GROUPE ESSCA

The future of agriculture in Europe

David Rees Ph.D.

Based on the book 'Nourrir l'Humanité' by Bruno Parmentier

INH

De la science du végétal à la culture du paysage

Origin and purpose of the CAP?

Contents

1. Farming capacity and food needs

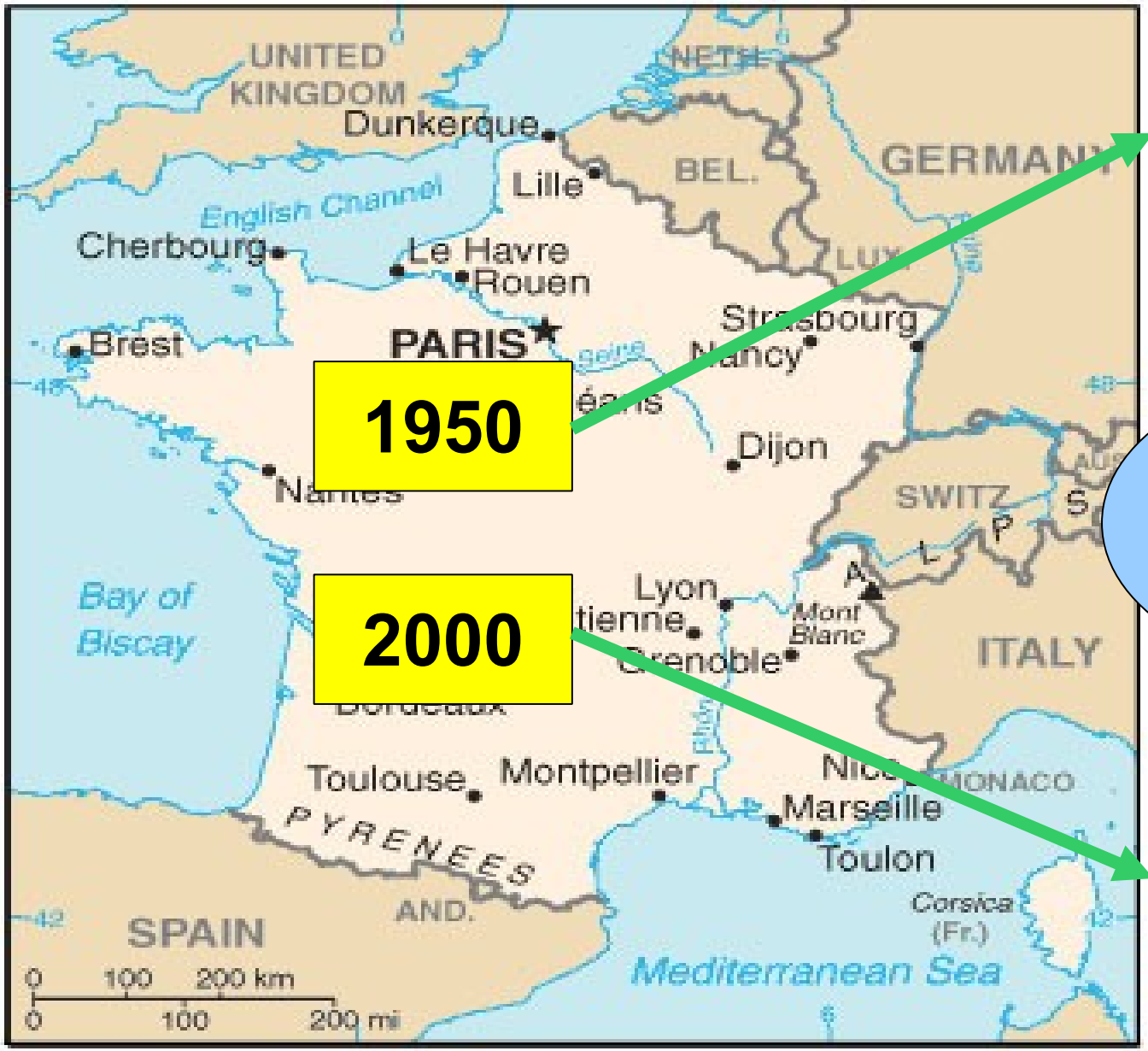
2. Land and water requirements

3. Biofuels

4. Aid

5. Conclusion

France



8m farmers
1 farmer fed
5 people

Agronomy:
pesticides
fertilisers
mechanisation

0.8m farmers
1 farmer feeds
100 people

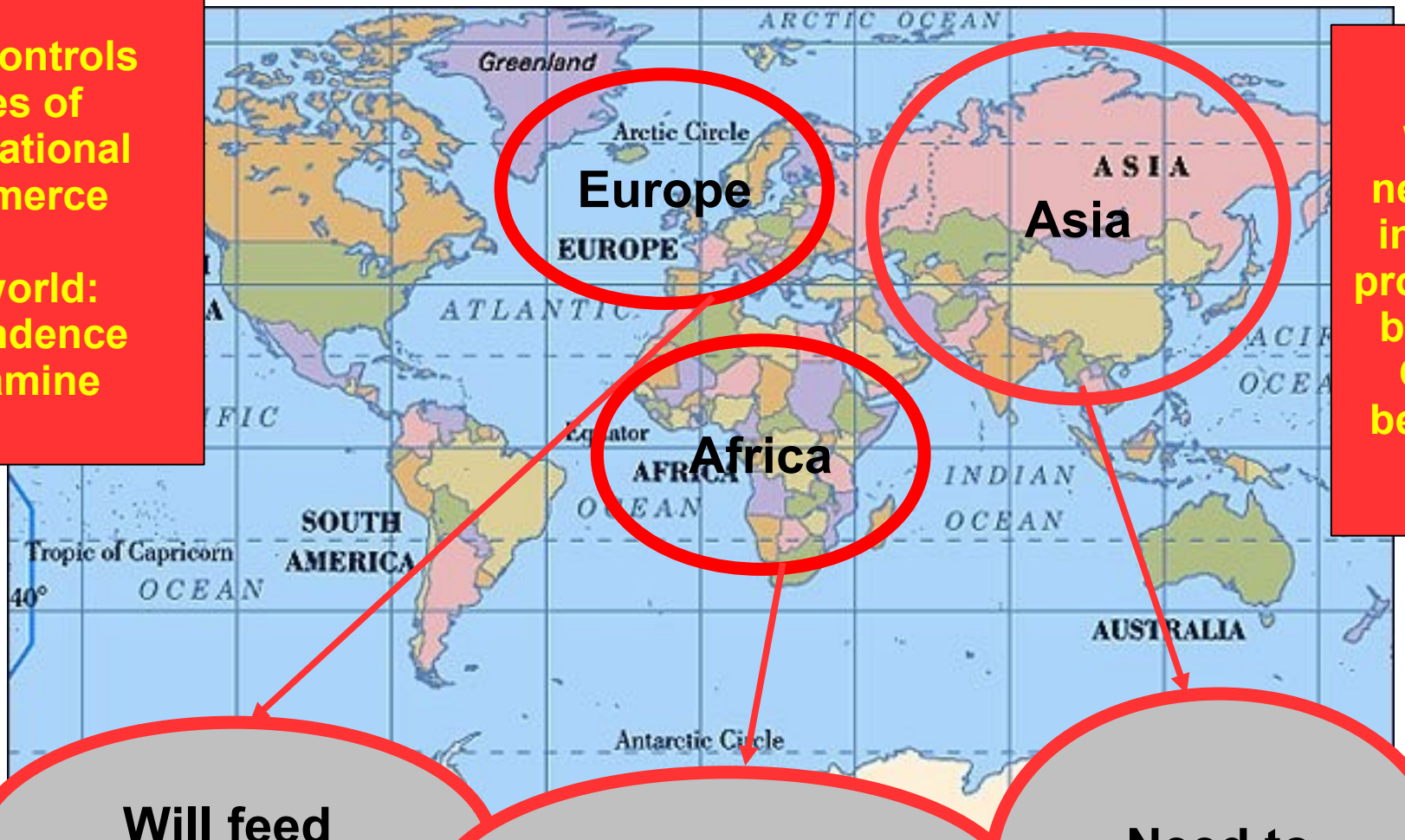
France: 23% of EU15 production
Top producer: beef, poultry
BUT – has to import 75% animal feed from USA, Brazil & Argentina

2007
Population: 6.4b
Hungry: 850m

2050
Population: 9.5b

West controls rules of International Commerce

3rd world: dependence or famine



Europe

Asia

Africa

World needs to increase production by 125% Can it be done?

Will feed themselves

Need to increase production by x5

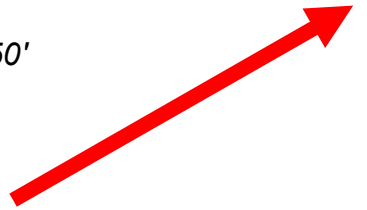
Need to increase production by x2.3

125%

Agricultural production to feed the world in 2005

	Africa	Asia	S. America	N. America	Oceania	Europe	World
Pop. Growth	3.14	1.69	1.8	1.31	1.61	0.91	**1.76**
Needs change	1.07	1.02	1.03	0.99	1	0.98	**1.02**
Diet change	1.64	1.38	1.07	1	1	1	**1.28**
Cum. effect	**5.14**	**2.34**	**1.92**	**1.31**	**1.61**	**0.91**	**2.25**

Ref: Philippe Collomb 'Une voie étroite pour la sécurité alimentaire d'ici à 2050'



2006: an Indian consumes 4kg of meat per year
: an American consumes 80kg of meat per year

2050: If Indians and Chinese consumed 40kg of meat per year?

(1kg of meat requires about 4-10kg of cereal)

44% cereals

→

meat production

1960 – 0.94b tons	→	***2000 – 2.2b tons***
2000 – 2.2b tons	→	***2050 – 3.2b tons***
+1b tons	→	***3x USA production***

Food Production

Maize, Rice and Corn

1950-2000

3 times more productive

Pesticides & Fertilisers

Fertiliser

Corn: France 240kg/h, Russia 25kg/h

Maize: USA 257kg/h, Tanzania 12kg/h

Rice: 320kg/h, Cambodia 4kg/h

Cotton: Tadjikstan 461kg/h, Benin 45kg/h

Food Production

Third-world farmer

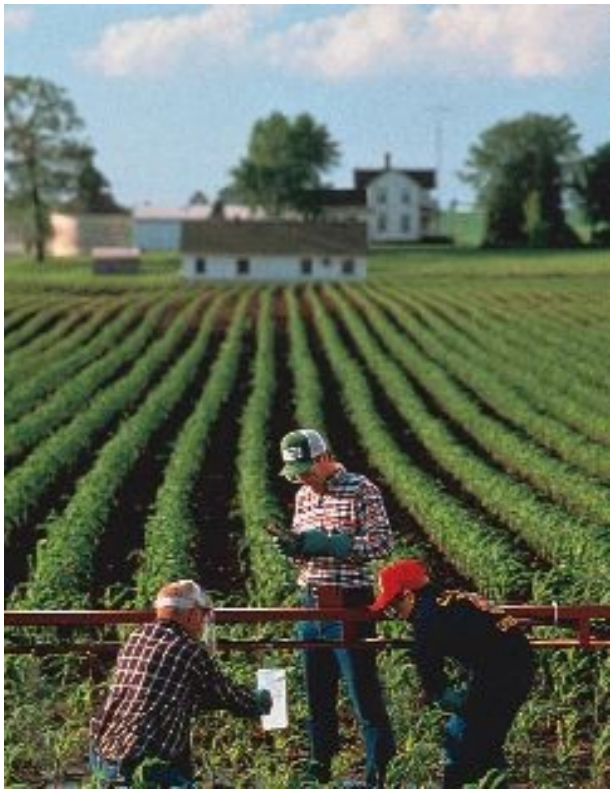
1h of land, no machines, no animal traction, no selected seed, no insecticide, no fertiliser

At 1$ per day, production cost is 36$ per 100kg

Canadian farmer 12$ per 100kg

Australians and Argentinians:

8$ per 100kg



Cannot allow market forces to determine the market

Opening the market: Mexico and the USA

US investment quadruples in Mexico (cheaper labour)

Mexican exports 31 to 165b$

0.75m to 1.6m cars per year

Maize (Mexican staple diet)

US maize production 4 times more productive

US maize twice the amount of subsidy

US Maize subsidies (10b$) more than the entire Mexican Agricultural budget

Mexico loses 3m farmers

US investment in the Maquiladoras now moving to Asia. How will Mexico earn the $ to import the food it used to grow?

EU CAP subsidies and dumping

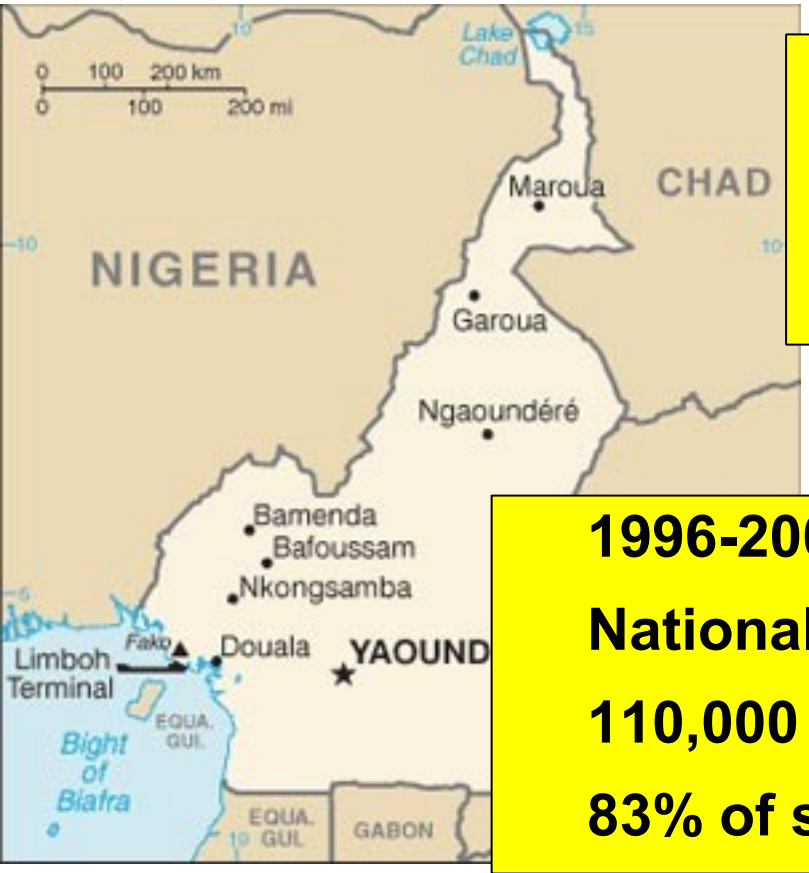
EU chicken producers

Cheaper cereal due to

subsidies

Best bits for the EU market

Worst bits (wings) to Africa



Cameroon

Local chicken: 2€28

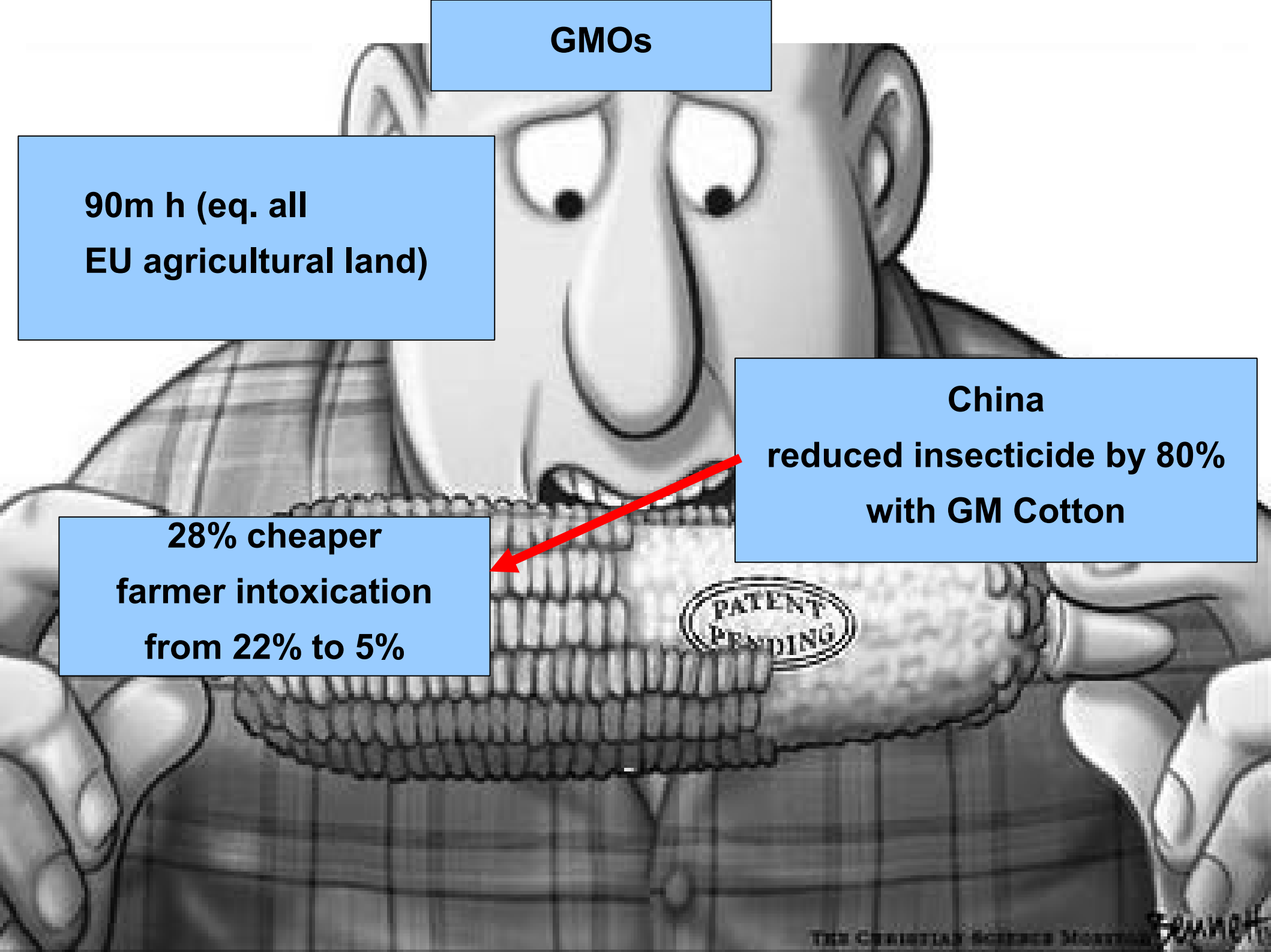
EU imported frozen chicken: 1€37

1996-2003: Imports 980 tonnes to 22,000 tonnes

National production 26,000 tonnes to 10,000 tonnes

110,000 jobs lost per year

83% of samples improper for consumption


GMOs
90m h (eq. all
EU agricultural land)
China
reduced insecticide by 80%
with GM Cotton
28% cheaper
farmer intoxication
from 22% to 5%
PATENT
PENDING

What should we eat?

1€50 - 1l vegetable oil - 7,200kcal

1€50 – 1kg sugar – 4,000kcal

1€50 – 0.5kg bread – 1,200kcal

1€50 – 0.1kg meat – 200kcal

1€50 – 1kg vegetables – 250kcal

Agricultural land

38% of land is farmed, pasture or forest

1960: 0.43h per person

2000: 0.25h per person

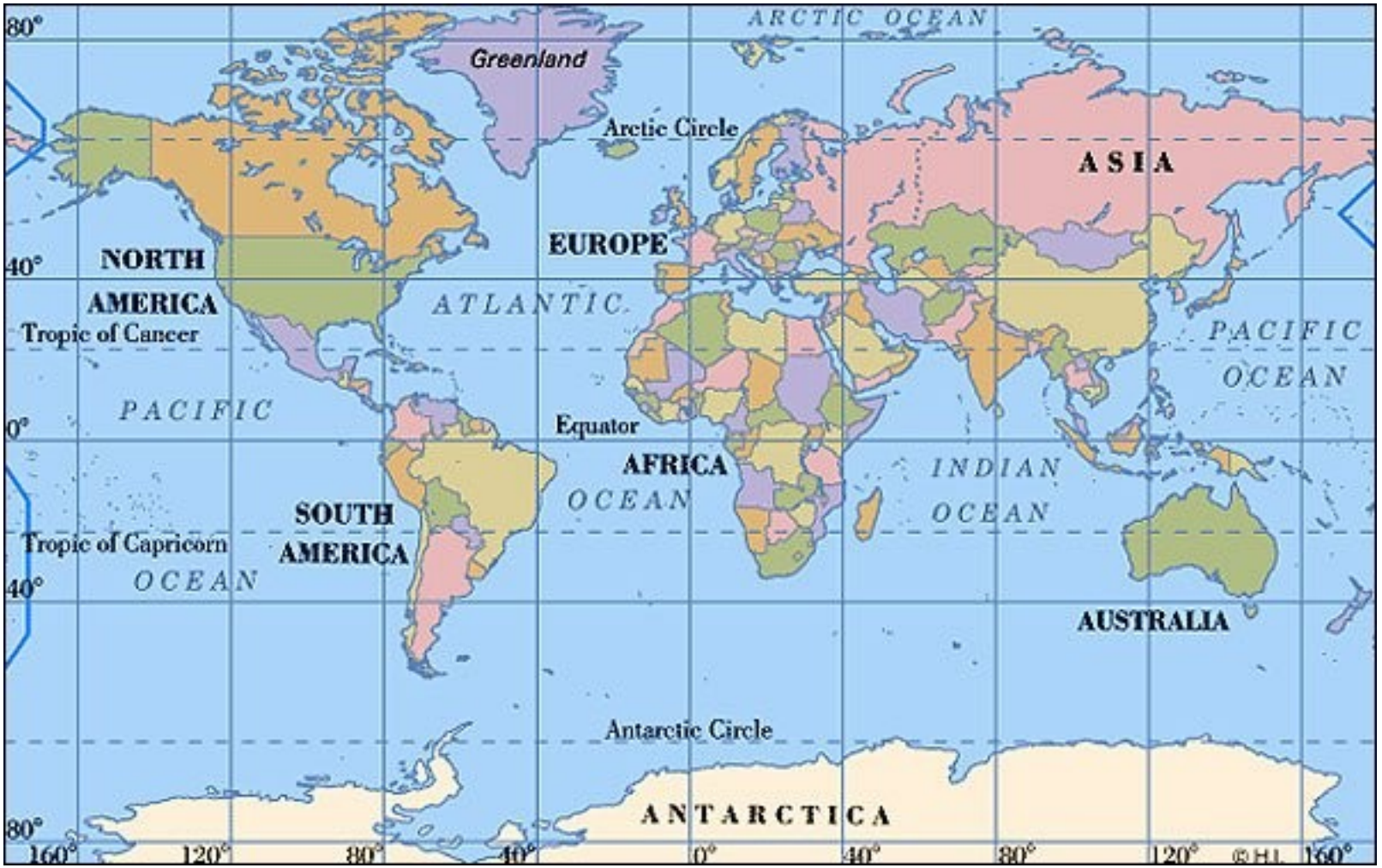
1960-2000: agricultural land +9%

1960-2000: population +50%

Australia: 2.5h / person

China: 0.12h / person

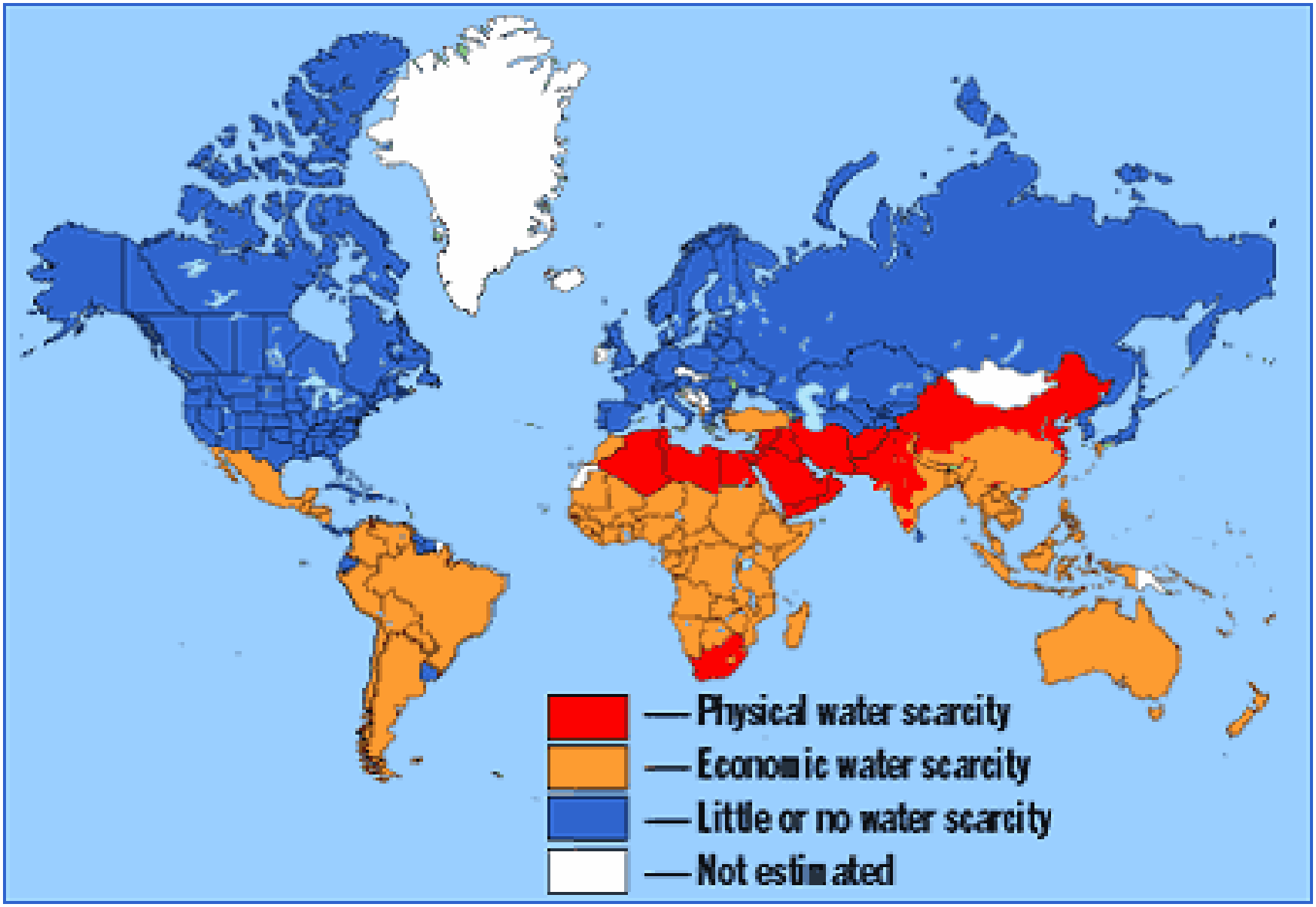
Farming needs water

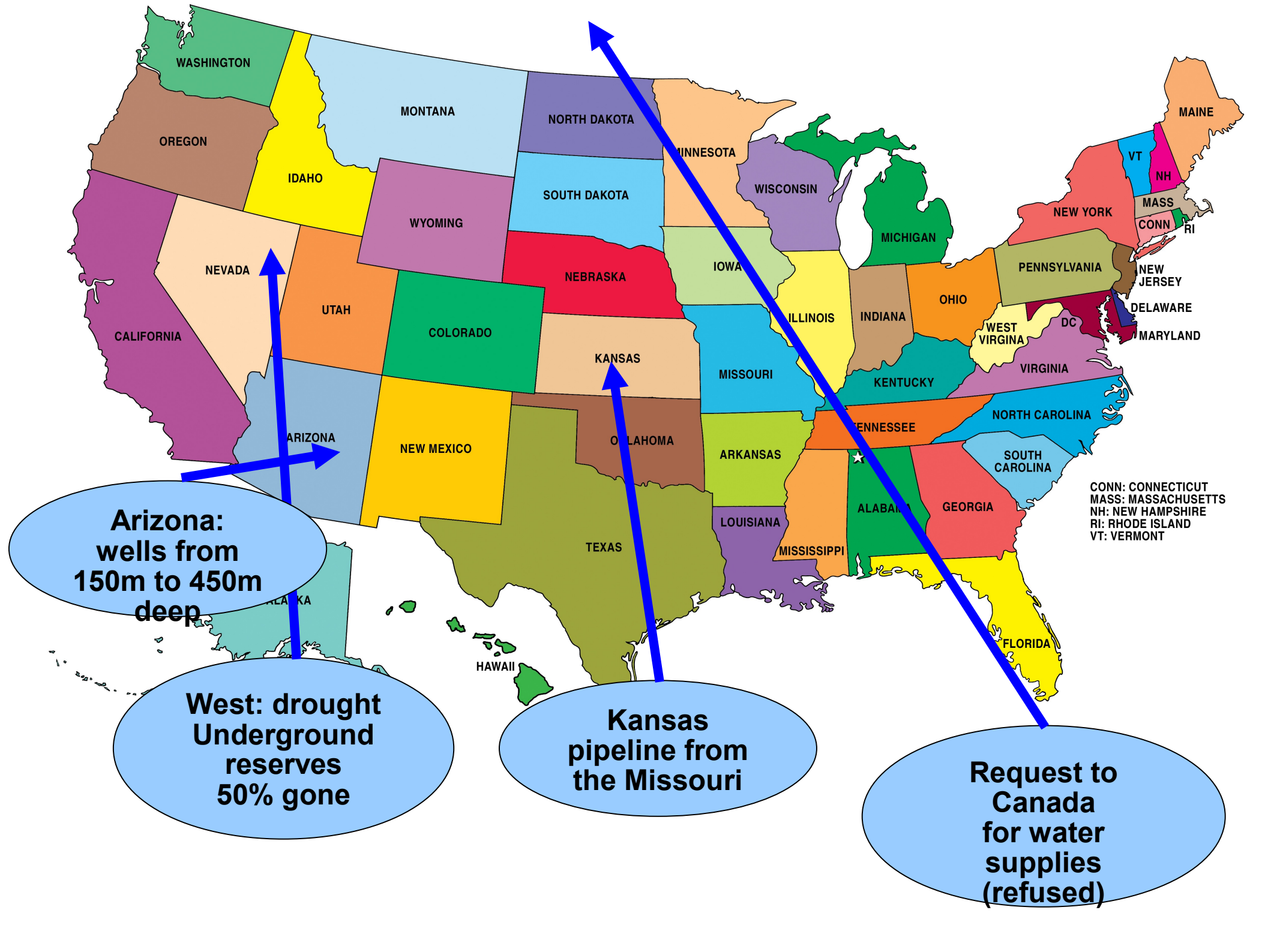


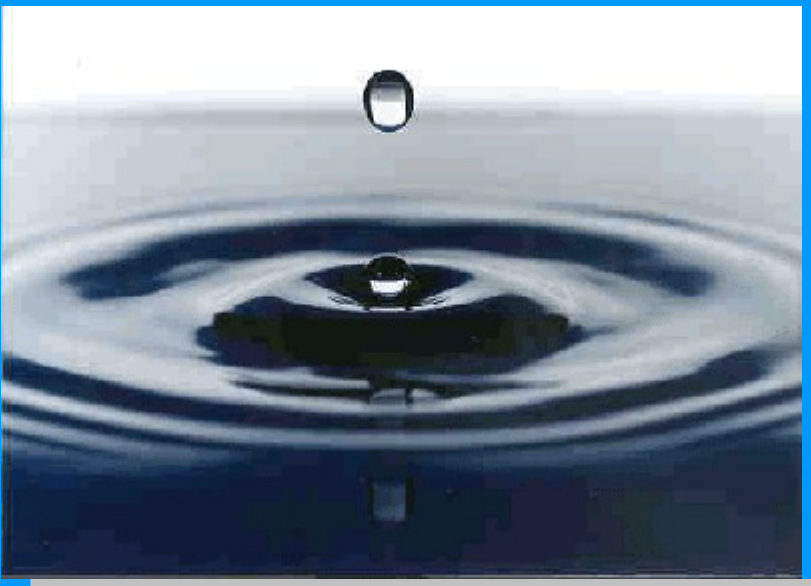
97.5 water is sea water, 2.5% fresh water – but
65% of fresh water is held as ice, so only 1% is available

"More than half of humanity will be living with water shortages, depleted fisheries and polluted coastlines within 50 years because of a worldwide water crisis", warns a United Nations report

World water needs




WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
VT
NH
MASS
CONN
RI
NEW JERSEY
DELAWARE
MARYLAND
DC
HAWAII
CONN: CONNECTICUT
MASS: MASSACHUSETTS
NH: NEW HAMPSHIRE
RI: RHODE ISLAND
VT: VERMONT
Arizona: wells from 150m to 450m deep
West: drought Underground reserves 50% gone
Kansas pipeline from the Missouri
Request to Canada for water supplies (refused)

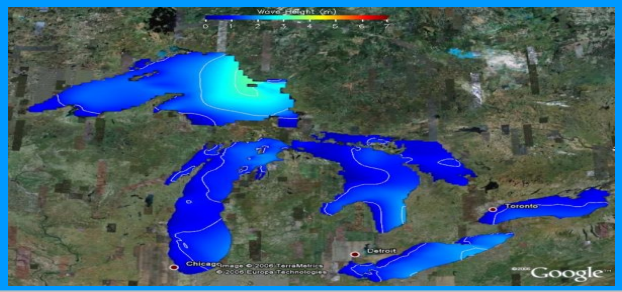


1950: Reserve of 16,800m3 per person

2006: Reserve of 6,800m3 per person

2025: Reserve of 4,800m3 per person

12 countries have 60% reserves (Brazil, Russia, USA, Canada, China, Indonesia, India, Colombia, Peru)

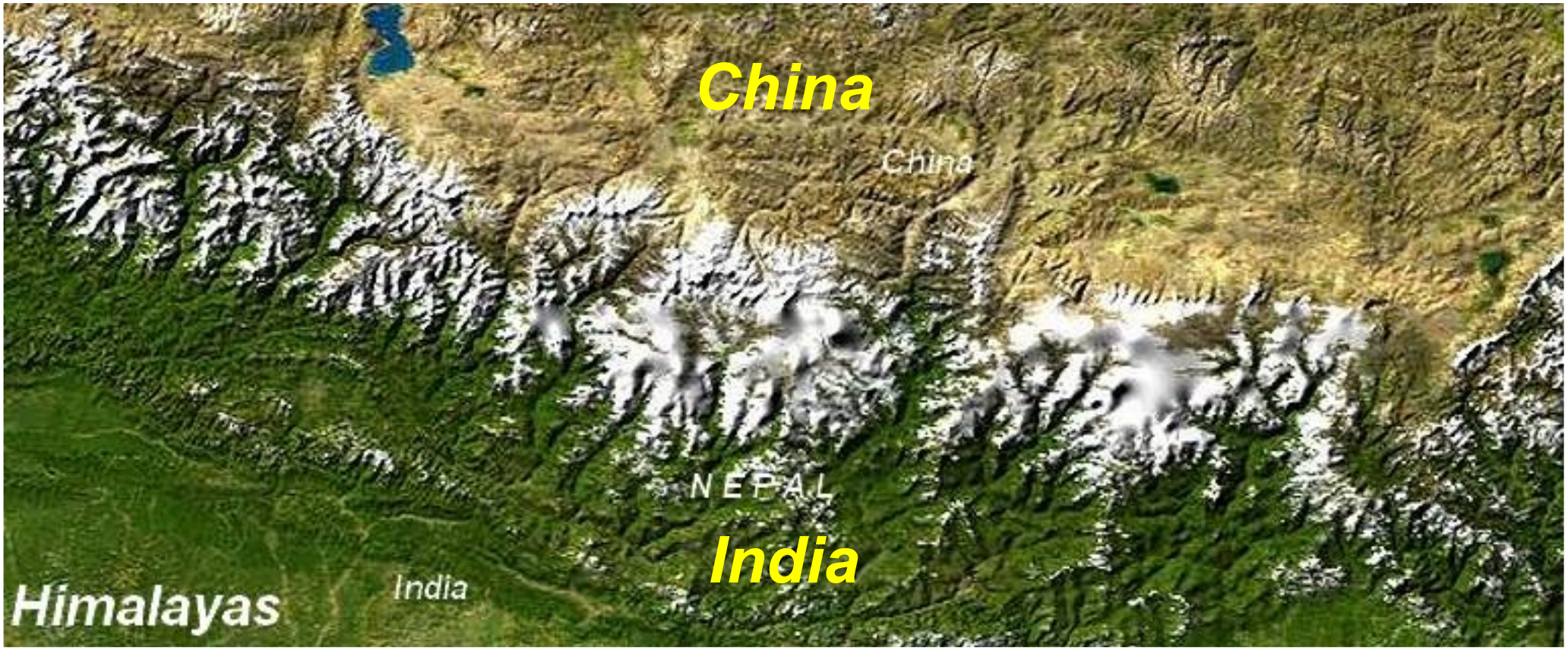


80 countries (40% world population) have serious water problems

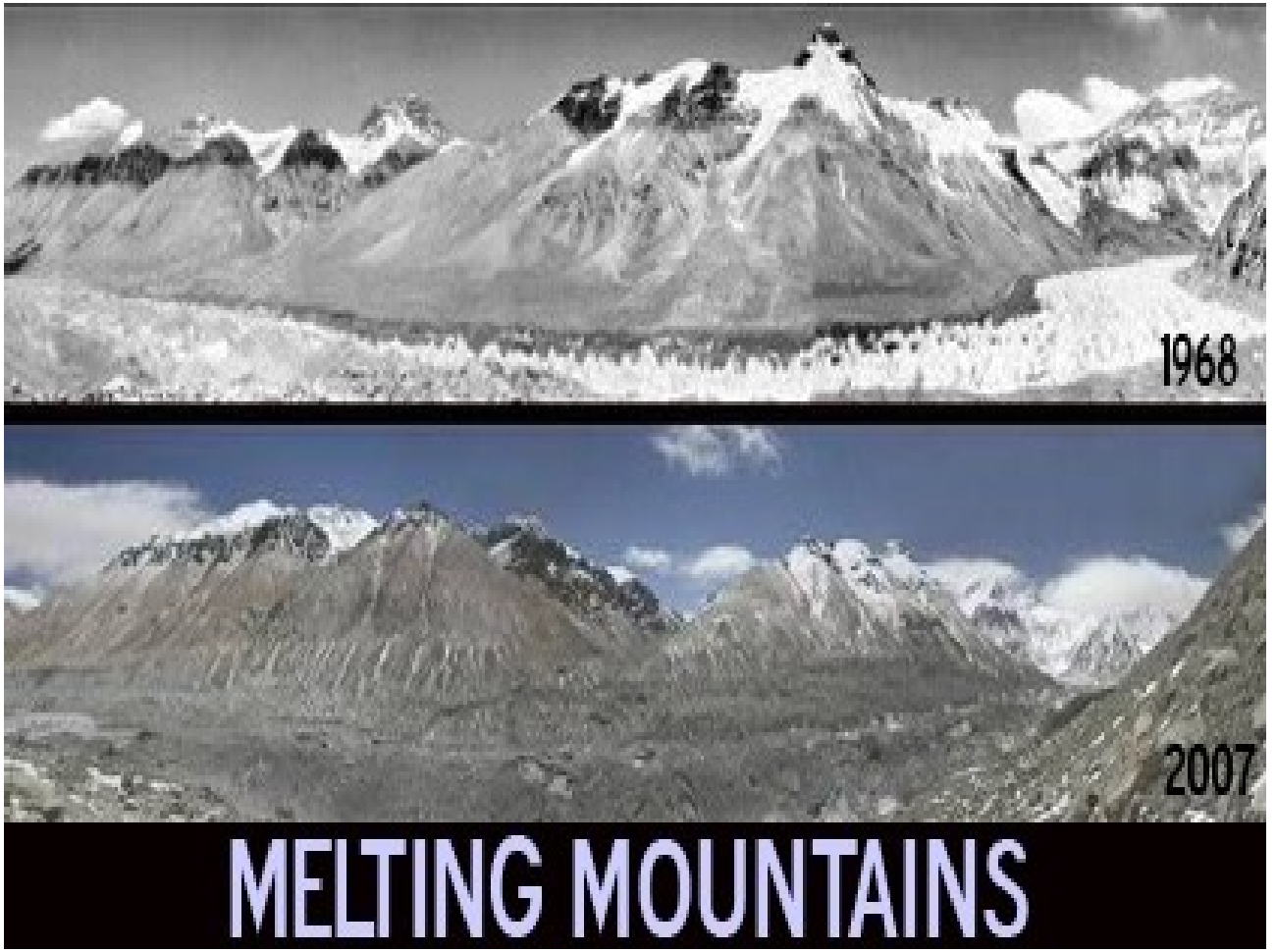

Erosion, desertification, industrialisation etc.
China loses 1m h of agricultural land per year!
35°
45°
30°
15°
Lake Balkhash
Burqin
Karamay
Yining
Urmqi
Mongolia
Hailar
Qiqihar
Harbin
Changchun
Shenyang
Kashi
Hohhot
Beijing
Tianjin
Dalian
North Korea
South Korea
Yumen
Huang R.
Shijiazhuang
Yantai
Yinchuan
Taiyuan
Jinan
Qingdao
Golmud
Xining
Lanzhou
Lianyungang
Zhengzhou
Shiquanhe
China
Xian
Yellow Sea
Nanjing
Hefei
Shanghai
Yangtze R.
Wuhan
Hangzhou
Brahmaputra R.
Chengdu
Lhasa
Chongqing
Nepal
Nanchang
East China Sea
Changsha
Fuzhou
Bhutan
Guiyang
Ganges R.
India
Xiamen
Taiwan
Kao hsiung
Banglecosh
Kunming
Xun R.
Guangzhou
Irrawaddy R.
Nanning
Hong Kong
Macau
Thanlwin R.
Vietnam
Zhanjiang
Laos
Bay of Bengal
Myanmar (Burma)
Gulf of Tonkin
Haikou
Hainan
Philippines
Luzon
Mekong
Thailand
South China Sea
0 500 km
0 500 mi

China: 1.26 billion people.
Over-pumping: Northern China water table dropping 1m per year.
300 cities short of water.
Diverting water from agriculture to industry; farmers bankrupt
Rivers: heavy metal pollution; too bad for irrigation.
Farm production reducing, imports increase (prices rise).

China – an unavoidable water crisis



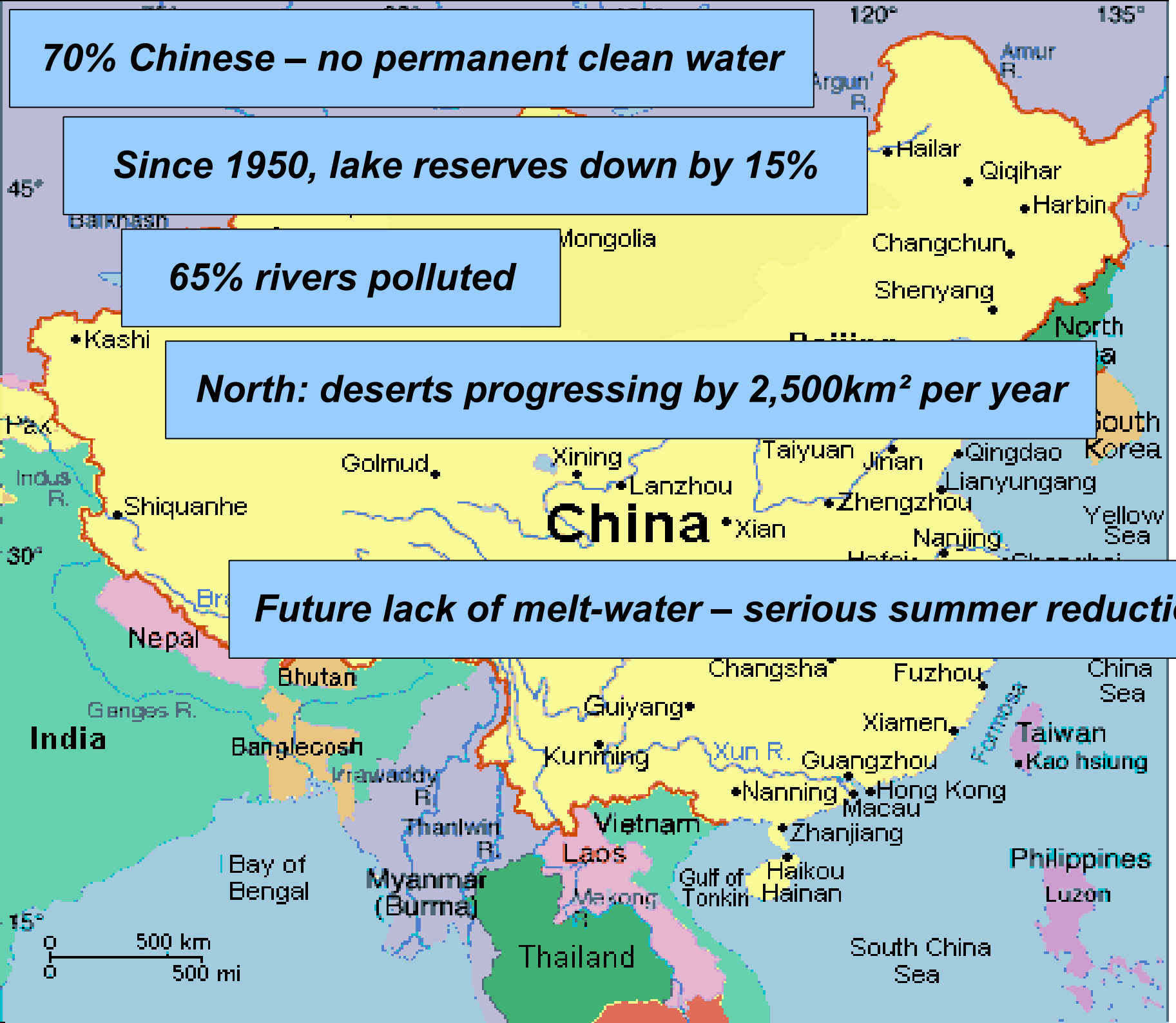
China and India use snow-melt waters for summer water supplies.

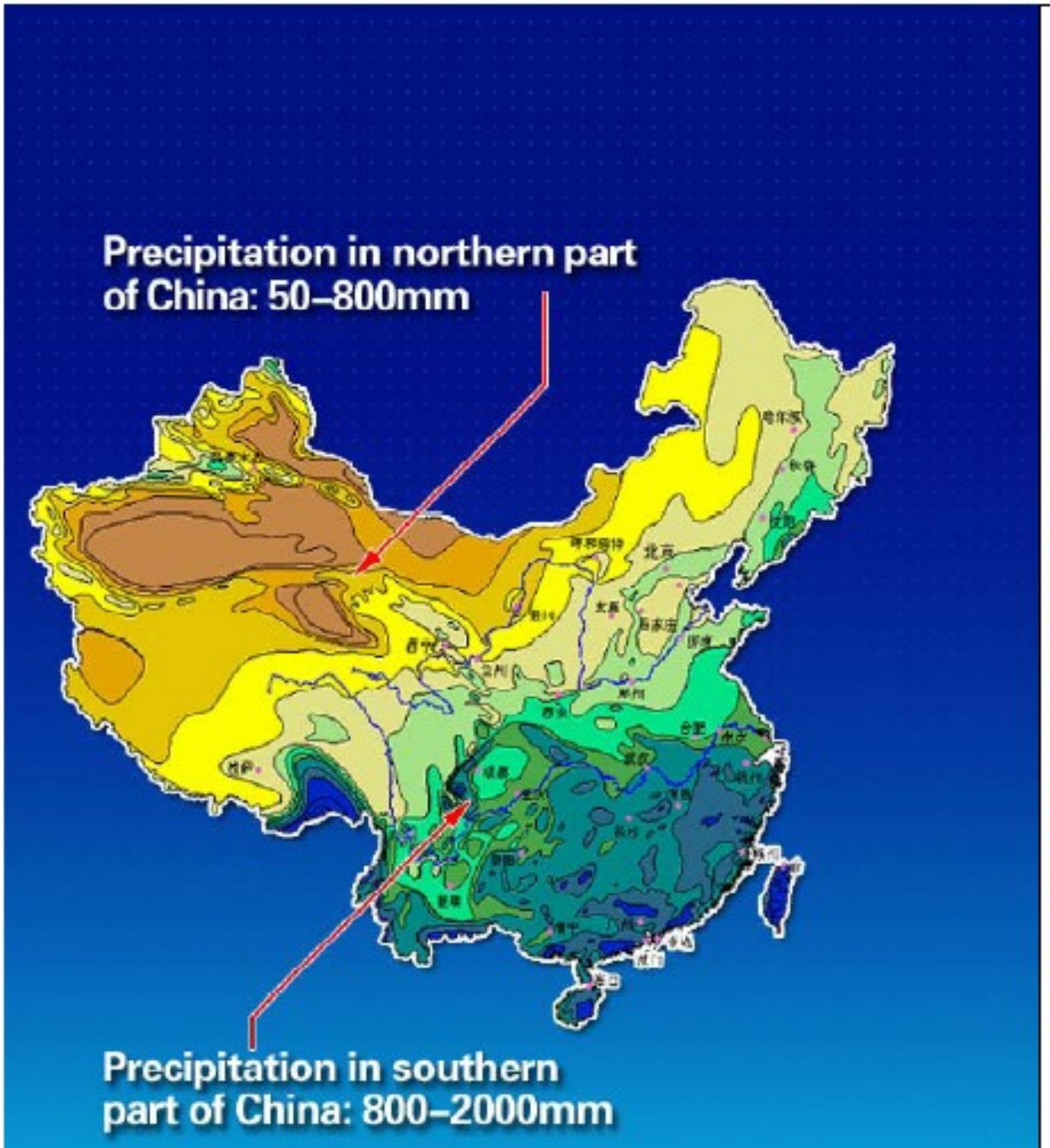


1968

2007

Himalayas: 33,000km². Depth reducing by 0.2 to 1m per year
Feeds the Amou-Daria, Ganges, Indus, Salouen,
Mekong, Yangzi, & Huang He.
Initial flooding will be replaced by lack of water


70% Chinese – no permanent clean water
Since 1950, lake reserves down by 15%
65% rivers polluted
North: deserts progressing by 2,500km² per year
Future lack of melt-water – serious summer reduction
China
Mongolia
India
Nepal
Bhutan
Thailand
Vietnam
Laos
Myanmar (Burma)
Bangladesh
Pak
Hailar
Qiqihar
Harbin
Changchun
Shenyang
Kashi
Golmud
Xining
Lanzhou
Taiyuan
Jinan
Qingdao
Lianyungang
Zhengzhou
Xian
Nanjing
Changsha
Fuzhou
Guiyang
Kunming
Xiamen
Guangzhou
Nanning
Hong Kong
Macau
Zhanjiang
Haikou
Hainan
Taiwan
Kao hsiung
Philippines
Luzon
Shiquanhe
Amur R.
Argun' R.
Indus R.
Ganges R.
Irrawaddy R.
Thanlwin R.
Mekong R.
Xun R.
Bay of Bengal
Gulf of Tonkin
South China Sea
China Sea
Yellow Sea
South Korea
North
45°
30°
15°
120°
135°
0 500 km
0 500 mi



Water is also unevenly distributed in space:

Northern part of China:

Water resources: 19%

population: 47%

Cultivated land: 64%

GDP: 45%

Southern part of China:

Water resources: 81%

population: 53%

Cultivated land: 35%

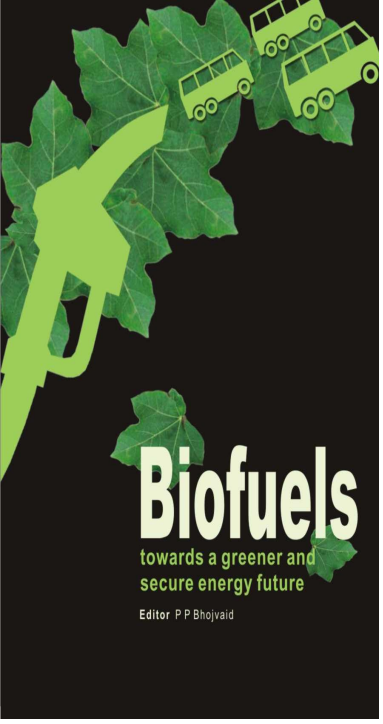
GDP: 55%


South-to-North Water Transfer Project
RUSSIA
KAZAKHSTAN
MONGOLIA
N. KOREA
Beijing
Shijiazhuang
CHINA
JAPAN
S. KOREA
Central route
NORTH CHINA PLAIN
Danjiangkou Reservoir
Western routes
Eastern route
Xiangfan
HUBEI
INDIA
TAIWAN
MYANMAR
PHILIPPINES
Miles
500

Virtual Water: how much water required to produce different foods

	l/H²0/kg
Corn	1,100
Rain rice	1,400
Flood rice	5,000
Soya	2,700
Cotton	5,200
Beef	13,500
Pork	4,600
Poultry	4,100
Milk	3,000
Cheese	5,000
Eggs	2,700

'Dry' countries should therefore import high virtual water products rather than producing them themselves.
N. Africa buys 40m tons of cereal per year. = 40b tons of virtual H²0



Biofuels – a solution or a menace?

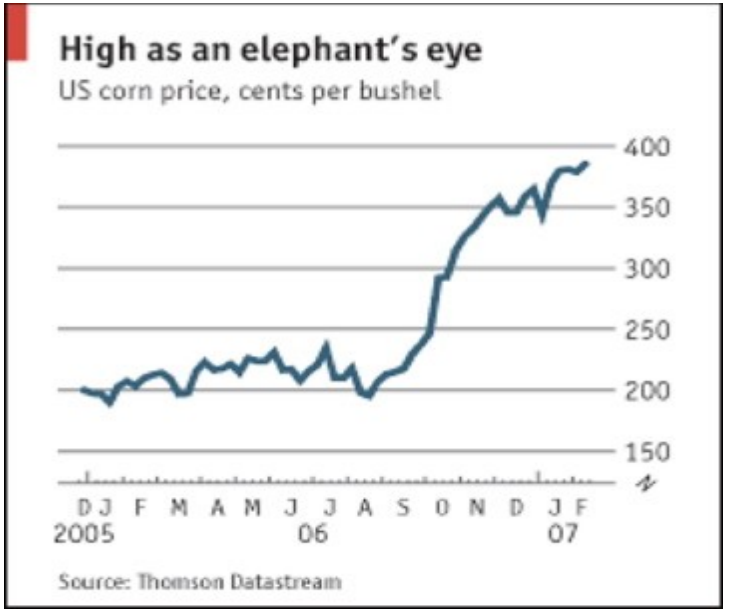
$

Biofuel production

Corn for food

Quantity

Price



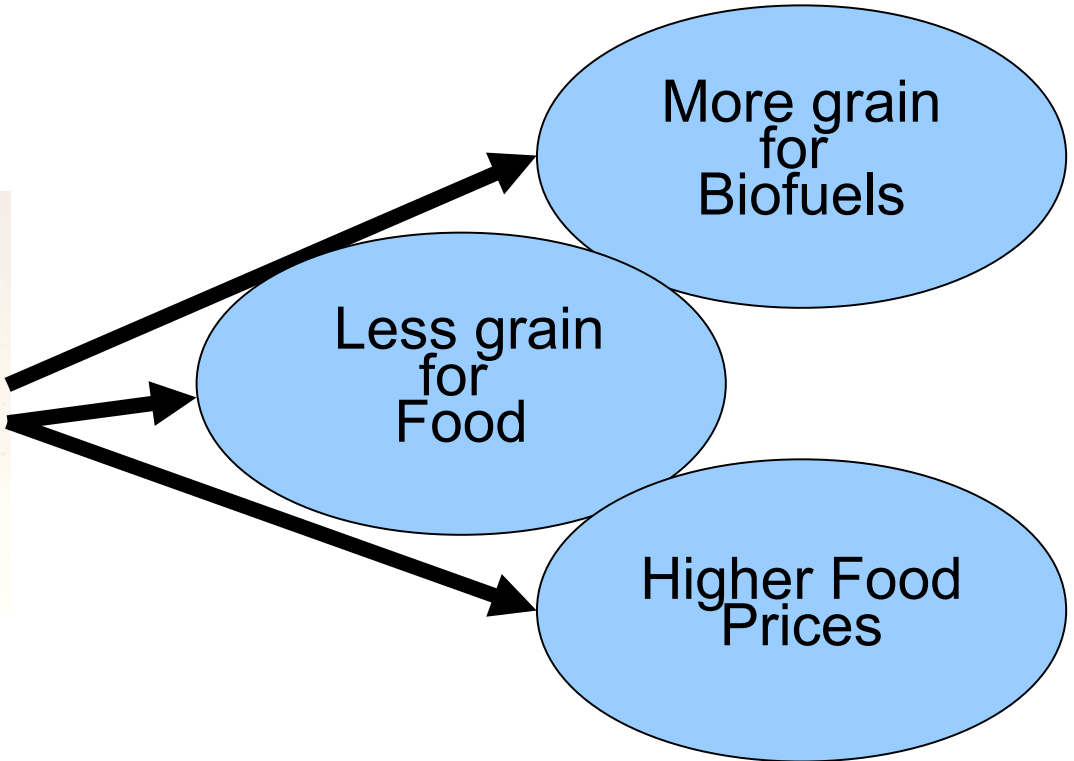
Biocarburants

2005: 0.5%

2010: 5.75%

2020: 20%

Ethanol and Biodeisel more profitable than agriculture when oil 80+$ per barrel

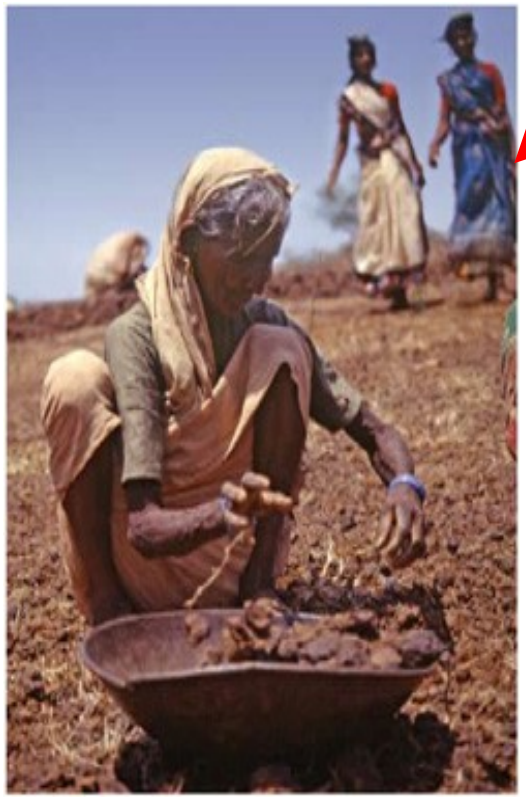


Food Aid

50% of cost is for shipping
(increasing with rising fuel costs)

Sustainable development ↓

Poverty



Farmer

Food imports ↑

Dependency ↑

Food Aid

Food aid depends on overproduction

1980-1987

Corn prices: 175$ to 120$

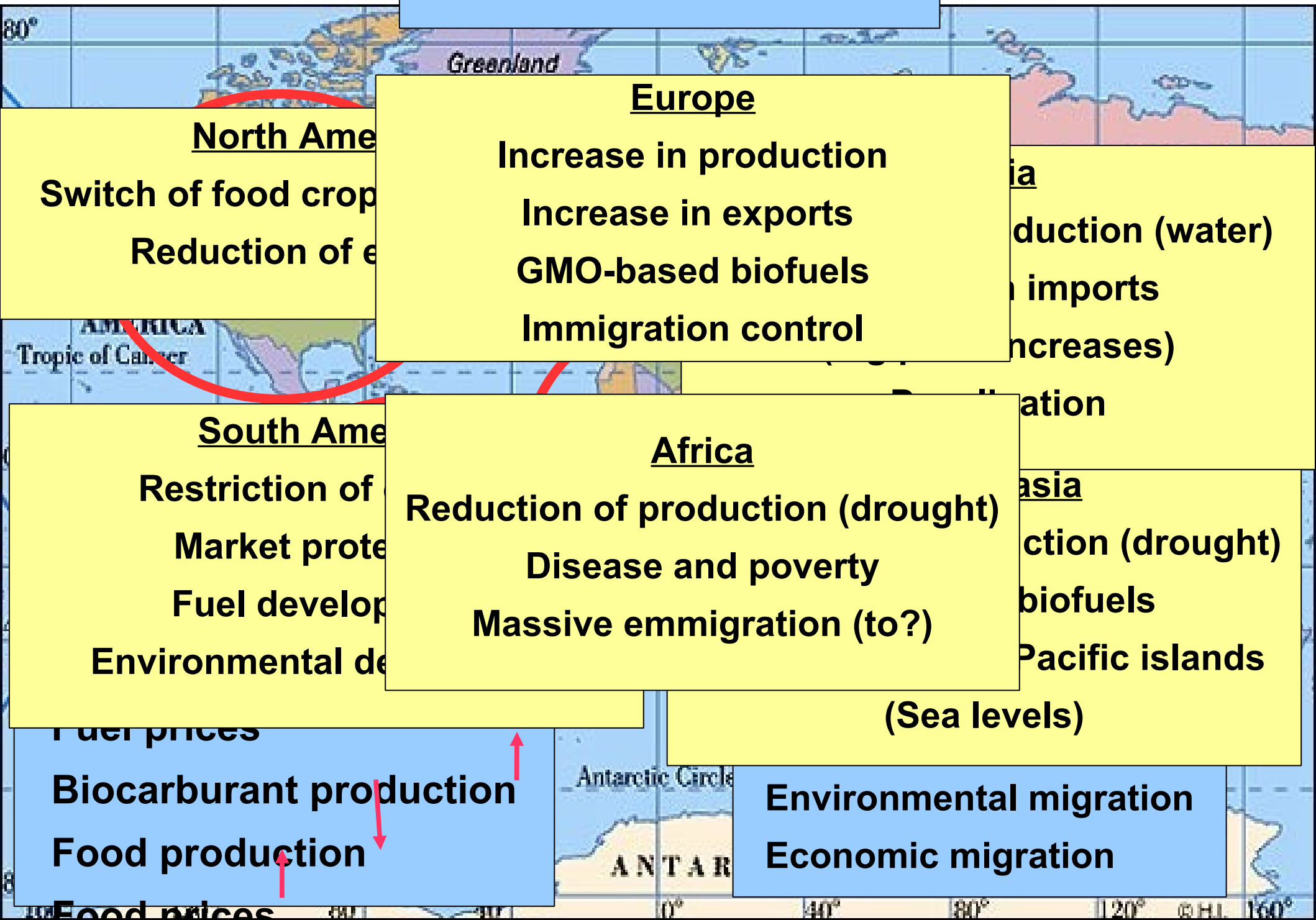
Aid 6-12m tonnes

By 1996

Corn prices: 120$ to 205$

Aid 12-3m tonnes

Conclusion



North Ame

Switch of food crop

Reduction of e

Europe

Increase in production

Increase in exports

GMO-based biofuels

Immigration control

ia

duction (water)

imports

ncreases)

ation

South Ame

Restriction of

Market prote

Fuel develop

Environmental de

Africa

Reduction of production (drought)

Disease and poverty

Massive emmigration (to?)

asia

ction (drought)

biofuels

Pacific islands

(Sea levels)

Fuel prices

Biocarburant production

Food production

Food prices

Environmental migration

Economic migration

Falling prices of third-world agricultural products 1980-2000

Cocao beans -70%

Palm Oil
-45%

Cotton
- 48%

Coffee beans -65%

Cocao – 3 companies control 40% of the market
The producer receives 2-4% of the final price

Coffee – 4 companies control
40% of the market. 4 companies control
45% of torrefaction.

Bananas – 88% for the international commercial companies, 12% for the (often foreign) producers, 2% for the labourers

Who will feed whom in the future?

China has to feed 22% of the world's population with 7% of agricultural land (and diminishing).

Produces 19% world cereals (twice EU)

30% world rice

15% world corn

19% maize

 # 1 cotton producer (25%)

 # 1 Pork (4 x more than the EU)

 # 1= Chicken

 # 3 cattle (behind Brazil and India)

 # 1 pisciculture

#1 fruits and vegetables (8 x EU)

Chronic flooding

Ice-melt in the Himalayas

Lowering of water reserve levels

Water and air pollution

Cereals for animal feed (1970 – 9%, 2000 - 30%)

Future world food reserve

Brazil

#1 sugar, coffee, soya, orange juice, chicken, beef, tobacco, ethanol.

30% GDP, 35% employment, 45% exports

With Argentina, will become the two biggest food exporters in the world and will supply Asia, Africa and the Middle East

EU – self-sufficient. The CAP regulations (protection) will be removed and the EU will face real food competition for the first time but increasing food prices and EU agronomy in developing EU countries (Central Eastern) will develop and sustain EU's position)

North Africa and the Middle East

Potential: land, water, labour OK.

But, political and economic instability, the lack of technology and capital and its inability to defend itself against EU and US competition.

Future – serious water shortages, serious food shortages, low income and higher food prices will lead to massive emmigration (attempts)

Middle East. Oil revenues (while they last) will allow the purchase of food and the desalination of water (high-energy costs). When the oil runs out – no other sufficient infrastructure.

Russia and ex Soviet Union

Can increase production considerably. Good land and water, global warming benefit. Could become future world cereal producer (like before - Odessa used to be the centre for world cereal prices)

Depends on:

Use of oil money for investment in technology and infrastructure (before the oil and gas runs out)

The responsibility of the CAP

<u>Agricultural subsidies:</u>

Switzerland 68%

Japan 56%

EU 32%

USA 16%

Australia 5%

Tax barrier aginst importing non-EU food 60% (as opposed to 5% for industrialised goods)

If the EU reduced its import taxes by 60%, it would increase by 20% developing country exports

What EU do we want? The EU could stop all agricultural exports and transform competitive production (sugar...) to internal production.

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David Rees Ph.D.

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INH

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