

# Innovation Africa



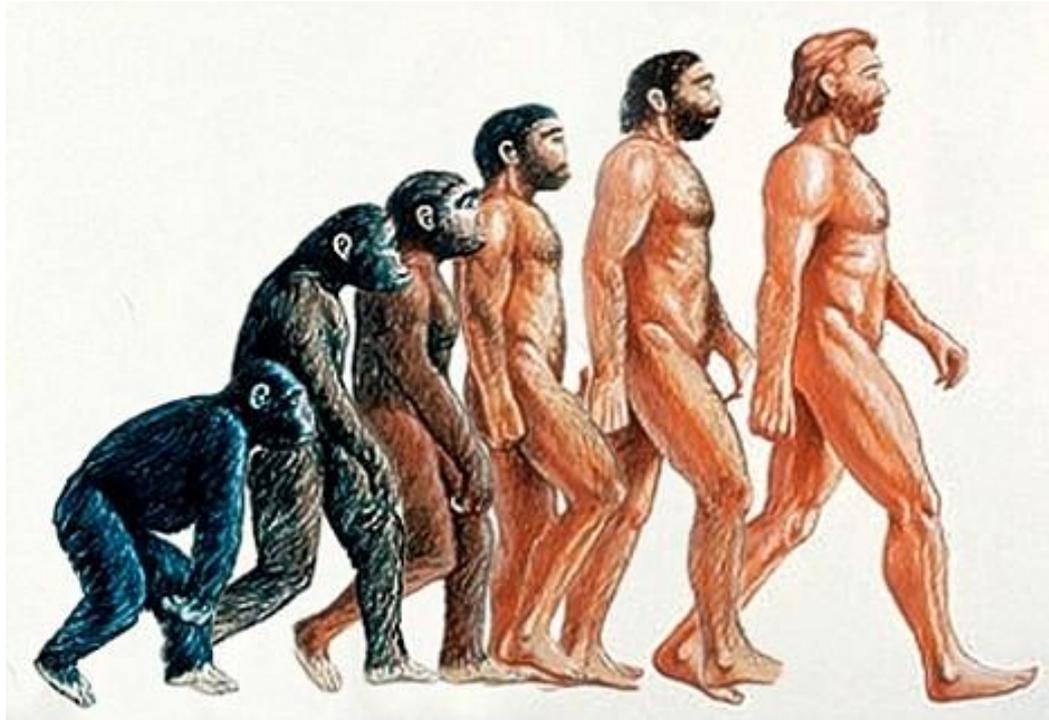
J Bruner

Cultures Are  
Knowledge  
Amplification  
Systems

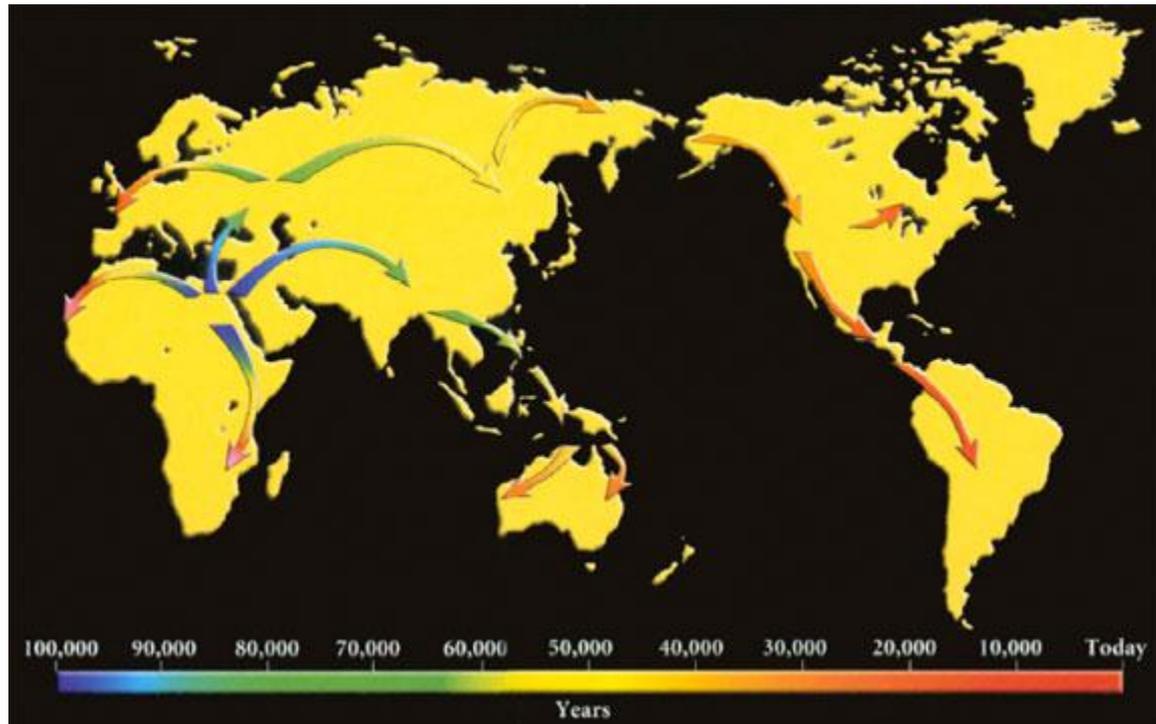
# Adam and Eve?



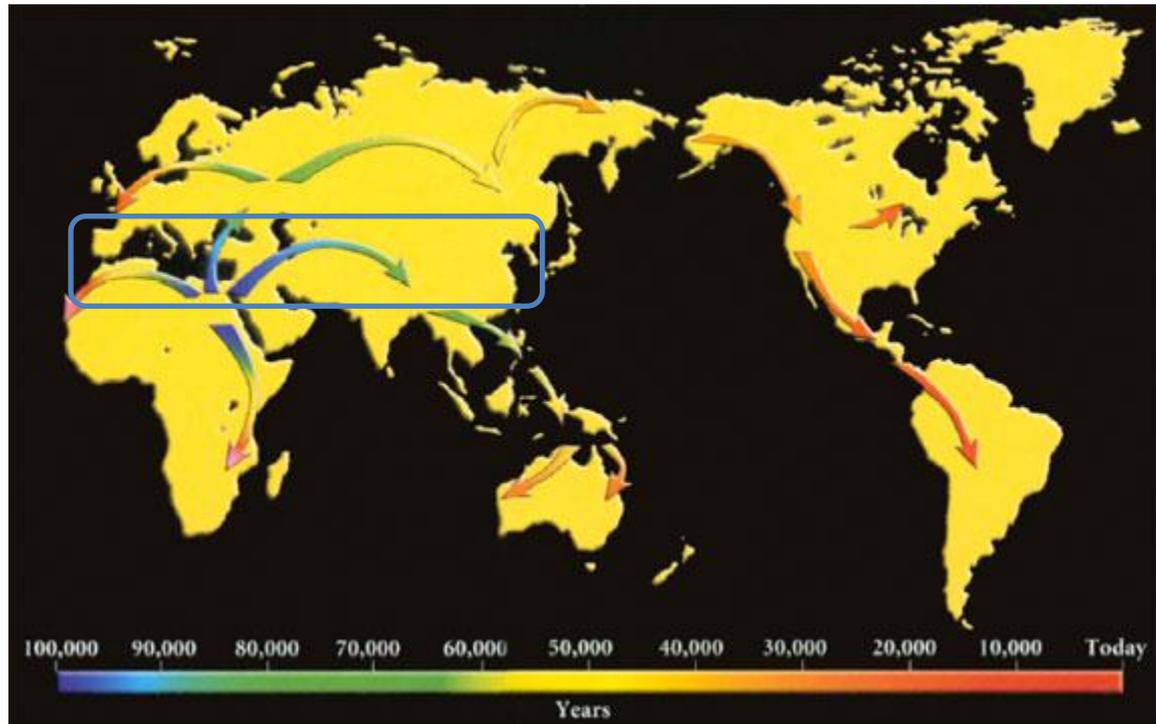
# Our evolutionary triumph?



# Africa: The Cradle of Human Knowledge



# Across Mediterranean To China Cultures Deeply Challenged: New Knowledge the Result



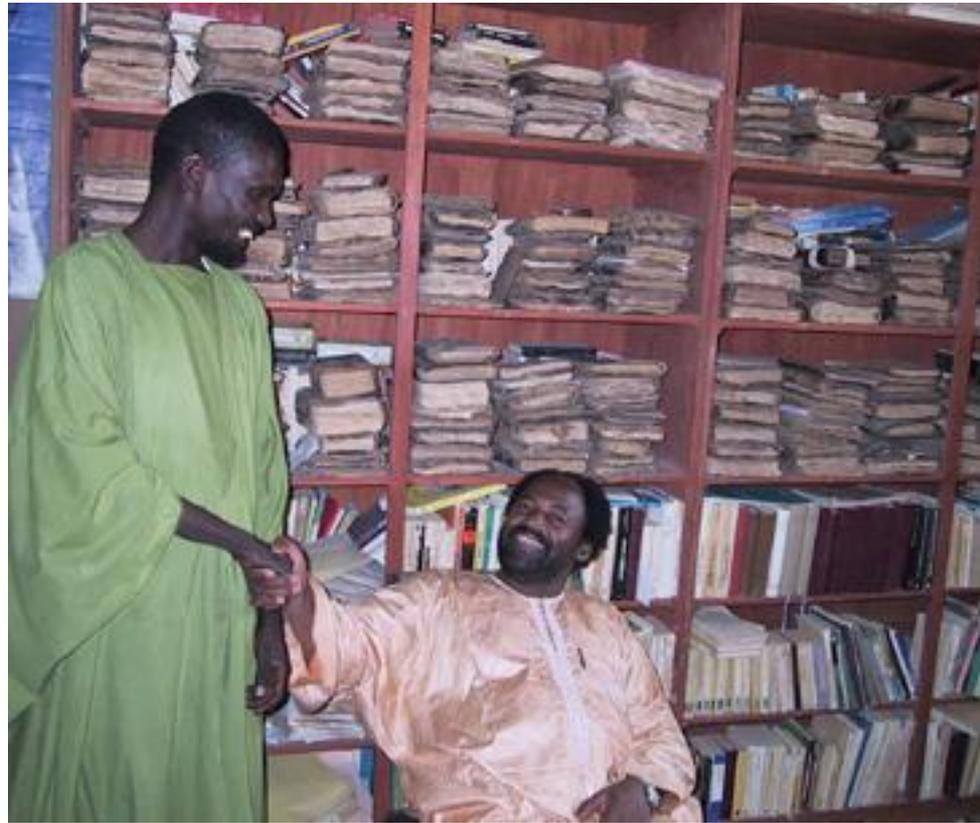
# Ways of Knowing

- **Philosophy** (the abstract mind)
- **Rationalism/Scepticism** (not accepting realities that are not immediately evident)
- **Religion** (faith in divine revelation and social tradition)
- **Mysticism** (experiences based on spiritual techniques)
- **Esotericism** (intuitive speculation on cosmological world-views)
- **Occultism** (using psycho-physical techniques to access hidden realities)
- **Gnosis** (innate wisdom and understanding)
- **Science** (experimental approach to the physical universe)

# The Great Library In Alexandria



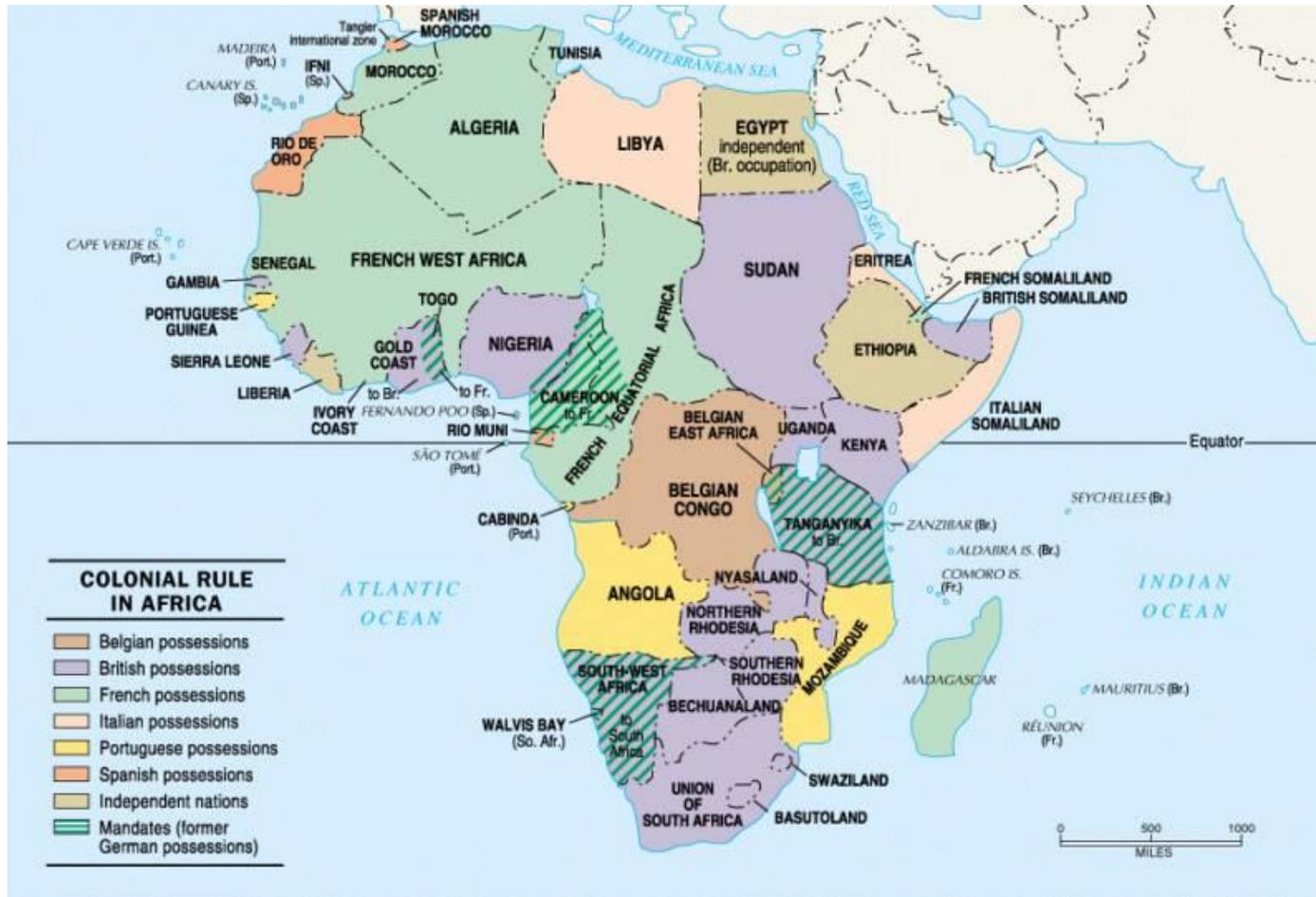
# The Library In Timbuktu



# Africa and Science



# Political Map Scramble For Africa

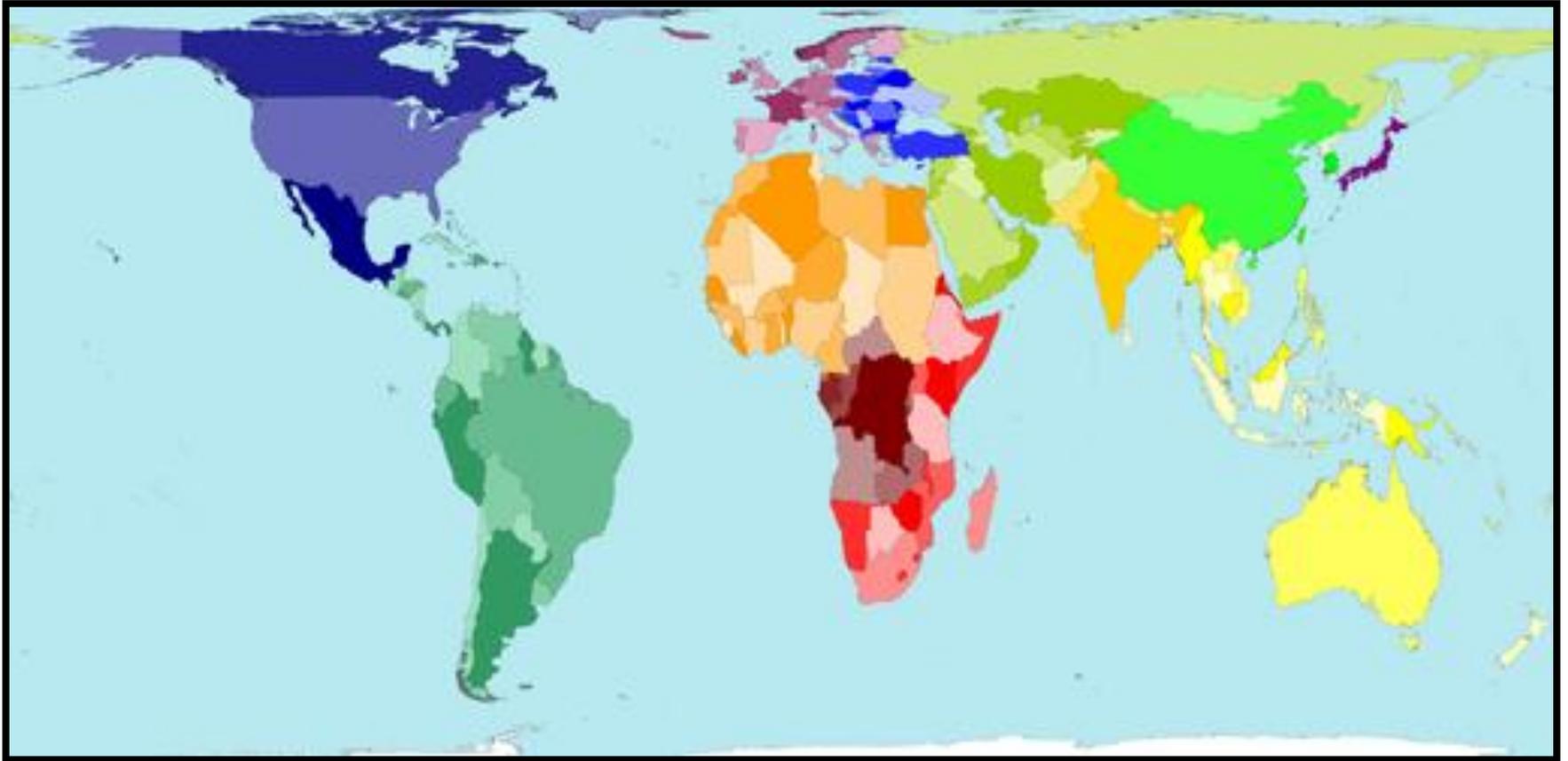


# Humankind's Great Intellectual Leaps

- Classical antiquity
- Renaissance
- Agricultural revolution
- Scientific revolution
- Industrial revolution
- Digital revolution \*\*\*\*\*

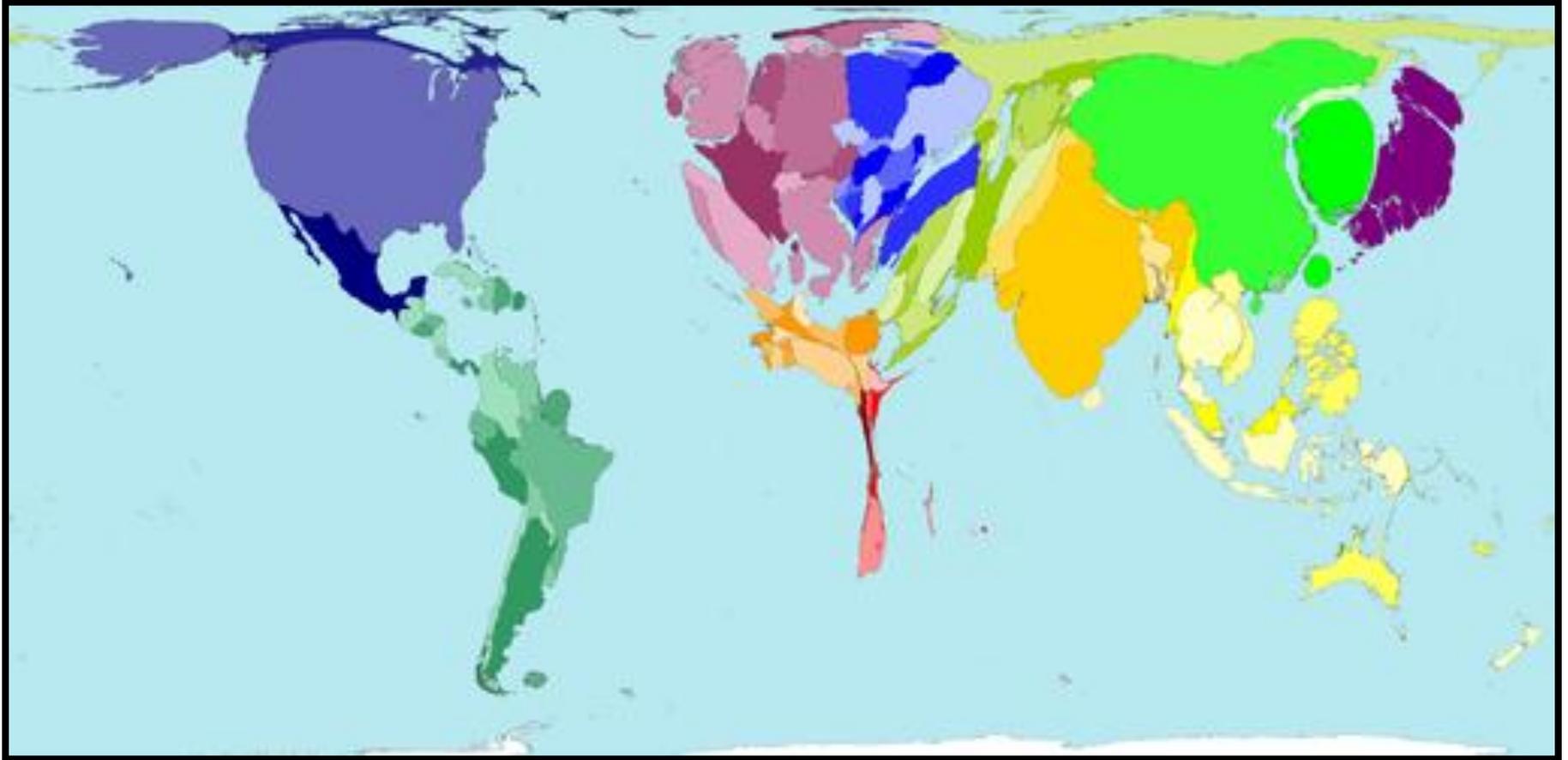
# Some Consequences for Africa

# The Continents: To Scale



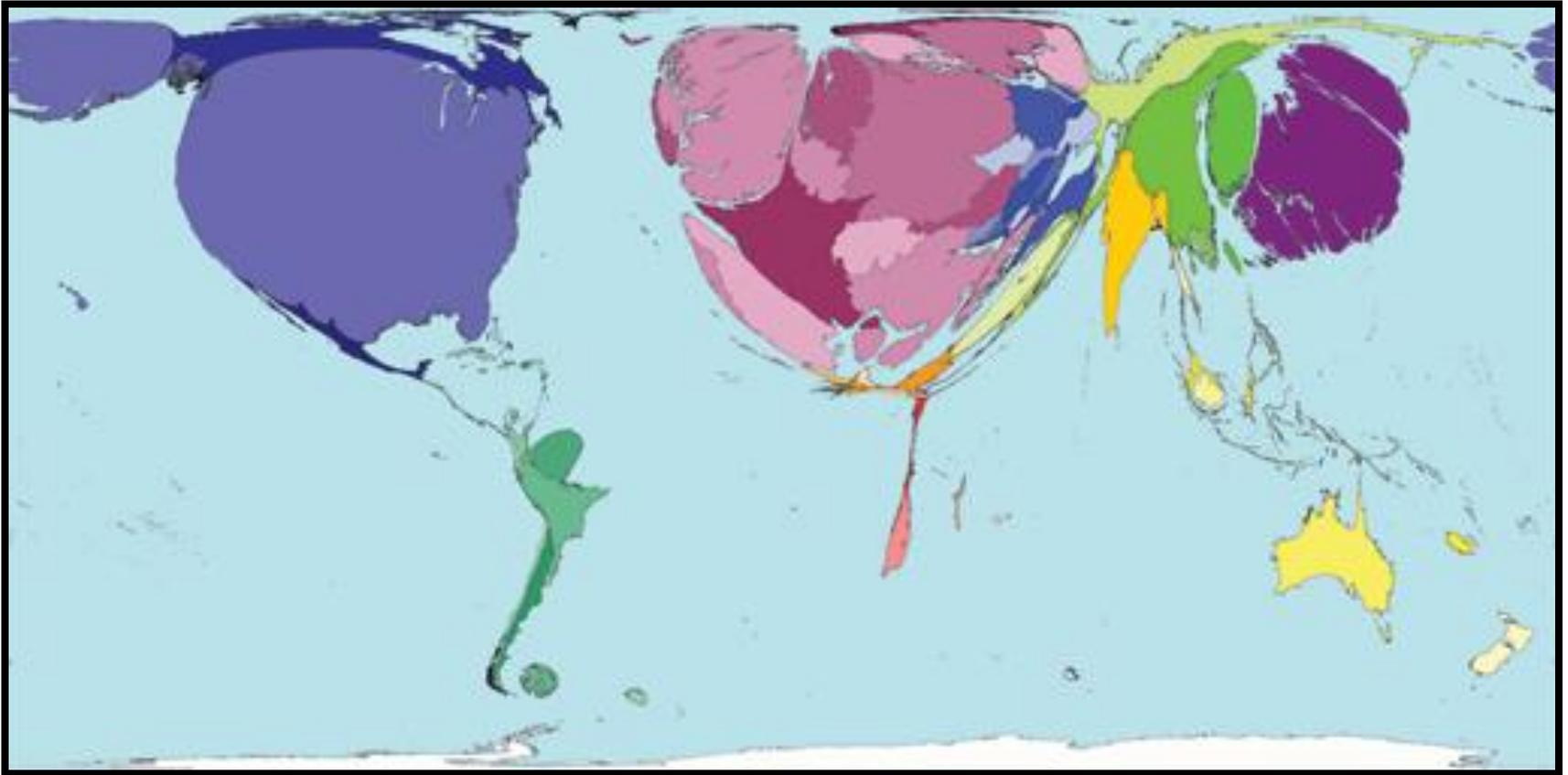
- The land area of each territory is shown here.
- The total land area of these 200 territories is 13,056 million hectares. Divided up equally that would be 2.1 hectares for each person. A hectare is 100 metres by 100 metres.
- However, population is not evenly spread: Australia's land area is 21 times bigger than Japan's, but Japan's population is more than six times bigger than Australia's.

# Tertiary Education



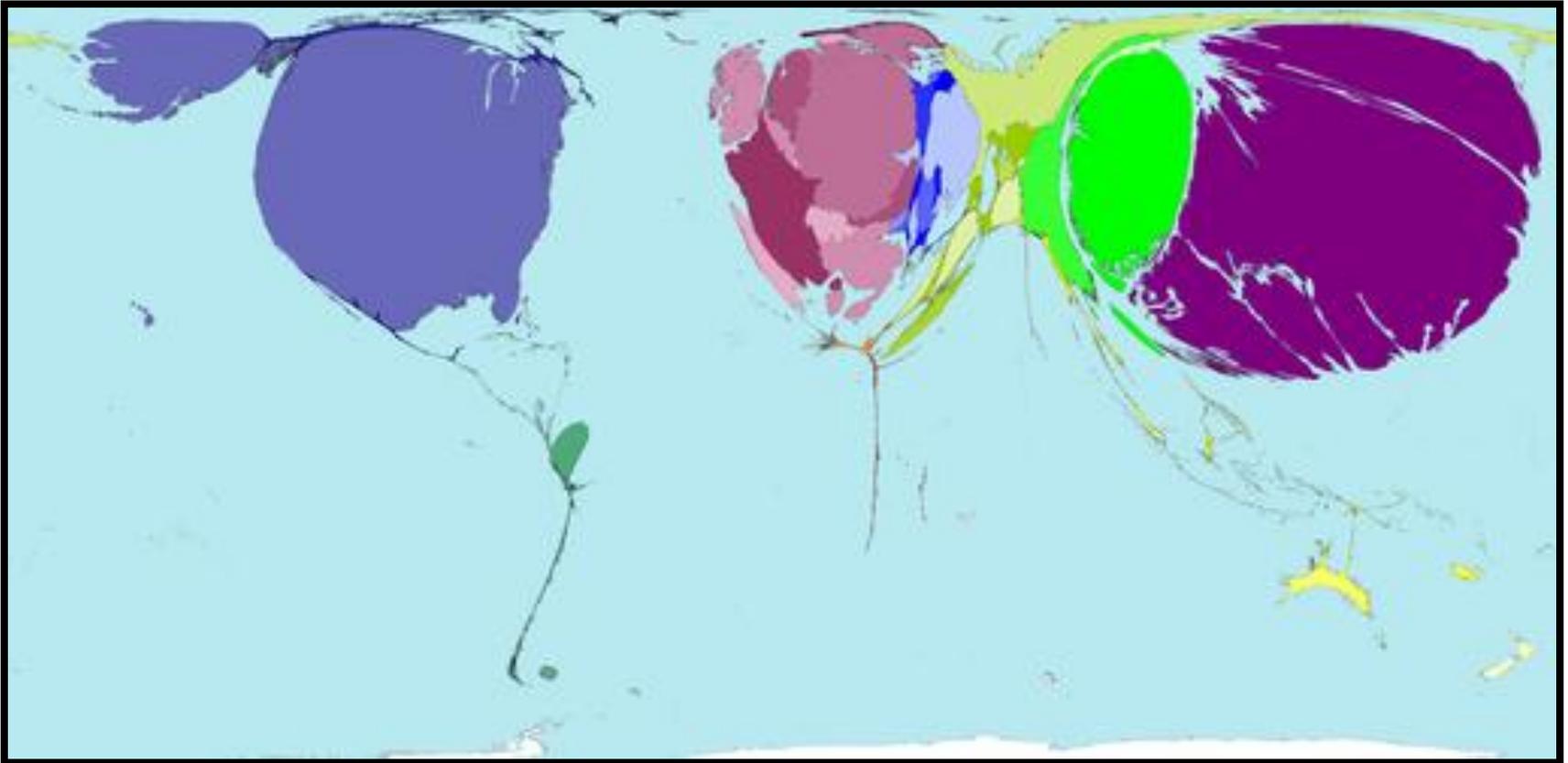
- The highest percentage of the student aged population enrolled is in Finland. Finland is 3.6 times the world average, with 140 times the chance of a tertiary education than in Mozambique.

# Science Research



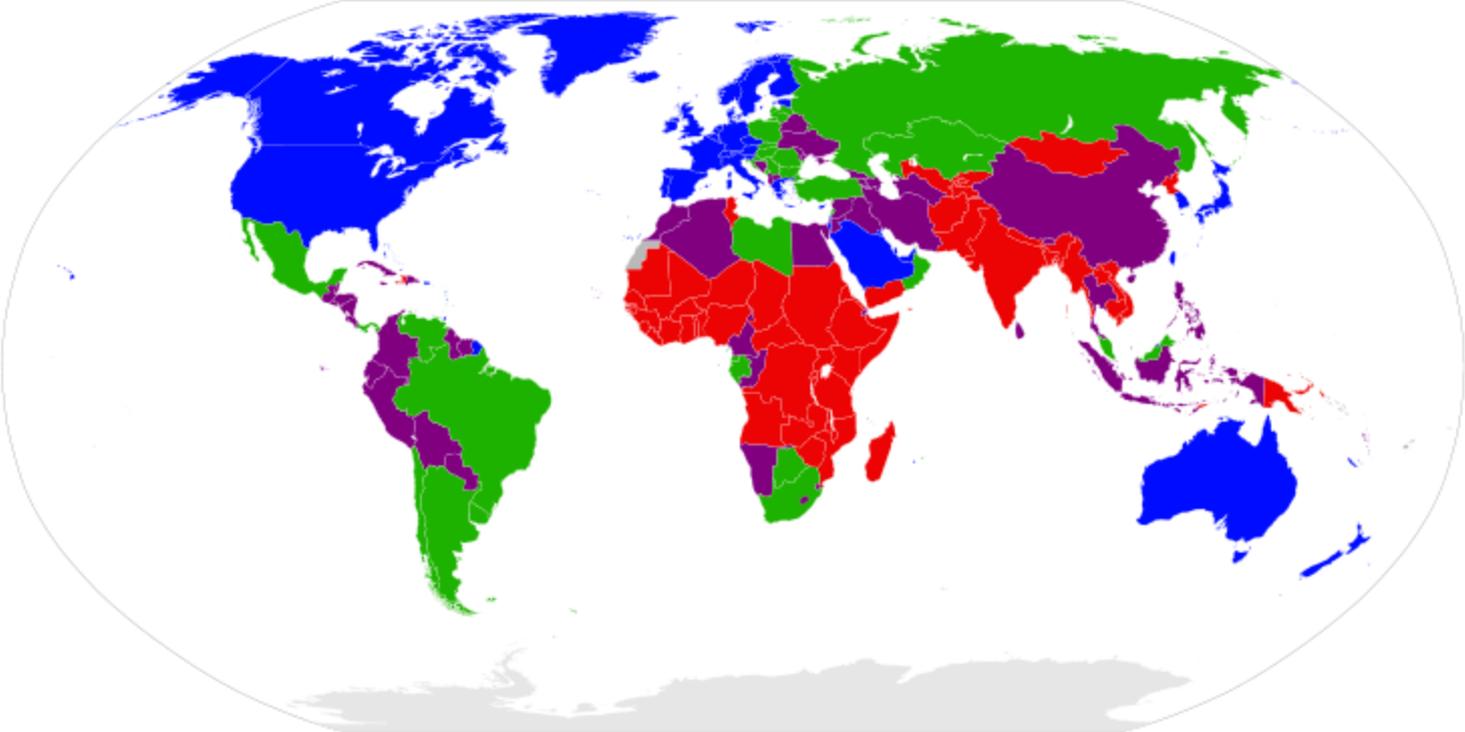
- Scientific papers cover physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering, technology, and earth and space sciences.
- The number of scientific papers published by researchers in the United States was more than three times as many as were published by the second highest-publishing population, Japan.
- There is more scientific research, or publication of results, in richer territories. This locational bias is such that roughly three times more scientific papers per person living there are published in Western Europe, North America, and Japan, than in any other region.

# New Patents



- In 2002, 312 thousand patents were granted around the world. More than a third of these were granted in Japan. Just under a third were granted in the United States.
- A patent is supposed to protect the ideas and inventions that people have. Patenting something will then allow the owner of the patent to charge others for the usage of an idea or invention. The aim is to reward the creator for their hard work or intelligence. But patents can prevent people from using good ideas because they cannot afford to do so.
- A quarter of all territories had no new patents in 2002, so will not profit from these in future years as others will.

# Un Poverty Index



- High income
- Upper-middle income
- Lower-middle income
- Low income

Our Hope



# HOUSE



# WORK



gwp102018 fotosearch.com

# FAMILY



# Potable Water



# Energy



# Child and Starvation



# Environmental Challenges

## Global warming: Causes and effects

Earth's temperature has risen about 1 degree Fahrenheit in the last century. The past 50 years of warming has been attributed to human activity.

Burning fuels such as coal, natural gas and oil produces greenhouse gases in excessive amounts.

Greenhouse gases are emissions that rise into the atmosphere and trap the sun's energy, keeping heat from escaping.

The United States was responsible for 20 percent of the global greenhouse gases emitted in 1997.

Most of the world's emissions are attributed to the United States' large-scale use of fuels in vehicles and factories.

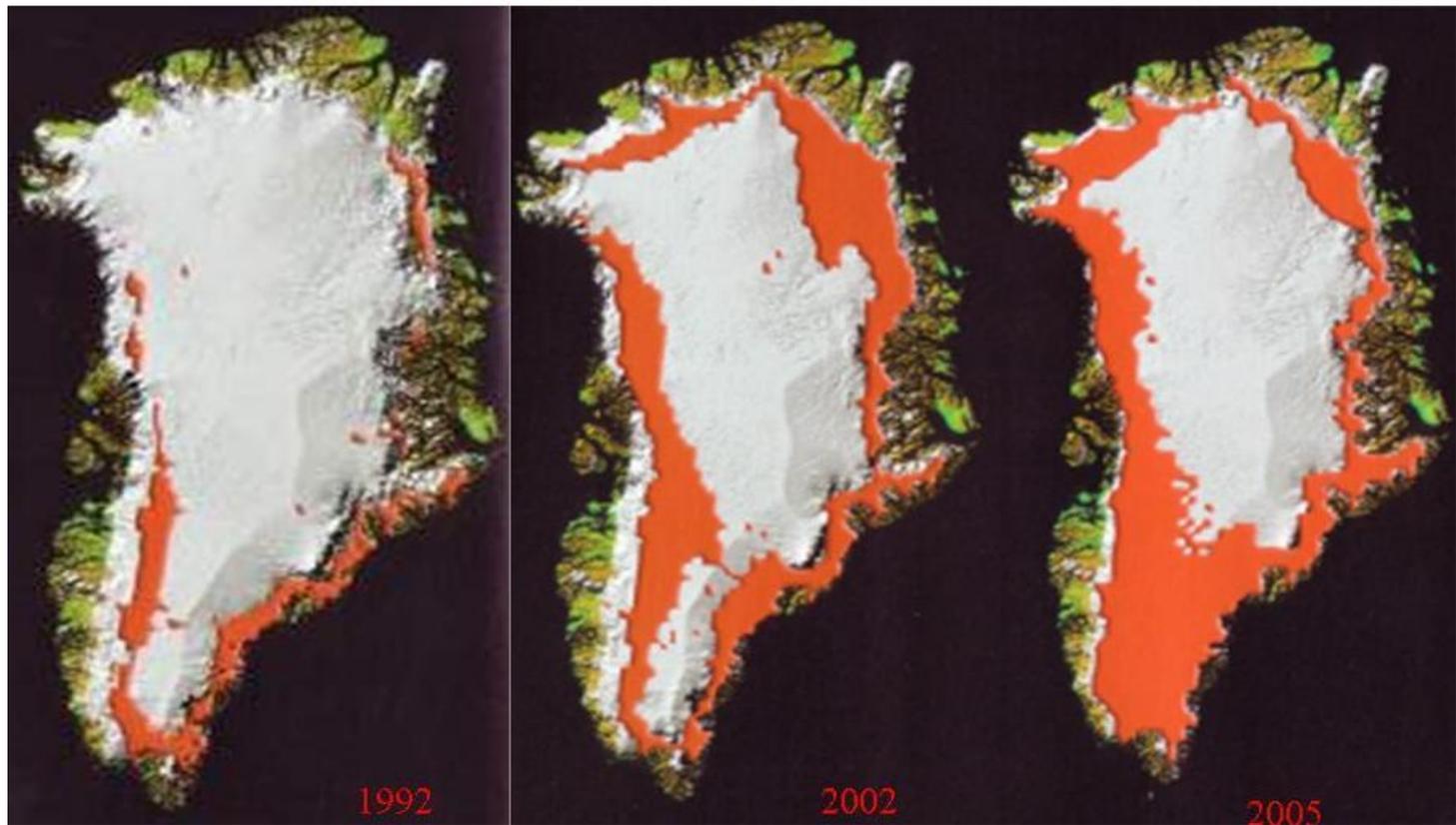
During the past 100 years global sea levels have risen 4 to 8 inches.

Some predictions for local changes include increasingly hot summers and intense thunderstorms.



Damaging storms, droughts and related weather phenomena cause an increase in economic and health problems. Warmer weather provides breeding grounds for insects such as malaria-carrying mosquitoes.

## Surface melting on Greenland is expanding

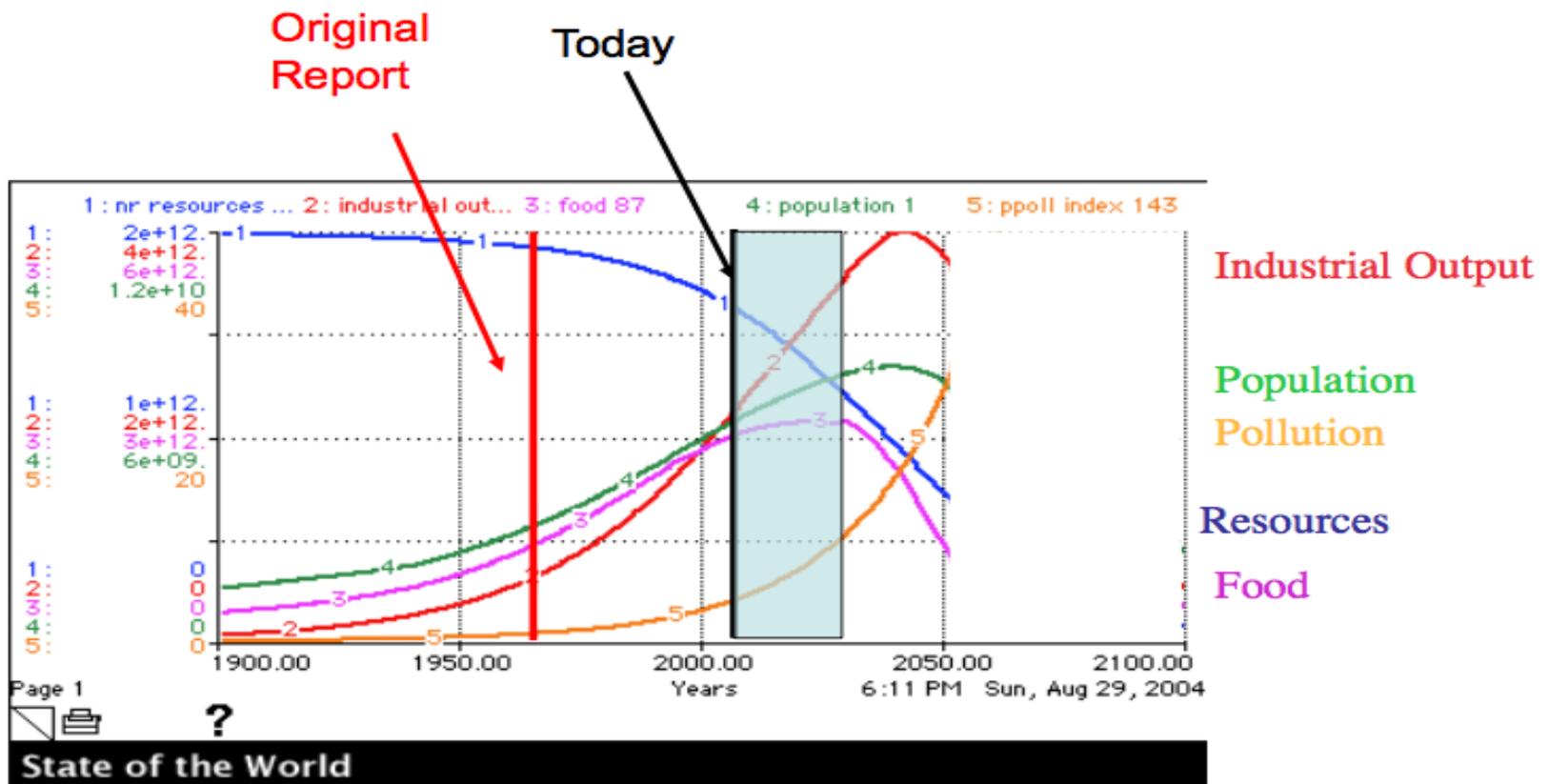


# Almost 7 Billion And Growing



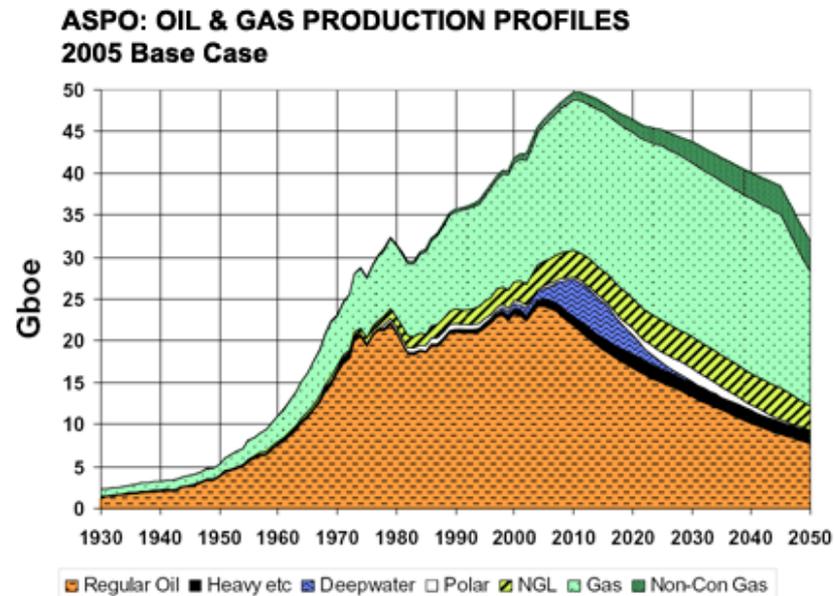
# Dennis Meadows: POPULATION

## The Reference Scenario



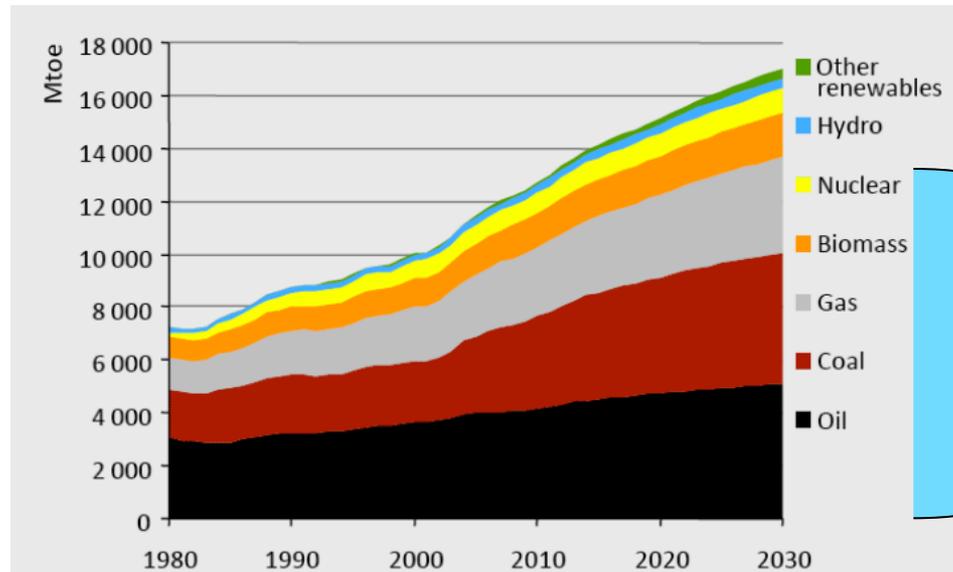
# HUMANITY'S PROBLEMS: TO SUM THINGS UP

Exploding amounts of energy addicts, claiming more as they become more educated



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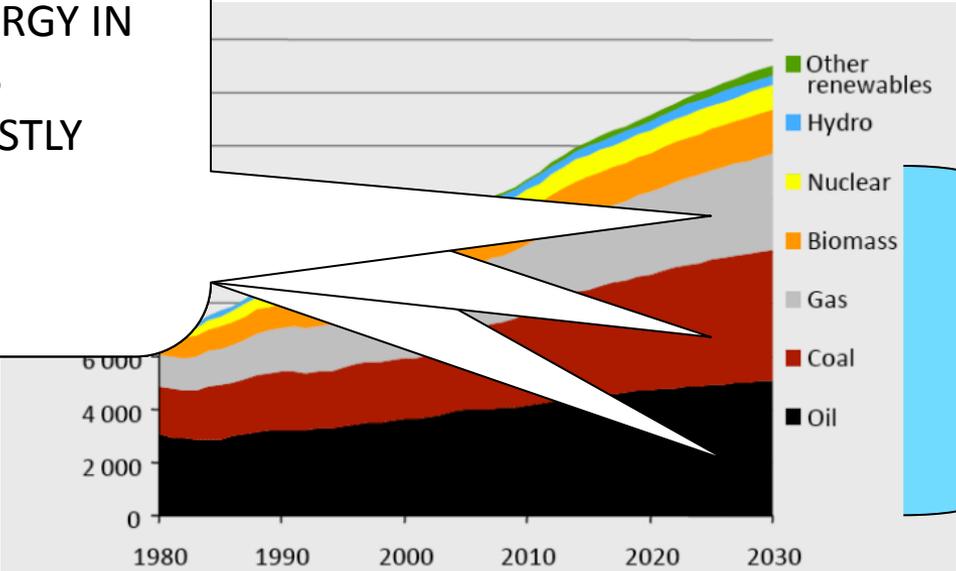
Finite resources

World energy demand expands by 45% between now and 2030—an average rate of increase of 1.6% per year—with coal accounting for more than a third of the overall rise.

# HUMANITY'S PROBLEMS: TO SUM THINGS UP

Exploding amounts of energy addicts, claiming more as they become more educated

TO RELEASE THE ENERGY IN FOSSIL FUELS, CO2 IS PRODUCED AND MOSTLY DUMPED IN THE ATMOSPHERE



Finite resources

World energy demand expands by 45% between now and 2030—an average rate of increase of 1.6% per year—with coal accounting for more than a third of the overall rise.

15%

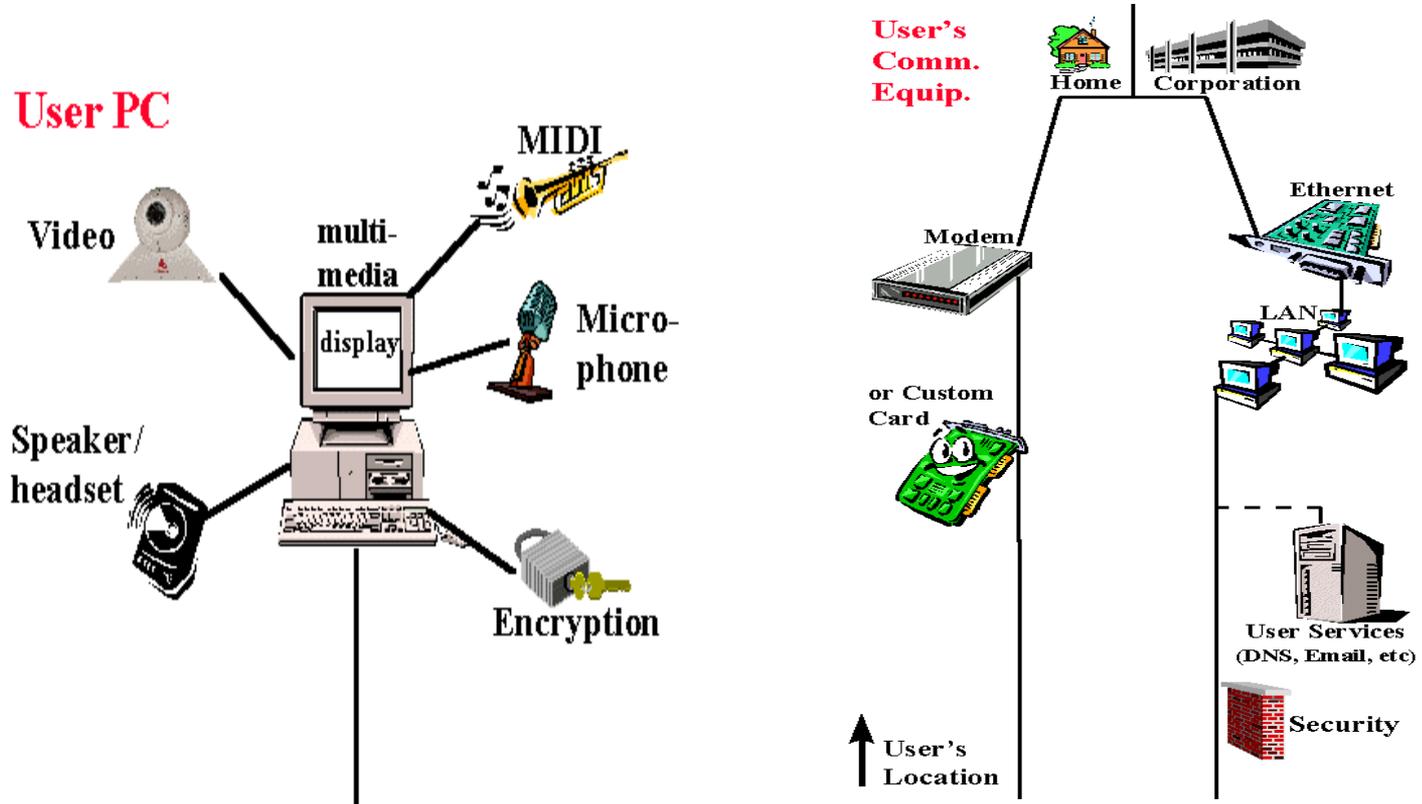


# SENSE-MAKING

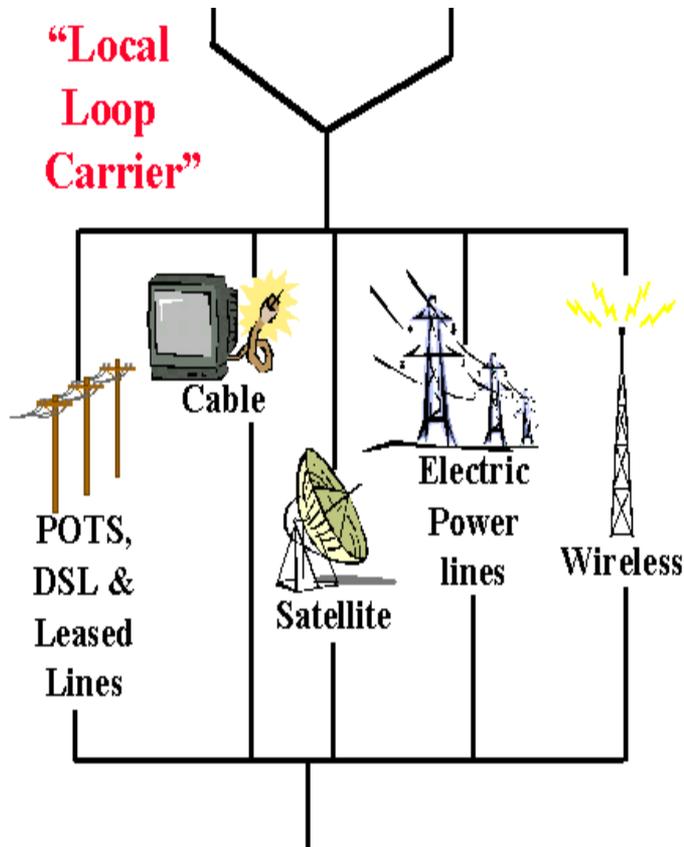
85%



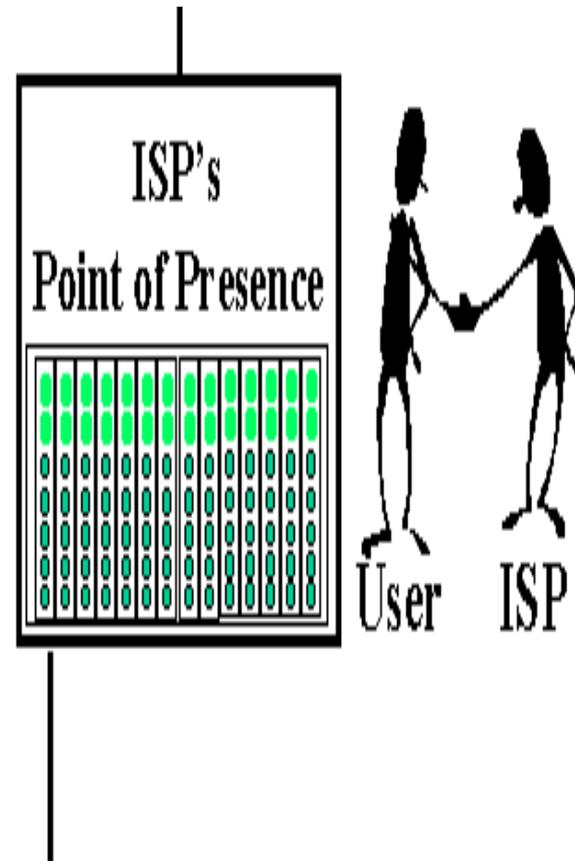
# Revolution Possible



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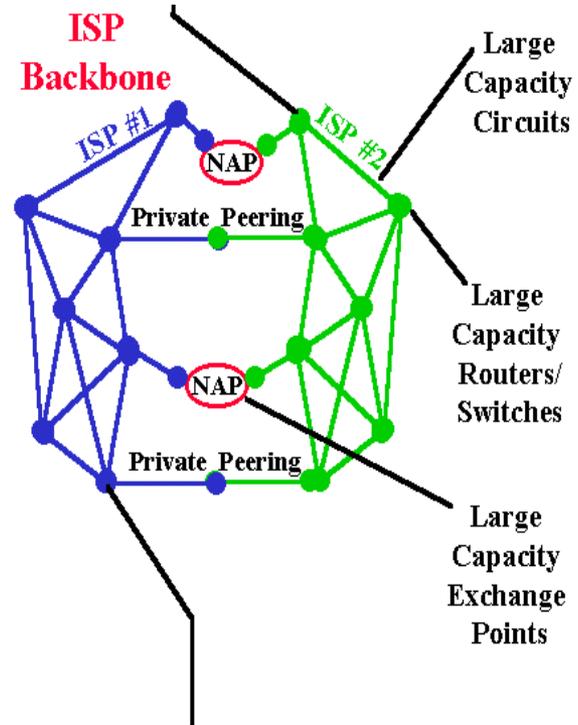
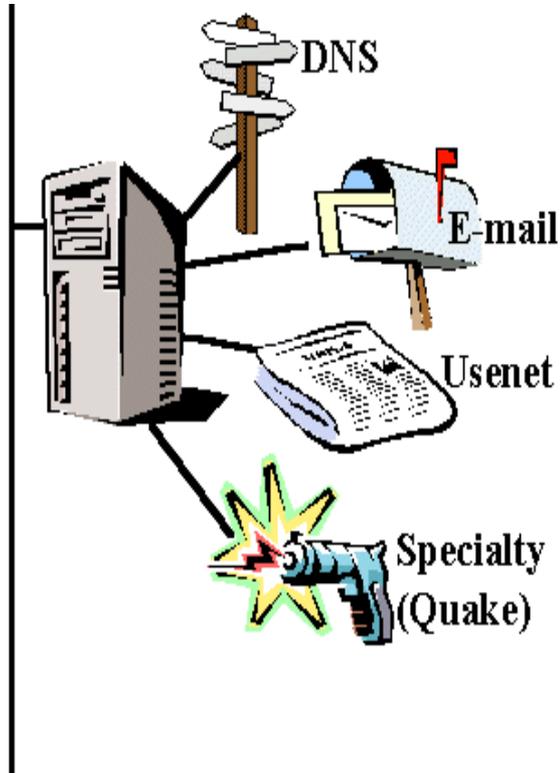


**ISP's  
POP**

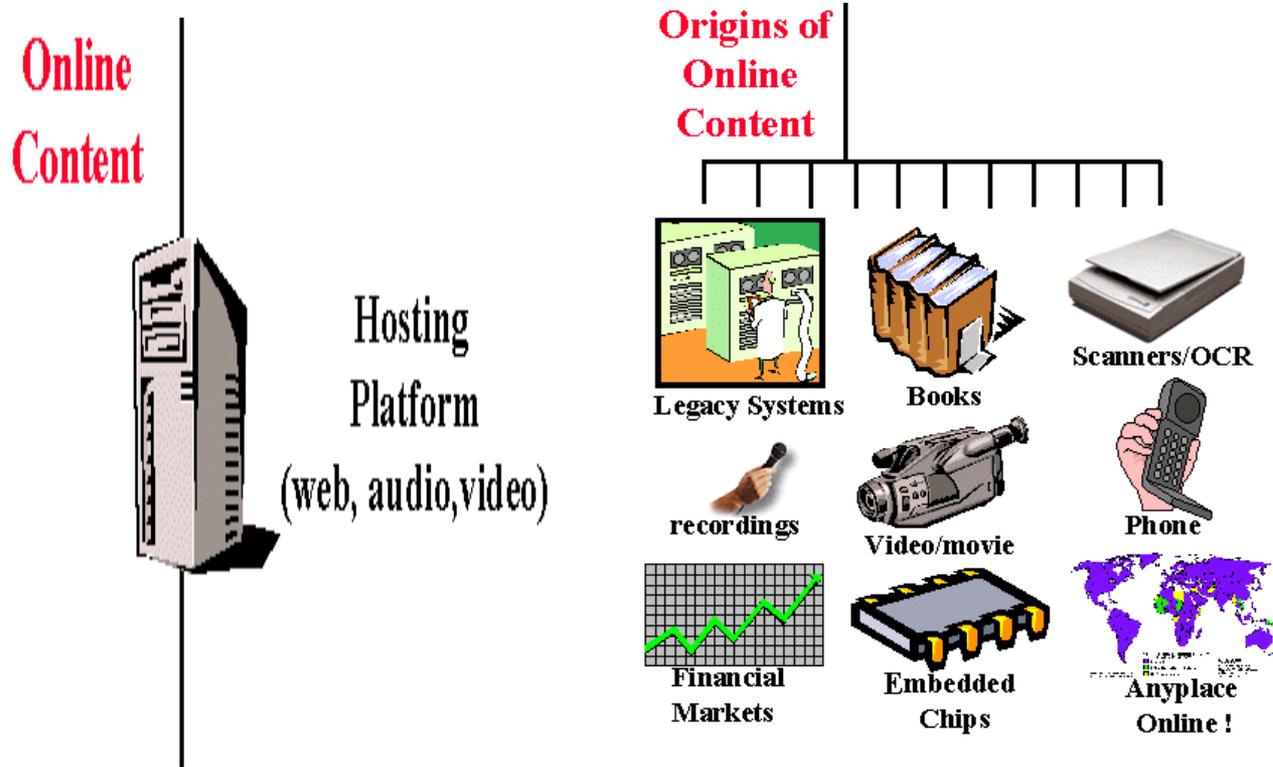


# Revolution Possible

**User  
Services**



# Revolution Possible



# South Africa and the Innovation Challenge

- 2012 WEF Network Readiness report on 142 countries challenges South Africa.

UWC'S RENAISSANCE

Metaphor for the

New South Africa

## Strategic Niche Areas

- Water
- Health
- Energy
- Earth and Beyond

## Faculty of Science

### Centres of Excellence

- South African National Bioinformatics Institute (SANBI) with DST/NRF Research Chair in Bioinformatics and Human Health
- DST/MinTek Nanotechnology Innovation Centres Biolabels Unit
- SA Institute for Advanced Material Chemistry (SAIAMC)
- Institute for Microbial Biotechnology and Metagenomics (IMBM)
- Institute for Water Studies - UNESCO Centre for Groundwater Studies (Unesco Chair) VLIR
- South African Herbal Science and Medicine Institute (SASHMI)
- SensorLab: Biosensors Group
- DST/NRF Research Chair in Astrophysics

# Research Areas and Strengths for Innovation

- South African Institute for Advanced Materials Science
- Institute for Microbial Biotechnology and Metagenomics
- Nonotechnology Innovation Centre: Biolabels and Biosensors
- Sensorlab
- Environmental and Nanoscience Group
- South African Bioinformatics Institute
- South African Herbal Science and Medicine Institute

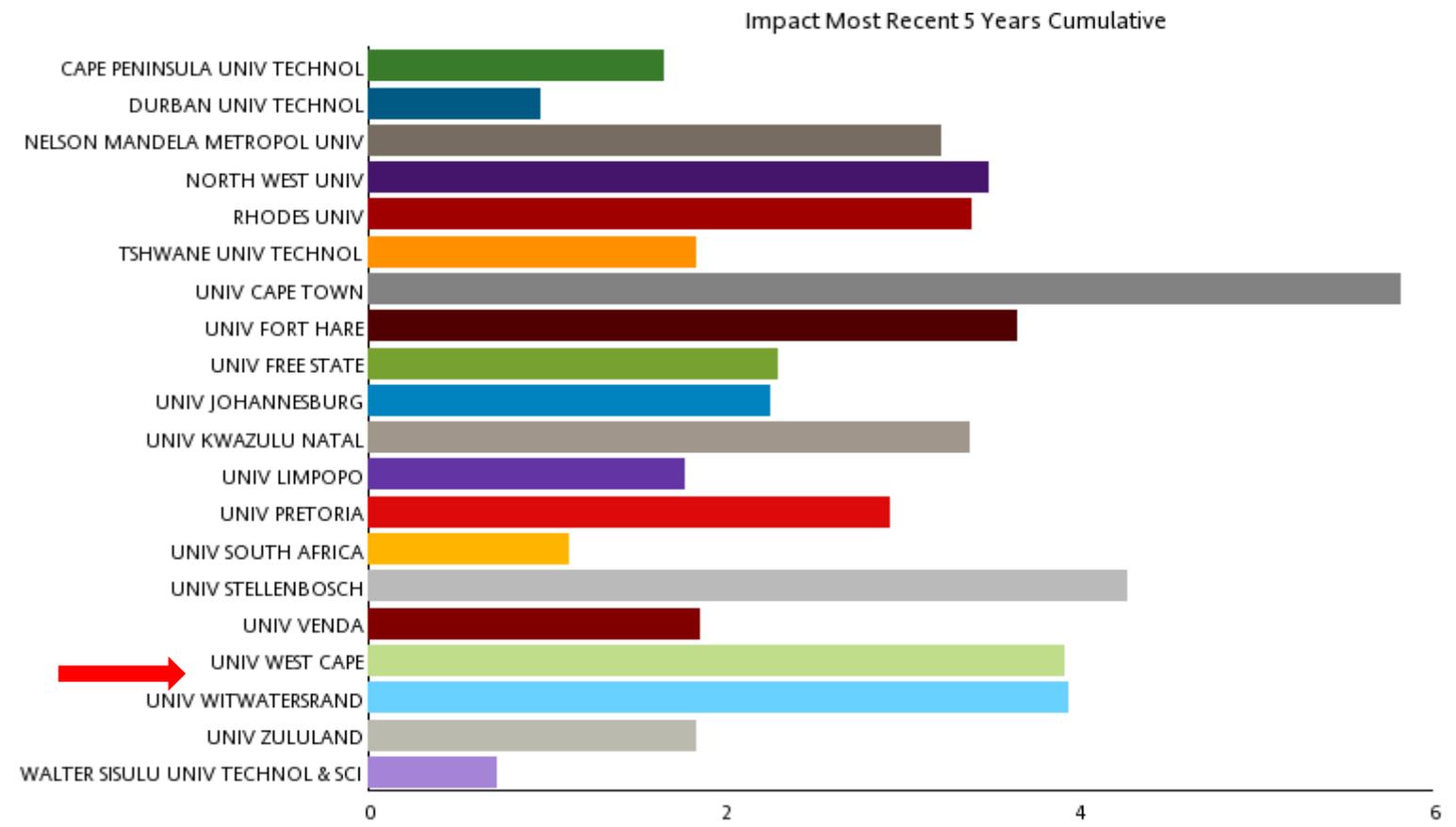
# National Research Foundation

## RESEARCH REPORT

2005 - 2010

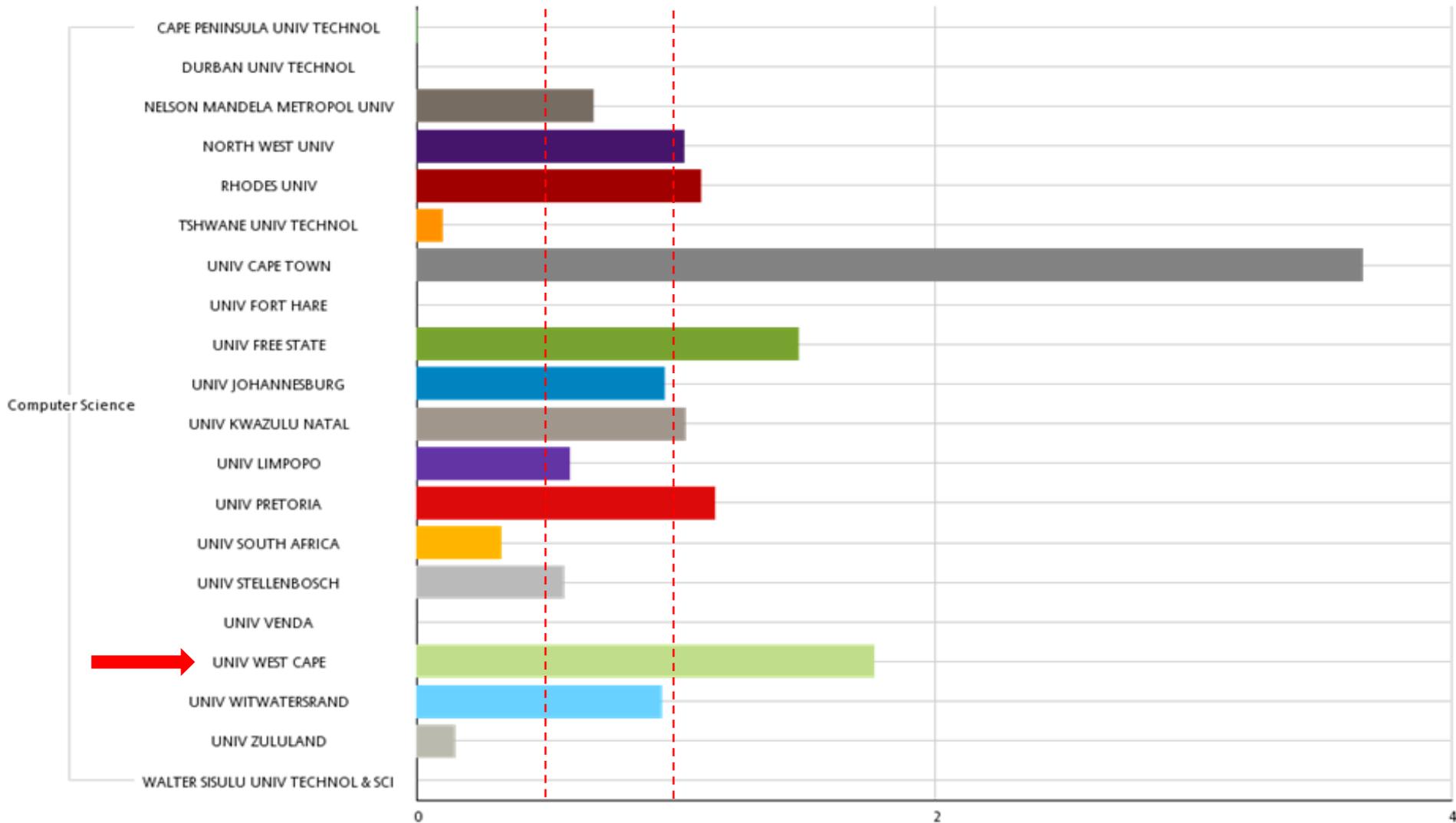
# Citations per Document – Impact (InCites Extraction)

## COMPARE INSTITUTIONS MOST RECENT 5 YEARS CUMULATIVE



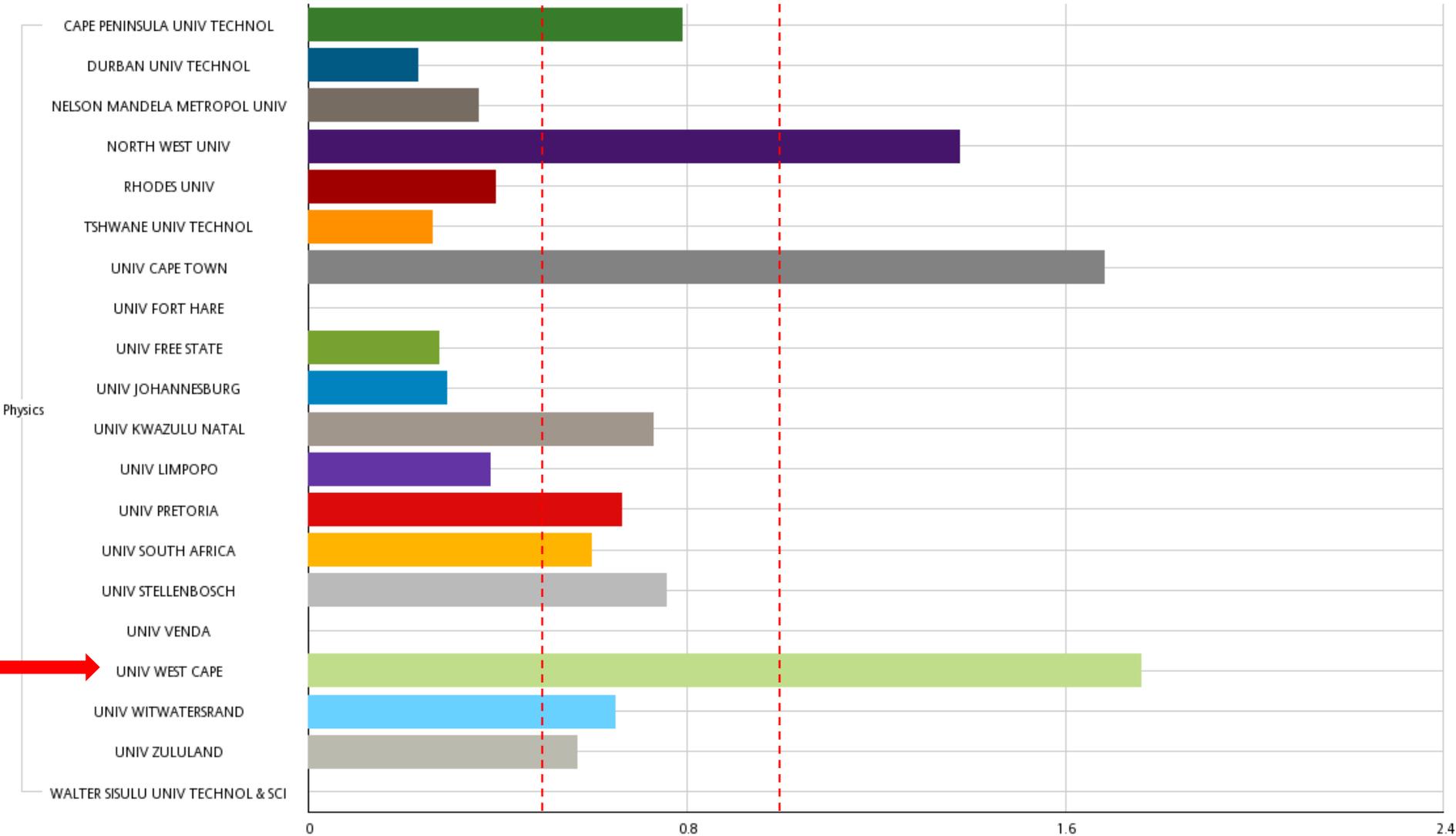
# Impact relative to Subject Area Computer Science

Impact Relative to Subject Area Most Recent 5 Years Cumulative



# Impact relative to Subject Area Physics

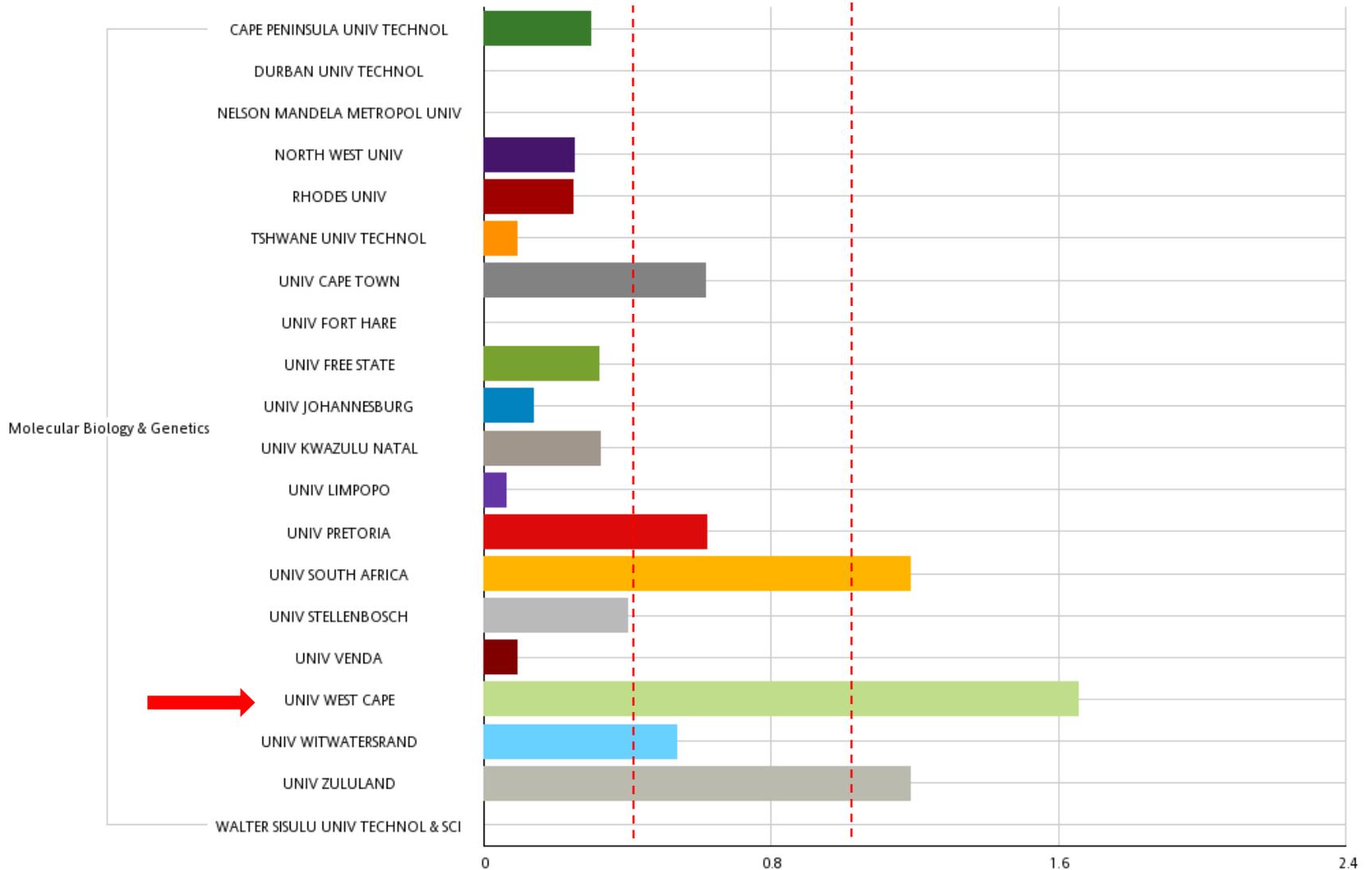
Impact Relative to Subject Area Most Recent 5 Years Cumulative



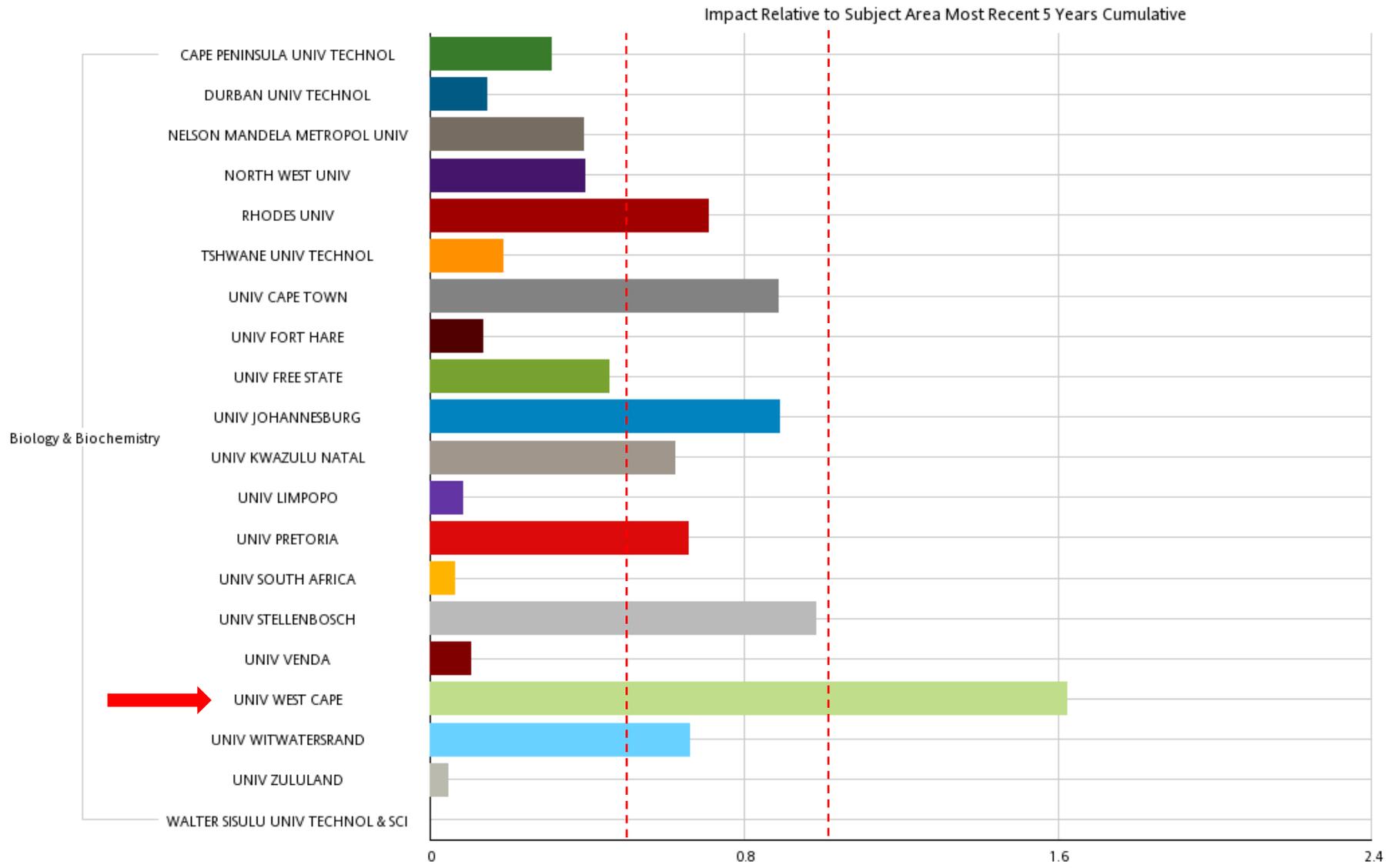
# Impact relative to Subject Area

## Molecular Biology & Genetics

Impact Relative to Subject Area Most Recent 5 Years Cumulative



# Impact relative to Subject Area Biology & Biochemistry



# LIFE SCIENCES BUILDING



south elevation

