15 Global Challenges

Framework for Understanding
Global Change,
Water

and

Collective Intelligence Systems

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The Millennium Project

The World needs a way to think together about the future...

…drawing on the collective intelligence of humanity to address our global challenges. The Millennium Project is working to create that capacity.

… May become a *TransInstitution*

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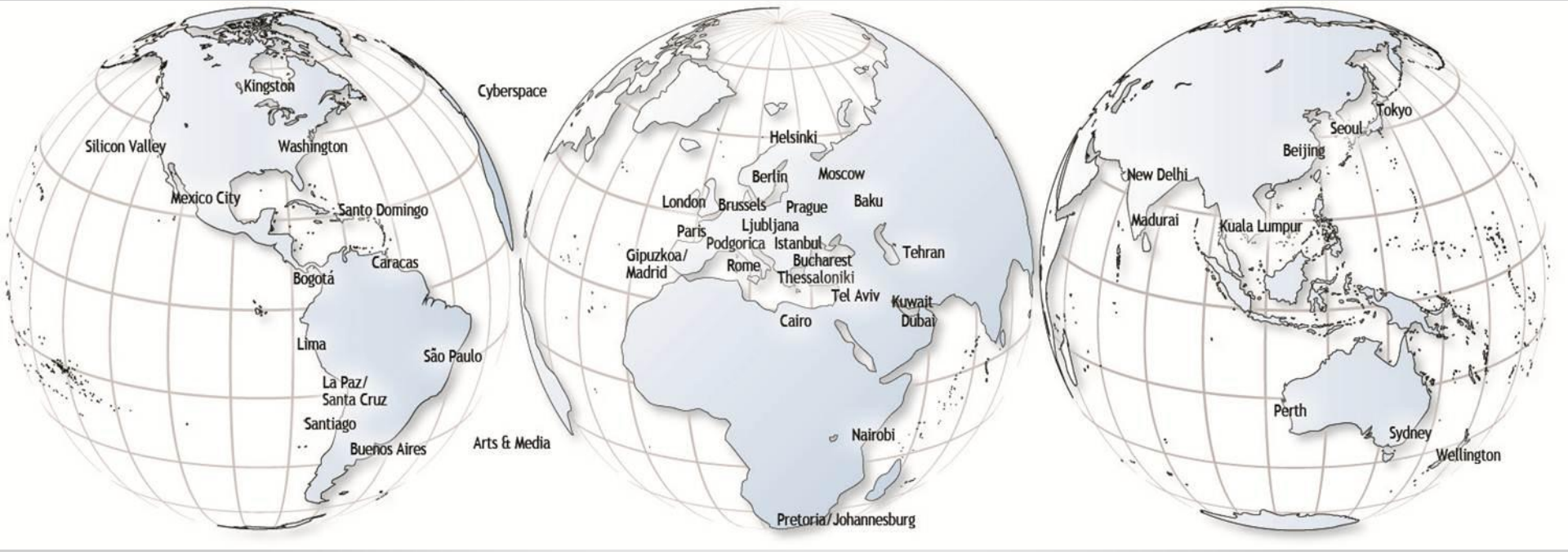
46 Millennium Project Nodes...

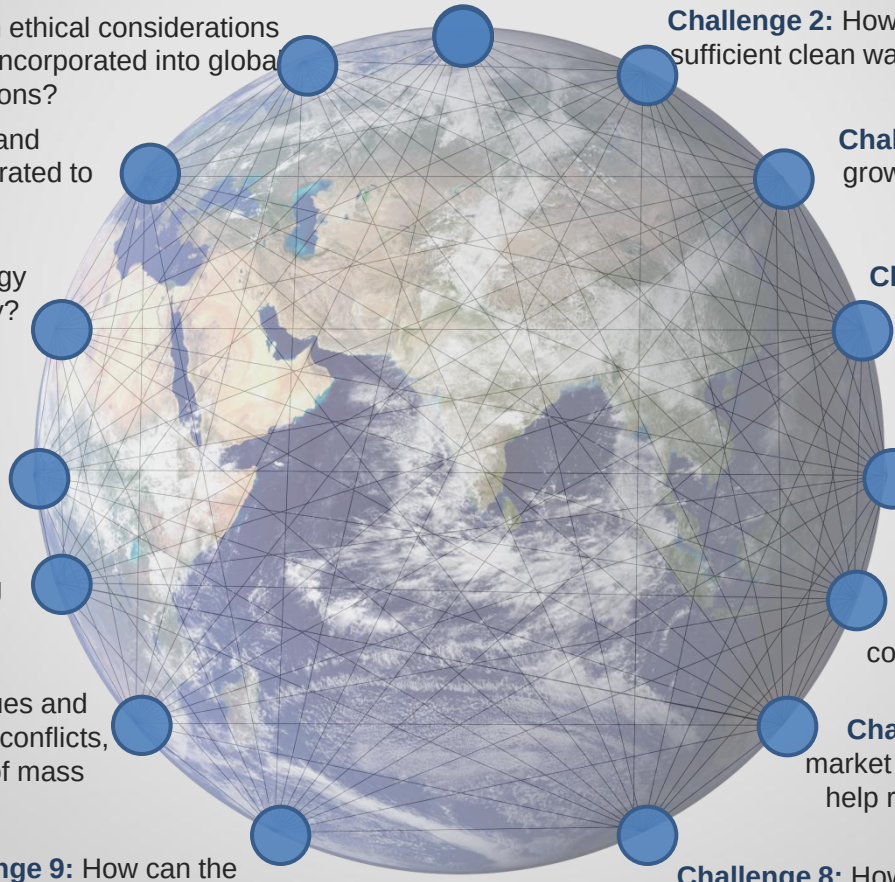
are groups of experts and institutions that connect global and local views in:



Nodes identify participants, translate questionnaires and reports, and conduct interviews, special research, workshops, symposiums, and advanced training.

15 Global Challenges:

A Framework for Understanding Global Change, and an Agenda for Humanity



Challenge 1: How can sustainable development be achieved for all while addressing global climate change?

Challenge 2: How can everyone have sufficient clean water without conflict?

Challenge 3: How can population growth and resources be brought into balance?

Challenge 4: How can genuine democracy emerge from authoritarian regimes?

Challenge 5: How can policymaking be made more sensitive to global long-term perspectives?

Challenge 6: How can the global convergence of information and communications technologies work for everyone?

Challenge 7: How can ethical market economies be encouraged to help reduce the gap between rich and poor?

Challenge 8: How can the threat of new and reemerging diseases and immune microorganisms be reduced?

Challenge 9: How can the capacity to decide be improved as the nature of work and institutions change?

Challenge 10: How can shared values and new security strategies reduce ethnic conflicts, terrorism, and the use of weapons of mass destruction?

Challenge 11: How can the changing status of women improve the human condition?

Challenge 12: How can transnational organized crime networks be stopped from becoming more powerful and sophisticated global enterprises?

Challenge 13: How can growing energy demands be met safely and efficiently?

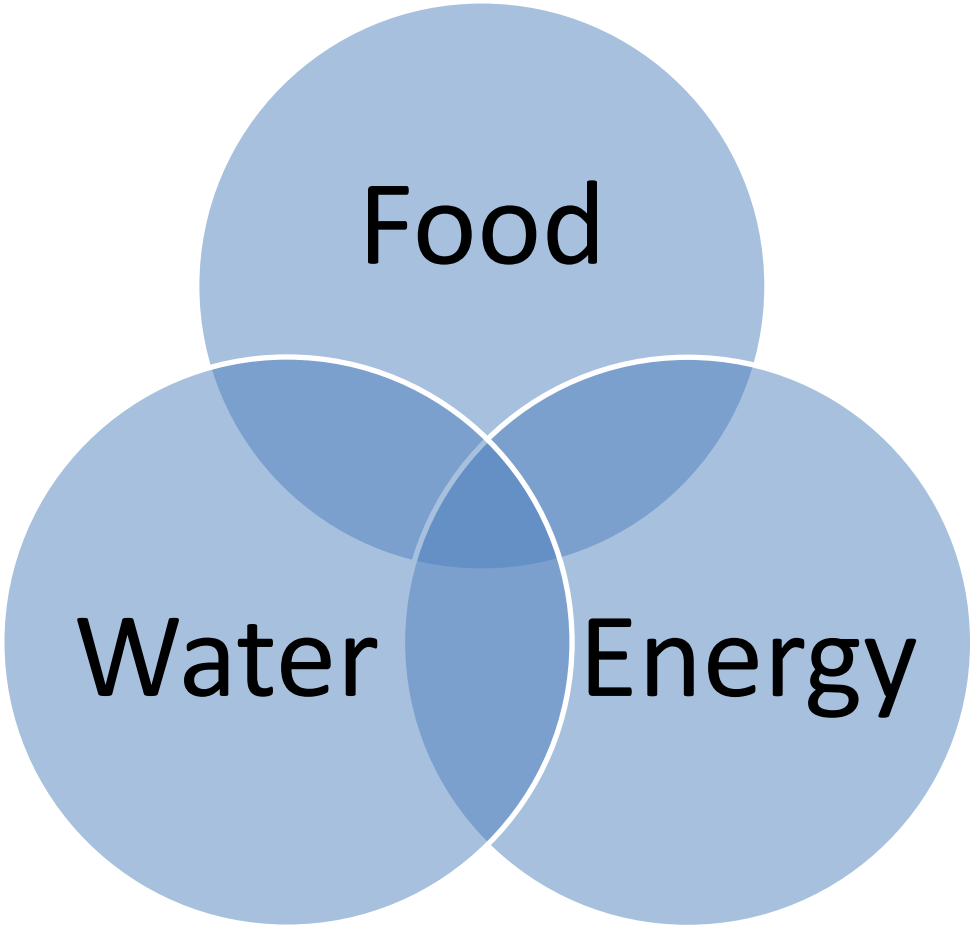
Challenge 14: How can scientific and technological breakthroughs be accelerated to improve the human condition?

Challenge 15: How can ethical considerations become more routinely incorporated into global decisions?

2 Billion *more* people in 38 years

- We have to dramatically change:
  - Food production and distribution systems
  - Water management, use, and production
  - Base load electricity for the world
- Addressing all this will be a great area for investments and job growth
- Greater wealth per capita (Internet means of production)
- Most (1.7 billion) in low-income urban Asia
- 1900 Total population of the earth was less
- Aging population
- Live expectance at birth 68 & Longevity Research

Prices are going up…



We have change each to avoid global instability

High Food Prices – Long-Term

1. population growth
2. rising affluence especially India & China
3. diversion of corn for biofuels
4. soil erosion
5. aquifer depletion
6. the loss of cropland
7. falling water tables and water pollution
8. Increasing fertilizer costs (high oil prices)
9. Market speculation
10. diversion of water from rural to urban
11. Increasing meat consumption
12. global food reserves at 25-year lows
13. climate change
    13) Increasing droughts
    14) Increasing flooding
    15) Melting mountain glaciers reducing water flows
    16) And eventually saltwater invading crop lands

UN World Water Scenarios 2012 – 2035

- UNESCO is leading the production of the World Water Development Report
- One chapter will be on water scenarios
- The Millennium Project produced the back ground papers on water drivers from culture to technology

United Nations Educational, Scientific and Cultural Organization

World Water Assessment Programme

UN WATER

:

Drivers researched

- Climate change & variability
- Water resources, including groundwater & ecosystems
- Demography
- Governance & institutions (includes the right to water)*
- Technology*
- Economy & Security*
- Ethics, society & culture* (includes questions of equity)
- Agriculture*
- Infrastructure
- Politics*

*=*R.T. Delphi*

The relevance of these drivers will vary in different regions of the world.

Three scenarios:

Under **business as usual** limited investments would continue in irrigation infrastructure, limiting water scarcity but resulting in food scarcities; global deficit of 200 million tons.

Under **economy and technology** scenario investments in water infrastructure would increase available water supply, but in India and China result in water scarcity because of over withdrawal for irrigation. OECD and higher-income developing countries would produce but many other countries would still face economic scarcity, suffer significant food shortages. Overall surplus 70 million tons.

Values and Lifestyles Slowing population growth and improving their agricultural practices, low-income countries would become more productive while protecting the environment. Both water and food deficits would be reduced in low-income countries.

A rapidly changing world poses threats, offers opportunities

- **Climate change is now a fact – and will continue**

- **Water-related technology:**
  - **Continual refinement of GIS with ability for real-time monitoring of agricultural crops and water quality and quantity**
  - **Information technology permitting a global collective intelligence system, hopefully public, to facilitate knowledge management and decision-making**
  - **Nanotechnology to replace current water sensors, water purification and desalination**
  - **Biotechnology to grow food plants, biofuels and trees using saline or brackish water and to increase the yield, disease and drought resistance of crops**
  - **Seawater-based food and biomass, including algal production**
  - **Plant-based meat substitutes and (in vitro) cultured meat**

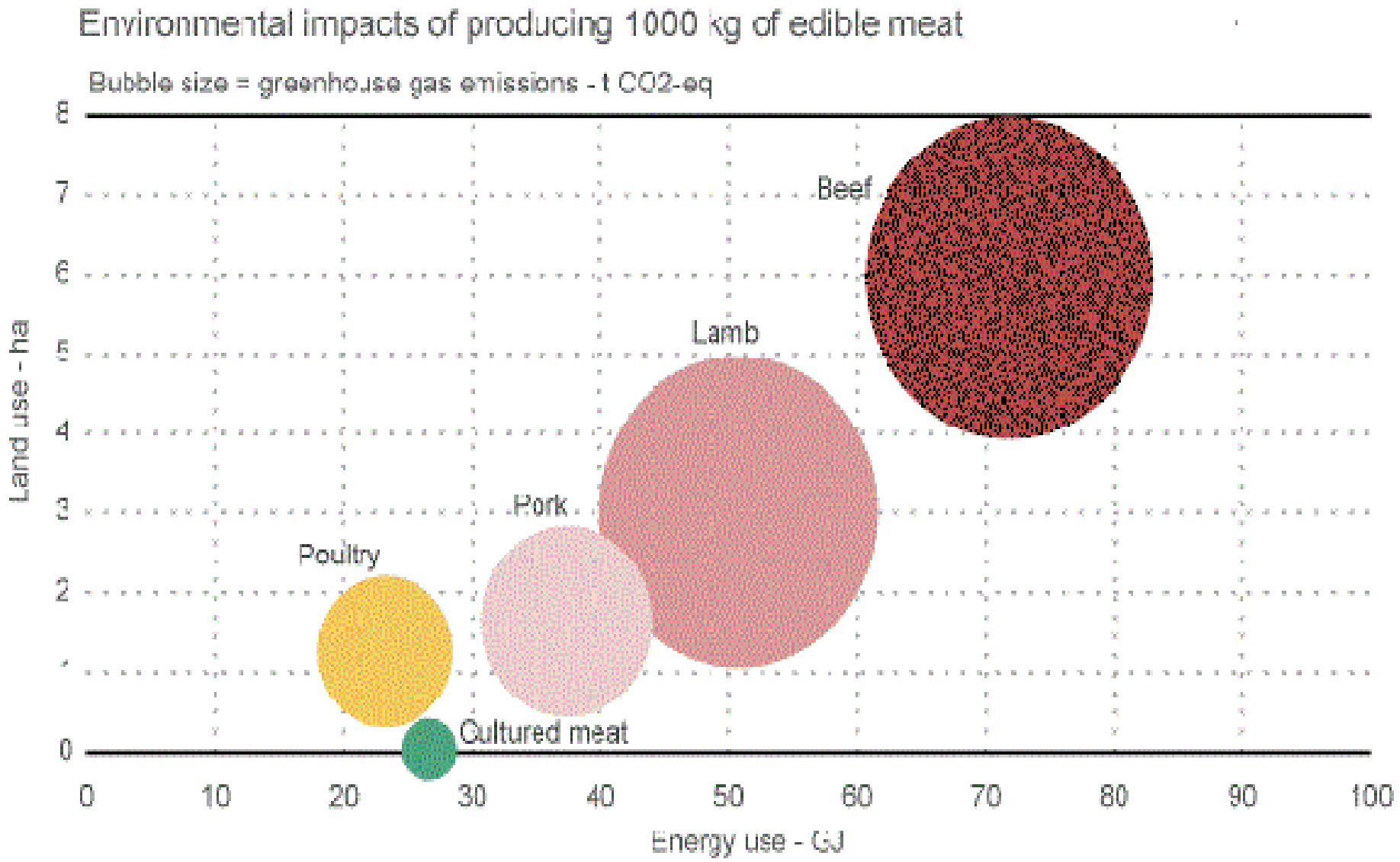
Water Situation

- Water tables are falling on every continent; Over 40% of the world gets its water from water sheds controlled by two or more countries; Glacial water diminishing; peak fossil water
- Water needed for an additional 2+ billion people in just 38 years (2050)
- About 884 million people don’t have access to clean water
- FAO estimates that by 2030 water requirements may increase by 60% to feed the growing world population.
- Energy demand may increase 50% in 20 years, which will increase water demands for cooling towers of coal, gas, and nuclear power.
- By 2025, water scarcity could affect 3 billion people due to climate change, population growth, and increasing demand for water/capita

Save Water by Growing Pure Meat without Growing Animals

- The majority of agricultural use of water is to grow animals
- Global demand for meat up 50% by 2025 and may double by 2050
- Could increase price of meat; lowering iron and protein for the poor
- To save water we should grow meat without growing animals
- One option is to take stem cells from the umbilical cord of cows, goats, and pigs and stimulate them to grow meat without growing the animals
- Another is to take muscle and fat tissue and stimulate them in nutritious mediums to rapidly reproduce
- Such meant could also include additional nutrition to make it healthier than cutting muscle tissue out of animals
- Saves energy, land, water, health costs, CO_2 and methane gas

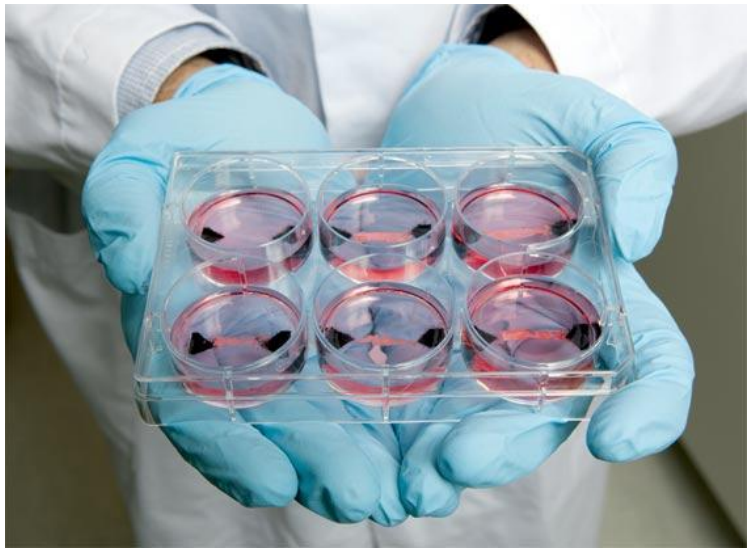
Cultured meat - what's at stake



Graph by Hanna Tuomist

Article by Michael Mountain November 17, 2011 in Zoenature.org

Pure Meat by Dr Mark Post at Maastricht University, the Netherlands



- Winston Churchill in Strand Magazine (1931): one day we will “escape the absurdity of growing a whole chicken in order to eat the breast or wing”.
- First Patent in 1999 Willem van Eelen, a Dutch doctor High quality global journalism requires investment. Please share this article with others using the link below, do not cut & paste the article. See our Ts&Cs and Copyright Policy for more detail. Email ftsales.support@ft.com to buy additional rights. http://www.ft.com/cms/s/2/87bf2654-89b3-11e1-85af-00144feab49a.html#ixzz1sn8ausF3
- Financial Times (April 20, 2012): Environmental Science & Technology journal (July 2011) article “found that lab meat can produce up to 96% lower greenhouse gas emissions than its conventional equivalent. Scientists at the universities of Oxford and Amsterdam found it would also take between 7 per cent and 45 per cent less energy to produce than the same volume of pork, sheep or beef, as well as requiring 99% less land use.
- It costs the US $50 billion per year in food-borne illness , much related from meat from animals.

Save Fresh Water with Sea Water Agriculture

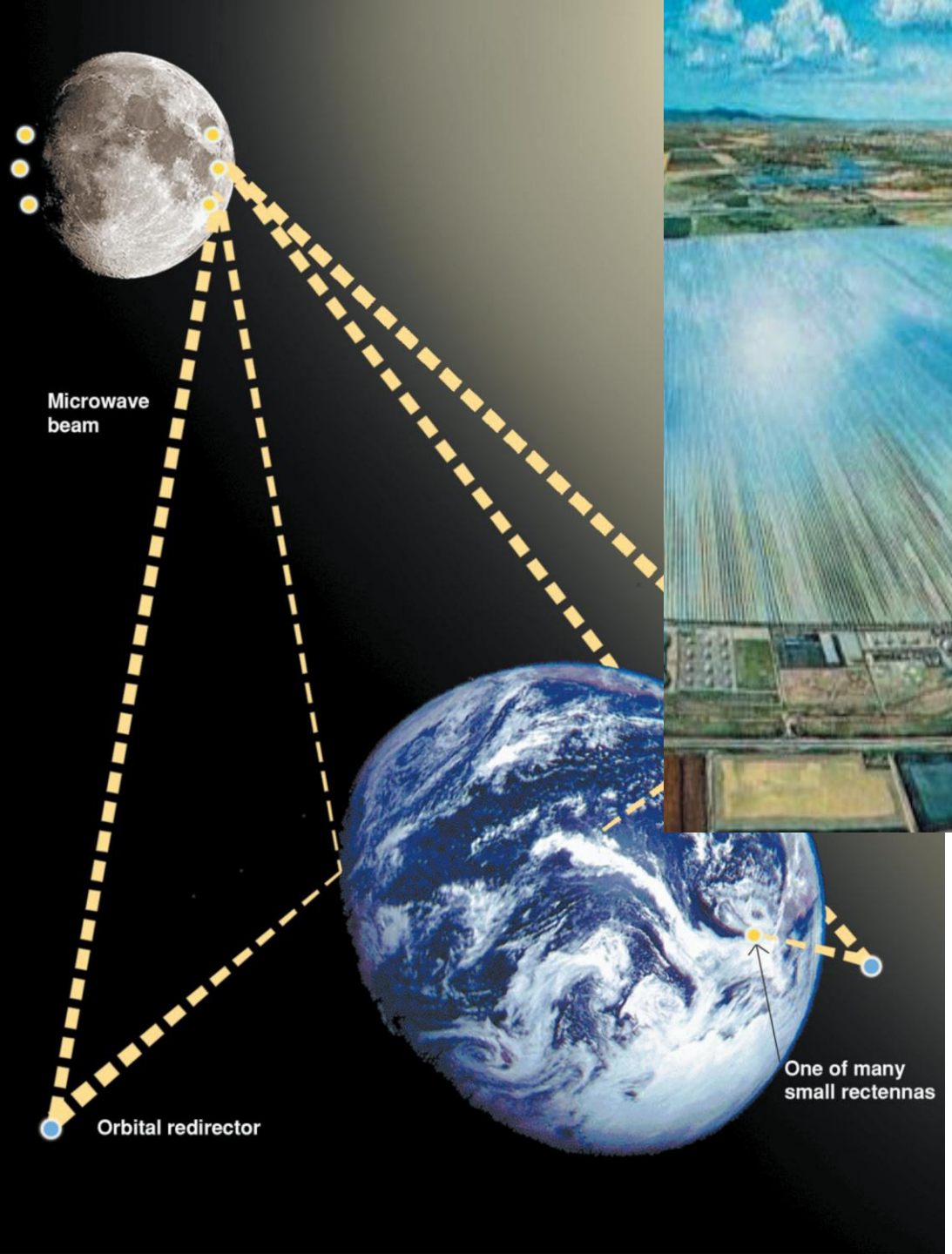
- 10,000 flora species can live on salt water
- 100 in commercial trials
- Tropical desert coastlines - Plant hundreds of miles long areas
  - Food for humans and animals
  - Biofuels
  - Pulp for paper product industries
  - Reduces fresh water drain for agriculture
  - Raises water tables
  - Absorbs Carbon Dioxide
- New source of income for poorer regions of the world

Salt Water Agriculture: Saves Water, Captures Carbon, produces food/fuel

Solar Energy/Saltwater Agriculture

Save Water with Space Solar Power Satellites

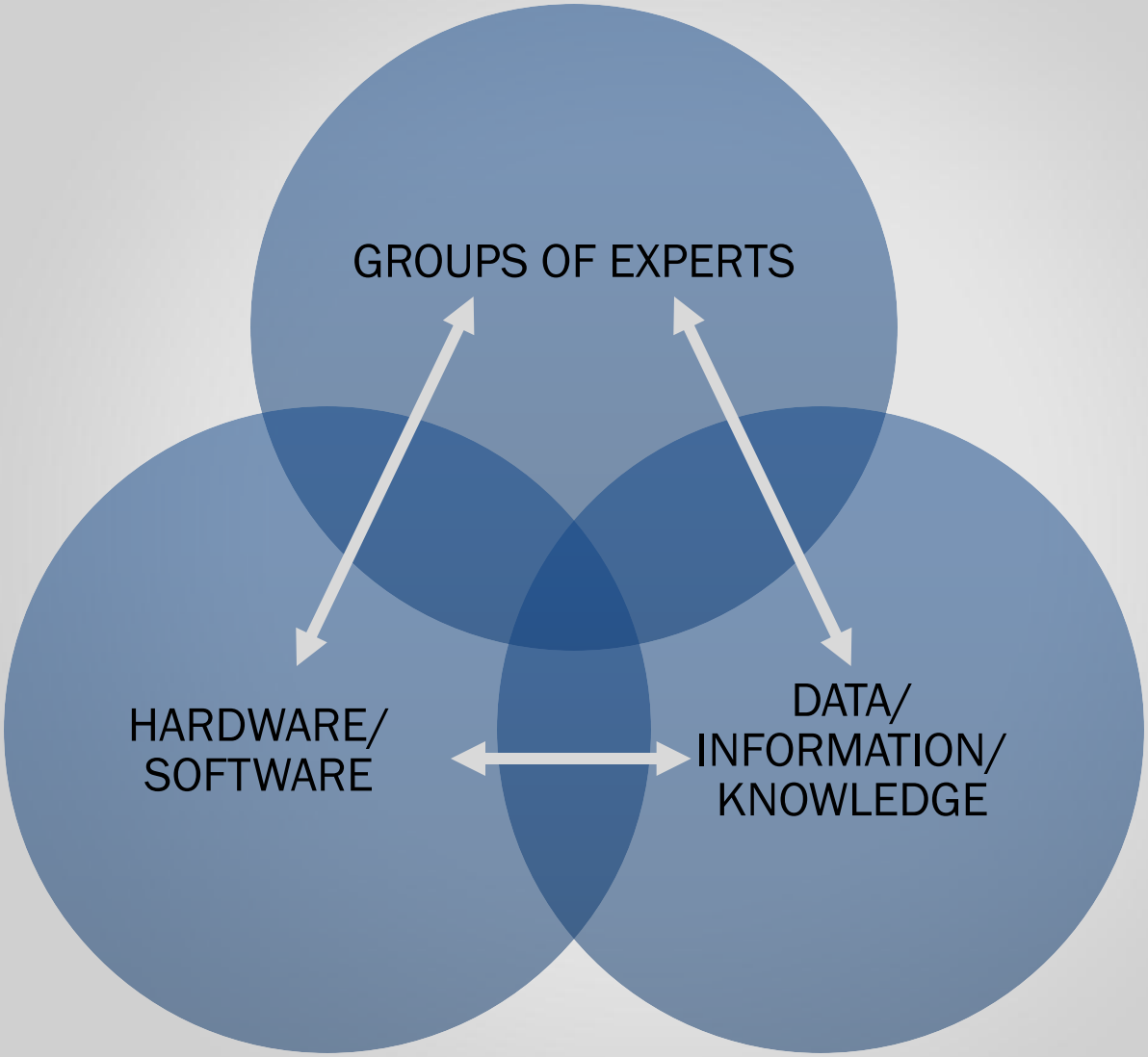
- Cooling towers of coal, gas, and nuclear power plants use vast quantities of water
- Water demand for energy production could double
- Space solar power pants in orbit require no cooling towers
- Global warming is reducing mountain/glacial sources for water
- Using Space Solar Satellites as a major supply of the world's base load electricity would help reduce global warming and water demand
- Japan (2030) and China (2040) have declared they will build a solar power satellite system to beam energy to electric grids on the earth.
- Space solar satellites offer the possibility of producing abundant electricity without greenhouse gases or nuclear waste.


Microwave beam
Orbital redirector
One of many small rectennas

Global Water Collective Intelligence

- It is an emergent property
- from synergies among
  - data/info/knowledge
  - software/hardware
  - experts
- that continually learns from feedback
- to produce (nearly) just in time knowledge for better decisions
- than these elements acting alone.

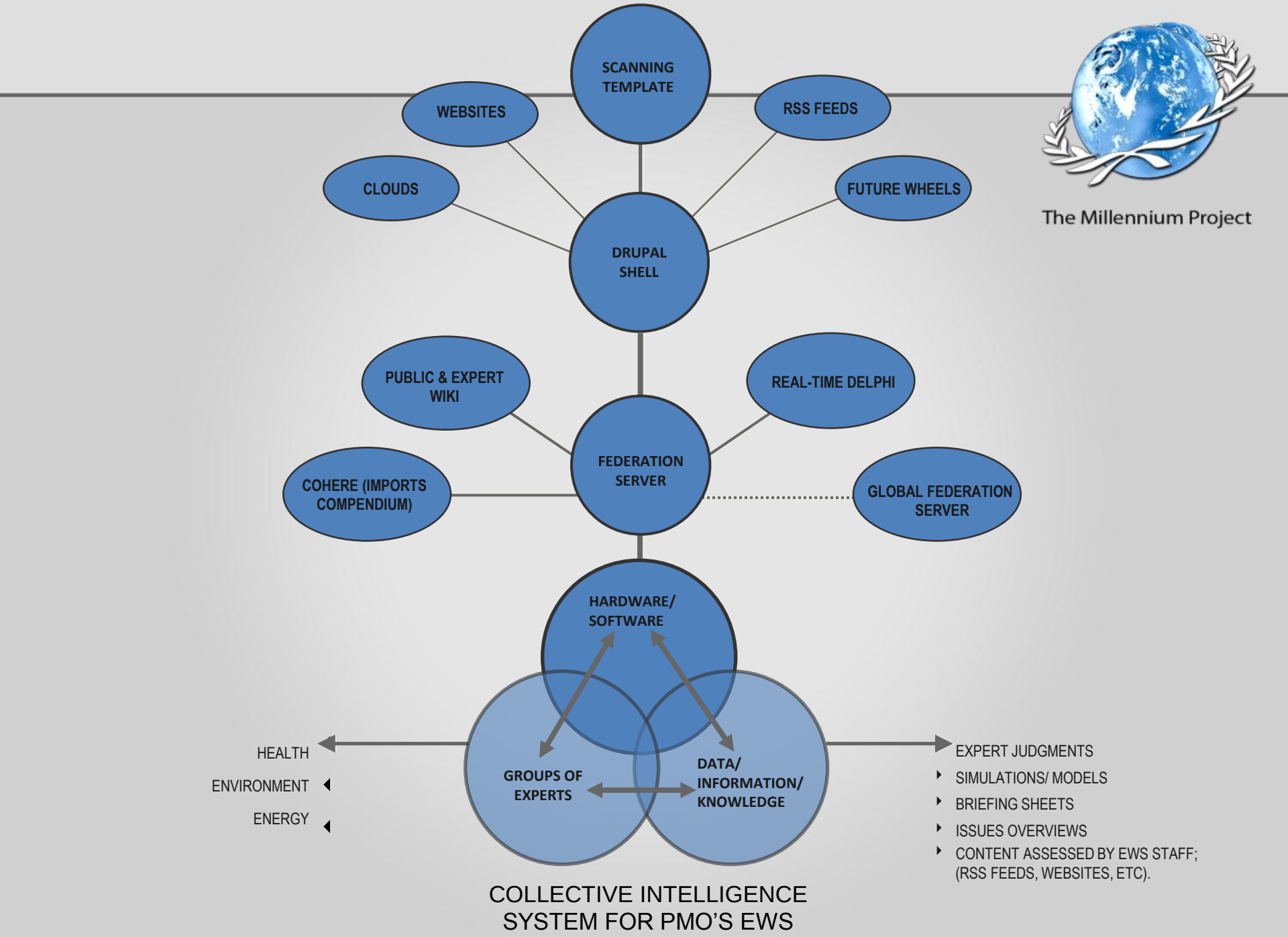
Each can change the other



COLLECTIVE INTELLIGENCE

Why Collective Intelligence?

- The velocity, volume, and complexity of change and challenges are increasing exponentially
- The data, information, knowledge, intelligence explosion is accelerating
- Local issues depend on global developments
- Our work shows that humanity has the knowledge to address the challenges ahead.
- Will we use that knowledge to make decisions necessary?
- We believe collective intelligence can help



The Millennium Project

COLLECTIVE INTELLIGENCE SYSTEM FOR PMO'S EWS

Global Futures CIS

- Interoperable, Searchable, Editable
- For each of the 15 Global Challenges
  - Expert Discussion Groups
  - Bookmarklet scanning system
  - Use of RSS News Feeds Aggregator
  - Key web resources
  - Situation Chart to update and improve
  - Short and Long text to update and Improve
  - Related computer models
- Futures Research Methodology
  - 39 Chapters with groups to update and improve
- All previous MP research
- Software (Models, Delphi, Futures Wheel, SOFI, Papers, briefings, Video)

On-Line Demonstration

- If any problems, then the following slides can be used.
- If the online connection is ok, the then the next four would be skiped

Challenge 1: Sustainable Development and Climate Change

How can sustainable development be achieved for all while addressing global climate change?

Current Situation

- PPM Atmospheric CO2
- Country Pledges
- Ocean Levels
- Forecasts temp changes
- Fossil Fuel Subsidies
- Ocean Acidity

Desired Situation

- 350-450 PPM Atmospheric CO2
- Required country targets
- Reduced Mountain Ice Melting rate
- Plausible desirable temp change

Policies To Address The Gap

- US-China 10-Year SD Goal with NASA-Like R&D Program
- Carbon Tax
- Cap and Trade
- Import Tax

Green Growth Technologies To Address The Gap

- Altemative Energy
- Altemative Agriculture
- Improved Standards

Adaptation To Address The Forecasts

- Resilience Teams
- Migration policies
- Coastal Evacuation Plans
- Work/Lifestyle Changes

Challenge 1: Sustainable Development and Climate Change

Add New Element | Edit Content | Reorder

Current Situation

- PPM Atmospheric CO2

391.07 ppm

Atmospheric CO2 for September 2012

Preliminary data released October 1, 2012

(Mauna Loa Observatory: Scripps Institution of Oceanography)

CO2Data Set CO2Data Set	Original data file posted M Original data file posted M
Measuring Location:	Mauna Loa Observatory, H
Why is CO2significant?	Carbon dioxide (CO2) is th causes global warming an moment to solve these gl as the monthly updates fc
What is the current trend?	The concentrations of CO2 decade to decade. acceler consistent with a continua
What level is safe?	The upper safety limit for CO2levels have stayed hig

- Country Pledges
  - Africa

Policies To Address The Gap

- Carbon Tax
- Cap and Trade
- Import Tax

Green Growth Technologies To Address The Gap

- Alternative Energy
- Alternative Agriculture
- Improved Standards

Adaptation To Address The Forecasts

- Resilience Teams
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n 1996 after a three-year feasibility study with the United Nations University, Smithsonian Institution, Futures Group Internation
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nt and climate Change | 2. Clean Water | 3. Population and Resources | 4. Democratization

Perspectives | 6. Global Convergence of IT | 7. Rich-poor Gap | 8. Health Issues

9. Capacity to Decide | 10. Peace and Conflict | 11. Status of Women | 12. Transnational Organized Crime

13. Energy | 14. Science and Technology | 15. Global Ethics

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1. Sustainable Development and climate Change
2. Clean Water
3. Population and Resources
4. Democratization
5. Long-term Perspectives
6. Global Convergence of IT
7. Rich-poor Gap
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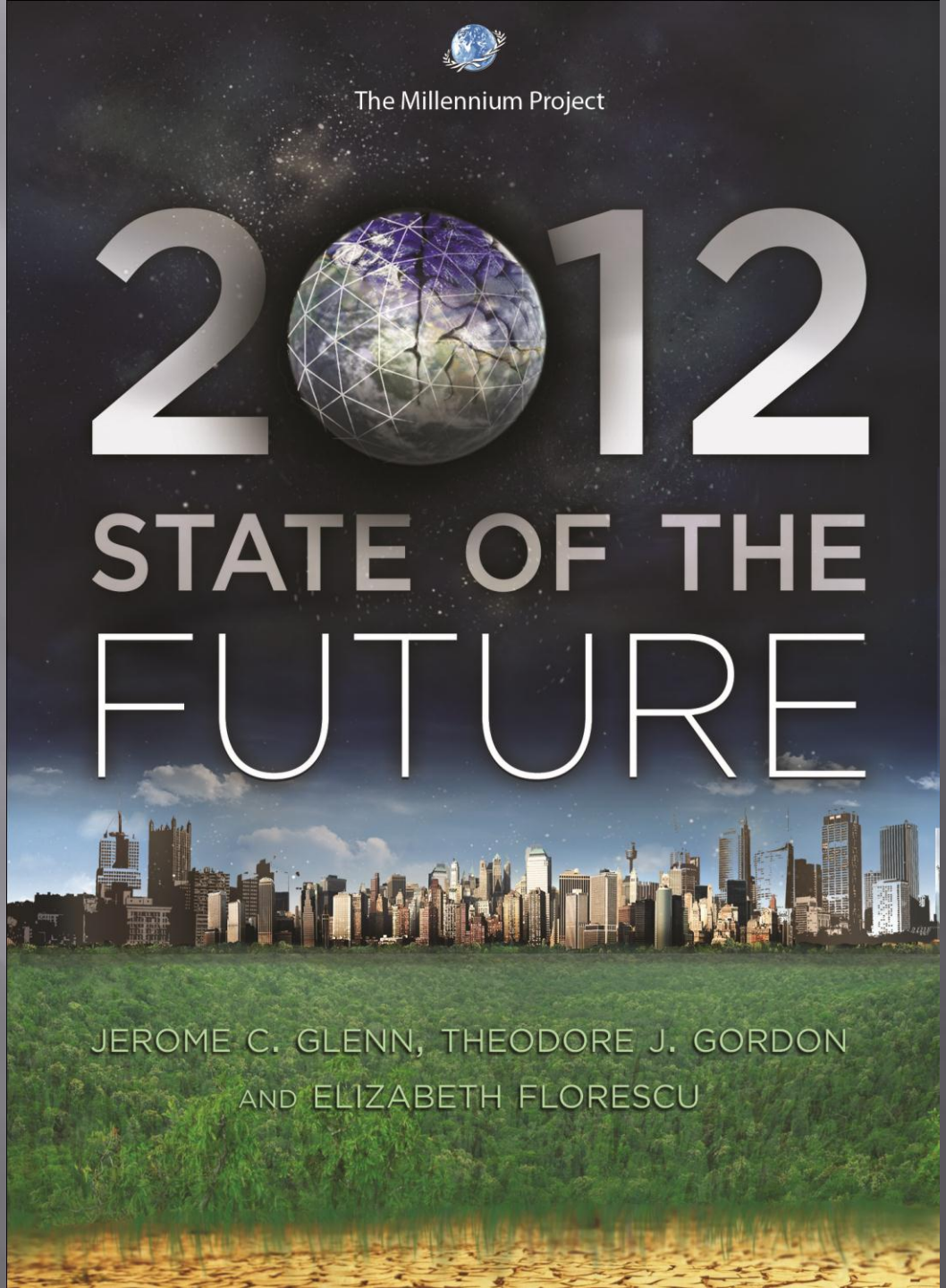
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JEROME C. GLENN, THEODORE J. GORDON
AND ELIZABETH FLORESCU

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