

Macroeconomics II

Lecture 9

Sustainable development
Limits to growth



Theoretical Lecture 9

Limits to growth

Sustainable development

- .Concepts of sustainability
- .Energy and economic and social impacts
- .Social vs economic sustainability
- .Limits to growth

Readings:

Diamond, Jared (2005), ***Collapse***, Penguin, London (there is a Portuguese translation)

Core (in Aquila)

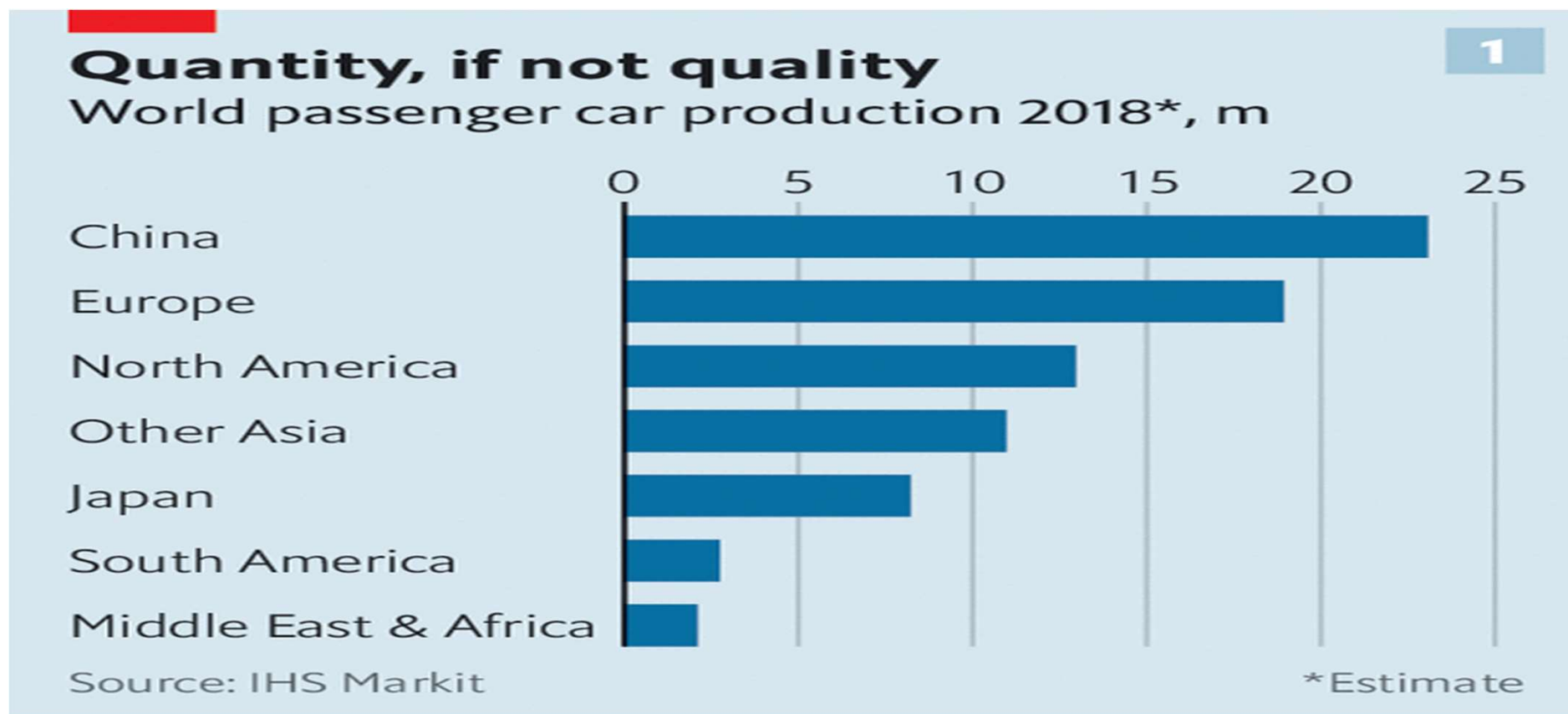
Recap:

What we discussed: **models and growth theories** (Adam Smith and classical economics, the Keynesian type of model by Harrod-Domar, the neoclassical models of Solow, AK and Romer)

Next chapter: making development (what to do, how to do, the economic, social and environmental problems)

Today: **limits to growth**

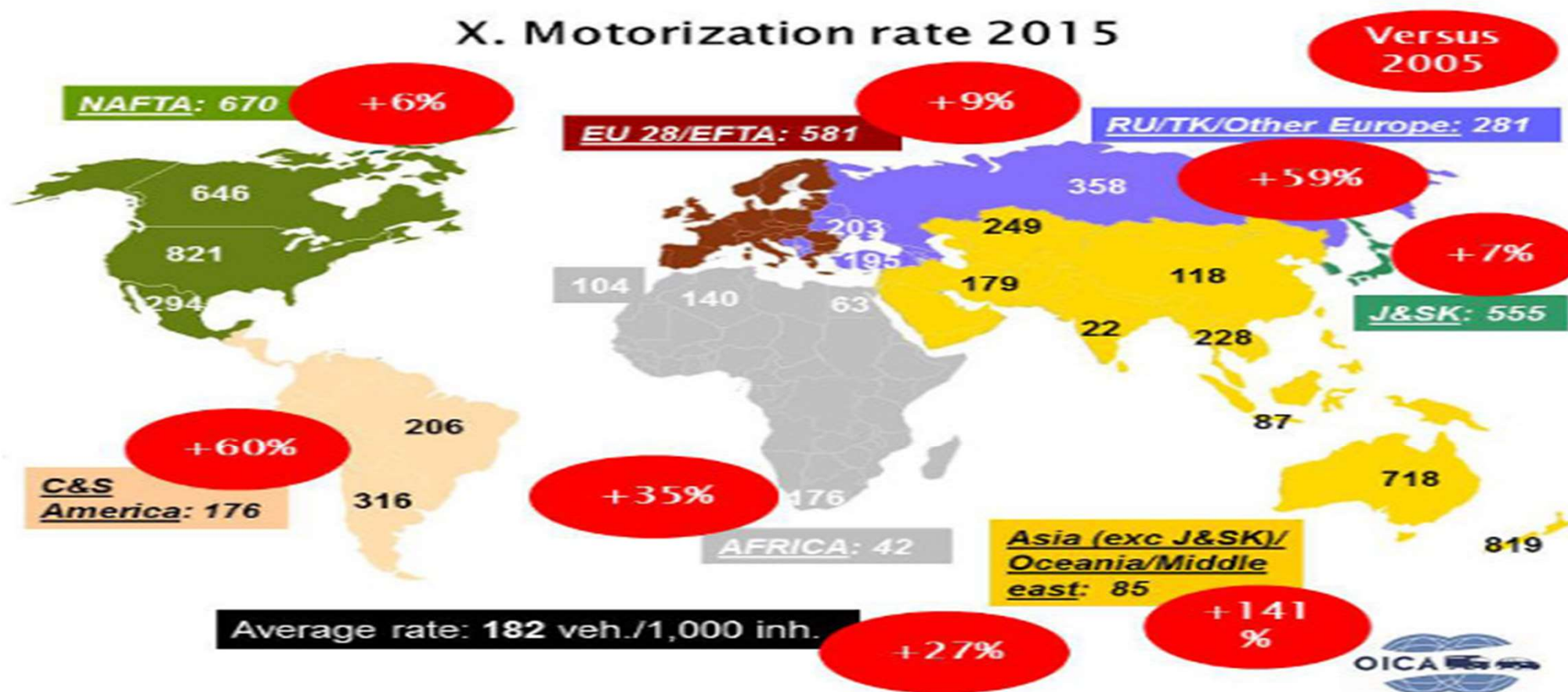
Is this sustainable?



Quite difficult, right?

MOTORIZATION RATE 2015 – WORLDWIDE

X. Motorization rate 2015



Overcrowded cities

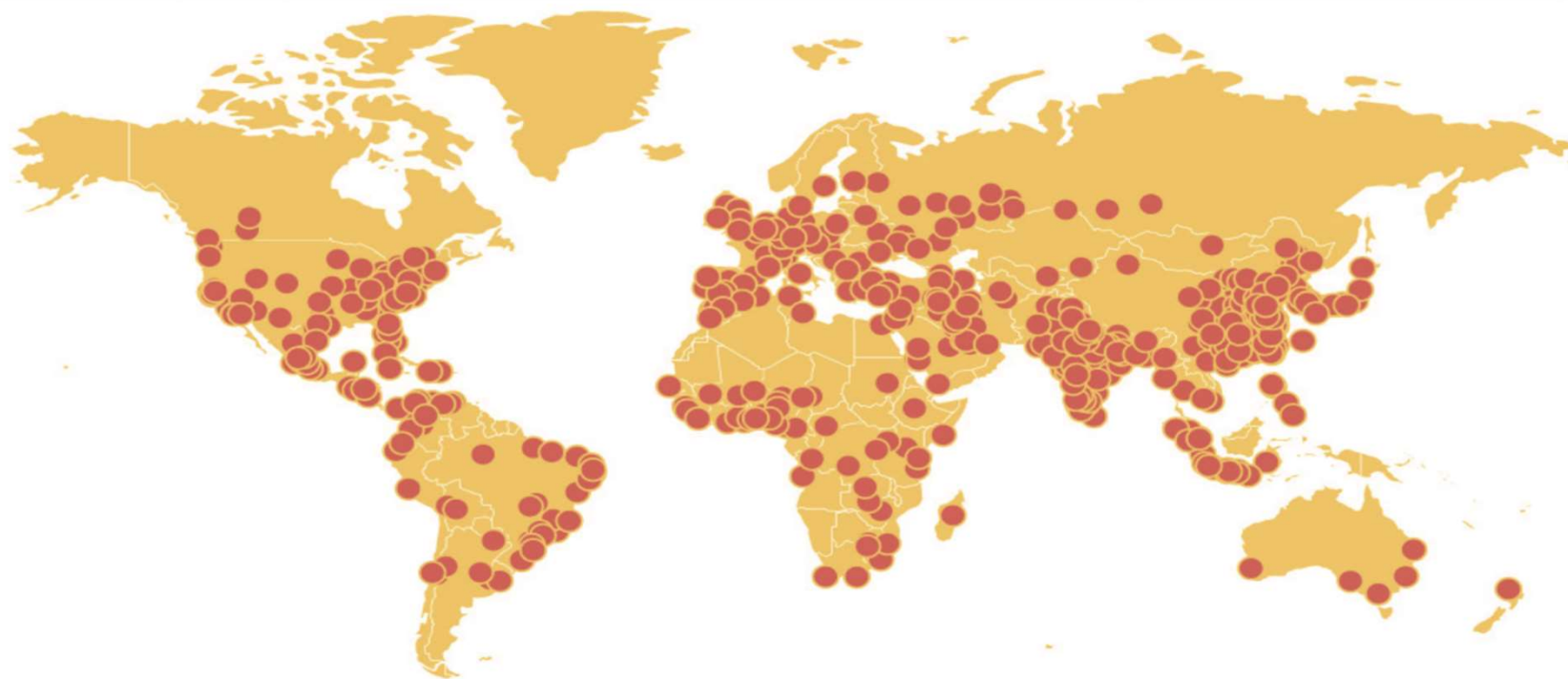
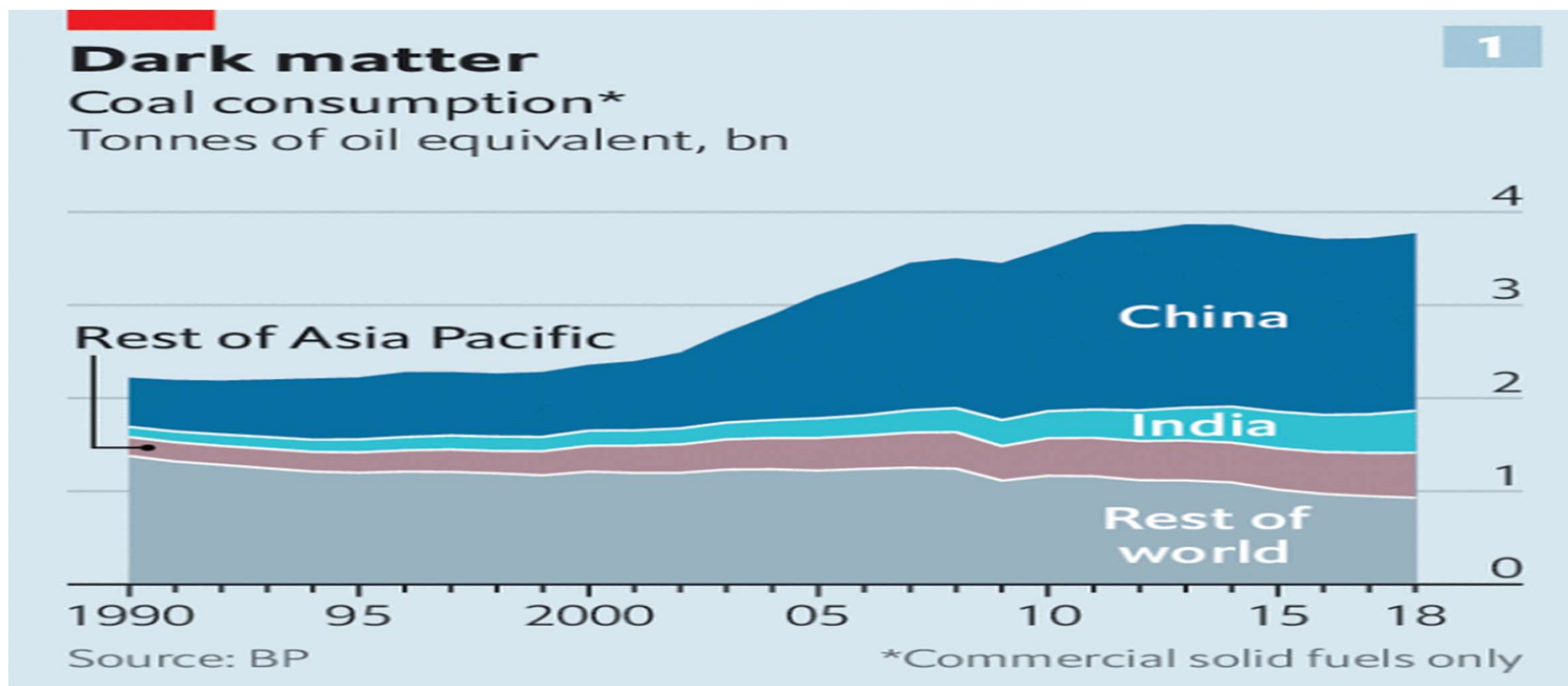


Figure 1.6 *Cities with more than 1 million inhabitants (2013).*

Source: 'Major Agglomerations of the World - Population Statistics and Maps.' 2015. Accessed June 2015. Data is for agglomerations (a central city and neighbouring towns (suburbs) forming a connected region of dense, predominately urban population with more than 1 million inhabitants.

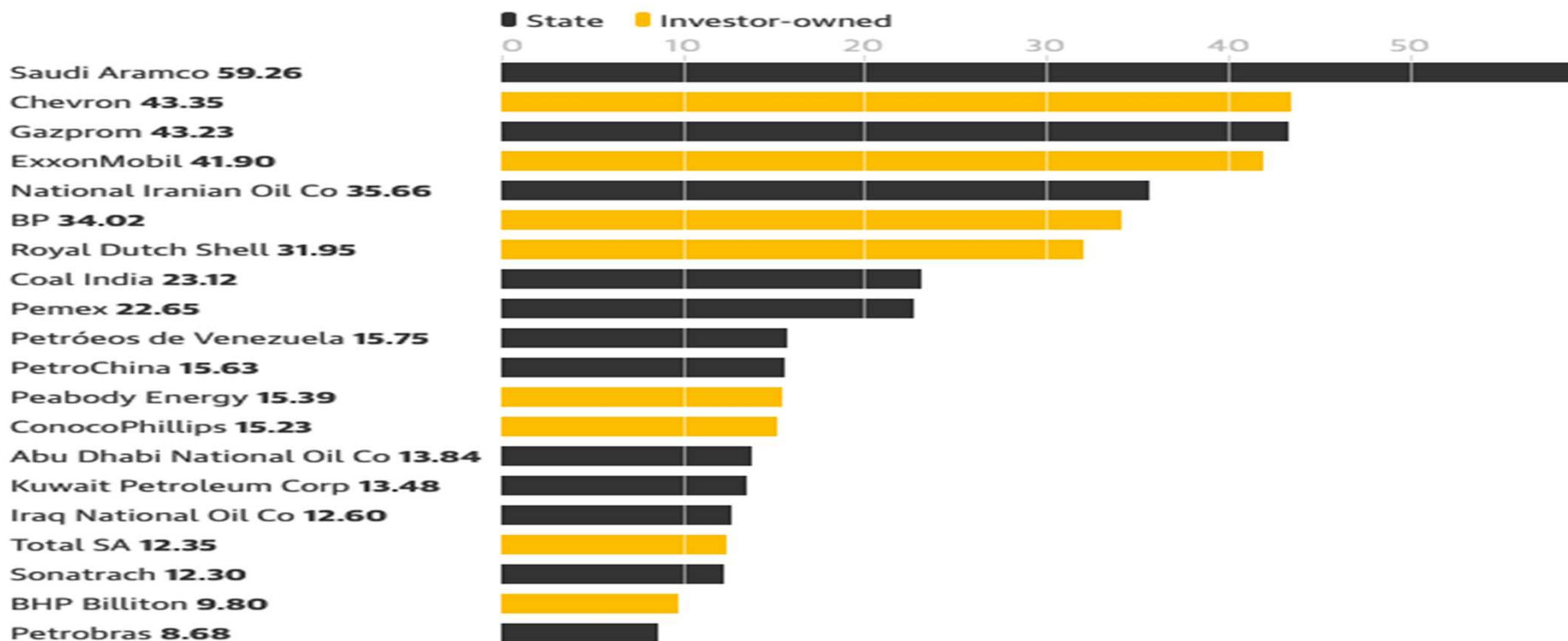
Sustainability? Coal consumption



Companies and global emissions

The top 20 companies have contributed to 480bn tonnes of carbon dioxide equivalent since 1965

Billion tonnes of carbon dioxide equivalent



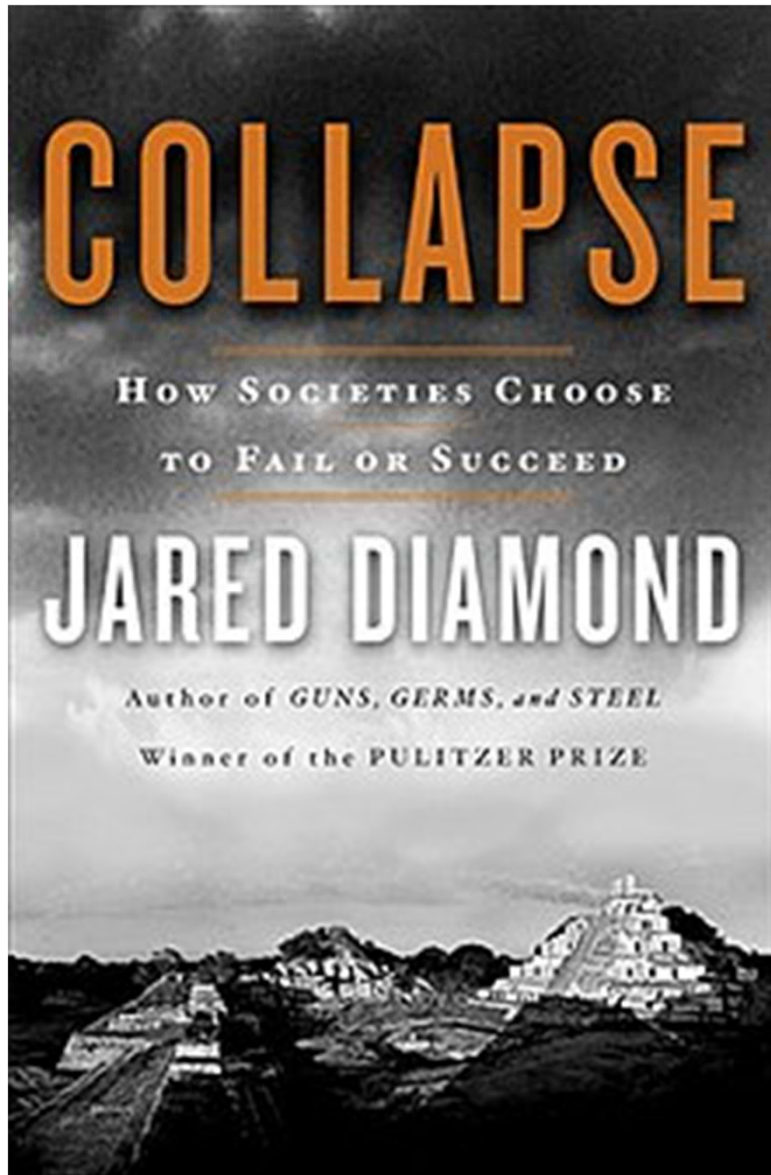
Guardian graphic | Source: Richard Heede, Climate Accountability Institute. Note: table includes emissions for the period 1965 to 2017 only





Limits to growth 1

Society, environment and climate change



Jared Diamond
(1937-...)
University of California



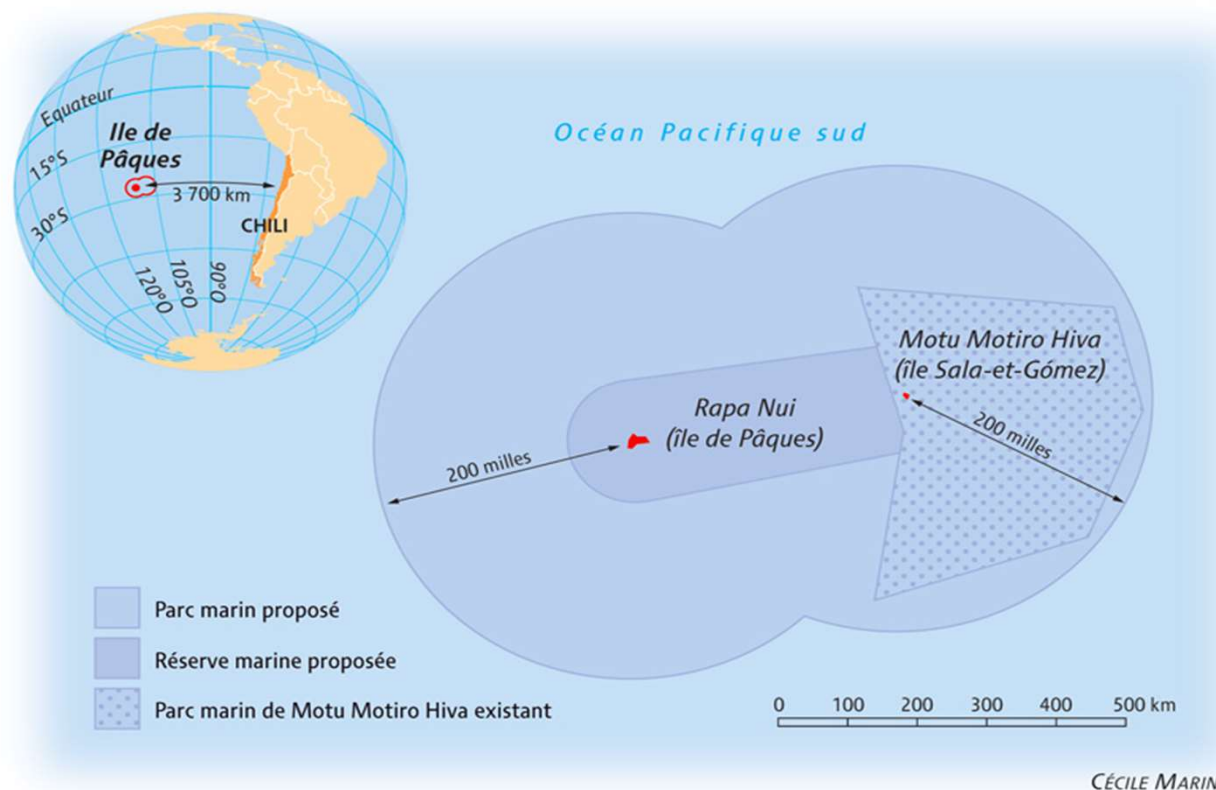
- How do societies survive and adapt?
- How and why do they fail?

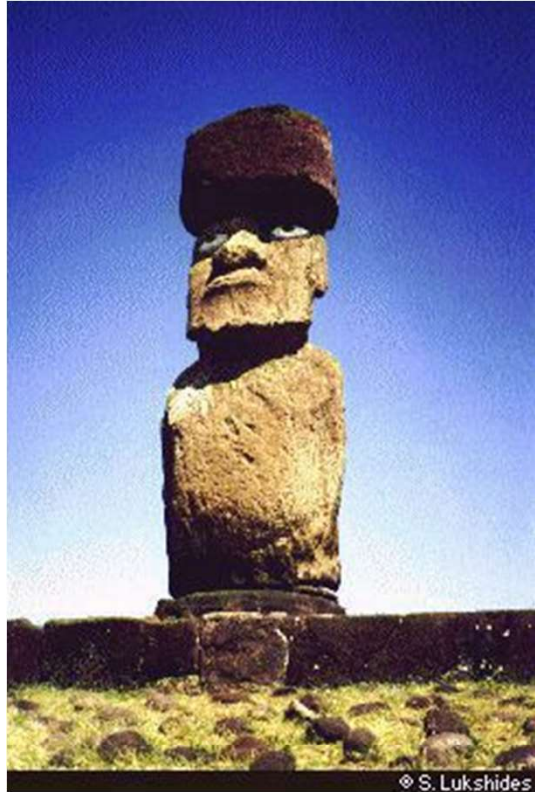
Climate change

Environment, agriculture, water and other resources

- **Social organization, trade, war**

Ecological catastrophe or human catastrophe? The case of the Easter Island





© S. Lukshides



Easter Island statues:
who did and why?



Why did this society collapse?

According to Diamond (but some disagree), it was mainly an **ecological catastrophe**: the statues were built for centuries as exhibition of power, but this exhausted the resources (trees for ropes and building tools).

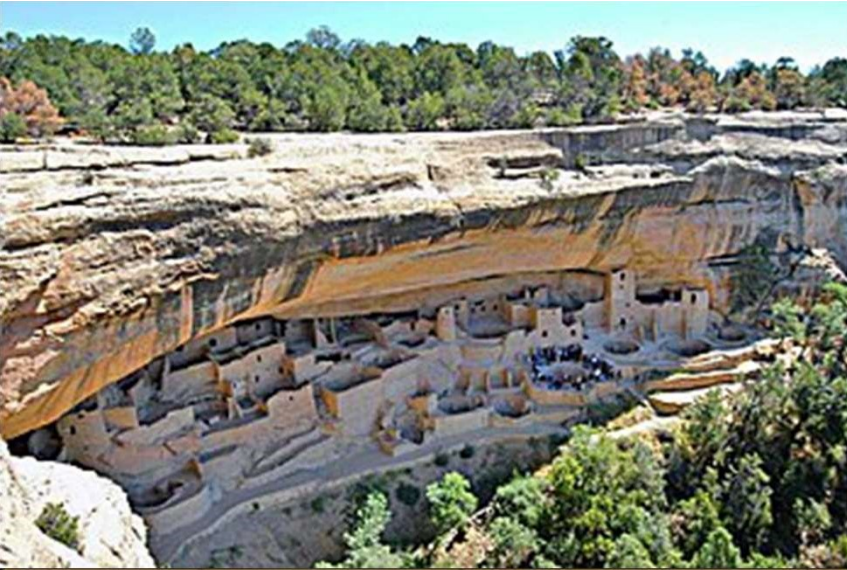
Then, the impoverished populations destroyed the statues and only a few remained at their sites.

Another explanation: diseases contaminated by the Dutch sailors finding the island in the 18th century.

The case of the Anasazi

·in what is now Utah, Colorado, Arizona, New Mexico

·Approx. 500-1350 our era





The Anasazi were able to build large urban settlements and to develop industry and innovative agriculture



They built houses using complex construction methods, developing pottery and writing elaborate pictographs



But the Anasazi society failed

- .Drought, in spite of a highly sophisticated irrigation system
- .Deforestation is the main candidate for the ignition of the crisis
- .But also a social context: much work and social subordination was required for the extent of “public works” we verify as buildings; wars and scarce resources created further contradictions and conflict
- .The Anasazi left their homes and migrated south

Third example: the Vikings in Greenland until 1450

“A thousand years ago, a group of Vikings led by Erik the Red set sail from Norway for the vast Arctic landmass west of Scandinavia which came to be known as **Greenland**. It was largely uninhabitable—a forbidding expanse of snow and ice. But along the southwestern coast there were two deep fjords protected from the harsh winds and saltwater spray of the North Atlantic Ocean, and as the Norse sailed upriver they saw grassy slopes and thick forests. Two colonies were formed, and the Norse raised sheep, goats, and cattle. They turned the grassy slopes into pastureland. They hunted seal and caribou.”

The vanishing of the vikings

“(The Vikings) built a string of parish churches and a magnificent cathedral, the remains of which are still standing. They traded actively with mainland Europe, and tithed regularly to the Roman Catholic Church. The Norse colonies in Greenland were law-abiding, economically viable, fully integrated communities, numbering at their peak five thousand people.

They lasted for **four hundred and fifty years—and then they vanished.**” (New Yorker)

The collapse of the Vikings in Greenland

- .Soil erosion
- .Limited forest
- .Huge use of resources for house building
- .Climate change
- .No renewal resources: they should have diminished their dependency on cattle
- .Despised the **Inuit**, the local inhabitants, who were better



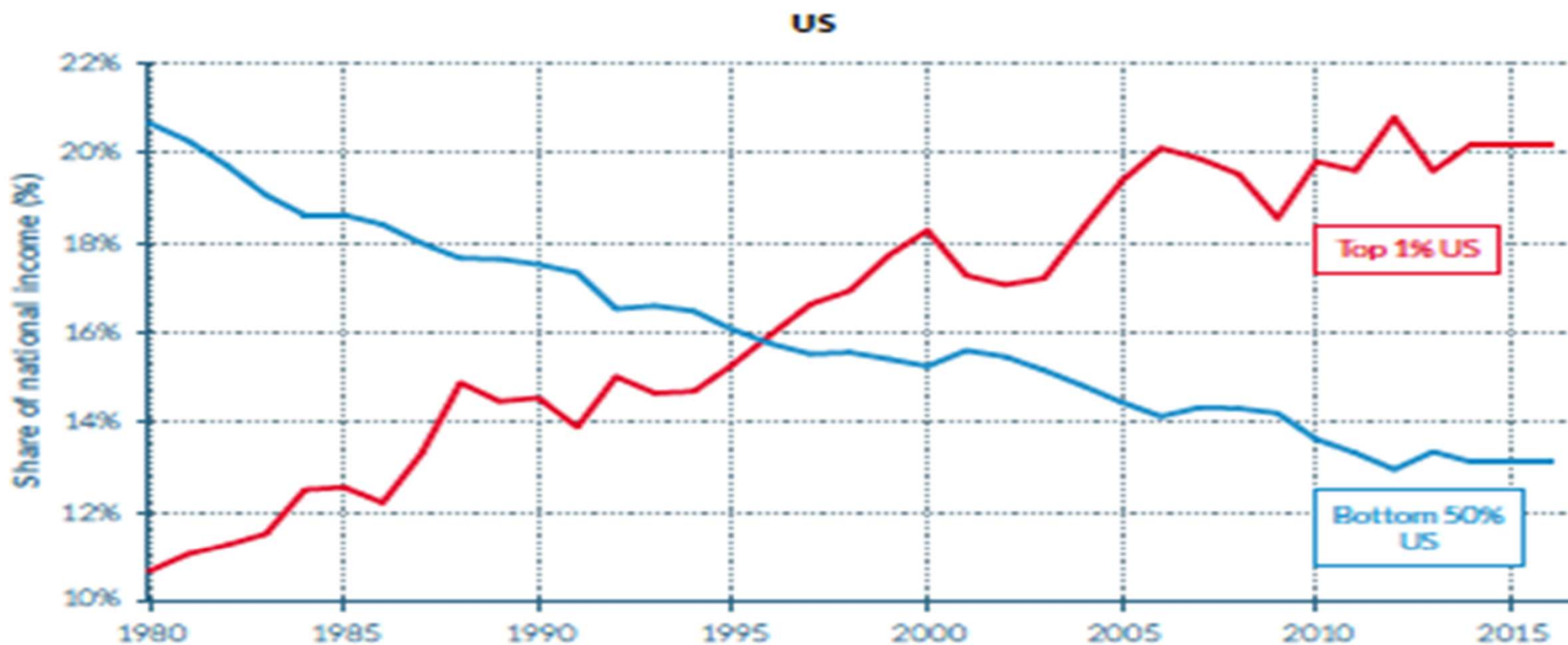
Limits to growth 2

Social conditions

(some examples, to be continued in the next lectures)

Figure E3

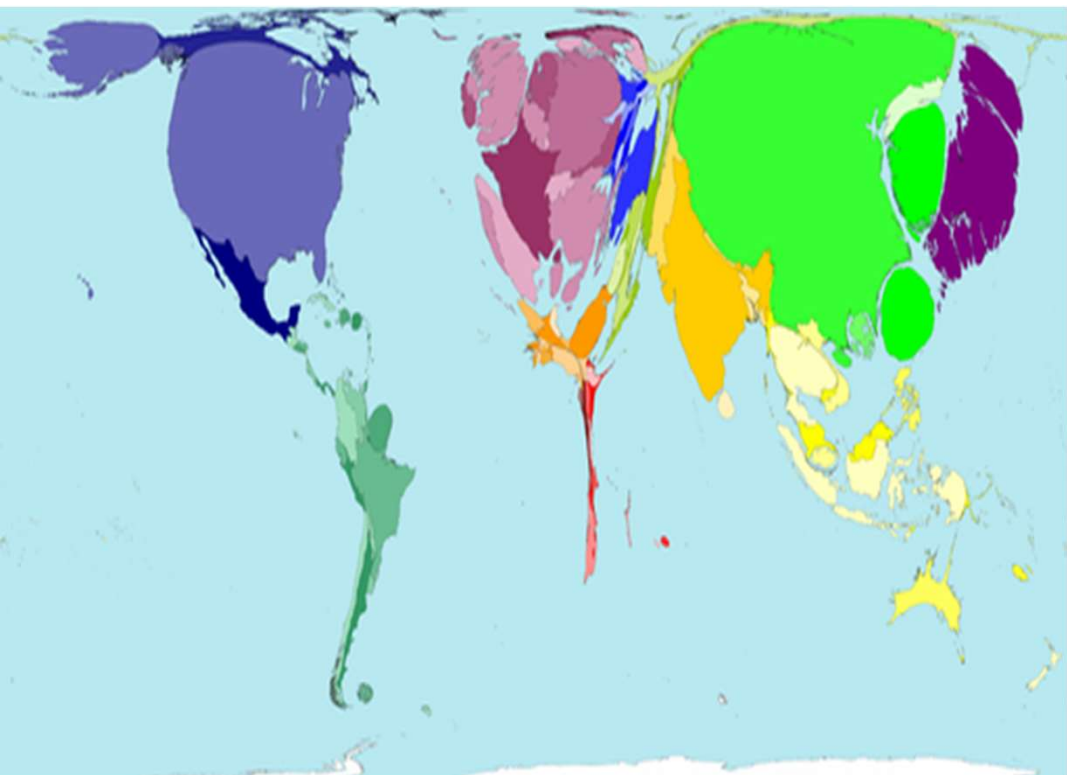
**Top 1% vs. Bottom 50% national income shares in the US and Western Europe, 1980-2016:
Diverging income inequality trajectories**



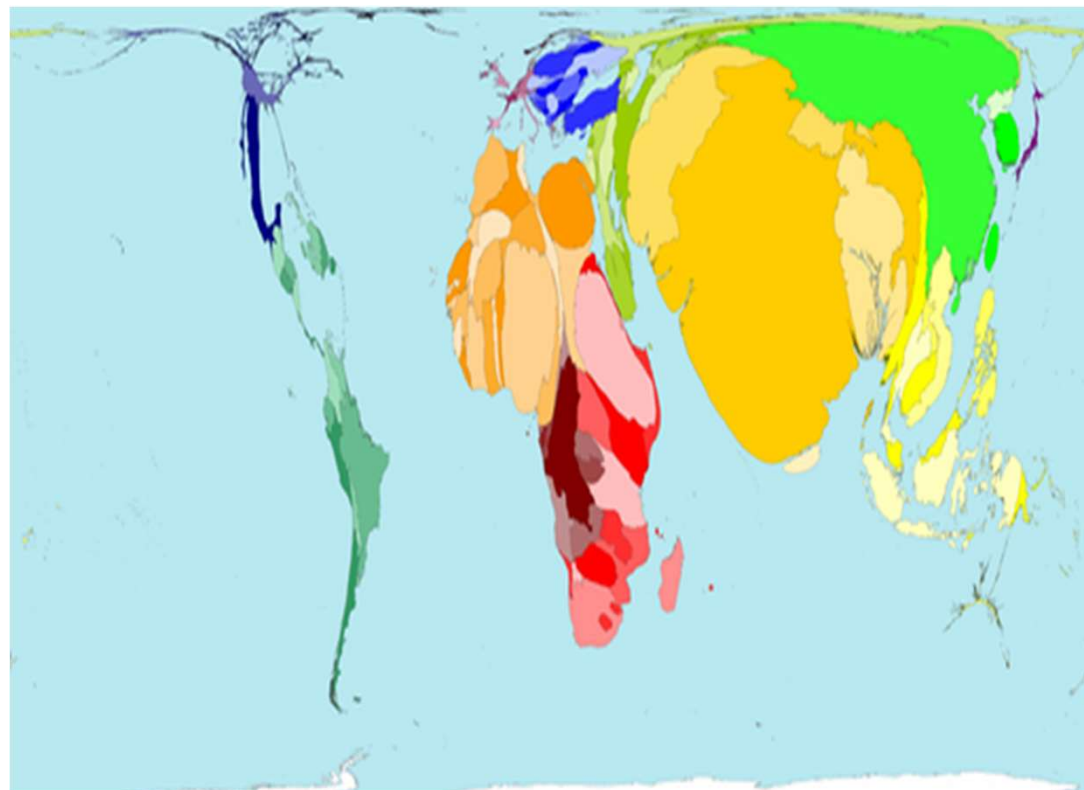
Source: WID.world (2017). See [wlr2016wid.world](#) for data series and notes.

In 2016, 12% of national income was received by the top 1% in Western Europe, compared to 20% in the United States. In 1980, 10% of national income was received by the top 1% in Western Europe, compared to 11% in the United States.

Wealth and poverty (World)



Wealth by country as compared to the world average (2015)



Poverty by country as compared to the world average (2003)

So, growth may be a problem

- .Societies and their economies express contradictions and social tensions (distribution and property issues)
- .Poverty, wealth or education inequality (or inequality in the access to other means of living), exploitation of resources, conditions of work, and rentism may affect the evolution of the economies: **growth may be unequal, uneven and unfair**

Limits to growth 3

Technology

Limits to growth debate

Meadows report (1972, MIT team): absolute limits to growth given the impact of production, food scarcity and pollution. Until 2070, a collapse will occur:

“If the present growth trends in world population, industrialisation, pollution, food production, and resource depletion continue unchanged, the **limits to growth** on this planet will be reached sometime within the next one hundred years.”

·Reply by Chris Freeman and the SPRU team (Sussex, UK): technology is a social choice and may be used to create alternatives against depletion of natural resources (if the social conditions are met)

More limits to growth

The Big questions for the 21st century?

Climate Change: scarcity of water and energy? Some regions and cities will be depopulated?

A **new pattern of inequality:** availability of common goods (water), uneven access to public goods (security)? Availability and access to basic universal income