Population & Climate Change

Beyond
Business As Usual

Ashok Khosla
Development Alternatives,
IUCN and Club of Rome

Development Alternatives

Crisis # 1: Poverty


1,500,000 !

Crisis # 2: Environment

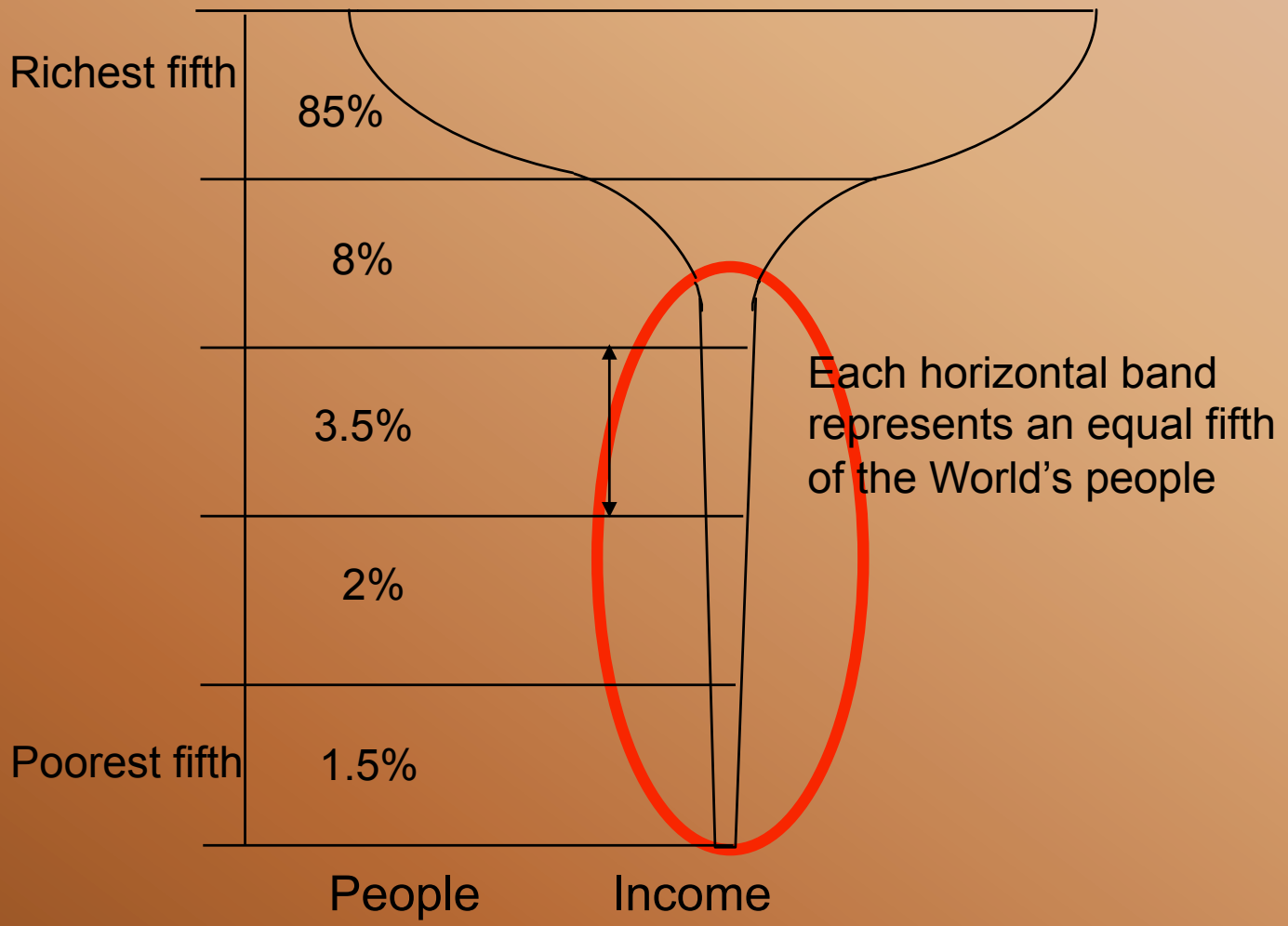
Climate Change

Development Alternatives

Poverty *and* Environment: Eco-Refugees

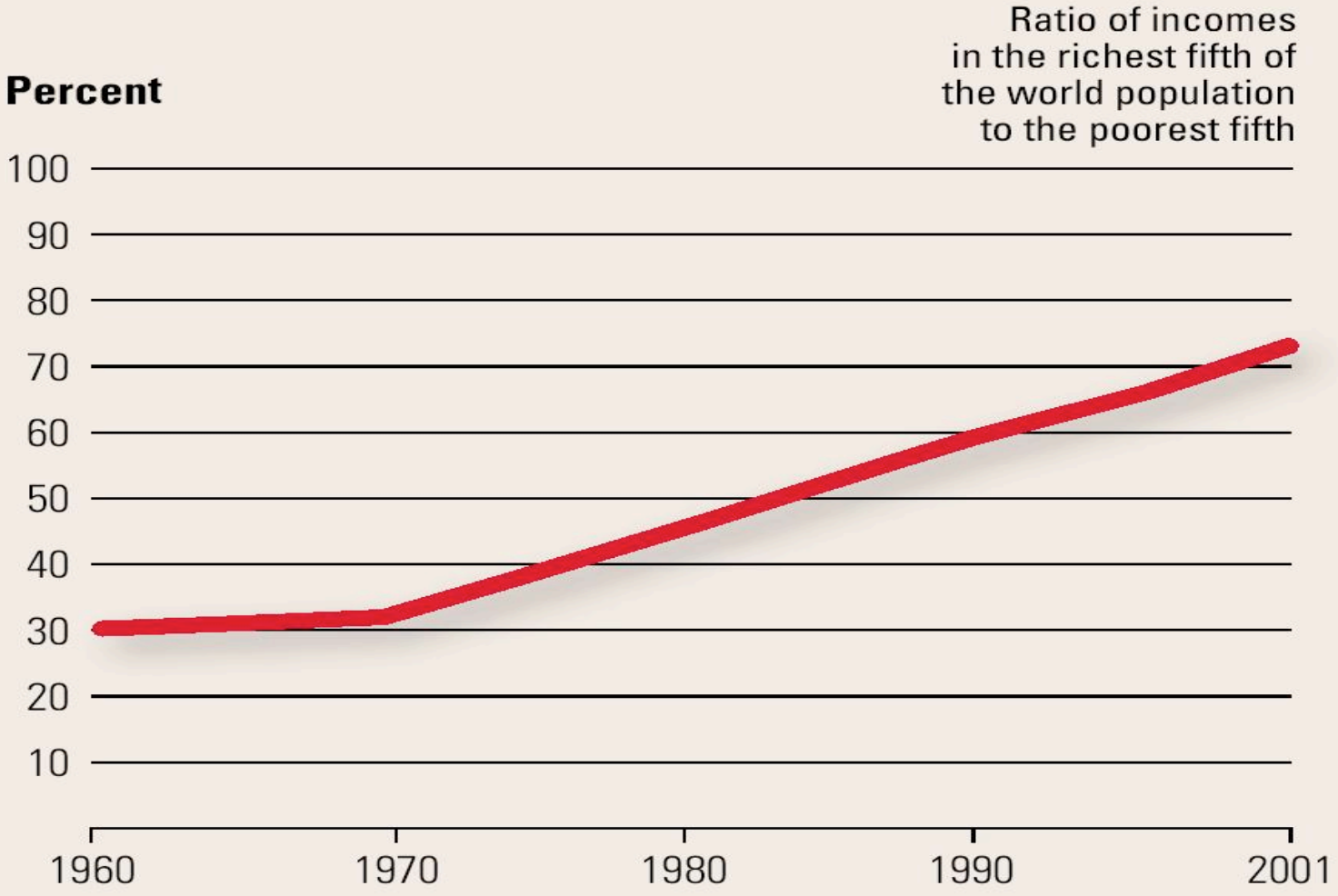
Development Alternatives

Our Income Distribution

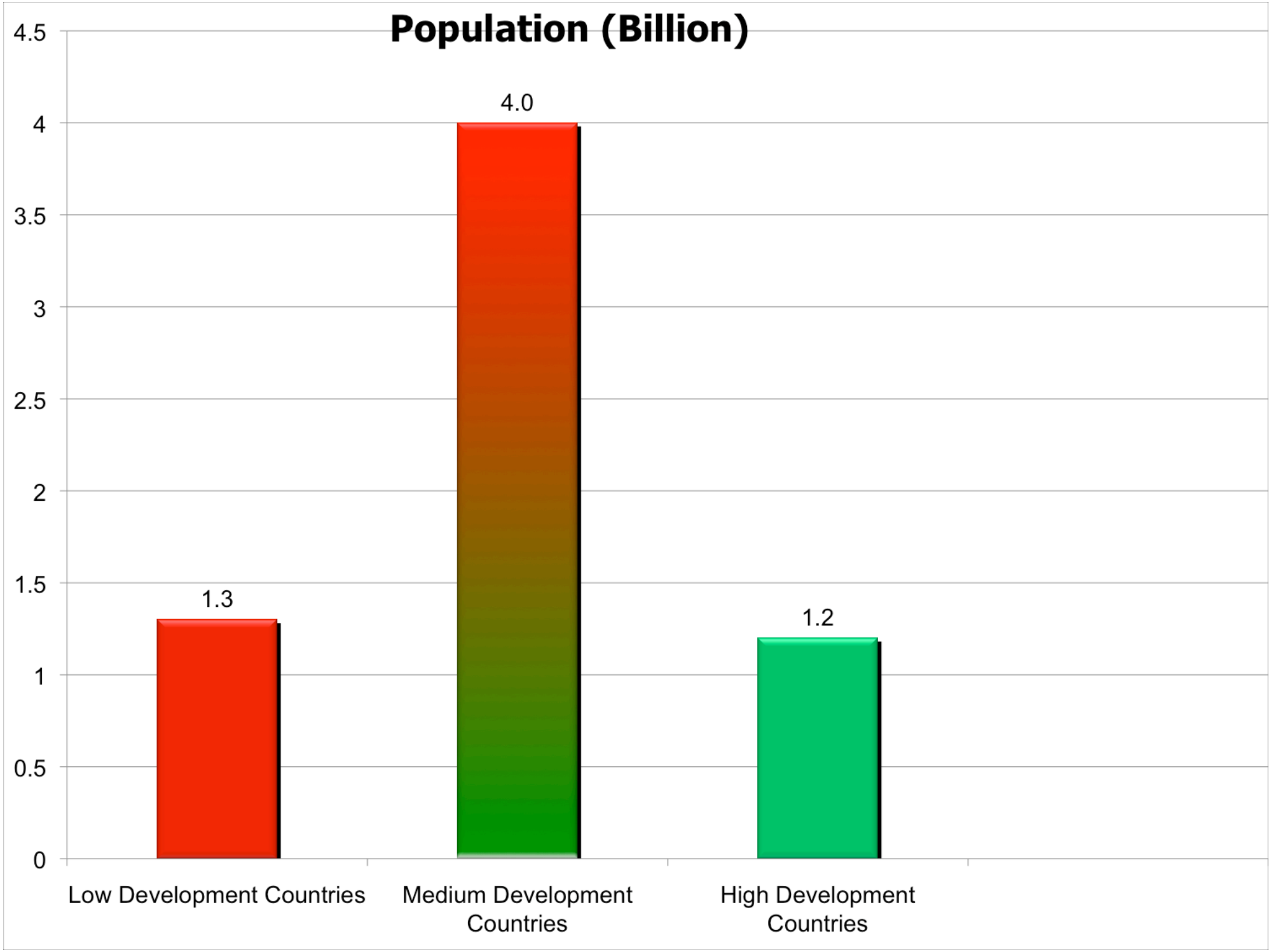


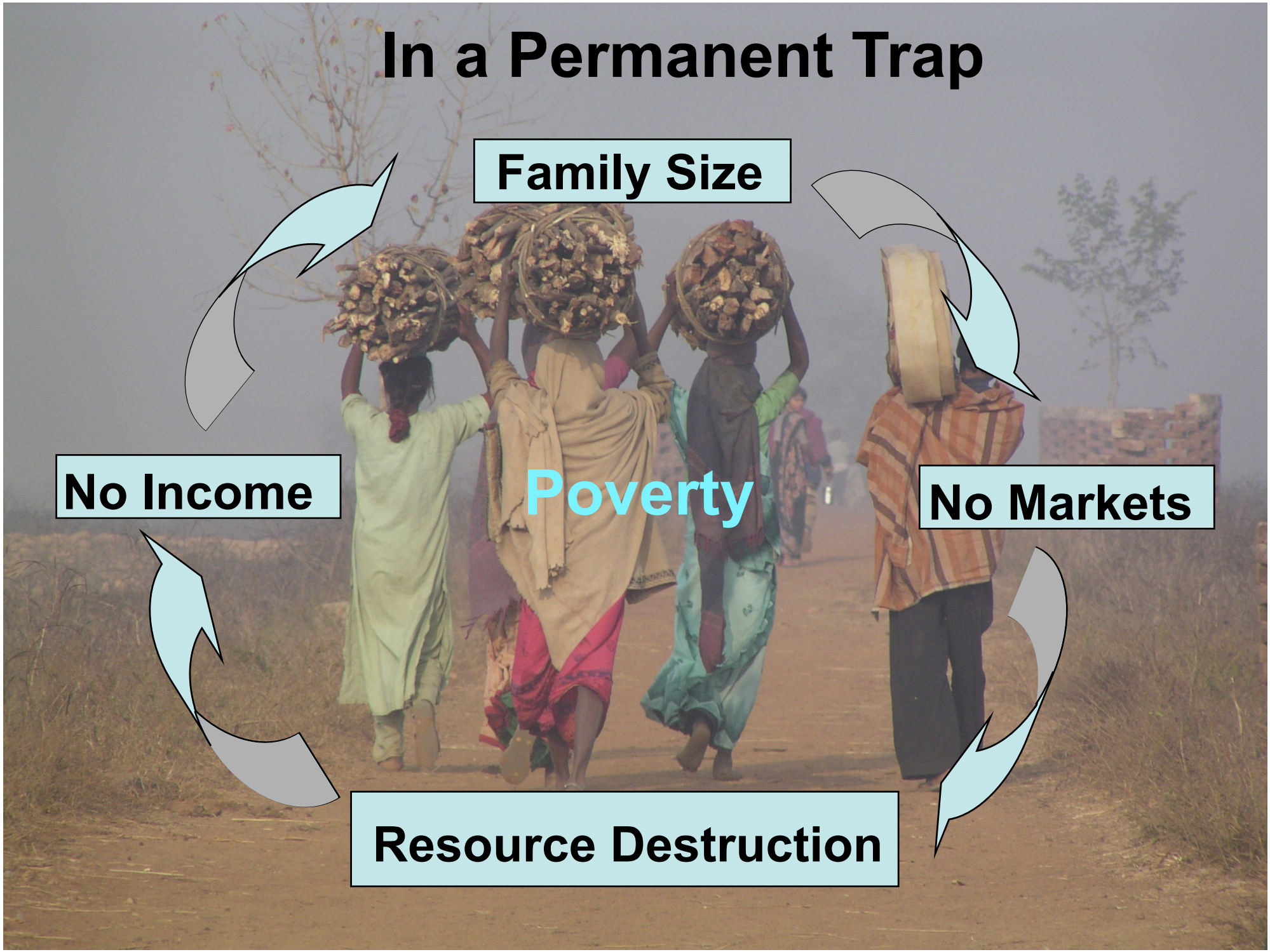
Development Alternatives

The Gap Is Widening

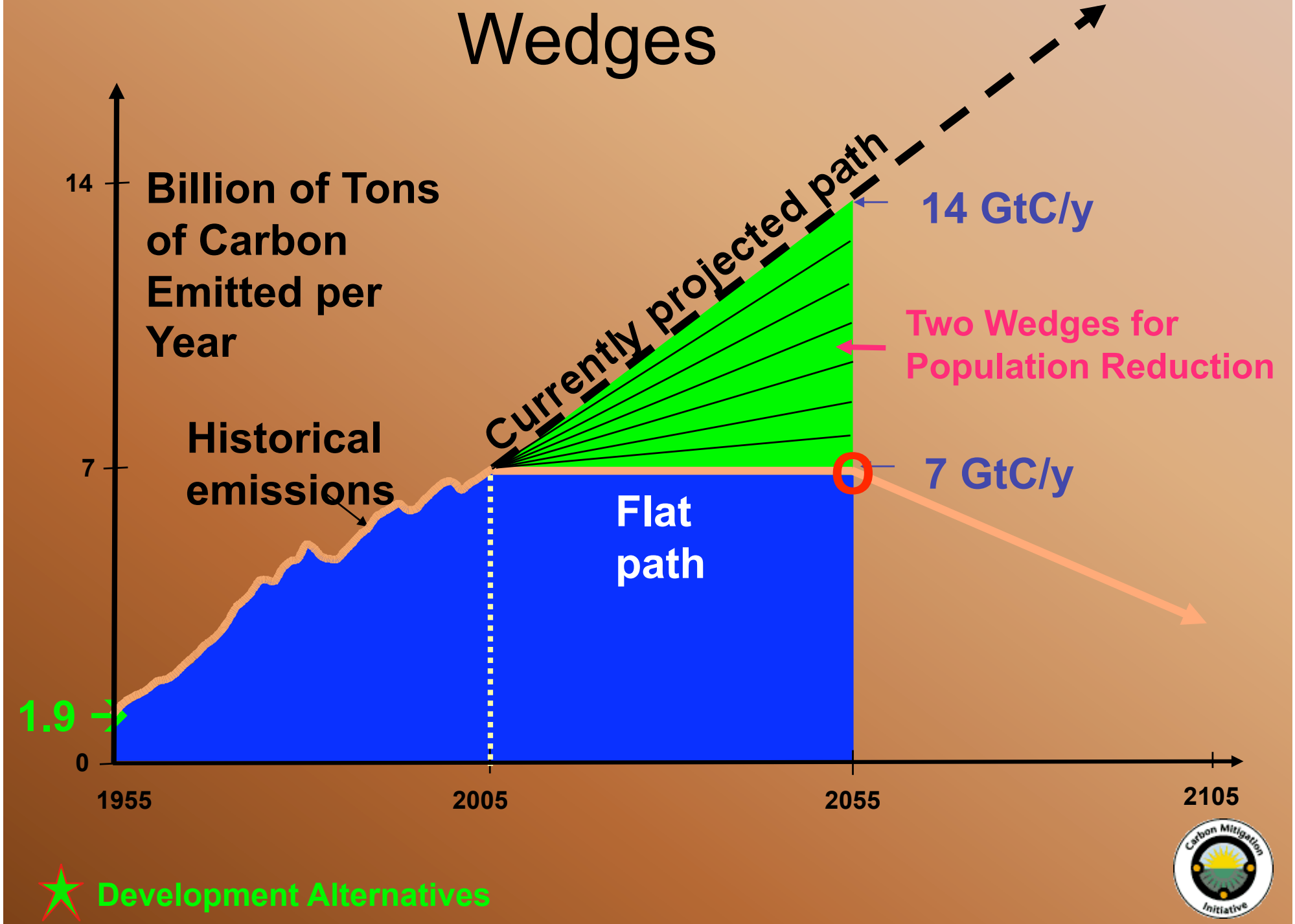


Source: UNDP 1998

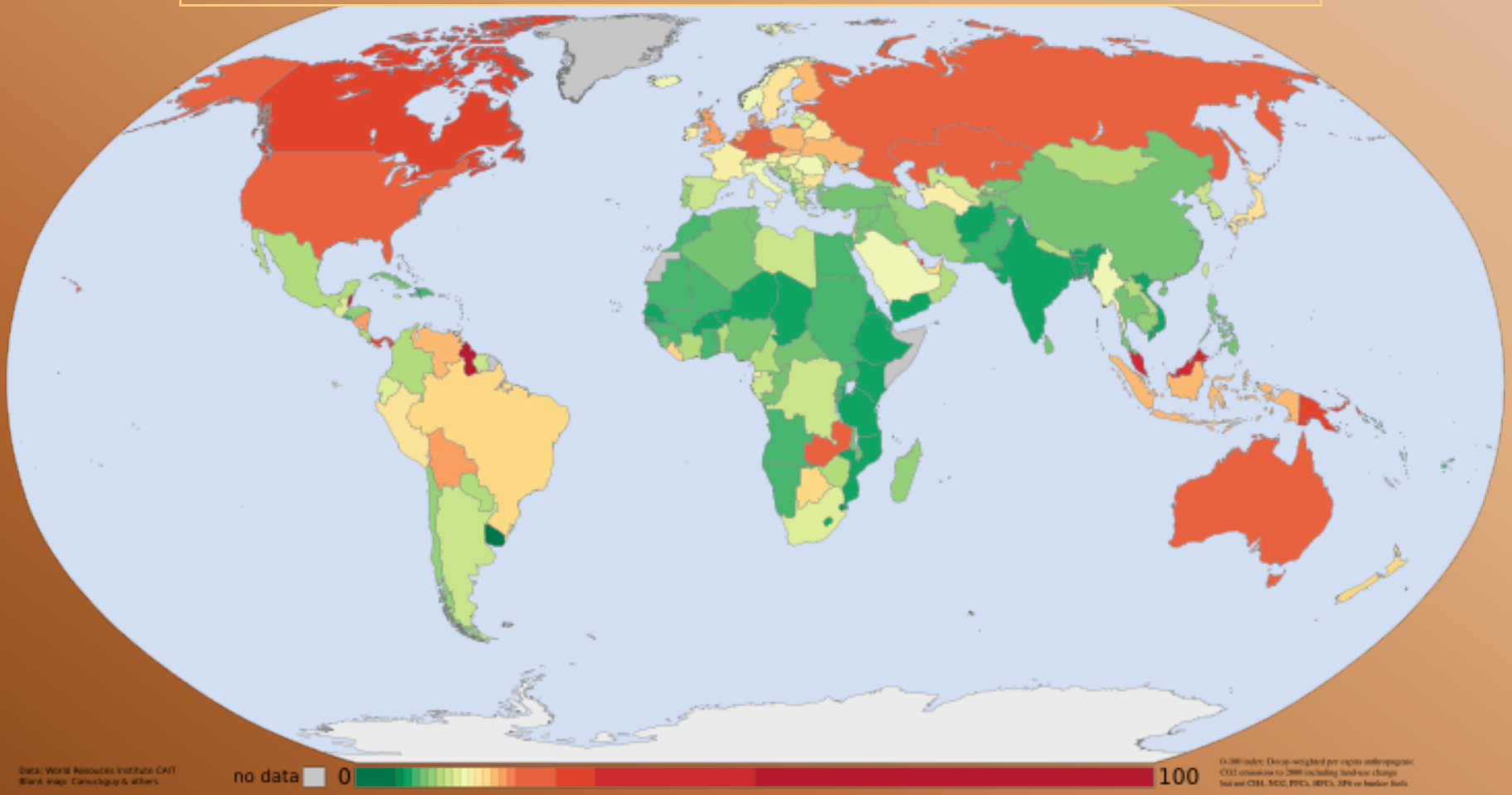

Population (Billion)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1.3
4.0
1.2
Low Development Countries
Medium Development Countries
High Development Countries


In a Permanent Trap
Family Size
No Markets
Resource Destruction
No Income
Poverty

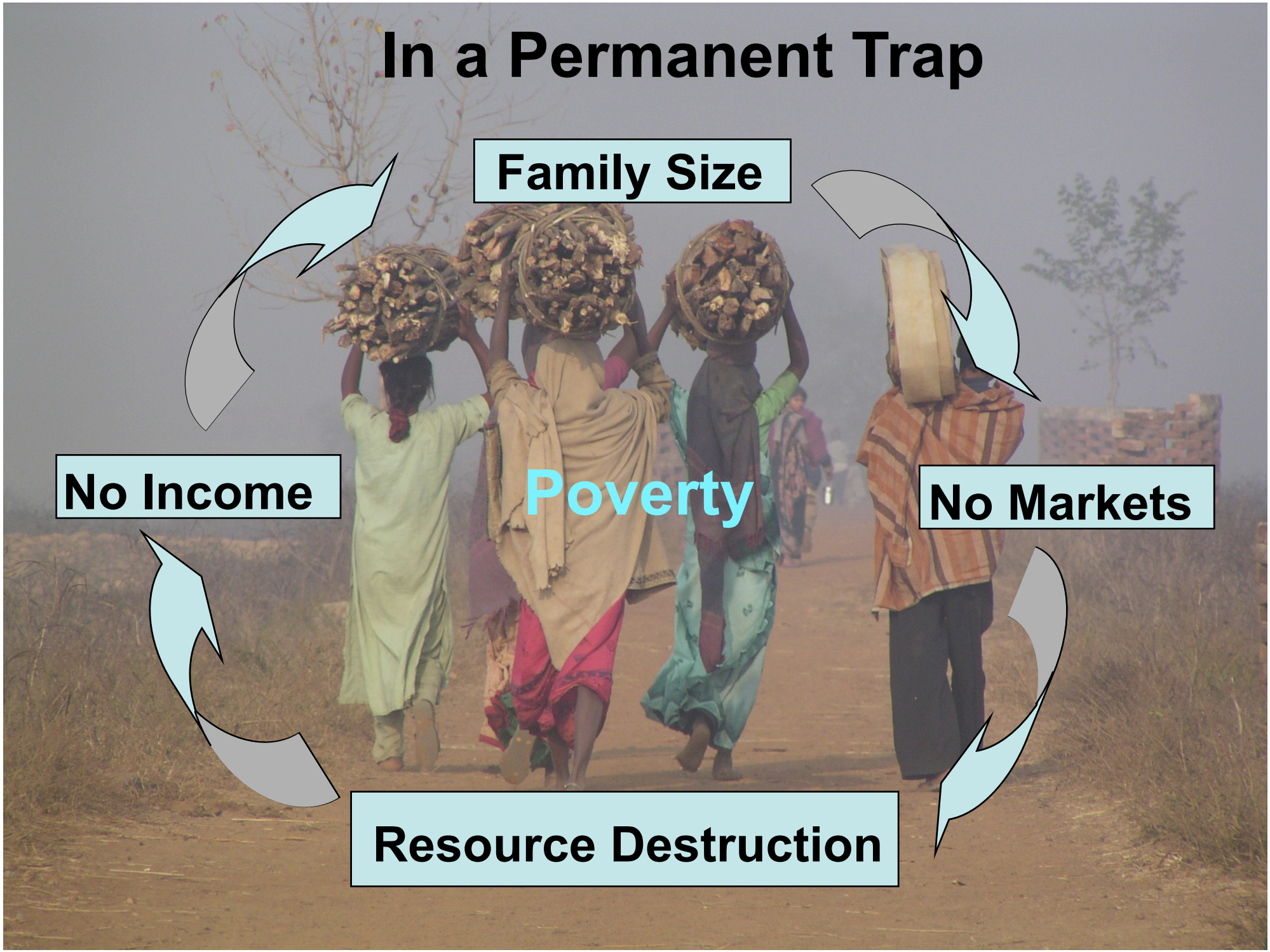
Wedges


14
Billion of Tons of Carbon Emitted per Year
7
Historical emissions
Currently projected path
14 GtC/y
Two Wedges for Population Reduction
7 GtC/y
Flat path
1.9
0
1955
2005
2055
2105
Development Alternatives
Carbon Mitigation Initiative

Per capita Historical Responsibility for Current Anthropogenic CO2 in Atmosphere



Development Alternatives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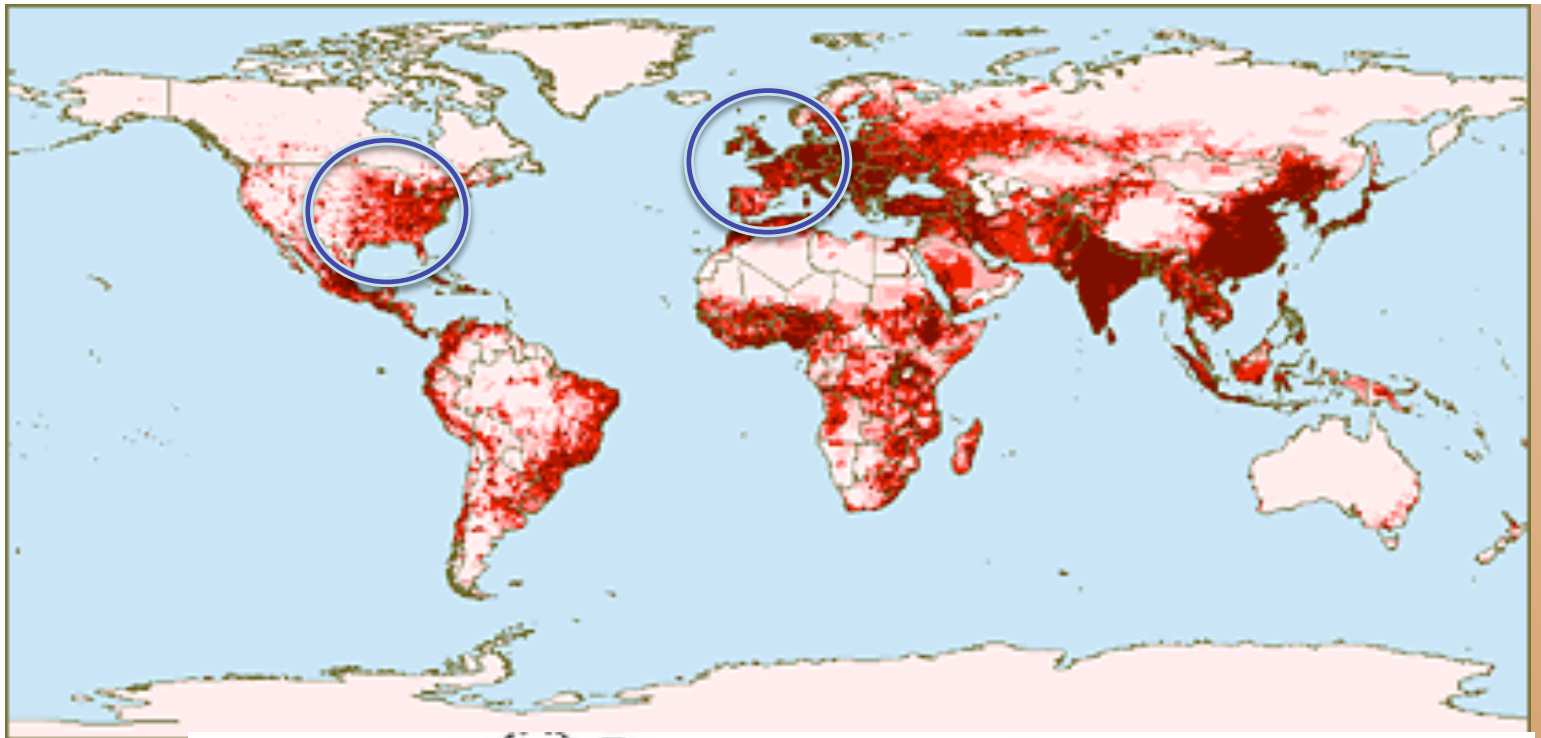
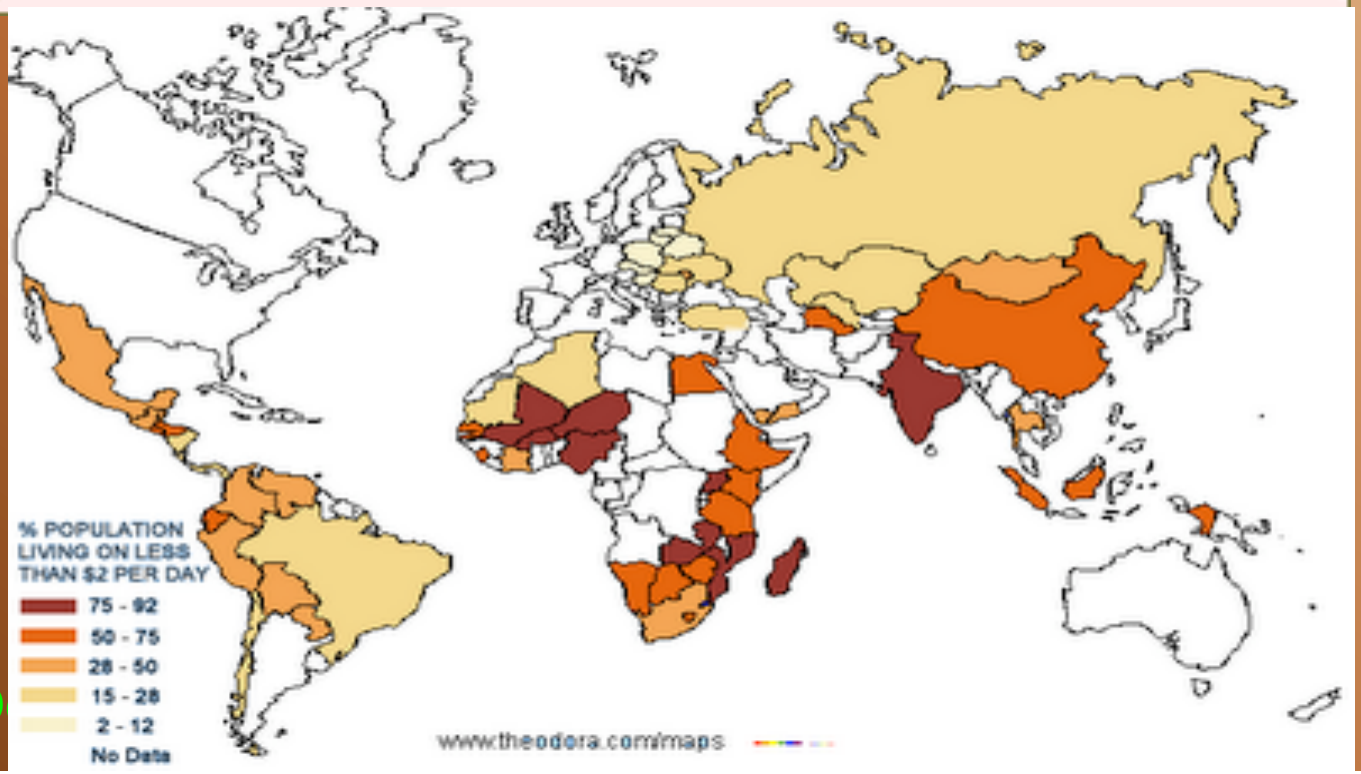


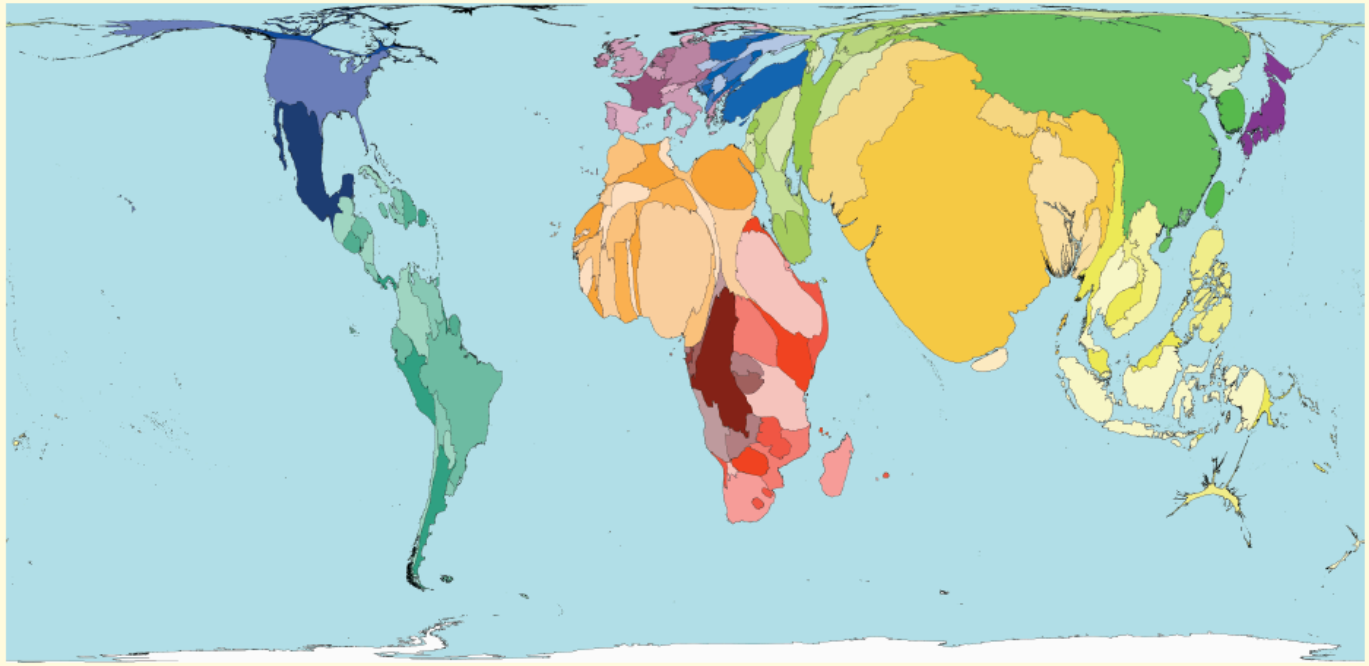
Population Density



Poverty Density

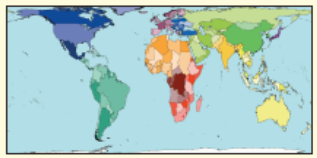
Total Births

The University Of Sheffield. The Leverhulme Trust Geographical Association
Produced by the SASI group (Sheffield) and Mark Newman (Michigan)



133 million babies were born in the year 2000. In territories with the fewest births per person, more people are dying than are being born. As with all population statistics, even this vital one, figures are rough estimates.

More children are born each year in Africa than are born in the Americas, all of Europe and Japan put together. Worldwide, more than a third of a million new people will be born on your birthday this year.



Land area

This map shows the proportion of the world's total births for each territory.

Technical notes

- Principal data source: World Health Organisation, 2005,World Health Report
- Birth data is from 2000.
- See website for further information.

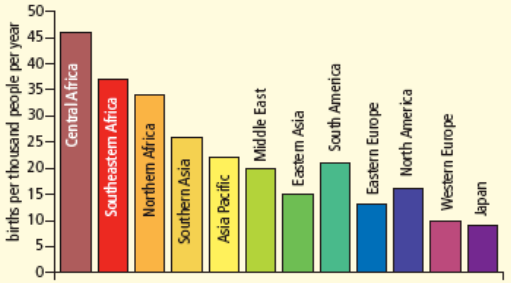
HIGHEST AND LOWEST BIRTH RATES

Rank	Territory	Value
1	Niger	52
2	Angola	50
3	Guinea-Bissau	49
4	Somalia	49
5	Democratic Republic of Congo	48
6	Uganda	48
7	Mali	47
8	Sierra Leone	47
9	Burkina Faso	46
10	Chad	46

Rank	Territory	Value
191	Germany	9
192	Italy	9
193	Lithuania	9
194	Belarus	9
195	Russian Federation	9
196	Czech Republic	9
197	Ukraine	9
198	Slovenia	9
199	Latvia	8
200	Bulgaria	8

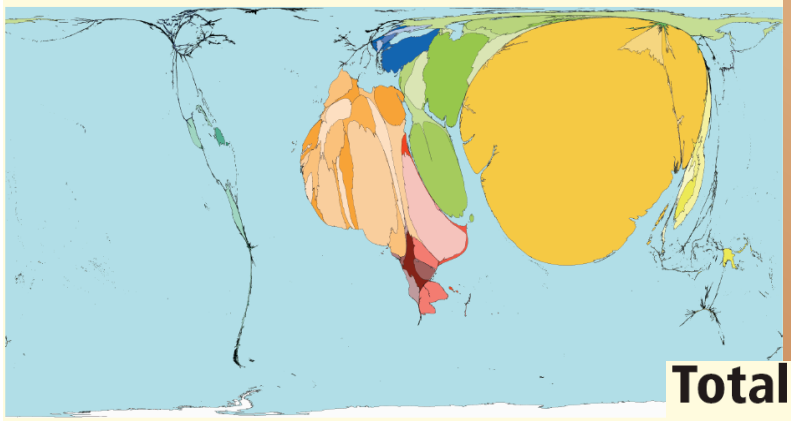
births per 1000 people per year

REGIONAL BIRTH RATES

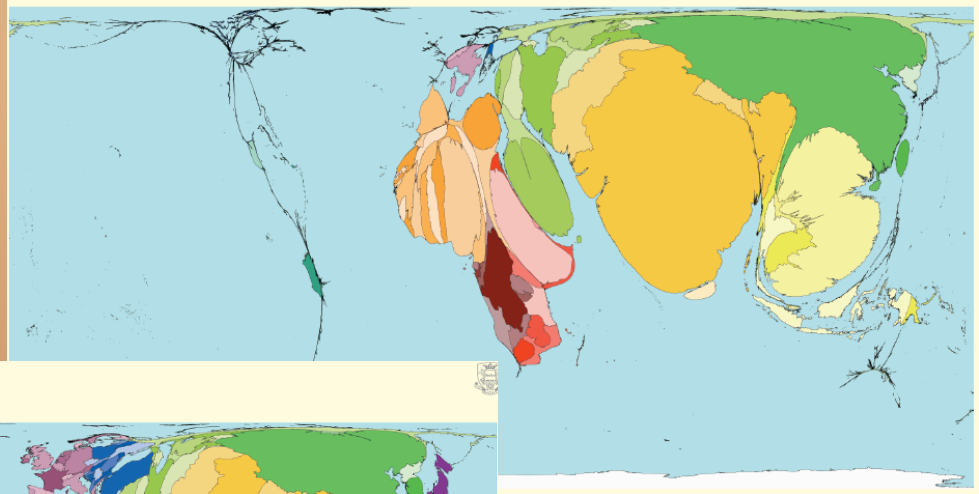


"The birth of a baby is an occasion for weaving hopeful dreams about the future." Aung San Suu Kyi, 1997

Girls not at Primary School



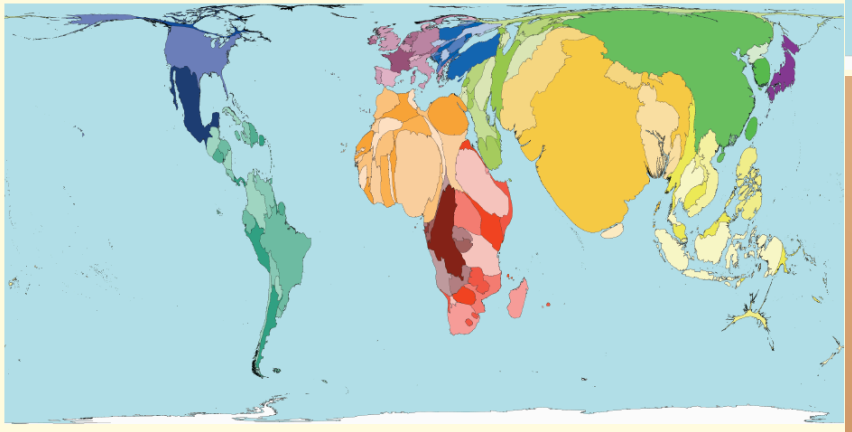
Girls not at Secondary School



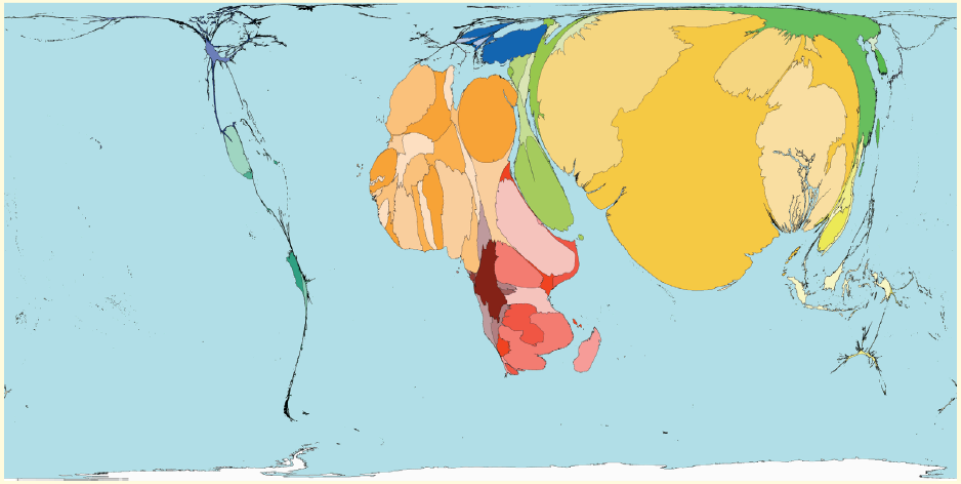
Positive Correlation

+

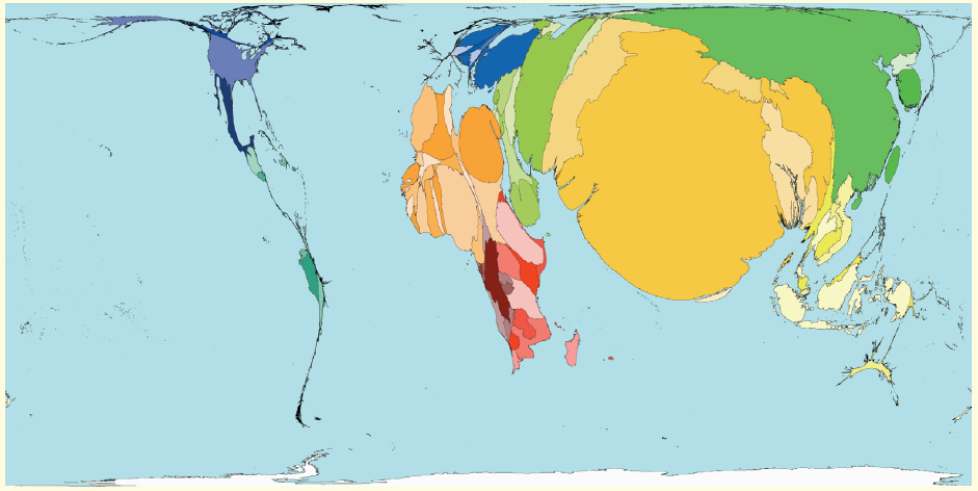
Total Births



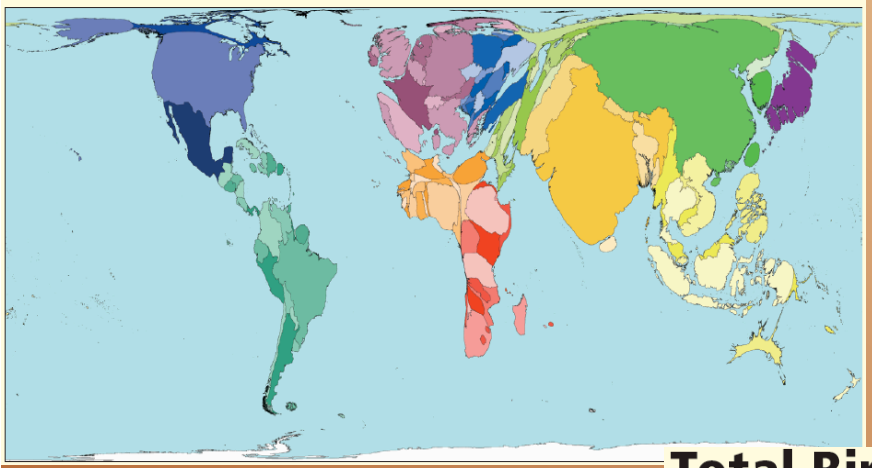
Illiterate Young Women



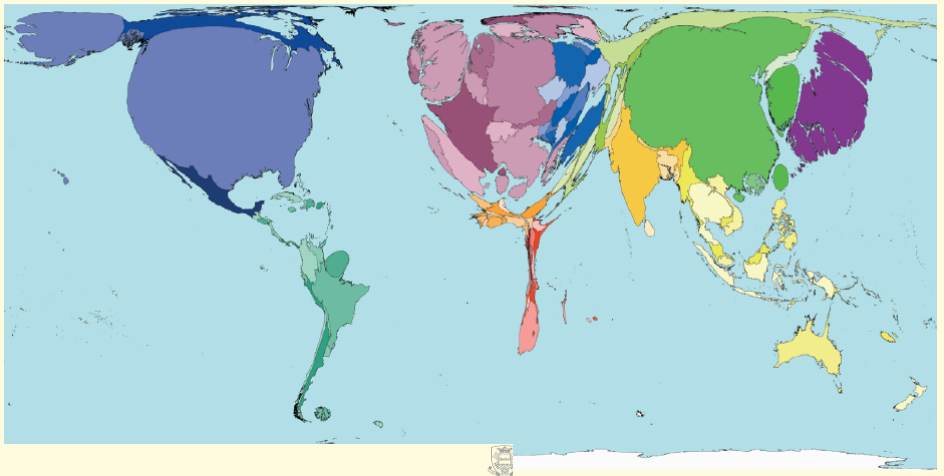
Illiterate Women



Gender Empowerment



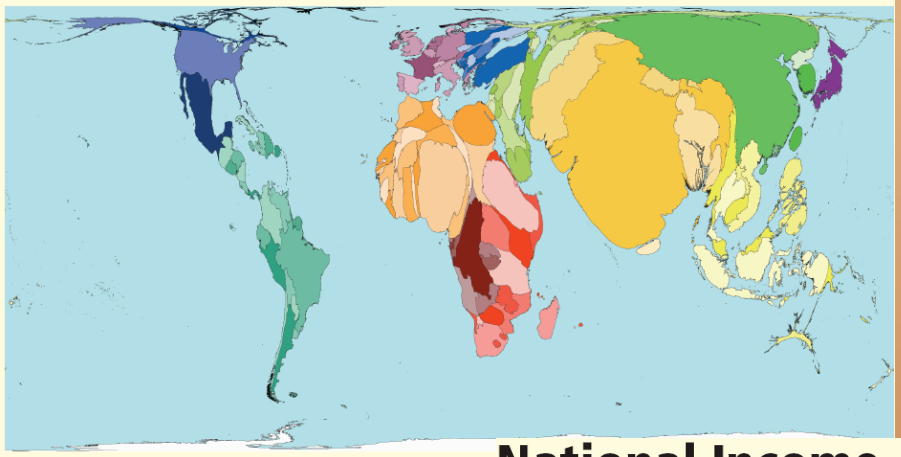
Women's Income



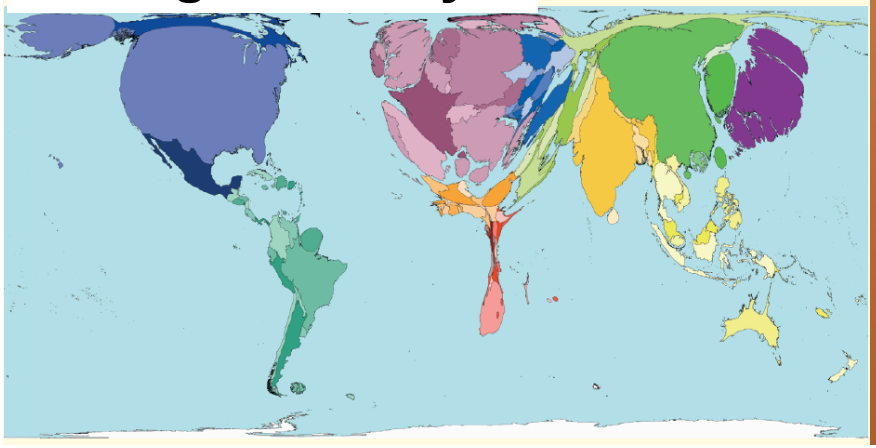
Negative Correlation

–

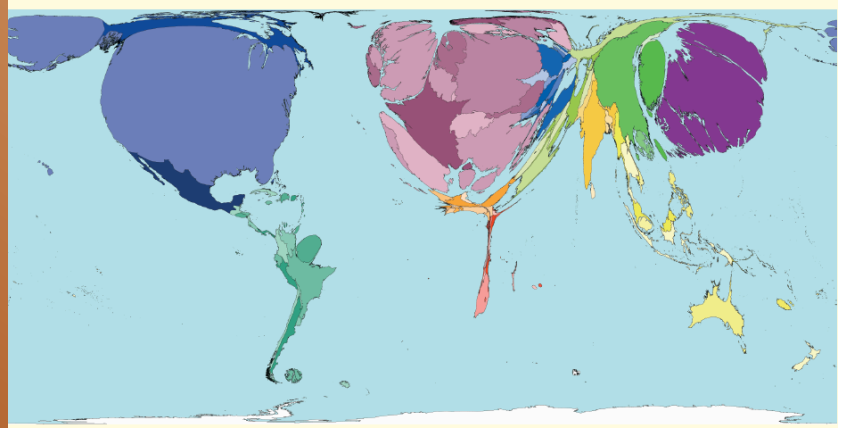
Total Births

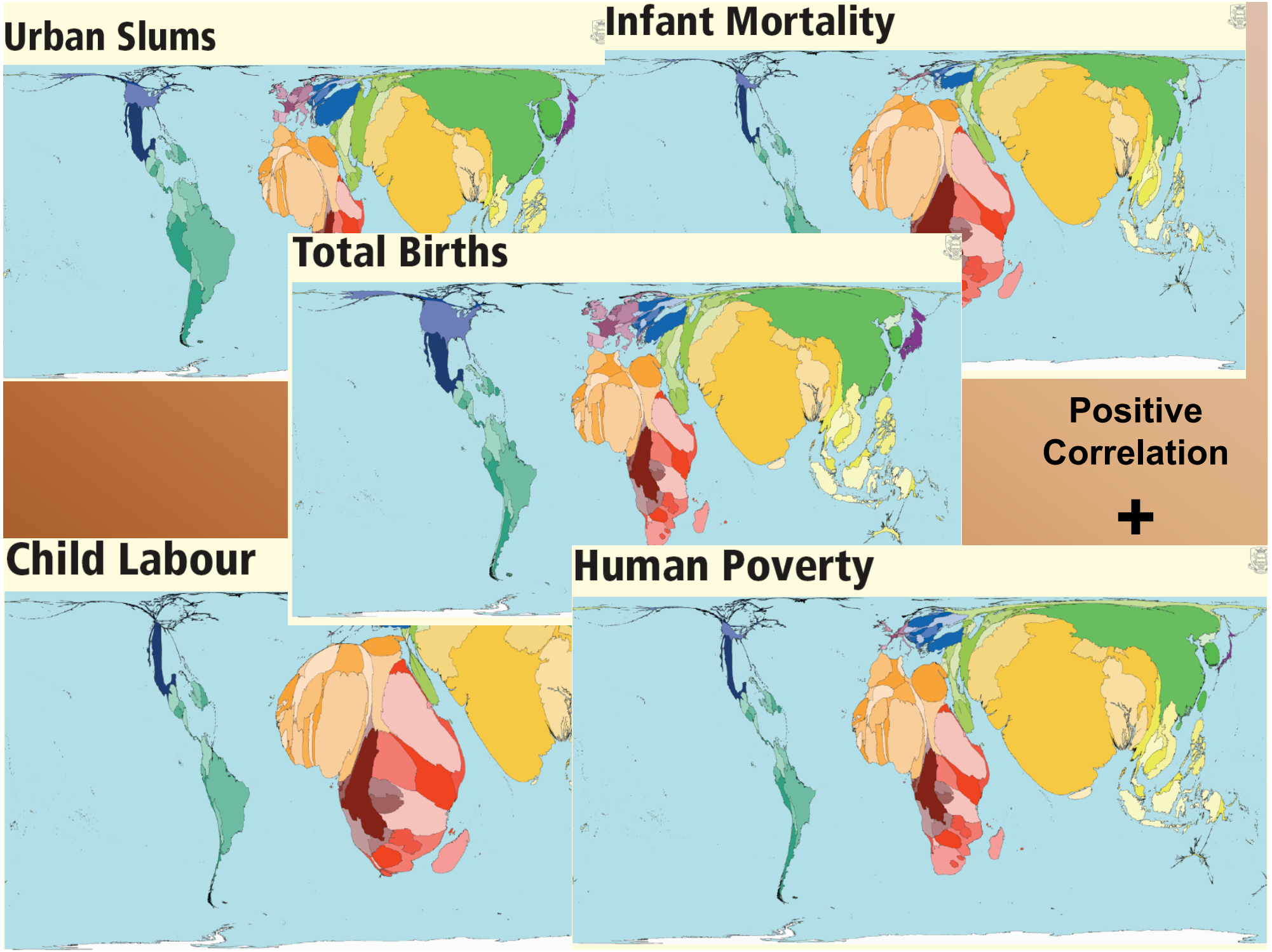


Old Age Security



National Income




Urban Slums
Infant Mortality
Total Births
Positive Correlation
+
Child Labour
Human Poverty

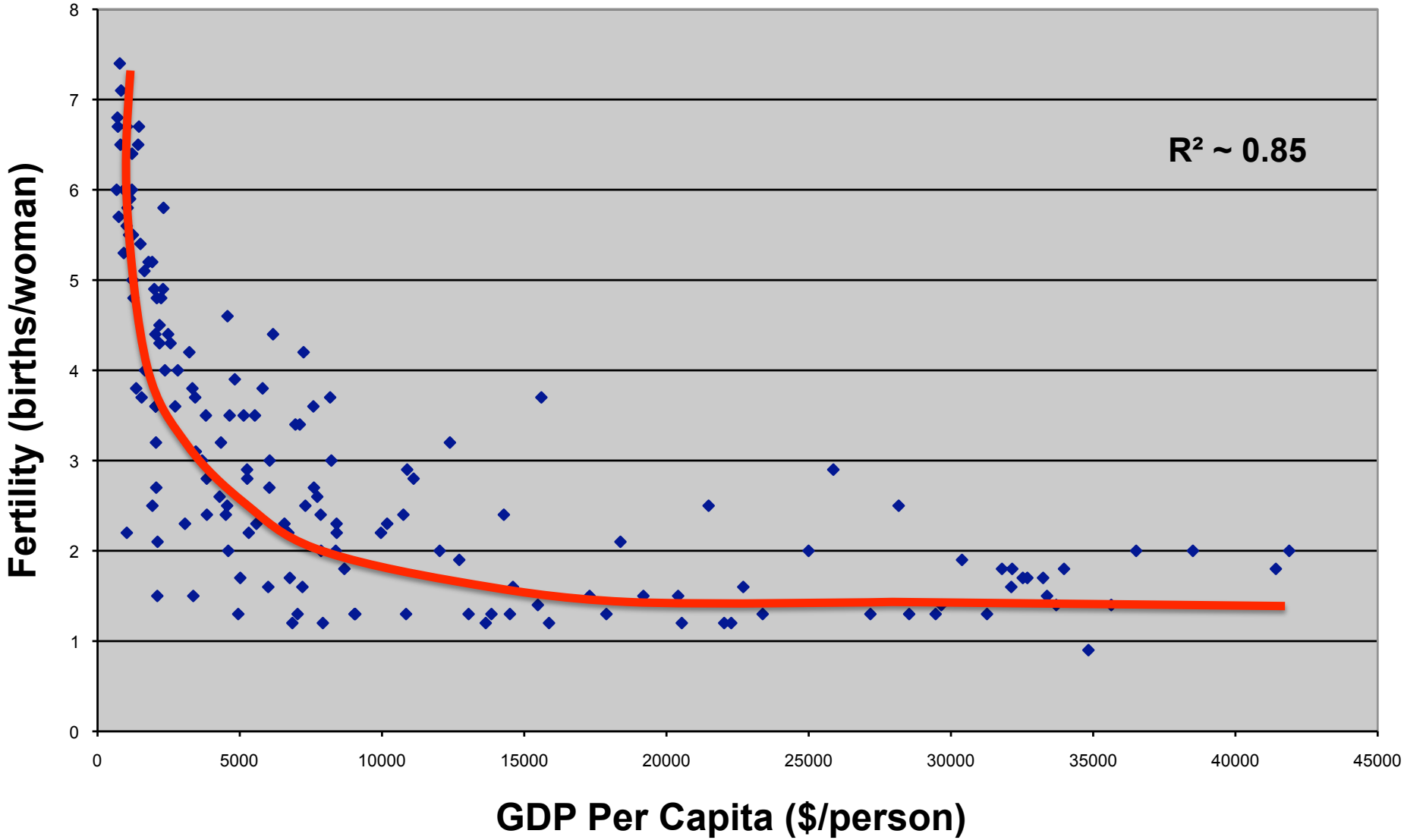
What Must Decline

Material & Energy Flows	Standard of Living
=	
Number of People	Demography
X	
Consumption per Person	Behaviour or Culture
X	
Materials & Energy per Unit of Consumption	Technology

Development Alternatives

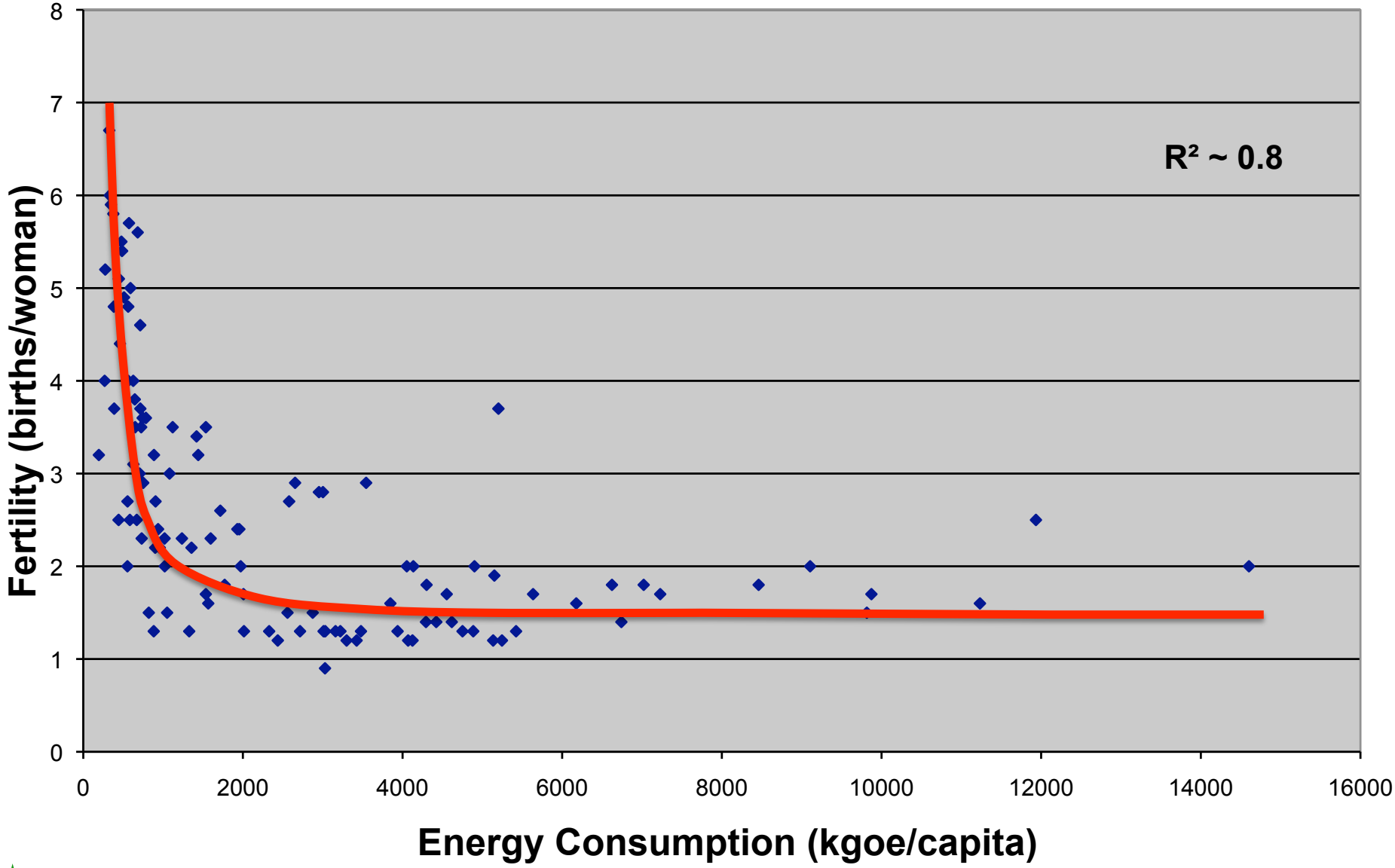

HUMAN DEVELOPMENT REPORT 1996
Human Development Report 2005
HUMAN DEVELOPMENT REPORT 2003
HUMAN DEVELOPMENT REPORT 2004
HUMAN DEVELOPMENT REPORT 1994
HUMAN DEVELOPMENT REPORT 1990
Human Development Report 2006
Beyond scarcity:
Power, poverty and the global water crisis
Human Development Report 2007/2008
Fighting climate change:
Human solidarity in a divided world
Published for the United Nations Development Programme (UNDP)
world development report 2009
RESHAPING ECONOMIC GEOGRAPHY
THE WORLD BANK
Rights
Urbanization
Poverty
Choices

Fertility vs GDP Per Capita (2005)



http://www.hdr.undp.org

Fertility vs. Energy Consumption per Capita (2005)



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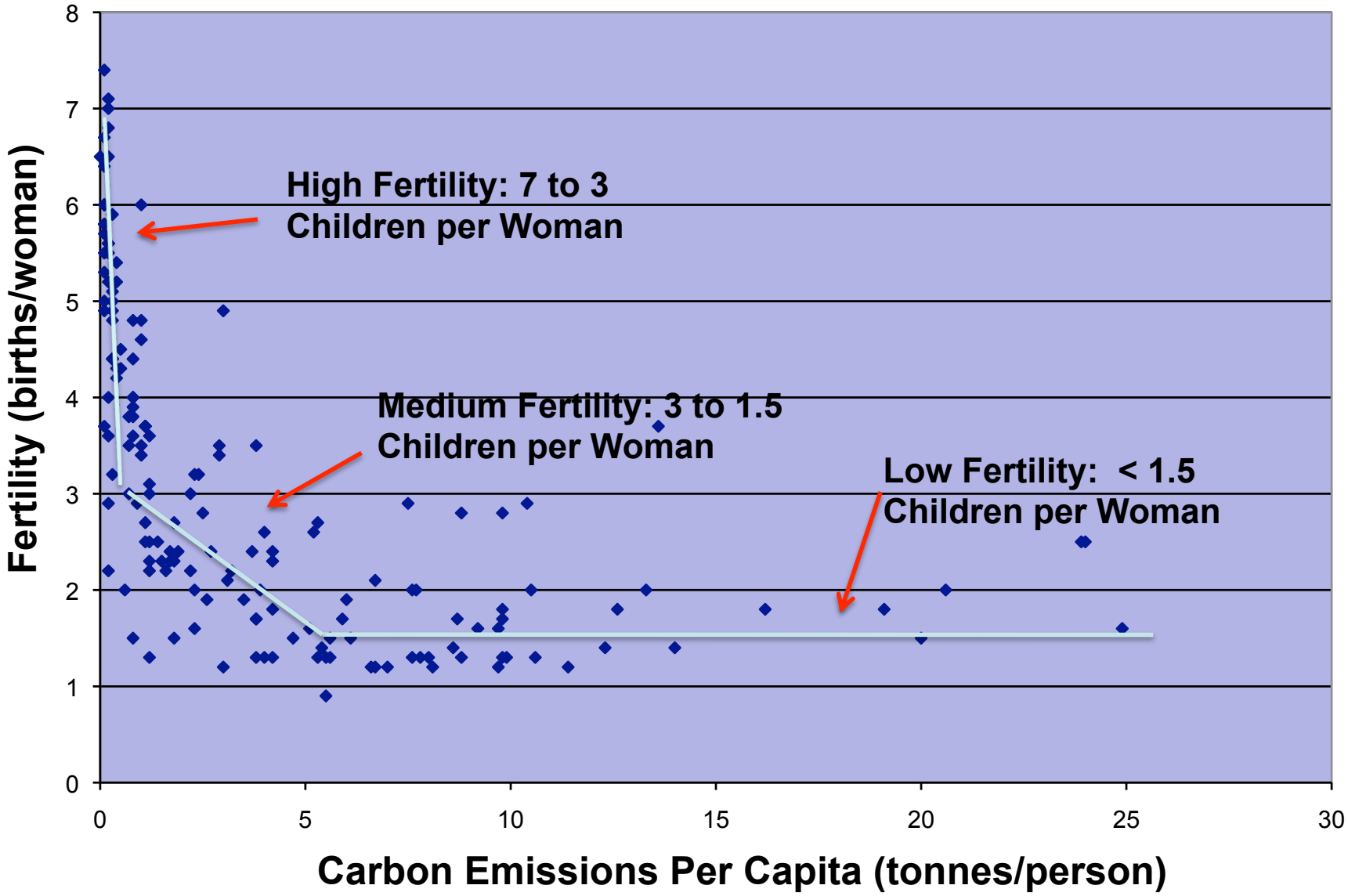
Fertility vs Carbon Emissions Per Capita (2005)



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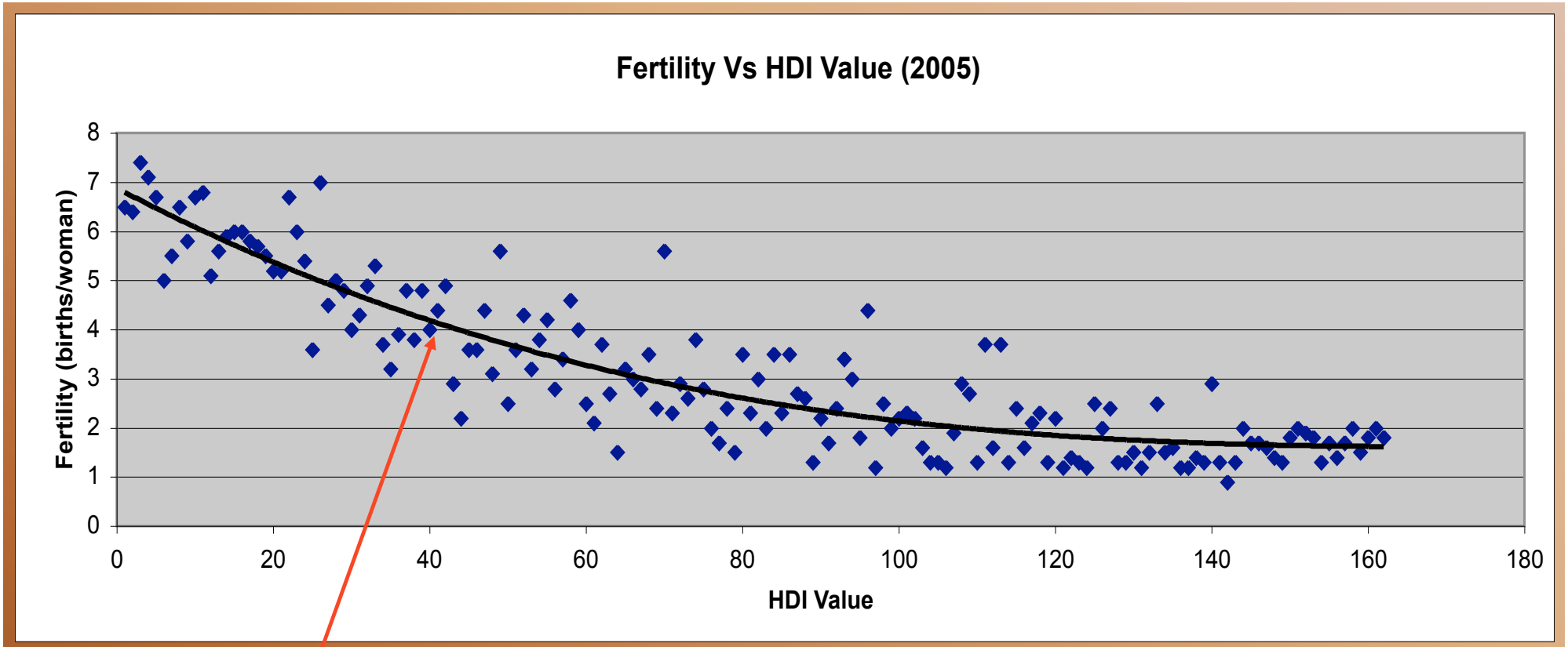
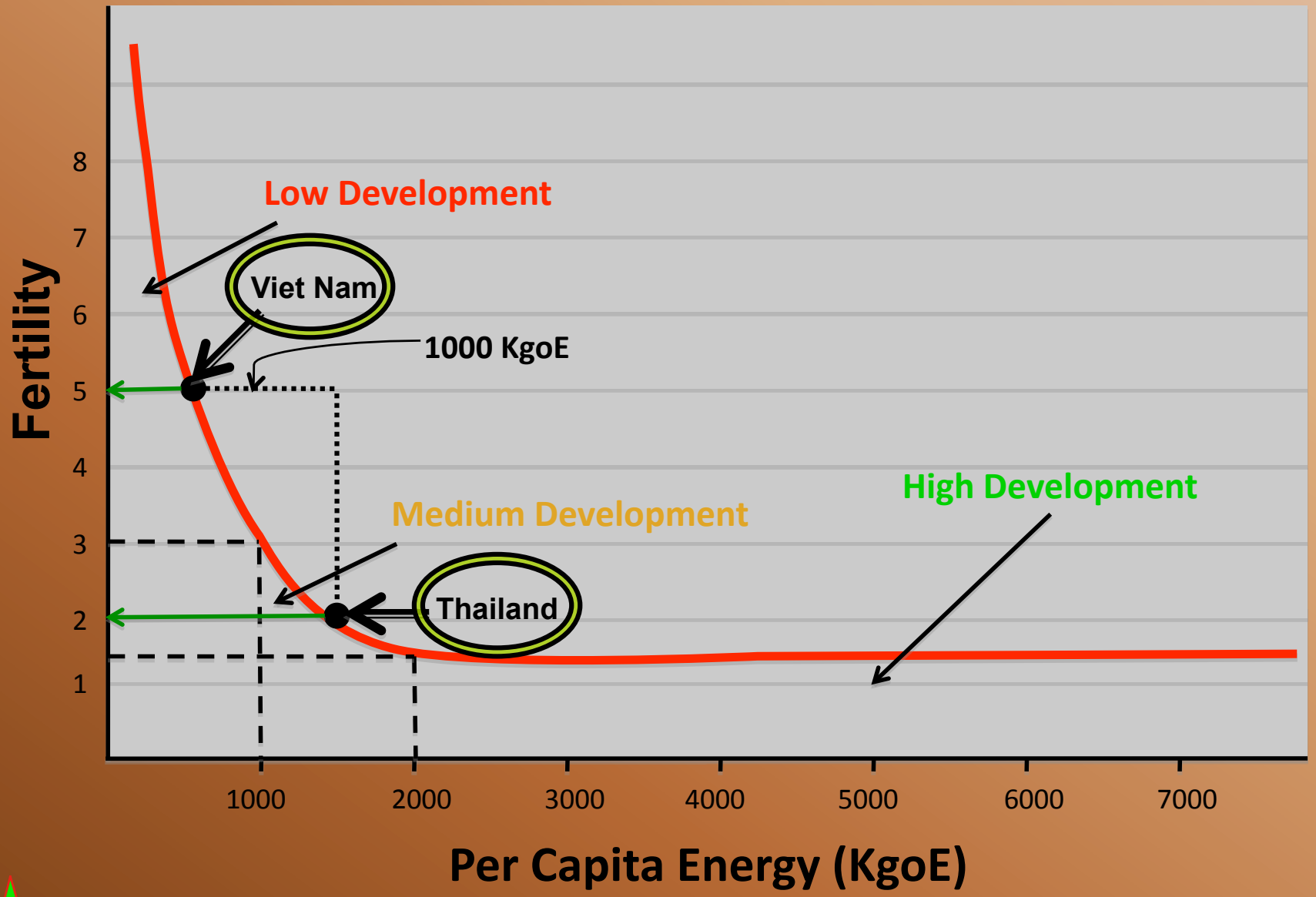


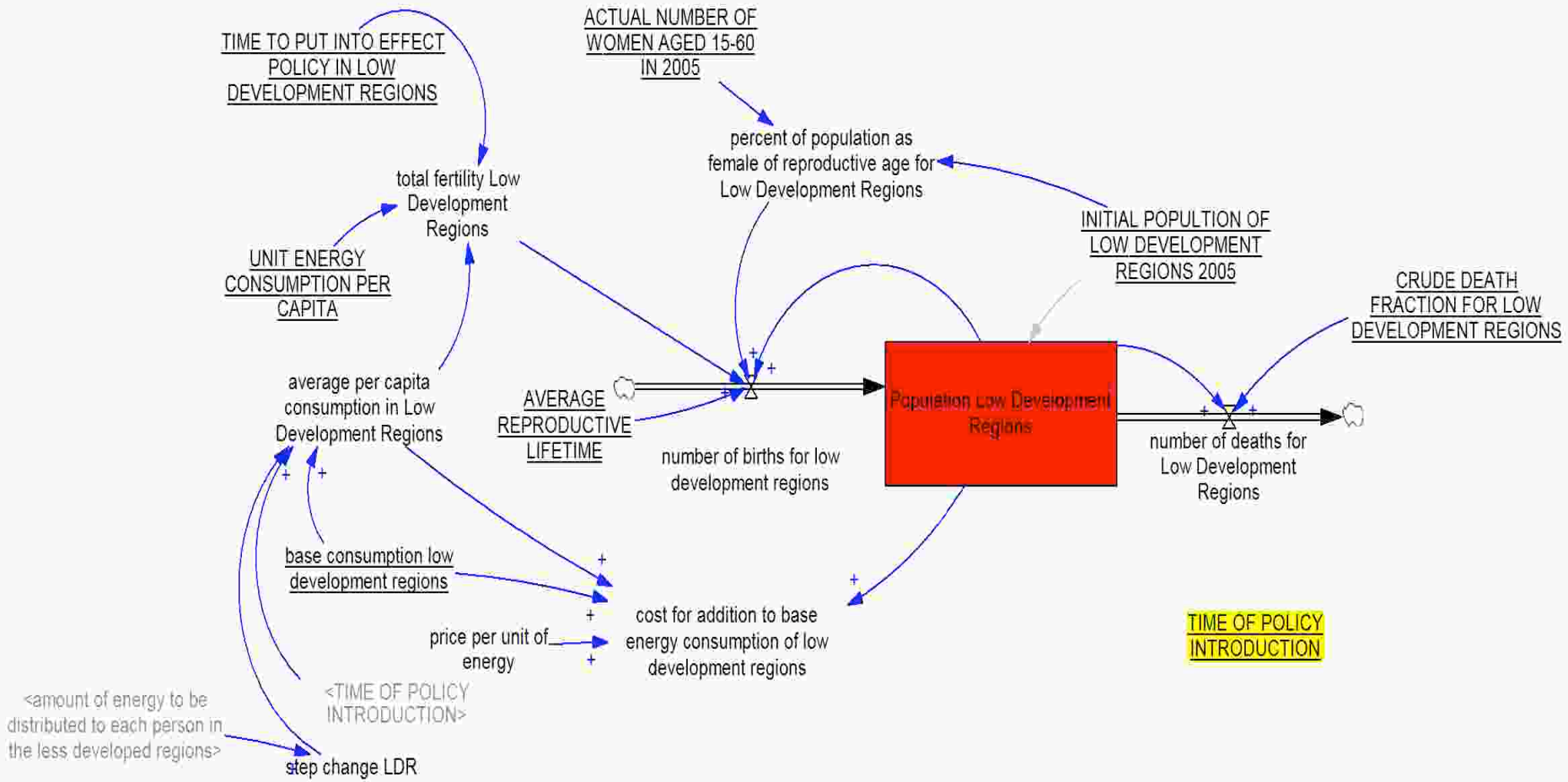
- $y = -7E\text{-}07x^3 + 0.0004x^2 - 0.0836x + 6.8774$
- Where “y” is Fertility (births per woman) and “x” is HDI
- $R^2 = 0.8124$
- No Direct Causal Relationship Necessary
- Statistically Significant Correlation

Energy Consumption and the Demographic Transition

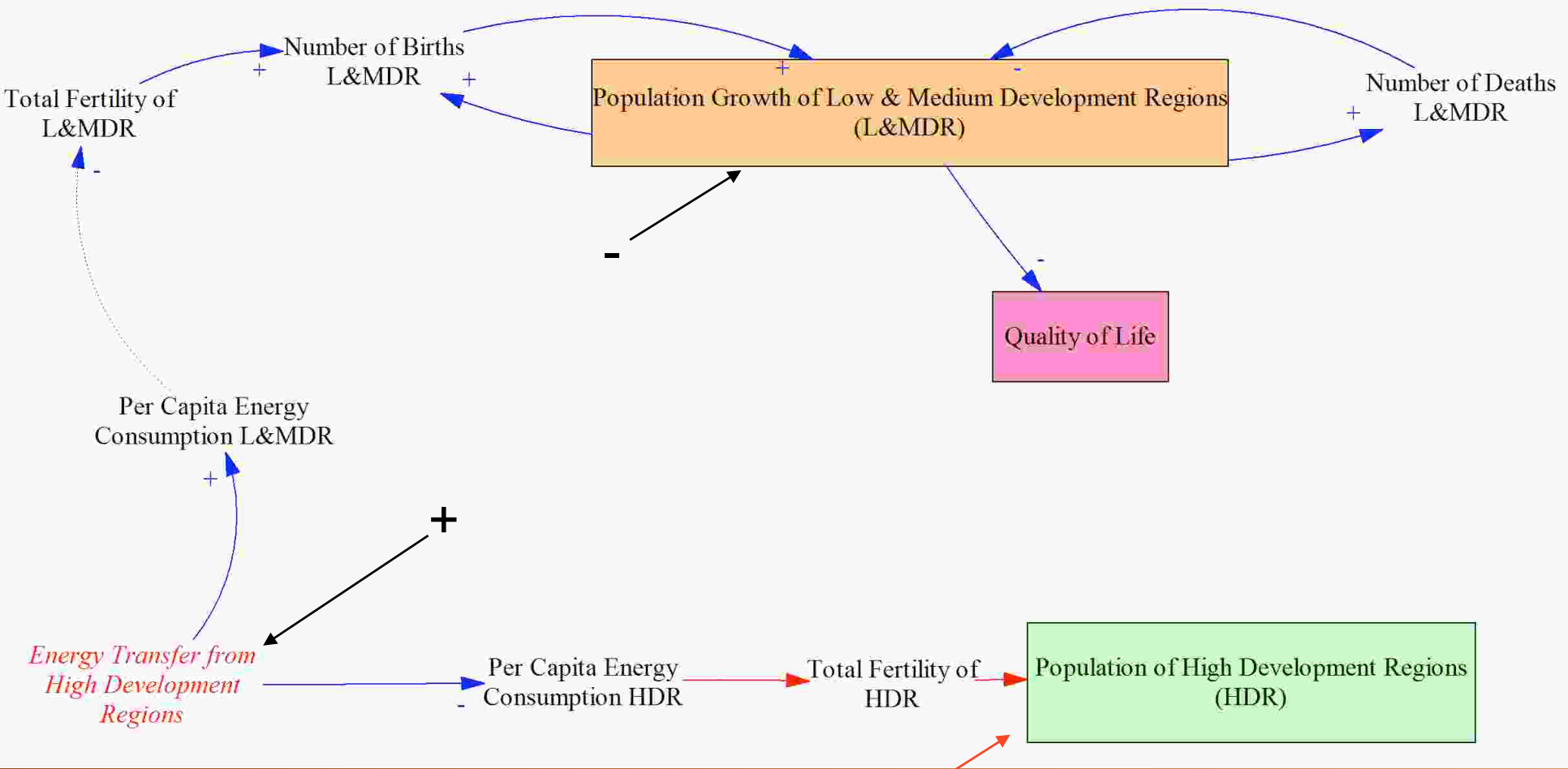


Development Alternatives

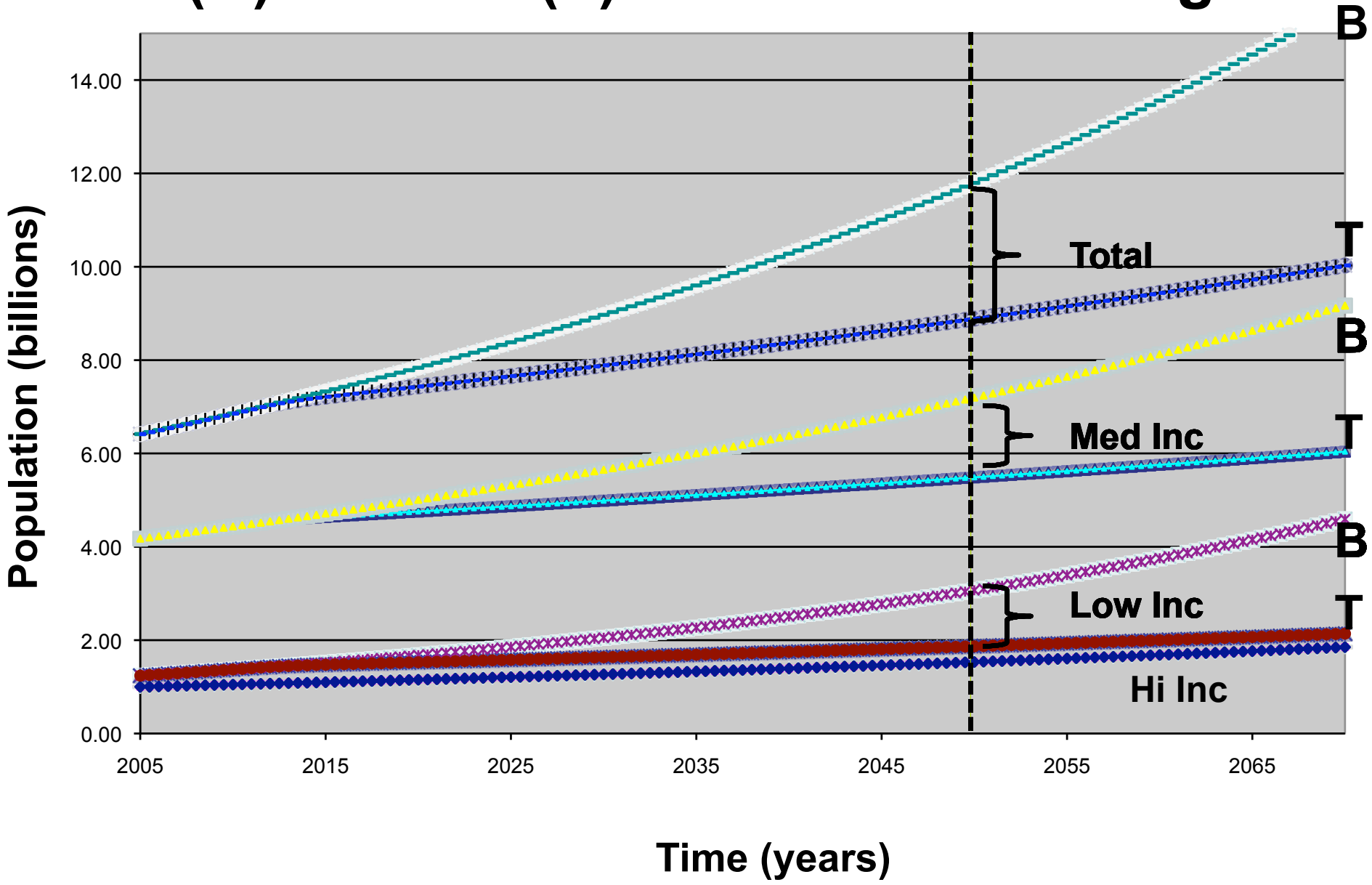
Sub-Model for Low Development Region



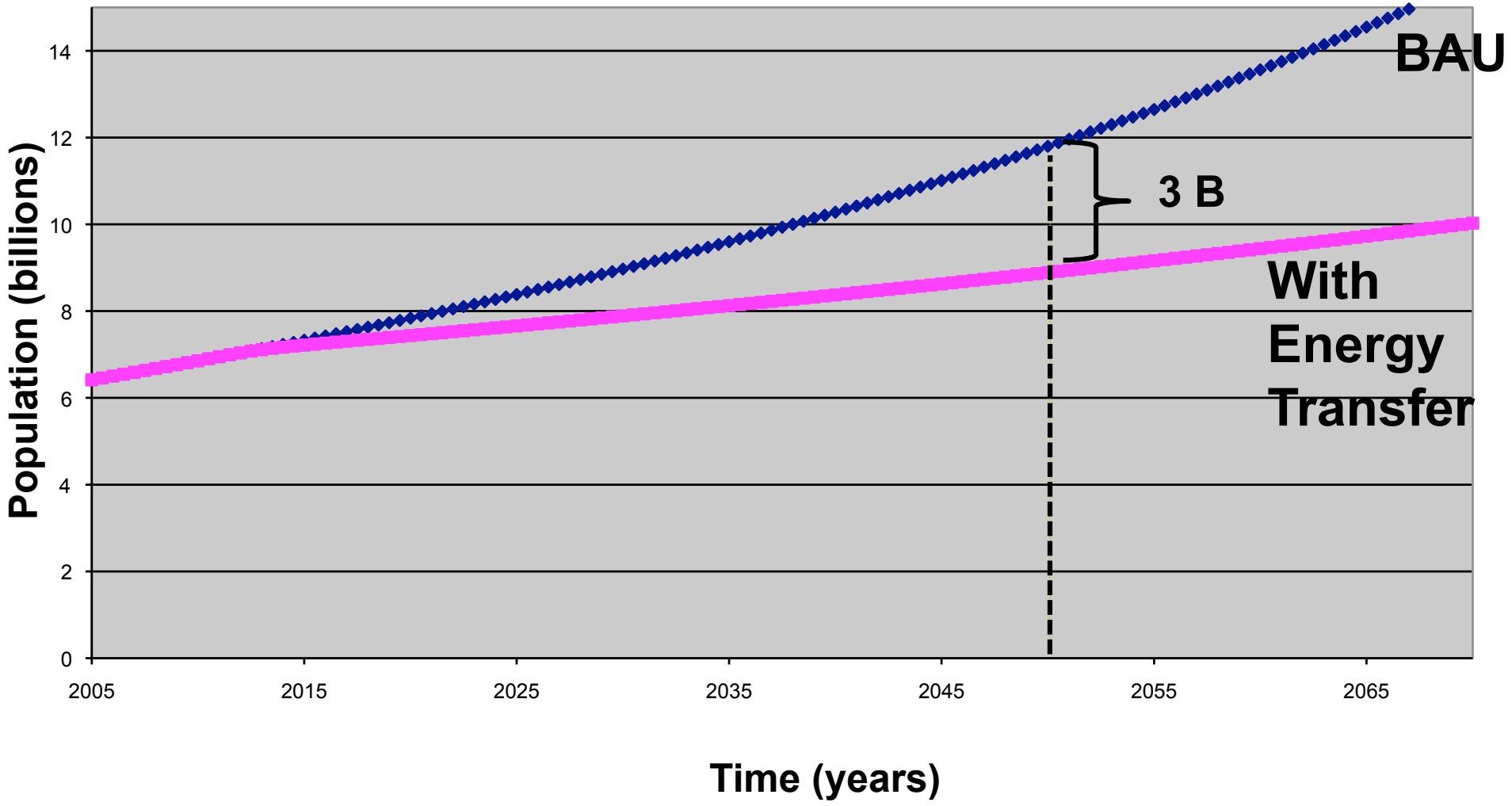
Relationship of Energy Consumption and Population Growth



Population Projections:
(B) BAU vs (T) Transfer of 1000KgOE



Total Population:
BAU vs 1000 Kg OE Transfer



Simulation Type 1 BC+

Region	BaseCase Energy Consumption (kgoe/person)	BaseCase Fertility (births/woman)	Equivalent Living Standard	Amount Added (kgoe/person)	BC+ Energy Consumption (kgoe/person)	BC+ Fertility (births/woman)	Equivalent Living Standard	Number of births averted in 2050 (persons)	Carbon Emission Savings (tonnes)
Low Development	721	3.42	Vietnam	1000	1721	1.99	Thailand	1.2 Billion	
Medium Development	1972	1.77	Mexico	1000	2972	1.09	South Africa	1.7 Billion	
High Development	7000	1.54	Norway	-1000	6000	1.54	Belgium	0	
			Matching Contribution	1000			**Total**	***3 Billion***	***16 Billion tonnes***

Before

After

Development Alternatives

Motivation for Family Planning

Jobs/ Livelihoods

Empowerment

Factory

Literacy/ Education

Community

Farm

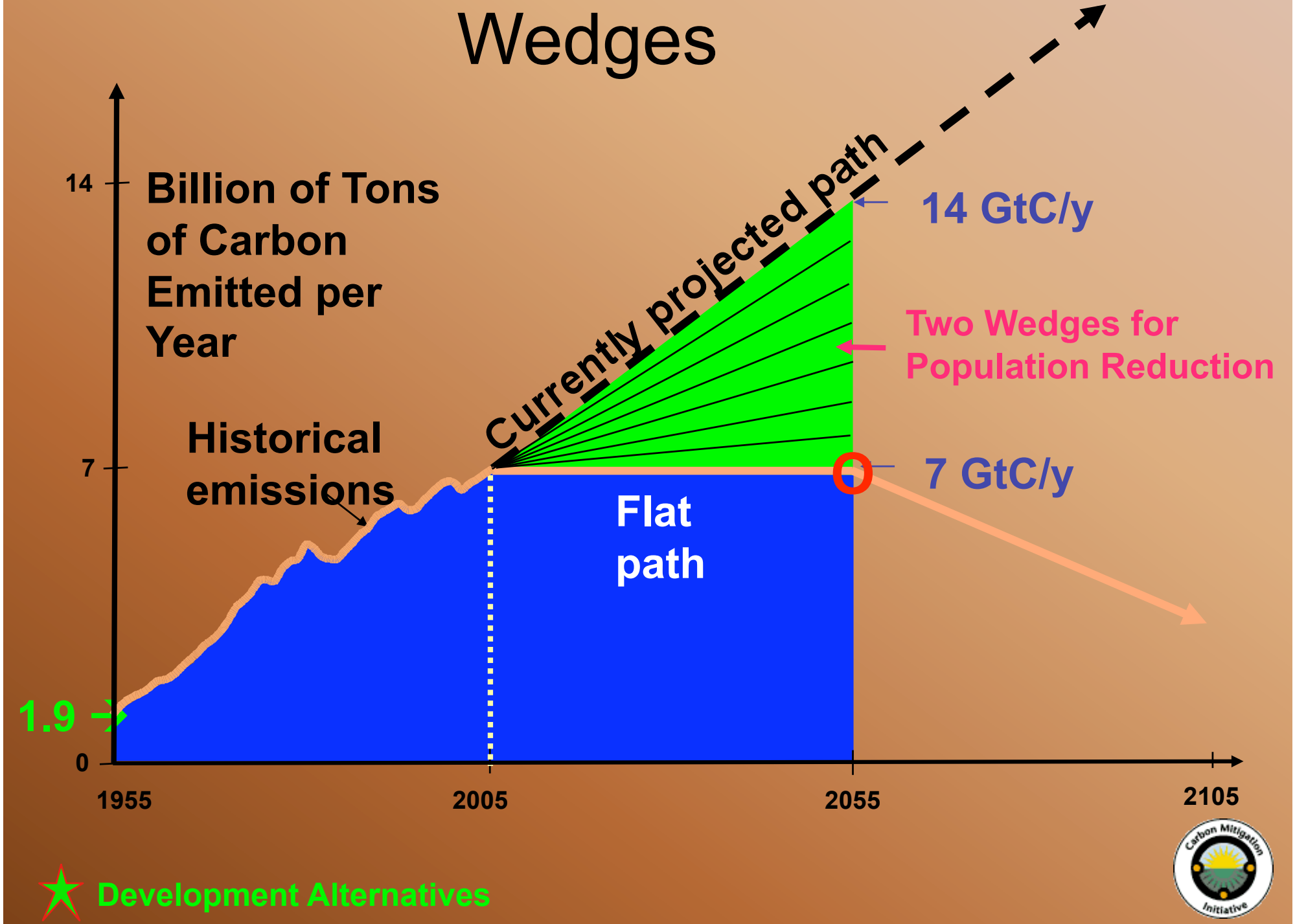
School

Electricity at Home

More Energy

Development Alternatives

Wedges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Flat path
1.9
0
1955
2005
2055
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Development Alternatives
Carbon Mitigation Initiative

Assumptions

1 Person Emits 1 Ton of Carbon/year

1 Ton of Carbon Saved > $ 20 Saved
Average Lifetime ~ 60 Years

So, 1 birth avoided > $ 1,200 Savings

Living Together …

Development Alternatives