



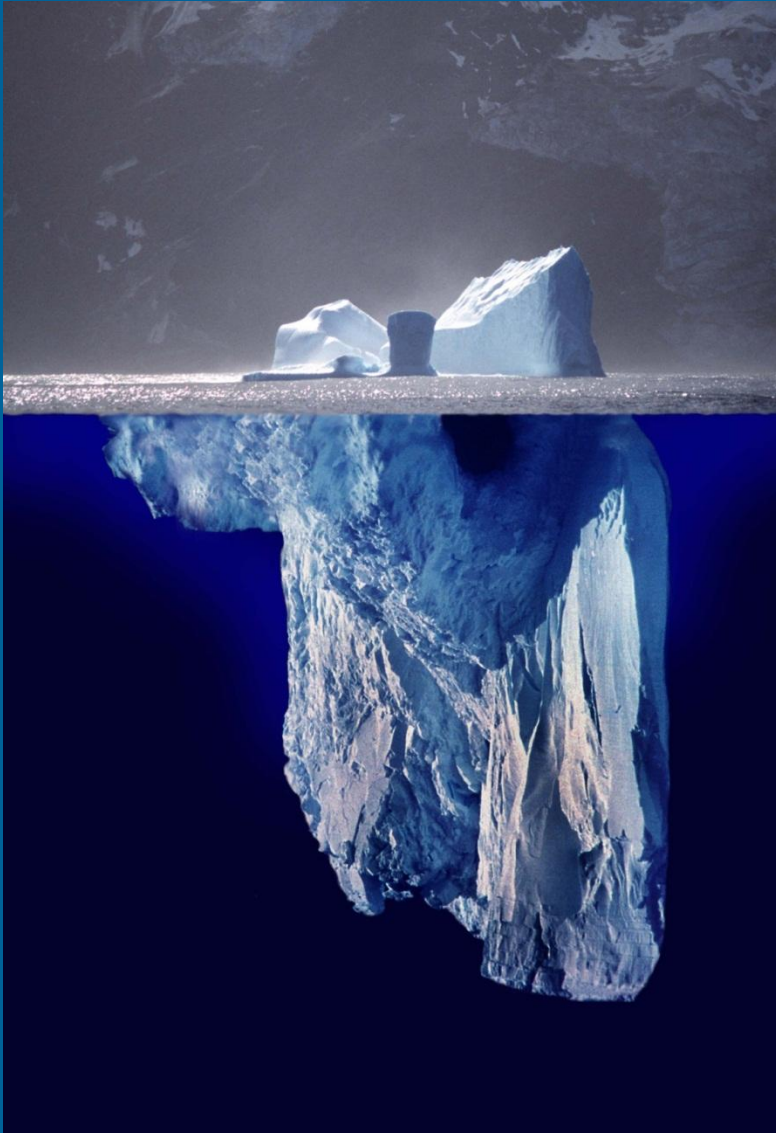
# GLOBAL PERSPECTIVES ON MARINE BIOTECHNOLOGY S&T POLICY

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# Marine Biotechnology: the tip of the iceberg



- The number of predicted ocean species is about 10 times higher than the number of catalogued species (200,000).
- How many more are there if we include meiofauna (animals < 0.5 mm), micro-organisms and bacteria?
- Over 1600 new marine species discovered every year
- Our knowledge of marine biodiversity is minute

*Mora et al. (2011). PLoS Biol 9(8): e1001127.  
doi:10.1371/journal.pbio.1001127*

*Pawlowski (2012). OECD Marine Biotechnology  
Workshop, Vancouver, May 2012.*



# What is Marine Biotechnology?

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## OECD Definition

Marine biotechnology can be thought of as the use of marine bioresources as the *target or source* of biotechnological applications



# Promise of Marine Biotechnology

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Much needed new source of innovation and economic growth in many countries ..... viewed as a way to address global grand challenges:

- Pursuing human **health** and well-being
- Offering a sustainable supply of high-quality **food**
- Developing sustainable sources of **energy** alternatives to crude oil and gas
- Providing new **industrial products and processes** with lower GHG emission

but needing .....

- **Protection and management** of the already stressed marine environment



# Promise of Marine Biotechnology .....

..... may be driven by scientific and technological advances.....



.....but the promise can only be realised through sound policy and investment.



## Responsible Development through Policy

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« The bioeconomy offers technological solutions for many challenges facing the world ... achieving its potential will require appropriate national, regional and, in some cases, global policies »

OECD: The Bioeconomy to 2030: designing a policy agenda



# Responsible Development of Marine Biotech

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## **Organism-based Technology**

- Bioprospecting
- Marine genome sequence and bioinformatics
- Metagenomics and other omics technologies

## **New Materials**

- Drug discovery
- Industrial materials
- Health supplements, nutraceuticals
- Biofuels and bioenergy
- Biorefining

## **Marine organism production**

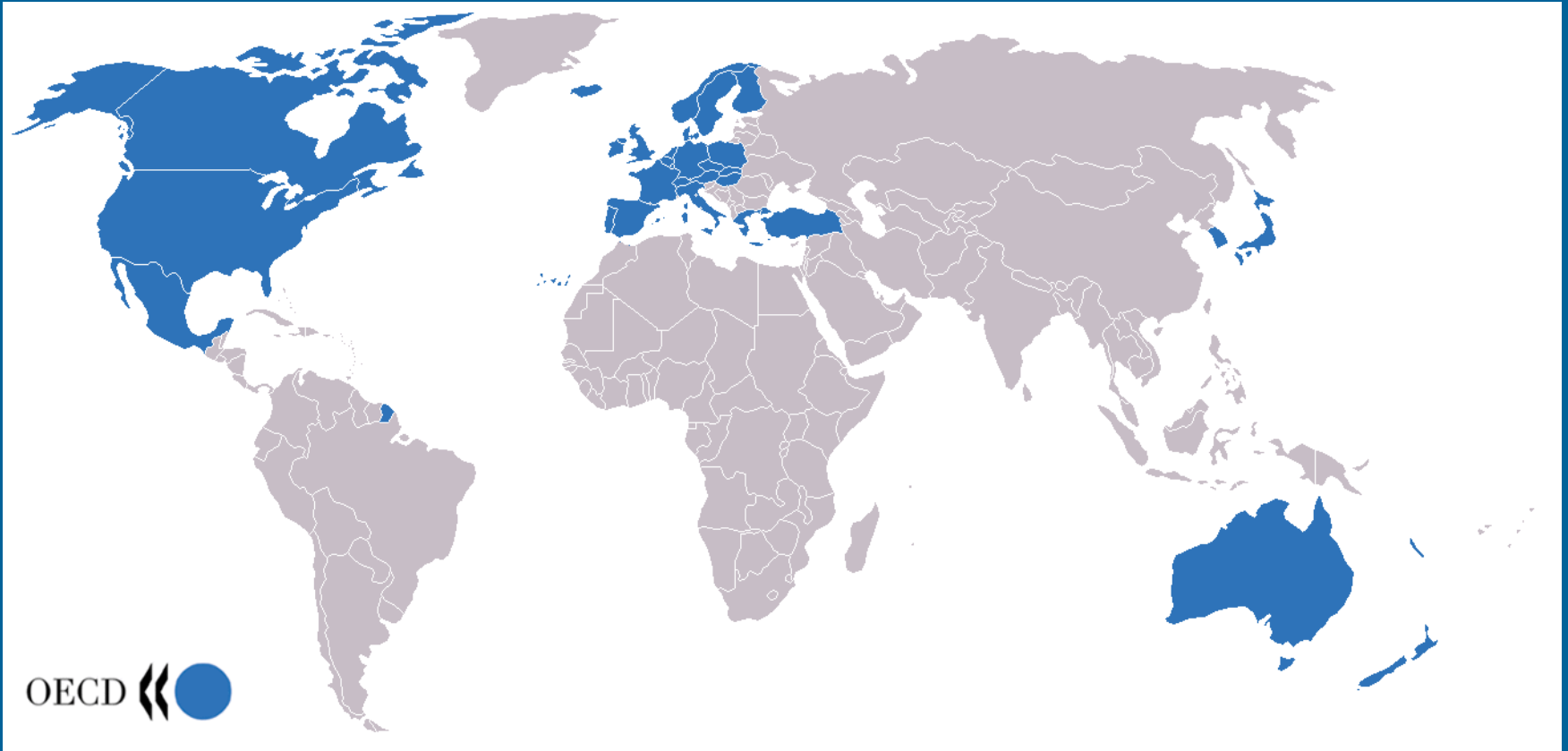
- Organism cultivation and collection
- Disease control and monitoring
- Marine biosafety
- Mass production e.g. seaweeds

## **Marine conservation**

- Monitoring environmental change
- Pollution prevention and control
- Biodiversity conservation and ecosystem recovery



# OECD: an inter-governmental organisation



- Founded 1960, currently 34 members
- Represents the most industrialised nations
- [www.oecd.org](http://www.oecd.org)

OECD works co-operatively on trade, finance, agriculture, education, science policy, development, governance, statistics, nanotech, biotech...







# OECD Working Party on Biotechnology

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## Role of the WPB

- To advise upon emerging policy-relevant issues of science, technology, research and innovation related to biotechnology including, as appropriate, their social, ethical and economic implications.
- To assist Member Countries in understanding and managing the changing nature of research, development and innovation in the bio-related sciences.
- To take into account the global context of R&D in biotechnology, including issues such as the progression of climatic and environmental changes and the globalisation of human activities.



# OECD Global Forum on Biotechnology

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## Marine Biotechnology Enabling Solutions for Ocean Productivity and Sustainability

Vancouver, Canada, 30-31 May 2012

### Objectives:

- To review the potential of marine biotechnology
- To identify challenges to realising this potential
- To identify areas of focus for future policy work



## OECD Global Forum: Marine Biotechnology

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This international dialogue identified the need for future policy work at OECD level on:

- Measures and indicators for marine biotechnology
- Infrastructure for R&D for marine biotechnology
- Governance of marine bioresources and ecosystems

See upcoming OECD publication: “*Marine Biotechnology – Enabling Solutions for Ocean Productivity and Sustainability*”



## OECD publication: “*Marine Biotechnology*”

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### **My** key points from the report:

- Appreciating the vastness and diversity of the marine environment
- Marine as “target or source”
- Addressing the challenges of responsibly governing differing and distributed bioresources
- Needing to go beyond economics to societal and environmental issues
- Increasing/ broadening international collaboration in defining needs and options
- Learning from each other/ from other areas of science



## Next steps

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# Working Party on Biotechnology 2013-14

Supporting the sustainable development of marine biotechnology (policy project)

- I. policies for marine biotechnology infrastructure (e.g. for biobanks, databases, screening platforms) – mutual learning, PPPs, megaprojects; and
- II. statistics and indicators for marine biotechnology.



# Supporting sustainable development of MBT

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## I. Policies for MBT R&D infrastructure

- Examine how governments are making decisions about marine biotechnology infrastructure globally
- Draw on existing work e.g. ESFRI, ESF, globally
- Share experiences and identify good practice models
- Report on policies & good practices and identify future actions

## II. Statistics and indicators for MBT

- Initially gathering information about existing definitions and categorisations of marine biotechnology
- Work with OECD NESTI and others
- Report on existing work, develop definitions and categorisations to enable future data gathering and use



# Complementary OECD work

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## International Futures Programme work on *The Future of the Ocean Economy (to 2030)*

- Established sectors of the ocean economy (shipping, shipbuilding, fisheries, tourism, ports)
- Emerging sectors (energy, marine bio, cruise tourism, aquaculture, sea-bed mining, ocean monitoring...)
- Focus on potential sources of economic growth & employment creation, required scientific and technological breakthroughs, investment needs, funding and business models, skills, environmental implications, avenues for policy action.

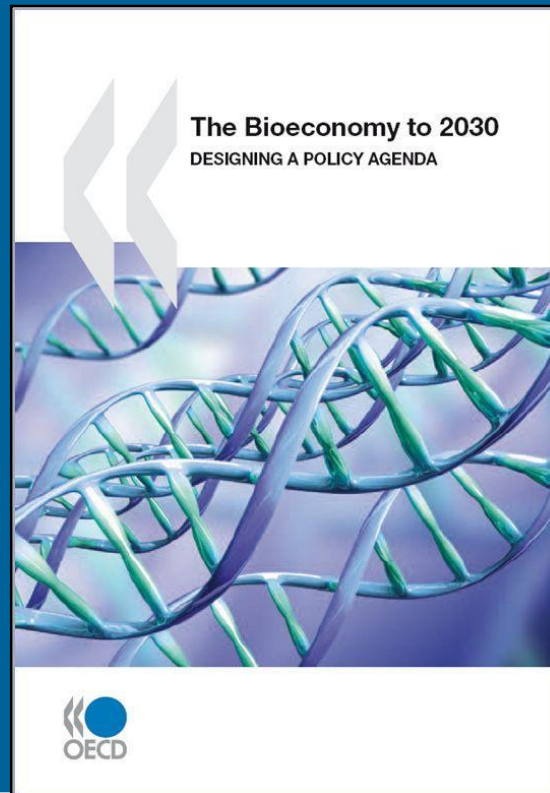
Contact: [pierre-alain.schieb@oecd.org](mailto:pierre-alain.schieb@oecd.org); [barrie.stevens@oecd.org](mailto:barrie.stevens@oecd.org)





# Some OECD reports and the web link

[www.oecd.org/sti/biotechnology](http://www.oecd.org/sti/biotechnology)





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With thanks to Rachael Ritchie and Jim Philp

THANK YOU FOR YOUR ATTENTION !