

The logo for TYAN (TWAS Young Affiliates/Alumni Network) is located in the top left corner. It features the acronym 'TYAN' in a bold, blue, sans-serif font, enclosed within a white rectangular box with a blue border. The box is slightly tilted and has a white shadow effect, making it stand out against the background.

TYAN

TWAS YOUNG
AFFILIATES/ALUMNI
NETWORK

Science Diplomacy: Science for a New World

Luiz Davidovich

Instituto de Física, Univ. Federal do Rio de Janeiro
President, Brazilian Academy of Sciences

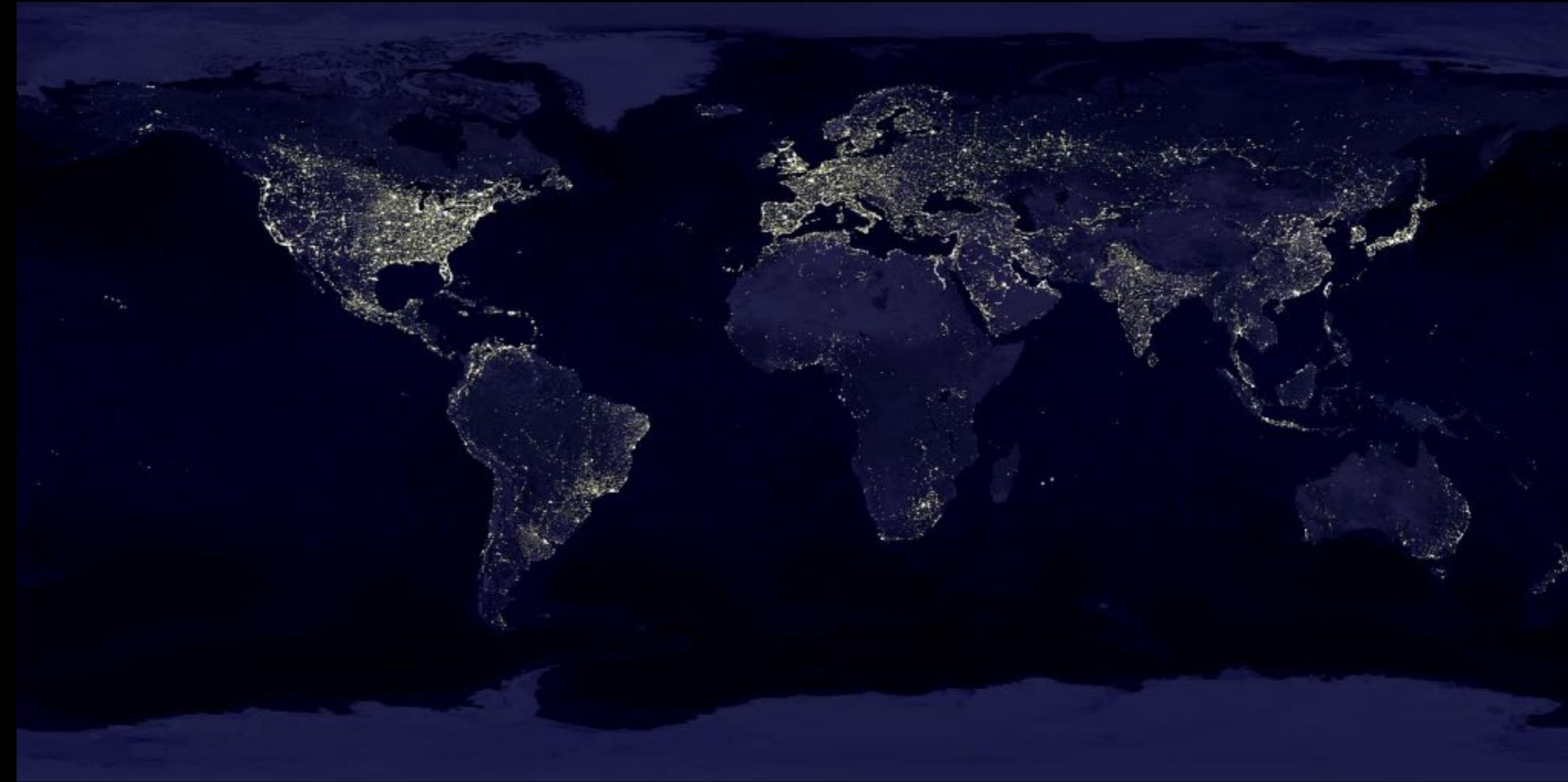
"The earth is blue"



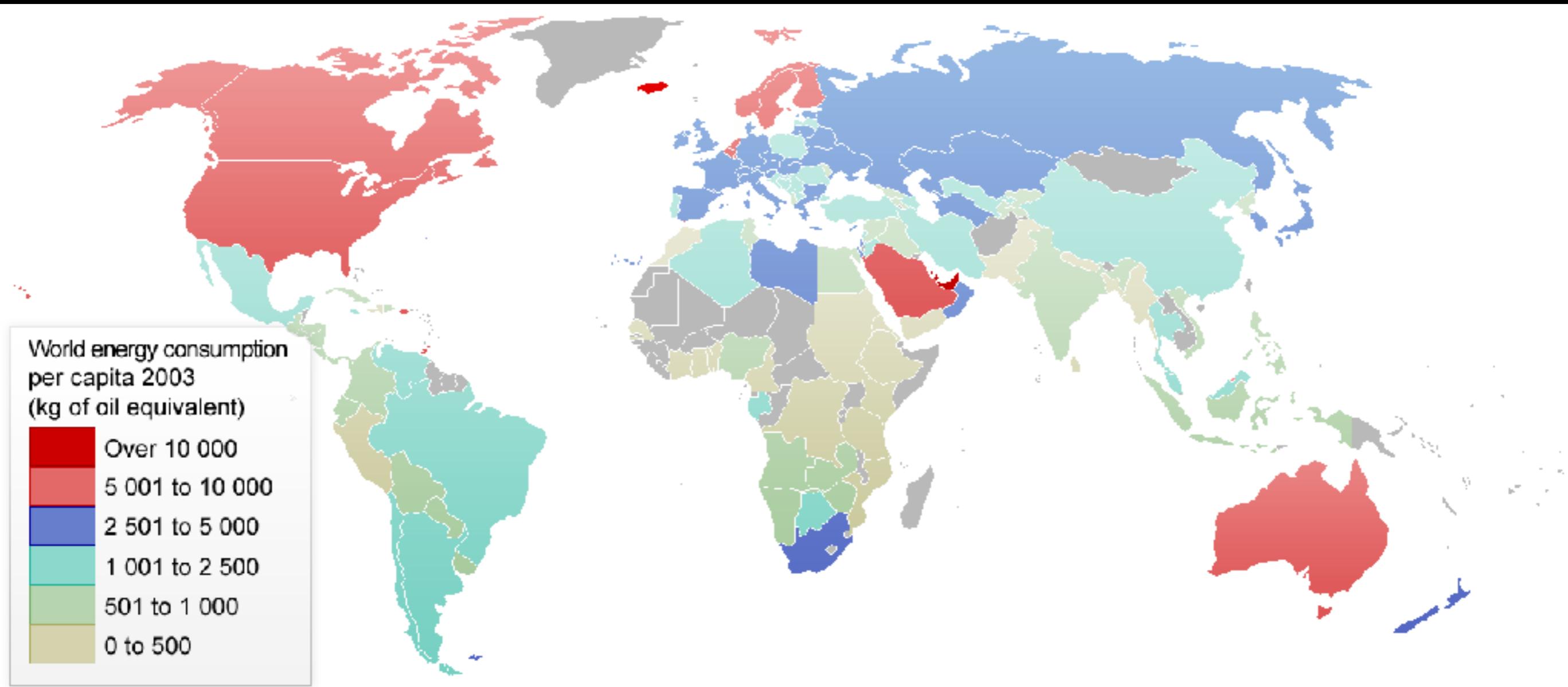
Earth at night



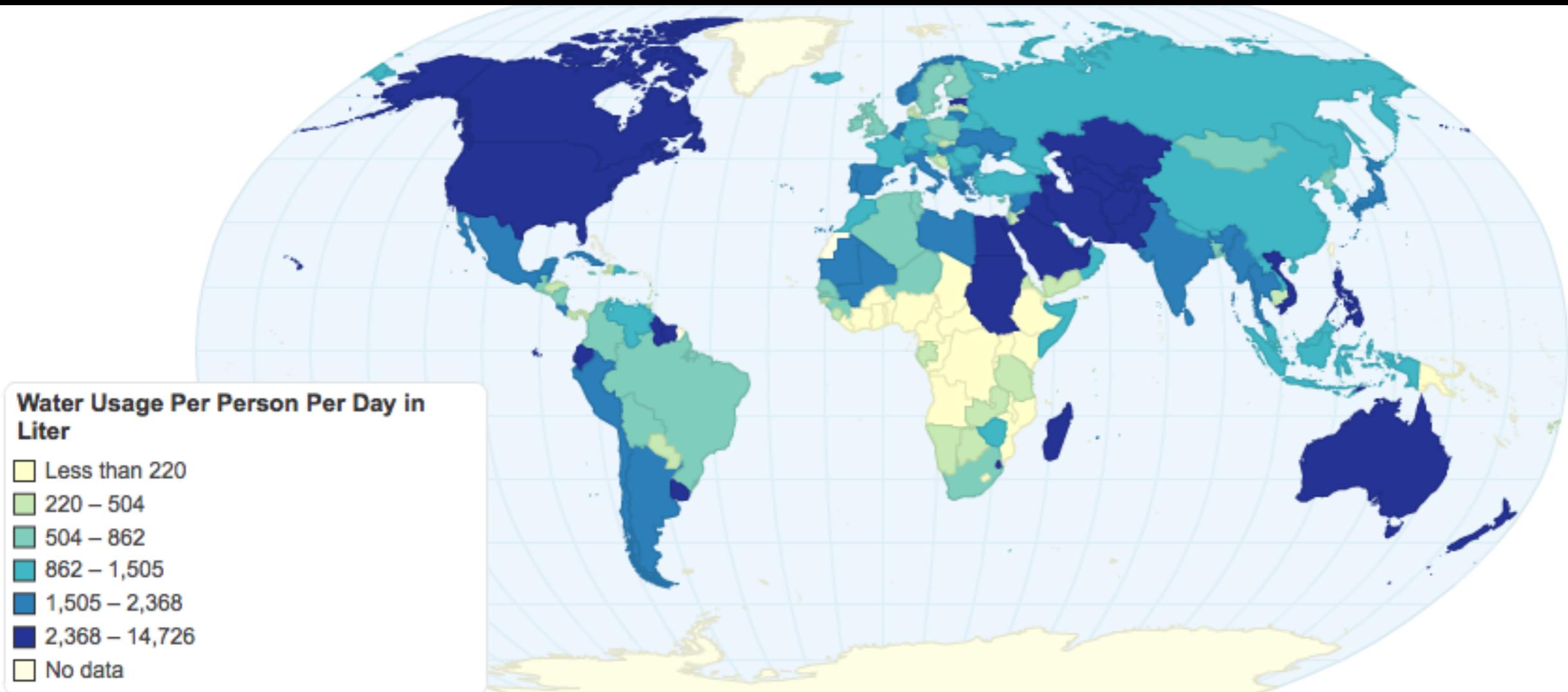
Earth at night



Energy consumption

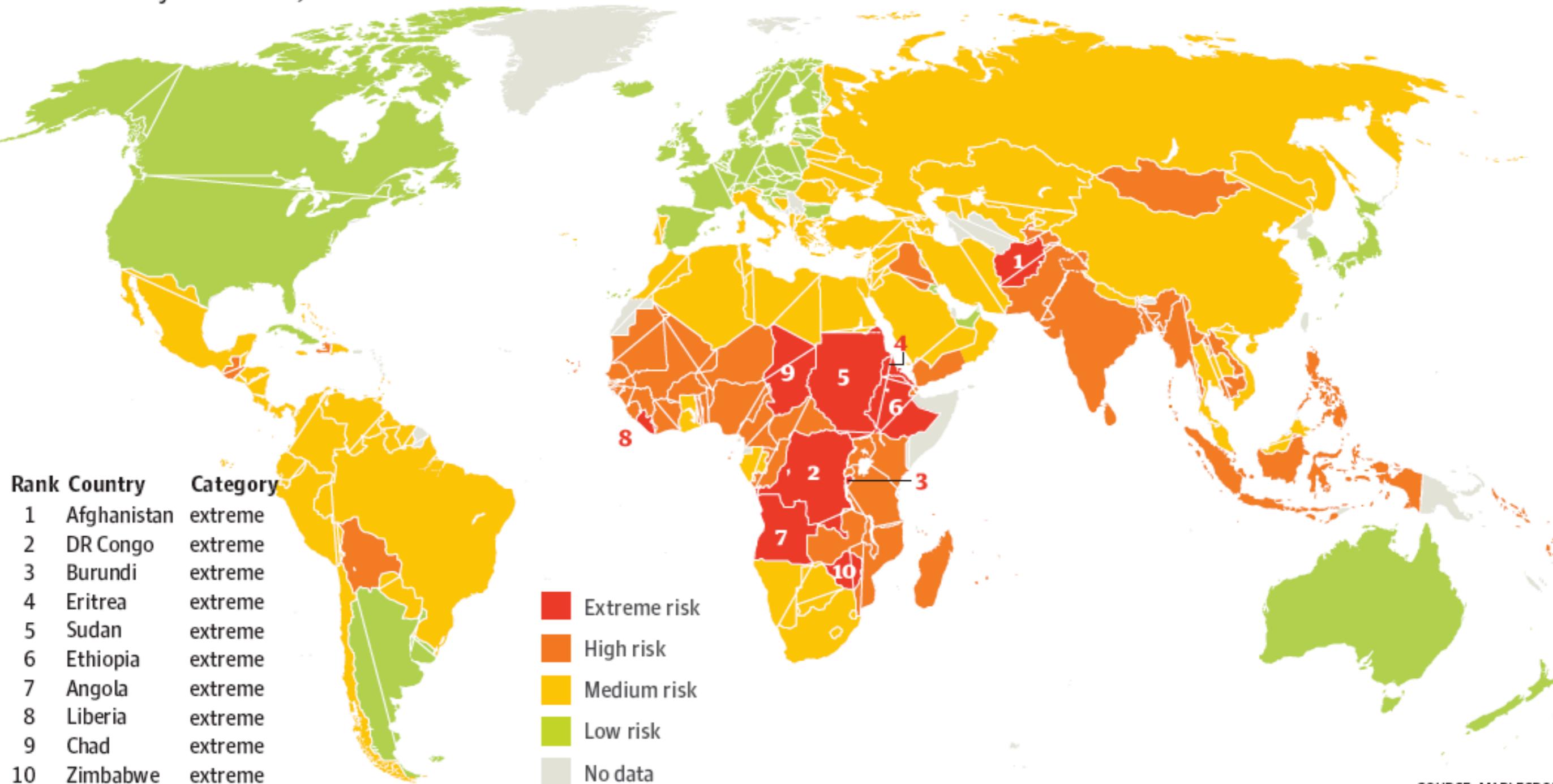


Water consumption

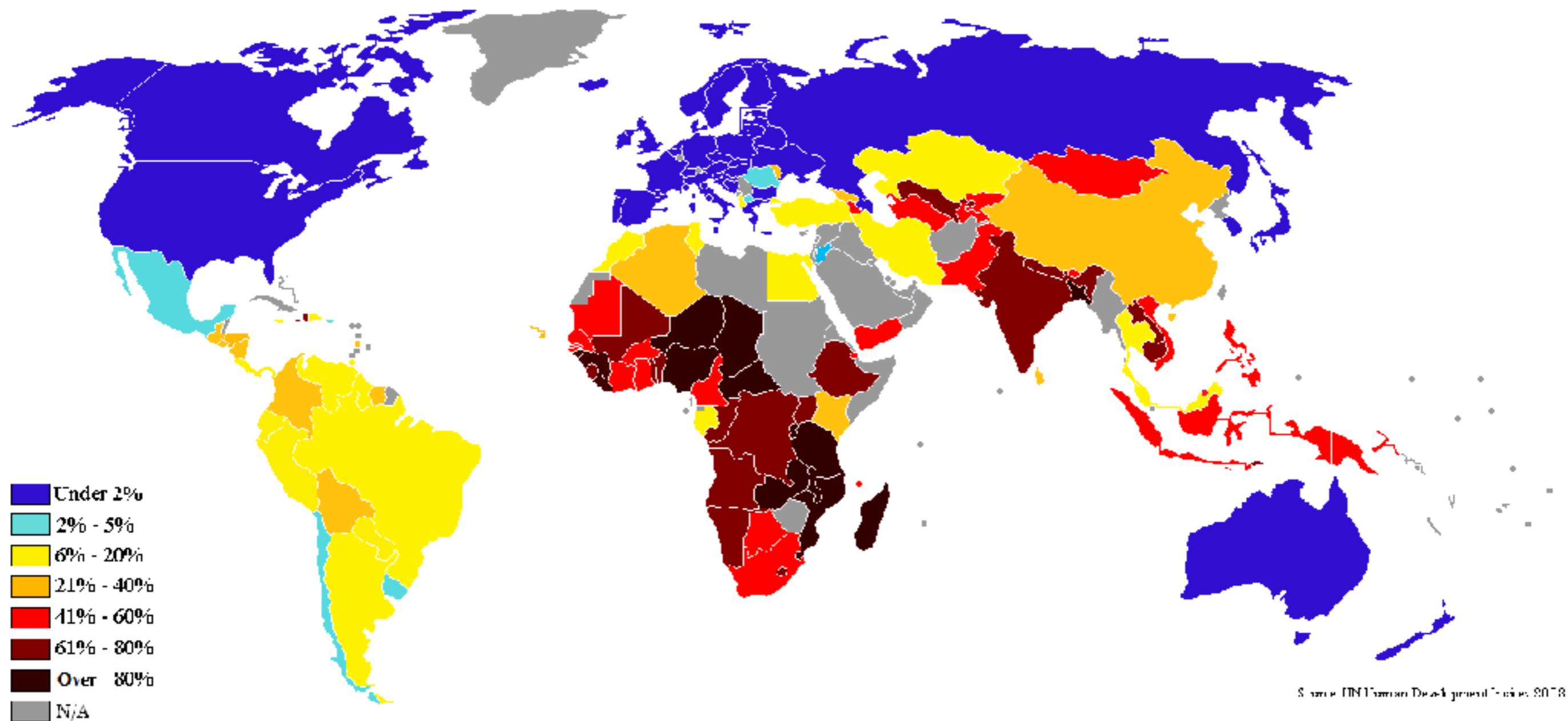


Food security

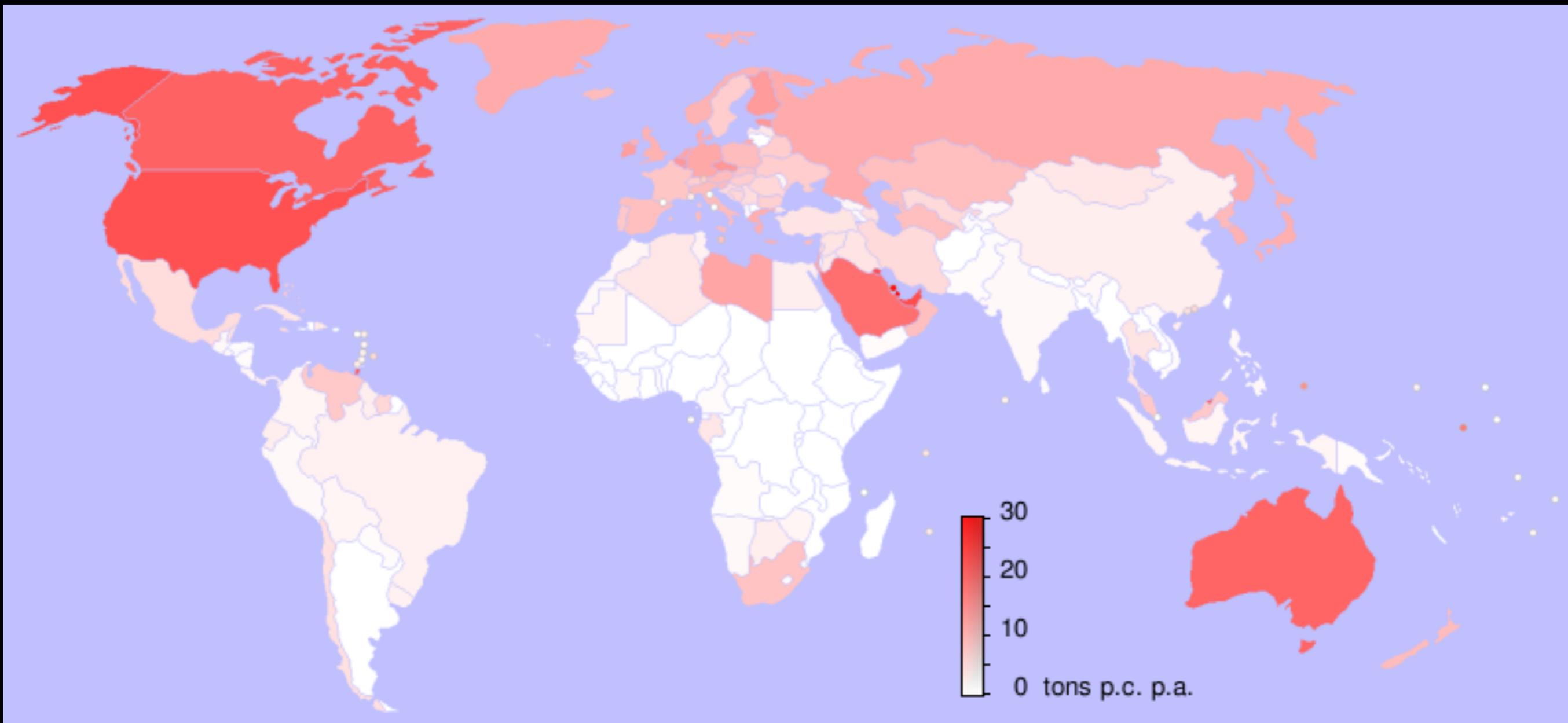
Food security risk index, 2010



Percentage of people living on less than US\$ 2 a day



Tons of CO₂ emission per capita per year



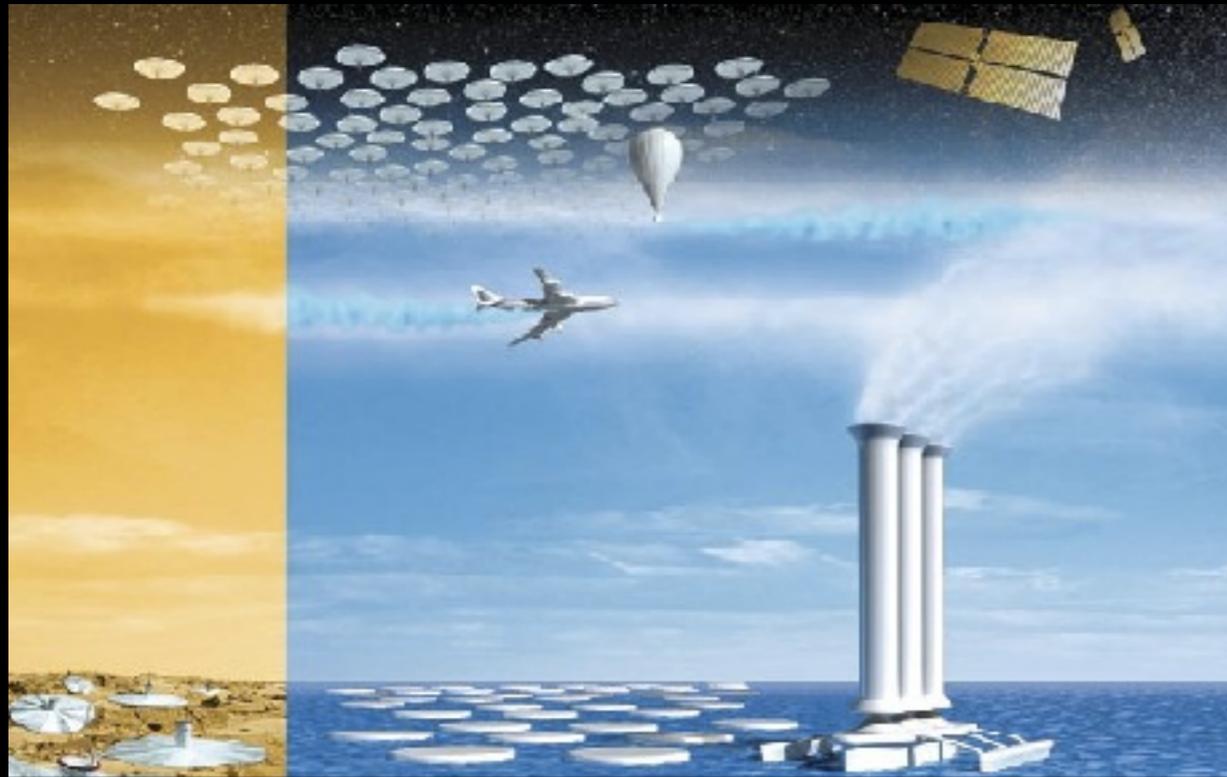
Big challenges for science

- Food security
- Water supply
- Energy supply
- Aging, diseases, sanitation
- Climate change and air pollution
- Natural disasters
- Science education, quality education for all
- Sustainable use of biodiversity
- Management of huge urban agglomerations: sanitation, transportation, education, energy, food, and water supply
- Ethics: responsibility towards social inclusion, reduction of inequalities



Big challenges for science-based global governance

Climate engineering



High seas



opinion & comment

CORRESPONDENCE:

Field tests of solar climate engineering

Stefan Schäfer*, [Peter J. Irvine](#),
[Anna-Maria Hubert](#), [David Reichwein](#),
[Sean Low](#), [Harald Stelzer](#), [Achim Maas](#) and
[Mark G. Lawrence](#).

Institute for Advanced Sustainability Studies,
Sustainable Interactions With the Atmosphere,

nature
climate change



FOREIGN
AFFAIRS

Published by the Council on Foreign Relations

The Truth About Geoengineering

Science Fiction and Science Fact

By David C. Voas, *M. Chagor-Morgan*, *Jay Apt*, *John Sridharan*, *Katherine Sible*

MARCH 27, 2013

APRIL 11, 2013

International conference



ECONOMIC, SOCIAL &
ENVIRONMENTAL COUNCIL

THE HIGH SEAS: OUR FUTURE

What governance for sustainable management of the oceans?

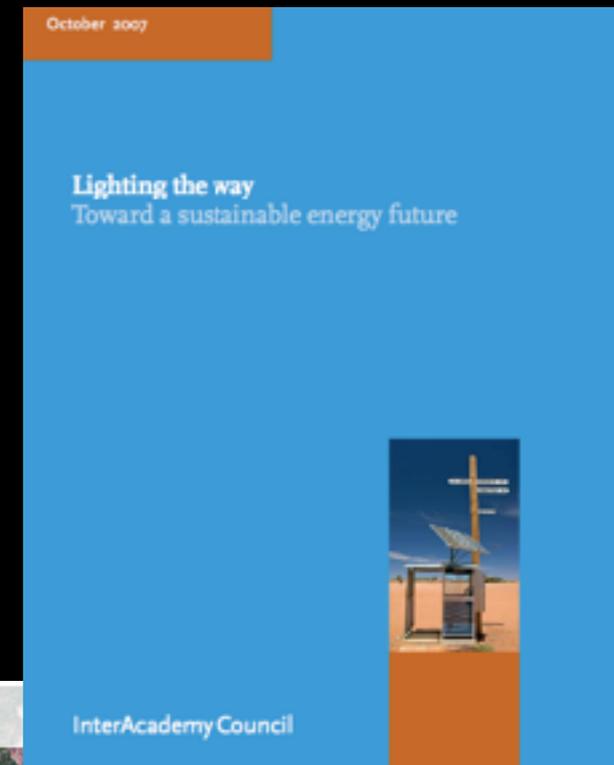
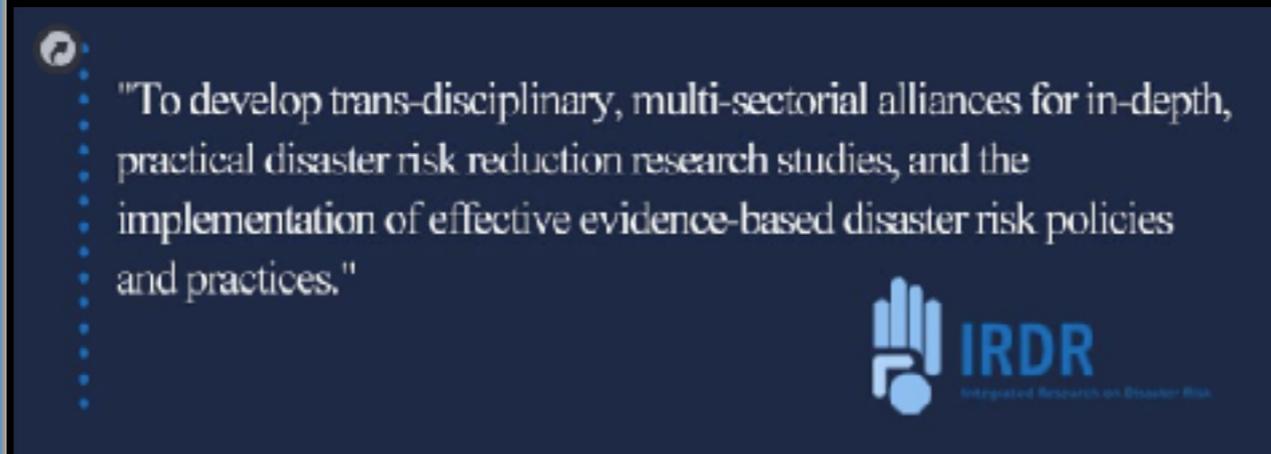
#highseas

Watch again the conference

PALACE D'ISA
PARIS 16th

(Thanks to Lucia Melo)

Scientific diplomacy for sustainable development with social inclusion

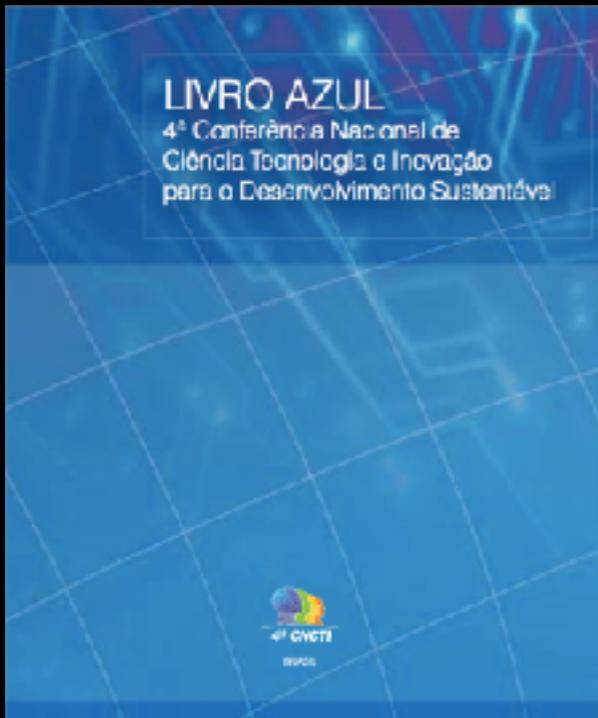


WE'RE STILL MISSING A
KEY TRANSLATOR...



9-7-02
SOWETAN E.
ZAPIRO

Science and Society: The Brazilian 4th National Conference on Science, Technology, and Innovation



26-28 May 2010: 4000 participants
More than 40.000 internet accesses

Innovation in Governance and Science Policy: Regional meetings, dialogue between academy, government, business, labor unions, social movements



Science collaboration in Latin America and Caribe



- Largest sink of carbon from the planet
- Huge water basins
- Huge biodiversity
- Strong social inequality, high vulnerability to natural disasters, small number of researchers, deficient educational systems, exports dominated by commodities
 - Multi-user labs
 - Regional "open access" environment
 - Science education
 - New financing mechanisms for regional collaboration
 - National laws favoring regional collaboration – less bureaucracy

Inventing the future

- S&T capacity building as a shared regional and global responsibility
- Digital libraries of science and technology with universal access
- Virtual networks of excellence linking scientific talents of entire regions and the globe – multidisciplinary approach
- Education “beyond the school”
- Reformulation of structure and programs of higher education towards more interaction between disciplines
- Global funding mechanisms should be strengthened for support of science and technology in developing nations:
 - Global institutional funds: supporting centers of excellence and multi-user labs of national or regional character
 - Global program funds: competitive grants system



What is the use of basic science?

- Faraday's reply to William Gladstone, then British Chancellor of the Exchequer (minister of finance), when asked of the practical value of electricity (1850)

“One day sir, you may tax it.”



Quantum physics in the beginning of the XXth century

Moving forces: curiosity,
passion, fascination



Planck



Einstein



Heisenberg



Schrödinger



Bohr



Born



Dirac

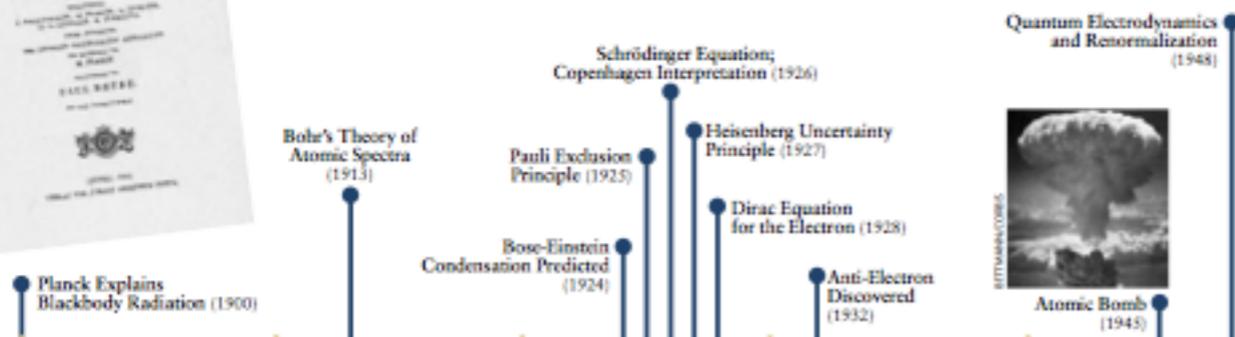
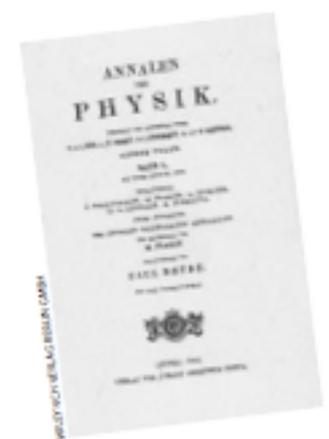


Pauli

Changing the world...

100 Years of QUANTUM MYSTERIES

by Max Tegmark and John Archibald Wheeler



FOUNDATIONS of quantum mechanics were laid in the period 1900–1926, including seminal contributions from the seven physicists shown at the right. Over its century of development, quantum mechanics has not only profoundly advanced our understanding of nature but has also provided the basis of numerous technologies. Yet some fundamental enigmas of quantum theory remain unresolved.



MAX PLANCK (1858–1947)



ALBERT EINSTEIN (1879–1955)



NIELS BOHR (1885–1962)

“An estimated 30 percent of the U.S. gross national product is based on inventions made possible by quantum mechanics, from semiconductors in computer chips to lasers in compact-disc players, magnetic resonance imaging in hospitals, and much more.”

What is the use of basic science?

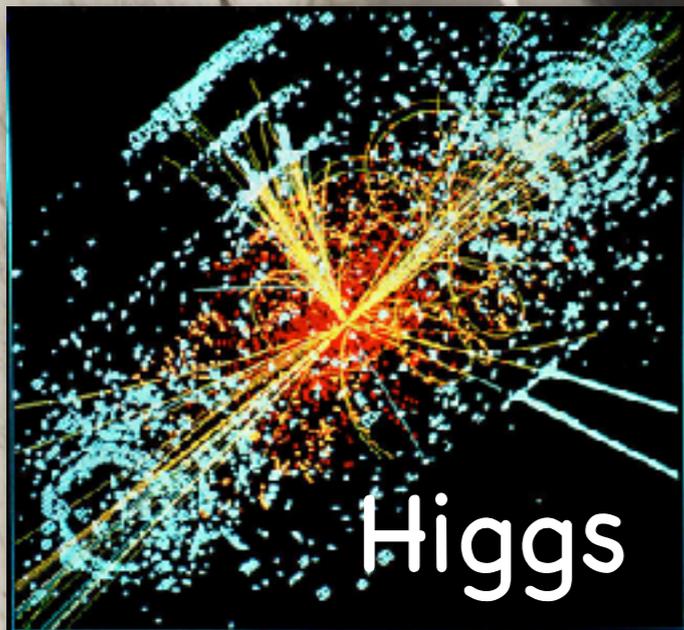
Large
Hadron
Collider

Aprox. 13.5 billions of dollars

Forbes "It is an important sum, but there are more than 50 billionaires in Forbes list who are worth more than this amount".

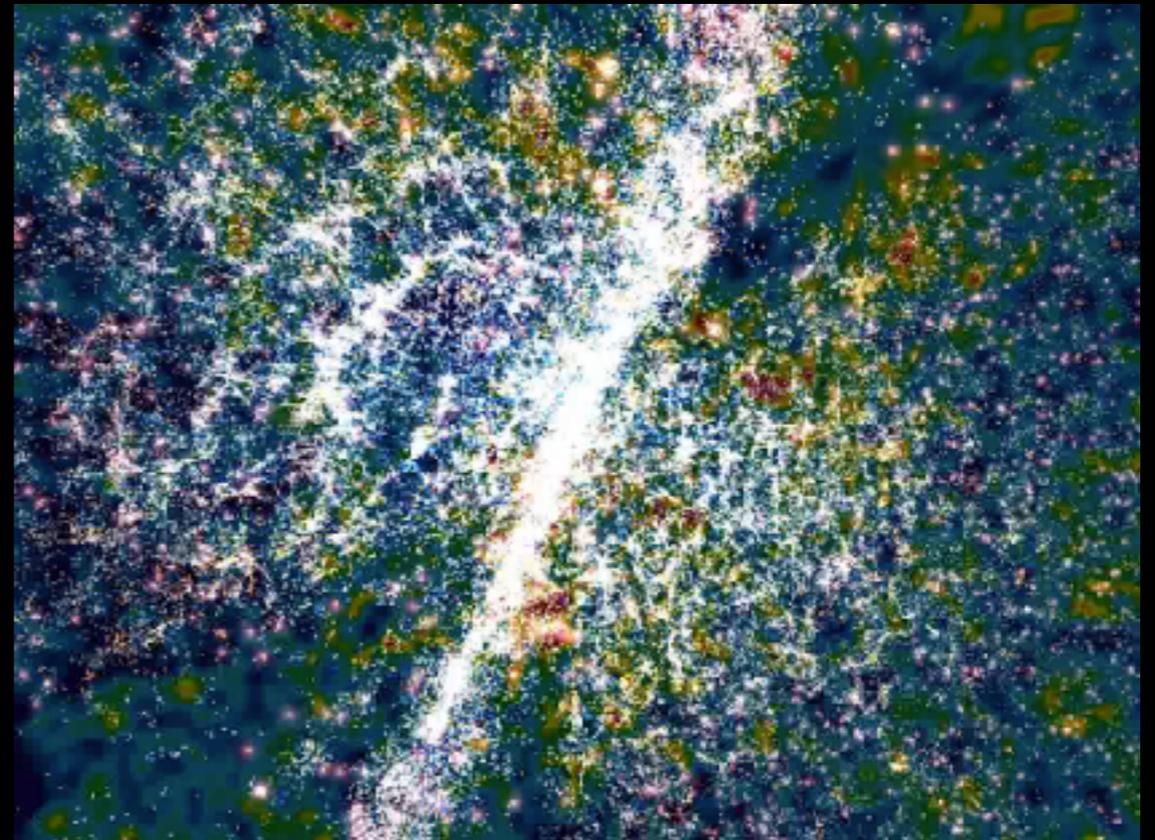
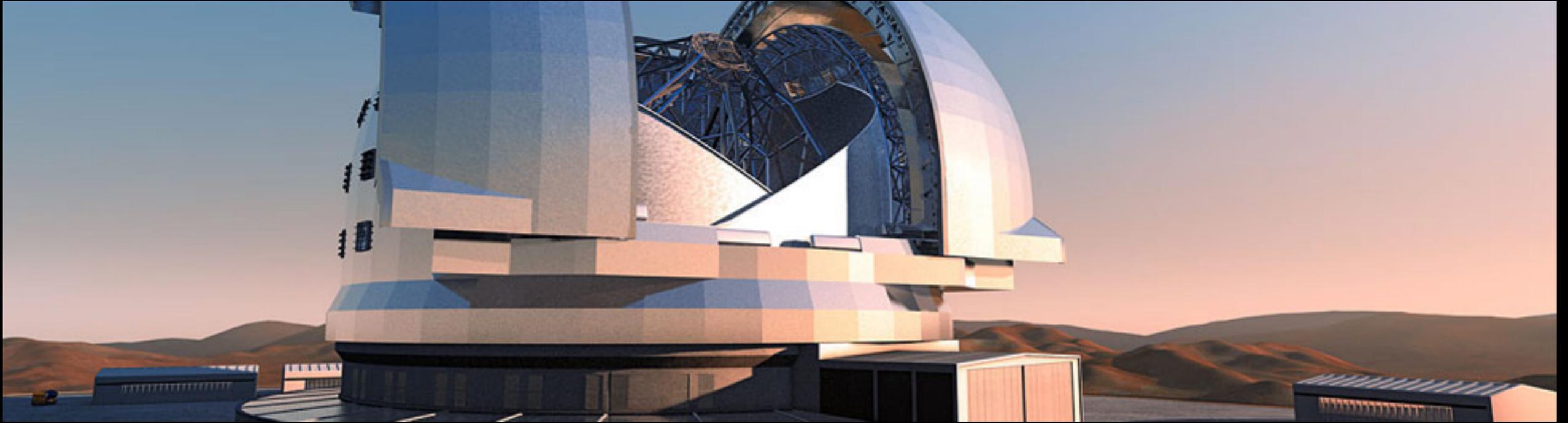
"When one considers the potential for advancing computer technology, medical imaging, and the high-impact scientific discoveries, \$13.5 billions look like a bargain."

"Specially when one considers that, beyond all that, the LHC and the experiments associated with it are bringing us closer to understanding the misteries of the Universe".



Higgs

What is the use of basic science?



Science for peace

Israel, Iran, Jordan and Turkey join forces for multimillion-dollar science project

Each of the four countries has pledged \$5 million toward the SESAME facility, which is being built near Amman.



Science for peace

- Beginning of 80's: suspicion that the militaries in Brazil and Argentina might get engaged into an arms race.
- November 1984: Document signed by Presidents of Brazilian Physical Society and Argentinean Physics Association
 - Against the production of nuclear arms
 - Against nuclear race between the two countries
 - For openness in nuclear research
 - For mutual control of nuclear plants

Inventing the future

"Science is not only itself a culture of global dimensions, it induces a cultural current that strongly and positively affects societies in which it flourishes – including those that at first were wracked by poverty and hunger, riven by civil strife, and embedded in fiscal crisis."

"The culture of science and the open, honest values that it engenders are enormously important above and beyond the material benefits that they help produce for human welfare."

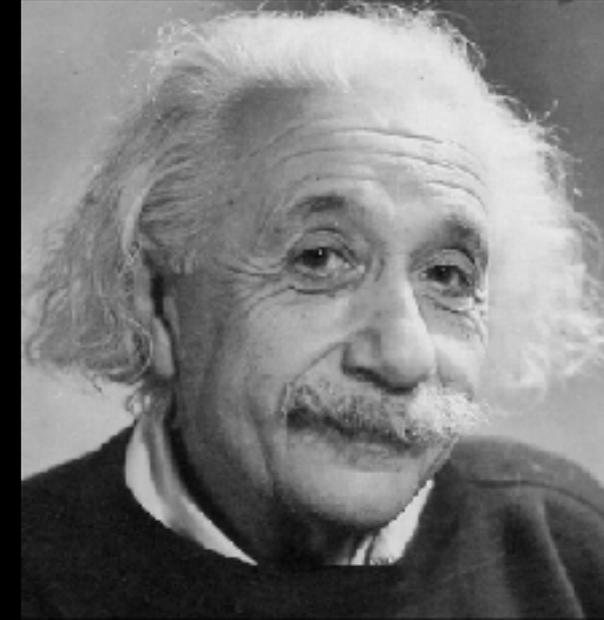


Science, art, beauty and culture

"A theory with mathematical beauty is more likely to be correct than an ugly one that fits some experimental data."

Paul A.M. Dirac (1902-1984)

Dirac gave general formulation of quantum mechanics, and his relativistic equation for the electron had profound and long-lasting consequences. (Photo Ramsey & Muspratt, 1934.)



"The most beautiful thing we can experience is the mysterious. It is the source of all true art and all science. He to whom this emotion is a stranger, who can no longer pause to wonder and stand rapt in awe, is as good as dead: his eyes are closed."

Einstein

Inventing the future

Every child in the world should have the right to quality education, quality health services, proper water and food, and equal opportunities to develop

"It is the birthright of every child, it is a necessity for every adult, to look out on the world, and see that the wonder of the cosmos transcends everything that divides us." (Brian Green)

Due to a subtle quirk of the evolution of the human species, the passion for science serves humanity, revolutionizes people's daily life, affects social organization, ways and costumes.



Thank you!