Know-How — Technology Transfer

Know-What — Technology Assessment

Know-Why — Who Benefits?

THE CASE FOR TECHNOLOGY ASSESSMENT

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action group on erosion, technology and concentration

RISKS

THE CASE AGAINST TECHNOLOGY ASSESSMENT: It wastes money that could have gone to more research; it ties up scientific talent; and it delays potentially important innovations and thwarts national competitiveness.

THE CASE FOR TECHNOLOGY ASSESSMENT: UN-level technology assessment shares the financial and human-resource burden while providing valuable and inexpensive training and know-how to G-77 countries while equalizing the spread of – and access to – beneficial technologies.

An efficient, transparent pathway for technological advancement would save national governments time and money while reducing risk. Those proposing new technologies and their backers seek to minimize risk. Especially, re-insurers and investors welcome steps that make government intervention and/or public responses predictable.

It is said that no one can predict the past but had the UN maintained its monitoring capacity over the last two decades – and had civil society been vigilant – the world might have saved itself billions of dollars, millions of lives, and much time. Some post-Rio (1992) examples…

RIO+20 AND TECHNOLOGY ASSESSMENT

Technology Transfer ("Know-How") without Technology Assessment ("Know What") is like buying airplanes and training pilots without building airports and training air-traffic controllers. ETC Group's series of issue papers and case studies call upon Rio+20 to establish UN-level Technology Assessment either through an Office of Technology Assessment attached to the UN General Assembly or through a specialized unit attached to a new sustainability facility associated with ECOSOC, UNCSD or UNEP.

1995 **GENETICALLY MODIFIED CROPS:** Civil society initially warned that the biotech industry was developing herbicide-tolerant plant varieties in 1981. In several parts of the world, small-scale producers immediately opposed GM seeds as a potential threat to their environment, their health and their markets. Likewise, many food retailers and their customers opposed GM foods in the absence of scientific evidence that the products were safe. Today, more than 130 types of "herbicide tolerant" weeds have infested an estimated 60 million acres in the USA.[1] Now the biotech industry is scrambling to develop GM crops that are tolerant to two or more (and more toxic) herbicides.[2] Regulators, having learned nothing, are fast-tracking the super toxic superweed killers.[3] Meanwhile, R&D costs have soared: the cost of a new GM variety was $136 million per trait from 2008-2012,[4] compared to approximately $1 million for a conventional inbred line.[5]

1996 **MAD-COW DISEASE/BOVINE SPONGIFORM ENCEPHALOPATHY (BSE):** Although British regulators knew in the 1970s that the public was being exposed to BSE, the information was covered up until 1996.[6] UN technology assessment and monitoring

could have removed the secrecy. The fallout from the regulatory failure has led to societal distrust of scientists and regulators ever since.

2001 **FOOT AND MOUTH DISEASE:** The regulatory scandal and financial losses from the outbreak of foot and mouth disease in the UK (and then Europe) again undermined citizen confidence in government regulation. In the end, the outbreak's cost totaled $16 billion in the UK, where 7 million sheep and cattle were killed. Governments haven't learned from 15 other outbreaks of the virus – including another in the UK in 2007. According to the US government, the risk of an accidental escape of foot and mouth disease virus from a federal lab is 70% over 50 years at a cost between $9 billion and $50 billion.[7]

2003 **TECHNOLOGICAL DISASTER:** Sir Martin Rees, the retired president of the UK's Royal Society, estimated in 2003[8] that the likelihood of a technological disaster wiping out at least 1 million lives before 2020 are 50-50. If he is right, UN failure to adopt a technology assessment mechanism at Rio in 2012 would amount to gross negligence.

2006 **NANOPARTICLES:** The estimated annual global market for nanotechnology varies widely between about $100 million and $100 billion and predictions for the near-term range from hundreds of billions to almost $3 trillion. There is agreement, however, that governments have spent more than $50 billion on nanotech R&D since 2001. Several thousand products – including pesticides, sunscreens and cosmetics – are in the marketplace today. Where so much money has been spent (and so many products are already on the shelf), it is unlikely that governments will respond well to health or environmental concerns. Worker and consumer issues have already arisen in China and Germany.[9] There is still neither a globally accepted definition of nanotechnology or agreed methods for measuring or evaluating nanoparticles. New scientific uncertainties related to health and environmental impacts emerge every week; the only certainty is that nanotechnology is virtually unregulated anywhere in the world. If nanoparticles turn out to be – as some researchers suggest – the "new asbestos," governments will have jeopardized more than $50 billion in taxpayer money – along with the taxpayers.

2007 **BIO/AGROFUELS:** In October 2011, a special report commissioned by the High-Level Panel of Experts of the UN Committee on World Food Security concluded that the world food price crisis that became evident at the end of 2007 was exacerbated by the rapid rise in production of so-called bio- or agro-fuels. Since 2007, industry has insisted that a second or third generation of biofuels will soon be available that will allow cars and people to be fuelled and fed simultaneously. Five years later, the world is still waiting. Europe and the United States have been spending $20 billion per year in biofuels industry subsidies.[10] In April 2012, a draft internal EU report concluded that conventional biofuels accelerate climate change and are financially impracticable.[11] If the UN had had a technology assessment capacity in place, the biofuels illusion would not have prevailed.

2009 **INTELLECTUAL PROPERTY FAILURES:** IP is a different kind of technology monitoring failure. There is widespread agreement that the intellectual property system, rather than facilitating innovation, is a financial and legal barrier to innovation. A 2009 study reports that total US corporate profits from patents (excluding pharmaceuticals) average around $4 billion annually – but the associated litigation costs are $14 billion per year.[12] Replicating this faulty system in developing countries could massively delay progress.

2010 **DEEP WATER DRILLING:** A near-disastrous offshore gas leak in Azerbaijan in 2008 led to the biggest personnel evacuation in the driller's history and a WikiLeaks disclosure says that the driller blamed faulty cement casings – the same problem the same driller, BP, identified in the Deepwater Horizon spill 18 months later.[13] BP estimates that the cost of the Gulf of Mexico spill could reach $40 billion.[14] 760 million litres of oil spill into the world's oceans annually – that's a BP Gulf disaster every year.[15]

2011 **NUCLEAR POWER:** The Fukushima tragedy is the latest in a succession of scandals involving the commercial nuclear power industry since its inception in 1953. The Fukushima facility was assessed to be tsunami-resistant because a 35-metre cliff separated the construction site from the ocean.[16] However, the cliff was removed to allow boats to bring heavy equipment to the site. Following the tsunami, Fukushima was plagued by a number of other technical and political failures, expected to cost at least $64 billion.[17] 88 of the world's 442 operational nuclear plants have been built on seismic faults.[18] According to the International Atomic Energy Agency, 138 commercial power reactors have been permanently shut down by the beginning of 2012; at least 80 more are slated for shut-down in the next decade.[19] Only 17 of these have been dismantled due to both technical difficulty and expense. For almost 60 years, the industry has struggled with nuclear waste disposal. Despite constant assurances, no country has solved the problem. A 2011 UN report noted that the industry originally adopted nuclear-powered submarine standards that prioritized compactness and mobility and undervalued safety – standards unhelpful to commercial power plants.[20]

EARLY WARNINGS WITHOUT EARLY LISTENERS

EARLY WARNING	PROBLEM	LATE LISTENING	YEARS DELAYED
1602	**Tobacco**[21]	1970s	>370
1896	**Radiation**	1928	32
1897	**Benzene**	1977	80
1898	**Asbestos**	1931	33
1899	**PCBs**	1972	73
1907	**CFCs**	1977	70
1938	**Halocarbons**	1997	59
1938	**DES**	1971	33
1945	**Antimicrobials**	>1970	>25
1952	**Sulfur dioxide**	1979	27
1954	**MTBE**	2000	46
1962	**DDT**	1969	7
1970	**TBT**	1982	12
1970	**Hormones**	1982	12
>1970	**BSE**	1996	>20
1980	**GMOs**	2003	23
2002	**Nanoparticles**	>2003	?

Source: Adapted from *Late Lessons from Early Warnings*: *The Precautionary Principle 1896-2000*, Environmental Issues Report, EEA, 2001, with additional examples from ETC Group.

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For More Information

ETC Group has published several documents on issues related to Rio+20 and New Technologies, including *Who Will Control the Green Economy?, Tackling Technology: Three Proposals for Rio (Submission to Zero Draft*), *The New Biomassters. Synthetic Biology and the Next Assault on Biodiversity and Livelihoods*, *The Big Downturn. Nanogeopolitics* and *Geopiracy. The Case against Geoengineering* available on our website: www.etcgroup.org

References

1 Carey Gillam, "Super Weeds Pose Growing Threat to U.S. Crops," *Reuters*, 20 September 2011; Emily Waltz, "Glyphosate resistance threatens Roundup hegemony," *Nature Biotechnology*, Vol. 28, No. 6, June 2010, pp. 537-538; Jack Kaske, "Monsanto, Dow Gene-Modified Crops to Get Faster U.S. Reviews," *Bloomberg News*, 9 March 2012.

2 Such as 2,4-D, a component of the Vietnam War defoliant, Agent Orange, and dicamba, which is chemically related to 2,4-D.

3 Jack Kaske, "Monsanto, Dow Gene-Modified Crops to Get Faster U.S. Reviews," *Bloomberg News*, 9 March 2012.

4 Phillips McDougall Consultancy, "The cost and time involved in the discovery, development and authorisation of a new plant biotechnology derived trait," *A Consultancy Study for CropLife International*, September 2011.

5 Goodman, M., "Plant Breeding Requirements for Applied Molecular Biology," *Crop Science*, Vol. 44, November-December 2004, pp. 1913-14.

6 European Environment Agency, *Late Lessons from Early Warnings: The Precautionary Principle 1896-2000*, Environmental Issues Report, 2001.

7 Anon., "Fears of virus release from proposed US lab," *New Scientist*, 20 November 2010.

8 Martin Rees, *Our Final Hour -- A Scientist's Warning: How Terror, Error, and Environmental Disaster Threaten Humankind's Future in This Century On Earth and Beyond*, New York: Basic Books, 2003, p. 16.

9 Y., Song, X., and X. Du, "Exposure to nanoparticles is related to pleural effusion, pulmonary fibrosis and granuloma," (Abstract) *European Respiratory Journal*, 1 September 2009, vol. 34 no. 3, pp. 559-567.

10 International Energy Agency, World Energy Outlook: 2010, Executive Summary, p. 9.

11 EurActiv (http://www.euractiv.com) "EU report questions conventional biofuels' sustainability " 11 April 2012: http://www.euractiv.com/climate-environment/eu-report-questions-conventional-biofuels-sustainability-news-512076.

12 Anon., "Patent medicine - Why America's patent system needs to be reformed, and how to do it," *The Economist*, electronic edition, August 20, 2011.

13 Guy Chazan, "Cables Suggest BP Near-Fiasco in '08," *Wall Street Journal*, 17 December 2010.

14 Guy Chazan, "BP Confident of Turnaround," *Wall Street Journal*, 25 October 2011.

15 Dana Mackenzie, "Oil spill X Prize: Winning inventors clean up," *New Scientist*, 26 October 2011.

16 Chester Dawson and Yuka Hayashi, "Fateful Move Exposed Japan Plant," *Wall Street Journal*, 12 July 2011.

17 Anon., "The $64 billion question," *The Economist*, 5 November 2011.

18 Paul Marks, "Fukushima throws spotlight on quake zone nuclear power," *New Scientist*, 19 March 2011.

19 Fred Pearce, "How to dismantle a nuclear reactor," *New Scientist*, 16 March 2012.

20 United Nations World Economic and Social Survey 2011, *The Great Green Technological Transformation, Department of Economic and Social Affairs*, New York, 2011.

21 Carlo M. Cipolla, *Before the Industrial Revolution*, New York: W.W. Norton, 1993.