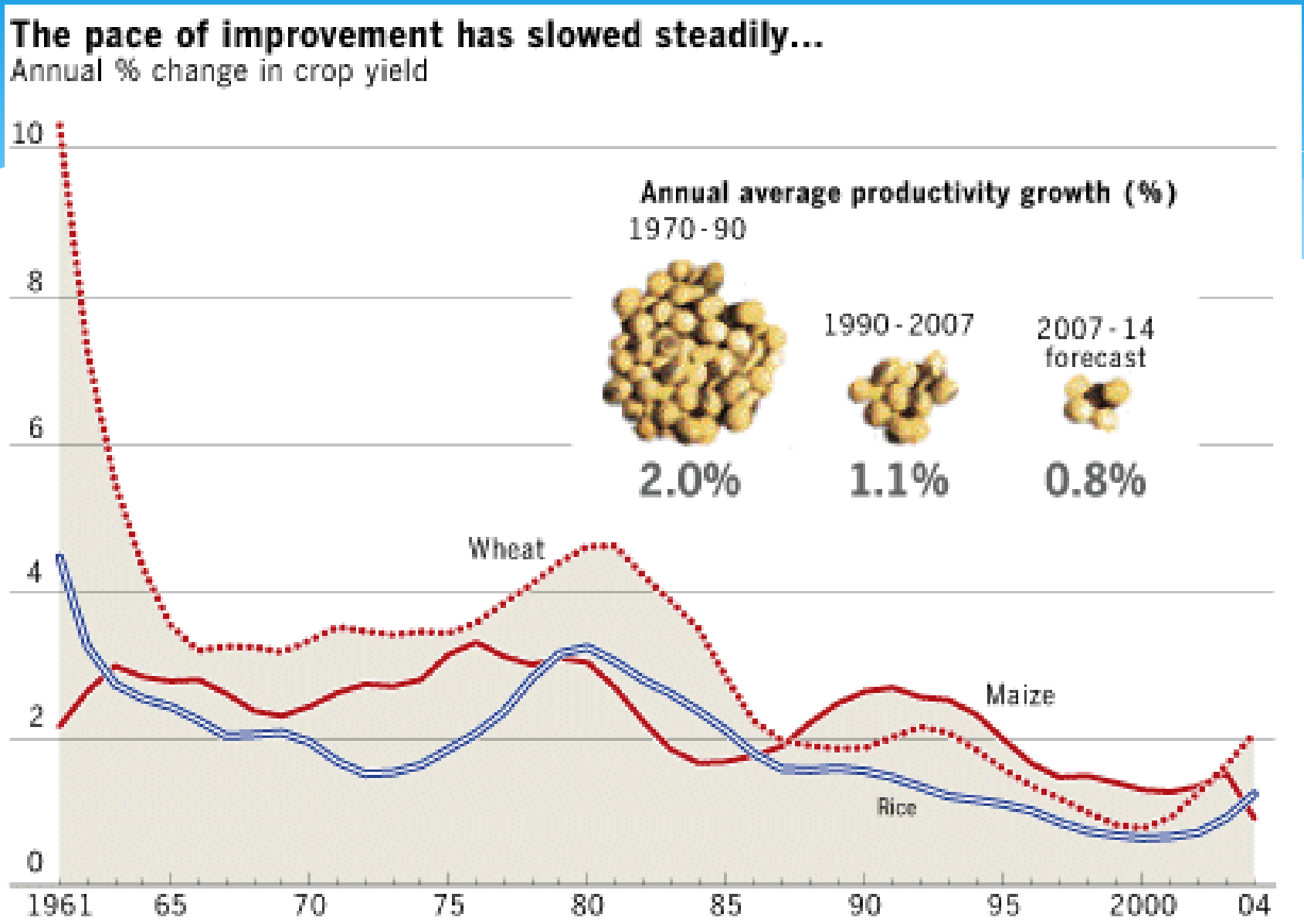
Source: James Killoran et al., *The Key to Understanding Global History*, Jarrett Publishing Co. (adapted)

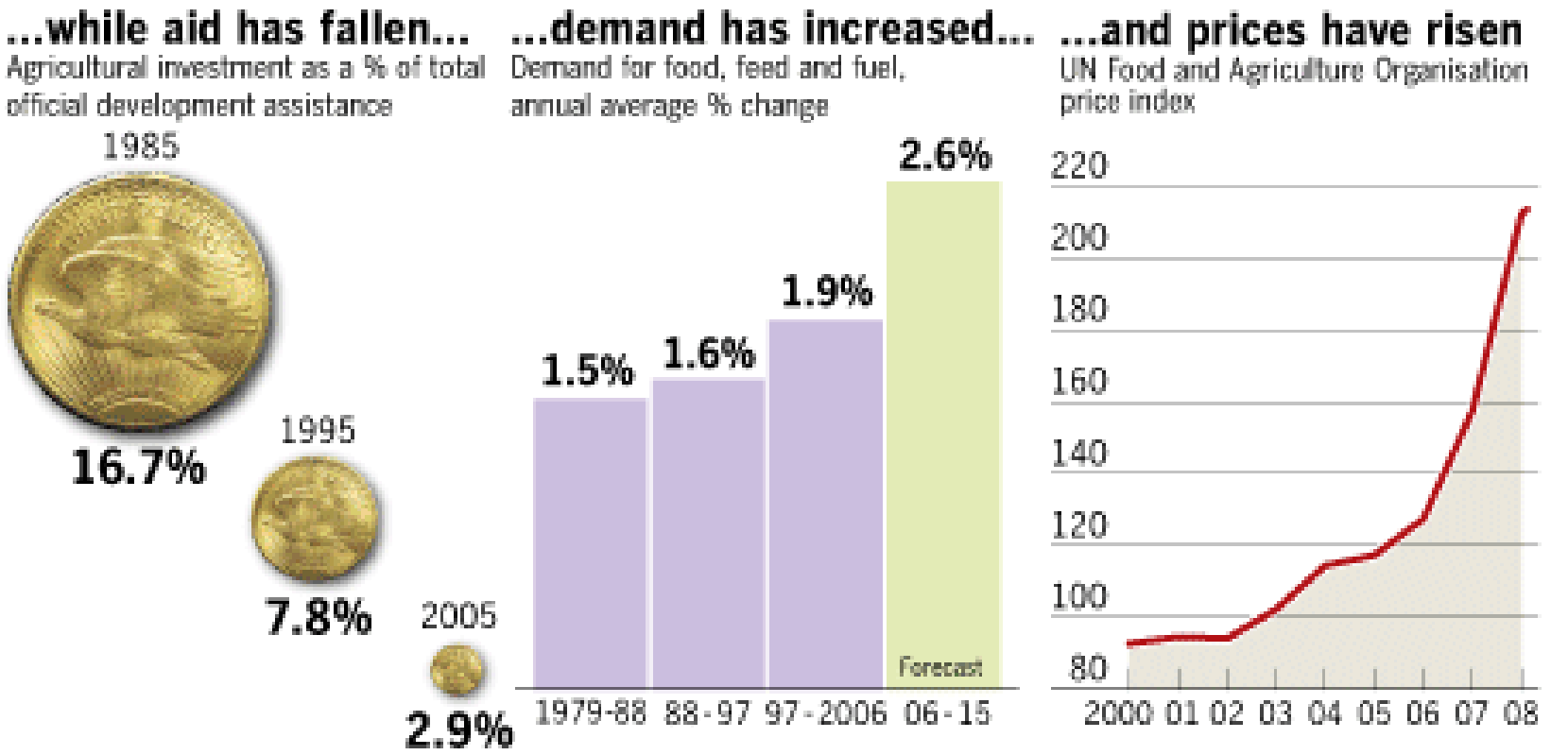
The 2nd green revolution

* Can it be done again?



How it happened...		...and why replicating that success is difficult now
Seeds  Selective breeding produced higher-yielding strains and increased resistance to drought and insects	**Green revolution** 1950-70	 Further improvements may require greater use of biotechnology - which faces much opposition, particularly in Europe
Water  Investment in dams, reservoirs and canals allowed previously rain-fed land to be irrigated		 Climate change, urbanisation and the expansion of industry are making water an increasingly scarce resource
Pesticides, fertilisers and oil  Agriculture became vastly more energy-intensive, while use of hydrocarbon-based pesticides and fertilisers expanded		 Rising oil and gas prices have increased costs and prompted talk of a need for a 'greener' Green Revolution


The pace of improvement has slowed steadily...
Annual % change in crop yield
10
8
6
4
2
0
1961
65
70
75
80
85
90
95
2000
04
Wheat
Maize
Rice
Annual average productivity growth (%)
1970-90
2.0%
1990-2007
1.1%
2007-14 forecast
0.8%


...while aid has fallen...
Agricultural investment as a % of total official development assistance
1985
16.7%
1995
7.8%
2005
2.9%
...demand has increased...
Demand for food, feed and fuel, annual average % change
1.5%
1.6%
1.9%
2.6%
Forecast
1979-88
88-97
97-2006
06-15
...and prices have risen
UN Food and Agriculture Organisation price index
220
200
180
160
140
120
100
80
2000 01 02 03 04 05 06 07 08

Demand

* More hungry mouths
* Changing global diets

China Milk Consumption

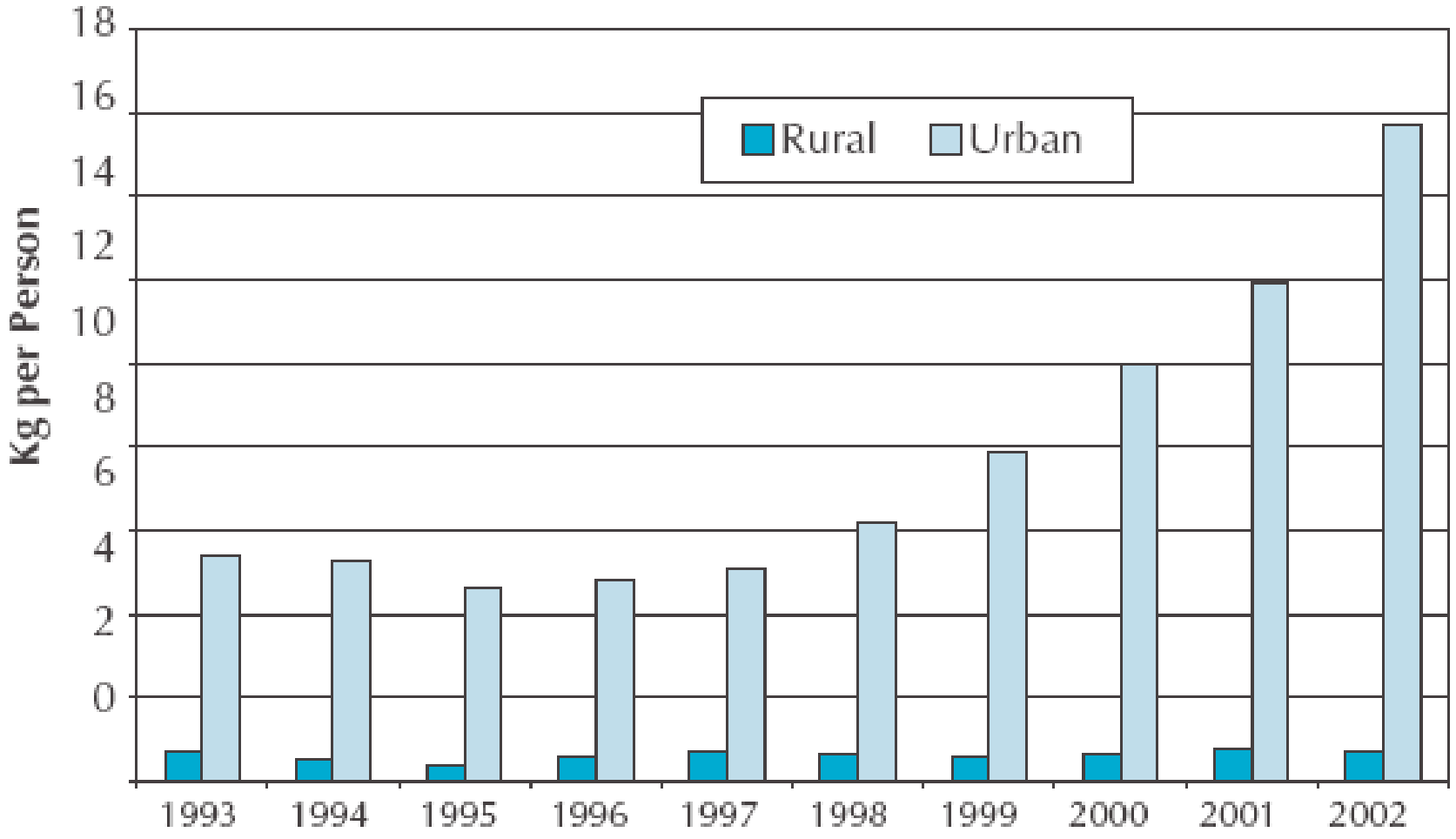
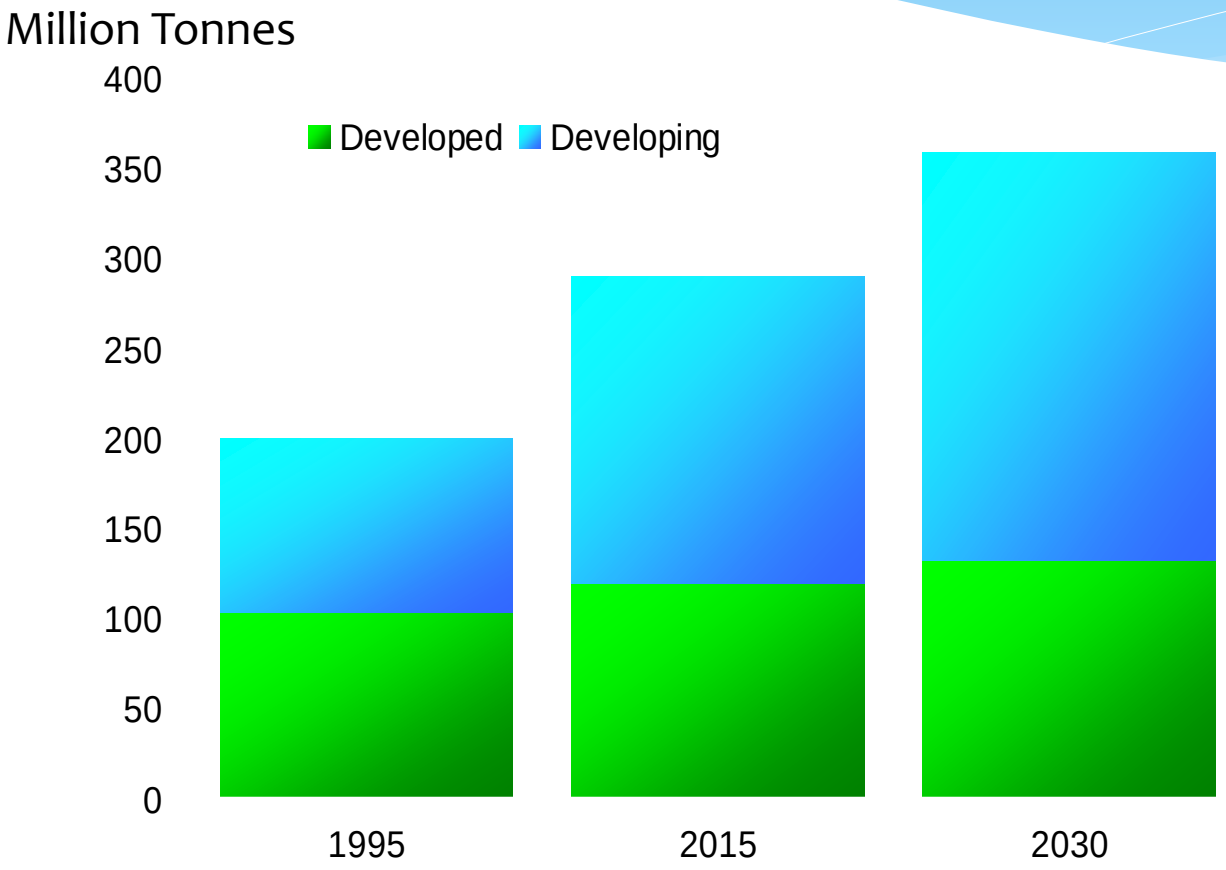


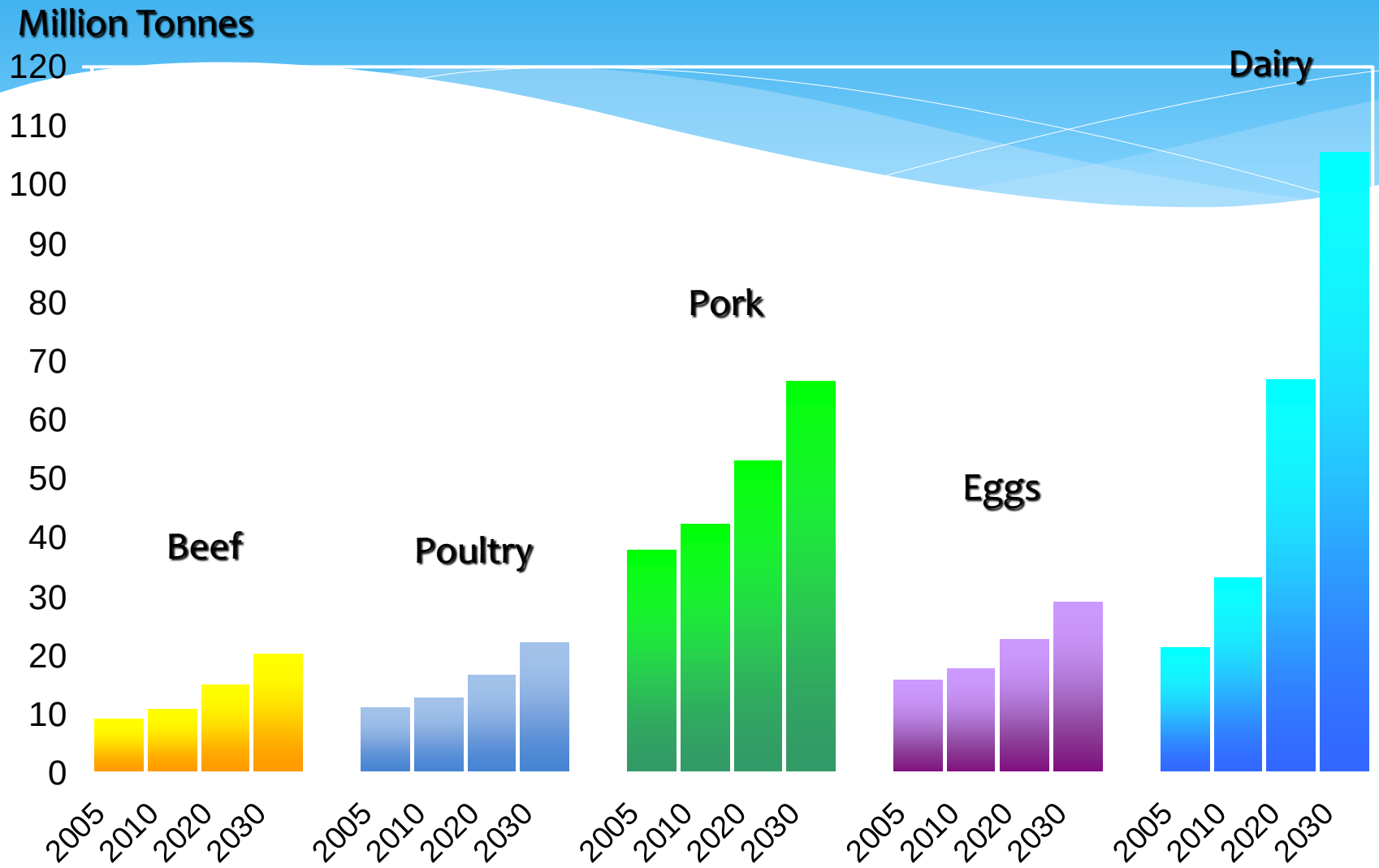
FIGURE 1. URBAN AND RURAL FRESH DAIRY PRODUCT CONSUMPTION

World Meat Consumption 1995 - 2030



Source: FAO

China's Meat Consumption 2005 - 2030

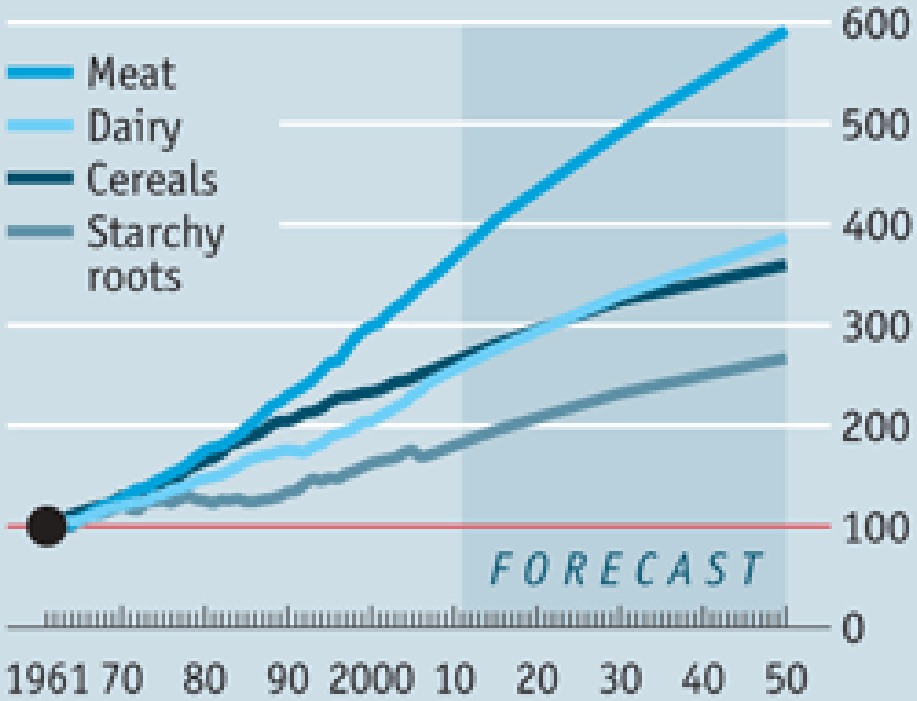


Source: Brilliant Pioneer Consultant

Meat on the menu

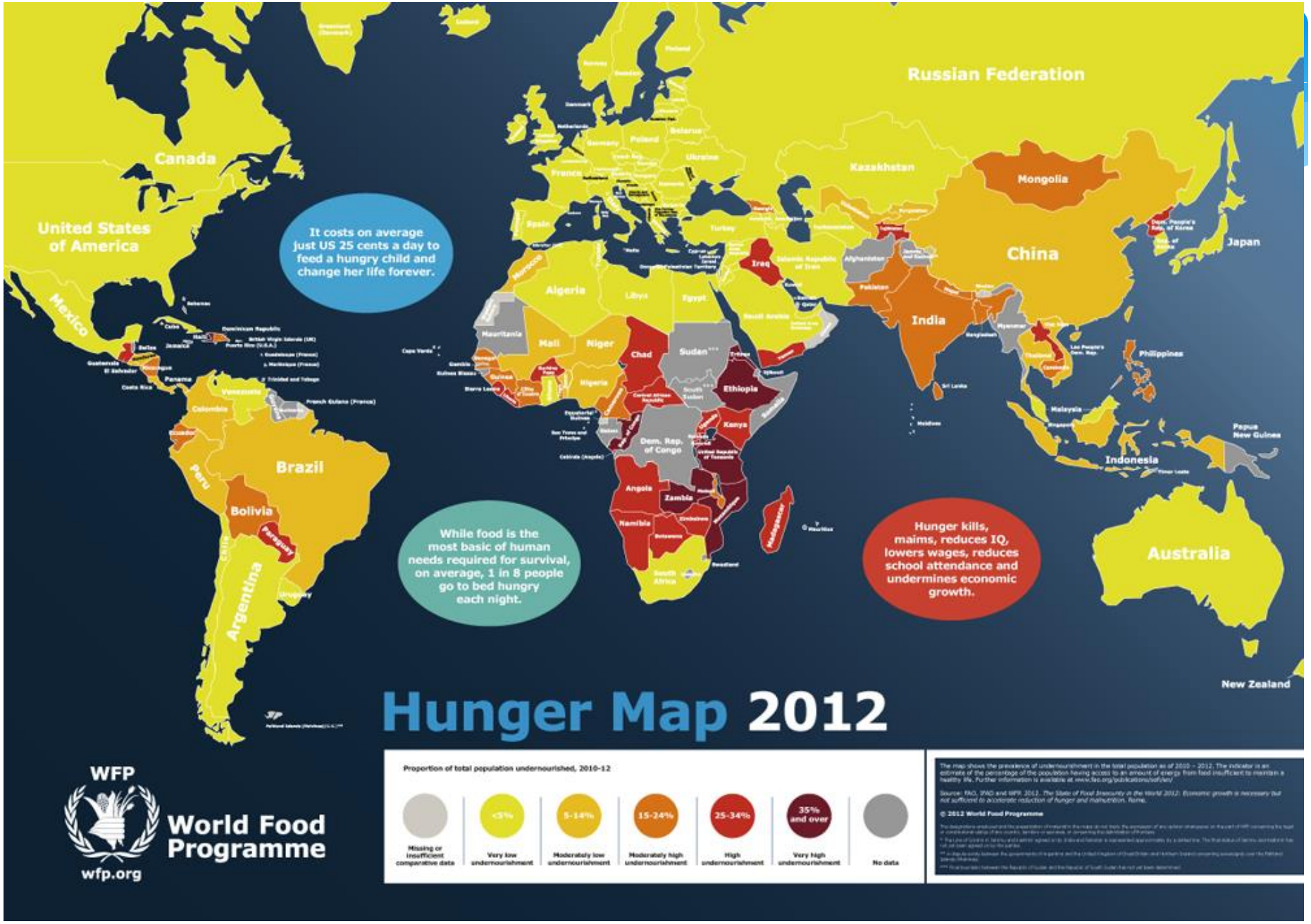
3

Global food demand, 1961=100

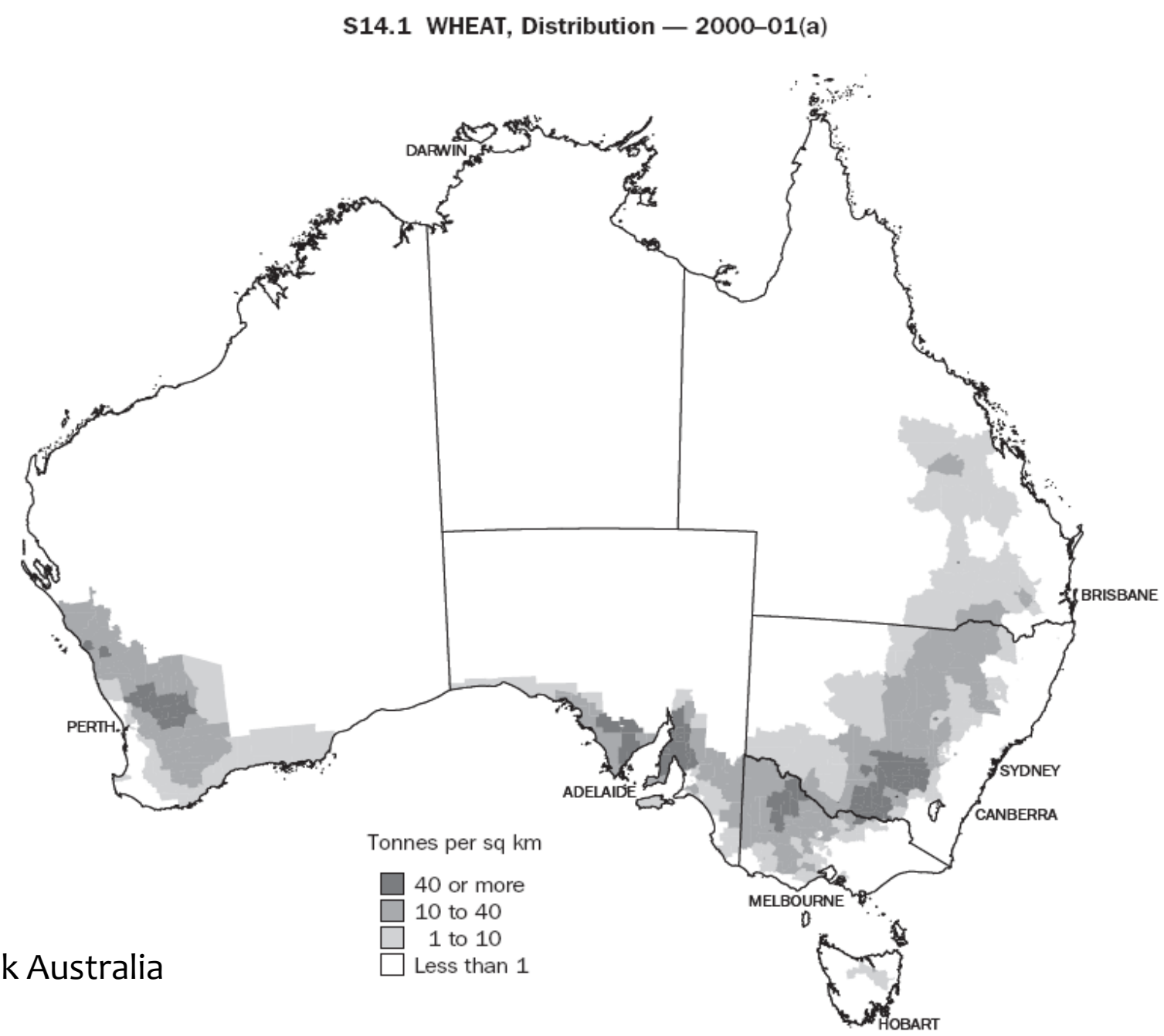


Source: Food and Agriculture Organisation


RETHINK
YOUR DRINK
Kool-Aid Jammers
Citrus Punch
DARIGOLD
Red Bull
ADVENTURE'S FIRST
MAVERICK
X-LARGE
Mtn Dew

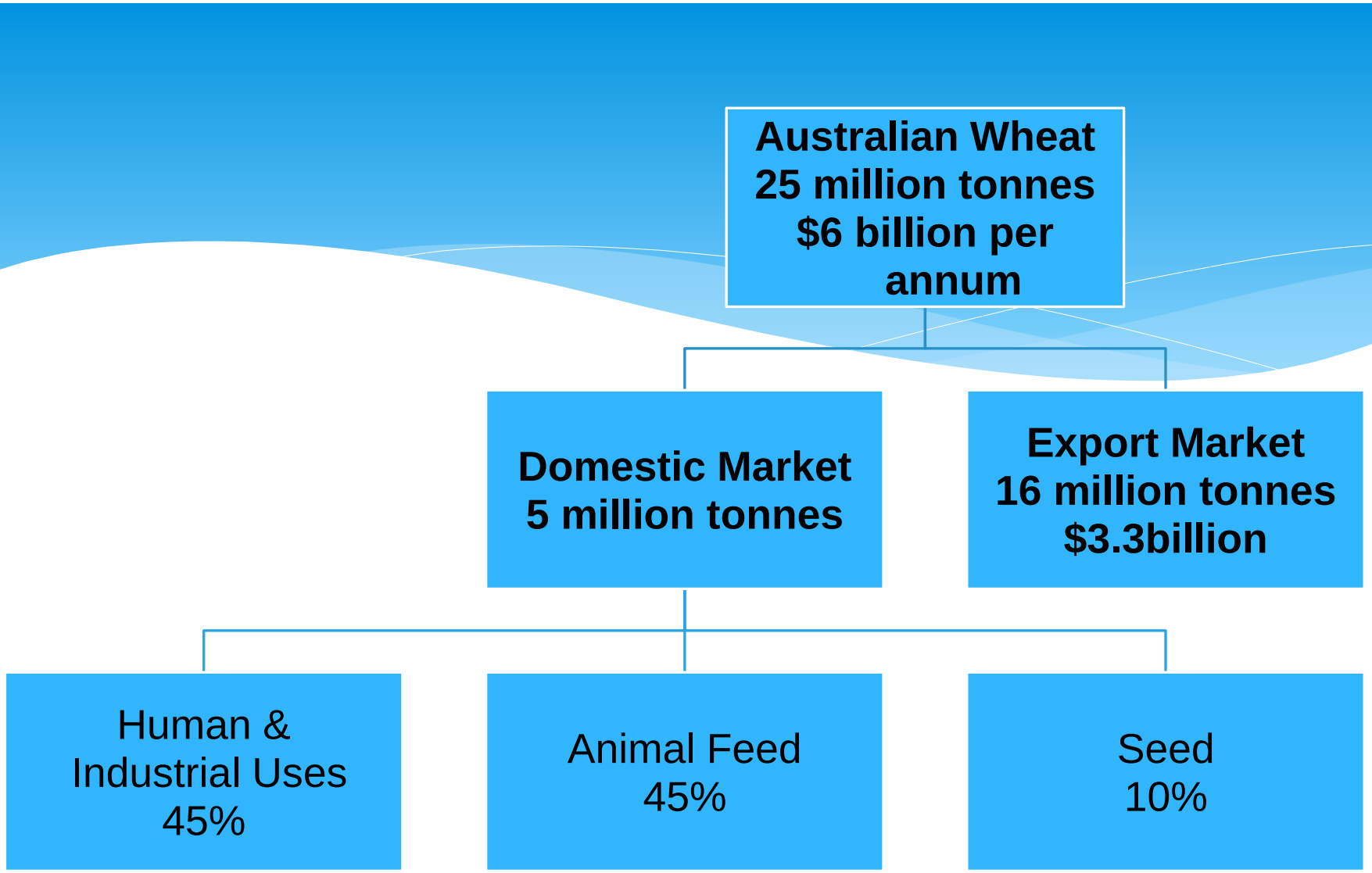

Russian Federation
Canada
United States of America
Mexico
Brazil
Argentina
Bolivia
Paraguay
Peru
Kazakhstan
Mongolia
China
India
Japan
Philippines
Indonesia
Papua New Guinea
Australia
New Zealand
Algeria
Libya
Egypt
Iraq
Mauritania
Mali
Niger
Chad
Sudan
Ethiopia
Kenya
Nigeria
Dem. Rep. of Congo
Angola
Zambia
Namibia
South Africa
Madagascar
It costs on average just US 25 cents a day to feed a hungry child and change her life forever.
While food is the most basic of human needs required for survival, on average, 1 in 8 people go to bed hungry each night.
Hunger kills, maims, reduces IQ, lowers wages, reduces school attendance and undermines economic growth.
Hunger Map 2012
Proportion of total population undernourished, 2010-12
Missing or insufficient comparative data
<5%
Very low undernourishment
5-14%
Moderately low undernourishment
15-24%
Moderately high undernourishment
25-34%
High undernourishment
35% and over
Very high undernourishment
No data
WFP
World Food Programme
wfp.org


2
COMMONWEALTH OF AUSTRALIA
2



Year Book Australia

2006


Australian Wheat
25 million tonnes
$6 billion per annum
Domestic Market
5 million tonnes
Export Market
16 million tonnes
$3.3billion
Human & Industrial Uses
45%
Animal Feed
45%
Seed
10%

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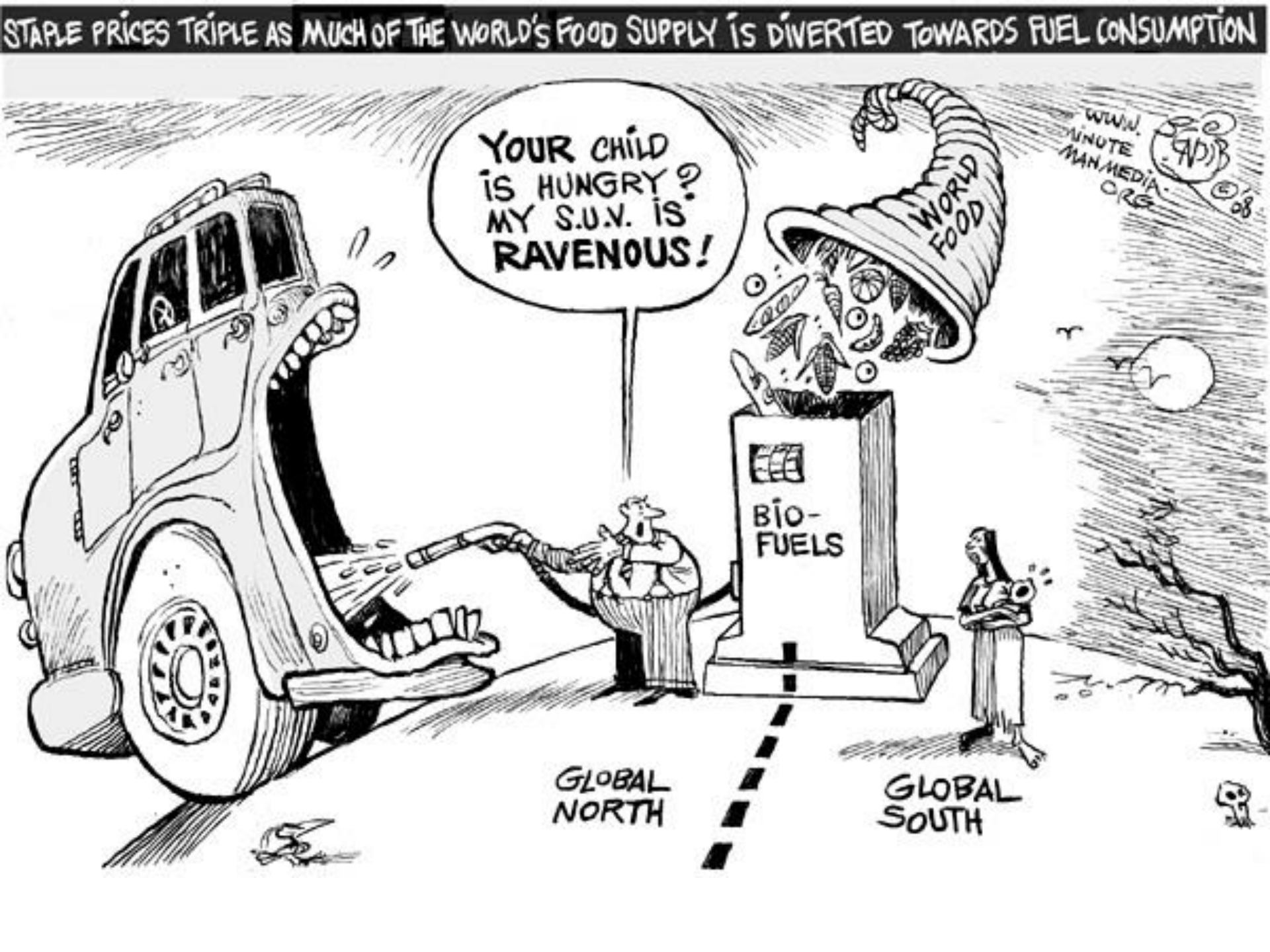
Food Crisis

Food, Feed, Fuel, Seed

The old pie and the new pie


ethanol


STAPLE PRICES TRIPLE AS MUCH OF THE WORLD'S FOOD SUPPLY IS DIVERTED TOWARDS FUEL CONSUMPTION
YOUR CHILD IS HUNGRY? MY S.U.V. IS RAVENOUS!
WORLD FOOD
BIO-FUELS
WWW.MINUTEMANMEDIA.ORG
©'08
GLOBAL NORTH
GLOBAL SOUTH

"We have to tackle climate change now"

"If we get it right biofuels could help to save the planet"

"We do have enough land to grow crops for food and biofuels"

"We have to make sure we produce biofuels in a way that does not damage the earth in the long-term"

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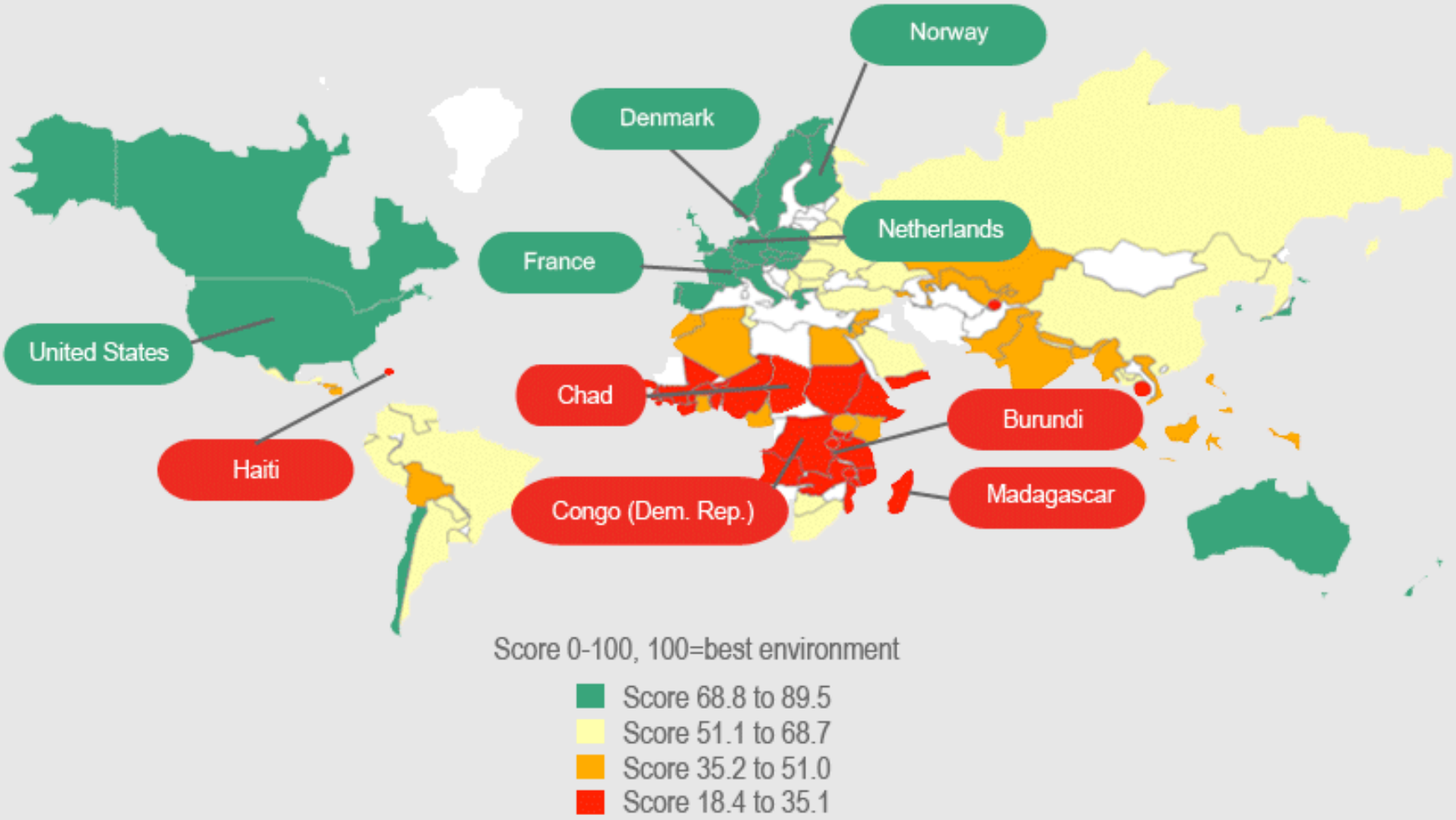
In 1996 The World Food Summit declared **food security** occurs when all people at all times have economic and physical access to sufficient and nutritious food that meets their dietary needs and preferences for an active and healthy life. Factors such as agricultural production, food quality, food prices, income, trade, climate change, water availability and political stability contribute to the food security of a person and a country.

The Four Main Components of Food Security

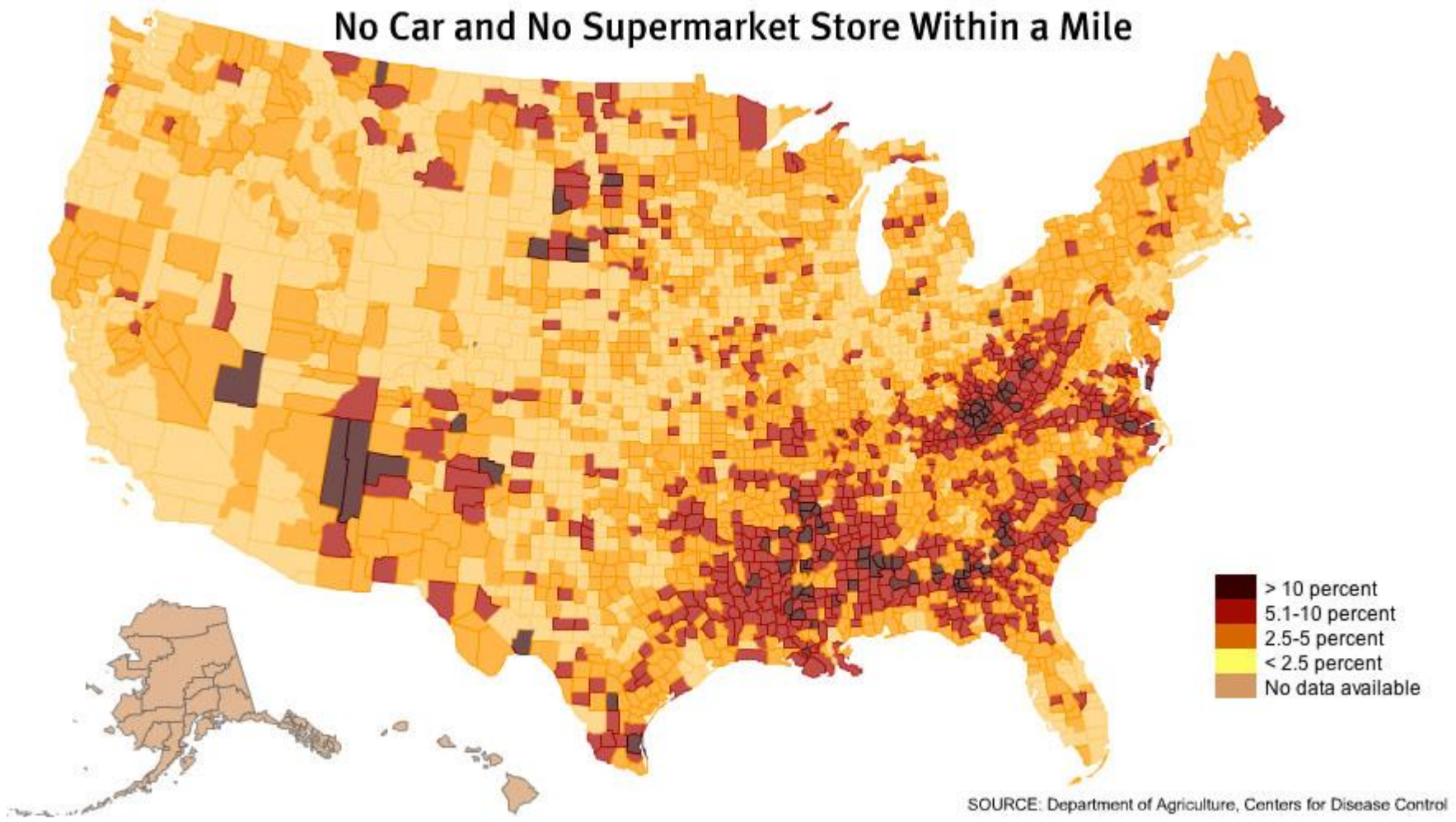
The Economist Intelligence Unit's Global Food Security Index considers the core issues of food affordability, availability, and quality across a set of 105 countries.



Food insecurity in Australia

* Access, supply and appropriate use
* The prevalence of food insecurity in Australia is 5%
* Vulnerable groups
  * Unemployed, single parent households, low income, young people
* Reasons
  * Resources (money, transport, etc)
  * Access to affordable nutritious food
  * Motivation and knowledge

Food deserts



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yes! magazine
Related articles at
www.yesmagazine.org/foodforall

HOW A COMMUNITY-BASED FOOD SYSTEM WORKS

Everybody Eats

It begins with small farms working with natural cycles and ends with fresh food and stronger communities.

SMALL INTEGRATED FARMS

Cooperatives allow farmers to share the cost of buying land and supplies, and to share labor and equipment.

Fact: Farms of 27 acres or less produce 10 times more dollar value per acre than larger ones.

Clean energy
Solar, wind, and biogas provide clean power for farm machinery

Fruit and nut orchards

Crop diversity increases yield, keeps soil fertile, helps fight pests

Grass-fed livestock has smaller carbon footprint, leaves grain for humans to eat.

Closed-loop cycles mimic nature, eliminate waste. Nutrients returned to soil.

Farm waste to biogas fuel

Farm waste to compost

Manure to fertilizer

Homegrown Seed keeps old strains alive, produces new varieties adapted to local conditions.

Fact: since 1900, 75 percent of vegetable varieties have disappeared worldwide.

Clean water runoff

BULK GRAINS

No-till farming reduces soil loss and sequesters carbon. Edible prairie produces grain while building soil.

Fact: If all farmers in the U.S. used no-till, crop rotation and cover crops they'd sequester 300 million tons of carbon a year.

LONG-HAUL DISTRIBUTION

Fact: Moving goods by rail instead of truck reduces fuel use by two-thirds.

Money spent locally increases a community's economic health.

Fact: Every dollar that stays in a community has three times the effect of a dollar that goes to a distant corporate HQ.

Farmers markets *CSAs* *Urban food vans* *Co-ops*

Where we get our food: Farmers markets and community supported agriculture leave out the big-retailer middleman. Small farmers make a living; communities get fresh, healthy, affordable food.

LOCAL MARKETS

SHORT HAUL DISTRIBUTION

Using electric vehicles to move food from railheads and ports to markets in cities will result in cleaner air and a new automobile industry.

Fact: A regional diet uses 17 times less oil than the typical American long-distance diet.

REGIONAL PROCESSING

Local cooperatives can replace giant corporate processors for frozen and canned foods.

Food processing waste is composted and goes back to farm

GROW YOUR OWN

Lawns, abandoned lots, balconies, roofs, and even windowsills become gardens. Neighbors build community gardens and share the bounty at neighborhood feasts.

Fact: During WWII, Victory Gardens produced 40 percent of the vegetables people ate.

Household food scraps composted by worms

Garden waste to compost

Homegrown seeds

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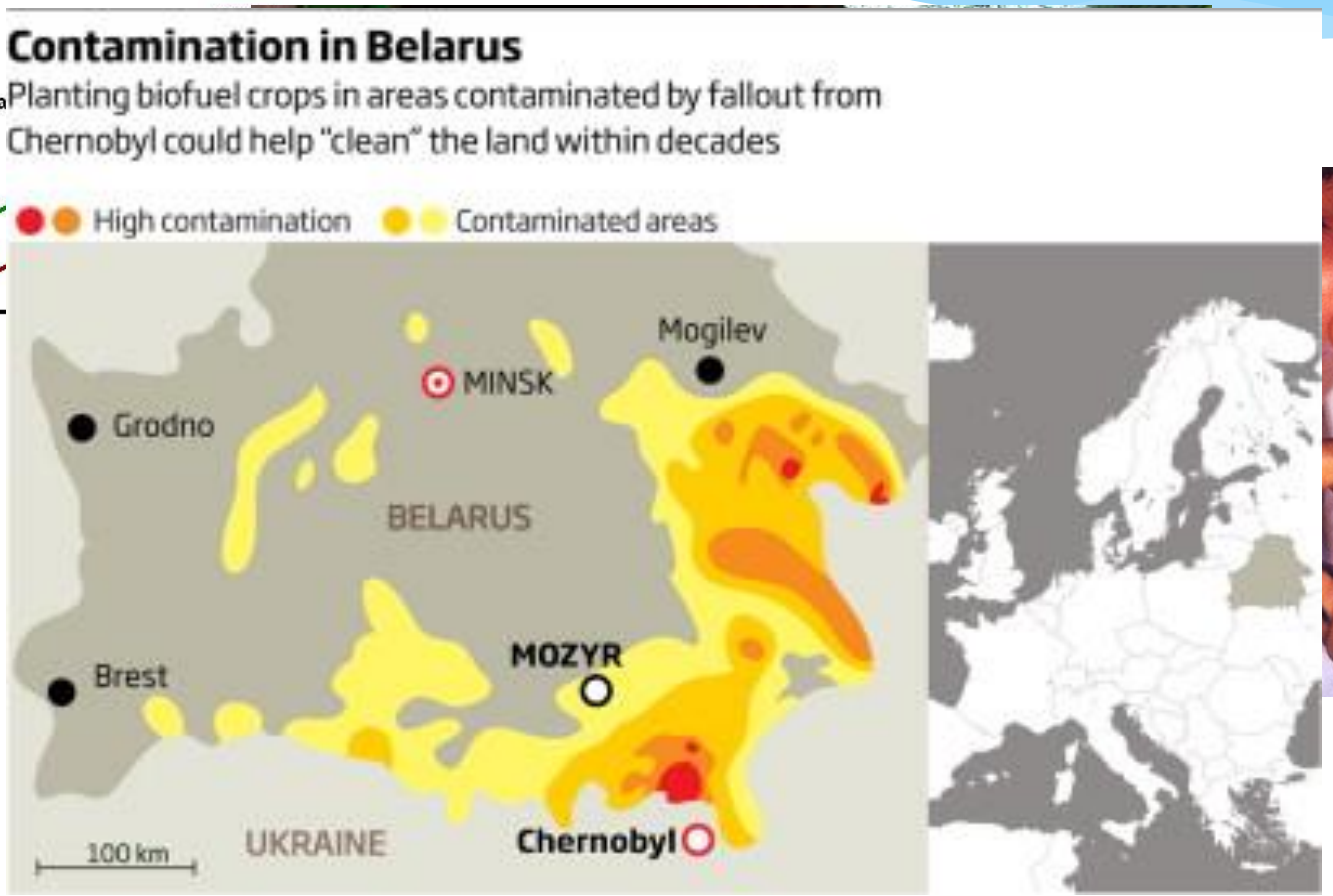
Solutions?


War, fa


Contamination in Belarus
Planting biofuel crops in areas contaminated by fallout from Chernobyl could help "clean" the land within decades
High contamination
Contaminated areas
Mogilev
MINSK
Grodno
BELARUS
MOZYR
Brest
100 km
UKRAINE
Chernobyl

Conclusion

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