Agriculture Development Facing a Climate Change Scenario

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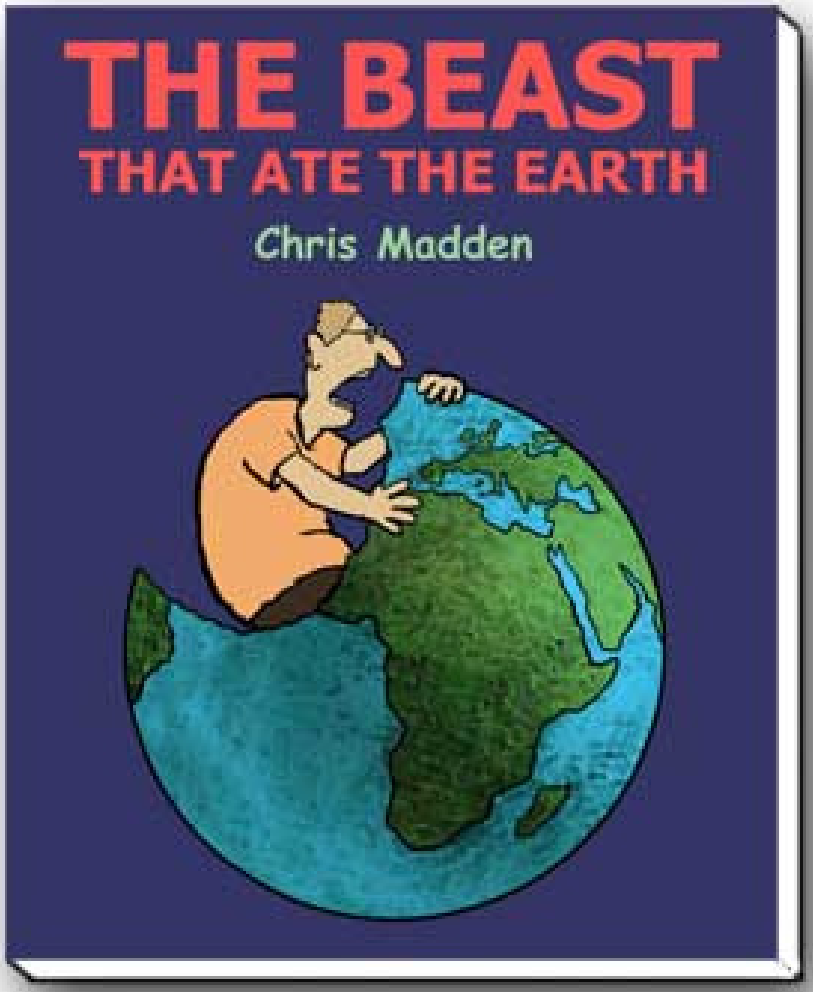
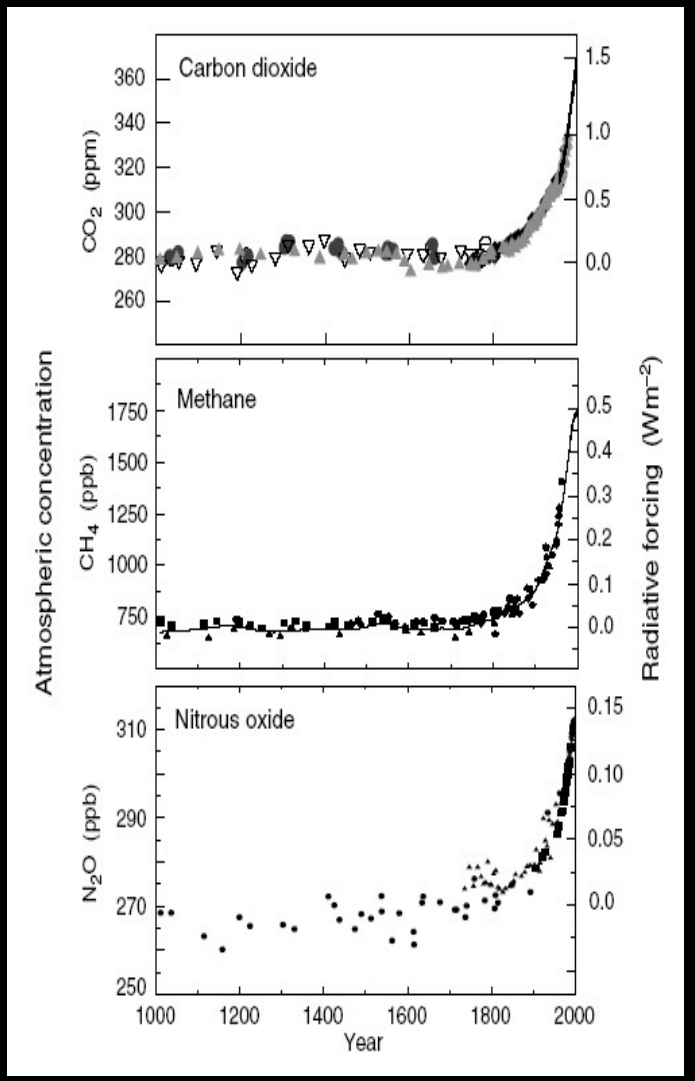
Welcome into the anthropocene…..



CO_2

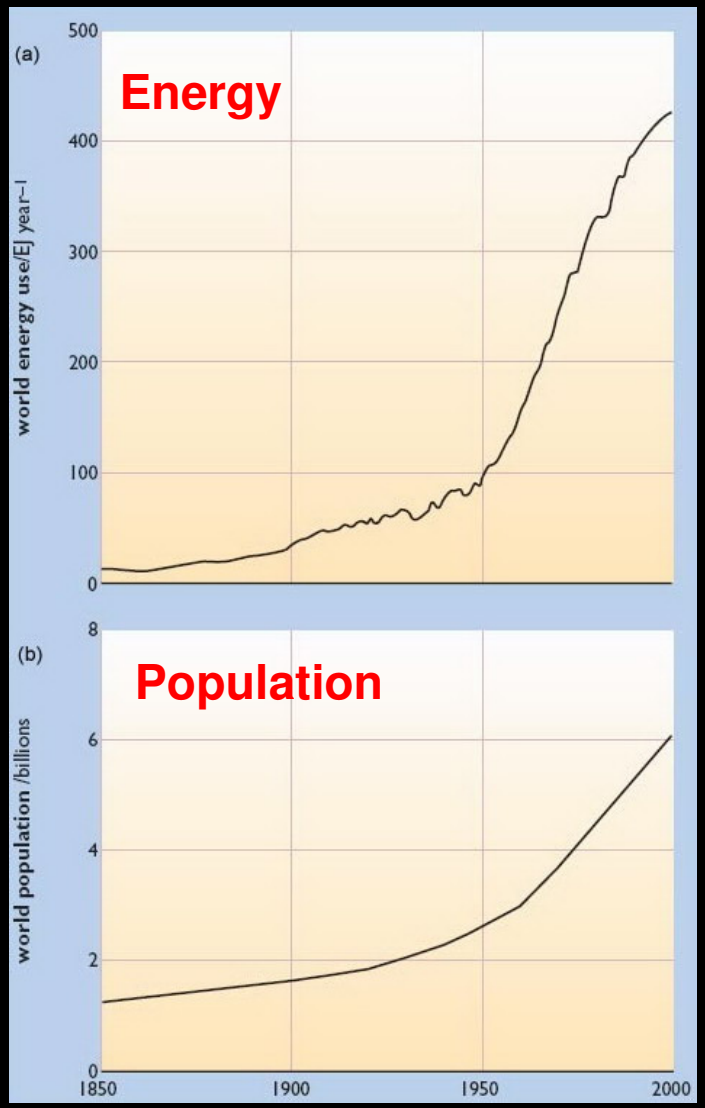
CH_4

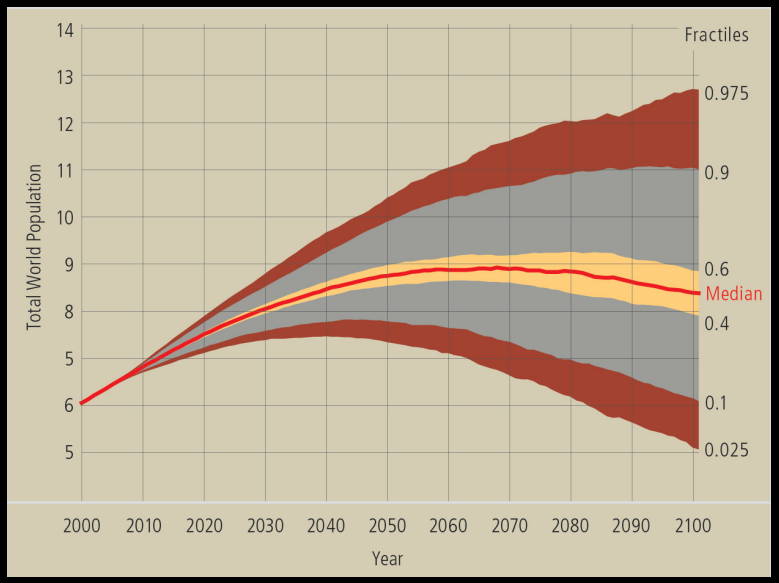
N_2O

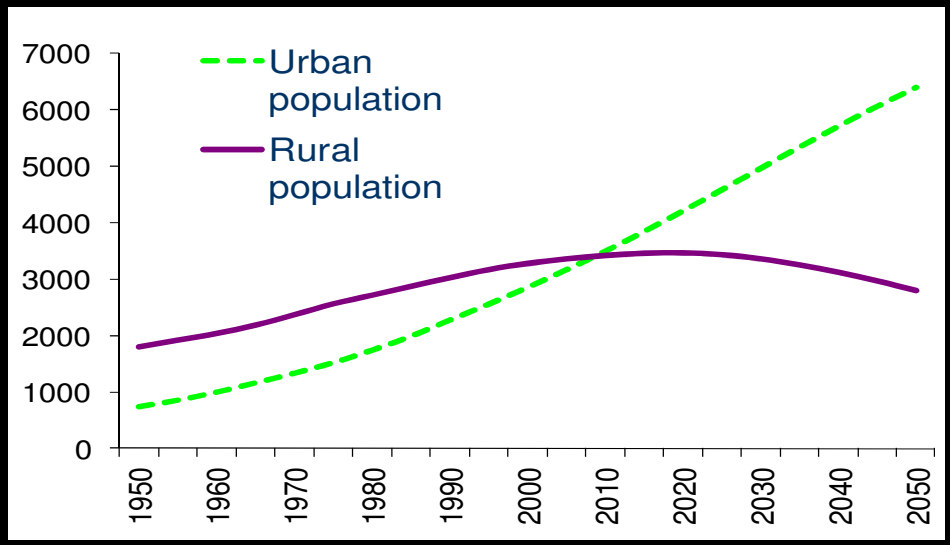


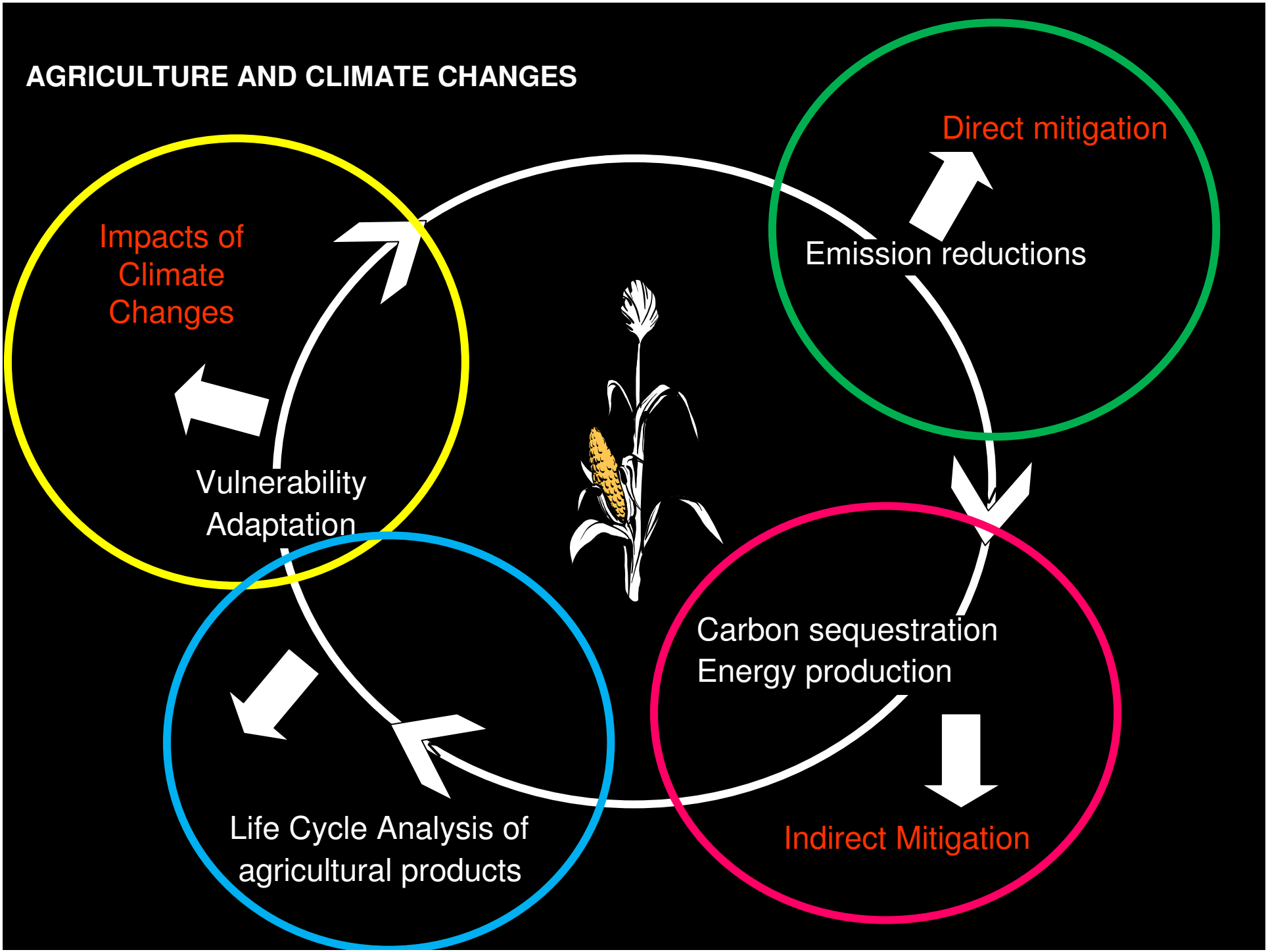
Energy population

From 6 to 9 billion by 2050 …

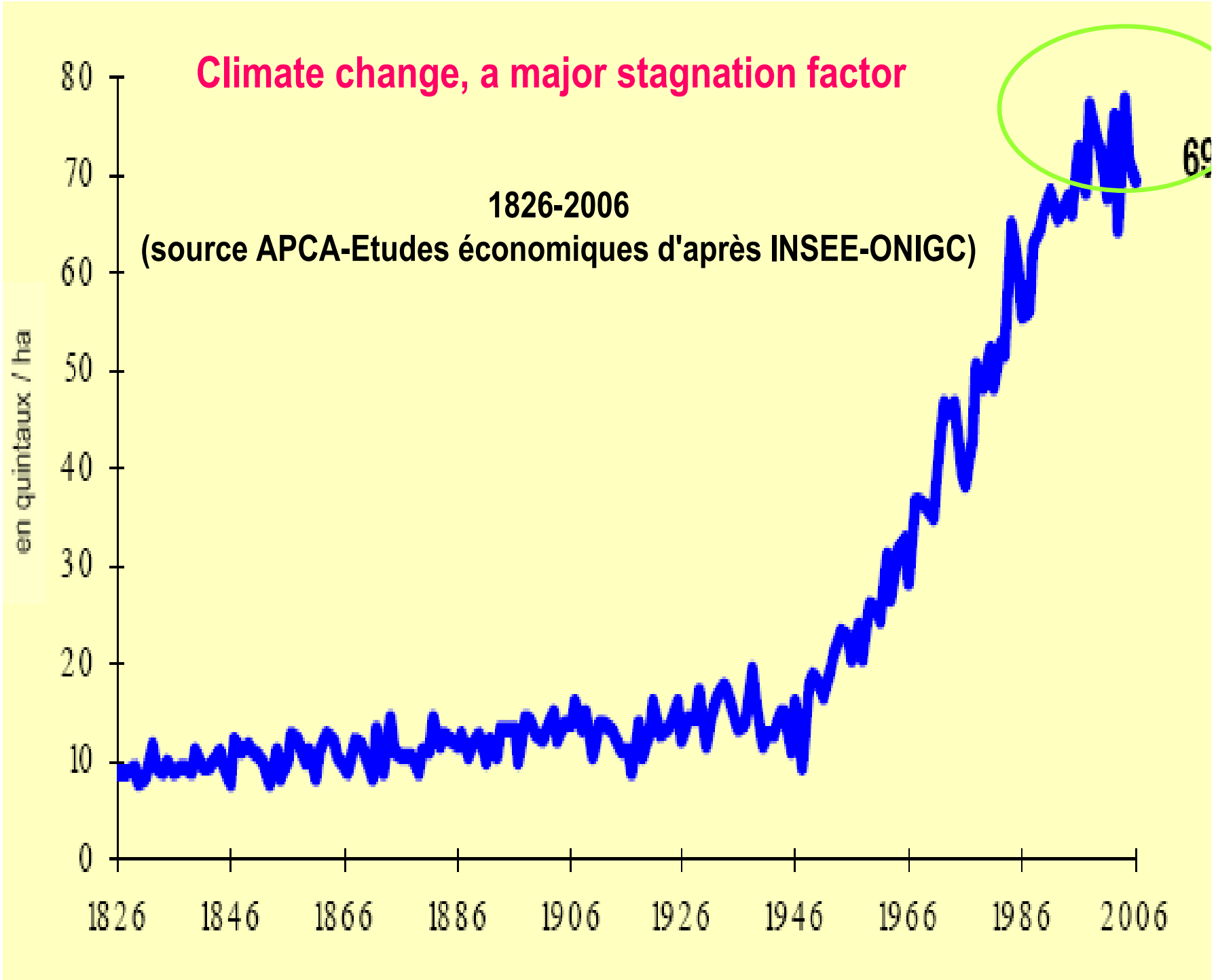






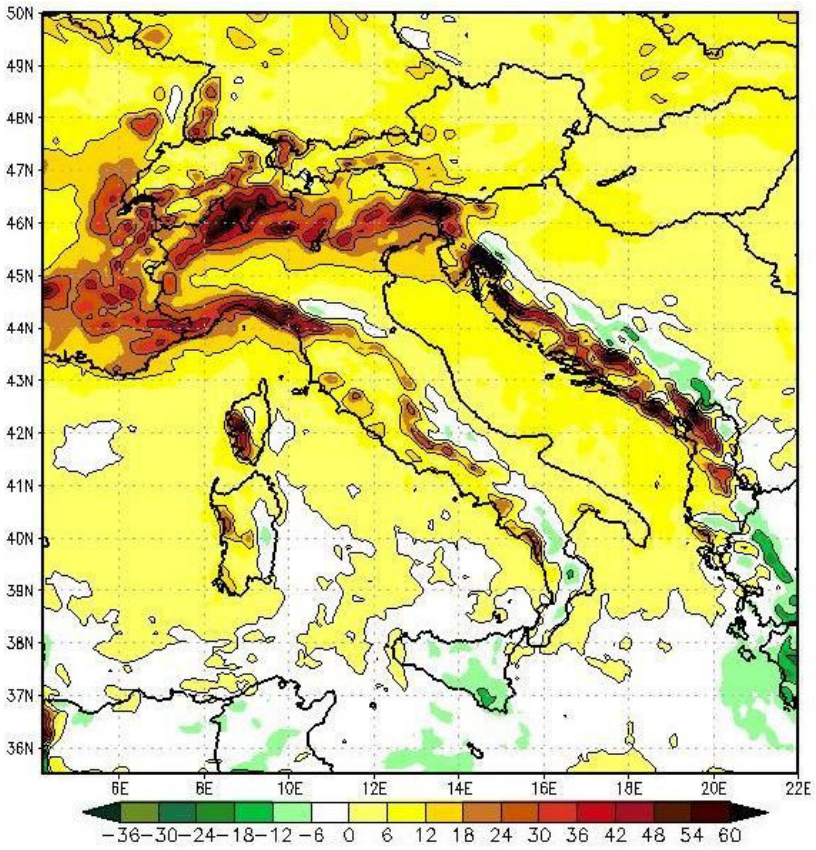

AGRICULTURE AND CLIMATE CHANGES
Direct mitigation
Emission reductions
Impacts of Climate Changes
Vulnerability
Adaptation
Carbon sequestration
Energy production
Indirect Mitigation
Life Cycle Analysis of agricultural products

Climate change, a major stagnation factor



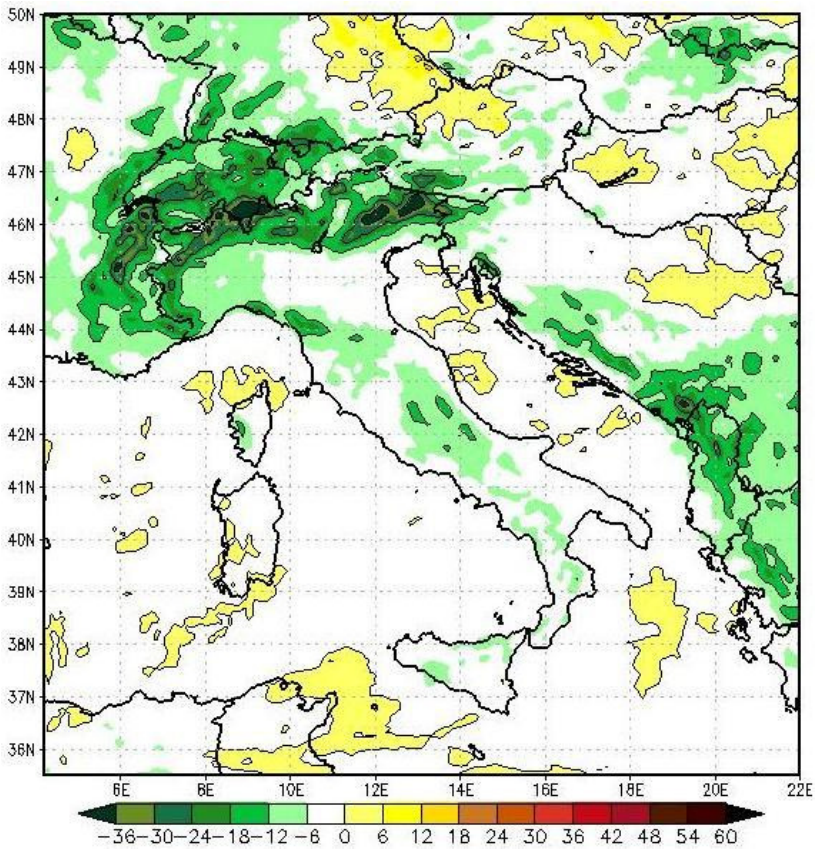
10. Italy precipitation variation (mm/month): future (2071-2100) minus past (1971-2000)

DJF



Increase of precipitation over Alpine area

JJA



Reduction of precipitation over Alpine area

Emissions from Agriculture

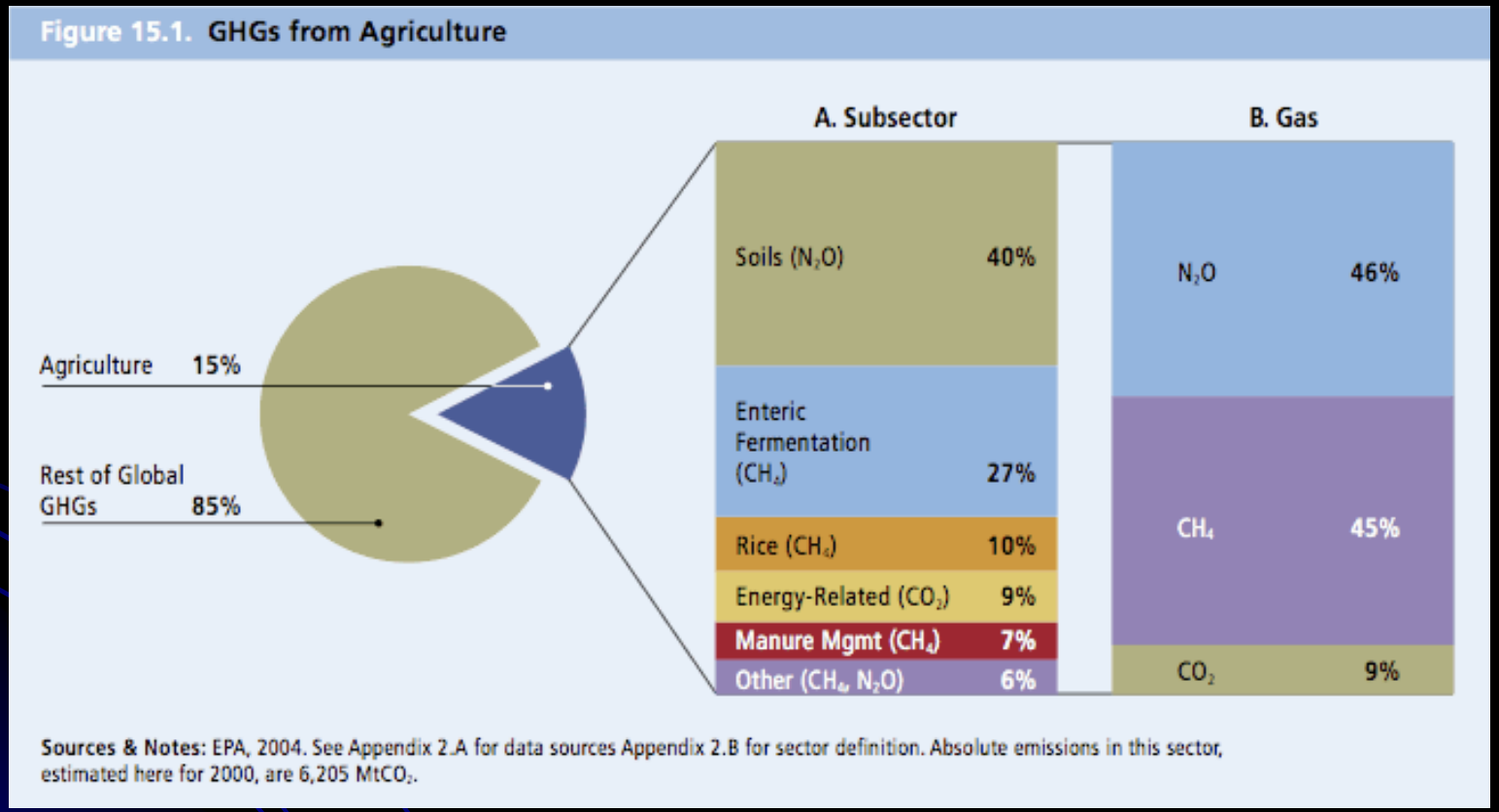
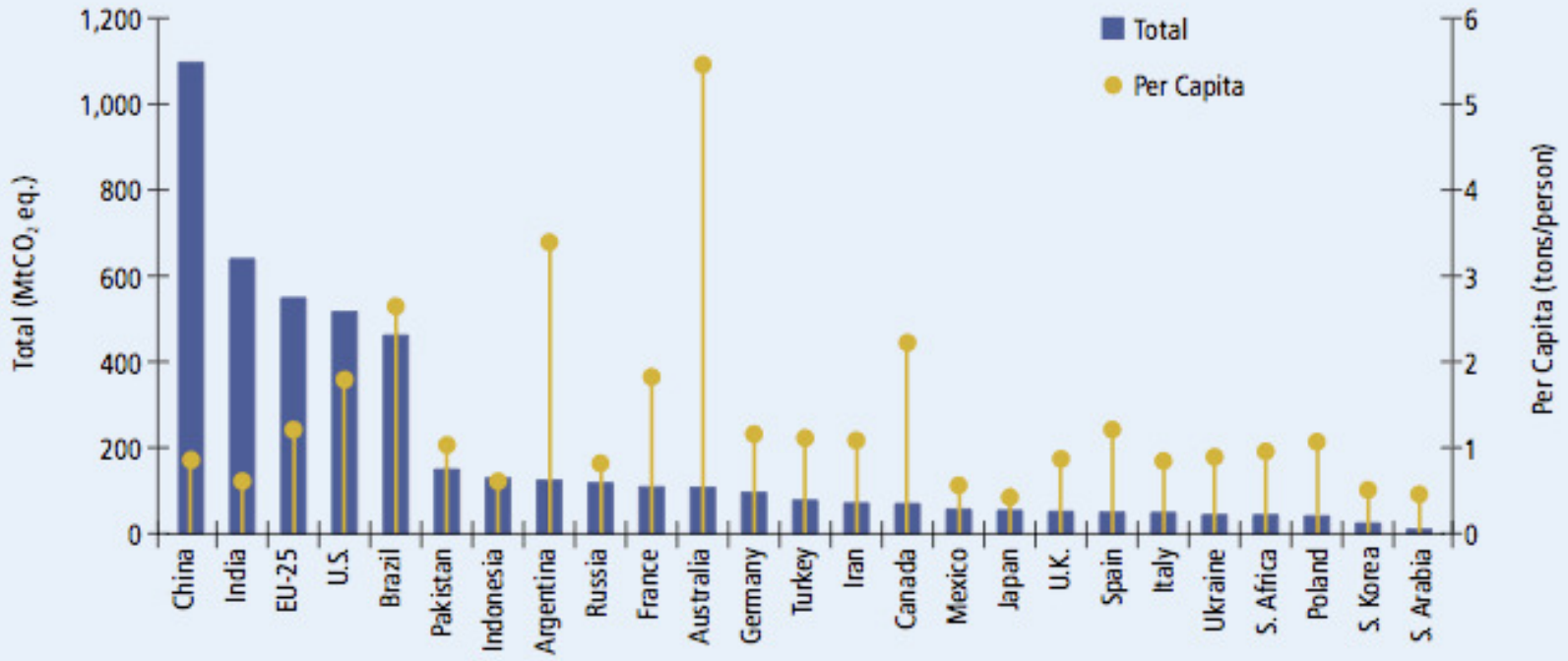


Figure 15.3. CO_2 **from Agriculture, Total and Per Capita, 2000**
Top 25 GHG emitters

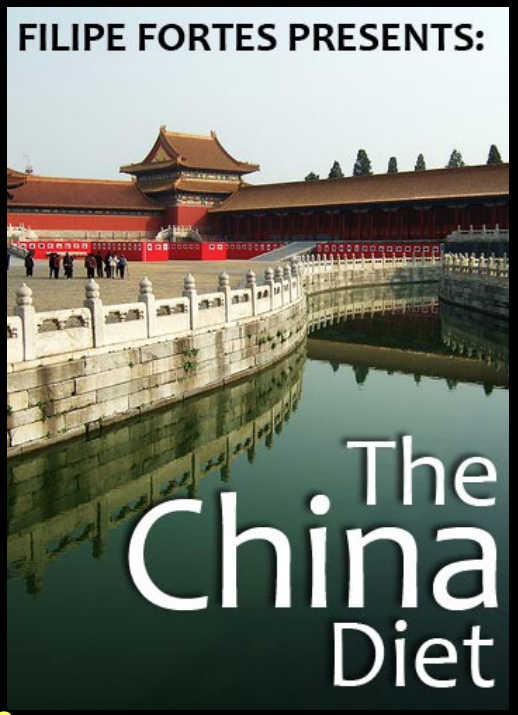


Sources & Notes: WRI, based on CAIT and IEA, 2004a. CO_2 emissions are from direct fossil fuel combustion only.

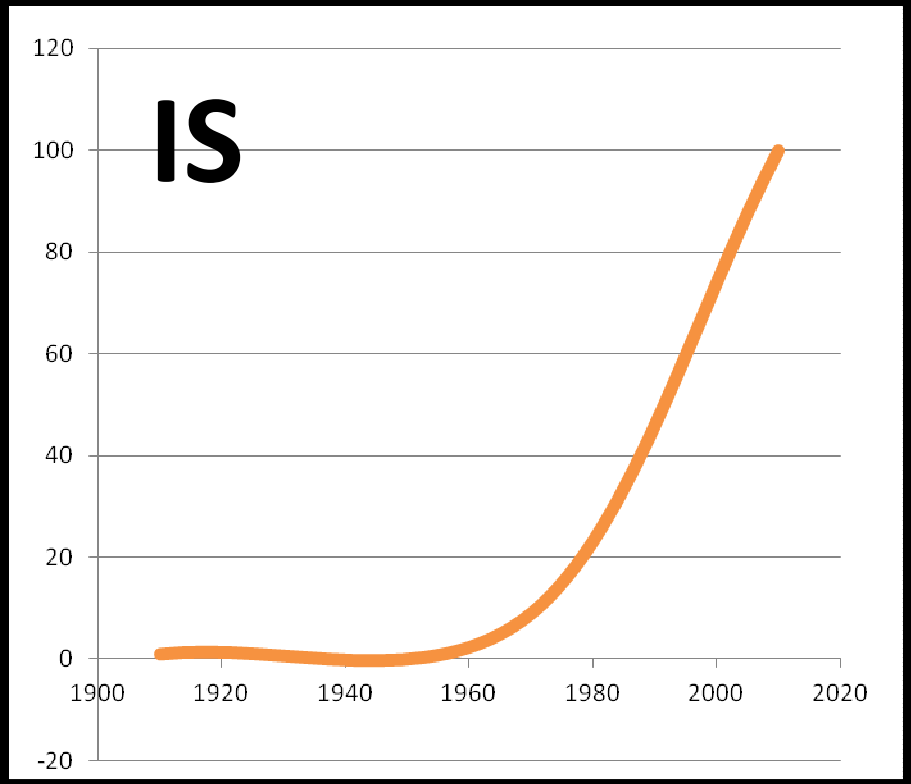
Table 1—food consumption per-capita Taiwan, 1940-92

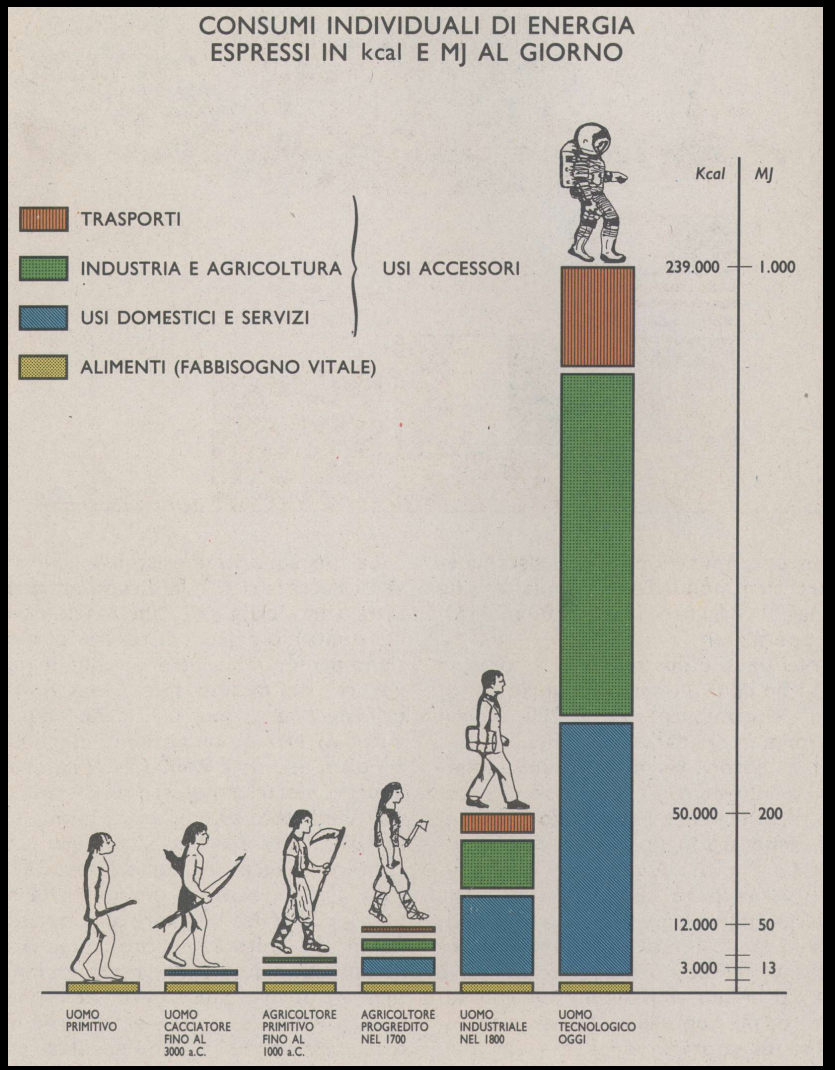
Period	Rice	Wheat	Potato	Meat
			(kilograms per capita per year)	
1940-44	109	0	91	11
1949-51	133	7	66	13
1959-61	137	22	62	16
1969-71	136	25	24	25
1979-81	105	24	4	40
1989-91	68	29	2	62
1992	64	29	2	66

Source: Taiwan, Council for Agricultural Planning and Development, various years



$$IS = \frac{Energy\ consumed\ to\ produce\ food}{Energy\ content\ of\ \ food}$$





The Greenhouse gas balance of italian agro-industry

(1778 kg CO2eq/year per capita)

Settore	*Mt CO2 eq*
Agriculture production	**47,1**
Enteric fermentation	**11,6**
Manure and waste	**6,9**
Transport	**19,8**
Industrial transformation	**5,5**
Packaging	**13,1**
TOTAL	**104,0**

[1] Con il termine emissioni della produzione agricola si intendono tutte le emissioni di gas serra in seguito alle lavorazioni, irrigazione, concimazioni etc. fino al confine dell'azienda (*Farm gate*)
[2] Escluse foraggere
[3] Dato elaborato da NIR (ISPRA,2009)
[4] Dato elaborato da NIR (ISPRA,2009)

ISMEA 2009, Rapporto AGRICARBON

The Global Warming Potential of some products from Agriculture

CARROT	Total	Fertilizer N	Electricity	Traction	Direct N_2O emissions
GWP kg CO_2 eq	**0,0589**	0,0126	0,0055	0,026	0,013
%	100	**21**	9	**44**	**22**

GREEENHOUSE TOMATOES	Total	Fertilizer N	Small plants production	Greenhouse heating	Electricity	Direct N_2O emissions
GWP kg CO_2 eq	**3,46**	0,038	0,046	3,13	0,22	0,031
%	100	1.1	1,3	**90,9**	6,4	0,9

TOMATOES FROM FIELD - industrial production -	Total	Fertilizer N	Fertilizer P	Diesel	Direct N_2O emissions
GWP kg CO_2 eq	**0,049**	0,0198	0,005	0,004	0,018
%	100	**40**	10	8	**36,7**

Do you know the Water Footprint of…?

water footprint

Potato (100 g)

Egg (40 g)

Bag of potato chips (200 g)

Slice of cake (80 g)

Sheet of A4 paper (80 g/m²)

Tomato (70 g)

Piece of cheese (100 g)

Piece of chocolate (50 g)

T-shirt (250 g)

Slice of bread (30 g)

Orange (100 g)

Apple (100 g)

Hamburger (150 g)

Pair of a leather shoes

Global average Water Footprint of some types of commonly used products (expressed in liters)

Water footprint

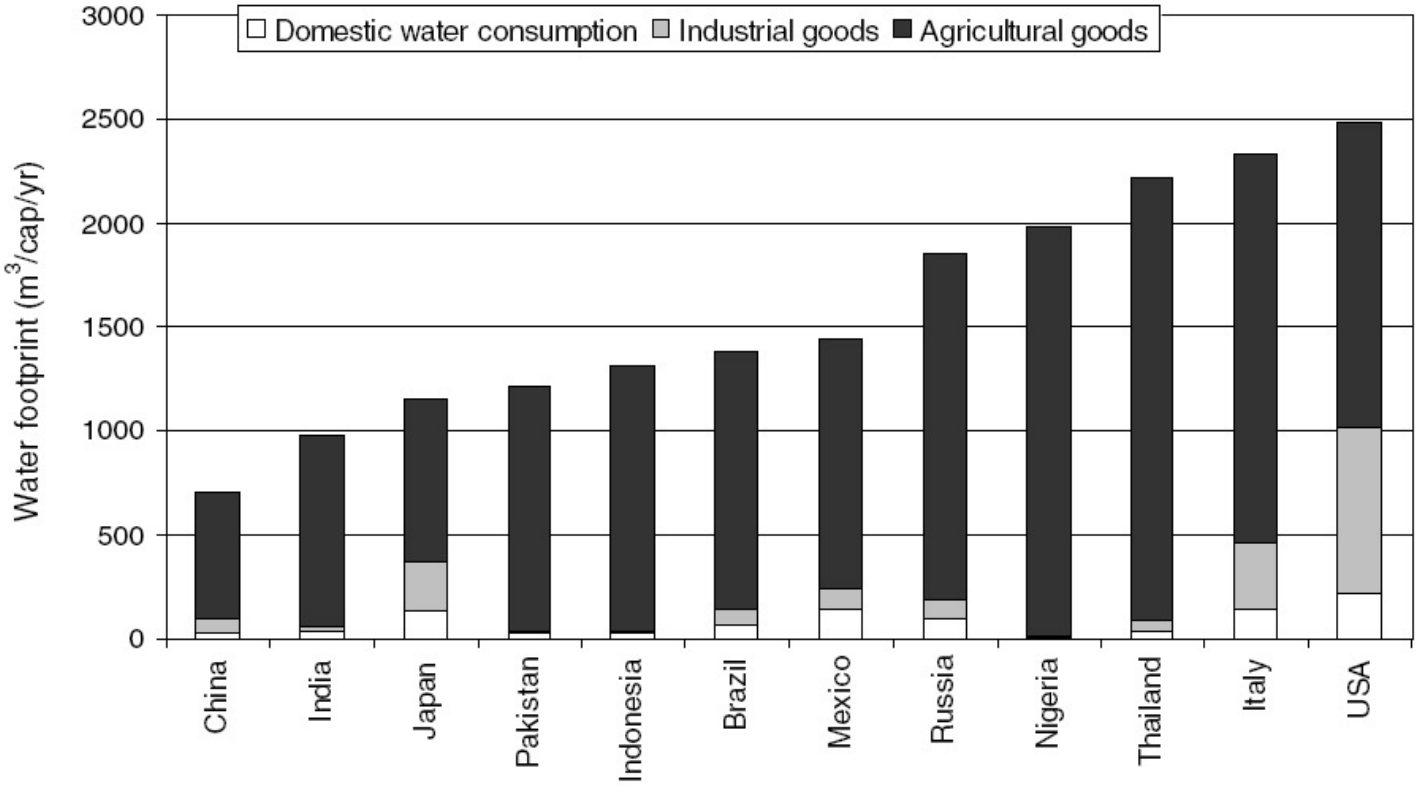
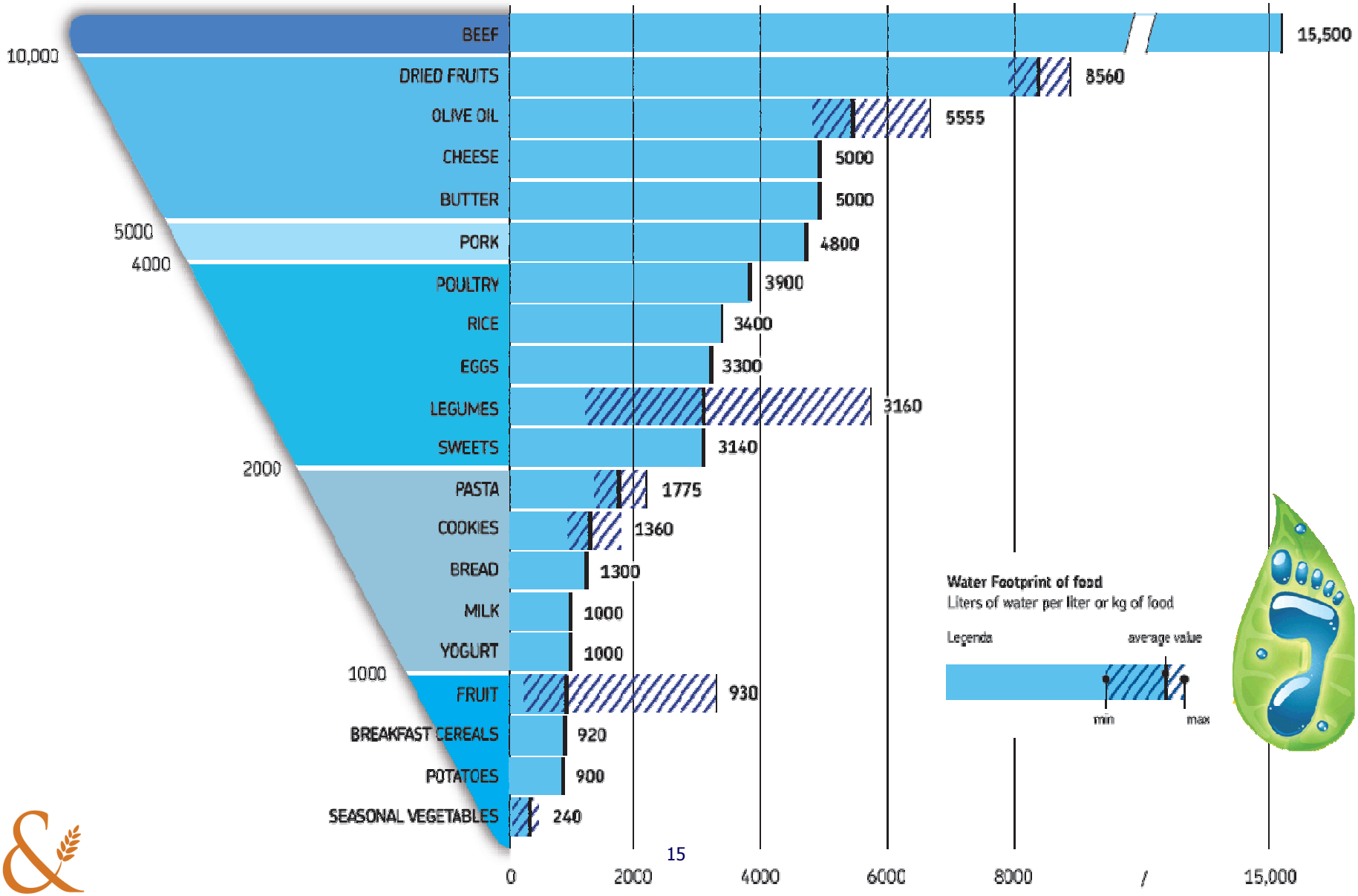
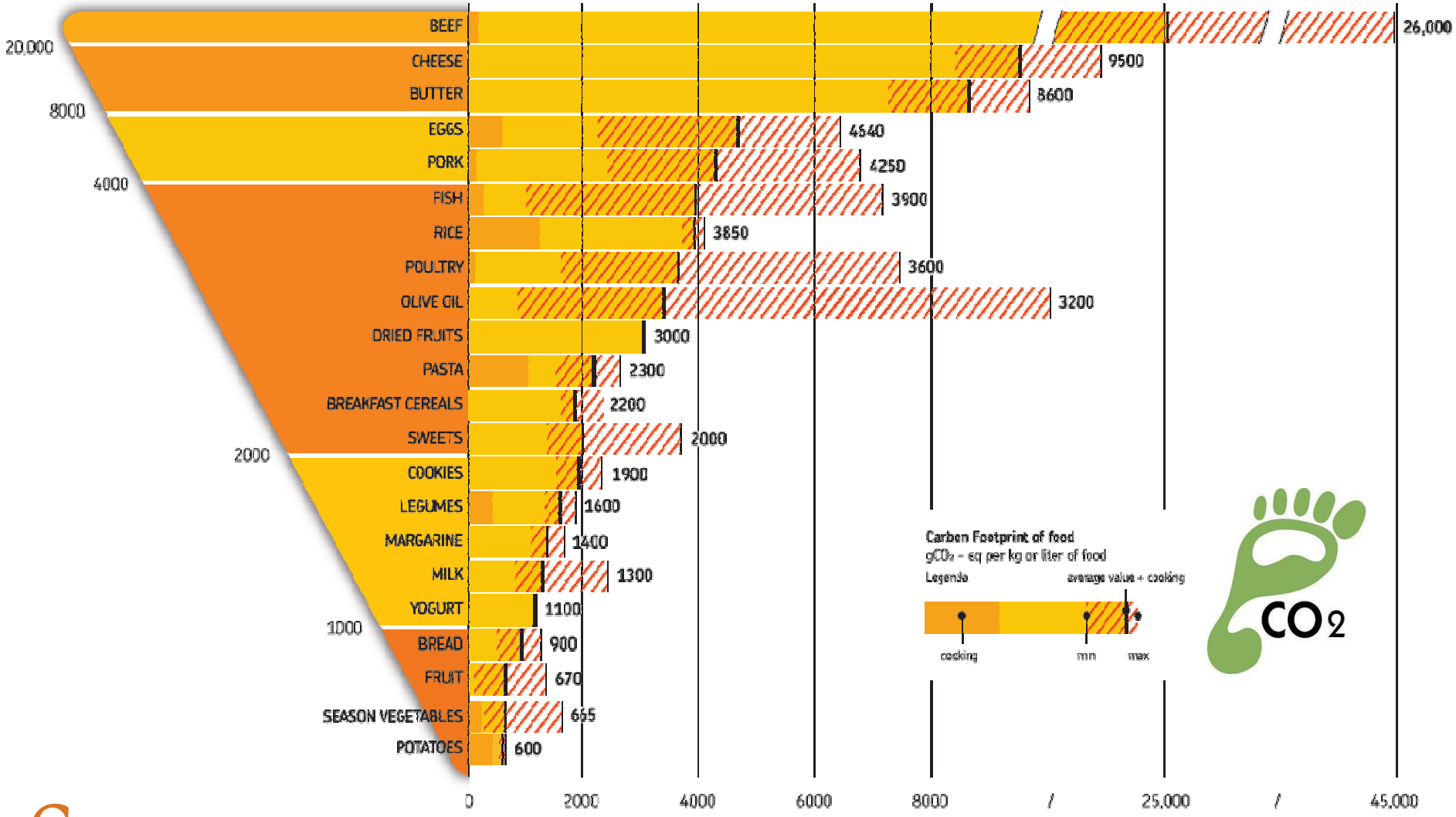


Fig. 5 The national water footprint per capita and the contribution of different consumption categories for some selected countries

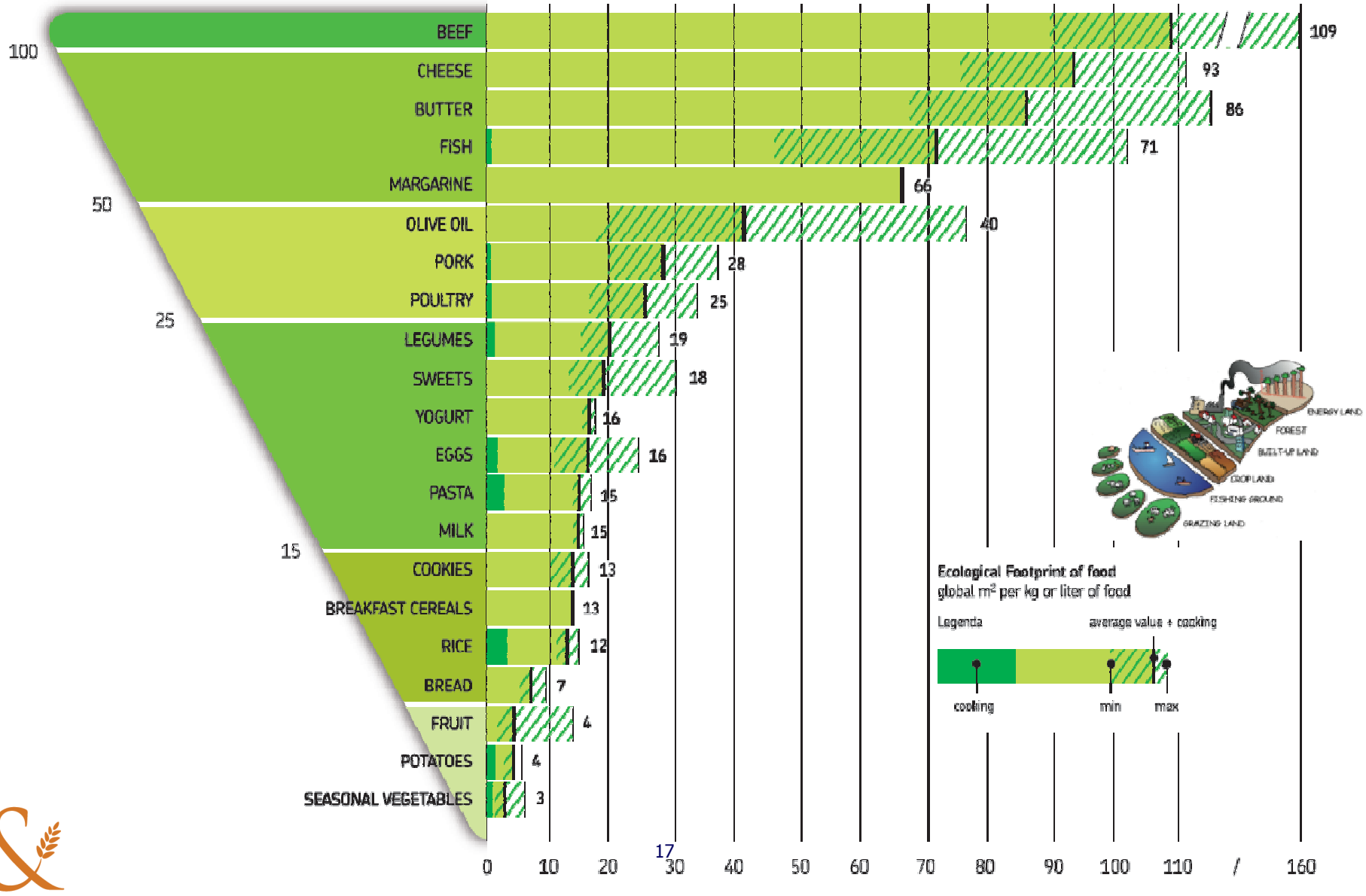
Environmental Pyramid: Water Footprint



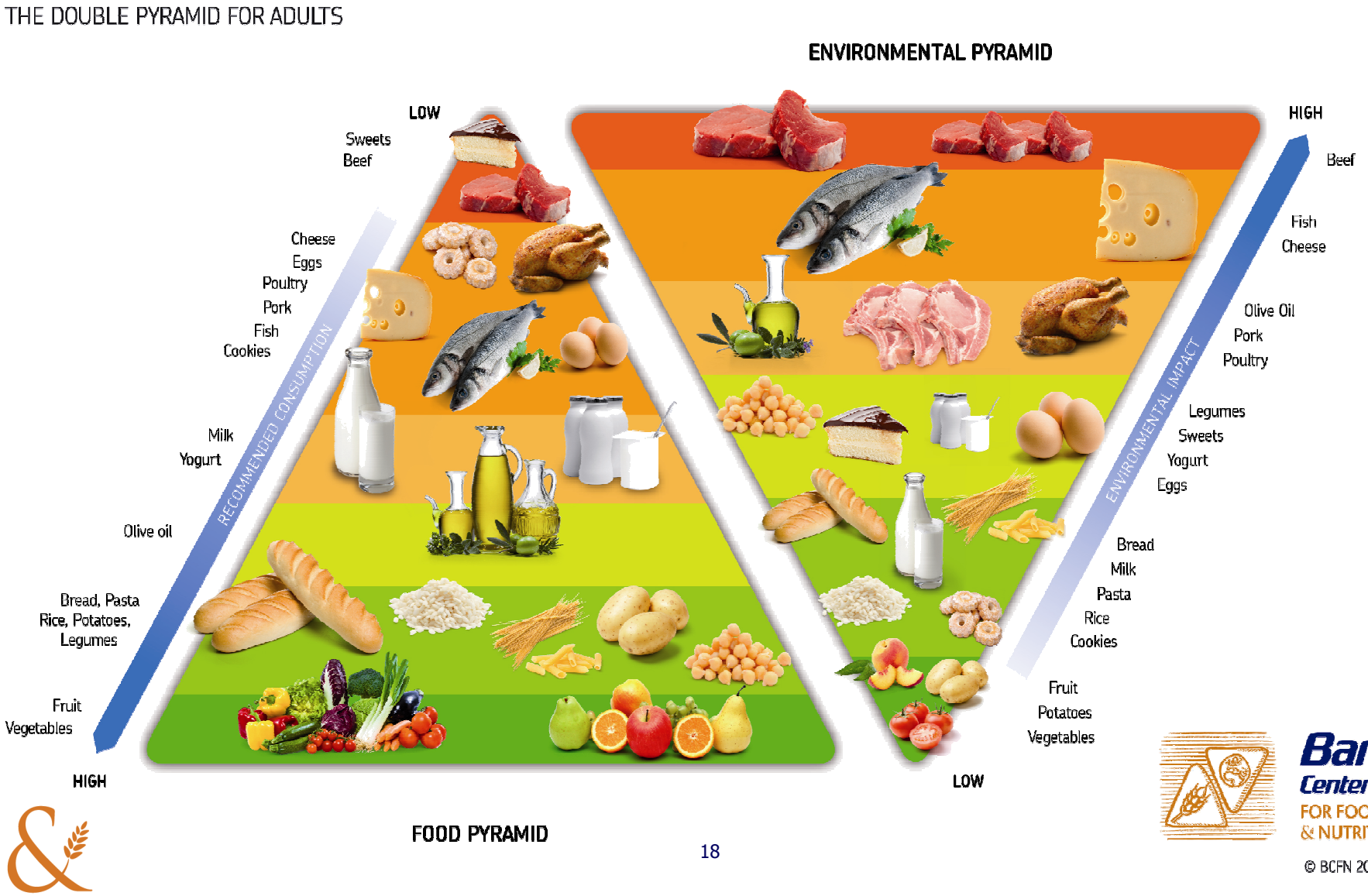
Environmental Pyramid: Carbon Footprint



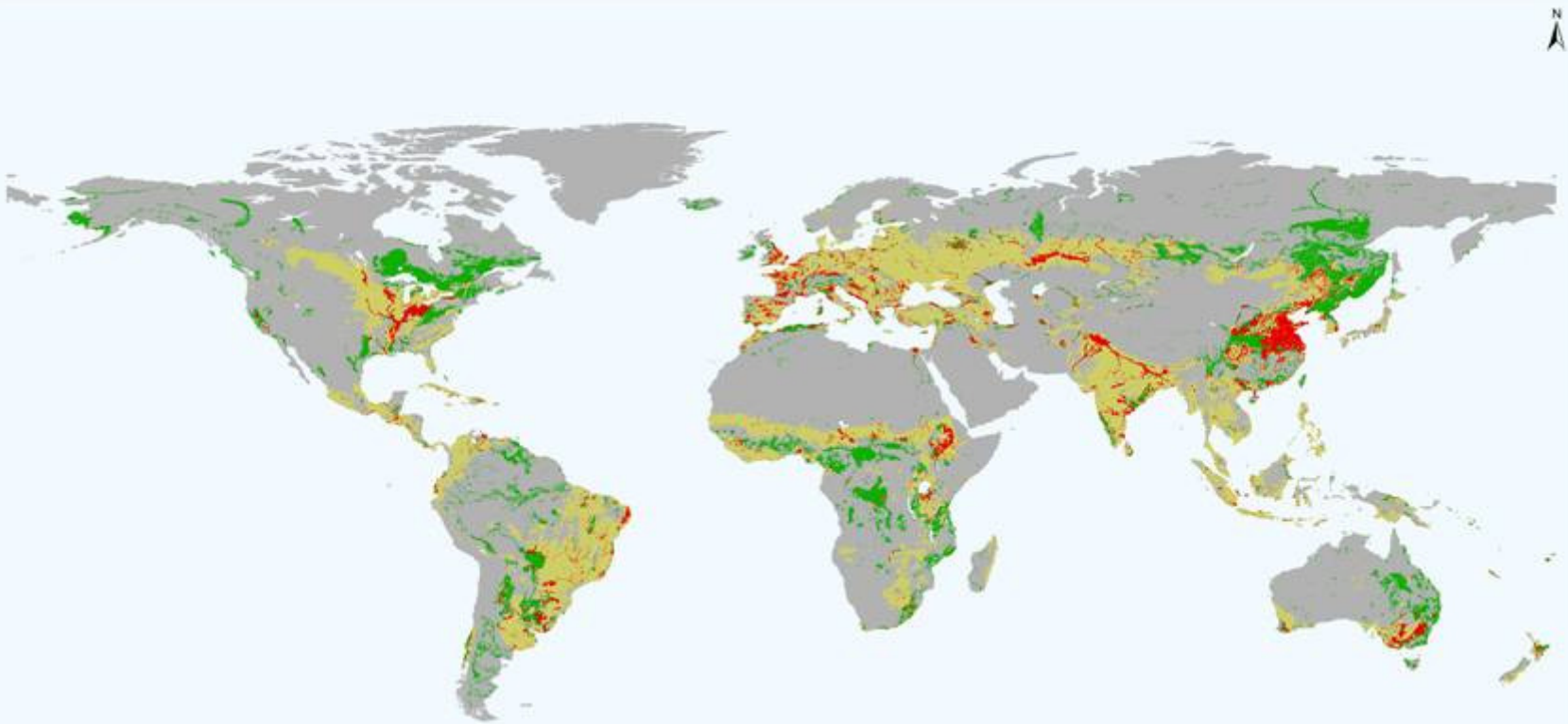
Environmental Pyramid: Ecological Footprint



The Result is the BCFN Double Pyramid *for adults*



Potential to sequester additional carbon in soils on croplands



Source: SOFA 2007, FAO

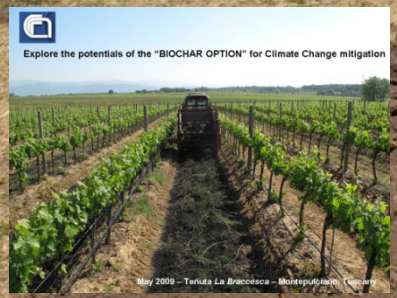
FAO - NRCE 2007

GRASSING

ROTATIONS
GREEN MANURE
LANDFILLS

FERTIIZATION
REDUCTIONS

MINIMUM
TILLAGE



BIOCHAR

BIOENERGY

The Regional Carbon Budget
A trademark for sustainable agriculture production

Reforestation

Optimization/transport/ packaging

Set aside

Compost/biogas

Bionergy

Biochar

Renewable energies

CO2-free label