

# Growing a Sustainable Bioeconomy?

# Organisation for Economic Cooperation & Development

- International Organisation established by Treaty in 1960
- 30 member countries operating by consensus: US, Canada, Mexico; Japan, South Korea, Australia, New Zealand; Switzerland, UK, Germany, France, Italy, Spain, Portugal, Ireland, Luxembourg, Netherlands, Belgium, Denmark, Norway, Finland, Sweden, Iceland, Austria, Czech Republic, Poland, Hungary, Slovakia, Greece, Turkey. China, Russian Federation, Israel, South Africa are observers. CEC takes part.

# What Do We Do?

- (i) Collection & Analysis of Data**
- (ii) Provide a Forum for Broad Debate - *Stretch and Leverage***
- (iii) Address Issues Empirically**
- (iv) Agree international policy recommendations**
- (v) Develop best practice guidelines**

# Key Contributions (1)

## *Intellectual Property Rights*

*1982 Biotechnology IPR considerations*

*1992 IPRs and Genetic Resources*

*2002 IPRs and Genetic Inventions*

## *Regulation of Safety & Harmonisation*

*1986 “Blue Book” - Recombinant DNA Safety Considerations*

*Consensus Documents on Release of GMOs*

# Key Contributions (2)

## *International Policy Recommendations*

*Xenotransplantation*

*Genetic Testing*

*Biological Resource Centres*

## *International Tools*

*Statistics*

*Indicators*

*Assessments of sustainability/ Life Cycle*

# The Committee History

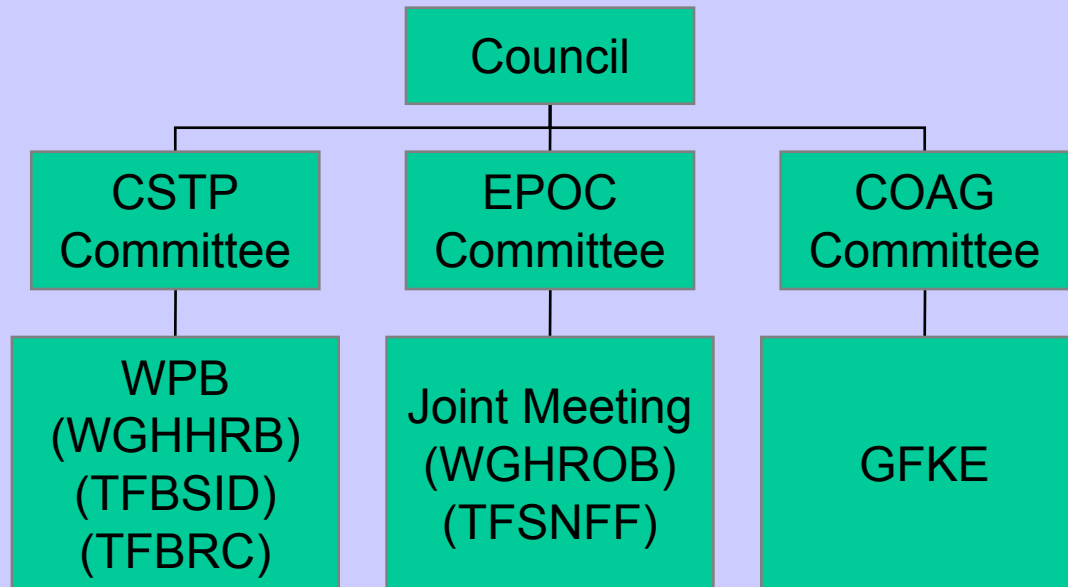
## Pre-92

- *Group of National Experts on Safety in Biotechnology*

## Post -92

- *Working Group on Harmonisation of Regulatory Oversight in Biotechnology*
- *Task Force for the Safety of Novel Foods and Feeds*
- *Working Party on Biotechnology*

# Biotechnology by Committee



# OECD Working Party on Biotechnology

## *Mission*

*Create international conditions to ensure that the opportunities offered by biotechnology can contribute safely to:*

- (i) Sustainable economic growth*
- (ii) Security of economies and populations*
- (iii) Equitable Globalisation*

# **Agro-Food Biotech GM Crops & Foods**

- **Harmonised principles**
- **mutual acceptance of data**
- **no public consensus**
- **no political consensus**
- **intra-OECD tension**

# Human Health - Key Areas

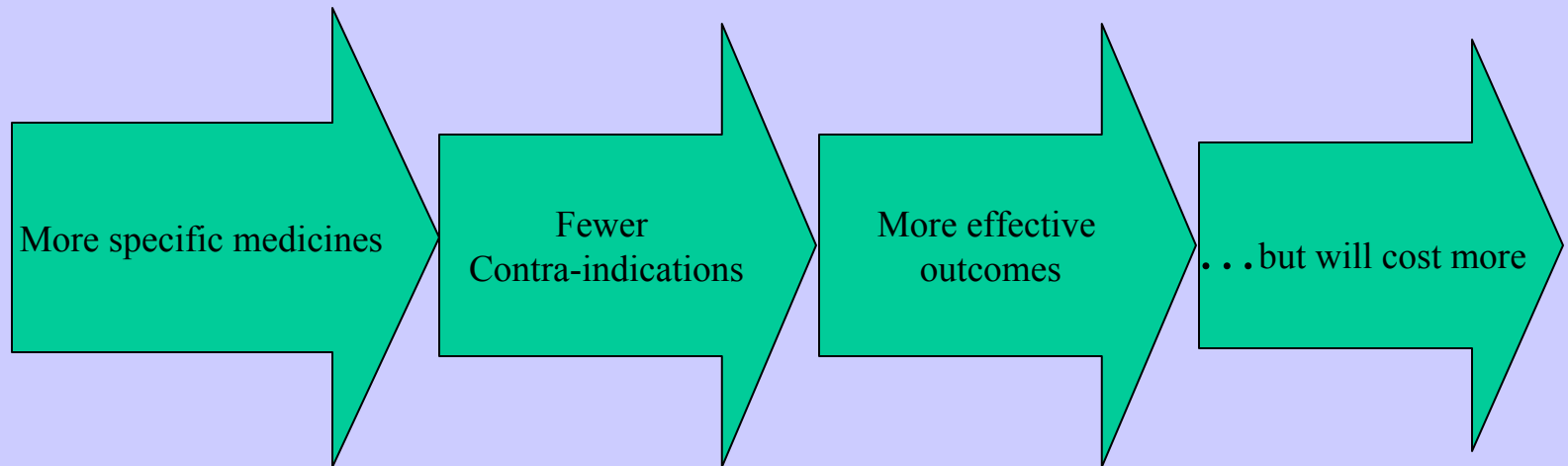
Genetic Testing & Data - Quality Assurance and Proficiency; IPRs & Clinical Access to Technology; Paying for Technology; Impact on privacy and security.

Infectious diseases - potential of biotech to detect, diagnose, monitor and treat; technology blocks; overcoming market failure; public/ private mix.

Water - detection methodologies. Surveillance, communication, risk triggers and management. Drinking water security.

# Pharmacogenetics

The vision.....



# 4 Key Areas in Health

Technology Assessment - How do you assess new and emerging health technologies so that health systems pick up the winners AND encourages innovation? How do you integrate such health technology assessments within a health care system? What works and what doesn't? Share experiences and look for elements of best practice.

# **Health Technology Assessment**

## *Some Challenges*

- **value of genetic testing**
- **assessing pharmacogenetics**
- **addressing uncertainty (data and investment)**
- **capturing and diffusing innovation for better outcomes**
- **transferability of data**
- **ensuring equity of access**
- **framework of analysis.....**

# Intellectual Property Rights

**Patents and licensing of genetic inventions - empirical analysis of impact of system on access to technology.**

**Best Practice guidelines for licensing genetic tests.**

**Economic & Social Impact of biotechnology patents.**

# Berlin, January 2002

- **Consider new empirical evidence on licensing practices for genetic inventions**
- **Debate benefits and costs of patenting and licensing practices and their impacts on the research process, new product development, clinical use.**
- **Assess whether present system of protection is working in the broad public interest and avoiding potential “breakdowns”.**

# Towards Best Practice

- **Perception of problems offering patented genetic tests**
- **reasons unclear - costs, access, awareness, expertise -- survey of testing laboratories**
- **experts develop general principles for best licensing practice.**
- **Validate with users**
- **Involve WTO (TRIPs)**
- **24 months**

# Economic and Social Impacts

- **Biotechnology patents - define scope**
- **develop proposed methodology**
- **OECD patent database**
- **economic and social indicators**
- **longer term project**

# Infrastructure

**Biological Resource Centres - develop system of accreditation for global network. Task Force on Biological Resource Centres.**

**Privacy and Security of Data - workshop on development of and access to research databases of genetic information - access, use, best practice.**

# Biological Resource Centres

- **BRCs as full service providers. Taxonomy, MTAs, IPRs, well described and high quality. Forward looking, not museums.**
- **develop system of accreditation and certification for global network. Broad scope (microbe, plant, animal, human), focus on quality and access. Distributed network - burden sharing.**
- **international standards on quality, access & security, information networking.**
- **political agreement on sustainability.**

# Privacy and Security of Genetic Data

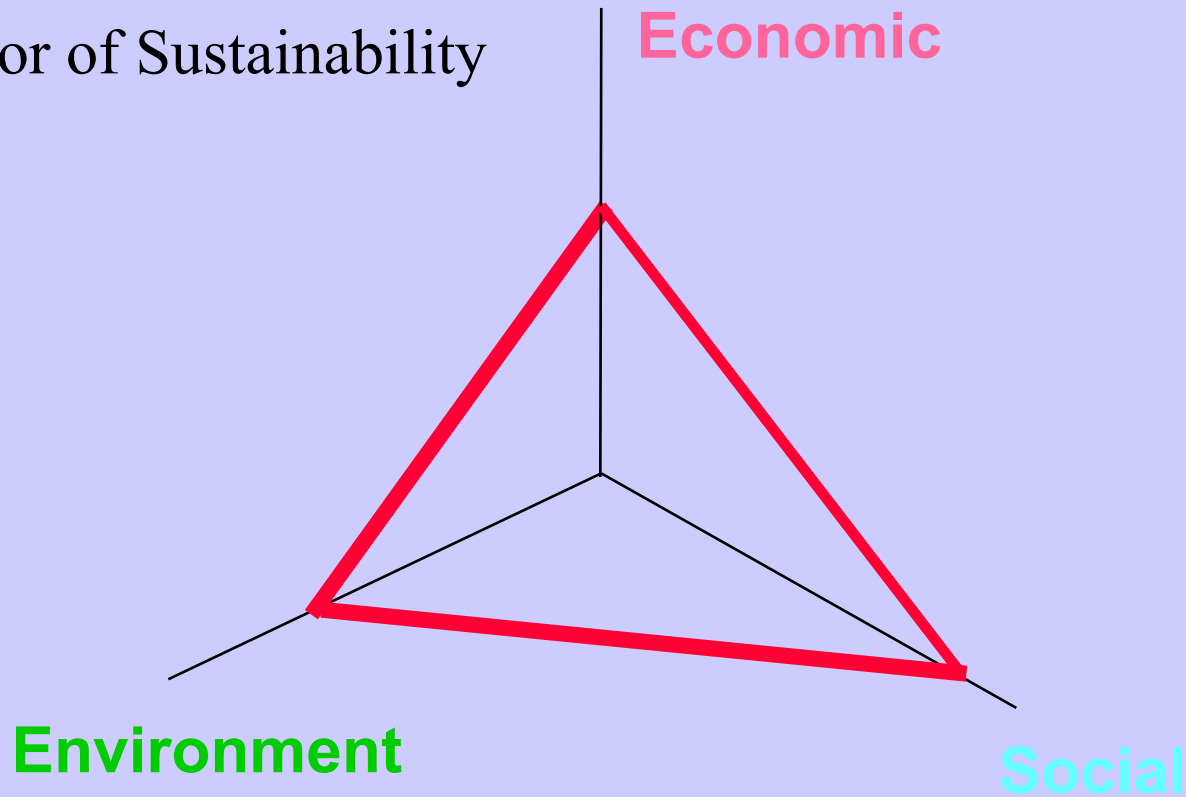
- **key role in genomics and pharmacogenomics**
- **focus on genetic databases used for research.**
- **issues around development, access to individuals' data and subsequent use**
- **workshop in Tokyo, early 2004**
- **debate issues and move towards development of general principles**
- **medium-term process (towards bioeconomy)**

# Search For Sustainability.....

- **Role of technology in delivering sustainable growth**
- **Potential for biotechnology to deliver on triple bottom line**
- **But how well is biotechnology contributing?**
- **And is industry choosing biotech?**

# Triple Bottom Line

Indicator of Sustainability



# Biotechnology for Sustainable Development

## *OECD Policy Papers*

- Biotechnology for a Clean Environment (94)
- Biotechnology for Clean Industrial Products and Processes - Towards Industrial Sustainability (98)
- The Application of Biotechnology to Industrial Sustainability (2001)

# “The Application of Biotechnology to Industrial Sustainability”

- 21 Case Studies
- Companies Adopted Biotechnology Processes
- Factors in Decision Making
- Lessons for Policymakers
- Lessons for Industry Decision Makers

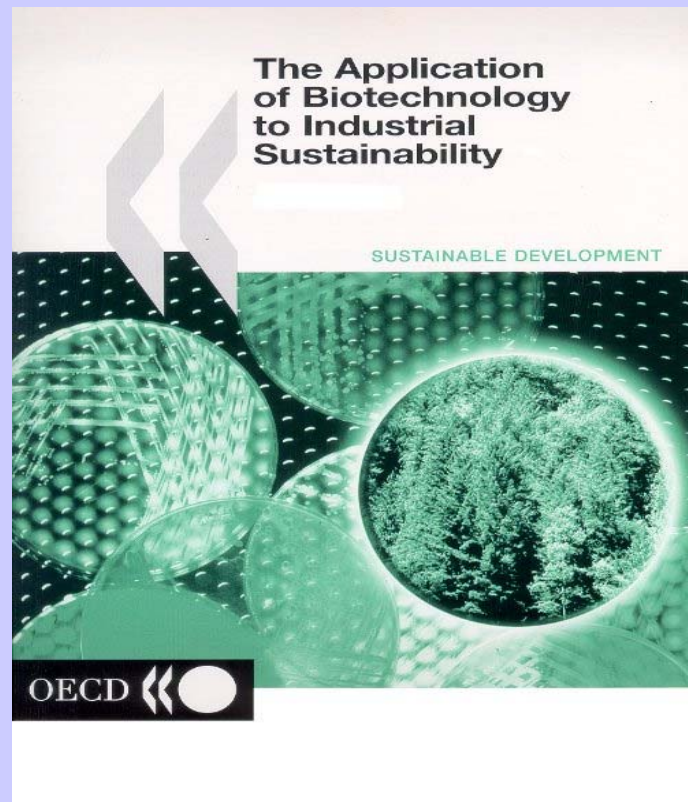
# Main Findings (1)

- Successful use of biotech always associated with more environmentally friendly process
- Also with cheaper process
- Environmental friendliness secondary to cost and quality *unless*
- Environmental legislation driving.

# Main Findings (2)

- Approaches rarely systematic - follow a hunch
- Biotech skills had to be acquired - needs industrial or academic partners
- Lead times improved with succeeding developments

# The Application of Biotechnology to Industrial Sustainability



# Products That Can Be Made From Cellulose / Sugars

- **Ethanol (transportation fuel)**
- **Polymers – PLA, PHA, PDO**
- **Fine Chemicals**
- **Bulk Chemicals**
- **Commodity Chemicals**

# Cargill-Dow (Nebraska)



# Market for Industrial Biotechnology

- Recognise opportunities to realise latent value natural processes.
- Significant economic potential in manufacturing and processing industry (sector provides 17% direct economic value in OECD countries - big pharma another 3%).
- But must avoid over-hype and exact estimates missing -need to be generated.

# **Sustainable Development**

## **(Task Force on Biotechnology for Sustainable Industrial Development)**

**Monitor uptake of sustainable biotechnology by manufacturing and processing industry**

**Developing indicators for impact of biotechnology on economy and environment**

**Scenario planning for moving to bio-based economy to back-cast to identify policy options**

# Future Scenarios

- **equally plausible possible futures**
- **back-cast to policy decision points**
- **country variability**
- **internationalisation of science**
- **common denominators**

# Statistics & Indicators

**Measure research activity in biotechnology in national  
S&T data**

**Survey manufacturing and processing industry for use of  
biotechnology**

**Develop indicators of impact of biotechnology on economy  
and environment**

# OECD Science Ministerial

## *29-30 January 2004*

**A vision for a more bio-based economy using** renewable bioresources, bioprocesses and eco-industrial clusters to produce sustainable bioproducts, jobs and income and decouple industrial growth from environmental degradation by making consumption and production of materials more sustainable. *Focuses on carbohydrate-based production.*

# The Third Bottom Line of Sustainable Development

- **How do you build societal capital in biotechnology so that the public perceive sustainable solutions where they exist?**
- **How can the bioeconomy develop in a way that delivers on society's expectations - health, economic prosperity, security, safety and acceptability?**

# Opportunities and Challenges.....

Eco-efficiency and growth through a more bio-based (carbohydrate-based) economy

Health and growth through a capture of health innovation in line with societal expectations

Food security and growth in advanced agri-products

# **Sustainable Industrial Production**

- **decoupling industrial development from environmental degradation**
- **more sustainable production and manufacturing**
- **a carbohydrate-based, or bio-based economy?**

# Health Investment - a Positive Sum Game

- **innovation will cost more - across systems**
- **health outcomes need to improve**
- **meet societal needs - access to those who need**
- **market structure needs to adapt**
- **assessing benefits - systems-wide approach**

# **Agro-Food Biotech Biomass & Functional Foods**

- **renewables - public & political consensus?**
- **potential role in disease prevention with market of \$ 300 billion in Europe by 2010?**
- **industry transformation/ integration based on novel technology platforms, clinical research, GMP**
- **regulatory uncertainty - how will societal and market demand develop?**

# No Shared View Amongst Policymakers

What policy decisions need to be made to deliver a growth-based bioeconomy?

- Agriculture Policy
- Environment Policy
- Science and Innovation Policy
  - Social Policy
  - Health Policy
  - Economic Policy

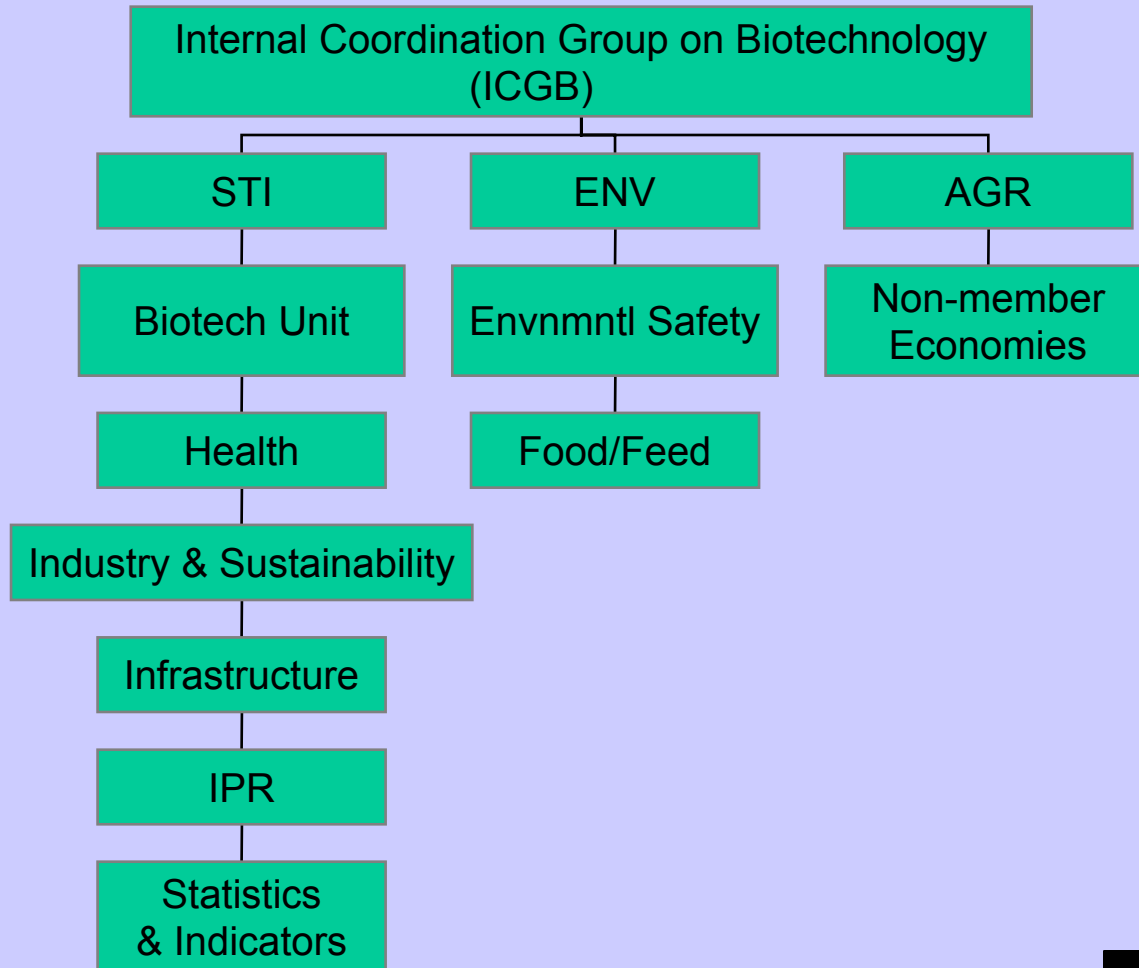
# The Future - A Bioeconomy

*Biotechnology as a driver for sustainable economic growth. Meets the economic, environmental and health needs of tomorrow in a way that satisfies the expectations of society.*

# Why OECD and How?

- *internationalisation of science - convergence of challenges*
- *need to consider 3 bottom lines sustainability*
- *like-minded economies*
- *avoid (further) trade distortions*
- *multidisciplinary approaches*

# Directorate Activities - Biotechnology



# What Next.....

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# International Approaches



Growing a Sustainable Bioeconomy?