

# THE PATH TO SUSTAINABLE DEVELOPMENT: UNDERSTANDING AND MANAGING COMPLEX GLOBAL SYSTEMS

JEFFREY D. SACHS  
DIRECTOR OF THE EARTH INSTITUTE  
VIENNA, MARCH 12, 2014



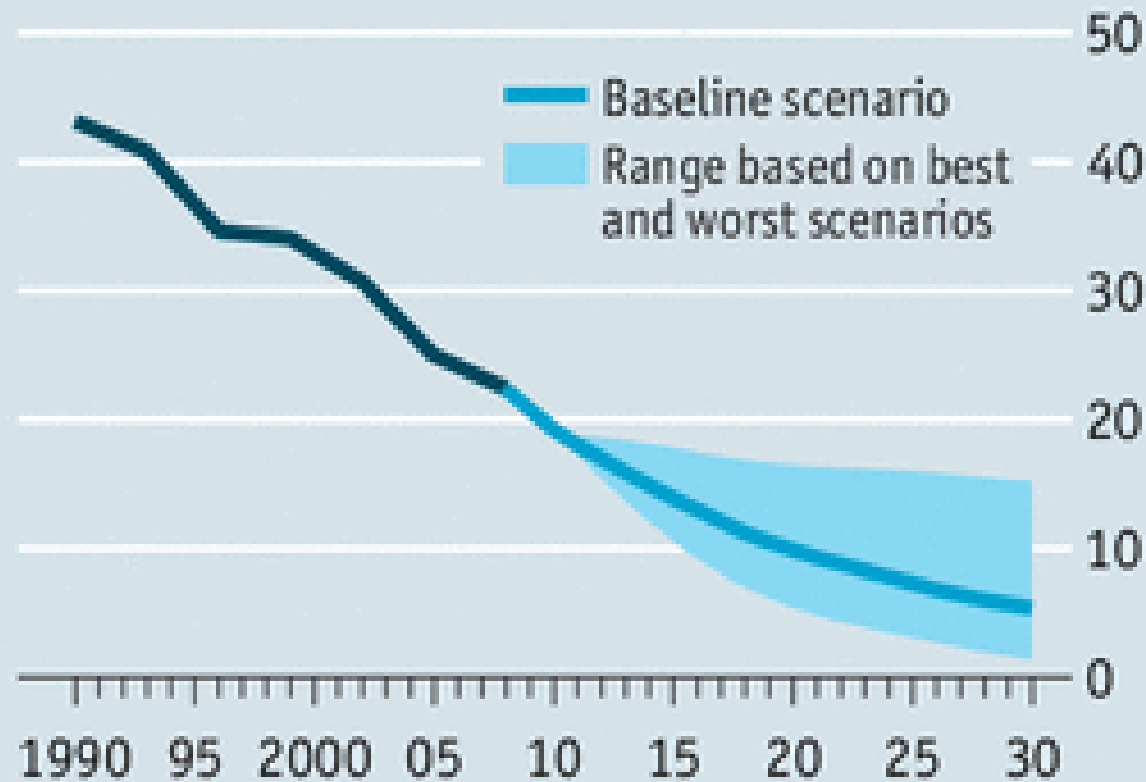
“For man holds in his mortal hands  
the power to abolish all forms of human  
poverty and all forms of human life.”

-JFK Inaugural Address  
January 20, 1963

# Hooray!

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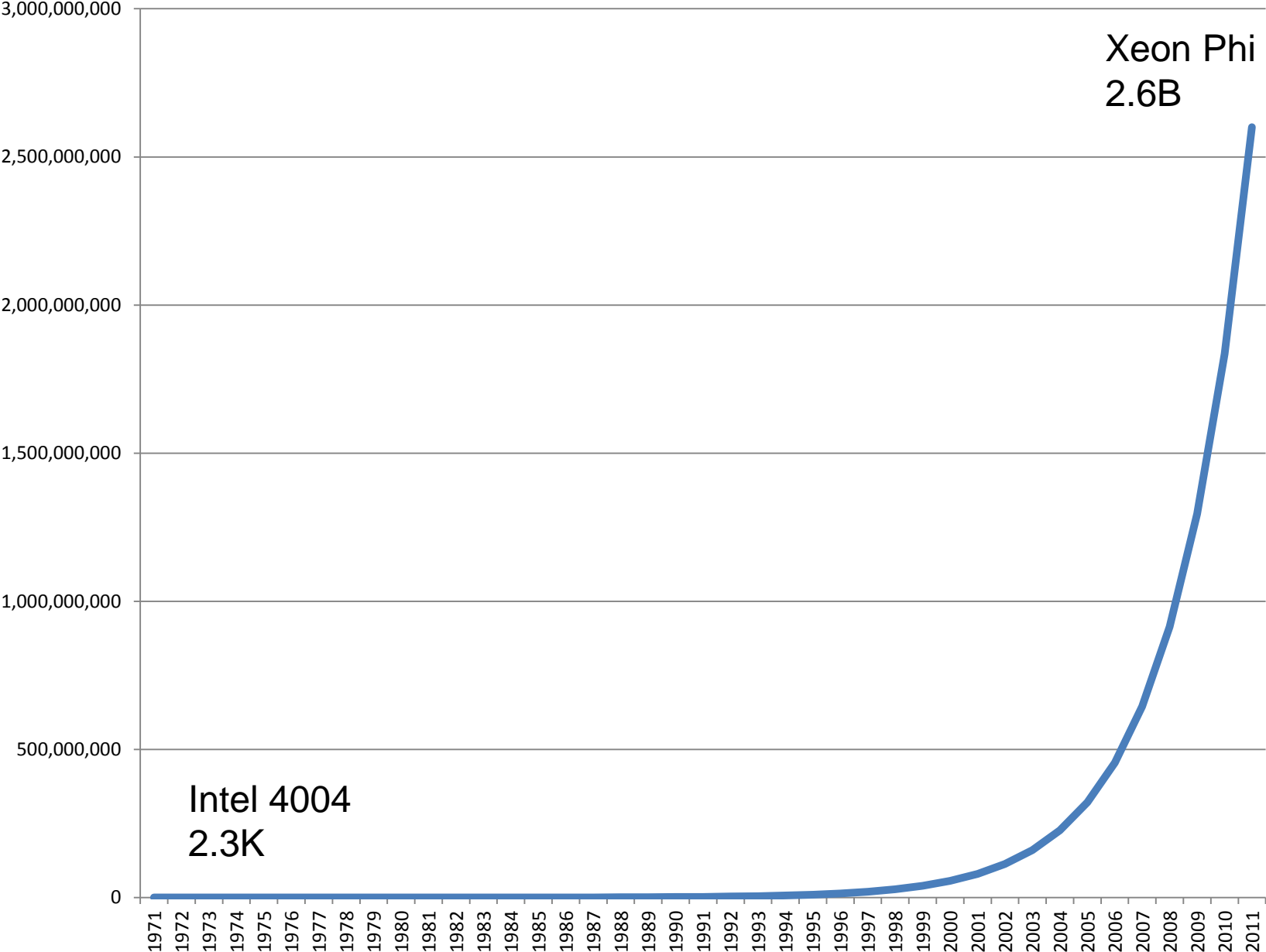
Global poverty rate, %



Source: Laurence Chandy, Natasha Ledlie and Veronika Penciakova

# The IT Revolution Fueling Global Progress:

## Microprocessor Transistor Count





Tunis, January 2011



Cairo, January 2011



Athens July 2011



Tel Aviv, August 2011



Chile, August 2011



New York City, November 2011



Madrid, September 2012



Istanbul, June 2013



Rio de Janeiro, June 2013

CLIMATE CHANGE (SUPERSTORM SANDY, OCTOBER 29, 2012)



# BEIJING ENVELOPED IN POLLUTION, JANUARY 2014

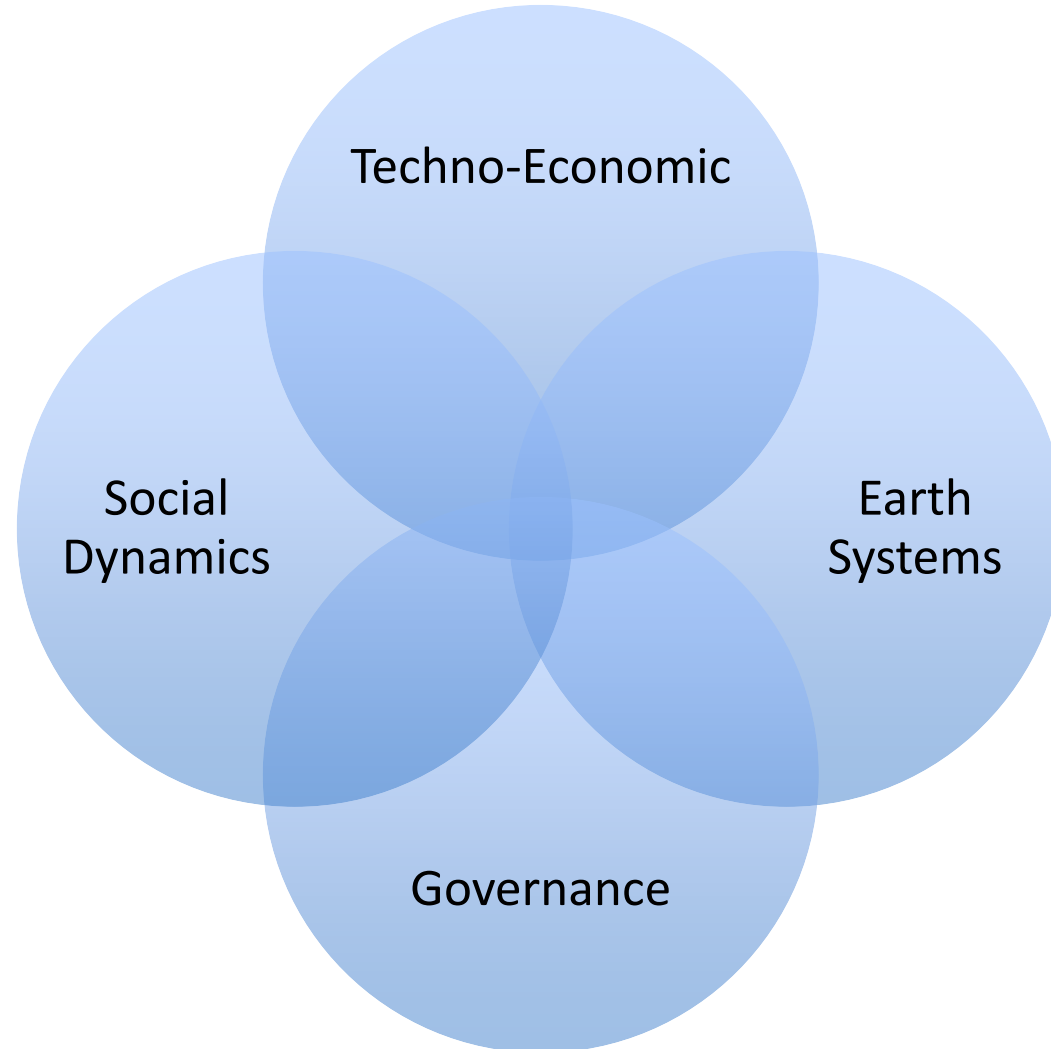


# SYRIA





# SUSTAINABLE DEVELOPMENT IS THE CHALLENGE OF MANAGING FOUR GLOBAL-SCALE, COMPLEX, INTERCONNECTED SYSTEMS



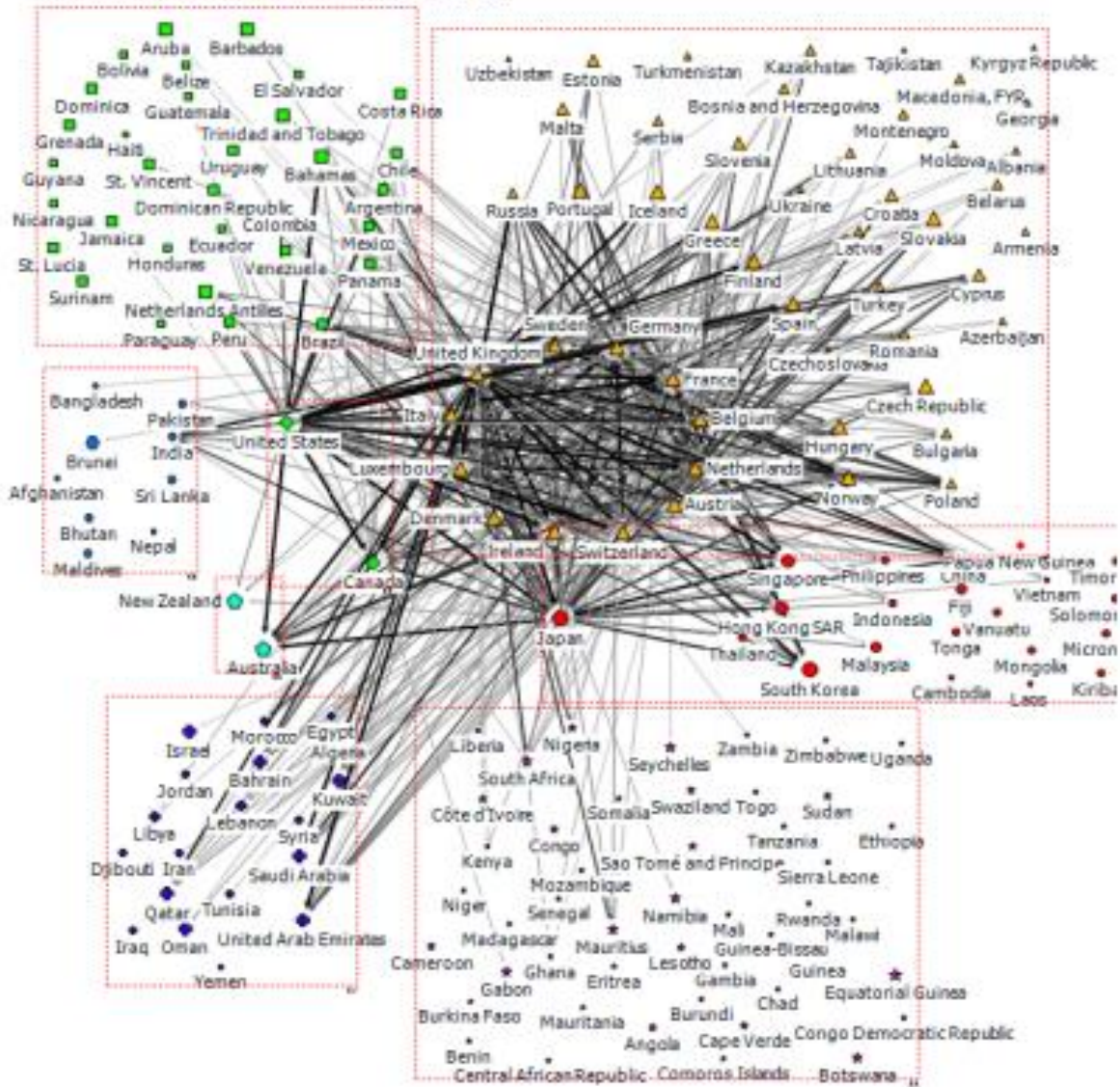
THIS KIND OF SYSTEMS FOCUS HAS OF COURSE BEEN THE DEFINING HALLMARK OF IIASA SINCE ITS INCEPTION.

NOW, THE WORLD SHOULD EMBRACE THIS KIND OF SYSTEMS APPROACH AS BOTH AN ANALYTICAL METHOD AND AS THE NORMATIVE BASIS FOR ACTION

2007

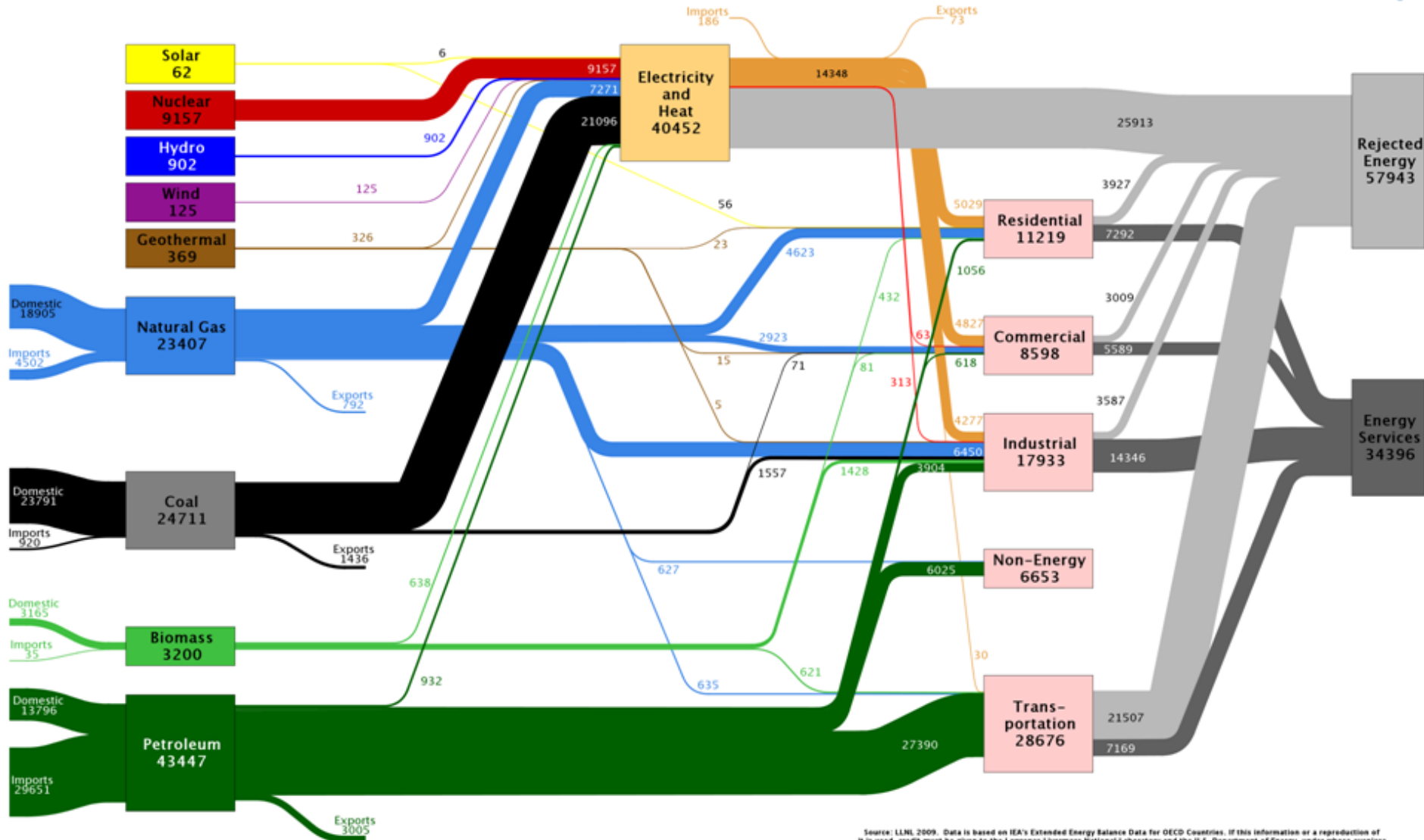
**ECONOMIC  
SUB-SYSTEM:**

**CROSS-BORDER  
BANKING**



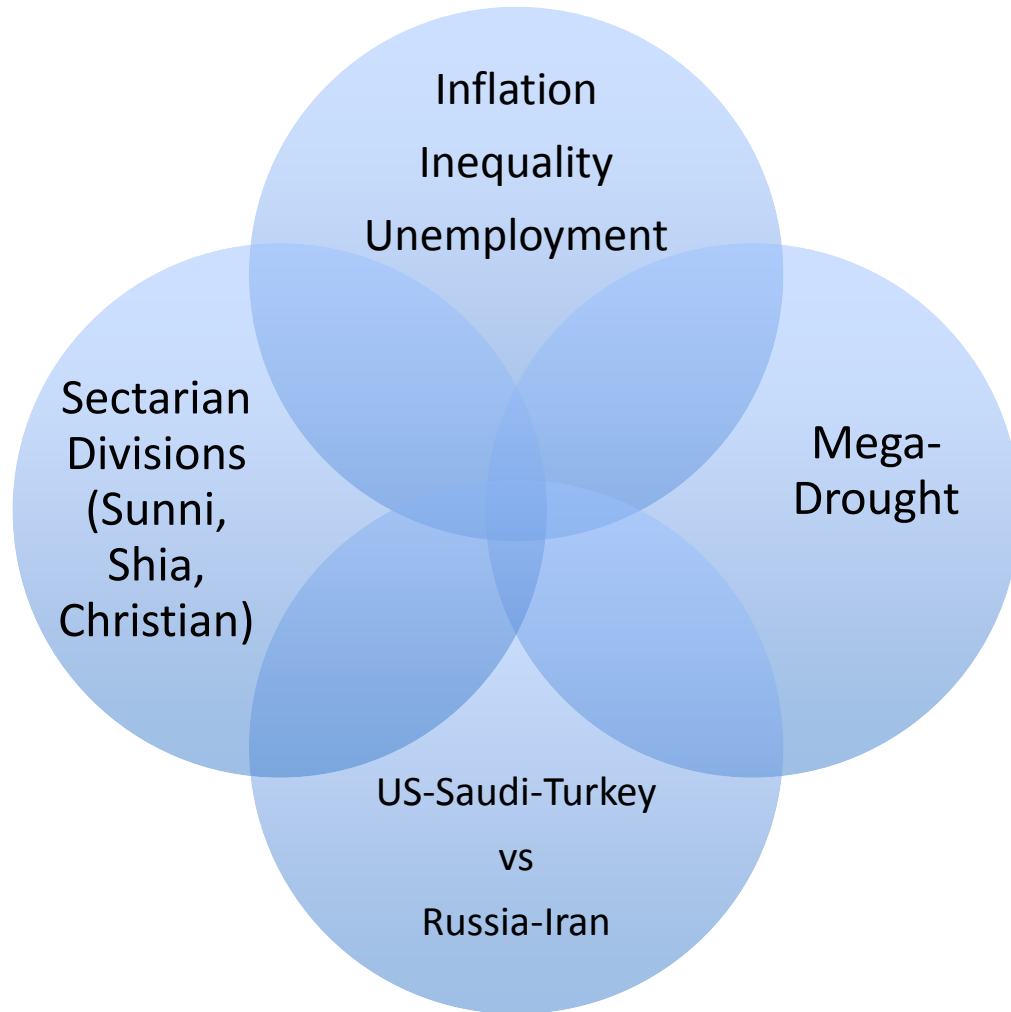
# TECHNICAL SUB-SYSTEM: ENERGY USE IN THE US

United States Energy Flow  
in 2007: ~105,379 PJ

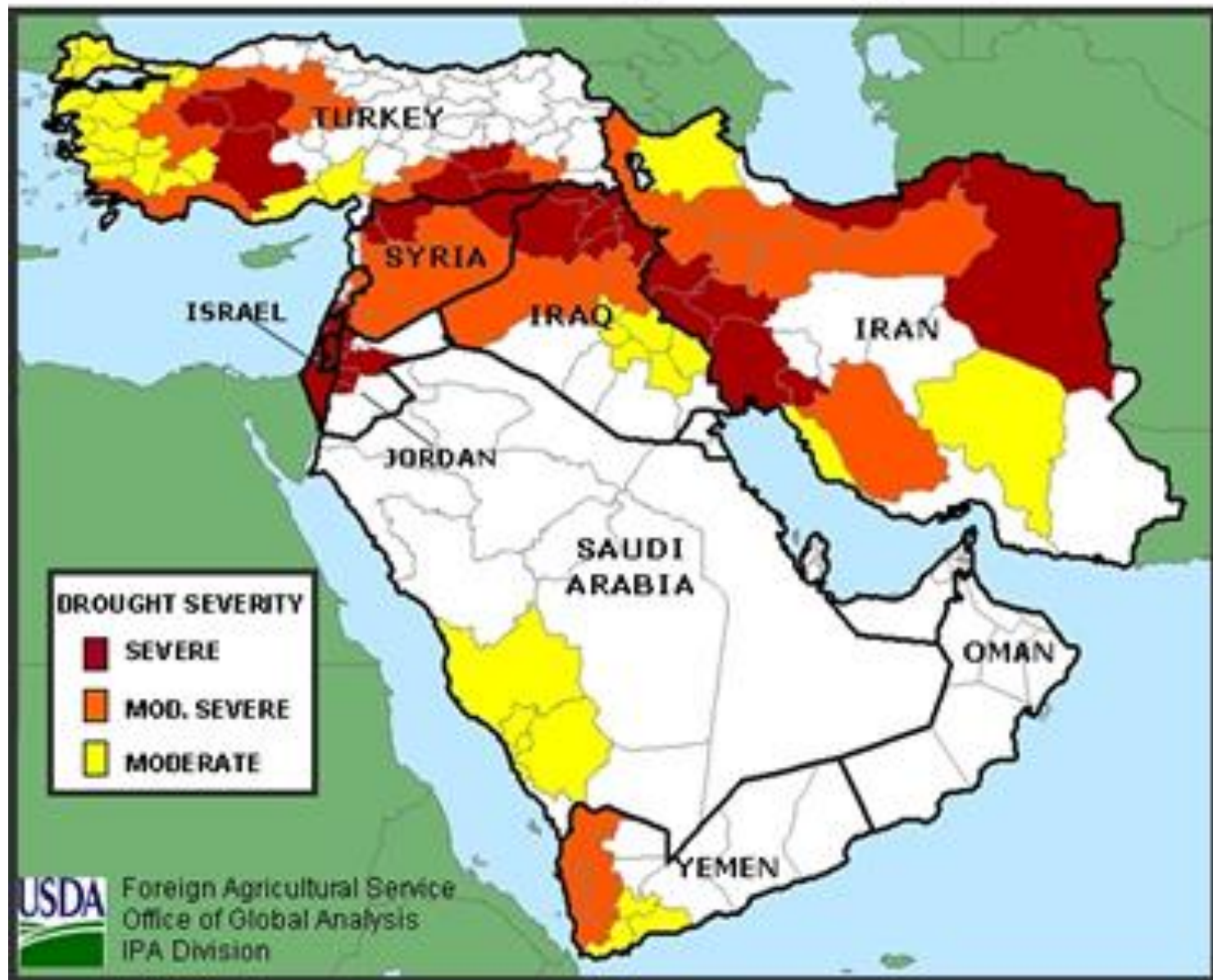


Source: LLNL 2009. Data is based on IEA's Extended Energy Balance Data for OECD Countries. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the U.S. Department of Energy, under whose auspices the work was performed. Totals may not equal sum of flows due to statistical differences. Domestic supply includes changes in stocks. Biomass includes the renewable portion of waste and Petroleum includes the non-renewable portion of waste. Rejected energy from Electricity includes transmission losses. Industry includes energy used in coal, oil and gas extraction and processing as well as agriculture, forestry and fishing. Transportation includes fuel delivered to international aviation and marine bunkers. LLNL-MI-410527.

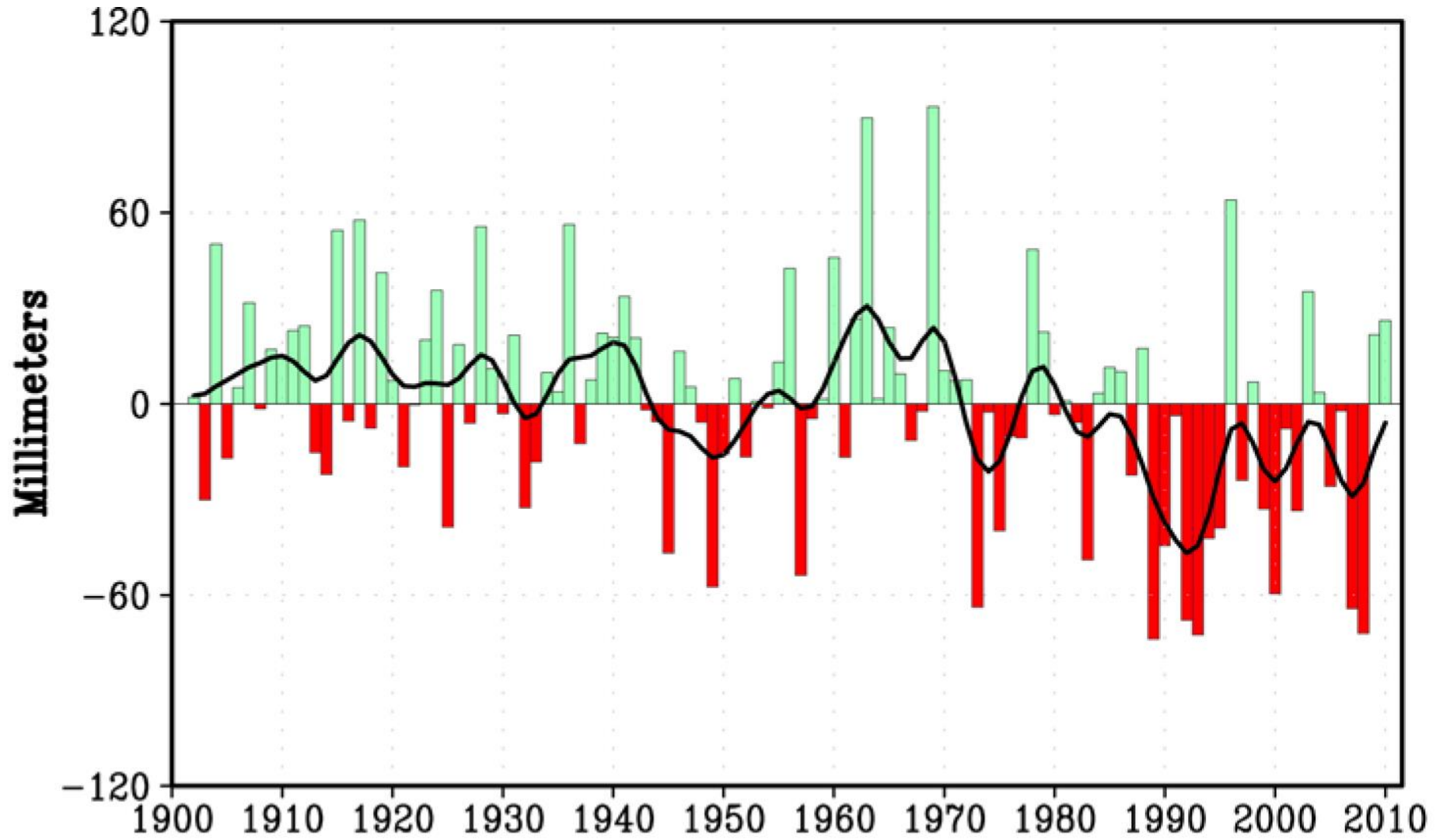
# CONSIDER THE RAPID DESCENT OF SYRIA INTO MASS KILLING (ESTIMATED 136,000 DEAD BY NOW)



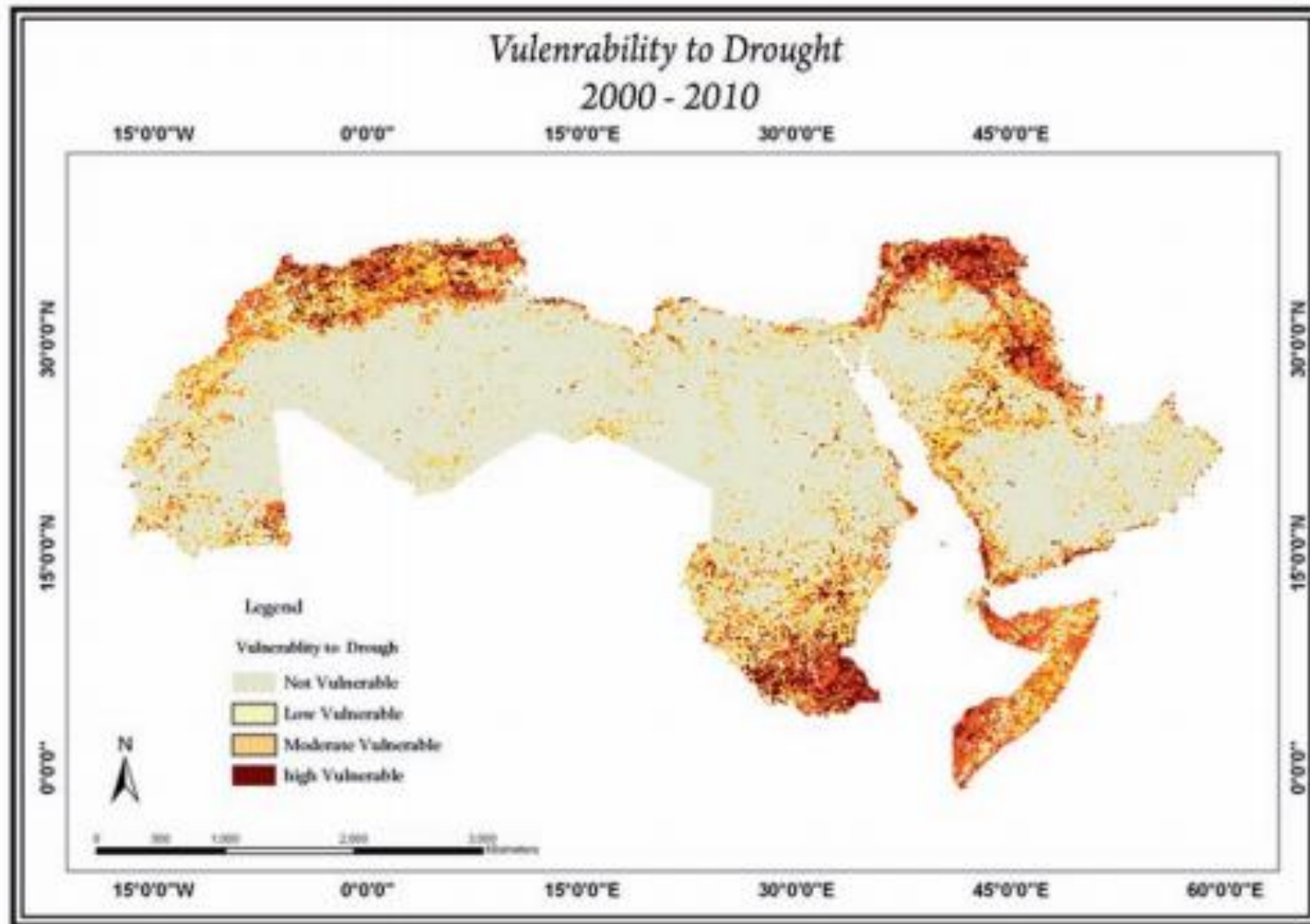
## MIDDLE EAST: 2008 Regional Drought Impact



# RAINFALL IN THE MEDITERRANEAN REGION



Hoerling, NOAA, 2011



**Figure 5 Drought Vulnerability during the Agriculture Seasons 2000 - 2010**



## 2008 Financial Crisis



# THE CRISIS OF INEQUALITY AND JOBLESSNESS



# THE NEED FOR LONG-TERM SYSTEMS THINKING AND STRATEGIES:

INVESTING IN YOUNG PEOPLE

SUSTAINABLE TECHNOLOGIES AND DEEP  
DECARBONIZATION

SUSTAINABLE AGRICULTURE AND DIETS  
WELLBEING, NOT GDP

TRANSPARENT GLOBAL FINANCE AND TAX  
SYSTEMS

ENDING EXTREME POVERTY (E.G. AFRICA)

STABLE SYSTEMS OF POLITICAL ALTERNATION



By defining our goal more clearly -- by making it seem more manageable and less remote -- we can help all people to see it, to draw hope from it and to move irresistibly towards it.

(JFK, American University Speech, June 1963)

# Illustrative SDGs

1. End Extreme Poverty Including Hunger **POVERTY**
2. Achieve Growth and Jobs within Planetary Boundaries **ECONOMY**
3. Effective Education for All Children and Youth for Life and Livelihood **EDUCATION**
4. Achieve Gender Equality, Social Inclusion, and Human Rights for All **INCLUSION**
5. Achieve Health and Wellbeing at All Ages **HEALTH**
6. Improve Agricultural Systems and Rural Productivity **FOOD**
7. Empower Inclusive, Productive, and Resilient Cities **CITIES**
8. Curb Climate Change and Ensure Sustainable Energy **ENERGY/CLIMATE**
9. Secure Ecosystem Services, Biodiversity, Water, Natural Resources **BIODIVERSITY**
10. Transform Government for Sustainable Development **GOVERNANCE**

**(SDSN Action Plan, 2013)**

We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too.

JFK, RICE UNIVERSITY, SEPTEMBER 1962

So let us not be blind to our differences, but let us also direct attention to our common interests and the means by which those differences can be resolved. And if we cannot end now our differences, at least we can help make the world safe for diversity. For in the final analysis, our most basic common link is that we all inhabit this small planet. We all breathe the same air. We all cherish our children's futures. And we are all mortal.

John F. Kennedy, June 10, 1963