

4th BESSG/BESAB Meeting , March 9, 2015, Hamburg



Future of international science

Deliang Chen

Department of Earth Sciences

University of Gothenburg, Sweden

<http://rcg.gvc.gu.se/dc>

Acknowledgement: ICSU and AAAS

Outline

- What is foresight?
- An foresight from ICSU- four exploratory scenarios
- Evolving context for society and science dialogues

Foresight

- Various approaches for thinking about the future (e.g. **scenarios**, Delphi, etc.)
- A **participatory** process with the objective to:
 - achieve a better **common understanding** of the **desirable and feasible visions** of the future,
 - bring together and network different stakeholders involved in their implementation

ICSU Foresight: International Science in 2031

4 Exploratory Scenarios

The ICSU process and approach

A **consultative** process to:

- Describe the **present landscape** for international science
- Identify **drivers** of international science
- Develop **exploratory scenarios**
- Develop a **Success Scenario**

Why a scenario approach?

- Tool for ordering perceptions about alternative future environments in which decisions are played out
- Storylines to stimulate creative thinking on future actions

What factors influence international science?

- **Megatrends:** those factors whose future trends are reasonable clear
- **Key Drivers:** those factors whose direction and evolution is very uncertain

Megatrends

- Demography
- Natural resource availability
- Global environmental change
- Human health and well being
- Technological change
- Enabling information technologies

Key Drivers

- State sovereignty, regionalism and globalism
- Science and Society
- Global science agendas and arenas
- Epistemic organisation of science
- Values, beliefs, ethics
- Scientific integrity and self regulation
- Spatial organisation
- Private sector/military science
- States and markets
- International collaborative research infrastructures
- Nature of the scientific record
- Science education and careers

The Triumph of Globalism

Scenario 1: Global and Engaged with society



← **Global**

interest

Science for sale in a global market place

Scenario 3: Global and Detached from society



↑ **Engaged**
science
outlook
Detached ↓

Science Supplying National Needs

Scenario 2: National and Engaged with society



states

National →

Rise of Aggressive Nationalism

Scenario 4: National and Detached from society



The Triumph of Globalism

Scenario 1: Global and Engaged with society

A single strong organisation representing the independent voice of global science

Globally coordinated strategic research

Global Governance has received new lifeblood

Global networks of decentral research facilities

More interdisciplinarity at the expense of disciplinary research; integration of natural and social sciences

Activist scientists



Greater mobility of scientists

Increased external regulation of science

Less curiosity-driven research opportunities

Science Supplying National Needs

Scenario 2: National and Engaged with society

After a series of major global economic crisis, nations have adopted an order of self-sufficiency: focus on local sustainability

Science socially embedded

Different national science strategies

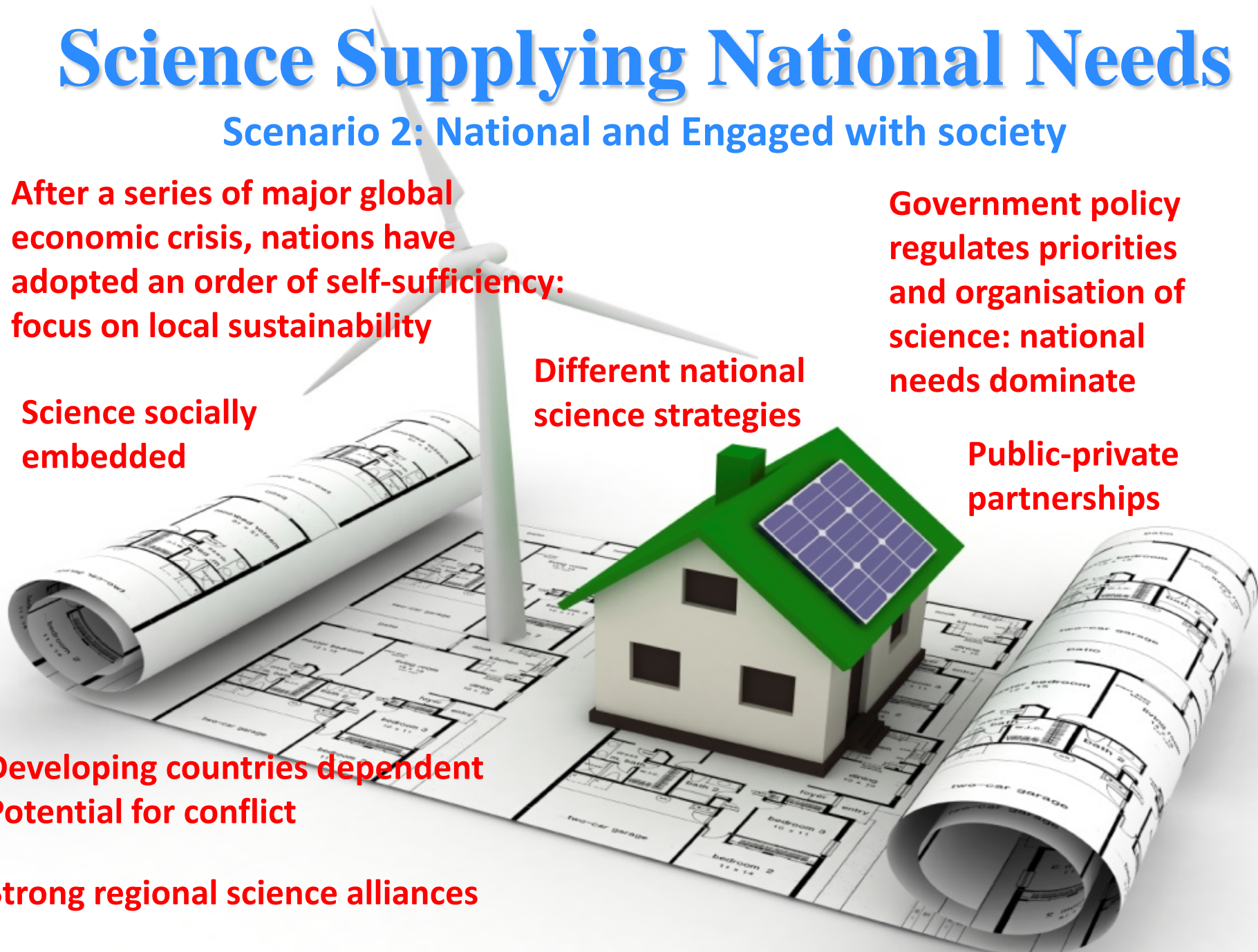
Government policy regulates priorities and organisation of science: national needs dominate

Public-private partnerships

Developing countries dependent
Potential for conflict

Strong regional science alliances

Less curiosity-driven research opportunities



Science for sale in a global market place

Scenario 3: Global and Detached from society

Converging technologies and medical sciences new frontiers of science

New multinational companies drive fast globalization

Detachment from society
Public trust in science declines

Science informs policy, but decisions not driven by science

Global universities

Global governance structures dominated by business

Countries have specialized in particular fields of research

Countries have increasingly specialized in supplying only certain products to global markets and by doing so become more dependent on the global system

Science gained independence through new breakthroughs
More curiosity-driven research

Rise of Aggressive Nationalism



Scenario 4: National and Detached from society

Strong competition between nations and a power struggle for global leadership

**Greatest potential for conflict and for harmful use of knowledge
Military science**

Less developed countries are isolated

Trust in international assessments and predictions has eroded

Nodes of strong national science

**Culture of secrecy
Parallel research efforts**

**Decline in researcher mobility
Growing education divide**

International governance of science dominated by economic powers

National languages promoted for scientific communication

The overall societal context for science is set by

- Issues within science itself
- Government regulations, priorities and funding
- How the public relates to science

Advances in science are coming at a very rapid pace, in part because

- “Big science” has spread into new fields
- Increasing inter-dependency of sciences
- Advances in science are being fueled by advances in technology

At the same time, issues/events within science are damaging the science-society relationship

- Incidents of scientific misconduct
- Human subjects concerns
- Animal welfare issues
- Conflict of interest problems
- **Premature publicity**
 - “Publishing by press release”

In Europe, the overall view of science has deteriorated:

- In 2005, 52% of people felt benefits of science outweighed its risks vs. 61% in 1992
 - That's almost 20 percentage points below the US.

Historically, science and technology have been evaluated primarily on the basis of their **costs/risks and benefits.**

Now, **values** are being overlaid onto “simple” risk/benefit calculations...

Overlay of values is having serious consequences for the whole science-society relationship

- Society wants to influence science
 - Rather than just the reverse
- Creating a growing divide between science and the rest of society

Causes of the “Great Divide”

- Encroachment on/of values
- Misunderstandings about the word “*theory*”
 - “*Theory*” has different meaning to scientists and lay persons
- Media insistence on presenting “both sides” of every story
- Science’s assumption that scientific illiteracy is the major obstacle

What can we do?

- Continue protesting/lamenting the situation
- Engage with the public on the issue
 - Try to find common ground

What not to do: the traditional approach

- A large forum dominated by extreme advocates on both sides
 - Beware evangelical atheists!
 - Never debate an ideologue!
- A pontificating jargon-laden lecture by elites

Ruth Wooden, RIA 2004

We need to hear from the public about:

- Their concerns about science and technology and their concomitants
 - Risks and benefits
 - Encroachment on human values
- Their priorities among research areas
- Questions they would like/need us to answer
 - Help frame the research agenda

How should scientists behave in this dialogue?

- Scientists must stick to the facts
 - Do not express your personal values
- Do not go outside your specific area of expertise
- Find easily understood ways to connote your meaning
 - No jargon, no nuances
- Never violate the data
- Listen!