Environmental and moral consequences of industrialized meat production and trade

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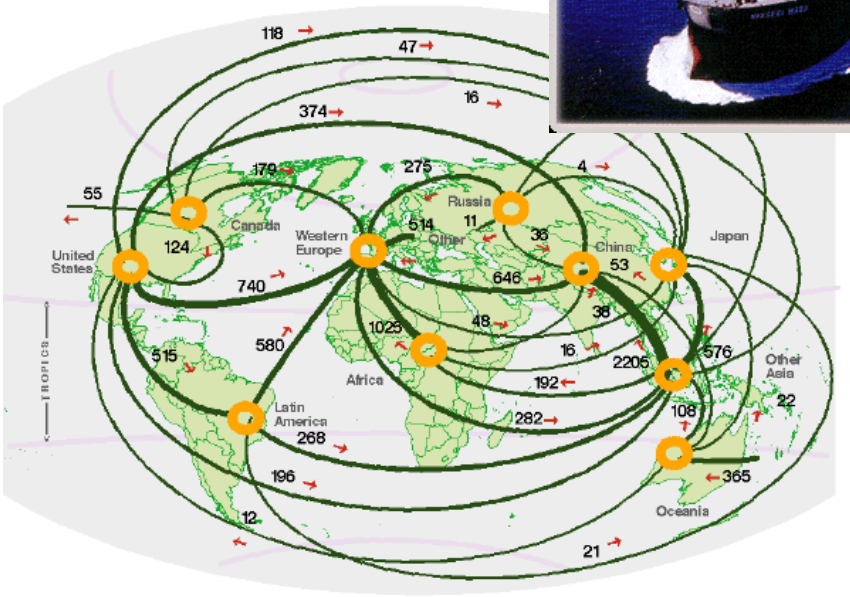
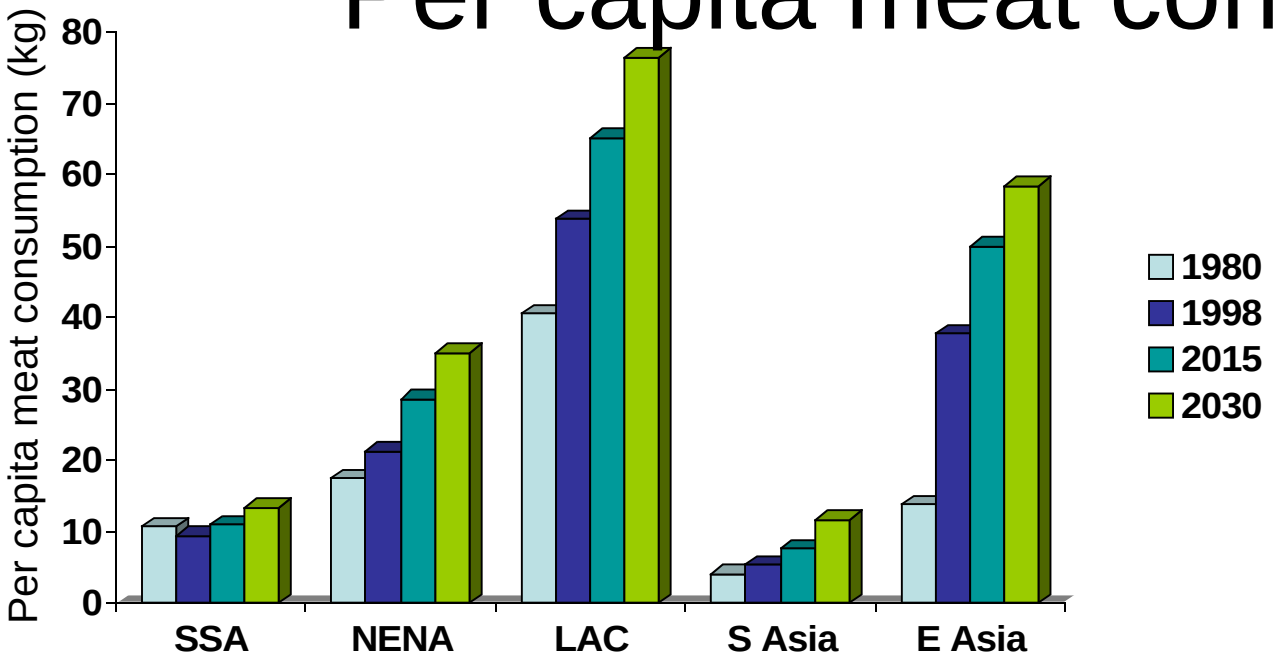
IAIA ‘07

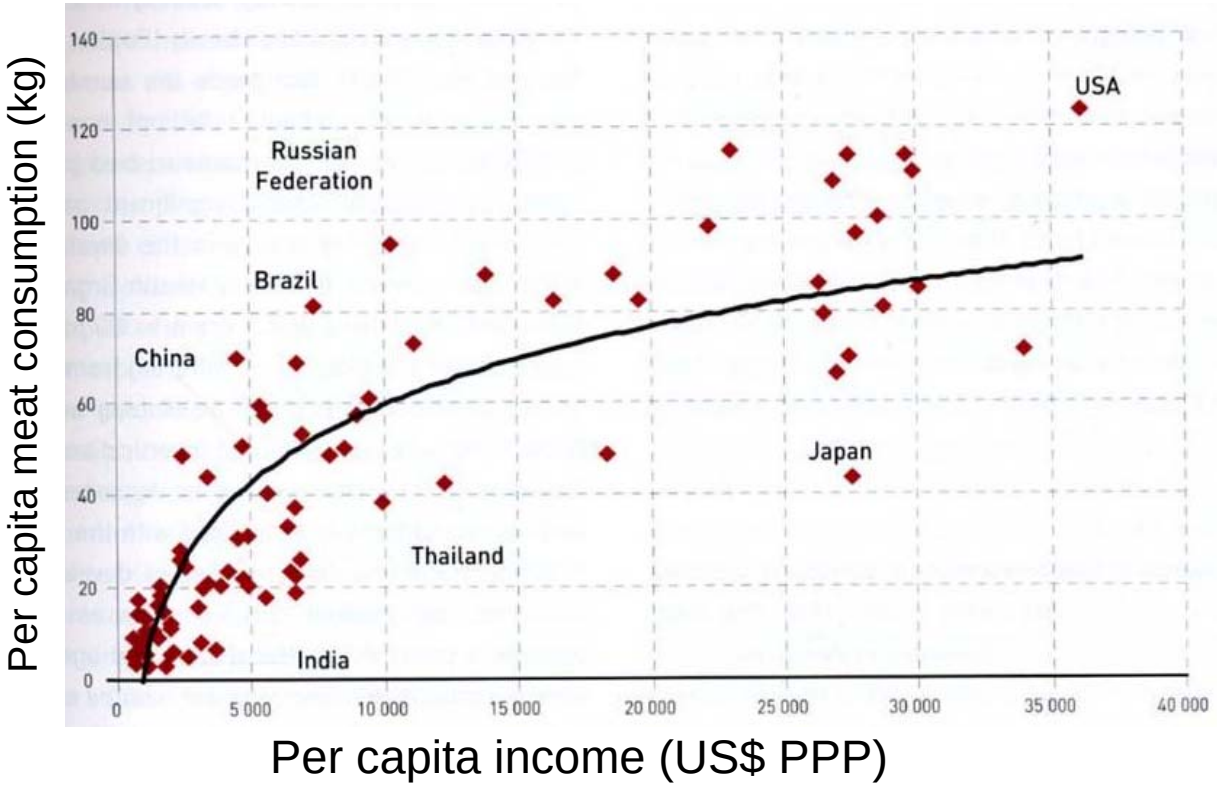
Meat + Trade = ?

1. Livestock
2. Environment
3. Virtual transfers
4. Model
5. Results
6. Discussion



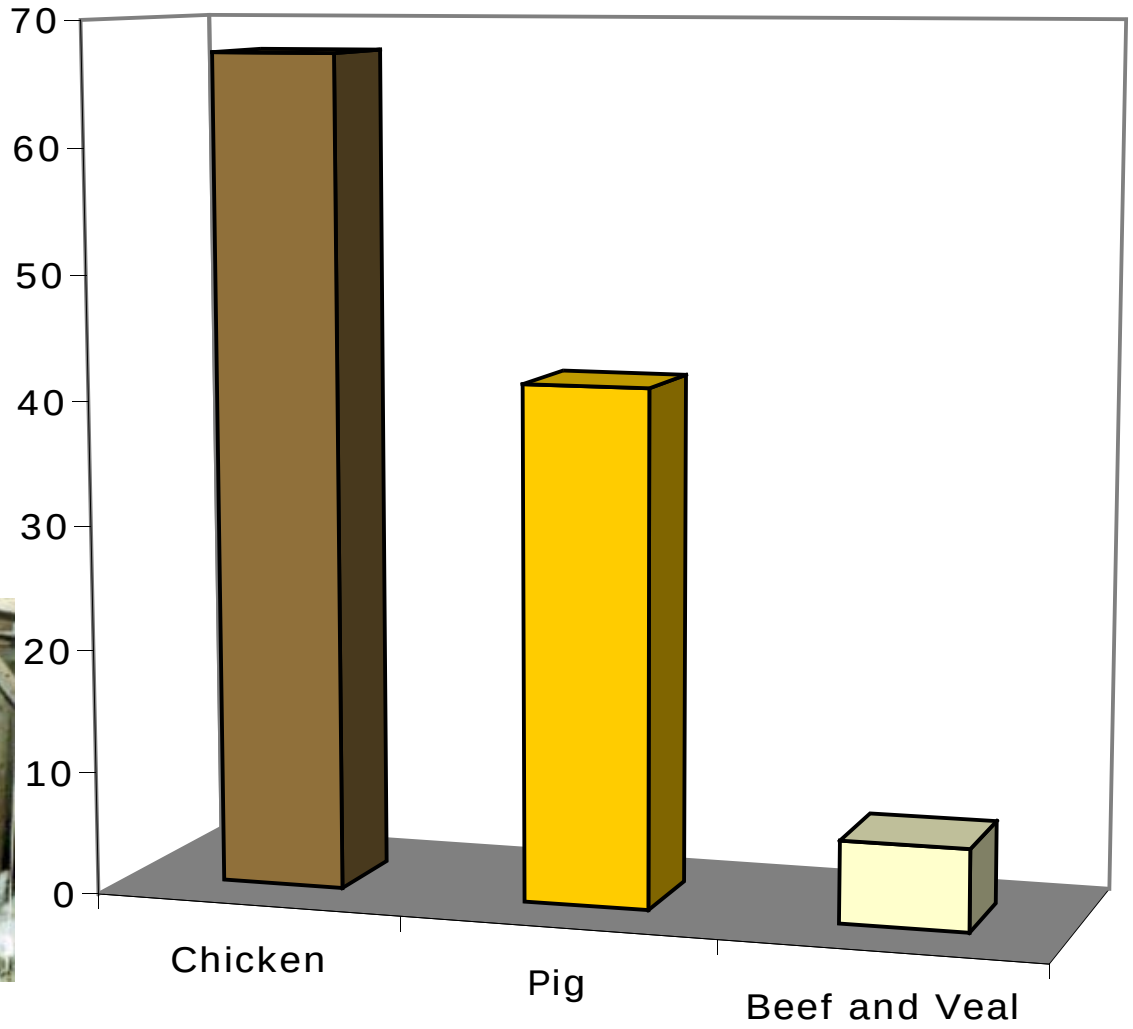
Per capita meat consumption



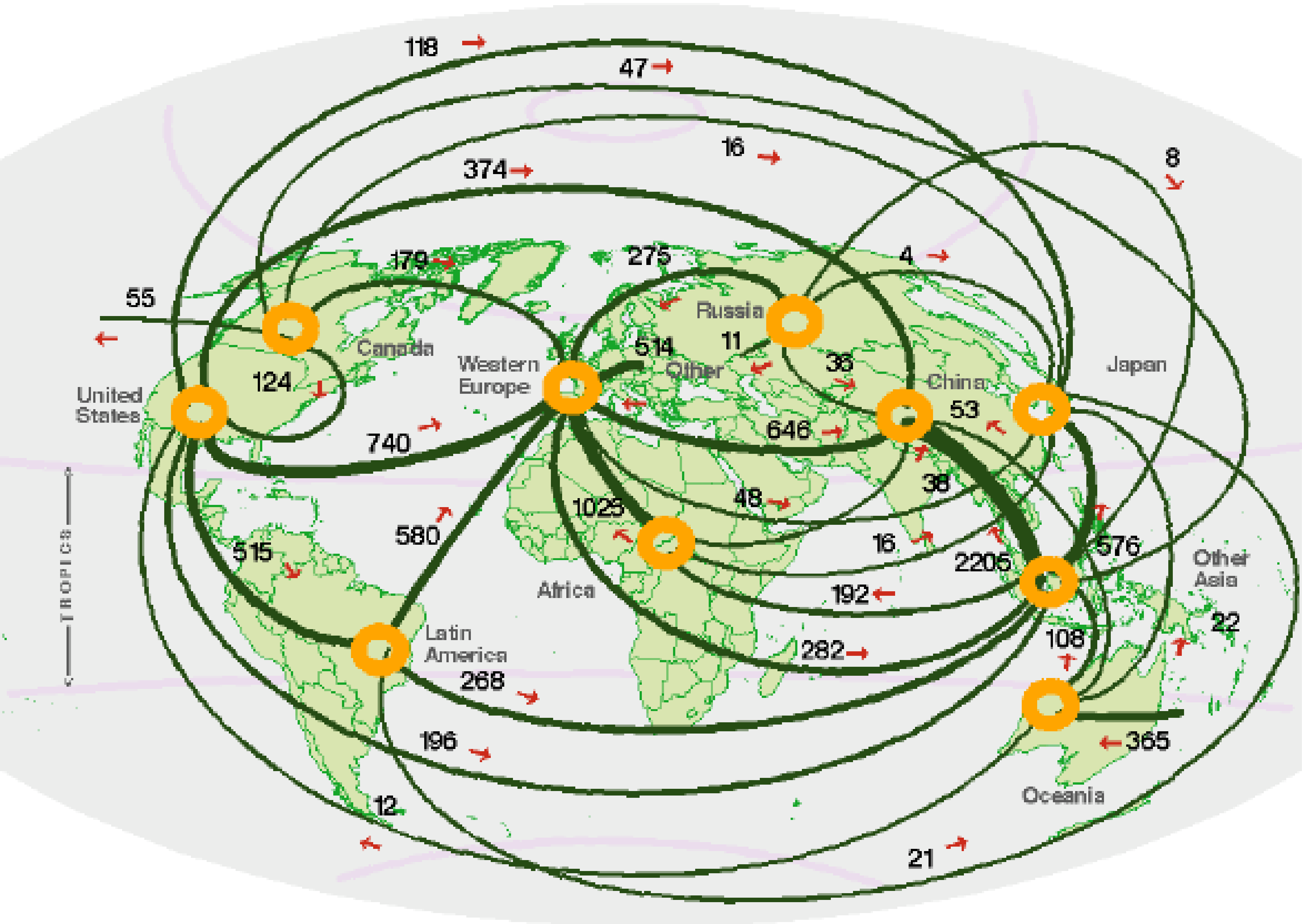


Industrialization

Percent global production from industrial systems (2004)



Source: FAO 2004

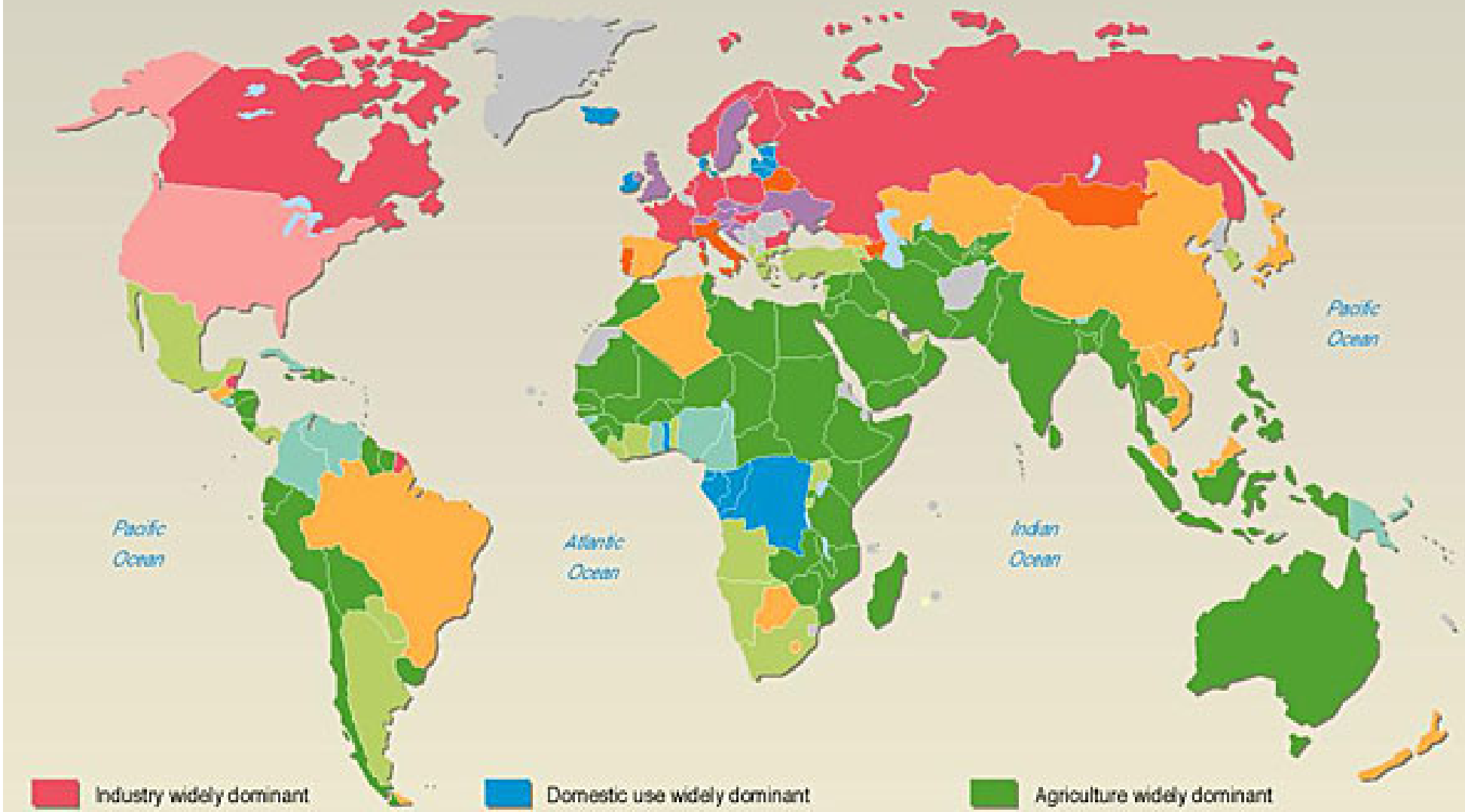

118
47
16
374
8
179
275
4
55
Russia
11
514
Other
36
Canada
Western Europe
Japan
China
124
United States
53
740
646
38
48
1025
580
16
576
TROPICS
515
2205
Other Asia
Africa
192
Latin America
282
108
22
268
365
196
Oceania
12
21

Tip = What you pay

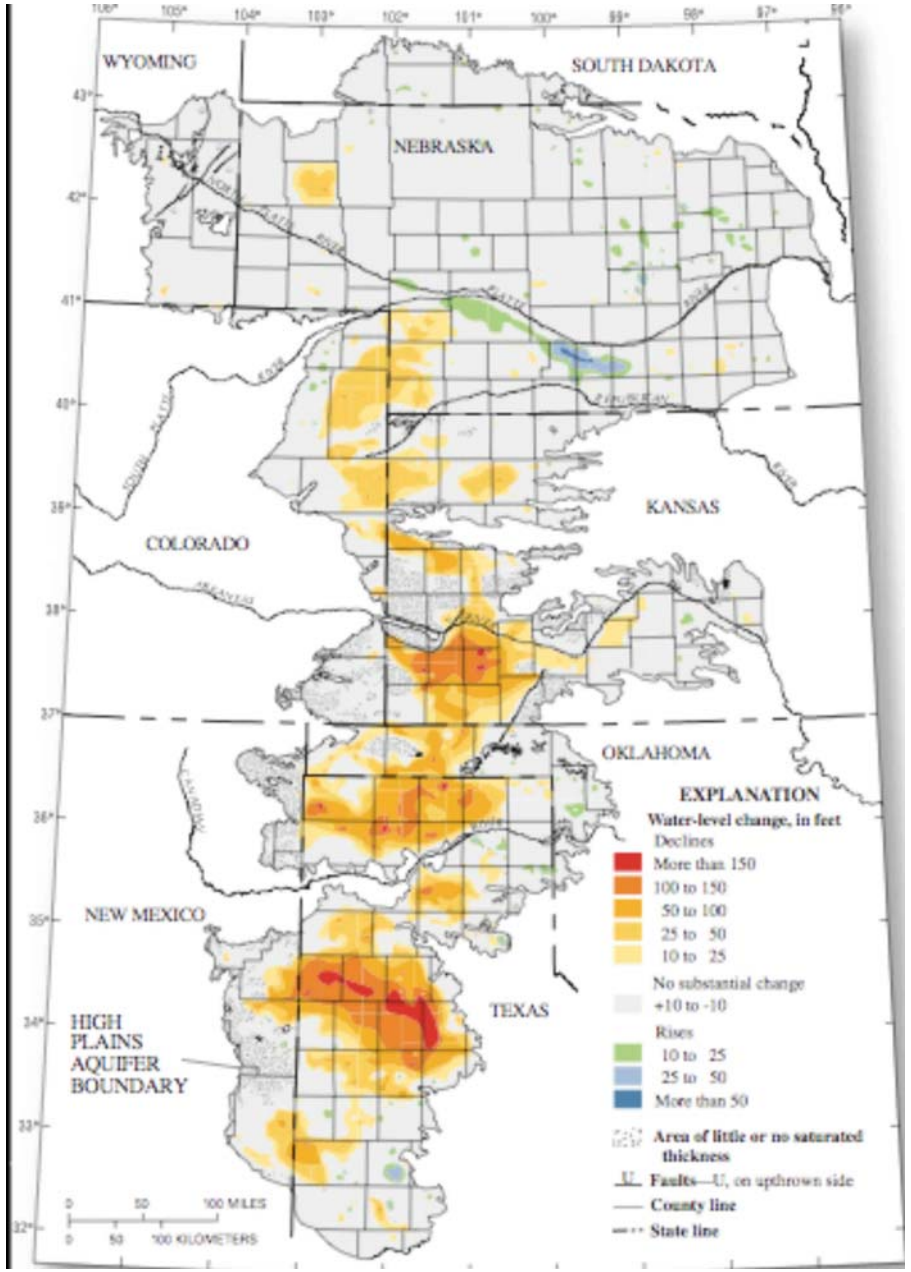
The true cost of goods…

Global Freshwater Withdrawal

Country Profiles Based on Agricultural, Industrial and Domestic Use

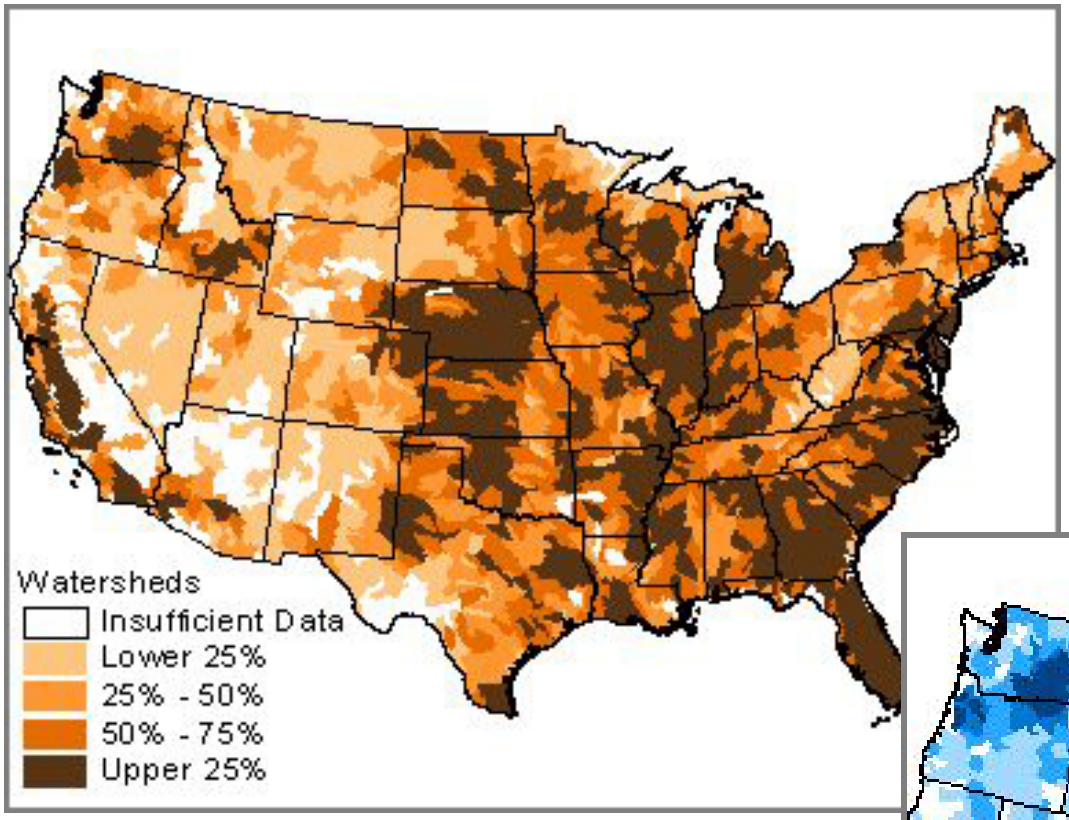


Source: Based on data fromTable FW1 in *World Resources 2000-2001, People and Ecosystems: The Fraying Web of Life*, World Resources Institute (WRI), Washington DC, 2000.

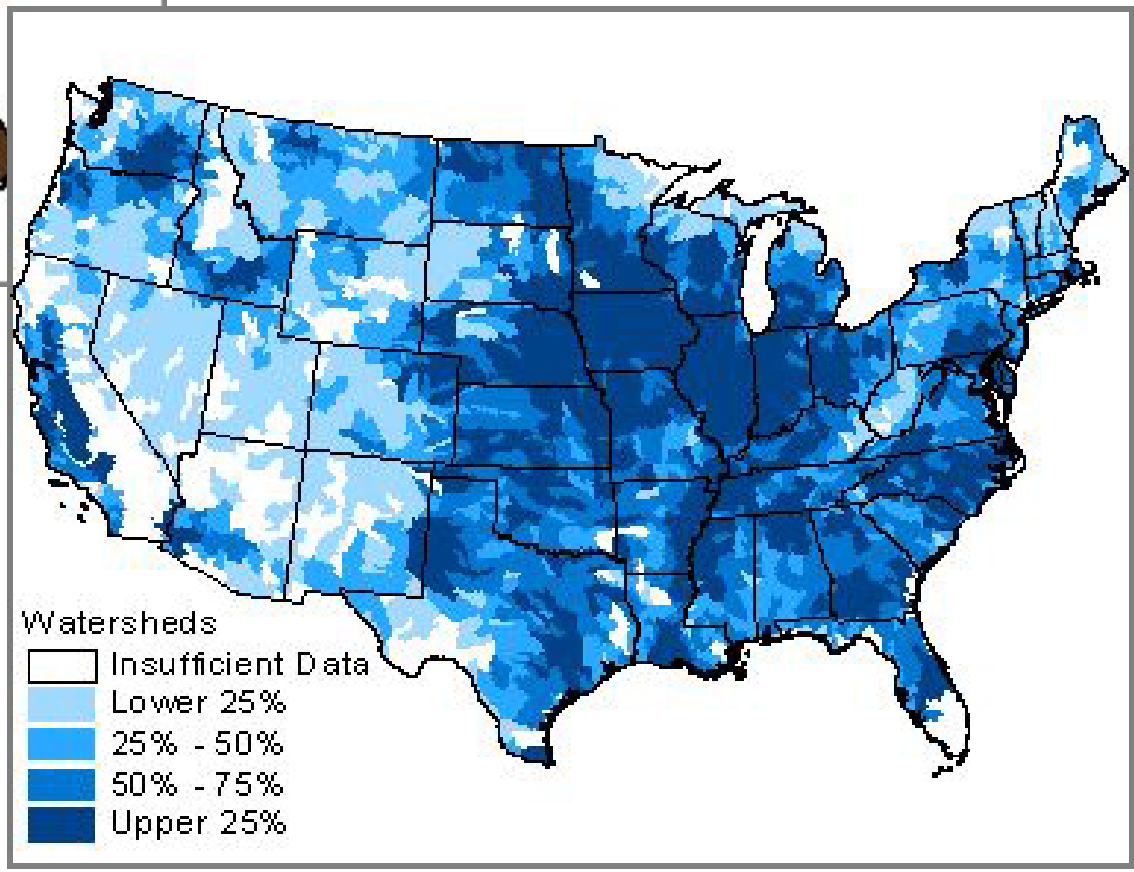

WYOMING
SOUTH DAKOTA
NEBRASKA
KANSAS
COLORADO
OKLAHOMA
NEW MEXICO
TEXAS
HIGH PLAINS AQUIFER BOUNDARY
EXPLANATION
Water-level change, in feet
Declines
More than 150
100 to 150
50 to 100
25 to 50
10 to 25
No substantial change
+10 to -10
Rises
10 to 25
25 to 50
More than 50
Area of little or no saturated thickness
Faults—U, on upthrown side
County line
State line
0 50 100 MILES
0 50 100 KILOMETERS

Source: USGS

Potential nitrogen leaching to ground water



Potential nitrogen leaching to surface water

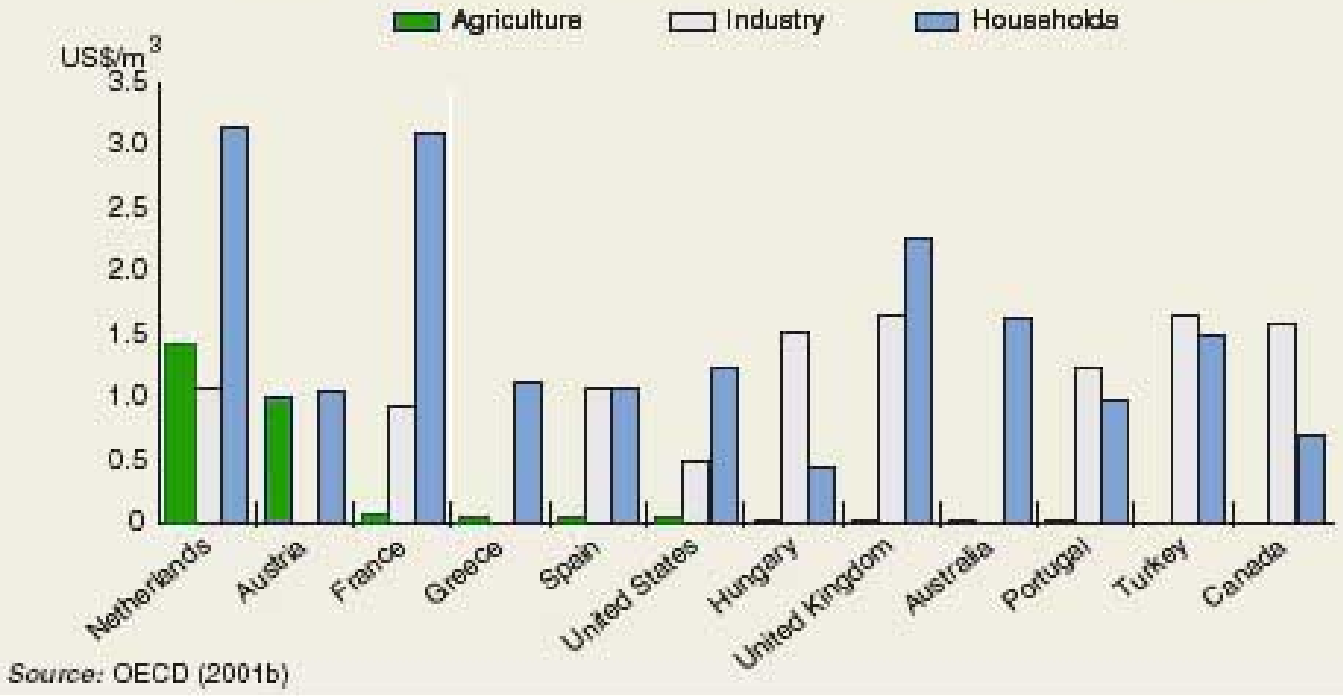


Source: USDA ERS

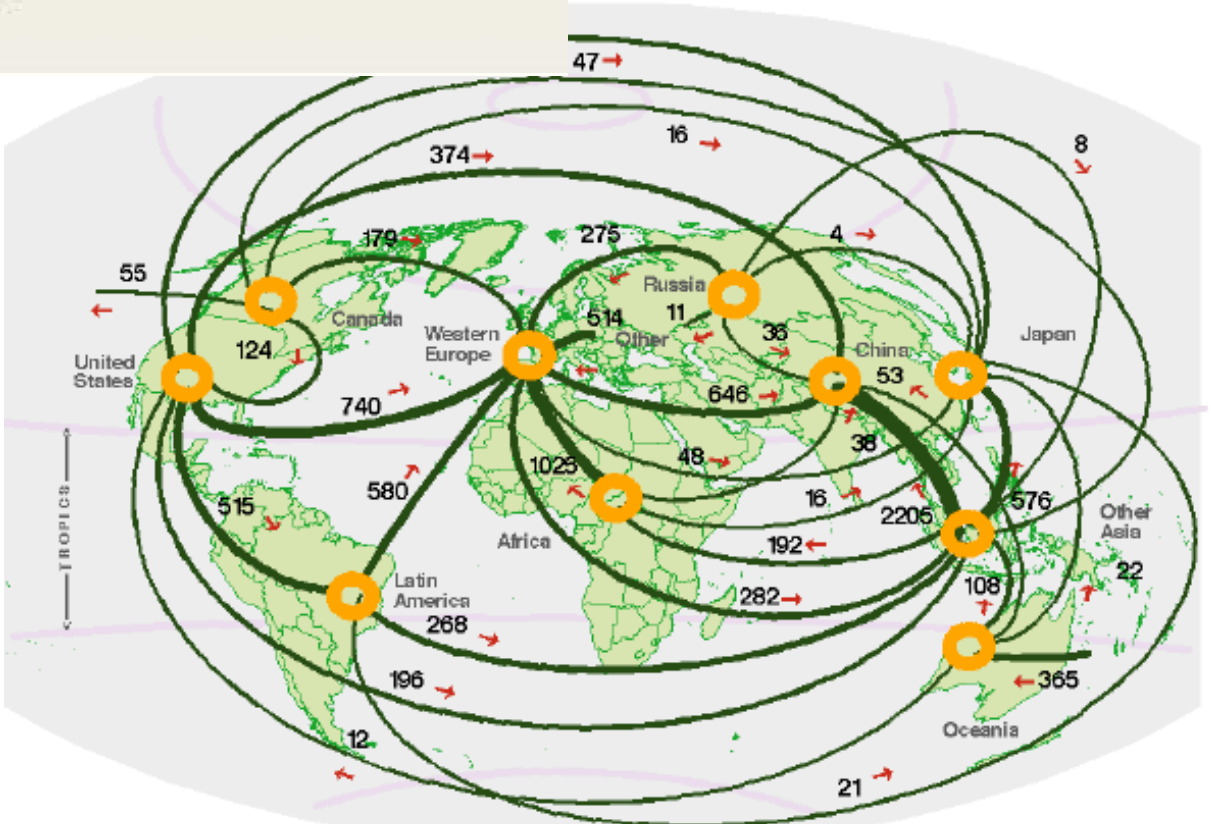
Source: USGS

Price of water

Comparison of agricultural, industrial and houshold water prices (late 1990s)



Source: OECD (2001b)



Virtual Transfers

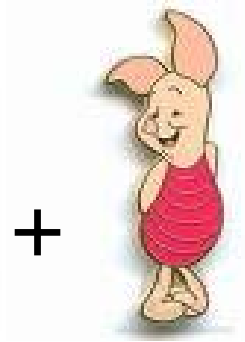
Virtual Transfer = $Resource_{Inputted} - Resource_{Product}$

Our Model

+

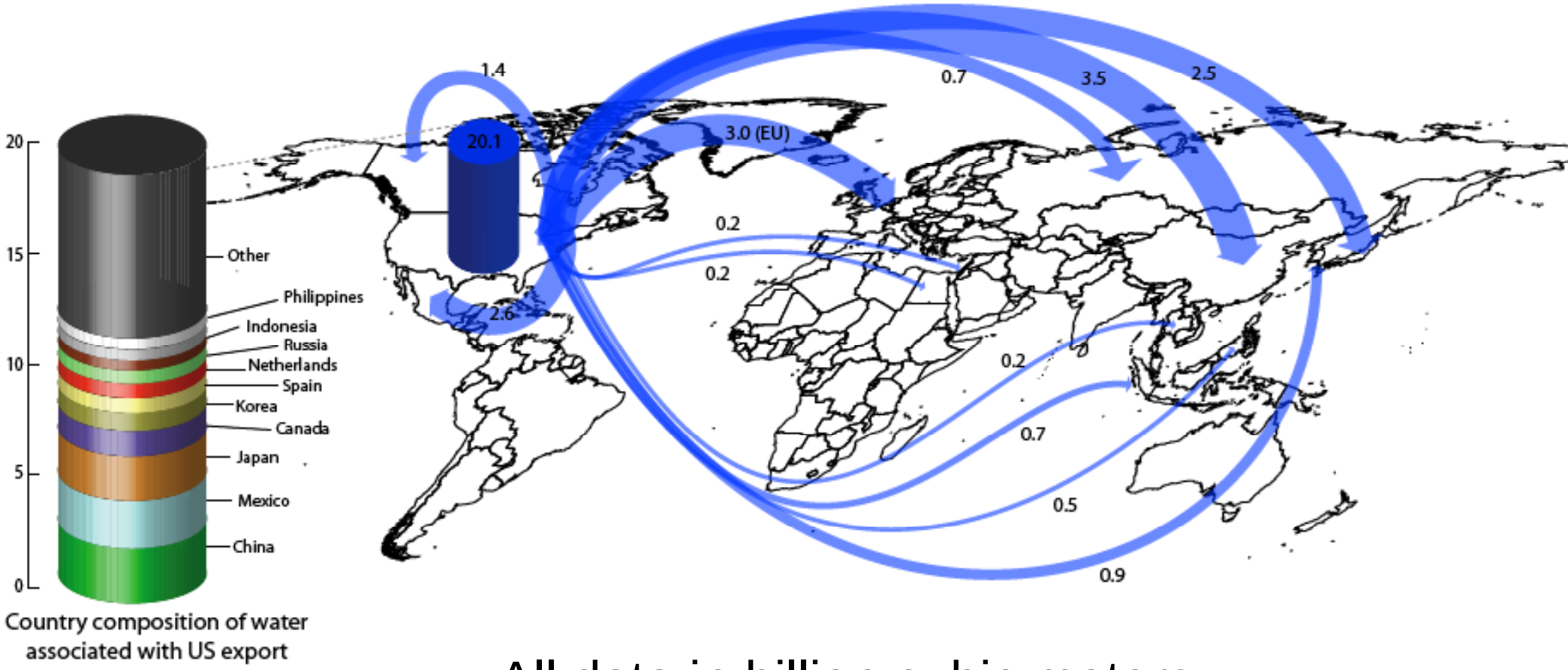
+

+



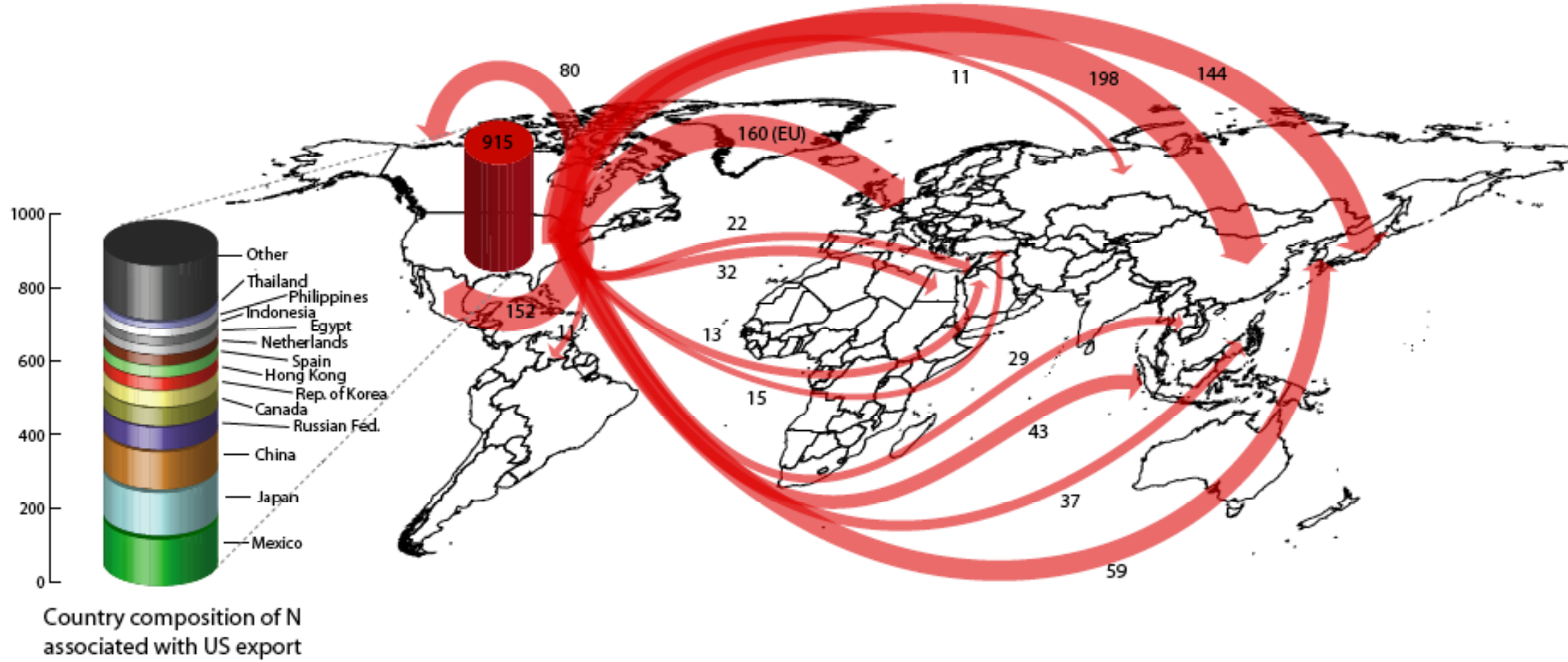
Co-designers of the model are: Marshall Burke, Ellen McCullough, and Joanne Gaskell

US Virtual Water Exports



All data in billion cubic meters

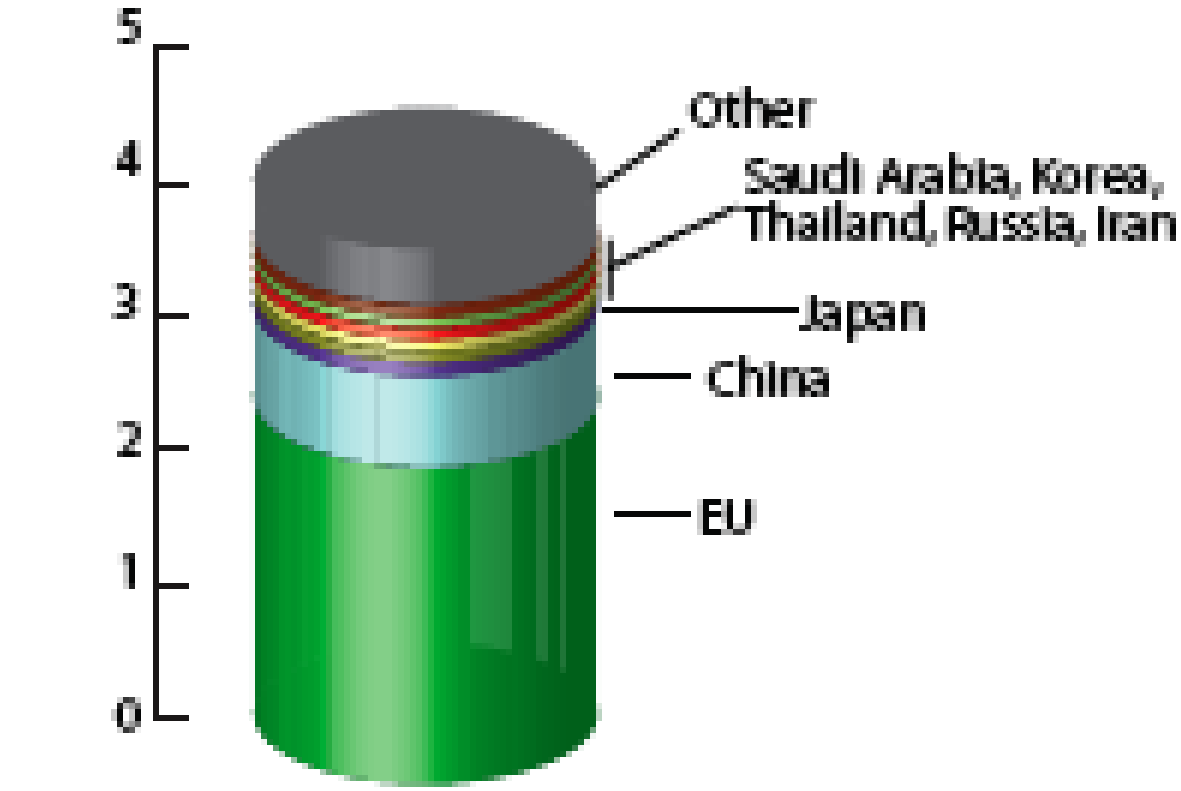
US Virtual Nitrogen Exports



Country composition of N associated with US export

All data in thousand tons

Brazil's Soy Exports

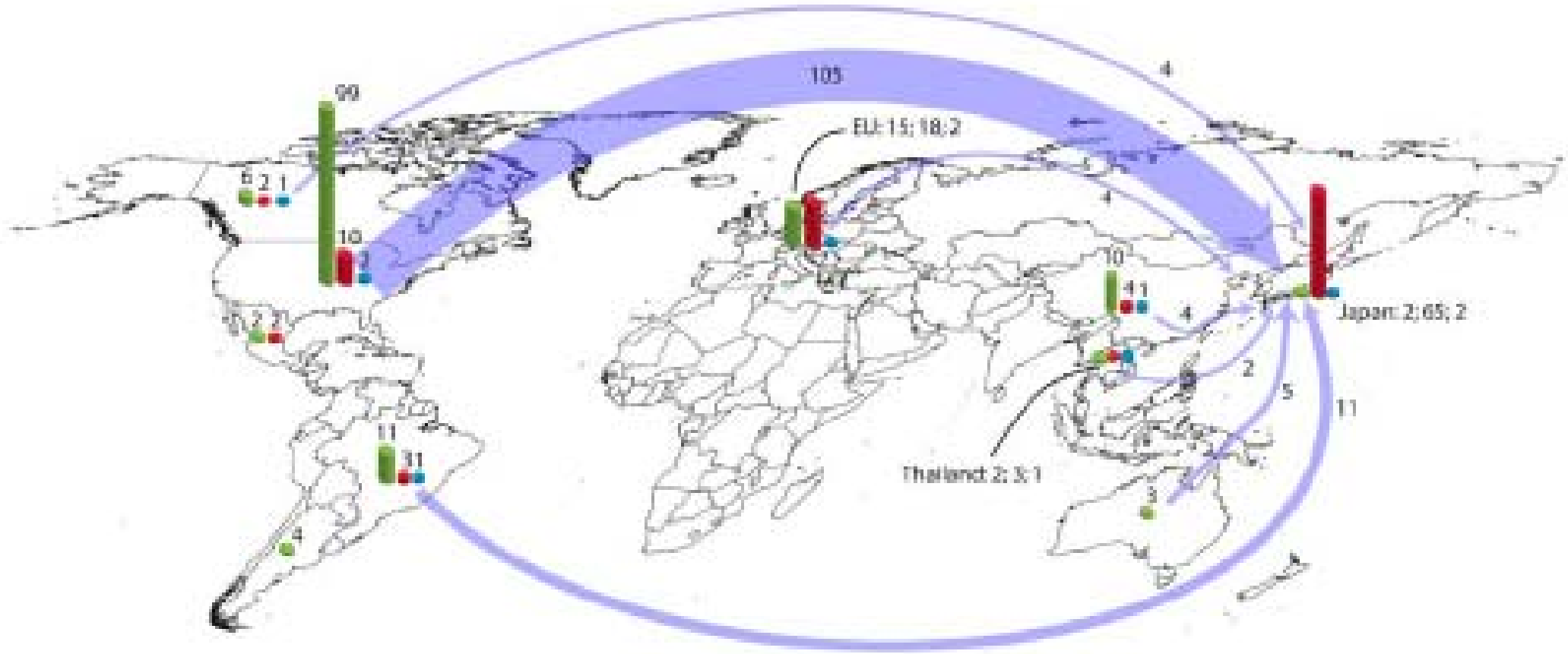


Recipients of Brazilian soy exports (million hectares)

Brazil's Virtual Land Exports

			Feed	Live	Proc	Total
LAND (hectares)	Import	Virtual	380,850	0	0	380,850
		Embedded	0	0	0	0
	Export	Virtual	5,611,098	0	0	5,611,098
		Embedded	0	0	0	0
	Domestic	Virtual	5,073,877	0	0	5,073,877
		Embedded	0			0
	Net export	Virtual	5,230,247			5,230,247
		Embedded	0			0

Japan's Virtual N Imports



Nitrogen associated with the production of pigs and chickens consumed in Japan. Bars refer to N left behind in the producing country during different states of production; green = feed; red = live animal production; blue = meat processing. Arrows represent transfer of total N embedded in shipped product. Data are annual values in thousands of metric tons, averaged over the years 2000-2002

Source: Galloway, Burke, … "Tip of the Pork Chop" forthcoming in Ambio (2007)

Implications

- Trade
  - Can be good for the environment
  - Magnitude and pattern of global resource use
  - Separates consumers from impacts
- Underpricing resources: not good
  - Externalities, misallocation, price distortions
- Virtual transfers: powerful tool
- Winners become losers
  - Trading away natural resource wealth
  - Obligations?
    - Getting prices right
    - PLUS consumer choice
    - International regulatory policies

Thank you

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