

Population, Poverty, & Climate Change

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&

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Outline

1. Difficulties of managing emissions to limit climate change
2. Population growth & climate change
3. Impact of climate change harshest on poor countries
4. What can poor countries do, to mitigate the impact of climate change?
5. How do the poorest countries gain from lower fertility?
6. Conclusions

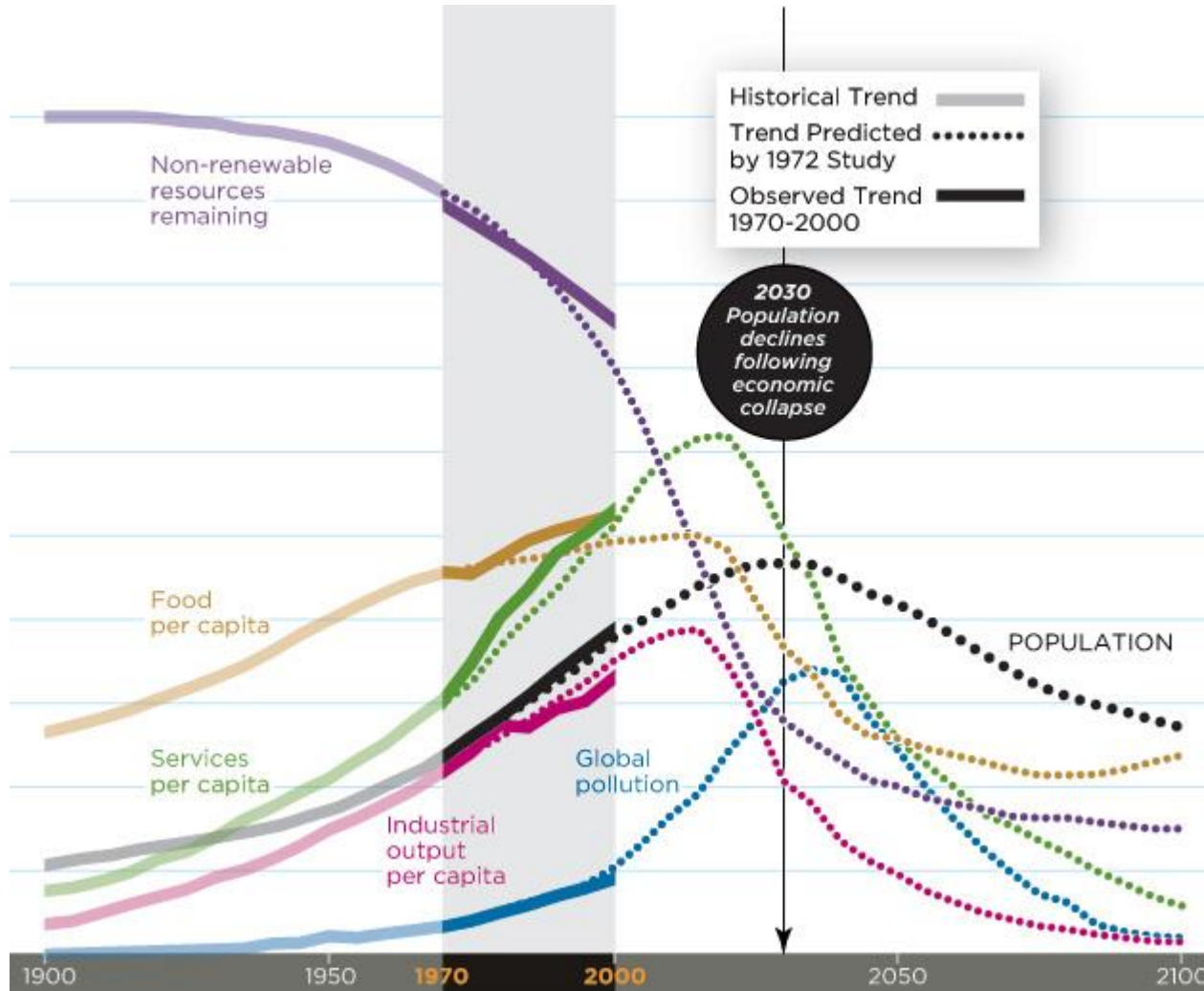
1. DIFFICULTIES OF MANAGING EMISSIONS TO LIMIT CLIMATE CHANGE

Julian Simon vs Kenneth Arrow

Some types of resources more likely to be conserved than others

- Resources that are more fully priced:
 - Clear incentives to conserve use
- Resources that are free or not fully-priced:
 - Lower incentives to conserve use
 - Difficulties of coordinating management of common property resources (CPRs)
 - Depreciation of natural capital threatens sustainability of production possibilities

Despite much international negotiation,
the original projections of the Club of Rome “Limits to Growth” report largely held
Comparing the 1970 projections with trends observed by 2000



Source: Strauss (2012), summarizing Turner’s (2012) comparisons of observed trends 1970-2000 with the “business-as usual” projections of the Limits to Growth model (Meadows et al 1972)

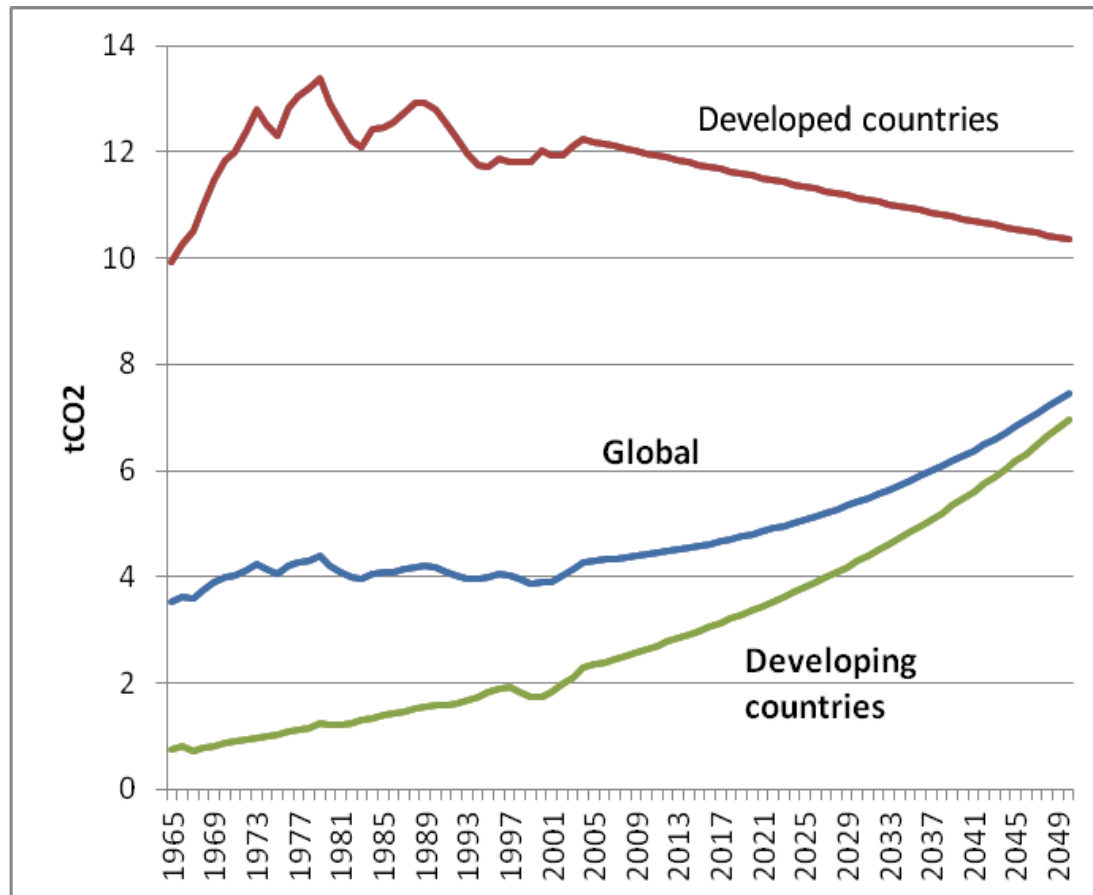
2. POPULATION GROWTH & CLIMATE CHANGE

Climate change affected by:

- (a) Emissions per person
- &
- (b) The number of persons

(a) Carbon emissions per person
... leveling off in developed countries,
but growing fast in developing countries: *economic growth & population growth*

Per capita carbon emissions, 1965-2050
(historical estimates and projected future trends)



Source: Stern (2006), based on Holtsmark (2006)

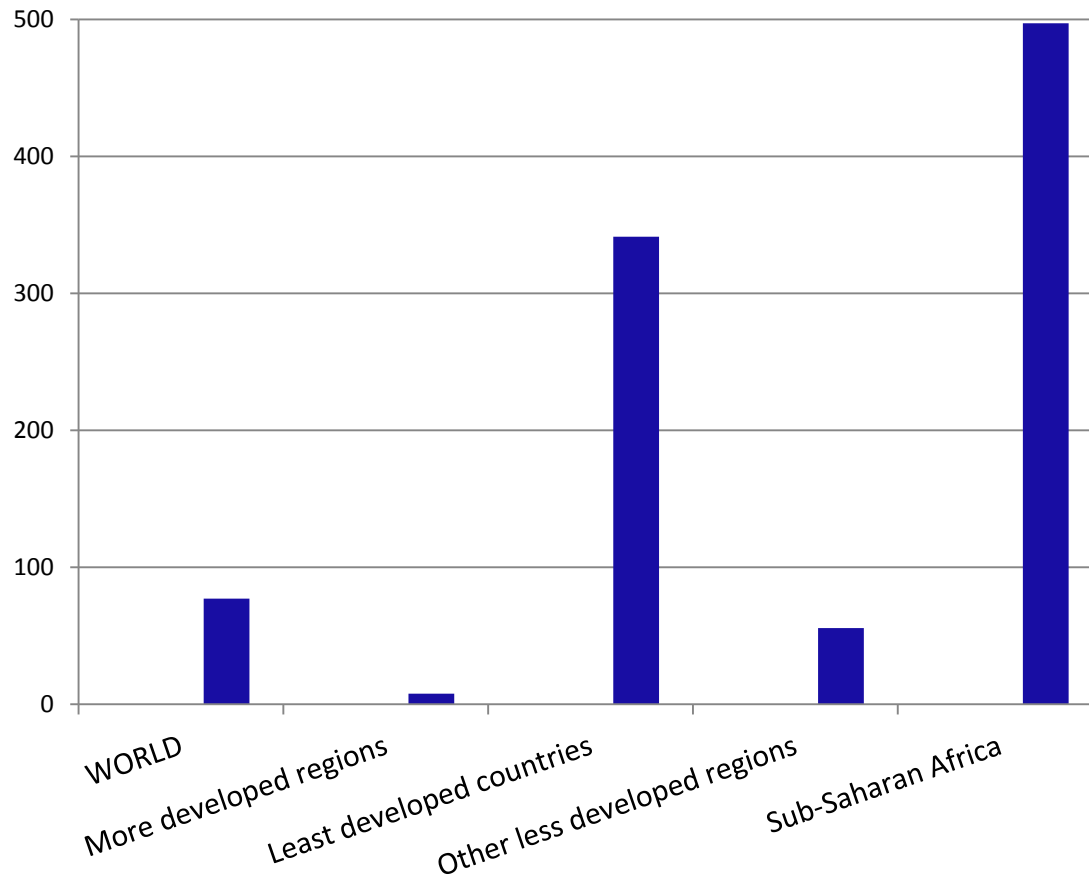
(b) Number of persons

Poorest countries add to emissions through rising numbers of consumers

- even if no change in consumption levels
- fortunately economic growth picking up widely

% increase in population 2000-2100

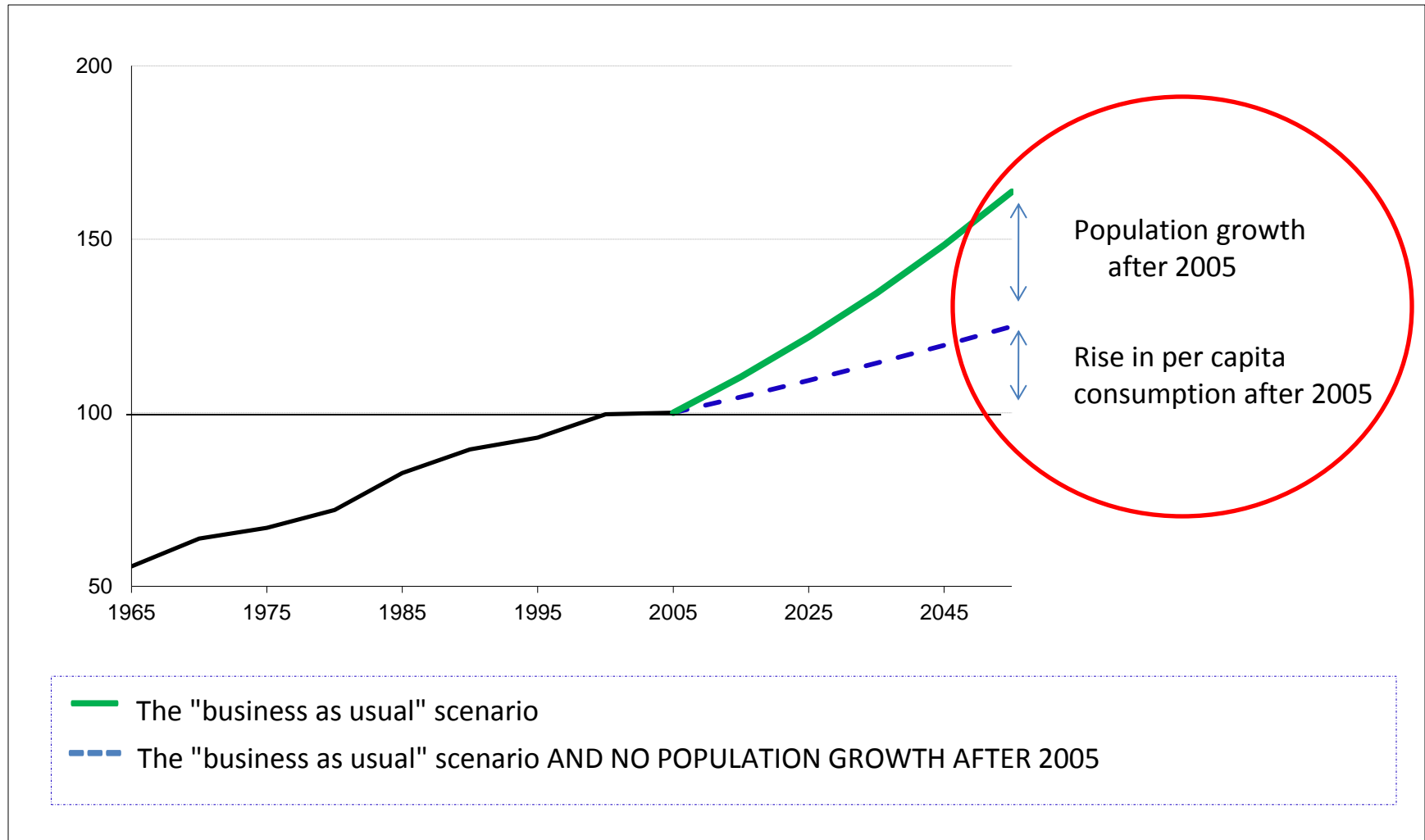
(UN (2012) medium fertility projections)



Growth in both population size and per capita consumption generates pressure to expand production

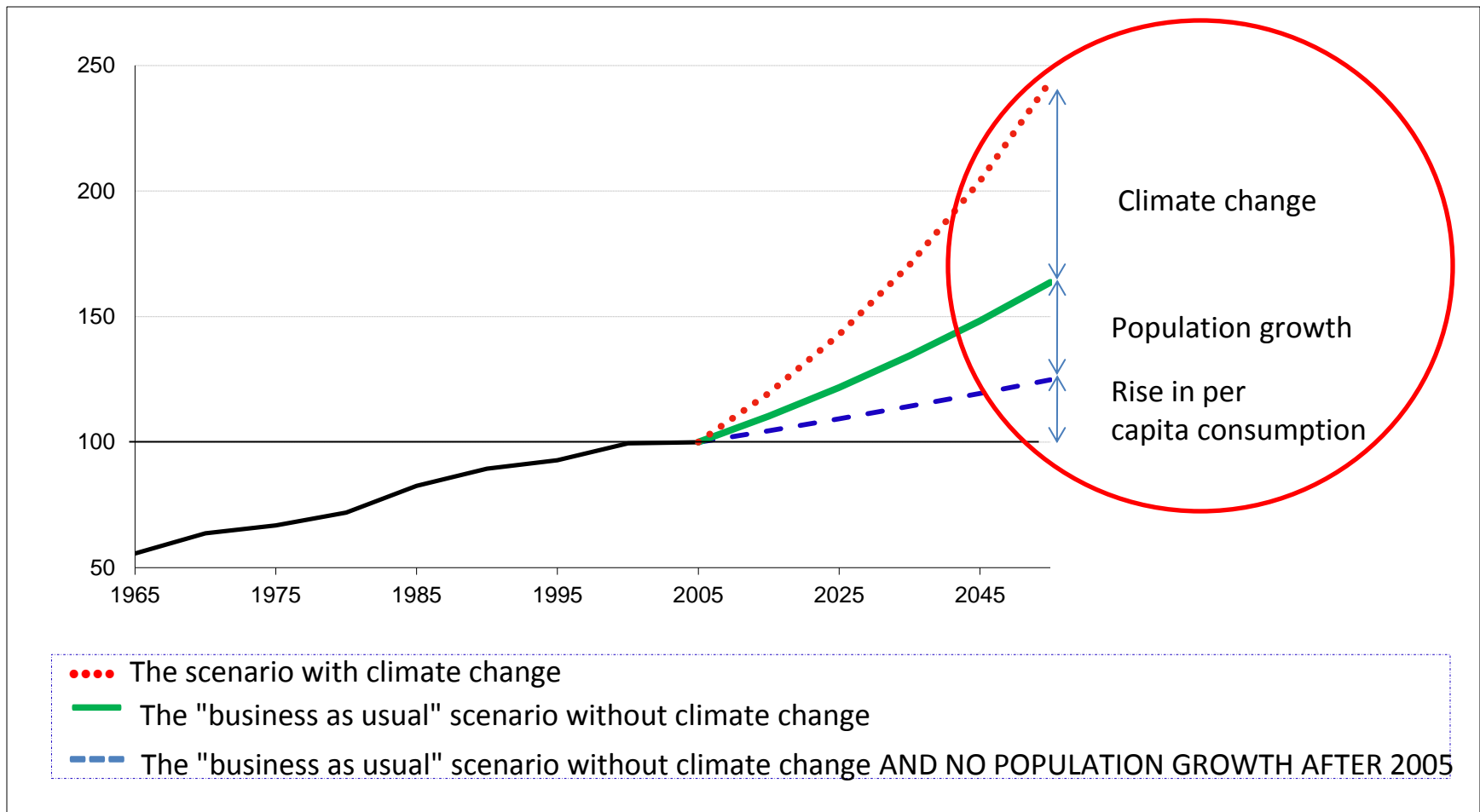
- *Dyson (2005) estimates that the effect of a 40% reduction in CO2 emissions per capita in developed countries between 2000 and 2050 would be entirely offset by the increase in emissions attributable to expected population growth in poorer countries over this period – even assuming no increase in emissions per capita in these countries.*

Population growth accounts for much of estimated need for growth in agricultural productivity 2005-2025



Source: *World Development Report 2010*: Figure 3.5 (derived from Lotze-Campen et al 2009). Dr Lotze-Campen generously disaggregated the "business as usual" scenario into two estimates: (1) with population held constant at the 2005 level, and (2) the WDR 2010's "business as usual" scenario, which includes anticipated population increase to 9 billion by 2055.

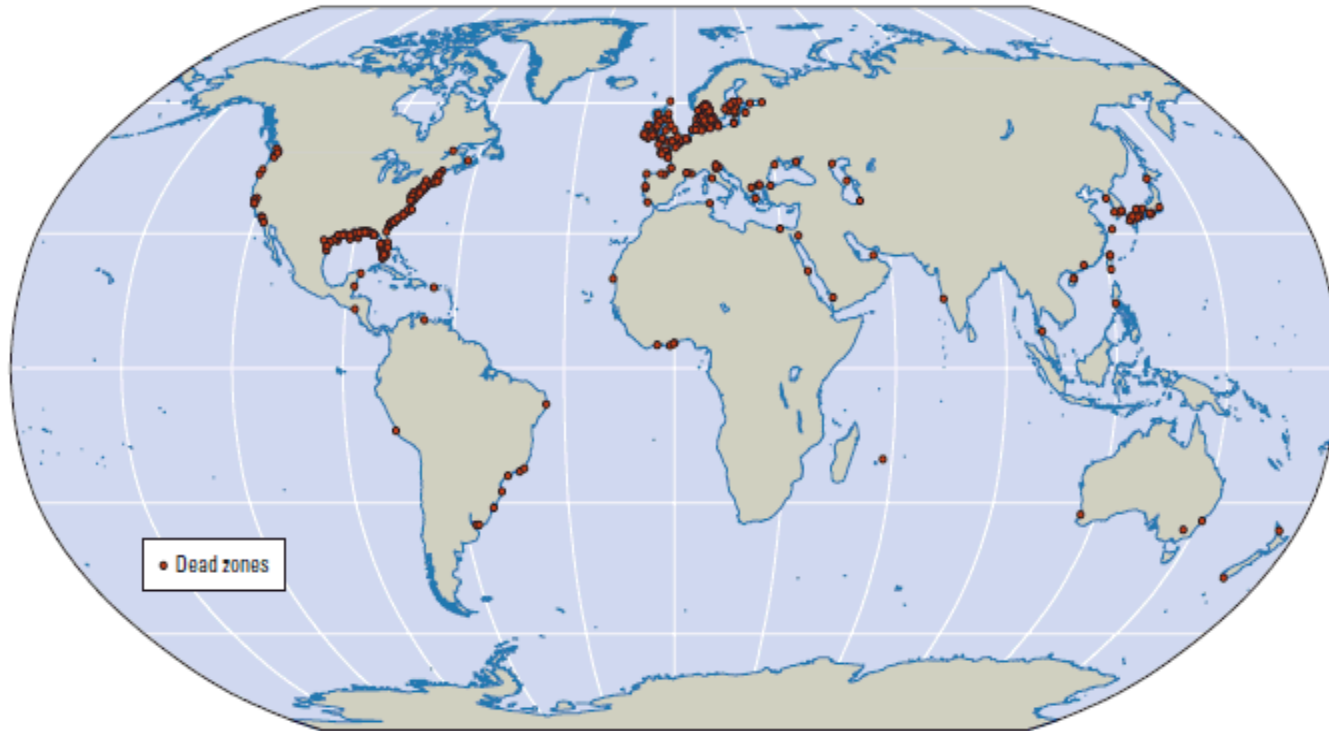
... and climate change makes it far harder to achieve



Source: *World Development Report 2010*: Figure 3.5 (derived from Lotze-Campen et al 2009). Dr Lotze-Campen generously disaggregated the "business as usual" scenario into two estimates: (1) with population held constant at the 2005 level, and (2) the WDR 2010's "business as usual" scenario, which includes anticipated population increase to 9 billion by 2055.

Complexities in raising agricultural production sustainably

Intensive agriculture contributes to “dead zones” in oceans



Source: Diaz and Rosenberg 2008.

Source: World Bank (2010) *World Development Report 2010*: Map 3.4 (derived from Diaz and Rosenberg 2008).

3. ENVIRONMENTAL INJUSTICE: UNEQUAL IMPACT OF CLIMATE CHANGE

*Developed world responsible for much of the current stock of emissions
making for climate change,
... but impact hardest on the developing world*

Impact of global warming

(consensus from varying models)

- 1. Food:** Fall in crop outputs at lower latitudes
(developing regions already warmer on average than developed regions)

- 2. Water:** Droughts, floods, shifting patterns of water availability threaten agricultural cycles
 - *potent shocks for long-term impoverishment*

 - Poor people the most affected - 75% of the poorest billion people in the world rely on farming

 - Population growth pushes people to vulnerable marginal areas (arid, poor soil, low-lying coastal areas)

Impact of global warming *(cont'd)*

3. *Natural disasters:*

- More frequent disasters
- Low-lying coastal areas increasingly uninhabitable with salinization of land & groundwater

4. *Health conditions:*

- Rise in vector-borne and other diseases
- especially among children, lasting impact on their schooling & future earnings

3. *Conflicts:*

- Increased migration with land shortage, environmental degradation and climate change
- Generates conflict - esp if locals also under pressure

Effect on prospects of poverty reduction

- Population growth and climate change can:
 - entrench the poverty that already exists and
 - pull more people down into poverty
- Curiously neglected in much discussion of poverty reduction
 - Needs incorporating into “business as usual” analyses

**4. WHAT CAN POOR COUNTRIES DO TO
MITIGATE THE IMPACT OF CLIMATE CHANGE?**

Mitigating the Impact: *options beyond financial reach of poor countries*

Adaptation / mitigation efforts very costly, e.g.

- Build & maintain coastal barriers
- Increase safety nets to help rebuild lives
- Shift people to safer areas & other livelihoods

Mitigating the Impact:

potentially affordable options for poor countries

Improve systems for:

- disaster management
- population health (disease prevention & control)

Requires considerable administrative & technical capacity

Many developing countries have low capacity in these systems, while facing intensified threats

Mitigating the Impact: *most tractable option*

Reducing fertility:

- Low financial outlays
- Simple implementation mechanisms
- Already done in many poor countries with weak administrative & fiscal capacity for improving disaster management systems

5. HOW DO THE POOREST COUNTRIES GAIN FROM LOWER FERTILITY?

- *Helps mitigate impact of climate change*
- *Helps reduce poverty & increase pace of economic growth*

Gains from lowering fertility

Clearly the poorest countries do not owe it to the world to reduce fertility to help slow the pace of climate change given the excesses perpetrated by others

...But lower fertility helps them mitigate the impact of climate change:

- Reduces additions to global warming emissions
(benefits them more than developed countries)
- Reduces poverty & increases pace of economic growth:
 - more resources per capita to cope with climate change
 - fewer people living in conditions extra-vulnerable to climate change

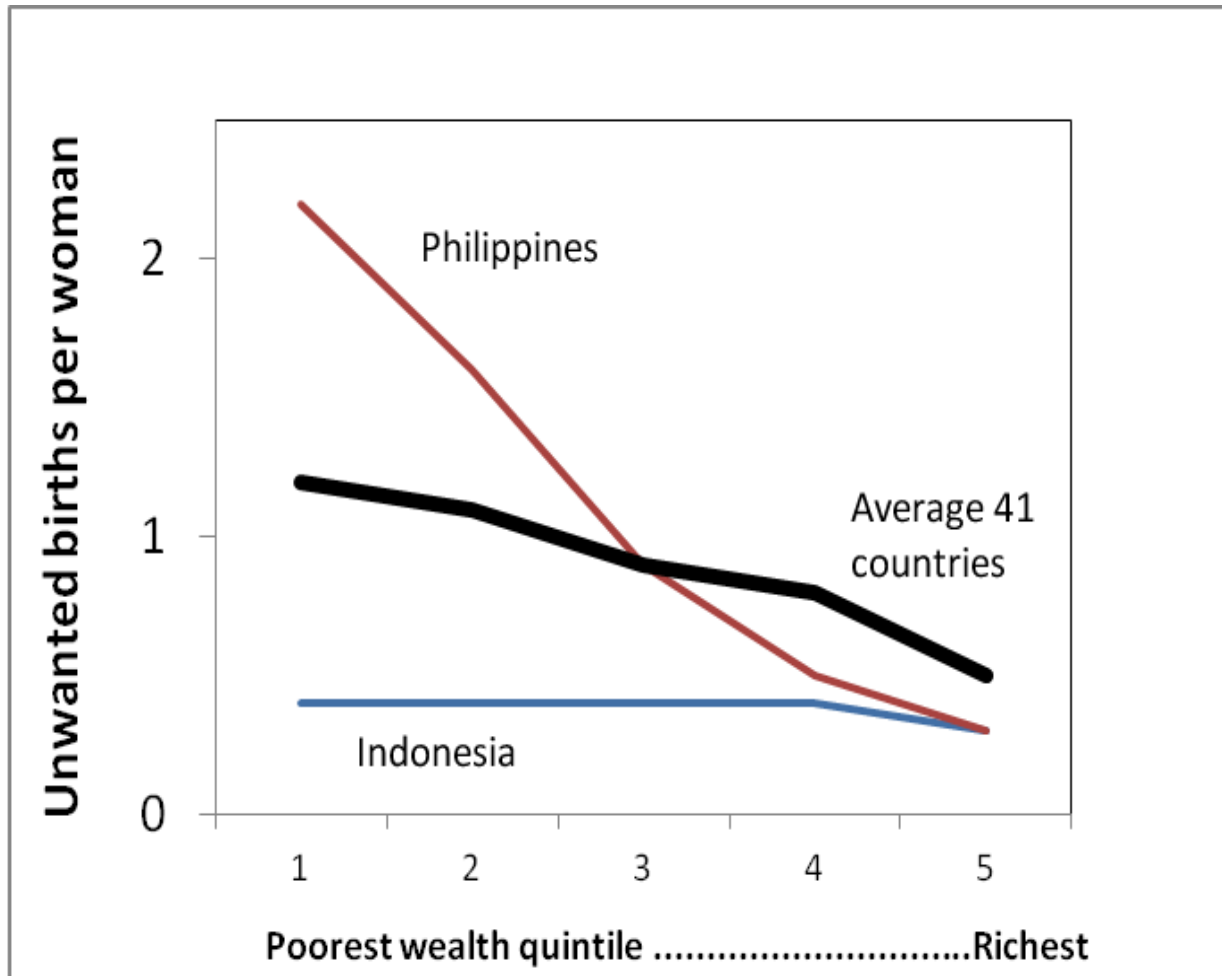
Gains from fertility decline

“Natural experiments” show benefits of expanding access to contraception:

- For women: higher schooling, work prospects, lifetime earnings (and better health)
- For their children: more human capital, better life chances
- Helps most women who are poor/ less-educated / young

Helps break intergenerational cycle of poverty

Poorer women report higher numbers of unwanted children, and effective family planning programs can reduce this gap



Source: Gillespie et al. (2007): Table 1

The “demographic dividend”

- Fertility decline creates demographic “window of opportunity” :
 - Low dependency ratios enable savings, investment & growth
 - *If maximize investments during this window, can permanently lock in higher income levels* Needs good policy settings
- Often overlooked:
 - *Fertility decline alone yields a substantial dividend for poor / high fertility countries*

Fertility decline *lowers pressure on livelihoods*

Critical given existing shortfalls:

– Land:

- SSAfrica cropland per agricultural person estimated to have fallen 40% during 1960-2003

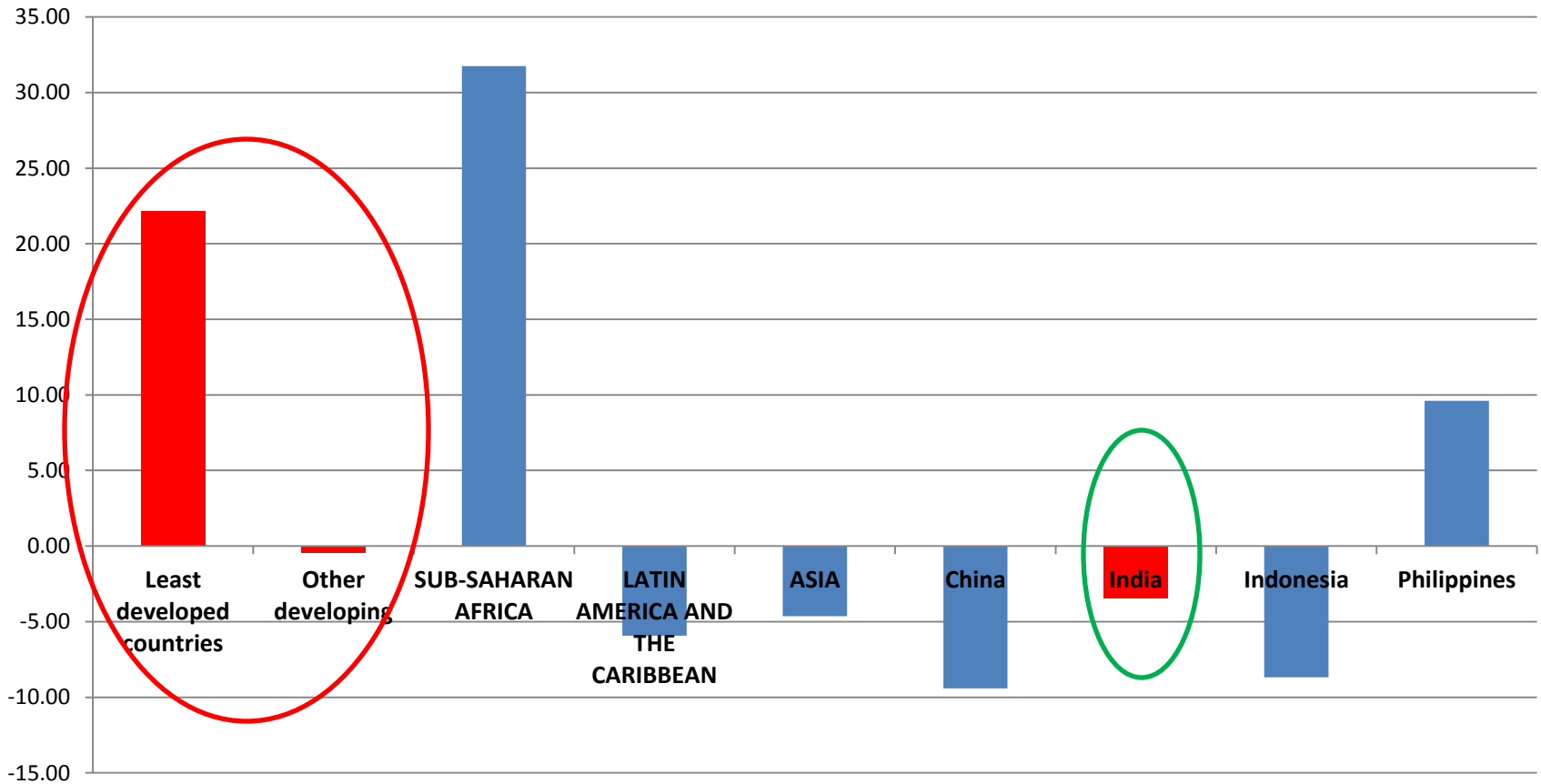
– Jobs: ***just to maintain 2005 levels of employment in 2020***

- Additional million jobs a month need to be generated in S Asia
- Number of jobs in SSAfrica would have to increase 50%

Population Pressure on Jobs & Livelihoods

Largest numbers entering the laborforce in the least developed countries

Projected % change in population aged 0-14, 2015-2030

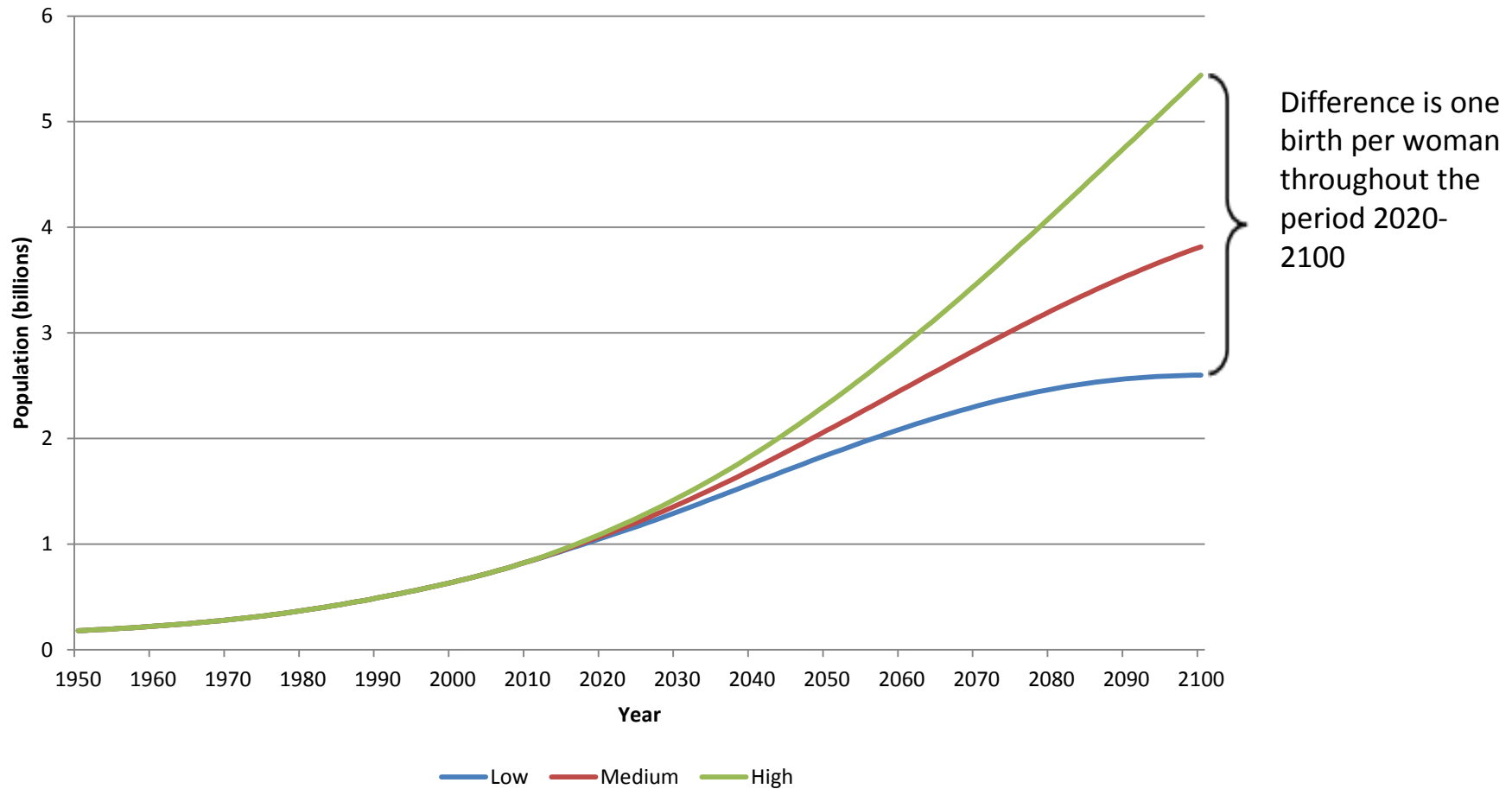


Source: UN World Population Prospects 2012 Revision

Modest fertility decline adds up

Maintaining 1 less birth per woman reduces projected population in 2100 by 2.8 billion

UN 2012 Population projections for Sub-Saharan Africa



Note: The “high” and “low” projections diverge during 2010-2020, reaching a difference of 1 birth by 2020

6. CONCLUSIONS

Conclusions

1. Difficult to manage emissions to limit climate change
2. Climate change emissions affected by
 - *Per capita emissions & population growth*
3. Climate change impact harshest on poor countries
4. Poor countries' incentives to reduce fertility
 - Most tractable policy option available to them for mitigating the impact of climate change & reducing poverty

Though they don't owe it to the world to reduce global population growth, given other's excesses