

**POLICIES AND PRINCIPLES ON ACCESS TO AND
REUSE OF PUBLIC SECTOR INFORMATION: a review of
the literature in Australia and selected jurisdictions**

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with assistance from

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[This is an ongoing project which will seek to expand on this version of the Literature Review]

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Chapter 3: International

The importance of adopting an international approach to information access and re-use has long been recognised, whether the focus is on science research data, environmental data, spatial information or other kinds of information produced with public funding. During the past decade, a growing realisation of the nature and magnitude of the environmental, social and economic issues confronting the global community has been accompanied by an increased awareness of the importance of ensuring the flow of information and knowledge produced by the public sector or with public funding. Developments in the international arena evidence an understanding that the challenges being faced can only be effectively addressed at the global level, through closer international cooperation, and that they require clear commitments to information access and reuse.

There are many statements supporting data access and reuse at the international level, in resolutions and declarations of United Nations agencies, in statements by intergovernmental organisations (such as the OECD) and in the arrangements governing international scientific collaborations. The United Nations and its specialised agencies have issued numerous official resolutions, declarations and reports addressing the development of policies on access to and reuse of government information.¹ Within the United Nations system, UNESCO played a leading role in the development of policy guidelines from the late 1990s. More recently, a growing awareness of the importance of access to public sector information and science data has been reflected in the work of intergovernmental bodies such as the Organisation for Economic Cooperation and Development (OECD) and the International Council for Science (ICSU). During the 2000s, the OECD has been perhaps the most significant entity at the international level in the development of the policy framework for access to and reuse of PSI and publicly funded research data.² As well as the principles contained in declarations by UN agencies and intergovernmental organisations, statements of principles relating to open access to research data and academic publications are found in declarations of non-government organisations and groups operating at the international level.

There is also an extensive body of literature dealing with SDI initiatives from an international and comparative perspective. Since the early 1990s, with the development of the internet and other information technologies, it has become increasingly important to adopt an international, global approach towards the production and management of spatial data. In the US, the National Information Infrastructure (NII) initiative led to the formation of the US National Spatial Data Infrastructure (NSDI) and influenced thinking about a Global Spatial Data Infrastructure (GSDI) and the development of SDIs at the national level worldwide.³

¹ Paul Uhler, *Policy Guidelines for the Development and Promotion of Governmental Public Domain Information*, UNESCO, Paris, 2004 at p1.

² The OECD is a group of 30 member countries (including Australia) which aim to facilitate and promote good governance. See http://www.oecd.org/about/0,2337,en_2649_201185_1_1_1_1_1,00.html. The OECD's Directorate for Science, Technology and Policy (see http://www.oecd.org/department/0,3355,en_2649_33703_1_1_1_1_1,00.html.) has examined the social and economic implications of the development and use of information and communication technologies, the internet and e-business.

³ More than 100 national SDIs are being developed. For a listing of SDI initiatives around the world, see <http://www.spatial.maine.edu/~onsrud/GSDI.htm>.

1. The United Nations (UN) system⁴

Many specialised agencies within the UN system (such as the World Meteorological Organisation (WMO), the World Health Organisation (WHO), the United Nations Environment Program (UNEP) and UNESCO) have data programs and policies, some of which provide broad international access to that information. As Paul Uhler observed in *Policy Guidelines for the Development and Promotion of Governmental Public Domain Information* (2004):

[t]here are numerous official resolutions, declarations, and reports issued by the United Nations and its specialized agencies, as well as by individual Member States, that support and justify the formulation of Policy Guidelines for the Development and Promotion of Governmental Public Domain Information.⁵

Universal Declaration of Human Rights, United Nations General Assembly (1948)

Article 19 of the Universal Declaration of Human Rights, adopted by the UN General Assembly in 1948, states that the right to freedom of opinion and expression “includes the freedom to seek, receive and impart information and ideas through any media and regardless of frontiers”. Article 27(1) of the Declaration recognises the “right freely to participate in the cultural life of the community...and to share in scientific advancement and its benefits”.

In the current era, human development through access to and use of information and knowledge demands that citizens have access to information and communications technology and the internet.

United Nations Geographic Information Working Group (UNGIWG)

The United Nations Geographical Information Working Group (UNGIWG)⁶ is a network of professionals working in the fields of cartography and geographic information science. It was formed in 2000 to address common geospatial issues - maps, boundaries, data exchange, standards - that affect the work of UN organizations and Member States. UNGIWG also works directly with non-governmental organizations, research institutions and industry to develop and maintain common geographic databases and geospatial technologies to enhance normative and operational capabilities. UNGIWG reports periodically to the UN Chief Executive Board (CEB) on progress

⁴ See also the United Nations publications: *Special Session of the General Assembly to Review and Appraise the Implementation of Agenda 21*, 1997, at <http://www.un.org/esa/earthsummit/ga97info.htm>; *GIS Standards and Standardisation: A Handbook*, 1998. For details of Agenda 21, a detailed plan for achieving sustainable development in the 21st century, see: <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21toc.htm>.

⁵ Paul Uhler, *Policy Guidelines for the Development and Promotion of Governmental Public Domain Information*, UNESCO, Paris, 2004 at p1. For a searchable database of environmental treaties created by CIESIN at Columbia University, New York, see <http://sedac.ciesin.columbia.edu/entri/>; on remote sensing and environmental treaties, see <http://sedac.ciesin.columbia.edu/rs-treaties/>. See also the World Data Centre Thematic Portal on Governance at <http://sedac.ciesin.columbia.edu/wdc/governance.jsp#> and the World Resources Institute's EarthTrends portal at http://earthtrends.wri.org/searchable_db/index.php?theme=10. For a listing of various UN and other bodies operating at the international level see <http://sedac.ciesin.columbia.edu/wdc/partners.jsp>

White Paper on the GEOSS Data Sharing Principles (Review Draft) September 2008 (CODATA, Paris) http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf

⁶ <http://www.ungiwg.org>.

made and priority issues.⁷ It has 30 members worldwide.

The aims of UNGIWG are to:

- improve the efficient use of geographic information for better decision-making;
- promote standards and norms for maps and other geospatial information;
- build mechanisms for sharing, maintaining and assuring the quality of geographic information develop core maps to avoid duplication; and
- provide a forum for discussing common issues and emerging technological changes.⁸

Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP)

In 1995, following the 13th Conference of the United Nations Regional Cartographic Conference for Asia and the Pacific (UNRCC-AP) in Beijing in May 1994, national mapping agencies in the Asia-Pacific region formed the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP)⁹ to develop the Asia and the Pacific Spatial Data Infrastructure (APSDI).¹⁰

PCGIAP has 55 members, represented by the directorates of their national survey and mapping organisations or equivalent national agencies. It aims to provide a forum for nations in the region to cooperate on the development of the APSDI and contribute to the development of the GSDI, in order to maximise the economic, social and environmental benefits of geographic information in accordance with Agenda 21.¹¹

PCGIAP operates under the auspices of the UNRCC-AP, reporting and making recommendations to this Conference. It meets annually and reports to the UNRCC-AP triennially. PCGIAP's activities are largely funded by member agencies, with some specific external funding sourced from aid organisations and government grants.

United Nations Environment Program (UNEP)

GEO Data Portal

The GEO Data Portal holds the authoritative datasets used by UNEP in the Global Environment Outlook (GEO) report and other integrated environment assessments. More than 450 variables are

⁷ See "About UNGIWG", webpage, <http://www.ungiwg.org/about.htm> accessed on 13 January 2009.

⁸ Ibid.

⁹ See <http://www.pcgiap.org/>

¹⁰ PCGIAP, A Spatial Data Infrastructure for the Asia and the Pacific Region, PCGIAP Publication No. 1, Canberra, 1998; see http://219.238.166.217/pcgiap/tech_paprs/apsdi_cnts.htm; other papers are at http://219.238.166.217/pcgiap/tech_paprs/tech_paprs.htm. See also <http://www.geom.unimelb.edu.au/research/publications/IPW/Journal%20of%20GIS%20Development-June2003.pdf>.

¹¹ For details of Agenda 21, a detailed plan for achieving sustainable development in the 21st century see: <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21toc.htm>.

available in the online database, as national, subregional, regional, and global statistics or as geospatial data sets (maps), covering themes such as freshwater, population, forests, emissions, climate, disasters, health and the economy. Data can be displayed as maps, graphs, data tables and can be downloaded in different formats.¹²

Global Resource Information Database (GRID)

UNEP's Global Resource Information Database (GRID)¹³ specializes in global data for environmental assessment and for early warning systems. There are regional centers in the following locations: Asia (Asian Institute of Technology-Bangkok), Africa (GRID-Nairobi), Europe (GRID-Geneva), Eastern Europe (GRID-Warsaw), Northern Europe (GRID-Arendal), and North America (GRID-Sioux Falls, South Dakota).

Online Access to Research in the Environment (OARE)

Online Access to Research in the Environment (OARE) is an international public-private consortium coordinated by the United Nations Environment Programme (UNEP), Yale University, and leading science and technology publishers which enables developing countries to gain access to one of the world's largest collections of environmental science research. Launched in October 2006, OARE has a mission to improve the quality and effectiveness of environmental science research, education and training in low-income countries.¹⁴

Over 1,300 peer reviewed titles owned and published by over 340 prestigious publishing houses and scholarly societies are now available in more than 100 low-income countries. Research resources are available in a wide range of disciplines, including biology, biotechnology, genetics and genetically modified species, botany and plant biodiversity, climatology and climate change and meteorology.

World Health Organisation (WHO) - HINARI (Access to Research Initiative)

The HINARI program, set up by World Health Organisation (WHO) together with major publishers, enables developing countries to gain access to one of the world's largest collections of biomedical and health literature. It provides free or very low cost online access to the major journals in biomedical and related social sciences to local, not-for-profit institutions in developing countries. Local, not-for-profit institutions in two groups of countries may register for access to the journals through HINARI. The country lists are based on Gross National Income (GNI) per capita (World Bank figures).¹⁵

Upon launch in January 2002, HINARI covered some 1500 journals from six major publishers: Blackwell, Elsevier Science, the Harcourt Worldwide STM Group, Wolters Kluwer International Health & Science, Springer Verlag and John Wiley. Since then, the numbers of participating publishers and of journals and other full-text resources have continued to grow. Over 6000 journal titles are now available to health institutions in 108 countries, benefiting many thousands of health

¹² See <http://geodata.grid.unep.ch/>

¹³ See <http://www.rrcap.unep.org/about/gcenter.cfm>

¹⁴ <http://www.oaresciences.org/en>.

¹⁵ See "About HINARI", webpage, <http://www.who.int/hinari/about/en/> accessed on 13 January 2009.

workers and researchers, and in turn, contributing to improved world health.¹⁶

Food and Agriculture Organisation of the United Nations (FAO) - Access to Global Online Research in Agriculture (AGORA)

Launched in October 2003, the AGORA program, set up by the United Nation's Food and Agriculture Organization (FAO) together with major publishers, enables developing countries to gain access to a digital library collection in the fields of food, agriculture, environmental science and related social sciences. AGORA provides a collection of 1278 journals to institutions in 107 countries. AGORA is designed to enhance the scholarship of the many thousands of students, faculty and researchers in agriculture and life sciences in the developing world.¹⁷

The AGORA program provides free or low cost access to major scientific journals in agriculture and related biological, environmental and social sciences to public institutions in developing countries. The goal of AGORA is to improve the quality and effectiveness of agricultural research, education and training in low-income countries, and in turn, to improve food security. Through AGORA, researchers, policy-makers, educators, students, technical workers and extension specialists have access to high-quality, relevant and timely agricultural information via the Internet.

Food and Agriculture Organisation of the United Nations (FAO) - GeoNetwork

The FAO has numerous geostatistical and geospatial datasets on themes related to food production and security, environmental conditions and sustainable development.

The purpose of GeoNetwork,¹⁸ hosted by FAO, is to improve access to and integrated use of spatial data and information, to support decision-making, and to promote multi disciplinary approaches to sustainable development. It allows users to share geographically referenced thematic information between different FAO units, other UN agencies, NGOs and other institutions.

GeoNetwork opensource¹⁹ is a standards-based geospatial catalogue which was developed by the FAO to enable individuals and communities to organise and publish their geospatial data on the web. It uses Free and Open Source software (FOSS) and international and open standards for services and protocols (ISO/TC211 and OGC).²⁰ The software provides an easy-to-use web interface to search geospatial data across multiple catalogues, combine distributed map services in the embedded map viewer, send annotated interactive maps to other users by email, and publish geospatial data using the online metadata editing tools.²¹

United Nations Educational, Scientific and Cultural Organisation (UNESCO)

¹⁶ Ibid; see also <http://www.who.int/hinari/en>.

¹⁷ <http://www.aginternetwork.org/en/>,

¹⁸ See <http://www.fao.org/geonetwork>.

¹⁹ <http://geonetwork-opensource.org/>.

²⁰ See OSDM at <http://www.osdm.gov.au/Metadata/GeoNetwork/default.aspx> and <http://geonetwork-opensource.org/>.

²¹ <http://geonetwork-opensource.org/the-geonetwork-opensource-geospatial-catalog-v2-2-0-is-out>.

The Communication and Information Sector (CI) of UNESCO, which was established in its present form in 1990, has played an active role in promoting access to public sector information and science data. Its programs are based on UNESCO's Constitution which requires it to promote the "free flow of ideas by word and image".²² The CI Sector is represented at UNESCO's headquarters in Paris and in 27 UNESCO field offices. The principal objectives of its programs are to:

- promote the free flow of ideas and universal access to information;
- promote the expression of pluralism and cultural diversity in the media and world information networks; and
- promoting access for all to ICTs.²³

In 1997, the UNESCO General Conference invited the Director-General to undertake action "to facilitate access to information in the public domain with the ultimate aim of building up a general electronic repository of all information of a public nature relevant to UNESCO's fields of competence".²⁴ At the 26th plenary meeting of the UNESCO General Conference in November 1999, the *Draft recommendation on the promotion and use of multilingualism and universal access to cyberspace* (Resolution 37) was adopted.²⁵ Resolution 41, *Promotion of free and universal access to public domain information for the purposes of education, science and culture*, was adopted by the UNESCO General Conference on 17 November 1999:

*"Promotion of free and universal access to public domain information for the purposes of education, science and culture - Resolution 41" UNESCO (1999)*²⁶

Resolution 41 Promotion of free and universal access to public domain information for the purposes of education, science and culture

The General Conference,

Recalling Article 19 and Article 27 of the Universal Declaration of Human Rights defining free access to information as one of the basic human rights,

Also recalling Article I of UNESCO's Constitution underlining that one of the Organization's main goals is to "maintain, increase and diffuse knowledge ... by initiating methods of international cooperation calculated to give the people of all countries access to the printed and published materials produced by any of them",

²² See http://portal.unesco.org/ci/en/ev.php-URL_ID=1509&URL_DO=DO_TOPIC&URL_SECTION=201.html accessed on 13 January 2009.

²³ Ibid.

²⁴ UNESCO (1997), 29 C/Resolution 36, available at <http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?database=gctd&req=2&by=2&ord=1&sc1=1&sc2+value%3D=&look=cfg2&sc2=1&dc=29+C%2FResoluti ons>.

²⁵ Resolution adopted on the report of Commission V at the 26th plenary meeting, on 17 November 1999. UNESCO (1999), 30 C/Resolution 37, available at <http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?database=gctd&req=2&by=2&ord=1&sc1=1&sc2+value%3D=&look=cfg2&sc2=1&dc=30+C%2FResoluti ons>. Note that this draft recommendation was adopted on 21 November 2003.

²⁶ UNESCO (1999), 30 C/Resolution 41, available at <http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?database=gctd&req=2&by=2&ord=1&sc1=1&sc2+value%3D=&look=cfg2&sc2=1&dc=30+C%2FResoluti ons>. This Resolution was adopted on the report of Commission V at the 26th plenary meeting of the UNESCO General Conference on 17 November 1999.

Further recalling 29 C/Resolution 28, and in particular its paragraph 2.A(h), inviting the Director-General “to facilitate access to information in the public domain”,

Conscious of the fundamental importance of the global common good of humanity, one aspect of which is free and universal access to information, as well as freedom in the creation, treatment and dissemination of knowledge,

Recognizing that access to information belonging to the public domain (such as freely available works of literature and sciences, information produced by the public sector and open source software) is crucial for education, sciences and culture and for fostering democracy in the information society,

Noting the positive effects of free and universal access to information belonging to the public domain in narrowing the gap between the information-rich and the information-poor,

Acknowledging the possibilities offered by new information and communication technologies to ensure free and universal access to information and to reduce inequalities in the interests of social justice and economic well-being,

1. *Urges* all Member States to:

(a) promote free and universal access to public domain information for the purposes of education, science and culture;

(b) establish national information strategies and policies focused on free and universal access to public domain information;

(c) support the role of libraries, archives and museums as collectors and disseminators of information in the traditional and digital environments; [emphasis added]

2. *Invites* the Director-General to:

(a) ensure that high priority is given to the worldwide promotion of free and universal access to public domain information in UNESCO’s activities;

(b) promote common strategies and standards at the international level in the area of new information and communication technologies for ensuring free and universal access to public domain information;

(c) support, in liaison with the World Intellectual Property Organization (WIPO) and the other relevant United Nations institutions, digitization campaigns to make the public cultural heritage preserved in libraries, archives and museums freely and universally accessible, and in particular projects such as the virtual collection of representative works of world literature belonging to the public domain, their translation free from copyright, and the setting up of a collection of multilingual dictionaries and lexicons in the public domain;

(d) encourage the development and dissemination of open source software.

The third UNESCO Congress on ethical, legal and societal challenges of cyberspace, *INFOethics 2000* was held in Paris from 13 to 15 November 2000. *INFOethics 2000*, the theme of which was “Universal access to information in the twenty-first century”,²⁷ was held in furtherance of the objective of having the ethical, legal and societal issues associated with equitable access to information included in the World Summit on the Information Society (WSIS) in 2003. The Congress strongly reaffirmed UNESCO’s role in dealing with those issues and in bringing them to the attention of WSIS. The report and proposals of *INFOethics 2000* were to be considered in the finalisation by an International Committee of Experts of a Recommendation on Universal access and promotion and use of multilingualism in cyberspace to be submitted to UNESCO’s General

²⁷ See UNESCO (2000), Proceedings and Proposals: INFOethics 2000, CII-2000/CONF.402/CLD), Paris, France, available at <http://webworld.unesco.org/infoethics2000/documents/proceedings.rtf>.

Conference in November 2001.²⁸ The report was also to be used to guide UNESCO's Secretariat in preparing its contribution to the WSIS in 2003.

In its work program for 2002-2003, UNESCO included the preparation of Guidelines to advise Member States on policies for developing and promoting public domain information, taking account of both national needs and international practices. In March 2003, UNESCO hosted the International Symposium on Open Access and the Public Domain in Digital Data and Information for Science.²⁹

Following this symposium, UNESCO sponsored work on the formulation of a common, international set of principles for public access to scientific data and information. It hosted a CODATA workshop in Paris in September 2005 to promote development of international policies and guidelines for action at the national and international levels for creating the "information commons" for e-science.³⁰ This initiative took its lead from the Creative Commons initiative and looked to extend the application of that model beyond copyright content to scientific information. The Information Commons workshop reviewed government and university mechanisms for managing publicly funded scientific information in the digitally networked research environment in the US, the EU and selected developing countries, to identify problems and solutions that could serve as models for adoption by the broader research community. The workshop participations considered the benefits and drawbacks to providing public access to and unrestricted use of publicly funded scientific data and information and worked on the development of policies and guidelines to enable the scientific community to more effectively utilise such data and information. An important outcome of the September 2005 workshop was the formation of the CODATA Global Information Commons for Science Initiative (GICSI),³¹ which was formally announced at WSIS in Tunis in November 2005. In November 2003, UNESCO's General Conference adopted the Recommendation on Promotion and Use of Multilingualism and Universal Access to Cyberspace,³² which includes a section on "Development of Public Domain Content".

"Recommendation on the Promotion and Use of Multilingualism and Universal

²⁸ The Report, at page 9, when addressing the "Broader and more efficient provision of public contents", under the theme of "The role of public authorities in access to information", states that:

Public authorities (which include central and local governments) are currently the most significant source of public sector information and have a critical role to play in facilitating access to it.

Public sector information forms part of our "intellectual commons". It is critical for research, education, innovation, social and economic inclusion and is an essential foundation for an informed, participatory and global society. Such information is akin to a "global public goods" and therefore should be presumed to be publicly available (that is, as in the "public domain"²⁸). Greater public benefit is to be derived if such information resources and knowledge are shared with the broadest possible audience, rather than allowing exclusivity (in terms of the control of the information) or private interests, to prevail in the management of this resource.

²⁹ See the UNESCO website at http://portal.unesco.org/ci/en/ev.php-URL_ID=8228&URL_DO=DO_TOPIC&URL_SECTION=201.html where there are videos of the presentations.

³⁰ *Creating the Information Commons for e-Science*, UNESCO, Paris, September 2005, see <http://www.codataweb.org/UNESCOmtg/>.

³¹ The GICSI concept had been developed by the US National Academies of Science and CODATA during the period 2002 to 2005.

³² UNESCO (21 November 2003), Recommendation on the Promotion and Use of Multilingualism and Universal Access to Cyberspace and Report by the Director-General (31 C/25), available at http://portal.unesco.org/ci/en/ev.php-URL_ID=13475&URL_DO=DO_TOPIC&URL_SECTION=201.html; see also UNESCO (6 June 2003), Report by the Director-General on the Consultation Process and the Revised Recommendation on the Promotion and Use of Multilingualism and Universal Access to Cyberspace, 32 C/27, available at <http://unesdoc.unesco.org/images/0013/001304/130483e.pdf>.

Access to Cyberspace”, UNESCO (2003)

UNESCO’s Recommendation on the Promotion and Use of Multilingualism and Universal Access to Cyberspace strongly encouraged government bodies to “develop public domain content” and provided guidance in implementing that objective. It states:

PREAMBLE

The General Conference,

Committed to the full implementation of the human rights and fundamental freedoms proclaimed in the Universal Declaration of Human Rights and other universally recognized legal instruments, and *mindful* of the two International Covenants of 1966 relating respectively to civil and political rights and to economic, social and cultural rights, **(1)**

Recognizing the “central and important role of the United Nations Educational, Scientific and Cultural Organization in the field of information and communication and in the implementation of the relevant decisions in this area adopted by the General Conference of that Organization and of the relevant parts of the Assembly resolutions on the subject”, **(2)**

Recalling that the Preamble to the Constitution of UNESCO affirms, “that the wide diffusion of culture, and the education of humanity for justice and liberty and peace are indispensable to the dignity of man and constitute a sacred duty which all the nations must fulfil in a spirit of mutual assistance and concern”,

Further recalling Article I of the Constitution, which assigns to UNESCO among other purposes that of recommending “such international agreements as may be necessary to promote the free flow of ideas by word and image”, **(3)**

Affirming the principles embodied in the Universal Declaration on Cultural Diversity, adopted by the General Conference of UNESCO at its 31st session and particularly its articles 5, 6 and 8,

Referring to the resolutions of the General Conference of UNESCO **(4)** with regard to the promotion of multilingualism and universal access to information in cyberspace,

Convinced that the development of new information and communication technologies (ICTs) provides opportunities to improve the free flow of ideas by word and image but also presents challenges for ensuring the participation of all in the global information society,

Noting that linguistic diversity in the global information networks and universal access to information in cyberspace are at the core of contemporary debates and can be a determining factor in the development of a knowledge-based society,

Taking into account international treaties and agreements on intellectual property, in order to facilitate the promotion of universal access to information,

Acknowledging the need for capacity-building, particularly for developing countries, in acquisition and application of the new technologies for the information-poor,

Recognizing that basic education and literacy are prerequisites for universal access to cyberspace,

Considering that different levels of economic development affect prospects for access to cyberspace and that specific policies and increased solidarity are required to redress current asymmetries and create a climate of mutual trust and understanding,

Adopts the present Recommendation:

DEVELOPMENT OF MULTILINGUAL CONTENT AND SYSTEMS

1. The public and private sectors and the civil society at local, national, regional and international levels should work to provide the necessary resources and take the necessary measures to alleviate language barriers and promote human interaction on the Internet by encouraging the creation and processing of, and access to, educational, cultural and scientific content in digital form, so as to ensure that all cultures can express themselves and have access to cyberspace in all languages, including indigenous ones.
2. Member States and international organizations should encourage and support capacity-building for the production of local and indigenous content on the Internet.
3. Member States should formulate appropriate national policies on the crucial issue of language survival in cyberspace, designed to promote the teaching of languages, including mother tongues, in cyberspace. International support and assistance to developing countries should be strengthened and extended to facilitate the development of freely accessible materials on language education in electronic form and to the enhancement of human capital skills in this area.
4. Member States, international organizations and information and communication technology industries should encourage collaborative participatory research and development on, and local adaptation of, operating systems, search engines and web browsers with extensive multilingual capabilities, online dictionaries and terminologies. They should support international cooperative efforts with regard to automated translation services accessible to all, as well as intelligent linguistic systems such as those performing multilingual information retrieval, summarizing/abstracting and speech understanding, while fully respecting the right of translation of authors.
5. UNESCO, in cooperation with other international organizations, should establish a collaborative online observatory on existing policies, regulations, technical recommendations, and best practices relating to multilingualism and multilingual resources and applications, including innovations in language computerization.

FACILITATING ACCESS TO NETWORKS AND SERVICES

...

6. Member States and international organizations should recognize and support universal access to the Internet as an instrument for promoting the realization of the human rights as defined in Articles 19 and 27 of the Universal Declaration of Human Rights.
7. Member States and international organizations should promote access to the Internet as a service of public interest through the adoption of appropriate policies in order to enhance the process of empowering citizenship and civil society, and by encouraging proper implementation of, and support to, such policies in developing countries, with due consideration of the needs of rural communities.
8. In particular, Member States and international organizations should establish mechanisms at the local, national, regional and international levels to facilitate universal access to the Internet through affordable telecommunications and Internet costs with special consideration given to the needs of public service and educational institutions, and of disadvantaged and disabled population groups. New incentives in this area should be designed towards this end including public-private partnerships to encourage investment and the lowering of financial barriers to the use of ICT, such as taxes and customs duties on informatics equipment, software and services.
9. Member States should encourage Internet service providers (ISPs) to consider provision of concessionary rates for Internet access in public service institutions, such as schools, academic institutions, museums, archives and public libraries, as a transitional measure towards universal access to cyberspace.
10. Member States should encourage the development of information strategies and models that facilitate community access and reach out to all levels of society, including the setting up of community projects and fostering the emergence of local information and communication technology leaders and mentors. Strategies should also support cooperation on ICT among public service institutions, as a means of reducing the cost of access to Internet services.
11. Interconnection on a negotiated cost-sharing basis in the spirit of international cooperation should be encouraged between national Internet peering points combining the traffic of private and non-profit ISPs in developing countries and peering points in other countries whether developing or industrialized.

12. Regional organizations and forums should encourage the establishment of inter- and intra-regional networks powered by high capacity regional backbones to connect each country within a global network in an open competitive environment.

13. Concerted efforts within the United Nations system should promote the sharing of information about and experience on the use of ICT-based networks and services in socio-economic development, including open source technologies, as well as policy formulation and capacity-building in developing countries.

14. Member States and international organizations should promote appropriate partnerships in the management of domain names, including multilingual domain names.

DEVELOPMENT OF PUBLIC DOMAIN CONTENT

...

15. Member States should recognize and enact the right of universal online access to public and government-held records including information relevant for citizens in a modern democratic society, giving due account to confidentiality, privacy and national security concerns, as well as to intellectual property rights to the extent that they apply to the use of such information. International organizations should recognize and promulgate the right for each State to have access to essential data relating to its social or economic situation.

16. Member States and international organizations should identify and promote repositories of information and knowledge in the public domain and make them accessible by all, thus shaping learning environments conducive to creativity and audience development. To this end, adequate funding should be provided for the preservation and digitization of public domain information.

17. Member States and international organizations should encourage cooperative arrangements which respect both public and private interests in order to ensure universal access to information in the public domain without geographical, economic, social or cultural discrimination.

18. Member States and international organizations should encourage open access solutions including the formulation of technical and methodological standards for information exchange, portability and interoperability, as well as online accessibility of public domain information on global information networks.

19. Member States and international organizations should promote and facilitate ICT literacy, including popularizing and building trust in ICT implementation and use. The development of “human capital” for the information society, including an open, integrated and intercultural education combined with skills training in ICT, is of crucial importance. ICT training should not be limited to technical competence but should also include awareness of ethical principles and values.

20. Inter-agency cooperation within the United Nations system should be reinforced with a view to building up a universally accessible body of knowledge, particularly for the benefit of developing countries and disadvantaged communities, from the massive amount of information produced through development projects and programmes.

21. UNESCO, in close cooperation with other intergovernmental organizations concerned, should undertake the compilation of an international inventory of legislation, regulations and policies on the generation and online dissemination of public domain information.

22. Definition and adoption of best practices and voluntary, self-regulatory, professional and ethical guidelines should be encouraged among information producers, users and service providers with due respect to freedom of expression. [emphasis added]

REAFFIRMING THE EQUITABLE BALANCE BETWEEN THE INTERESTS OF RIGHTS-HOLDERS AND THE PUBLIC INTEREST

23. Member States should undertake, in close cooperation with all interested parties, the updating of national

copyright legislation and its adaptation to cyberspace, taking full account of the fair balance between the interests of authors, copyright and related rights-holders, and of the public embodied in international copyright and related rights conventions.

24. Member States and international organizations, when appropriate, should encourage rights-holders and the lawful beneficiaries of limitations and exceptions to copyright and related rights protection to ensure that such limitations and exceptions are applied in certain special cases that do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the rights-holders as required for in the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT).

25. Member States and international organizations should pay careful attention to the development of technological innovations and to their potential impact on access to information in the framework of copyright and related rights protection under international treaties and agreements.

* * *The General Conference recommends that Member States apply the above provisions by taking whatever legislative or other steps are required to give effect within their respective territories and jurisdictions to the norms and principles set forth in this recommendation.

The General Conference recommends that Member States bring this recommendation to the attention of the authorities and services responsible for public and private works on ICT policies, strategies and infrastructures, including use of multilingualism on the Internet, the development of networks and services, expansion of public domain information on the Internet and intellectual property rights issues.

The General Conference recommends that Member States should report to it, on the dates and in a manner to be determined by it, on the action they have taken to give effect to this recommendation.

APPENDIX

DEFINITIONS

For the purpose of this Recommendation:

- Backbone is a high-capacity network that links together other networks of lower capacity;
- Copyright limitations and exceptions are provisions in copyright and related rights laws restricting the right of the author or other rights-holders with regard to the exploitation of their work or object of related rights. The main forms of such limitations and exceptions are compulsory licenses, statutory licenses and fair use;
- Cyberspace is the virtual world for digital or electronic communication associated with the global information infrastructure;
- Domain name is the name given to an Internet address, which facilitates access to Internet resources by users (e.g. “unesco.org” in <http://www.unesco.org>);
- Intelligent linguistic systems combine the rapid computational, data retrieval and manipulation power of today’s computers with the more abstract and subtle reasoning skills and understanding of nuances that are implied but not necessarily explicitly stated in inter-human communication within and across languages, thus allowing the simulation of human communication to a high degree;
- Internet service provider (ISP) is a supplier of Internet access services;
- Interoperability is the ability of software and hardware on different machines from different vendors to share data;
- Open source technologies are based on the premise of open source, a certification standard issued by the Open Source Initiative (OSI) that indicates that the source code (program instructions in their original form or programming language) of a computer program is made available free of charge to the general public;
- Peering is a relationship between two or more ISPs in which the ISPs create a direct link between them and agree to forward each other’s packets directly across this link instead of using the Internet backbone. When peering involves more than two ISPs, all traffic destined for any of the ISPs is first routed to a central exchange, called a peering point, and then forwarded to the final destination;
- Portability refers to the ability of software to be used on a variety of computers without necessitating a particular machine or hardware;

- Public domain information is publicly accessible information, the use of which does not infringe any legal right, or any obligation of confidentiality. It thus refers on the one hand to the realm of all works or objects of related rights, which can be exploited by everybody without any authorization, for instance because protection is not granted under national or international law, or because of the expiration of the term of protection. It refers on the other hand to public data and official information produced and voluntarily made available by governments or international organizations;
- Search engine is a software application that searches documents for specified keywords and localizes or retrieves the documents where the keywords were found;
- Universal access to cyberspace is equitable and affordable access by all citizens to information infrastructure (notably to the Internet) and to information and knowledge essential to collective and individual human development;
- Web browser is a software application used to locate and display World Wide Web pages.

The foregoing is the authentic text of the recommendation duly adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization during its 32nd session, which was held in Paris and declared closed the seventeenth day of October 2003.

IN FAITH WHEREOF we have appended our signatures this twenty-first day of November 2003.

The President of the General Conference

The Director-General

Articles 19 and 27 of the Universal Declaration of Human Rights, 1948; International Covenant on Civil and Political Rights, Article 27, and International Covenant on Economic, Social and Cultural Rights, 1966; United Nations Declaration on the Rights of Persons belonging to National, Ethnic, Religious and Linguistic Minorities (resolution 47/135 of 18 December 1992); the ACC Statement on Universal Access to Basic Communication and Information Services, issued in 1997; paragraph 25 of the United Nations Millennium Declaration, 2000.

- United Nations General Assembly resolution 35/201 (97th plenary meeting, 16 December 1980).
- Article I, paragraph 2(a).
- 29 C/Resolution 28, paragraph 2.A(h), 29 C/Resolution 36, 30 C/Resolution 37, 30 C/Resolution 41, and 31 C/Resolution 33.³³

“OneGeology (2008)

UNESCO, together with six other international umbrella bodies, established the OneGeology portal as the flagship project for the United Nations International Year of the Planet Earth (2008).³⁴

OneGeology, an international web-based initiative launched in mid 2008, is designed to improve the accessibility and usefulness of global geological map data.³⁵ Its aim is to create a dynamic digital geological map of the world, with the Geological Survey or Organisation in each contributing nation providing mapping data to a web portal.³⁶ Currently (early 2009) 90 nations have signed up,

³³ UNESCO (21 November 2003), Recommendation on the Promotion and Use of Multilingualism and Universal Access to Cyberspace and Report by the Director-General (31 C/25), available at http://portal.unesco.org/ci/en/ev.php-URL_ID=13475&URL_DO=DO_TOPIC&URL_SECTION=201.html.

³⁴ See <http://www.onegeology.org/home.html>.

³⁵ Its mission statement is to: “Make web-accessible the best available geological map data worldwide at a scale of about 1:1 million, as a geological survey contribution to the International Year of Planet Earth.” See http://www.onegeology.org/what_is/mission.html.

³⁶ http://www.onegeology.org/what_is/how.html.

with 30 providing data.³⁷ Australia participates through CSIRO's Solid Earth and Environment GRID (SEEGrid)³⁸ and Geoscience Australia.³⁹

One of the project's objectives is to stimulate a rapid increase in interoperability, through the development and use of the web mark-up language GeoSciML⁴⁰, a web-based geoscience encoding standard developed by the International Union of Geological Sciences (IUGS) Interoperability Working Group. GeoSciML is an "application schema" of GML, the OGC's OpenGIS(R) Geography Markup Language Encoding Standard⁴¹ for representation of geospatial features and geometry, and GeoSciML also uses the OpenGIS Observations and Measurements (O&M) Encoding standard. In addition to GeoSciML, OneGeology uses the OpenGIS Web Map Service (WMS) Interface Standard⁴² and other OGC standards.⁴³

International Oceanographic Commission of UNESCO (IOC) and International Oceanographic Data and Information Exchange (IODE)

The Intergovernmental Oceanographic Commission (IOC)⁴⁴ was founded in 1960 to promote oceanographic research and contribute to the establishment of systematic ocean observation platforms (ships, satellites, etc), the necessary technological development and transfer of knowledge. The IOC is headquartered in Paris and has 129 Member States which make up the IOC Assembly. It is the UN's focal point for ocean matters, guiding users to information through the development and maintenance of specialised portals and clearinghouse mechanisms, working in close collaboration with the UN and other agencies.

With the advance of oceanography from a science dealing mostly with local processes to one that is also studying ocean basin and global processes, researchers depend critically on the availability of an international exchange system to provide data and information from all available sources. Additionally, scientists studying local processes benefit substantially from access to data collected by other Member States in their area of interest.

A Working Group on Exchange of Oceanographic Data was formally established by IOC Resolution I-9, adopted at the first session of the IOC Assembly in October 1961 which stated that:

The mission of this Working Group shall be the facilitating of exchange of oceanographic data, the standardization of forms for reporting and coding data, the encouragement of the preparation of data catalogues, and the assistance of development of national oceanographic data centres.⁴⁵

Resolution I-9 also set out the following recommendations:

³⁷ www.onegeology.org

³⁸ See <http://www.seegrid.csiro.au>.

³⁹ See <http://www.ga.gov.au>.

⁴⁰ See http://www.onegeology.org/what_is/why.html

⁴¹ GML - ISO DIS 19136.

⁴² <http://www.opengeospatial.org/standards/wms>.

⁴³ http://www.geoconnexion.com/geo_news_article/-OGC-Standards-%22Bedrock%22-for-OneGeology-Project/4608.

⁴⁴ See <http://ioc-unesco.org>.

⁴⁵ See http://www.iode.org/index.php?option=com_content&task=view&id=132&Itemid=115.

Recommends that all oceanographic data taken by ships and recording stations outside territorial waters within the limits of declared national programmes be exchanged under the headings listed and by the methods prescribed in the IGY data centre manual...

Recommends to member countries the establishment of national oceanographic data centres in order to facilitate the collection, processing, analysis, and exchange of oceanographic data.⁴⁶

The IOC aims to ensure that oceanographic data and information collected through research, monitoring and observation, are used efficiently and distributed to the widest possible audience. In 2002, the IOC adopted a Data Exchange Policy which states that all IOC Member States are to provide timely, free and unrestricted access to all data, associated metadata and products generated under the auspices of IOC programs.⁴⁷

The IOC also has a specialized program for oceanographic data and information management, the International Oceanographic Data and Information Exchange (IODE)⁴⁸, which was established in 1961. The objectives of the IODE program (as updated during IODE-XVIII) are:⁴⁹

- to facilitate and promote the exchange of all marine data and information including metadata, products and information in real-time, near real time and delayed mode;
- to ensure the long term archival, management and services of all marine data and information;
- to promote the use of international standards, and develop or help in the development of standards and methods for the global exchange of marine data and information, using the most appropriate information management and information technology;
- to assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the IODE network; and
- to support international scientific and operational marine programmes of IOC and WMO [World Meteorological Organization] and their sponsor organisations with advice and data management services.

The IODE network, comprising more than 60 oceanographic data centres, facilitates the exchange of oceanographic data and information between participating Member States.⁵⁰ IODE forms a worldwide network consisting of marine information libraries and information centres that promote the management, exchange and dissemination of oceanographic data and information. Most of these are Designated National Agencies (DNAs) or National Oceanographic Data Centres (NODCs), while some were given special responsibility for specific regions or data types and are called Responsible National Oceanographic Data Centres (RNODCs). The DNAs, NODCs and RNODCs supply their data to World Data Centres (WDCs) dedicated to oceanography, based at Silver Spring (USA), Obninsk (Russian Federation) and Tianjin (China).⁵¹ IODE's National Oceanographic Data Centre members adhere to the IOC Data Exchange Policy.

⁴⁶ See http://www.codata.org/data_access/policies.html#WMO%20WDC

⁴⁷ International Oceanographic Commission, *IOC Oceanographic Data Exchange Policy*, UNESCO, 2002 available at http://www.iode.org/index.php?option=com_content&task=view&id=51&Itemid=95.

⁴⁸ See http://www.iode.org/index.php?option=com_content&task=view&id=2&Itemid=34.

⁴⁹ http://www.iode.org/index.php?option=com_content&task=view&id=89&Itemid=121.

⁵⁰ IODE started out as a Working Group on Oceanographic Data Exchange which was created by the First IOC Assembly (19-27 October 1961) through Resolution I-9. The Working Group became a Working Committee in 1973 through Resolution VIII-31, adopted by the 8th Session of the IOC Assembly (5-17 November 1973).

⁵¹ http://www.iode.org/index.php?option=com_content&task=view&id=3&Itemid=33.

The traditional model of centralized data centres at national or global scale is gradually being replaced by a decentralised network of data centres accessible and searchable over the internet. With this decentralised model scientists can participate more actively in the data management chain, and can also access data and information more easily. The model also enables a wider range of user communities to access data, data products and information. The global application of the new model and its inherent technology to oceanographic data and information management requires the continuing development and fine-tuning of new standards and applications.⁵² The IODE Program also has a strong capacity building role, aimed at assisting developing countries to acquire the necessary skills to participate equitably in IODE and other IOC programs.⁵³ For many years, the IODE Program has provided substantial support, through its TEMA component, to narrow the “digital divide” that still exists between developing and developed countries. Through an integrated capacity building programme that combines training, equipment and operational support, Member States in developing regions are assisted to ensure their active participation in the global network for Oceanographic Data Centres.⁵⁴

Whereas in the past IODE data centres focused mainly on physical oceanography data, the IODE Program now gives attention to all ocean related data including physical oceanography, chemical, biological, etc. IODE now closely collaborates with, and services the needs of other IOC and related programmes such as Ocean Sciences, Global Ocean Observing System (GOOS) and the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). Another major and long-term commitment of the IODE Program is the long-term accessibility and archival of oceanographic data, metadata and information to safeguard present and future holdings against loss or degradation. This strategy breaks through the traditional sectoralization of Ocean Services, Ocean Science and GOOS and ensures that the entire ocean research and management can benefit effectively from the extensive data and information infrastructure and know-how developed by the IODE Program.

IODE has developed a set of Guiding Principles for marine information management:⁵⁵

Guiding Principles

- Marine Information is a common resource, indispensable for understanding the ocean and for the wise exploitation and management of its resources.
- Marine Information is a prerequisite to the development of national and regional infrastructures, and contributes to the transfer of knowledge and technology between developing and developed countries.
- International marine information systems exist to interact and cooperate within a network of information centers, each of which is self-sufficient at the national level.
- Management of a cooperative network, based on the concept of confederation, is coordinated by the Intergovernmental Oceanographic Commission/IODE within the United Nations system, to ensure cohesion and coherency.

⁵² See http://www.iode.org/index.php?option=com_content&task=view&id=2&Itemid=34.

⁵³ Recommendation IODE-XVIII.1 was adopted at IODE-XVIII in (approximately 2004). The Recommendation is available at http://www.iode.org/index.php?option=com_content&task=view&id=2&Itemid=34.

⁵⁴ See http://www.iode.org/index.php?option=com_content&task=view&id=2&Itemid=34.

⁵⁵ See http://www.iode.org/index.php?option=com_content&task=view&id=4&Itemid=35.

- Member States make a firm commitment to a national policy in marine information management, based on the framework, services, and products and nominate members to contribute to the IODE Group of Experts on Marine Information Management (GEMIM).

In March 1993, the IOC adopted a *Data Management Policy for Global Ocean Programs*, as follows:

The overall purpose of this policy statement is to facilitate full and open access to quality ocean data for global ocean research programs. The Global Ocean Program to be carried out under GOOS (Global Ocean Observing System) requires an early and continuing commitment to the establishment, maintenance, validation, description, accessibility and distribution of high-quality, long-term data sets.

1. Full and open sharing of a wide spectrum of global international data sets for all ocean programs is a fundamental objective.
2. Data submitted for international exchange should be provided at the lowest possible cost to global ocean researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of processing, copying and shipping to fill a specific user request.
3. Preferably, all data should be made available in the public domain of IODE [International Organization for Data Exchange] data centers within one year of collection (chemical, biological and geological data may require longer intervals). For those global ocean programs in which selected principal investigators have initial periods of exclusive data use, data should be made available as soon as they become widely useful or at the maximum two years after data collection.
4. Preservation of data needed for long-term global ocean programs is required. For each and every global ocean data parameter, there should be at least one explicitly designated archive.
5. International data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
6. National and international standards should be used to the greatest extent possible for media and for processing and communication of global oceanographic data sets.⁵⁶

“Aarhus Convention on Access to Information, Public Participation in Decision Making, and Access to Justice in Environmental Matters”, United Nations Economic Commission for Europe (UNECE) (1998)

The Aarhus Convention, signed on 25 June 1998, grants the public rights and imposes on Parties and public authorities (as defined) obligations regarding access to information, public participation, and access to justice, the Convention’s three pillars or themes.⁵⁷

Article 1 describes the Convention’s fundamental objective:

In order to contribute to the protection of the right of every person of present and future generations to live in an environment adequate to his or her health and well-being, each Party shall guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.⁵⁸

⁵⁶ See http://www.codata.org/data_access/policies.html#WMO%20WDC

⁵⁷ See <http://www.unece.org/env/pp/> accessed on 13 January 2009.

⁵⁸ The text of the Convention is available at <http://www.unece.org/env/pp/treatytext.htm>. “Environmental information” is defined in Article 2, paragraph 3, as meaning -
continued on page

When commenting on the Convention, Kofi A. Annan, former Secretary-General of the United Nations stated that:

[a]lthough regional in scope, the significance of the Aarhus Convention is global. It is by far the most impressive elaboration of principle 10 of the Rio Declaration, which stresses the need for citizen's participation in environmental issues and for access to information on the environment held by public authorities...As such it is the most ambitious venture in the area of environmental democracy so far undertaken under the auspices of the United Nations.⁵⁹

The main thrust of the obligations contained in the Convention is towards public authorities, which are defined to cover governmental bodies from all sectors and at all levels (national, regional, local, etc.) and bodies performing public administrative functions. Although the Convention is not primarily directed at the private sector, privatised bodies having public responsibilities in relation to the environment and which are under the control of public authorities also fall within the definition.⁶⁰ The definition of “public authority” also covers the institutions of regional economic integration organisations which become a Party to the Convention. Therefore, if the EU ratifies the Convention, the provisions of the Convention will apply to EU institutions.

The Convention contains a number of important general features, including a rights based approach which is expressed in Article 1. This Article, setting out the objective of the Convention, requires Parties to guarantee rights of access to information, public participation in decision-making and access to justice in environmental matters. It also refers to the goal of protecting the right of every person of future and present generations to live in an environment adequate to health and well-being, which represents a significant step forward in international law. These rights underpin the procedural requirements in the Convention.⁶¹

Article 5 deals with the collection and dissemination of environmental information by each of the contracting parties to the Convention:

1. Each Party shall ensure that:

(a) Public authorities possess and update environmental information which is relevant to their

from page

...[A]ny information in written, visual, aural, electronic or any other material form on:

(a) The state of elements of the environment, such as air and atmosphere, water, soil, land, landscape and natural sites, biological diversity and its components, including genetically modified organisms, and the interaction among these elements;

(b) Factors, such as substances, energy, noise and radiation, and activities or measures, including administrative measures, environmental agreements, policies, legislation, plans and programmes, affecting or likely to affect the elements of the environment within the scope of subparagraph (a)

above, and cost-benefit and other economic analyses and assumptions used in environmental decision-making;

(c) The state of human health and safety, conditions of human life, cultural sites and built structures, inasmuch as they are or may be affected by the state of the elements of the environment or, through these elements, by the factors, activities or measures referred to in subparagraph (b) above;

⁵⁹ Ibid.

⁶⁰ Note that bodies acting in a judicial or legislative capacity are excluded.

⁶¹ See article by Svitlana Kravchenko, “Strengthening Implementation of MEAs: The Innovative Aarhus Compliance Mechanism” 7th INECE Conference Proceedings (2005): Svitlana Kravchenko explores the compliance mechanism established under the Aarhus Convention on Access to Information, Public Participation in Decision Making, and Access to Justice in Environmental Matters, and its “ambitious effort of bringing democracy and participation to the very heart of compliance itself”. See *Making Law Work: Environmental Compliance and Sustainable Development*, Chapter 3 “Multilateral Environmental Agreements in Action” at http://www.inece.org/mlw/Chapter3_MEAsInAction.pdf.

functions;

(b) Mandatory systems are established so that there is an adequate flow of information to public authorities about proposed and existing activities which may significantly affect the environment;

(c) In the event of any imminent threat to human health or the environment, whether caused by human activities or due to natural causes, all information which could enable the public to take measures to prevent or mitigate harm arising from the threat and is held by a public authority is disseminated immediately and without delay to members of the public who may be affected.

2. Each Party shall ensure that, within the framework of national legislation, the way in which public authorities make environmental information available to the public is transparent and that environmental information is effectively accessible, inter alia, by:

(a) Providing sufficient information to the public about the type and scope of environmental information held by the relevant public authorities, the basic terms and conditions under which such information is made available and accessible, and the process by which it can be obtained;

(b) Establishing and maintaining practical arrangements, such as:

- (i) Publicly accessible lists, registers or files;
- (ii) Requiring officials to support the public in seeking access to information under this Convention; and
- (iii) The identification of points of contact; and

(c) Providing access to the environmental information contained in lists, registers or files as referred to in subparagraph (b) (i) above free of charge.⁶²

The Convention provides for processes for applying for environmental information and specifies certain exemptions to requests for information.⁶³ Article 9 sets out the rights to access justice conferred on a party unsuccessfully requesting environmental information.⁶⁴

“Declaration of Principles and Action Plan”, World Summit on the Information Society (WSIS) (2003)

The World Summit on Information Society (WSIS) was a United Nations-sponsored conference that

⁶² The text of the Convention is available at <http://www.unece.org/env/pp/treatytext.htm>.

⁶³ Article 4 deals with Access to Environmental Information. The grounds for exemption are specified in paragraphs 3 and 4 of that Article and include where providing the information requested would adversely affect “international relations, national defence and public security” (para 4 (b)), “intellectual property” (para 4(e)), and “the confidentiality of personal data ..relating to a natural person where the person has not consented to the disclosure to the public, [and] where such confidentiality is provided for in national law” (para 4(f)).

⁶⁴ Article 9, paragraph 1, provides that:

1. Each Party shall, within the framework of its national legislation, ensure that any person who considers that his or her request for information under article 4 has been ignored, wrongfully refused, whether in part or in full, inadequately answered, or otherwise not dealt with in accordance with the provisions of that article, has access to a review procedure before a court of law or another independent and impartial body established by law.

In the circumstances where a Party provides for such a review by a court of law, it shall ensure that such a person also has access to an expeditious procedure established by law that is free of charge or inexpensive for reconsideration by a public authority or review by an independent and impartial body other than a court of law.

Final decisions under this paragraph 1 shall be binding on the public authority holding the information. Reasons shall be stated in writing, at least where access to information is refused under this paragraph.

convened in two phases - in Geneva in 2003 and in Tunis in 2005. The Geneva phase produced the Declaration of Principles and Action Plan (adopted on 12 December 2003).⁶⁵ The Geneva Action Plan described eleven action lines.⁶⁶

Concern for access to public sector information, particularly environmental information, was recognised in the Declaration of Principles entitled *Building the Information Society: a global challenge for the new Millennium*⁶⁷. The WSIS Declaration of Principles sets out some overarching principles for the information society, including that:

- “everyone has the right to freedom of opinion and expression, that this right includes freedom to hold opinions without interference and to seek, receive and impart information through any media regardless of frontiers”,⁶⁸ and
- “the wide dissemination, diffusion and sharing of knowledge is important to encourage innovation and creativity”.⁶⁹

Part B3 of the Declaration of Principles, entitled *Access to information and knowledge*, sets out the following principles:

(24) The ability for all to access and contribute information, ideas and knowledge is essential in an inclusive Information Society.

(25) The sharing and strengthening of global knowledge for development can be enhanced by removing barriers to equitable access to information for economic, social, political, health, cultural, educational, and scientific activities and by facilitating access to public domain information, including by universal design and the use of assistive technologies.

(26) A rich public domain is an essential element for the growth of the Information Society, creating multiple benefits such as an educated public, new jobs, innovation, business opportunities, and the advancement of sciences. Information in the public domain should be easily accessible to support the Information Society, and protected from misappropriation. Public institutions such as libraries and archives, museums, cultural collections and other community-based access points should be strengthened so as to promote the preservation of documentary records and free and equitable access to information.

(27) Access to information and knowledge can be promoted by increasing awareness among all stakeholders of the possibilities offered by different software models, including proprietary, open-source and free software, in order to increase competition, access by users, diversity of choice, and to enable all users to develop solutions which best meet their requirements. Affordable access to software should be considered as an important component of a truly inclusive Information Society.

⁶⁵ World Summit on the Information Society – WSIS, *Declaration of Principles – Building the Information Society: a global challenge in the new Millennium*, WSIS-03/GENEVA/DOC/4-E, 12 December 2003, available at <http://www.itu.int/wsis/documents/index.html>; and WSIS, *Plan of Action*, WSIS-03/GENEVA/DOC/5-E, 12 December 2003, available at <http://www.itu.int/wsis/documents/index.html>.

⁶⁶ For information about how UNESCO is progressing the WSIS Action Plan see http://portal.unesco.org/ci/en/ev.php-URL_ID=15868&URL_DO=DO_TOPIC&URL_SECTION=201.html. For Access to Information and Knowledge, see http://www.unesco-ci.org/cgi-bin/wsis/database/page.cgi?g=Access_to_Information_and_Knowledge/index.html&d=1.

⁶⁷ World Summit on the Information Society (WSIS), *Declaration of Principles – Building the Information Society: a global challenge in the new Millennium*, WSIS-03/GENEVA/DOC/4-E, 12 December 2003, available at <http://www.itu.int/wsis/docs/geneva/official/dop.html>.

⁶⁸ Part A, para 4 at <http://www.itu.int/wsis/docs/geneva/official/dop.html>

⁶⁹ Part B6, para 42 at <http://www.itu.int/wsis/docs/geneva/official/dop.html> at 13 February 2007.

(28) We strive to promote universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information, including open access initiatives for scientific publishing.

Another focus of the WSIS Declaration was to turn “the digital divide into a digital opportunity” for developing countries in particular, where the benefits of information technology are unevenly distributed between rich and poor.⁷⁰

Action Line C3, *Access to information and knowledge*, in the Plan of Action states:

10. ICTs allow people, anywhere in the world, to access information and knowledge almost instantaneously. Individuals, organizations and communities should benefit from access to knowledge and information.

a) Develop policy guidelines for the development and promotion of public domain information as an important international instrument promoting public access to information.

b) Governments are encouraged to provide adequate access through various communication resources, notably the Internet, to public official information. Establishing legislation on access to information and the preservation of public data, notably in the area of the new technologies, is encouraged.

c) Promote research and development to facilitate accessibility of ICTs for all, including disadvantaged, marginalized and vulnerable groups.

d) Governments, and other stakeholders, should establish sustainable multi-purpose community public access points, providing affordable or free-of-charge access for their citizens to the various communication resources, notably the Internet. These access points should, to the extent possible, have sufficient capacity to provide assistance to users, in libraries, educational institutions, public administrations, post offices or other public places, with special emphasis on rural and underserved areas, while respecting intellectual property rights (IPRs) and encouraging the use of information and sharing of knowledge.

e) Encourage research and promote awareness among all stakeholders of the possibilities offered by different software models, and the means of their creation, including proprietary, open-source and free software, in order to increase competition, freedom of choice and affordability, and to enable all stakeholders to evaluate which solution best meets their requirements.

f) Governments should actively promote the use of ICTs as a fundamental working tool by their citizens and local authorities. In this respect, the international community and other stakeholders should support capacity building for local authorities in the widespread use of ICTs as a means of improving local governance.

g) Encourage research on the Information Society, including on innovative forms of networking, adaptation of ICT infrastructure, tools and applications that facilitate accessibility of ICTs for all, and disadvantaged groups in particular.

h) Support the creation and development of a digital public library and archive services, adapted to the Information Society, including reviewing national library strategies and legislation, developing a global understanding of the need for “hybrid libraries”, and fostering worldwide cooperation between libraries.

i) Encourage initiatives to facilitate access, including free and affordable access to open access journals and books, and open archives for scientific information.

j) Support research and development of the design of useful instruments for all stakeholders to foster increased awareness, assessment, and evaluation of different software models and licences, so as to ensure an optimal choice of appropriate software that will best contribute to achieving development goals within local conditions. [emphasis added]⁷¹

⁷⁰ See <http://www.itu.int/wsis/docs/geneva/official/dop.html> at 13 February 2007.

⁷¹ *Plan of Action*, WSIS-03/Geneva/Doc/5-E, 12 December 2003 at

The second phase of WSIS produced the Tunis Agenda for the Information Society, adopted on 18 November 2005. The Tunis phase reaffirmed the principles established at Geneva phase and reiterated that:

[a]ccess to information and sharing and creation of knowledge contributes significantly to strengthening economic, social and cultural development.

The attendees recognised that open access to information could not be achieved without first creating a trustworthy, transparent and non-discriminatory legal and policy environment. They placed some reliance on governments to develop and adopt regulatory frameworks, stating:

We are convinced that our goals can be accomplished through the involvement, cooperation and partnership of governments and other stakeholders, i.e. the private sector, civil society and international organizations.

Since WSIS, work has proceeded on the eleven action lines described in the Geneva Action Plan. For each action line, a UN organisation (eg ITU or UNESCO) was appointed as a “facilitator” or “moderator”. Beginning in 2006, various facilitation and consultation meetings have taken place. At a meeting in Geneva in May 2007, Action Lines were developed to implement the principles and goals set out in the WSIS sessions of 2003 and 2005. UNESCO organised facilitation meetings on WSIS Action Line C7 (ICT applications – benefits in all aspects of life, including e-science) and Action Line C3 (access to information and knowledge).

The Internet Governance Forum (IGF)⁷² is a direct outcome of the World Summit on the Information Society (WSIS).⁷³ The Tunis Agenda invited the UN Secretary General to convene a new forum for multi-stakeholder policy dialogue – the IGF.⁷⁴ The inaugural meeting of the IGF was in Athens, Greece from 30 October to 2 November.⁷⁵ The second IGF meeting was held in Rio de Janeiro in November 2007 and the third was held in Hyderabad in December 2008.

“Rio Declaration on Environment and Development”, United Nations Conference on Environment and Development (UNCED) (1992)

At the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro 3 – 14 June 1992, the Rio Declaration was adopted and the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, was reaffirmed.⁷⁶

The Rio Declaration includes the following principles:

Principle 9

from page

<http://www.itu.int/wsis/docs/geneva/official/poa.html#c3>

⁷² See <http://www.intgovforum.org/cms/index.php/home>.

⁷³ See generally at <http://www.intgovforum.org/cms/index.php/home> and *Internet Governance Forum – the first two years*, at <http://www.intgovforum.org/cms/index.php/home/57-2008igf/311-internet-governance-forum-the-first-two-years>.

⁷⁴ Para 67.

⁷⁵ <http://www.intgovforum.org/cms/index.php/athensmeeting>.

⁷⁶ <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=1163>; UNEP is the United Nations Environment Program.

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.⁷⁷

“Framework Convention on Climate Change”, United Nations Conference on Environment and Development (UNCED) (1992)

The United Nations Framework Convention on Climate Change (UNFCCC), adopted at UNCED in Rio de Janeiro in June 1992 provides:

Article 4: Commitments

1. All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, shall:

...

g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and regarding the economic and social consequences of various response strategies;

h) Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate change, and to the economic and social consequences of various response strategies...⁷⁸

At the November 1998 Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC), the Parties adopted Decision 14 which urged them to:

[U]ndertake free and unrestricted exchange of data to meet the needs of the Convention, recognizing the various policies on data exchange of relevant international and intergovernmental organizations...⁷⁹

“Agenda 21”, United Nations Conference on the Environment and Development (UNCED) (1992)

Agenda 21, adopted at UNCED in Rio de Janeiro in June 1992, states in Chapters 31 and 35:

⁷⁷ Ibid. See further at <http://www.gdrc.org/decision/principle-10.html> and <http://www.gdrc.org/decision/edm-documents.html>.

⁷⁸ The United Nations Framework Convention on Climate Change (1992), accessible at http://unfccc.int/essential_background/convention/background/items/2853.php.

⁷⁹ See <http://unfccc.int/cop4/>.

Chapter 31: The Scientific and Technological Community

A. Improving communication and cooperation among the scientific and technological community and decision makers and the public

Basis for action:

31.2 The scientific and technological community and policy makers should increase their interaction in order to implement strategies for sustainable development on the basis of the best available knowledge. This implies that decision makers should provide the necessary framework for rigorous research and for full and open communication of the findings of the scientific and technological community, and develop with it ways in which research results and the concerns stemming from the findings can be communicated to decision-making bodies so as to better link scientific and technical knowledge with strategic policy and program formulation ...

Activities:

31.4 Governments should undertake the following activities:

...

e) To improve and strengthen programs for disseminating research results of universities and research institutions...This requires full and open sharing of data and information among scientists and decision makers.

...

Chapter 35: Science for Sustainable Development

D. Building up scientific capacity and capability

Activities:

35.22 The following activities should be undertaken:

...

c) Develop and expand national scientific and technological databases, processing data in unified formats and systems, and allowing full and open access to the depository libraries of regional scientific and technological information networks. Promote submission of scientific and technological information and databases to global or regional data centers and network systems;

...

e) Develop, strengthen and forge new partnerships among national, regional and global capacities to promote the full and open exchange of scientific and technological data and information and to facilitate technical assistance related to environmentally sound and sustainable development. This should be done through the development of mechanisms for the sharing of basic research, data and information, and the improvement and development of international networks and centers, including regional linking with national scientific databases, for research, training and monitoring. Such mechanisms should be designed so as to enhance professional cooperation among scientists in all countries and to establish strong national and regional alliances between industry and research institutions...⁸⁰

“Global Climate Observing System (GCOS) Policy on Data Access”, Joint Scientific and Technical Committee of GCOS (1993)

⁸⁰ See <http://www.un.org/esa/sustdev/documents/agenda21/index.htm>.

In beginning to discuss and formulate a data policy, the Joint Scientific and Technical Committee of GCOS listed the following points as important for consideration in the development of the policy:

- Global environmental concerns, as reflected in the recommendations agreed at the UNCED, are an overriding justification for ensuring the unrestricted international exchange of GCOS data for non-commercial scientific and applications purposes.
- The GCOS requires an early and continuing commitment by participating national governments and international bodies to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality, long-term data.
- The sharing and exchange of GCOS data is a fundamental objective. Data should be provided at the lowest possible cost to users.
- Preservation of all data needed for GCOS is required; suitable archive facilities should be ensured for all GCOS data; procedures and criteria for setting priorities for data acquisition, retention, and purging should be developed and implemented by participating nations and international bodies; an international clearinghouse process should be established to prevent the purging and loss of important data.
- To the maximum extent possible, data archives must include easily accessible information about the data holdings, including long-term quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data.
- International standards should be used as far as possible to acquire, process, and distribute global data.
- For those data relevant to GCOS in which selected investigators or organizations have initial periods of exclusive data use, data should be made available as soon as possible.⁸¹

***“Global Climate Observing System (GCOS) Climate Monitoring Principles”,
Conference of the Parties, United Nations Framework Convention on Climate
Change (UNFCCC) (2003)***

At the November 1999 COP to the UNFCCC, 10 basic climate change monitoring principles were adopted.⁸² The complete set of principles was adopted by the Congress of the World Meteorological Organization (WMO) in May 2003,⁸³ agreed to by the Committee on Earth Observation Satellites (CEOS) at its 17th Plenary in November 2003, and adopted by the COP of the UNFCCC in December 2003.⁸⁴

The GCOS Climate Monitoring Principles set out the requirements for effective climate monitoring systems. Principle 10 requires data management systems that facilitate access, use and interpretation to be included as essential elements of climate monitoring systems.⁸⁵

“Implementation plan for the Global Observing System for Climate in support

⁸¹ See http://www.codata.org/data_access/policies.html#WMO%20WDC.

⁸² Decision C/CP.5 at COP-5, November 1999.

⁸³ Resolution 9 (Cg-XIV), May 2003.

⁸⁴ Decision 11/CP.9 at COP – 9, December 2003.

⁸⁵ FCCC/SBSTA/2004.MISC.16, <http://unfccc.int/resource/docs/2004/sbsta/misc16.pdf> at p15.

of the United Nations Framework Convention on Climate Change”, Global Climate Observing System (GCOS), United Nations Framework Convention on Climate Change (UNFCCC) (2004)⁸⁶

The Global Climate Observing System (GCOS), in consultation with its partners, has prepared an Implementation Plan that addresses the requirements identified in the Second Report on the Adequacy of Global Observing Systems for Climate in Support of the UN Framework Convention on Climate Change (UNFCCC) (the ‘Second Adequacy Report’).⁸⁷ In decision 14/CP.4, the Conference of the Parties (COP) urged Parties to undertake free and unrestricted exchange of data to meet the needs of the UNFCCC.

The Plan is based on the free and unrestricted exchange of all data and products and incorporates actions to: develop standards and procedures for meta-data and its storage and exchange; to ensure timely, efficient and quality-controlled flow of all Essential Climate Variables (ECVs) data to climate monitoring and analysis centres and international archives, and to ensure that data policies facilitate the exchange and archiving of all ECV data and associated metadata.⁸⁸

This Implementation Plan specifically responds to the request of the COP of the UNFCCC in decision 11/CP.9 to develop a 5 to 10 year implementation plan. On issues of access to and reuse of climate data, the Implementation Plan states:

4. Access to Climate Data

4.1. High-Quality Climate Data

Ensuring that high-quality climate data records are collected, retained and made accessible for use by current and future generations of scientists and decision-makers is a key objective of this Plan. As a result, investment in the data management and analysis components of the system is as important as the acquisition of the data. The Plan calls for strengthening the current International Data Centres⁸⁹ and seeking commitments for new Centres so that all Essential Climate Variables (ECVs) have an appropriate infrastructure.

...

Key Action 8: Parties need to ensure that International Data Centres are established and/or strengthened for all ECVs.

The flow of data to the user community and to the International Data Centres is not adequate for many Essential Climate Variables (ECVs), especially for those of the terrestrial observing networks. Lack of national engagement and/or resources, restrictive data policies, and inadequate national and international data-system infrastructure are the main causes of the inadequacy.

In decision 14/CP.4, the COP urged Parties to undertake free and unrestricted exchange of data to meet the needs of the Convention, recognizing the various policies on data exchange of relevant intergovernmental and international organizations. Yet, as the Second Adequacy Report points out repeatedly with respect to almost all of the variables, the record of many Parties in providing full access to their data is poor.

⁸⁶ GCOS – 92, WMO/TD No.1219.

⁸⁷ The Second Report on the Adequacy of the Global Observing Systems for Climate in Support of the UNFCCC, GCOS-82, April 2003 (WMO/TD No. 1143). The Executive Summary of the report is at FCCC/SBSTA/2004.MISC.16, <http://unfccc.int/resource/docs/2004/sbsta/misc16.pdf> at page 6.

⁸⁸ Ibid.

⁸⁹ International Data Centres are responsible for monitoring, product preparation and dissemination as well as archiving.

World Meteorological Organization (WMO)

The World Meteorological Organisation (WMO)⁹⁰ is a specialised agency of the United Nations., established in 1951.⁹¹ It has 185 member states and territories which coordinate the collection and exchange of information on the state of the global atmosphere, ocean and inland waters and support the provision of essential meteorological and related services in individual countries and for international shipping and aviation. Australia has been a member of the WMO since 1949.⁹²

The WMO is responsible for global cooperation in meteorological and hydrological observations and services (including systems for rapid data exchange, standardised observations and uniform publication of observations and statistics).⁹³ It plays a leading role in several international programs and cooperation agreements related to climate change (such as the World Climate Program which supports GCOS and the Intergovernmental Panel on Climate Change (IPCC)).⁹⁴

In June 1990, the WMO's Executive Council adopted a resolution requesting "members to reaffirm their commitment to the 'free and unrestricted international exchange of basic meteorological data and products' among national meteorological services".

At the June 1995 WMO Congress, faced with a proposal for a resolution that would require members to enforce restrictions on certain categories of information for the commercial benefit of other nations, the US proposed a compromise which was accepted. The compromise explicitly affirmed the fundamental principle that governmental meteorological information – like other scientific, technical and environmental information – should be shared between nations without restriction.⁹⁵

Resolution 40 (Cg-XII) - WMO Policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities, is an important data policy. Resolution 40 states that the WMO Congress:⁹⁶

Adopts the following policy:

As a fundamental principle of the World Meteorological Organization (WMO), and in consonance with the expanding requirements for its scientific and technical expertise, WMO commits itself to broadening and enhancing the free and unrestricted* international exchange of meteorological and related data and products;

Adopts the following practice:

⁹⁰ http://www.wmo.int/pages/index_en.html. WMO policy documents are available at http://www.wmo.int/pages/governance/policy/index_en.html

⁹¹ The Agreement between the United Nations and WMO, which came into force on 20 December 1951, is at ftp://ftp.wmo.int/Documents/MediaPublic/Publications/Policy_docs/agreement_un.pdf. The WMO's headquarters are in Geneva. It is the successor to the International Meteorological Organisation (IMO), which dated back to 1853.

⁹² See http://www.wmo.int/pages/members/membership/index_en.html

⁹³ See http://www.iode.org/index.php?option=com_content&task=view&id=3&Itemid=33

⁹⁴ Ibid.

⁹⁵ For background, see Appendix IV to OMB Circular A-130 – Analysis of key sections at http://www.whitehouse.gov/omb/circulars/a130/a130appendix_iv.html.

⁹⁶ See <http://www.nws.noaa.gov/im/wmor40.htm> and generally at <http://www.nws.noaa.gov/im/wmocovr.htm#Contents;> Resolution 40 (Cg-XII) is also available at ftp://ftp.wmo.int/Documents/MediaPublic/Publications/Policy_docs/508_E.pdf

1. Members shall provide on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of all nations, particularly those basic data and products, as, at a minimum, described in Annex I to this resolution⁹⁷, required to describe and forecast accurately weather and climate, and support WMO Programs;
2. Members should also provide the additional data and products which are required to sustain WMO Programs at the global, regional, and national levels and, further, as agreed, to assist other Members in the provision of meteorological services in their countries. While increasing the volume of data and products available to all Members by providing these additional data and products, it is understood that WMO Members may be justified in placing conditions on their re-export for commercial purposes outside of the receiving country or group of countries forming a single economic group, for reasons such as national laws or costs of production;
3. Members should provide to the research and education communities, for their noncommercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO with the understanding that their commercial activities are subject to the same conditions identified in Adopts (2) above;

Urges Members to:

1. Strengthen their commitment to the free and unrestricted exchange of meteorological and related data and products;
2. Increase the volume of data and products exchanged to meet the needs of WMO Programs;
3. Assist other Members, to the extent possible, and as agreed, by providing additional data and products in support of time-sensitive operations regarding severe weather warnings;
4. Strengthen their commitments to the WMO and ICSU WDCs in their collection and supply of meteorological and related data and products on a free and unrestricted basis;
5. Implement the practice on the international exchange of meteorological and related data and products, as described in Adopts (1) to (3) above;
6. Make known to all Members, through the WMO Secretariat, those meteorological and related data and products which have conditions related to their re-export for commercial purposes outside of the receiving country or group of countries forming a single economic group;
7. Make their best efforts to ensure that the conditions which have been applied by the originator of additional data and products are made known to initial and subsequent recipients;

*"Free and unrestricted" means non-discriminatory and without charge. "Without charge", in the context of this resolution, means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.⁹⁸

Resolution 40 recognised that individual nations may in particular cases apply their own domestic copyright and similar laws to prevent what they deem to be unfair or inappropriate competition within their own territories. The compromise reached in Resolution 40 left open the possibility of further consultation on whether government information policy in global information infrastructure

⁹⁷ Note that Annex 1 to WMO Resolution 40 (Cg-XII), Data and Products to be exchanged without charge and with no conditions on use is available at <http://www.nws.noaa.gov/im/wmor40a1.htm>

⁹⁸ See <http://www.nws.noaa.gov/im/wmor40.htm>; Resolution 40 (Cg-XII) is also available at ftp://ftp.wmo.int/Documents/MediaPublic/Publications/Policy_docs/508_E.pdf; The definition of "without charge" in set out in Annex 4 to Resolution 40 (Cg-XII), and is taken from Resolution 23 (EC-XLII), *Free and Non-discriminatory and without unrestricted charge*.

would follow the “open and unrestricted access” model favoured by the US and several other nations, or whether it should follow the “government commercialisation” model adopted by others. The importance of ensuring the “appropriate implementation of the letter and spirit of Resolution 40” was reaffirmed in the *Geneva Declaration* of the thirteenth World Meteorological Congress which met in Geneva in May 1999.⁹⁹

To give effect to Resolution 40 (Cg-XII) and other relevant WMO programs, the WMO has developed the following *Principles Governing Access to Data Held in WMO World Data Centres (WDCs)*:

1. WMO World Data Centres (WDCs) are coordinated through the relevant WMO bodies. The Centres themselves are established, organized, supported and managed entirely within national and international entities, as their contribution to the relevant WMO Programmes.
2. WMO Members have a common ownership of the data held in the WMO WDCs.
3. WMO WDCs should provide data on a free and unrestricted basis, at the lowest possible cost which should be no more than the cost of reproduction and distribution. No charge will be made for the data themselves.
4. WMO WDCs shall not accept in their holdings data for which there are restrictions for free and open access.
5. Members participating in the relevant WMO Programmes are urged to endeavor to submit data to the relevant WMO WDCs as promptly as possible in accordance with the procedures defined by the Centres.
6. Procedures and criteria for data reporting to the WMO WDCs should be developed by each of the Centres.
7. Data archives of WMO WDCs must include readily accessible and comprehensive information describing the datasets, including quality assessments.
8. WMO WDCs should, to the greatest extent possible, use media as well as processing and communication systems which are compatible with internationally accepted standards and protocols.
9. Long-term preservation of all data submitted to the WMO WDCs should be ensured.¹⁰⁰

These arrangements resulted in the Australian Bureau of Meteorology having access to meteorological data and information generated overseas, including satellite data, meteorological observations and forecast guidance material. It has been estimated that the introduction of any realistically conceivable market framework for international trade of basic meteorological data would result in a rise in cost to Australia of maintaining its current level (quality and quantity) of meteorological service provision by a factor of two to ten or more.

In recognition of the need for increased global water resources assessment, the WMO adopted a further policy in 1995 recognising the principle of free and unrestricted exchange of hydrological data and products (Resolution 25, Cg-XIII, 1995).

⁹⁹ Geneva Declaration of Thirteenth World Meteorological Congress (Cg-XIII, Annex IV), at http://www.wmo.int/pages/governance/policy/geneva_declaration_en.html.

¹⁰⁰ See http://www.codata.org/data_access/policies.html#WMO%20WDC

“Guide on Managing Intellectual Property for Museums”, World Intellectual Property Organisation (WIPO) (2007)

Where once museums were concerned with using the IP owned by others, they are now faced with the responsibility of managing their own IP and mediating the potential third party uses and users. The IP at issue may relate to their own interpretative or contextualised authoritative content, to technologies developed in-house to assist in distributing or administering their collections, and to branding tools that provide recognition and awareness of the museum in a commercial context.¹⁰¹

The perception of IP in museums in developing countries has been more varied, with some addressing the issue in the context of providing broad access to documented heritage or, instead, as but one issue in the broader debate concerning the retention and preservation of national cultural heritage. With the advent of new technologies, museums in developing countries are also facing similar challenges in managing and distributing their cultural heritage content, that is, while still maintaining provenance, attribution and authority, objectives shared by museums globally.

The World Intellectual Property Organisation (WIPO) recognised a growing need in the cultural heritage community and thus, commissioned this publication to address its needs. The publication is separated into two parts, with the first addressing the identification of IP relating to museums and the recommended best practices to manage it, consistent with institutional mission and mandate. The second part of the publication reviews existing and emerging business models that may assist in identifying opportunities for museums as a means of creating sustainable funding for its programs in a manner consistent with their respective mission and mandate.

2. International organisations

Organisation for Economic Cooperation and Development (OECD)

The OECD is a group of 30 countries (including Australia) which aims to facilitate and promote good governance.¹⁰² The OECD:

produces internationally agreed instruments, decisions and recommendations to promote rules of the game in areas where multilateral agreement is necessary for individual countries to make progress in a globalised economy.¹⁰³

In a Ministerial Communique issued in January 1991, the OECD stated that

OECD governments should strengthen their efforts to support and encourage the international science community to assess environmental risks to human health and natural ecosystems, and to promote a full and open exchange of environmental data and information.¹⁰⁴

During the last decade the OECD,¹⁰⁵ through its Directorate for Science, Technology and Policy¹⁰⁶

¹⁰¹ Pantalonny, Rina Elster, WIPO Guide on Managing Intellectual Property for Museums, 2007, available at http://www.wipo.int/copyright/en/museums_ip/guide.html.

¹⁰² http://www.oecd.org/about/0,2337,en_2649_201185_1_1_1_1_1,00.html.

¹⁰³ Ibid.

¹⁰⁴ See http://www.codata.org/data_access/policies.html#WMO%20WDC.

and, in particular, the Working Party on the Information Economy (WPIE) within that Directorate,¹⁰⁷ has examined the social and economic implications of the development and use of information and communication technologies, the internet and e-business.¹⁰⁸ The WPIE has focused on a range of issues including digital content and taken a leading role in the development of international policy on access to public sector information and publicly funded research outputs.¹⁰⁹

“OECD Workshop on Public Sector Information: Summary”, OECD Directorate for Science, Technology and Industry, Committee for Information, Computer and Communications Policy (2006)

At the OECD Working Party on the Information Economy’s Workshop on Public Sector Information held on 31 May 2006, Professor Burkert presented a set of general principles for public sector information policy, which he had developed with the (late) Peter Weiss of the US Department of Commerce, based on analyses of national and regional policies.¹¹⁰

The principles were summarised as follows:

1. Inventory principle - Public sector institutions (PSI) should make an inventory of their information holdings, update it regularly and actively make it generally and easily accessible.
2. Access principle - PSI holdings should be subject to a regime of access principles. These comprise the right of anyone to obtain PSI. Exemptions should only be based on consideration of personal privacy, preservation of significant private commercial interests where explicitly protected by copyright, or legitimate national security concerns.
3. Quality principle - PSI holdings should be provided in the same quality as they have been provided by the public sector.
4. Cost principle - The costs chargeable to any requester should not exceed marginal costs of distribution; there should be the possibility to waive such costs in cases where requesters can show a specific public interest is involved.
5. Choice principle - If available (or if easily transformable) Information should be provided in the requested format. The requester may be charged with transformation costs, provided administrative costs of recovering them do not exceed those.
6. IP rights and control of origin principles - PSI holdings should be exempted from IPR and also copyright and data-base protection regimes. The public sector should, however, be entitled to ensure through minimal regulation that responsibilities for any changes to the original information after its

from page

¹⁰⁵ For an overview of recent OECD activity in relation to digital content and public sector information, see http://www.epsiplus.net/reports/oecd_psi_reports_presentations.

¹⁰⁶ http://www.oecd.org/department/0,3355,en_2649_33703_1_1_1_1_1,00.html.

¹⁰⁷ <http://www.oecd.org/sti/information-economy>.

¹⁰⁸ For example, see: *Public Sector Modernisation: Open Government*, OECD Policy Brief, 2005 at <http://www.oecd.org/dataoecd/1/35/34455306.pdf>

¹⁰⁹ For example, on 4 – 5 February 2008 the WPIE and CODATA co-hosted a workshop in Paris on “The Socioeconomic Effects of Public Sector Information on Digital Networks: Towards a Better Understanding of Different Access and Reuse Policies”, see http://www.oecd.org/document/48/0,3343,en_2649_33757_40046832_1_1_1_1,00.html.

¹¹⁰ H Burkert and P Weiss, ‘Towards a Blueprint for a Policy on PSI’ in G Aichholzer and H. Burkert (eds), *Public Sector Information in the Digital Age* (2004) as cited in DSTI/ICCP/IE(2005)2/FINAL, reproduced in OECD, Working Party on the Information Economy, *OECD Workshop on Public Sector Information: Summary* DSTI/ICCP/IE(2006)14 at p27, <http://www.oecd.org/dataoecd/34/42/37865140.pdf>. See Paul Uhler’s comments at p29. For other documents presented at the workshop see <http://www.oecd.org/sti/digitalcontent>.

transfer are made appropriately transparent.

7. Legitimate improvement principle - Public sector institutions may extend, improve quality and format of their information provided they do so after a transparent procedure and in order to improve quality and/or extent of their services. Public bodies should not “feel compelled to discontinue a service that is to the public benefit simply because a commercial vendor chooses to duplicate it. [...] Information vital to the public interest should not be “captured” by any entity, particularly in the private sector, which has economic reasons for controlling access”.
8. Continuity of obligations principle - PSI activities even if transferred to the private sector are subject – to the extent of their privilege – to the same principles as PSI holdings.

“Digital Broadband Content: Public Sector Information and Content”, Organisation for Economic Co-operation and Development (OECD) (2006)

The 2006 report, *Digital Broadband Content: Public Sector Information and Content*, by Graham Vickery and Sacha Wunsch-Vincent of the OECD’s Directorate for Science, Technology and Industry, was presented to the Working Party on the Information Economy in 2005.¹¹¹

The study provides an overview of the main areas of public sector information (PSI), including geographic and meteorological information, and their commercial applications. It considers the measures taken by OECD countries to develop competitive markets for PSI, such as ensuring that private service providers face the same conditions as public institutions, enabling private sector access to public data and clarifying the conditions under which the data can be used. Issues which need to be further addressed include which access regimes and reuse arrangements maximise the positive economic and social benefits of PSI and which may, for example, lead to the development of innovative activities based on government-generated content and data.

The objective of the study was to illustrate the economic importance and variety of PSI and its main commercial applications, and to explore practices to preserve and to make public sector information and content accessible. For this purpose, the study:

- a) develops a taxonomy of different types of PSI and public content to help identify their similarities and differences;
- b) analyses particular domains of PSI to increase understanding of business sector value-adding activities and looks at existing public content projects and programmes and relating challenges;
- c) discusses benefits of information and communication technologies (ICTs) for preservation and diffusion of public sector content specifying opportunities to promote social and economic benefits and particular challenges; and
- d) identifies the main policy issues in these two areas and discusses solutions and further research.¹¹²

¹¹¹ OECD, *Digital Broadband Content: Public Sector Information and Content*, DSTI/ICCP/IE(2005)2/FINAL, Committee for Information, Computer and Communications Policy, Working Party on the Information Economy, 30 March 2006, available at <http://www.oecd.org/dataoecd/10/22/36481524.pdf>.

¹¹² Ibid, p8.

“Ministerial Declaration on Access to Research Data from Public Funding” (2004) and “Recommendation of the Council concerning Access to Research Data from Public Funding”, Organisation for Economic Co-operation and Development (OECD) (2006)

At a meeting in Paris in January 2004, the OECD member countries adopted the Ministerial Declaration on Access to Research Data from Public Funding.¹¹³ The Declaration recognised that:

An optimum international exchange of data, information and knowledge contributes decisively to the advancement of scientific research and innovation.¹¹⁴

OECD member countries declared their commitment to work towards establishing open access regimes for digital research data derived from publicly funded projects, in accordance with specific objectives and principles: openness, transparency, legal conformity, formal responsibility, professionalism, protection of intellectual property, interoperability, quality and security, efficiency and accountability. The Declaration invited OECD members “to develop guidelines based on commonly agreed principles to facilitate optimal cost-effective access to digital research data from public funding”, for endorsement by the OECD Council.¹¹⁵ In response, the OECD’s Committee for Scientific and Technological Policy convened a group of experts to develop a set of principles and guidelines.

A Draft Recommendation of the OECD Council Concerning Access to Research Data from Public Funding in May 2006 reiterated the OECD member countries’ commitment to open access and called on them to increase their efforts to develop policies and good practices relating to the accessibility, use and management of research data.¹¹⁶

Following several rounds of consultation with research organisations and policy making bodies in OECD member countries to achieve consensus, the Committee for Scientific and Technological Policy published the *Principles and Guidelines for Access to Research Data from Public Funding*,¹¹⁷ which are designed to provide guidance on enhancing international cooperation in research. The principles and guidelines were approved by the OECD’s Committee for Scientific and Technological Policy in October 2006.

On 14 December 2006, the OECD Council endorsed the *Principles and Guidelines for Access to Research Data from Public Funding*, attached to an OECD Recommendation to member countries to take the Principles and Guidelines into consideration (taking account of differences in their national context) “to develop policies and good practices related to the accessibility, use and

¹¹³ OECD, *Declaration on Access to Research Data from Public Funding*, adopted on 30 January 2004 in Paris at the Meeting of the OECD Committee for Scientific and Technological Policy at Ministerial Level, available at: http://www.oecd.org/document/15/0,2340,en_2649_201185_25998799_1_1_1_1_00.html.

¹¹⁴ <http://www.codataweb.org/UNESCOmtg/dryden-declaration.pdf>.

¹¹⁵ See http://www.oecd.org/document/0,2340,en_2649_34487_25998799_1_1_1_1_00.html as at Annex 1; see further below, *OECD Recommendation of the Council for Enhanced Access and More Effective use of PSI*, OECD (2008) for more detail on these agreed principles.

¹¹⁶ OECD, *Draft Recommendation Concerning Access to Research Data from Public Funding – Version for Consultation*, DSTI/STP(2006)18, May 2006, at http://www7.nationalacademies.org/usnc-codata/OECD_Principles_and_Guidelines.pdf.

¹¹⁷ See <http://www.oecd.org/dataoecd/9/61/38500813.pdf>.

management of research data.”¹¹⁸

The Recommendation instructs the OECD Committee for Scientific and Technological Policy to review its implementation as necessary and to review the Principles and Guidelines on Access to Research Data from Public Funding and, as appropriate, to:

take into account advances in technology and research practices, with the intention of further fostering international co-operation.¹¹⁹

The Principles and Guidelines set out broad policy recommendations to the governmental science policy and funding bodies of OECD members on access to research data and public funding.¹²⁰ Their intention is to:

promote data access and sharing among researchers, research institutions, and national research agencies, while at the same time, recognising and taking into account, the various national laws, research policies and organisational structures of Member countries.

The Principles and Guidelines apply to research data gathered using public funds for the purpose of producing publicly accessible knowledge. They are principally aimed at research data in digital, computer-readable format, although they could apply to analogue research data in situations where the marginal costs of giving access to such data can be kept reasonably low. For the purposes of the Principles and Guidelines, “research data” is defined as:

factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research, and that are commonly accepted in the scientific community as necessary to validate research findings. A research data set constitutes a systematic, partial representation of the subject being investigated.

The Principles are as follows:¹²¹

A) Openness

Openness means access on equal terms for the international research community at the lowest possible cost, preferably at no more than the marginal cost of dissemination. Open access to research data from public funding should be easy, timely, user-friendly and preferably Internet-based.

...

B) Flexibility

Flexibility requires taking into account the rapid and often unpredictable changes in information technologies, the characteristics of each research field and the diversity of research systems, legal systems and cultures of each Member country. Specific national, social, economic and regulatory implications should be considered when organisations develop research data access arrangements, and when governments develop policies to promote data access and review the implementation of these Principles and Guidelines.

¹¹⁸ OECD, *Recommendation of the Council concerning Access to Research Data from Public Funding C(2006)184*, <http://webdomino1.oecd.org/horizontal/oecdacts.nsf/Display/3A5FB1397B5ADFB7C12572980053C9D3?OpenDocument>.

¹¹⁹ Ibid.

¹²⁰ For comment, see Dirk Pilat and Yukiko Fukasaku, *The Principles and Guidelines for Access to Research Data*, Data Science Journal, Vol. 6, Open Data Issue, 17 June 2007.

¹²¹ <http://webdomino1.oecd.org/horizontal/oecdacts.nsf/Display/3A5FB1397B5ADFB7C12572980053C9D3?OpenDocument>. Note that these have also been published in the OECD publication: OECD (2007) OECD Principles and Guidelines for Access to Research Data from Public Funding, available at <http://www.oecd.org/dataoecd/9/61/38500813.pdf>.

...

C) Transparency

Information on research data and data-producing organisations, documentation on the data and specifications of conditions attached to the use of these data should be internationally available in a transparent way, ideally through the Internet. Lack of visibility of existing research data resources and future data collection poses serious obstacles to access.

...

D) Legal conformity

Data access arrangements should respect the legal rights and legitimate interests of all stakeholders in the public research enterprise.

...

E) Protection of intellectual property

Data access arrangements should consider the applicability of copyright or of other intellectual property laws that may be relevant to publicly-funded research databases.

...

F) Formal responsibility

Access arrangements should promote explicit, formal institutional practices, such as the development of rules and regulations, regarding the responsibilities of the various parties involved in data-related activities. These practices should pertain to authorship, producer credits, ownership, dissemination, usage restrictions, financial arrangements, ethical rules, licensing terms, liability, and sustainable archiving.

Access arrangements, whether at the governmental or institutional levels, should be developed in consultation with representatives of all directly affected parties. In collaborative research programmes or projects, and especially in international scientific co-operation or in research projects based on public / private partnerships where there are differences in regulatory frameworks, the parties involved should negotiate research data sharing arrangements as early as possible in the life of the research project, ideally at the initial proposal stage. This will help ensure that adequate and timely consideration will be given to issues such as the allocation of resources for sharing and sustainable preservation of research data, differences in national intellectual property laws, limitations due to national security, and the protection of privacy and confidentiality.

Access arrangements also should be responsive to factors such as the characteristics of the data, their potential value for research purposes, the level of data processing (raw versus partially processed versus final), whether they are homogeneous data from a facility instrument or sensor versus heterogeneous field data collected by single researchers, data on human subjects or physical parameters, and whether the data are generated directly by a government entity or as a result of government funding. These variations in the origin or type of data should be taken into consideration when establishing data access arrangements.

...

G) Professionalism

Institutional arrangements for the management of research data should be based on the relevant professional standards and values embodied in the codes of conduct of the scientific communities involved.

...

H) Interoperability

Technological and semantic interoperability is a key consideration in enabling and promoting international and interdisciplinary access to and use of research data. Access arrangements, should pay due attention to the relevant international data documentation standards. Member countries and research institutions should co-operate with international organisations charged with developing new standards.

...

I) Quality

The value and utility of research data depends, to a large extent, on the quality of the data itself. Data managers, and data collection organisations, should pay particular attention to ensuring compliance with explicit quality standards. Where such standards do not yet exist, institutions and research associations should engage with their research community on their development. Although all areas of research can benefit from improved data quality, some require much more stringent standards than others. For this reason alone, universal data quality standards are not practical. Standards should be developed in consultation with researchers to ensure that the level of quality and precision meets the needs of the various disciplines.

...

J) Security

Specific attention should be devoted to supporting the use of techniques and instruments to guarantee the integrity and security of research data. With regard to guaranteeing the integrity of a data set, every effort should be made to ensure the completeness of data and absence of errors. With regard to security, the data, along with relevant meta-data and descriptions, should be protected against intentional or unintentional loss, destruction, modification and unauthorised access in conformity with explicit security protocols. Data sets and the equipment on which they are stored should be protected as well from environmental hazards such as heat, dust, electrical surges, magnetism, and electrostatic discharges.

...

K) Efficiency

One of the central goals of promoting data access and sharing is to improve the overall efficiency of publicly-funded scientific research to avoid the expensive and unnecessary duplication of data collection efforts.

...

L) Accountability

The performance of data access arrangements should be subject to periodic evaluation by user groups, responsible institutions and research funding agencies. Although each party is likely to use somewhat different evaluation criteria, the sum total of the results should provide a comprehensive picture of the value of data and of data access regimes. Such evaluations should help to increase the support for open access among the scientific community and society at large.

...

M) Sustainability

Due consideration should be given to the sustainability of access to publicly funded research data as a key element of the research infrastructure. This means taking administrative responsibility for the measures to guarantee permanent access to data that have been determined to require long-term retention. This can be a difficult task, given that most research projects, and the public funding provided, have a limited duration, whereas ensuring access to the data produced is a long-term undertaking. Research funding agencies and research institutions, therefore, should consider the long-term preservation of data at the outset of each new project, and in particular, determine the most appropriate archival facilities for the data.¹²²

¹²² Ibid.

The relevance of the OECD's Ministerial Declaration on Access to Research Data from Public Funding (2004) to the development of strategic frameworks for scientific data management was acknowledged in Australia by the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) Data for Science Working Group in its 2006 report, *From Data to Wisdom: Pathways to Successful Data Management for Australian Science* (2006).¹²³ The PMSEIC Data for Science Working Group recommended that the OECD guidelines should be taken into account in the development of a strategic framework for management of research data in Australia.¹²⁴

“Giving Knowledge For Free: The Emergence of Open Educational Resources” Organisation for Economic Co-operation and Development (OECD) (2007)

This 2007 report on “open educational resources” (OER) by the OECD's Centre for Educational Research and Innovation discusses open licensing and frameworks for the free sharing of digital educational resources in virtual learning environments.¹²⁵

The report addresses four main questions:

1. how can sustainable cost/benefit models for OER initiatives be developed?
2. what are the intellectual property rights issues linked to OER initiatives?
3. what are the incentives and barriers for universities and faculty staff to deliver their materials to OER initiatives? and
4. how can access and usefulness for the users of OER initiatives be improved?

The report observes that whilst information technology makes it possible to multiply and distribute content worldwide and almost at no cost, legal restrictions on the reuse of copyright material hamper its negotiability in the digital environment. To overcome this impediment academics worldwide have started to use open licences to create a space in the on-line world – a creative commons – where people can share and reuse copyright material without fear of being sued. In doing so, copyright owners agree or give permission for their material to be shared through a generic licence that gives permission in advance. The report considers that the Creative Commons licence is by far the best-known licence for such content and notes that its use is growing exponentially.

Chapter 5, “Open Licences and Copyright”, refers to a report by Professor Brian Fitzgerald et al in the Open Access to Knowledge (OAK) Law project¹²⁶ entitled, *Creating a Legal Framework for*

¹²³ Prime Minister's Science, Engineering and Innovation Council, Working Group on Data for Science, *From Data to Wisdom: Pathways to Successful Data Management for Australian Science*, (2006) http://www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/Presentation_Data_for_Science.htm at 26 March 2007.

¹²⁴ Ibid. Recommendation 9.

¹²⁵ OECD, *Giving Knowledge for Free The Emergence of Open Educational Resources*, 2007 OECD Publishing <http://www.oecd.org/dataoecd/35/7/38654317.pdf> at 26 June 2007.

¹²⁶ Ibid, pp 73 and 76. See Fitzgerald et al (2006), *Creating a Legal Framework for Copyright Management of Open* continued on page

Copyright Management of Open Access within the Australian Academic and Research Sector (2005). The OAK Law project involved, in part, the development of an action agenda and recommendations for the then Australian Government Department of Education, Science and Training (DEST) regarding a legal framework for copyright management of open access within the Australian academic sector. Chapter 5 of the OECD report commends the OAK Law action agenda and recommendations as being useful for the OER movement.

“OECD Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information”, OECD (2008)

On 30 April 2008, the OECD Council adopted the *Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information*.¹²⁷ This Recommendation was developed by the OECD Committee for Information, Computer and Communication Policy, particularly its Working Party on the Information Economy. Work on the principles of the Recommendation was initiated in 2007, on the basis of prior analytical work.¹²⁸ The Preamble to the Recommendation makes reference to the Recommendation of the Council concerning Access to Research Data from Public Funding [C(2006)184] and the Recommendation of the Council on Broadband Development [C(2003)259].¹²⁹ The Preamble acknowledges the aim of increasing returns on public sector information and increasing “economic and social benefits from better access and wider use and re-use, in particular through more efficient distribution, enhanced innovation and development of new uses”, as well as the aim of promoting “more efficient distribution of information and content” and “the development of new information, products and services, particularly through market-based competition among re-users of information”.¹³⁰

“Public sector information” is broadly defined for purposes of the Recommendation as:

information, including information products and services, generated, created, collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution”, taking into account the legal requirements and restrictions referred to in the last paragraph of the preamble of this Recommendation.

The last paragraph of the Preamble to the Recommendation recognises that:

efforts to improve the access and use of public sector information need to take into account legal requirements and restrictions, including intellectual property rights and trade secrets, effective and secure management of personal information, confidentiality and national security concerns, and fundamental principles including democracy, human rights and freedom of information and that, consequently, certain principles contained in this Recommendation regarding in particular openness and re-use, can be applied to a different extent to different categories of public sector information;

“Re-use” is defined as including:

use by the original public sector generator or holder or other public sector bodies and further re-use by business or individuals for commercial or non-commercial purposes. In general, the term “use” implies this broad

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Access within the Australian Academic and Research Sector, OAK Law Report Number 1, August 2006, available at http://eprints.qut.edu.au/archive/00006099/01/Printed_Oak_Law_Project_Report.pdf and also at <http://www.oaklaw.qut.edu.au/reports>.

¹²⁷ C(2008)36, available at <http://www.oecd.org/dataoecd/0/27/40826024.pdf>.

¹²⁸ Ibid, foreword, p3.

¹²⁹ Ibid.

¹³⁰ Ibid, p4.

spectrum of use and re-use.¹³¹

The OECD Council recommends that, in establishing or reviewing their policies on access and use of public sector information, member countries should take account of and implement the following principles, which provide a general framework for the wider and more effective use of PSI and content and the generation of new uses from it:¹³²

Openness. Maximising the availability of public sector information for use and re-use based upon presumption of openness as the default rule to facilitate access and re-use. Developing a regime of access principles or assuming openness in public sector information as a default rule wherever possible no matter what the model of funding is for the development and maintenance of the information. Defining grounds of refusal or limitations, such as for protection of national security interests, personal privacy, preservation of private interests for example where protected by copyright, or the application of national access legislation and rules.

Access and transparent conditions for re-use. Encouraging broad non-discriminatory competitive access and conditions for re-use of public sector information, eliminating exclusive arrangements, and removing unnecessary restrictions on the ways in which it can be accessed, used, re-used, combined or shared, so that in principle all accessible information would be open to re-use by all. Improving access to information over the Internet and in electronic form. Making available and developing automated on-line licensing systems covering re-use in those cases where licensing is applied, taking into account the copyright principle below.

Asset lists. Strengthening awareness of what public sector information is available for access and re-use. This could take the form of information asset lists and inventories, preferably published on-line, as well as clear presentation of conditions to access and re-use at access points to the information.

Quality. Ensuring methodical data collection and curation practices to enhance quality and reliability including through cooperation of various government bodies involved in the creation, collection, processing, storing and distribution of public sector information.

Integrity. Maximising the integrity and availability of information through the use of best practices in information management. Developing and implementing appropriate safeguards to protect information from unauthorised modification or from intentional or unintentional denial of authorised access to information.

New technologies and long-term preservation. Improving interoperable archiving, search and retrieval technologies and related research including research on improving access and availability of public sector information in multiple languages, and ensuring development of the necessary related skills. Addressing technological obsolescence and challenges of long term preservation and access. Finding new ways for the digitisation of existing public sector information and content, the development of born-digital public sector information products and data, and the implementation of cultural digitisation projects (public broadcasters, digital libraries, museums, etc.) where market mechanisms do not foster effective digitisation.

Copyright. Intellectual property rights should be respected. There is a wide range of ways to deal with copyrights on public sector information, ranging from governments or private entities holding copyrights, to public sector information being copyright-free. Exercising copyright in ways that facilitate re-use (including waiving copyright and creating mechanisms that facilitate waiving of copyright where copyright owners are willing and able to do so, and developing mechanisms to deal with orphan works), and where copyright holders are in agreement, developing simple mechanisms to encourage wider access and use (including simple and effective licensing arrangements), and encouraging institutions and government agencies that fund works from outside sources to find ways to make these works widely accessible to the public.

Pricing. When public sector information is not provided free of charge, pricing public sector information transparently and consistently within and, as far as possible, across different public sector organisations so that it facilitates access and re-use and ensures competition. Where possible, costs charged to any user should not exceed marginal costs of maintenance and distribution, and in special cases extra costs for example of digitisation. Basing any higher pricing on clearly expressed policy grounds.

¹³¹ Ibid, p4.

¹³² Ibid, pp5 – 7.

Competition. Ensuring that pricing strategies take into account considerations of unfair competition in situations where both public and business users provide value added services. Pursuing competitive neutrality, equality and timeliness of access where there is potential for cross-subsidisation from other government monopoly activities or reduced charges on government activities. Requiring public bodies to treat their own downstream/value-added activities on the same basis as their competitors for comparable purposes, including pricing. Particular attention should be paid to single sources of information resources. Promoting non-exclusive arrangements for disseminating information so that public sector information is open to all possible users and re-users on non-exclusive terms.

Redress mechanisms: Providing appropriate transparent complaints and appeals processes.

Public private partnerships. Facilitating public-private partnerships where appropriate and feasible in making public sector information available, for example by finding creative ways to finance the costs of digitisation, while increasing access and re-use rights of third parties.

International access and use. Seeking greater consistency in access regimes and administration to facilitate cross-border use and implementing other measures to improve cross-border interoperability, including in situations where there have been restrictions on non-public users. Supporting international co-operation and co-ordination for commercial re-use and non-commercial use. Avoiding fragmentation and promote greater public sector information and content, the development of born-digital public sector information products and data, and the implementation of cultural digitisation projects (public broadcasters, digital libraries, museums, etc.) where market mechanisms do not foster effective digitisation.

Best practices. Encouraging the wide sharing of best practices and exchange of information on enhanced implementation, educating users and re-users, building institutional capacity and practical measures for promoting re-use, cost and pricing models, copyright handling, monitoring performance and compliance, and their wider impacts on innovation, entrepreneurship, economic growth and social effects.

The Recommendation concludes with words which indicate the OECD Council's intention that OECD members and non-members will take active steps towards implementation:

[The OECD Council]

INVITES: Member countries to disseminate this Recommendation throughout the public and private sectors, including governments, businesses and other international organisations to encourage all relevant participants to take the necessary steps to enhance access and promote more effective use of public sector information; Non-Member economies to take account of this Recommendation and collaborate with Member countries in its implementation.

INSTRUCTS the OECD Committee for Information, Computer and Communications Policy to promote the implementation of this Recommendation and review it every three years to foster enhanced access and more effective use of public sector information.¹³³

“Seoul Declaration on the Future of the Internet Economy”, OECD Ministers (2008)

The *Principles and Guidelines for Access to Research Data from Public Funding* and the *Recommendation of the Council for Enhanced Access and More Effective Use of Public Sector Information* were endorsed and adopted by the OECD Ministers at the OECD Ministerial Meeting on the Future of the Internet Economy in Seoul, Korea in June 2008.¹³⁴ The principles stated in

¹³³ Ibid, p7.

¹³⁴ See OECD, *Shaping Policies for the Future of the Internet Economy*, Annexes, available at <http://www.oecd.org/dataoecd/1/28/40821729.pdf>.

these documents have been included in the Seoul Declaration on the Future of the Internet Economy which was adopted by the OECD Ministers on 18 June 2008.¹³⁵

As a member of the OECD and a signatory to the Seoul Declaration and associated documents, Australia is committed (although not strictly legally bound) to implementing the principles which they set out. OECD Recommendations are OECD legal instruments that set out standards or objectives which OECD member countries are expected to implement, although they are not legally binding. However, through long-standing practice of member countries, a Recommendation is considered to have great moral force.¹³⁶

In the Seoul Declaration, the OECD Ministers declared:

WE SHARE a vision that the Internet Economy, which covers the full range of our economic, social and cultural activities supported by the Internet and related information and communications technologies (ICT), will strengthen our capacity to improve the quality of life for all our citizens by:

....

- Developing an increasingly important platform for research, international science co-operation, creativity and innovation in many different sectors.

.....

to contribute to the development of the Internet Economy, we will:

....

(b) Foster creativity in the development, use and application of the Internet, through policies that:

- Maintain an open environment that supports the free flow of information, research, innovation, entrepreneur-ship and business transformation.
- Make public sector information and content, including scientific data, and works of cultural heritage more widely accessible in digital format.
- Encourage basic and applied research on the Internet and related ICTs.
- Encourage universities, governments, public research, users and business to work together in collaborative innovation networks and to make use of shared experimental Internet facilities.
- Combine efforts to combat digital piracy with innovative approaches which provide creators and rights holders with incentives to create and disseminate works in a manner that is beneficial to creators, users and our economies as a whole.
- Encourage new collaborative Internet-based models and social networks for the creation, distribution and use of digital content that fully recognise the rights of creators and the interests of users.
- Strengthen the development of human resources to take full advantage of the Internet and related ICTs, and further develop ICT skills and digital and media literacy.¹³⁷

¹³⁵ OECD, *Seoul Declaration on the Future of the Internet Economy*, 18 June 2008, available at <http://www.oecd.org/dataoecd/49/28/40839436.pdf>.

¹³⁶ OECD, *Principles and Guidelines for Access to Research Data from Public Funding*, 2007, see <http://www.oecd.org/dataoecd/9/61/38500813.pdf> at p8.

¹³⁷ OECD, *Seoul Declaration on the Future of the Internet Economy*, 18 June 2008, at page 7, available at <http://www.oecd.org/dataoecd/49/28/40839436.pdf>.

“OECD Best Practice Forum on the ‘Enhanced Internet-enabled access and use of public sector information’”, Internet Governance Forum 3 - Hyderabad (2008)

The Internet Governance Forum (IGF)¹³⁸ is a direct outcome of the World Summit on the Information Society (WSIS) which convened in Geneva in 2003 and Tunis in 2005.¹³⁹ The Tunis Agenda invited the UN Secretary General to convene a new forum for multi-stakeholder policy dialogue – the IGF.¹⁴⁰ The inaugural meeting of the IGF was in Athens, Greece from 30 October to 2 November.¹⁴¹ The second IGF meeting was held in Rio de Janeiro in November 2007 and the third (IGF3) was held in Hyderabad, India in December 2008.

The topics considered at IGF 3 included:

- public sector information;
- privacy;
- access laws – freedom of information or right to information;
- eContent; and
- human rights in the context of the internet.

The OECD held a Best Practice Forum at IGF3 on increasing internet-enabled access to digital public sector information and content.¹⁴² The purpose of the Forum was to explore best practices in access to and use of PSI, building on the OECD Recommendation for Enhanced Access and More Effective Use of Public Sector Information. Participants discussed good practices, lessons learnt and problems to be avoided from various perspectives (institutions, users). The OECD explained the Forum as follows:

68. OECD Best practice Forum on the "Enhanced Internet-enabled access and use of public sector information"

Public organisations produce and hold a large amount of public sector information and content (PSI). An increasing amount of PSI is digitised or produced in digital form and is increasingly accessible and available as information products and services for potential users to find, access, re-use, and further develop for both individual and commercial purposes. Examples of the large potential of PSI when put to wider use could include the variety of new private sector services based on meteorological and cartographic data, access to video archives of national public broadcasters, and virtual guided tours through art galleries or museums.

The growing interest of governments in facilitating access to and promoting further use of PSI is based on the expectation that enhanced flows and re-use of information, and the increased economic and social activity associated with its use, contribute to improving government efficiency, economic growth, access to knowledge, education, understanding of cultural heritage and citizen welfare. Greater access also supports fundamental

¹³⁸ <http://www.intgovforum.org/cms/index.php/home>.

¹³⁹ See generally at <http://www.intgovforum.org/cms/index.php/home> and *Internet Governance Forum – the first two years*, at <http://www.intgovforum.org/cms/index.php/home/57-2008igf/311-internet-governance-forum-the-first-two-years>. See also entry for WSIS in later part- International scientific collaborations and data sharing.

¹⁴⁰ Para 67.

¹⁴¹ <http://www.intgovforum.org/cms/index.php/athensmeeting>.

¹⁴² 2 – 6 December 2008, see <http://www.intgovforum.org/cms/index.php/hyderabadprogramme> and http://www.intgovforum.org/cms/workshops_08/showmelist.php?mem=54.

principles including openness, democracy, human rights and freedom of information. But wider use of digital PSI may require changes in policy approaches and reorganisation of public information as a number of obstacles impede efficient access to PSI and its effective use. Difficulties faced include restrictive or unclear rules governing access and conditions of re-use; complex licensing procedures; inefficient distribution to final users. There are also challenges with new technologies and ensuring long-term preservation, the development of born-digital content, the implementation of cultural digitisation projects where market mechanisms do not foster effective digitisation, and barriers to development of international markets.

Included in the proceedings of this IGF Workshop were two presentations by panel members on the Recommendation of the OECD Council for enhanced access and more effective use of public sector information, and an example of PSI re-use in Europe – Lessons and Good Practice.¹⁴³ The high level lessons and good practice identified in the presentation on European experience, with developing and implementing a framework for enhanced internet-enabled access and use of PSI, are described in general terms to be “the need for leadership, simplicity, openness, transparency and accountability”.¹⁴⁴

International scientific collaborations and data sharing

There are many public scientific research initiatives, both long-standing and new¹⁴⁵, which involve international collaboration in the collection and use of data. Some of these projects have been established within formal organisational structures while others exist as informal arrangements between individual researchers or institutes. A feature of these cooperative research and data sharing initiatives is that they frequently aim to make data openly and freely available, with no restrictions on reuse.¹⁴⁶

International Council for Science (ICSU)

The International Council for Science¹⁴⁷ was established in 1931 as a worldwide, non-governmental, umbrella organisation for scientific councils, academies and societies/institutions. It has a global membership of national scientific bodies (114 members, representing 134 countries) and International Scientific Unions (29 members). ICSU’s activities focus on three areas: planning

¹⁴³

http://www.epsiplus.net/reports/internet_governance_forum_2008/enhanced_internet_enabled_access_and_use_of_public_sector_information. Copies of the two slide presentations are posted on this website. Also accessible is a copy of the transcript of the presentation by Chris Corbin, ePSIplus Analyst, on PSI re-use in Europe. Corbin states that, “The European Union provides a fertile source of best practice and case studies, which may be adopted or of interest to others across the world in the context of Public Sector Information.” This is due in part to the EU being a multi-national, multi-lingual and multi-cultural region. The presentation addresses issues encountered over the last 20 years in the European Union member states. For a short comment on the discussion of Article 6 of the EU PSI Directive (“Principles governing charging”) and the approach to pricing adopted by the OECD in the Ministerial Declaration on the Future of the Internet Economy in June 2008, see Chris Corbin, *Pricing of PSI – is the pendulum swinging?* ePSIplus Update, No. 9 January 2009 at http://www.epsiplus.net/news/newsletter/epsiplus_update_no_9

¹⁴⁴ Ibid.

¹⁴⁵ See for example the worldwide soil-mapping project at <http://www.globalsoilmap.net>; a project for sub-Saharan Africa is to be established – see <http://www.africasoils.net/> as reported at <http://www.voanews.com/specialenglish/2009-01-21-voa2.cfm> and <http://ciesin.columbia.edu/news.html#Gates-Award-for-Africa-Digital-Soils-Map>

¹⁴⁶ For a collection of the policies of numerous international research programs (through to approximately 2002), see http://www.codata.org/data_access/policies.html.

¹⁴⁷ See <http://www.icsu.org/index.php> and http://www.icsu.org/5_abouticsu/INTRO.php. The ICSU was formerly known as the International Council of Scientific Unions.

and coordinating research; science for policy; and strengthening the universality of science. It is actively involved in promoting freedom of access to scientific data and information, which it advocates through discussion forums, conferences and symposiums.¹⁴⁸

Over the years, ICSU's General Assembly has adopted a series of declarations in support of open access to scientific data and information. In 1988, ICSU adopted the following General Assembly Resolution:

Noting that:

- i. the success of international co-operative programmes in science depends on an unprecedented sharing of scientific data and information;
- ii. ICSU has a long-standing commitment to the free circulation of scientists and access to scientific data and information; and
- iii. processes of data and information handling and dissemination are rapidly becoming technically more sophisticated and potentially more expensive for those who provide and use these services;

Recommends all ICSU members to support the fundamental principle of open exchange of data and information for scientific purposes by strongly urging public and private organisations in all countries to facilitate access to scientific information and data needed to address the research objectives of ICSU programmes; and

Further recommends that the Executive Board establish a mechanism to monitor the implementation of his principle and take action on problems that may arise.¹⁴⁹

In 1996, ICSU adopted the following General Assembly Resolution:

Noting that there may be constraints on the free flow of scientific data and information, imposed on grounds of national security, confidentiality, commercial value, copyright, or historical disciplinary practice;

Recommends as a general policy the fundamental principle of full and open exchange of data and information for scientific and educational purposes.¹⁵⁰

In 1999 ICSU's General Assembly adopted the following Resolution:

Noting that in the course of the monitoring activities set up following the last General Assembly, ICSU Press, CODATA, ICSTI, COSTED, and SCFCS¹⁵¹ have noted threats to the free flow of scientific data and information inherent in the developing national and international legislative framework for intellectual property;

Calls on national members to take appropriate steps to ensure that their governments and legislators are aware of the needs of research and education when new national and international laws are being framed in the areas of intellectual property, copyright, and related rights.¹⁵²

¹⁴⁸ See http://www.icsu.org/5_abouticsu/INTRO.php.

¹⁴⁹ See http://www.codata.org/data_access/policies.html#WMO%20WDC.

¹⁵⁰ See http://www.codata.org/data_access/policies.html#WMO%20WDC.

¹⁵¹ CODATA = Committee on Data for Science and Technology; ICSTI = International Council for Scientific and Technical Information; COSTED = Committee on Science and Technology in Developing Countries; SCFCS = Standing Committee on Freedom in the Conduct of Science.

¹⁵² See http://www.codata.org/data_access/policies.html#WMO%20WDC.

ICSU was instrumental in developing the system of World Data Centres (WDCs) which was created to archive and distribute data collected from observational programs during the International Geophysical Year (1957-58).¹⁵³ Originally, the WDC system was established in the US, Russia, Europe and Japan but it has now expanded to 52 centres in 12 countries.¹⁵⁴ Its holdings include a wide range of solar, geophysical, environmental and human dimensions data.

The WDCs operate on the principle of “full and open access to scientific data and products” which does not require data to be made available for free although it must be able to be fully exchanged. Only data which is available on a full and open access basis can be claimed as part of WDC holdings. The document *Principles and Responsibilities of ICSU World Data Centres* (issued in April 1996) sets out the rules governing WDCs:

... WDCs will prepare and publish catalogs of their data holdings, or otherwise make freely available information on their holdings, e.g., by electronic access.

WDCs will exchange data among themselves, as mutually agreed and whenever possible without charge, to facilitate data availability, to provide back-up copies, and to aid the preparation of higher order data products.

No confidential or security-classified data are to be held in a WDC.

Data may be subject to privileged use by their originators, for a period to be agreed beforehand, and not to exceed two years from the date of acquisition by the WDC.

WDCs will provide data to scientists in any country free of charge, on an exchange basis or at a cost not to exceed the cost of copying and sending the requested data. Additional charges may be made for special services, or for acquiring data from outside the WDC system.

WDCs will accept any scientist as a visitor to work on site with data holdings held under WDC auspices.¹⁵⁵

Committees or commissions of ICSU are created to organise programs in multi- or trans-disciplinary fields.¹⁵⁶ Australia currently adheres to the ICSU committees on:

- Antarctic Research (SCAR);¹⁵⁷
- Committee on Data for Science and Technology (CODATA);¹⁵⁸
- Global Change (IGBP);¹⁵⁹
- Oceanic Research (SCOR);¹⁶⁰
- Solar-Terrestrial Physics (SCOSTEP);¹⁶¹
- Space Research (COSPAR);¹⁶² and
- World Climate Research (WCRP).¹⁶³

“Scientific Data and Information: a Report of the CSPR Assessment Panel”

¹⁵³ See <http://www.ngdc.noaa.gov/wdc/wdcmain.html>.

¹⁵⁴ For more on the World Data Centre system, see <http://www.ngdc.noaa.gov/wdc/wdcmain.html>.

¹⁵⁵ See http://www.codata.org/data_access/policies.html#WMO%20WDC

¹⁵⁶ See Australian Academy of Science website at <http://www.science.org.au/internat/icsu.htm>.

¹⁵⁷ See <http://www.scar.org/about/>.

¹⁵⁸ See <http://www.codata.org/>.

¹⁵⁹ See <http://www.igbp.net/>.

¹⁶⁰ See <http://www.scor-int.org>.

¹⁶¹ See <http://www.scostep.ucar.edu/>.

¹⁶² See <http://cosparhq.cnes.fr/>.

¹⁶³ See <http://wcrp.wmo.int/wcrp-index.html>.

International Council for Science (ICSU) (2004)

In December 2004, ICSU released *Scientific Data and Information: A Report of the CSPR Assessment Panel*, which focused on open access to scientific data.¹⁶⁴ The Report is strongly influenced by the Berlin Declaration, the Bethesda Statement on Open Access Publishing, and the open access endorsements of the OECD and WSIS.¹⁶⁵ The conceptual basis of the Report was stated as follows:

Scientific progress relies on full and open access to data and on the open disclosure of research results in the scientific literature. A strong public domain for scientific data and information promotes greater return from the public investment in research by stimulating innovation and more-informed decision making. Principles of open access to scientific data and information can be applied to research data, metadata, or scientific publications, although the specific issues vary with each.¹⁶⁶

ICSU made several recommendations to promote and strengthen scientific data management:

- financial support for data and information management should be routinely included in research budgets and the criteria for evaluating research funding proposals should include evaluation of data management;¹⁶⁷
- efforts should be made to raise awareness of the increasingly important role played by institutional repositories in relation to the management and preservation of scientific information and the need to ensure that such repositories are properly resourced, developed and maintained;
- all scientists should receive training in data management as part of their under-graduate and post-graduate education;
- guidelines should be developed for data management by employed scientists and their institutions; and
- collaborative development (involving information technology specialists, librarians, research scientists, government data producers, and donors) of standards and curricula for professional training for scientific data managers should be implemented.¹⁶⁸

A range of activities need to be coordinated if research data and information are to be effectively managed. These include:

- preservation of data and information, so that it will be available in digital formats and on media that can be used in the future;
- use of common metadata standards, to facilitate the identification, re-use and integration of scientific data and to provide information about data quality;

¹⁶⁴ http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/551_DD_FILE_PAA_Data_and_Information.pdf.

¹⁶⁵ Such international declarations and statements are discussed later in this chapter.

¹⁶⁶ Ibid, p24.

¹⁶⁷ The importance of appropriate funding was also emphasised by the UK Office of Science and Innovation (OSI) e-Infrastructure Working Group in its report *Developing the UK's e-infrastructure for science and innovation* <http://www.nesc.ac.uk/documents/OSI/report.pdf> at February 2007.

¹⁶⁸ ICSU, *Scientific Data and Information: A report of the CSPR Assessment Panel* (2004) 21.

- permanent archiving of scientific data and information and compliance with institutional data archiving obligations where applicable;
- promotion of interoperability between systems and meta data standards to facilitate cooperation and effective use of data and information;
- ensuring data security and integrity;
- compliance with legal requirements, including obligations to protect personal privacy and to maintain confidentiality; and
- **ensuring that intellectual property laws as they relate to scientific data and information recognise the importance of full and open access to data for scientific research and educational purposes.**¹⁶⁹ [emphasis added]

The ICSU Report also specifically considered the role of metadata. It encourages data repositories to ensure that standard metadata is available for all databases and records. The metadata should contain information on the legalities of, and the security and integrity measures employed in, the collection and management of relevant data. Importantly, the report advocates that metadata should be openly and freely accessible to all, through multidisciplinary metadata catalogues.

“International Experts Call for New Approach to Ensure Challenges to Data Access and Management Don’t Slow Scientific Progress”, ICSU Press Release (2008)

This press release provides an overview of the report of an expert panel appointed by ICSU,¹⁷⁰ which was presented to the 28th General Assembly of ICSU in Suzhou, China on 20 October 2008.¹⁷¹ It calls for the establishment of an international scientific data and information forum to promote a more coordinated approach to data collection and distribution. Such a forum is also seen as playing a role in ensuring that scientists in developing countries have equitable access to scientific data and information. ICSU has indicated that it intends implementing the report’s recommendations over the next three years.

The press release states:

Complex changes in data production, distribution and archiving—and issues they raise regarding who pays for data, who preserves it and who has access to it—should prompt an international initiative that ensures current and future scientists worldwide will have the information they need, according to a new report on challenges to data management and access presented today to the International Council for Science (ICSU).

.....

¹⁶⁹ ICSU, *Scientific Data and Information: A report of the CSPR Assessment Panel*, (2004) 9-11.

¹⁷⁰ The report is available at www.icsu.org/3_mediacentre/GA_29.html.

¹⁷¹ ICSU Press Release, *International Experts Call for New Approach to Ensure Challenges to Data Access and Management Don’t Slow Scientific Progress*, 20 October 2008, at http://www.icsu.org/3_mediacentre/RELEASES/28thGA_Data_Infor_eng.pdf.

“Data gathering, analysis and distribution has been profoundly and positively changed by quantum advances in computer hardware, software and connectivity and the result is that scientists can have access to more high quality data than ever before,” said Roberta Balstad, director of Columbia University’s Center for International Earth Science Information Network (CIESIN) and chair of the ICSU Priority Area Assessment (PAA) on Data and Information.

“But these new data and information technologies bring with them a series of challenges as well,” she added. “For example, **we don’t always have the necessary legal and regulatory frameworks in place to get the full benefit of scientific data.** We lack a coherent approach to preserving and archiving the incredible wealth of information being produced. And the more the access to long-term reservoirs of data becomes central to the modern scientific enterprise, the more it exacerbates inequities between scientists in rich and poor nations.”

Balstad and her colleagues on the PAA panel believe ICSU, with its international and multidisciplinary membership, “should assume a leadership role in identifying and addressing critical policy and management issues related to scientific data and information and that it create a new global framework for data and information policy management.”

The panel examined a range of issues that affect data generation, quality and access. For example, its report notes that while public sector funding of data collection has been “a major factor” driving scientific progress over the past 50 years, decisions regarding data are often fragmented and taken without consultation with the scientific community. The result in “extreme cases” can be actions driven by political, administrative or budgetary factors that do damage to scientifically valuable data series.

Meanwhile, the panel cautions that as the private sector plays a greater role in amassing and disseminating data, there is a risk that market demand, not scientific priorities, will determine what is collected and preserved and who has access. The panel notes that commercial interest in data collections can lead to license and user fees and intellectual property claims on data that become impediments to research.

The report recommends that data produced commercially or through public-private partnership be provided for research and education purposes either free or at nominal cost. Price and other access barriers to scientific data weigh most heavily on researchers in poor countries. They often lack affordable high-speed internet services and state of the art technologies for digitizing data or the resources for long-term data management.”

“A major problem for scientists in low-income countries is their lack of access to scientific publications, both as a means of learning about research in other parts of the world and as an outlet for their own research results,” the report observes. Scientists are frequently charged not only to view but also to publish articles. The panel notes that these charges hurt both scientists in developing countries and those in wealthier nations as well who would benefit from better information exchange and collaboration.

Other data-related challenges identified by the panel include the need for developing common criteria, structure and models that can guide institutions in the “permanent preservation of scientific data and information” so that what is amassed today will be available for future generations. There is also a need to identify and rescue data that are “at risk,” such as data that are not available in digital formats, are stored on faulty media, or are generated by obsolete software, yet another problem which is felt more acutely in developing countries.

Overall, the panel concludes that “by focusing attention on data and information management for the long term, ICSU will be providing a valuable service to the scientific community now and building a lasting foundation for improvements in scientific research and education that will be of benefit to society as a whole.”¹⁷² [emphasis added]

“International science community agrees on first steps to establish a global virtual library for scientific data”, ICSU Press Release (2008)

¹⁷² Ibid.

This press release issued by ICSU on 23 October 2008 addresses the recommendation in the report published on 20 October 2008 (see above) that the existing ICSU world data centres and services should be overhauled to create a World Data System.¹⁷³ It states:

The existing networks for collecting, storing and distributing data in many areas of science are inadequate and not designed to enable the inter-disciplinary research that is necessary to meet major global challenges. These networks must be transformed into a new inter-operable data system and extended around the world and across all areas of science. The General Assembly of the International Council for Science (ICSU) agreed today to take the first strategic steps to establish such a system. More scientific data and information is now available than at any other time in history and the volume is increasing daily, particularly via the World Wide Web. Yet the quality, long-term stewardship and availability of this data is largely uncertain and a large amount of valuable scientific data remains inaccessible.

Over 50 years ago, ICSU established networks of data centres and services to provide full and open access to scientific data and products for the global community. But the world has changed enormously in 50 years, most notably with advances in technology, and it is time for the existing structures to be integrated into a new expanded system—a World Data System. The expert report recommending the new system and presented to the ICSU General Assembly asserts: ‘there is a need for global federations of professional state of the art data management institutions, working together and exchanging practices. Such federations can provide quality assurance and promote data publishing, providing the backbone for a global virtual library for scientific data’. The report concludes that ICSU itself can play a leading role by re-structuring its own data bodies. Ray Harris, chair of the expert Committee that produced the report said, ‘Data is the lifeblood of science and there are many exciting developments, which mean that access to scientific data both for science and for policy making should be much easier. However, in many areas there is little order and the origin and reliability of what one finds on the web can be almost impossible to determine’. ‘A more strategic and systematic international approach, together with significant financial investment at the national level, is urgently required if we are to realise the full benefit of science for society,’ Harris continued.¹⁷⁴

Committee on Data for Science and Technology (CODATA)

CODATA is an interdisciplinary Scientific Committee of the ICSU which was established in 1966 to promote and encourage, on a world-wide basis, the compilation, evaluation and dissemination of reliable numerical data of importance to science and technology.¹⁷⁵ It works to improve the quality, reliability, management and accessibility of data of importance to all fields of science and technology.

CODATA is concerned with all types of data resulting from experimental measurements, observations and calculations in every field of science and technology, including the physical sciences, biology, geology, astronomy, engineering, environmental science, ecology and others. Particular emphasis is given to data management problems common to different disciplines and to data used outside the field in which they were generated.¹⁷⁶

CODATA’s objectives include:

- the improvement of the quality and accessibility of data, as well as the methods by which data are acquired, managed, analysed and evaluated, with a particular emphasis on

¹⁷³ ICSU, *International science community agrees on first steps to establish a global virtual library for scientific data*, 23 October 2008, at http://www.icsu.org/3_mediacentre/RELEASES/ICSU_29GA_Data_Information_Press_Release.pdf.

¹⁷⁴ Ibid.

¹⁷⁵ See <http://www.codata.org>.

¹⁷⁶ See “CODATA – Who Are We?”, webpage, at <http://www.codata.org/about/who.html>.

developing countries;

- the facilitation of international cooperation among those collecting, organizing and using data;
- the promotion of an increased awareness in the scientific and technical community of the importance of these activities;
- the consideration of data access and intellectual property issues.¹⁷⁷

CODATA has produced numerous publications, including the *Data Science Journal*. The theme of the June 2007 issue of the journal was open data issues.

“Scientific and Technical Statement”, Second World Climate Conference (SWCC) (1990)

In a Scientific and Technical Statement issued in November 1990, the Second World Climate Conference (SWCC) described the following requirements for data access and reuse:

High priority must be placed on the provision and international exchange of high-quality, long-term data for climate-related studies. Data should be available at no more than the cost of reproduction and distribution. A full and open exchange of global and other data sets needed for climate-related studies is required.¹⁷⁸

“Data Policy and Practices”, World Ocean Circulation Experiment (WOCE), Scientific Steering Group (SSG) (1990)

In May 1990, the Scientific Steering Group (SSG) of the World Ocean Circulation Experiment (WOCE) accepted the following Data Policy and Practices:

There is a fundamental trade-off in WOCE—on the one hand, the protection of the intellectual effort and time of originating investigators (those who plan an experiment, collect, calibrate, and process a data set to answer some questions about the ocean), and on the other hand the need to compare various data sets and data types to check their consistency, to better understand the ocean processes involved, and to see how well the numerical models describe the real ocean. The policy below is a trade-off between these conflicting needs.

Any data collected as part of WOCE should be made publicly available no later than 2 years (the publication-rights period) from collection, unless specifically waived by the SSG and funding agencies.¹⁷⁹

“Report No. 12”, International Geosphere-Biosphere Program (IGBP) (1990)

In a report published in November 1990, the International Geosphere-Biosphere Program (IGBP)

¹⁷⁷ Ibid.

¹⁷⁸ Note that this document is extracted in CODATA’s *Scientific Data Policy Statements*, 2002, available at http://www.codata.org/data_access/policies.html#SWCC

¹⁷⁹ Note that this document is extracted in CODATA’s *Scientific Data Policy Statements*, 2002, available at http://www.codata.org/data_access/policies.html#WOCE.

described the features of the IGBP-DIS as follows:

Consequently, IGBP-DIS should have the following characteristics:

- suitable preservation of all data needed for long-term, global change research must be ensured;
- data archives must include readily accessible and comprehensive information describing data sets (metadata about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining the data);
- national and international agencies with responsibilities for archiving and distributing global change data should, to the greatest extent possible, use media and processing and communications systems which are consistent with internationally accepted standards and protocols;
- in those cases in which individual scientists have initial periods of exclusive data use, data should be made openly available as soon as they become widely useful;
- data should be provided at the lowest possible cost which, as a first principle, should be no more than the cost of reproduction and distribution.¹⁸⁰

“Establishing Agreement”, Inter-American Institute for Global Change Research (1992)

The *Establishing Agreement* of the Inter-American Institute for Global Change Research (May 1992) describes the objectives of the Institute and the role of Institute Research Centres as follows:

Article II, Objectives:

The Institute shall pursue the principles of scientific excellence, international co-operation, and of **full and open exchange of scientific information**, relevant to global change. In order to do so, the objectives of the Institute are to:

...

c) foster standardization, collection, analysis and exchange of data relative to global change"

Article IX, Institute Research Centers:

3. The Institute Research Centers shall, inter alia:

...

b) collect data and **promote the full, open, and efficient exchange of data and information** between the Institute and the Parties...¹⁸¹ [emphasis added]

“Statement on the Climate Agenda”, World Climate Program (1993)

The intergovernmental meeting of the World Climate Program (WCP) in April 1993 adopted the

¹⁸⁰ Note that this document is extracted in CODATA's *Scientific Data Policy Statements*, 2002, available at http://www.codata.org/data_access/policies.html#IGBP.

¹⁸¹ See http://www.codata.org/data_access/policies.html#Inter-American.

Statement on the Climate Agenda,¹⁸² which recounts that the WCP and associated activities had:

...established concerted efforts to obtain and preserve data from the atmosphere, ocean and land surface, together with a co-ordinated international framework for the standardization and **full and open exchange of such data**... [emphasis added]

“Resolution on free access to environmental data”, International Union of Radio Science (URSI) (1993)

The General Assembly of the International Union of Radio Science (URSI) in Kyoto, Japan in 1993 adopted the *Resolution on free access to environmental data*:

URSI,

Aware of the idea growing in some quarters to consider environmental data as a market commodity, recognizing that such consideration could be acceptable when data are to be used for a commercial purpose,

Urges agencies that archive those data to warrant the **access to environmental information for scientific purpose free of charge or at marginal cost**.¹⁸³ [emphasis added]

“Social Science Data Management Policy”, International Social Science Council (ISSC) (1994)

In 1994, the General Assembly of the International Social Science Council adopted a Social Science Data Management Policy:

The International Social Science Council calls upon . . . all ISSC Member Associations and Member Organizations of the ISSC, to join in an early and continuing commitment to the establishment, maintenance, validation, description, accessibility, and distribution of high-quality, long-term datasets in all of the social sciences. Specifically,

- Full and open sharing of the full suite of datasets for all social scientists is a fundamental goal.
- . . .
- Data should be provided at the lowest possible cost to the greatest extent possible to researchers in the interest of full and open access to data. This cost should, as a first principle, be no more than the marginal cost of filling a specific user request. Agencies should act to streamline administrative arrangements for exchanging data among researchers.
- For those programs in which selected principal investigators have initial periods of exclusive data use, data should be made openly available as soon as they become widely useful, as soon as possible. Funding agencies should explicitly define the duration of any exclusive use period, and in any case not later than one year following the end of the grant period. While the rights of scholars to publish from their data must be protected, a guideline period of one year from data collection to availability will in most cases give such protection and good cause should be given for embargo beyond one year; a shorter period of exclusive rights would be commendable.

¹⁸² See http://www.codata.org/data_access/policies.html#WCP.

¹⁸³ See http://www.codata.org/data_access/policies.html#URSI.

- The rights of privacy of the individual must be protected, and nothing done either in the original investigation or in the transference of data to other researchers which would in any way compromise the rights of the individual. national laws regarding privacy/confidentiality of data must be respected and developed.
- The rights of access to data collected in developing countries should be given to researchers indigenous to those countries at least simultaneously with publication, at minimum cost, and if possible as soon as the data are available to the original researchers. Researchers in developing countries have a right to data collected in their countries. This should be provided by electronic means wherever possible.
- All researchers should strive to maximize access and use of data for which they are responsible as originators, fenders, archivists, editors and users.¹⁸⁴

Group on Earth Observations (GEO) and the Global Earth Observation System of Systems (GEOSS)

An important new initiative for cooperation and knowledge-sharing in geospatial information is the Group on Earth Observations (GEO) and its work coordinating international efforts to establish a Global Earth Observation System of Systems (GEOSS).

The vision for GEOSS is as a “system of systems”, built upon existing observational systems and incorporating new systems for Earth observation and modelling that are offered as GEOSS components by Member countries and Participating Organizations. This emerging public infrastructure links a diverse and growing array of instruments and systems for monitoring and forecasting changes in the global environment. This “system of systems” supports policymakers, resource managers, science researchers and many other experts and decision-makers.

The operational coordination and harmonisation of data policies and procedures, to facilitate the sharing and use of GEOSS data to maximise societal benefits for the widest possible range of users, is a major challenge of no less significance than developing technical interoperability between the diverse and increasing array of monitoring and forecasting systems and instruments.

Some instances of the challenges presented to the GEOSS by inappropriate policies are described in the following terms in the White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles:

Inconsistent or vague data policies and procedures could hamper the rapid dissemination and flexible use of data and information needed for mission-critical and /or life-threatening GEOSS applications. Restrictive policies on data re-use and re-dissemination would significantly reduce the net return on investment of public funds in Earth observations and lead to unnecessary and wasteful duplication of effort. Excessive charges for data would pose substantial barriers to many users, especially those in developing countries, who may have no or few alternative sources for data.¹⁸⁵

¹⁸⁴ See http://www.codata.org/data_access/policies.html#WMO%20WDC and http://www.codata.org/data_access/policies.html#ISSC.

¹⁸⁵ http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf, pages 5 and 6.

“White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles”, Global Earth Observation System of Systems (GEOSS) (2008)

A major early achievement of the Group on Earth Observations (GEO) was reaching agreement on a strategic set of Data Sharing Principles which represent an essential basis for the Global Earth Observation System of Systems (GEOSS). GEO has as one of its major ongoing undertakings the efficient and effective operational implementing of these high level principles.¹⁸⁶

GEO’s website provides the following account of the ongoing implementation work:¹⁸⁷

As part of the implementation of GEOSS, a team of experts has worked on the GEO Work Plan Task on GEOSS Data Sharing Principles DA-06-01 under the leadership of the Committee on Data for Science and Technology (CODATA) of the International Council for Science (ICSU).¹⁸⁸ Over the past two years, the team has drafted a White Paper that provides an overview of international data sharing laws, principles, and policies and recommends a draft set of implementation guidelines for the GEOSS Data Sharing Principles as outlined in the GEOSS 10-Year Implementation Plan. The White Paper builds upon a diverse history of data sharing practices to forge a set of specific guidelines for data sharing—consistent with the accepted Data Sharing Principles—that should enable GEOSS to maximize its societal benefits and realize its potential.

Following the successful initiation and progress of the Task, in November 2007, the Fourth Earth Observation requested that a process be put in place to further the establishment of detailed GEOSS data sharing guidelines leading up to their implementation. This document is not intended as a legal framework, but rather as a common basis for community discussion on how to share the data and information contributed to GEOSS.

*Data sharing principles*¹⁸⁹

The GEOSS 10 Year Implementation Plan explicitly acknowledges the importance of data sharing in achieving the GEOSS vision and anticipated societal benefits. The Plan, endorsed by nearly 60 countries and the European Commission at the Third Earth Observation Summit in Brussels, highlights the following GEOSS data sharing principles:

1. There will be full and open exchange of data, metadata and products shared within GEOSS, recognising relevant international instruments, and national policies and legislation.
2. All shared data, metadata and products will be made available with minimum time delay and at minimum cost
3. All shared data, metadata and products being free of charge or at no more than the cost of reproduction will be encouraged for research and education.¹⁹⁰

In October 2006, in conjunction with the 20th International CODATA Conference in Beijing, CODATA convened a meeting of experts to discuss the data-sharing task and associated implementation issues.¹⁹¹ This meeting provided important inputs into the structure and content of the *White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles*.

¹⁸⁶ http://www.earthobservations.org/geoss_dsp.shtml.

¹⁸⁷ Ibid.

¹⁸⁸ CODATA page on GEOSS at <http://www.codata.org/GEOSS/index.html>.

¹⁸⁹ White Paper on the GEOSS Data Sharing Principles (Review Draft) September 2008 (CODATA, Paris) at http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf.

¹⁹⁰ Ibid, page 4.

¹⁹¹ <http://www.codata.org/GEOSS/DA-06-01Meeting%20BeijingOct2006review.pdf>.

Overview of data sharing laws, principles and policies¹⁹²

The *White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles* provides an overview of data sharing laws, principles and policies:¹⁹³

As the GEOSS Data Sharing Principles make clear, there is a consensus among the GEOSS Members and Participating Organizations that data, metadata, and products that they make available through GEOSS need to be shared and exchanged on a “full and open” basis, with minimum time delay and minimum cost”.¹⁹⁴ “Full and open exchange” has been defined as “data and information derived from publicly funded research are made available with as few restrictions as possible, on a nondiscriminatory basis, for no more than the cost of reproduction and distribution” [NRC, 1997].

This definition is adapted from a principle for access to data from global change research that was first articulated as part of the U.S. Global Change Research Program [OSTP, 1991]. The cost of reproduction and distribution, or the marginal cost of fulfilling a user request, on the Internet is either very small or zero. This policy has been used in various international and national environmental projects and in environmental (and other) research over the past two decades.

Although intended primarily for data from publicly-funded research, the policy as defined can have broad applicability to other types of public data relevant for inclusion in the GEOSS data system. Moreover, there is an emerging international consensus that openness as the default rule for government data and information—free online and unrestricted in its use—provides the greatest return on the public investments in them and serves the public interest.

At the same time, the diversity of data and data sources expected to be made available through GEOSS makes data sharing difficult and uncertain in various contexts. Different data policy frameworks have evolved for different types of data, including research versus operational data, space-based versus in situ data, and data collected by public versus private organizations. Nations have developed different approaches to the ownership and use of publicly generated or funded data. When “raw”, that is unprocessed, data are transformed into value-added data and information, differing intellectual property laws may be applicable. Divergent policies may also apply to data used in legal or regulatory processes (i.e., electronic records) versus data collected for other purposes such as scientific research.

Further, the sharing of GEOSS data will in some cases be subject to important exceptions such as the protection of national security, privacy and confidentiality, indigenous rights, and threatened ecological and cultural resources. By “recognizing relevant international instruments and national policies and legislation,”

¹⁹² White Paper on the GEOSS Data Sharing Principles (Review Draft) September 2008 (CODATA, Paris) at http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf at p7.

¹⁹³ White Paper on the GEOSS Data Sharing Principles (Review Draft) September 2008 (CODATA, Paris) at http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf, at pp 7 and 8.

¹⁹⁴ At the end of January 2008, the *White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles* was circulated to GEO Committees and Task DA-06-01 Participants with a request for comments. (See http://www.earthobservations.org/documents/dsp/DSP_Annex1.pdf). The Australian response, in relevant part, stated:

Australia would like to express its appreciation to the Committee on data for Science and Technology (CODATA) and the team of experts who drafted the White Paper on Data Sharing Principles. This paper provides a very useful overview of international data sharing agreements, principles and policies as well as recommending additional guidelines for consideration. Australia can support the guidelines both from the 10-year Implementation Plan and the additional guidelines the task team has drafted in this White paper. By necessitating that any new systems provide full and open access to data, metadata and products in order to be official elements of GEOSS, it should be possible to see greater adherence to the GEOSS data sharing principles. It is particularly important within a framework designed around Societal Benefit Groups that users be free to integrate, reuse and re-disseminate data, products and information with minimal restriction.

The limitation of “recognising relevant international instruments and national policies and legislation” is a very broad yet necessary restriction on completely open data exchange and vastly simplifies the level of definition provided at the GEO level in this data sharing paper.[In] general, Australia is pleased with the content of the White Paper and would support its adoption.

the Data Sharing Principles clearly allow for exceptions to “full and open exchange of data, metadata, and products shared within GEOSS.” Good faith efforts to limit the scope and application of exceptions are necessary to avoid the development of a complex patchwork of rules that will inhibit desirable uses of data and that will, in the end, fail to provide the desired protections.

Because of the very broad scope of potential GEOSS data and their applications there are many international and national laws, principles, and policies that may be applicable. This chapter begins by examining the variety and complexity of those authoritative sources, with particular focus on policies that promote the open availability, or full and open exchange of data relevant to GEOSS. The underlying rationales for making the data as broadly shared and with the least number of restrictions are then presented, dividing the issues between data that are generated by governments, by other entities with a mix of public and private funding, and by the private sector. Particular attention is devoted to the special status of research, educational, and developing country users. The chapter concludes with an overview of the various legal and policy exceptions to data sharing, which must be taken into account by the contributors to the GEOSS data system.

Appendix C to *White Paper* sets out, in summary form, regional European data sharing policies. Appendix D, prepared by Professor Joanne Gabrynowicz, is a comprehensive international survey of national remote sensing laws and policies.¹⁹⁵

GEOSS has developed a guideline document to facilitate implementation of the data sharing principles by Members and Participating Organizations.¹⁹⁶

Benefits of automatic management of data

In the context of incentives for compliance with the Data Sharing Principles, the White Paper addresses the issues around digital rights management and automated online cost recovery mechanisms. Whilst indicating that digital rights management (DRM) has negative effects on deriving the full value from the use of data, particularly data produced in the public sector, it can provide certain advantages in the GEOSS data-sharing context in its uses for the automatic management of data. If properly applied, it can provide some advantages in the GEOSS data-sharing context in its uses for the automatic management of data.¹⁹⁷

The White Paper identifies further advantages which flexible technologies can deliver in facilitating online data sharing in an efficient and effective manner. It notes that:¹⁹⁸

In particular new methods for automated, flexible digital rights management and common-use licensing (such as Creative Commons licenses) for otherwise copyrighted data products provide the capability to manage a reasonable range of data restrictions in a rapid and seamless manner online. These methods can also help educate users about their rights, responsibilities, and restrictions regarding the data or information they obtain from GEOSS. Such approaches offer greater flexibility and the potential to promote both planned and unforeseen societal benefits than more traditional approaches that rely on technical controls, while reducing transaction costs.

¹⁹⁵

See

http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf.

¹⁹⁶ See *(Draft) Implementation Guidelines for the GEOSS Data Sharing Principles*, 27 September 2008, at http://www.earthobservations.org/documents/dsp/GEOSS%20Data%20Sharing%20Implementation%20Guidelines%20alone%2027Sept08draft_redline.pdf, September 2008 Draft, and http://www.earthobservations.org/geoss_dsp.shtml.

¹⁹⁷ White Paper on the GEOSS Data Sharing Principles (Review Draft) September 2008 (CODATA, Paris) http://www.earthobservations.org/documents/dsp/Draft%20White%20Paper%20for%20GEOSS%20Data%20Sharing%20Policies_27Sept08.pdf at page 49.

¹⁹⁸ *Ibid.*

4. Open access statements and declarations

There are numerous high level policy statements on access to public sector information and publicly-funded research outputs which embrace open access as a core value, notably the Declaration on Science and the Use of Scientific Knowledge (1999), the Berlin Declaration (2003),¹⁹⁹ the Budapest Open Access Initiative (2002),²⁰⁰ the Bethesda Statement on Open Access Publishing (2003),²⁰¹ the Santiago Statement (2006), the Cape Town Declaration (2007)²⁰² and the Beijing Declaration (2008).

“Declaration on science and the use of scientific knowledge”, World Conference on Science (1999)

Participants in the World Conference on Science²⁰³ held in Budapest, Hungary from 26 June to 1 July 1999 under the auspices of UNESCO and the ICSU agreed to adopt the *Declaration on science and the use of scientific knowledge*.²⁰⁴ The conference called on UNESCO and ICSU to submit the Declaration to the General Conference of UNESCO and the General Assembly of ICSU, noting that the document would also be brought to the attention of the UN General Assembly.

Preamble

Considering

....

10. that access to scientific knowledge for peaceful purposes from a very early age is part of the right to education belonging to all men and women, and that science education is essential for human development, for creating endogenous scientific capacity and for having active and informed citizens,

.....

15. the information and communication revolution offers new and more effective means of exchanging scientific knowledge and advancing education and research,

16. the importance for scientific research and education of full and open access to information and data belonging to the public domain,

.....

Proclaim the following:

.....

¹⁹⁹ See <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html> and <http://www.zim.mpg.de/openaccess-berlin/berlindeclaration.html>.

²⁰⁰ See <http://www.soros.org/openaccess/read.shtml>.

²⁰¹ See <http://www.earlham.edu/~peters/fos/bethesda.htm>.

²⁰² Cape Town Declaration, November 2007, at http://www.earthobservations.com/05_Cape%20Town%20Declaration.pdf.

²⁰³ *World Conference on Science for the Twenty-first Century: A New Commitment*, Budapest, Hungary, 26 June to 1 July 1999.

²⁰⁴ *Declaration on science and the use of scientific knowledge*, World Conference on Science, Budapest, Hungary, 1 July 1999, available at http://www.unesco.org/science/wcs/eng/declaration_e.htm#knowledge.

3. *Science for Development*

.....

35. The building of scientific capacity should be supported by regional and international cooperation, to ensure both equitable development and the spread and utilization of human creativity without discrimination of any kind against countries, groups or individuals. Cooperation between developed and developing countries should be carried out in conformity with the principles of full and open access to information, equity and mutual benefit.

....

38. Intellectual property rights need to be appropriately protected on a global basis, and access to data and information is essential for undertaking scientific work and for translating the results of scientific research into tangible benefits for society. Measures should be taken to enhance those relationships between the protection of intellectual property rights and the dissemination of scientific knowledge that are mutually supportive. There is a need to consider the scope, extent and application of intellectual property rights in relation to the equitable production, distribution and use of knowledge. There is also a need to further develop appropriate national legal frameworks to accommodate the specific requirements of developing countries and traditional knowledge and its sources and products, to ensure their recognition and adequate protection on the basis of the informed consent of the customary or traditional owners of this knowledge.

“Okinawa charter on global information society”, G8,²⁰⁵ Okinawa, Japan (22 July 2000)

The Charter provides in relevant part:

Information and Communications Technology (IT) is one of the most potent forces in shaping the twenty-first century. Its revolutionary impact affects the way people live, learn and work and the way government interacts with civil society. IT is fast becoming a vital engine of growth for the world economy. It is also enabling many enterprising individuals, firms and communities, in all parts of the globe, to address economic and social challenges with greater efficiency and imagination. Enormous opportunities are there to be seized and shared by us all.

The essence of the IT-driven economic and social transformation is its power to help individuals and societies to use knowledge and ideas. Our vision of an information society is one that better enables people to fulfil their potential and realise their aspirations. **To this end we must ensure that IT serves the mutually supportive goals of creating sustainable economic growth, enhancing the public welfare, and fostering social cohesion, and work to fully realise its potential to strengthen democracy, increase transparency and accountability in governance, promote human rights, enhance cultural diversity, and to foster international peace and stability. Meeting these goals and addressing emerging challenges will require effective national and international strategies.**

In pursuing these objectives, we renew our commitment to the principle of inclusion: everyone, everywhere should be enabled to participate in and no one should be excluded from the benefits of the global information society. *The resilience of this society depends on democratic values that foster human development such as the free flow of information and knowledge, mutual tolerance, and respect for diversity.*

We will exercise our leadership in advancing government efforts to foster an appropriate policy and regulatory environment to stimulate competition and innovation, ensure economic and financial stability, advance

²⁰⁵ The G8 is a group of eight countries that come together to discuss current world issues. These countries are France, Germany, Japan, the United Kingdom, the United States of America, Italy, Canada and Russia. See: http://www.g8.fr/evian/english/navigation/the_g8/background_to_the_g8.html.

stakeholder collaboration to optimise global networks, fight abuses that undermine the integrity of the network, bridge the digital divide, invest in people, and promote global access and participation.

Above all, this Charter represents a call to all, in both the public and private sectors to bridge the international information and knowledge divide. A solid framework of IT-related policies and action can change the way in which we interact, while promoting social and economic opportunities worldwide. An effective partnership among stakeholders, including through joint policy co-operation, is also key to the sound development of a truly global information society.²⁰⁶ [emphasis added]

“Budapest Open Access Initiative” (2002)

The Budapest Open Access Initiative (BOAI) arose out of a meeting convened in Budapest by the Open Society Institute in 2002.²⁰⁷ The purpose of the meeting was to accelerate progress in making research articles in all academic fields freely available on the internet. In contrast to the Bermuda Principles, the Budapest statement is specific to scholarly journal literature.

The BOAI has been significant in advancing the open access movement generally, articulating the importance of open access in:

Removing access barriers...[It] will accelerate research, enrich education, share learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.²⁰⁸

“Johannesburg Declaration on Sustainable Development” (2002)

At the World Summit on Sustainable Development (WSSD), held in Johannesburg in 2002, the participating nations issued a Declaration that recognized the need to support

the exchange of observations recorded from *in situ*, aircraft, and satellite networks, dedicated to the purposes of this Declaration, in a full and open manner with minimum time delay and minimum cost, recognizing relevant international instruments and national policies and legislation.²⁰⁹

“Bethesda Statement on Open Access Publishing” (2003)

Following the Budapest Open Access Initiative in 2002, there was a strong surge in the open access movement worldwide. 2003 saw the development of more well-defined, thorough and progressive open access statements, adopted by funding bodies and academic institutions alike. Among these was the Bethesda Statement on Open Access Publishing, published on 20 June 2003.²¹⁰ Like the BOAI, the Bethesda Statement was strongly focused on published research literature rather than data. Yet the Bethesda Statement was broader in its terms, supporting the position that:

²⁰⁶ See http://www.g8.fr/evian/english/navigation/g8_documents/archives_from_previous_summits/okinawa_summit_-_2000/okinawa_charter_on_global_information_society.html.

²⁰⁷ See <http://www.soros.org/openaccess/>.

²⁰⁸ <http://www.soros.org/openaccess/read.shtml>.

²⁰⁹ United Nations, *Johannesburg Declaration on Sustainable Development*, UN Department of Economic and Social Affairs, World Summit on Sustainable Development, available at: http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POI_PD.htm.

²¹⁰ See <http://www.earlham.edu/~peters/fof/bethesda.htm>.

a complete version of the [published] work and all supplemental materials (our emphasis)...in a suitable standard electronic format is deposited immediately upon initial publication in at least one on-line repository...²¹¹

Although the statement does not define “supplemental material”, it could be interpreted as including the data on which the published work is based, or at least the metadata supporting the deposited work.

“Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities” (2003)

Of the early international statements on open access, the Berlin Declaration is perhaps the most significant because it is the statement most referred to and relied upon by institutions creating open access policies for their repositories.²¹² The goal of the Berlin Declaration was to support “the open access paradigm via the Internet” and to:

Promote the Internet as a fundamental instrument for a global scientific knowledge base.²¹³

The Berlin Declaration drew strongly on the Bethesda Statement, with the addition of an inclusive definition for open access contributions. The Berlin Declaration defined open access contributions to include scientific research results, raw data and metadata, thereby extending the scope of open access principles to cover more than just literature and publications. The move away from the restrictive policy of relating open access principles to only literature was an important one, particularly in the context of the growth of scientific and research databases that include raw data and information as well as reports and articles.

“Workshop Statement: Global Spatial Data and Information User Workshop”, Columbia University (2004)

The participants in the Global Spatial Data and Information User Workshop²¹⁴ held on 21 – 23 September 2004 at Columbia University’s Lamont-Doherty Earth Observatory produced the following Workshop Statement.²¹⁵

²¹¹ <http://www.earlham.edu/~peters/fos/bethesda.htm>.

²¹² For example, see Biomed Central, Open Access Now <http://www.biomedcentral.com/openaccess/www/?issue=10> and the Italian Universities for Open Access: towards open access for scholarly literature, Messina Declaration <http://www.aepic.it/conf/viewappendix.php?id=49&ap=1&cf=1> among others.

²¹³ <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html>.

²¹⁴ The workshop was organised by CIESIN, FAO, UNEP, WHO and CGIAR and was co-sponsored by CODATA and SEDAC.

²¹⁵ de Sherbinin, A., and R.S. Chen (eds), *Global Spatial Data and Information User Workshop: Report of a Workshop*, 21-23 September 2004. Palisades, NY: Socioeconomic Data and Applications Center, Center for International Earth Science Information Network, Columbia University, 2005, available at http://sedac.ciesin.columbia.edu/GSDworkshop/GlobalDataWorkshop_report_web.pdf

We, the participants in the workshop, are representative of a wide range of global-scale data and information developers, managers, distributors, and users from both governmental and nongovernmental organizations around the world.

....

We therefore **acknowledge** the collective responsibility to:

- 1) Make global-scale data and derived information as widely accessible and usable to all types of users as possible, while recognizing the intellectual property rights of the underlying data sources;
- 2) Promote the appropriate use of these data and information resources among all types of users, through provision of suitable metadata and documentation, expert guidance, outreach to key user communities, and other means;
- 3) Improve the quality, comprehensiveness, and usability of global-scale datasets and derived information through collaboration with the relevant data sources and managers, the scientific community, diverse data users, and key sponsors;
- 4) Improve the capacity of data sources, data managers, and data and information users in developing countries to contribute to and benefit from global-scale data and information resources;
- 5) Promote efficient and seamless integration of global-scale data development, management, and access with corresponding local, national, and regional data programs, initiatives, and networks;
- 6) Establish effective coordination with other related data and information efforts including the development of national and global spatial data infrastructure, ongoing intergovernmental data programs, relevant international efforts to develop and implement open standards, and present and future international scientific initiatives; and
- 7) Ensure the long-term stewardship of these data including their long-term preservation and access.²¹⁶

“Santiago Statement”, Global Spatial Data Infrastructure Association (2006)

The GSDI Association is comprised of organisations, agencies, firms, and individuals from around the world. Its purpose is to promote international cooperation and collaboration in support of local, national and international spatial data infrastructure developments that will allow nations to better address social, economic, and environmental issues.

The Santiago Statement, produced from the findings of the Global Spatial Data Infrastructure Association’s 9th International Conference²¹⁷ held in Chile in November 2006, and discussion groups at the conference, is as follows:

1. Spatial Information is a public asset. Governments around the world should attempt to make freer access to it. This will better enable shared development that is interrelated and standardized for both the public and private organizations that use it. This information is an important element for our countries, becoming a basis for economic growth, encouraging public and private investment. Consequently it generates economic and social development.
2. Governments must invest in the development, implementation, application and use of spatial information, consequently making contributions to the budgets of the bodies which create territorial information, in order to produce, maintain and publish the spatial data that sustains development in these countries, oriented to a

²¹⁶ Ibid at pvii.

²¹⁷ See <http://www.gsdi.org/gsdiConferences.asp>; the theme of the 2006 conference was “Spatial information: Tool for reducing Poverty”.

continuous improvement of the standards and lives of the people of our planet.

3. Spatial information is a technological resource that should be used by governmental authorities at all administrative levels, in order for them to know, have access to and use territorial information, thus making decisions to benefit the population and its territory, being properly informed, in order to generate the tools for reducing poverty by determining the unsatisfied needs of the people that must be resolved as soon as possible.

4. Educational authorities should ensure that future generations of the most highly educated people set to become the leaders of tomorrow understand, use and learn to manage spatial data to benefit the society they work in, also studying relevant aspects such as measures in response to disasters, environmental protection, the acquisition of awareness of the social conditions involving poverty in the area studied, generating social measures to improve the quality of life among inhabitants, and gaining a real knowledge of the legacy and assets constituted by that territory.

5. Spatial Information becomes a real tool for reducing poverty while the governments of the world create geo-referenced territorial information and statistics about the social, economic, cultural, institutional and environmental conditions of the territory and its population. Poverty is the major issue and scourge of our current society, leading in turn to other problems, for example the increase in crime, corruption, drug addiction, child abuse and so on. We will seek to find the way to continuously improve living standards in our countries.

6. It is important that nations work on the creation of a legal framework that supports the work on SDIs in every country. A national SDI legal framework aids institutional backing that brings the financial resources this task requires and provides a structure that applies across all the activities of each country. Adequate training will be necessary for it all to function well.²¹⁸

“Cape Town Declaration”, Cape Town Ministerial Summit – Earth Observations for Sustainable Growth and Development, Group on Earth Observations (30 November 2007)

The Cape Town Declaration states, in part:

...Recognising that nations are facing major environmental, social and economic challenges as a consequence of global change;

Recognising that sound policy making for addressing the environment and sustainable development must be based on understanding, describing and predicting the complex and interdependent world, and therefore requires terrestrial, oceanic, air-borne, and space-based Earth observations, data assimilation techniques and Earth system modelling;

....

Recognising the important contribution GEOSS can make through collaboration with UN system bodies including a response to the needs of the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), United Nations Convention on Combating Desertification (UNCCD), and other relevant agreements and processes, and the growing need to further enhance such contributions;

....

We note with satisfaction the numerous contributions and early achievements made by Members and Participating Organisations towards the GEOSS 10- Year Implementation Plan, as described in the *GEO Report on Progress 2007*.

...

We support the establishment of a process with the objective to reach a consensus on the implementation of the Data Sharing Principles for GEOSS to be presented to the next GEO Ministerial Summit. **The success of GEOSS will depend on a commitment by all GEO partners to work together to ensure timely, global and open access to data and products.**

²¹⁸ <http://www.gsdi.org/newsletters.asp> . See GSDI Newsletter, September 2007 at p5.

We commit to explore ways and means for the sustained operation of the shared architectural GEOSS components and related information infrastructure;

...

We commit ourselves to work together to improve the interoperability of and access to observation and associated prediction and information systems towards the continued strengthening of GEOSS and the full realisation of the 10- Year Plan.

....

We resolve to meet again before the end of 2010 to review progress, conduct a mid-term assessment and give further guidance on the implementation of GEOSS.²¹⁹ [emphasis added]

Beijing Declaration (2008)

At the XXIst Congress of the International Society for Photogrammetry and Remote Sensing (ISPRS) in July 2008, the General Assembly of ISPRS made the Beijing Declaration²²⁰ which calls on international communities to work together and commit adequate resources for the benefit of society and the environment. The Declaration affirms the importance of photogrammetry, remote sensing and spatial information sciences for sustainable development and draws attention to the application of Earth observation technologies in a range of fields including socio-economic sustainable development, management of natural disasters, conservation of cultural heritage, sustainable use of water resources, and environment and health.

The text of the declaration is:

Beijing Declaration

(Approved on July 9th, 2008)

We, members of The International Society for Photogrammetry and Remote Sensing (ISPRS) and participants of the XXIst ISPRS Congress in Beijing, recognize the importance of imagery to measure and monitor the natural and man-made features on planet Earth and to explore other planets of the solar system, especially after witnessing the important role of photogrammetry, remote sensing and spatial information systems in the rescue operation and damage assessment of the recent devastating natural disasters.

We note scientific developments reported during the technical sessions of the Congress and the great progress made in the use of imagery from many different platforms, with numerous sensors, for a wide variety of applications. We particularly note:

1. Wide applications of Earth observation technologies and tools to the fields of socioeconomic sustainable development, natural disaster prediction, mitigation and response, maintenance of biodiversity, cultural heritage conservation, global and environmental climate change monitoring, energy exploration and management, land use and land cover inventory, food security, sustainable use of water resources, and human habitat, environment and health.
2. Significant technological achievement in the acquisition, processing, interpretation and analysis of aerial and satellite imagery, advances of airborne and terrestrial lidar, development of imaging radar technology, increased maturity of small satellites and of geo-sensor networks, validation, calibration

²¹⁹ Cape Town Declaration, November 2007, at http://www.earthobservations.com/05_Cape%20Town%20Declaration.pdf

²²⁰ See http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/2124_DD_FILE_ISPRS_Beijing_Declaration.pdf.

and certification of digital cameras and other types of sensors, automated information extraction from all forms of imagery, distributed data processing for information services, and multidimensional data modeling.

3. Great progress in developing new forms of cooperation and knowledge sharing, including the Group on Earth Observation (GEO) and its program to establish a Global Earth Observation System of Systems (GEOSS), and the International Council for Science (ICSU) Geo-unions and its activities in Africa, and the Joint Board of Geospatial Information Societies.

Recalling that the 2002 World Summit for Sustainable Development (WSSD) stressed the importance of Earth observation for advancing sustainable development, we strongly believe that photogrammetry, remote sensing and spatial information sciences are essential to ensure sustainable development in the 21st century. We further recognize that non-governmental organizations, especially ISPRS, have the responsibility to promote the peaceful use of space, airborne and terrestrial technology and the realization of the full potential of imagery for the benefit of society and for the maintenance of sustainable growth in all nations.

We reaffirm our commitment to implement the vision for the 21st century of ISPRS, which aims to realize the full potential of information from imagery by encouraging and facilitating research and development, advancing knowledge by scientific networking, promoting international cooperation, pursuing interdisciplinary integration, facilitating education and training, enhancing and exploring new applications, developing public recognition of photogrammetry, remote sensing and the spatial information sciences. We therefore call on international communities to support the **Cape Town declaration of GEO** and:

1. to commit adequate investment and active engagement in scientific research and development, education and training, and capacity and infrastructure building;

2. to promote the sharing of imaging and ranging technology and data for scientific research and peaceful applications; and

3. to encourage constructive dialogue and close cooperation and collaboration between scientists, governments, public and private sectors, non-governmental organizations, and international organizations and institutions.

We further call for a contribution from everyone to establish and operate a new silk road for information from imagery, leading to a people-centered and sustainable development-oriented information society.²²¹ [emphasis added]

5. Other international organisations and initiatives

Consultative Group for International Agriculture Research (CGIAR) and International Maize and Wheat Improvement Centre (CIMMYT)

CIMMYT is an internationally funded, non-profit, scientific research and training organization. The CGIAR Consortium for Spatial Information (CGIAR-CSI)²²² is an initiative of the geospatial scientists within CGIAR, which links the efforts of scientists, national and international partners and others with the objective of promoting effective use of geospatial science for sustainable agriculture development, natural resource management, biodiversity conservation and poverty alleviation in developing countries.

²²¹ Ibid.

²²² See <http://www.spatial-info.org> and <http://www.csi.cgiar.org>.

CGIAR-CSI creates mechanisms for standardizing datasets within CGIAR, sharing methodologies and solutions, and facilitating inter-centre collaboration. CSI serves as a platform for joint efforts in GIS-based agricultural research at global, regional, and local levels. Core membership includes 10 institutions. The CGIAR Central Advisory Service (CAS) on Intellectual Property²²³ was established by CGIAR in 1999 to facilitate the exchange of experiences and knowledge among the CGIAR Centres and to provide expert assistance on intellectual property matters.

“Legal Issues in the Use of Geo-spatial Data and Tools for Agriculture and Natural Resource Management: A Primer”, Roger A. Longhorn, Victoria Henson-Apollonio, and Jeffrey W. White (2002)

In activities of the GIS and Modelling Laboratory at CIMMYT, one of the authors (Jeff White) noted an increasing expectation among partner institutions that data exchanges would be accompanied by transfer agreements. Similarly, in collaborative efforts and contracted work, questions arose concerning ownership of software code and permitted use of commercial tools. In addressing these concerns, the opportunity arose for CGIAR’s then newly-established Central Advisory Service to assist CIMMYT in reviewing intellectual property issues relating to use of spatial information. Recognizing that such a review might interest a broad audience of researchers, development specialists and managers, the review was conducted under the aegis of CGIAR’s Consortium for Spatial Information.

This primer is one of the most practical guides of its kind.²²⁴ It provides an overview of intellectual property issues relating to GIS from an agricultural and natural resource management point of view. While dealing with a range of intellectual property issues at a basic level, it also contains many industry-specific examples (such as recent, at time of publication, patents relating to GIS).

Open Geospatial Consortium (OGC)

The Open Geospatial Consortium, Inc (OGC) is an international industry consortium of over 360 companies, government agencies, non-profit and research organizations, including universities, participating in a consensus process to develop publicly available interface specifications.²²⁵ OGC members collaboratively develop OpenGIS standards and specifications to address specific interoperability challenges. The OpenGIS standards and specifications, which are available at no cost, are technical documents that detail interfaces or encodings. Software developers use these documents to build support for the interfaces or encodings into their products and services.

²²³ See <http://www.cgiar.org/isnar/cas/>.

²²⁴ See http://209.85.173.132/search?q=cache:kMv8NLamt3QJ:csi.cgiar.org/download/IPR_Primer.pdf+Legal+Issues+in+the+Use+of+Geo-spatial+Data+and+Tools+for+Agriculture+and+Natural+Resource+Management:+A+Primer+Longhorn+%222002%22&hl=en&ct=clnk&cd=1&gl=au.

²²⁵ <http://www.opengeospatial.org/ogc> (accessed 15 December 2008).

“The Importance of Going ‘Open’: An Open Geospatial Consortium White Paper”, Open Geospatial Consortium (2005)

In this 2005 article,²²⁶ the Open Geospatial Consortium explains its role in the development of open standards and specifications and why they are important:

Standardisation is the reason for the success of the Internet, the World Wide Web, e-commerce and the emerging wireless revolution. The reason is simple: our world is going through a communications revolution on top of a computing revolution. Communication means “transmitting or exchanging through a common system of symbols, signs or behavior.” Standardization means “agreeing on a common system.”

Most of today’s communications technology standards (HTML, FTP, XML, TCP/IP1 etc.) are created by standards setting organizations (consortiums or task forces) that seek to develop effective standards that meet everyone’s needs without favoring any single company or organization. Organizations like the OGC, the World Wide Web Consortium (W3C), the Internet Engineering Task Force (IETF), and others are open organizations in the sense that any organization can participate, the topics of debate are largely public, decisions are democratic (usually by consensus), and specifications are free and readily available.

The OGC sets GIS standards [fn 2], addressing user needs that can only be addressed by cooperation among GIS vendors. [fn 2: accurately, the OGC sets standards for "geoprocessing," which includes capabilities now found in geographic information systems (GIS) and digital systems for Earth imaging, web mapping, location based services, surveying and mapping, CAD-based facilities management, webs of geolocated sensors, navigation, cartography, automated mapping etc. The "standards" are consensus-derived specifications for open interfaces, protocols, schemas etc. that enable different vendors' systems to exchange data and instructions, and that enable full integration of these capabilities into all kinds of information systems.]

Overall, users want to maximize the value of past and future investments in geoprocessing systems and data.

That general need points to the following three more specific classes of user needs:

1. The need to share and reuse data in order to decrease costs (avoid redundant data collection), get more or better information, and increase the value of data holdings.
2. The need to choose the best tool for the job, and the related need of reducing technology and procurement risk (i.e., the need to avoid being locked in to one vendor).
3. The need for more people with less training to benefit from using geospatial data in more applications: That is, the need to leverage investments in software and data.

Those three classes of user needs point to the following still more specific needs:

1. The need for organizations to have access to each other’s spatial information without copying and converting whole data sets. This includes:

- a. The need for passing data and instructions between different vendor’s systems.
- b. The need to integrate various data models, formats and coordinate systems.
- c. The need to visually integrate map displays (symbolology) from different data servers.
- d. The need to find and evaluate data and services held in other locations.

2. The need to have the pieces of a solution work together. This includes:

- a. The need to add or replace a capability in a current vendor solution, with minimal integration costs, and have it work seamlessly.
- b. The need to understand the interoperability requirements of application domains and define architecture profiles and application design strategies for each.

²²⁶ Open Geospatial Consortium, *The Importance of Going “Open” An Open Geospatial Consortium (OGC) White Paper*, July 2005 at <http://www.opengeospatial.org>.

- c. The need to integrate geoprocessing Web services with mainstream Web services, and to develop “loosely coupled systems” using network-resident services.

3. **The need to base geoprocessing on the World Wide Web open architecture**, which includes common best practices, “reusable” data and Web Services-based components.

Once geoprocessing systems work together and work with other systems on the open network, new opportunities/needs arise that require a standards foundation:

- a. The need to organize geographic data stored in text and on video, audio, and other media.
- b. The need to access and process on-line sensor data from multiple sources.
- c. The need for Location Based Services portable across devices, networks, and providers.
- d. The need for "semantic translation" from one data model to another.
- e. The need to take advantage of grid computing for geoprocessing applications.

The general solution to these needs: geoprocessing systems and components that interoperate across open interfaces in the context of global (or in some cases local) distributed computing platforms (usually the Web.)

Technical participants in OGC translate the user needs above into technology requirements that are formalized in open standards – OGC's OpenGIS Specifications. When users plan information systems by designing "open architectures" based on open standards, and when they buy products that conform to these open standards, they get the interoperability they need.

...

OpenGIS®, ***Open GIS®***, and ***open GIS™***

OGC registered the trademark “Open GIS” and OpenGIS” in countries around the world to assert the importance of open standards in geoprocessing and to protect its standards with a legal brand. A software vendor whose software implements interfaces based on OGC’s standards can claim that a product “implements” particular OpenGIS Specifications. If the product has passed a conformance *July 5, 2005 4 OGC* <http://www.opengeospatial.org> test for a particular OpenGIS Specification, the vendor can claim that its product conforms to that version of a specification and it can use OGC’s trademarks to assure buyers of the veracity of those claims. The phrase “open GIS” (with a small “o”) is also a trademark of OGC, with the same meaning as “Open GIS,” though “open GIS” is not a registered trademark.

Organizations that commit to "OpenGIS" commit to deploying and using distributed systems based on the OGC Reference Model.²²⁷

International Society for Digital Earth (ISDE)

The Digital Earth concept was described by then US Vice President Al Gore in 1998: a three-dimensional representation of the Earth, spatially referenced and interconnected with vast digital information repositories worldwide.

The first International Symposium on Digital Earth was held in Beijing in November-December 1999, hosted by the Chinese Academy of Sciences and the Chinese government.²²⁸ The fourth International Symposium on Digital Earth was held in Tokyo in 2005 on the theme “Digital Earth as a Global Commons”.

To promote the development of the Digital Earth project, the members of the International Symposium on Digital Earth steering committee agreed to establish an International Society for Digital Earth (ISDE). The purpose of the Society is to promote international cooperation on the Digital Earth vision and enable the Digital Earth technology to play a role in economic and socially

²²⁷ Ibid.

²²⁸ See http://www.isde-summit-2008.org/front_content.php?idcat=2; International Journal of Digital Earth at <http://www.informaworld.com/smpp/title~content=t777764757~tab=summary>.

sustainable development, environmental protection, disaster mitigation, natural resources conservation and improvement of living standards.

In 2008, ISDE and the Society for Geoinformatics jointly convened the Digital Earth Summit on Geoinformatics in Germany in order to bring scientists involved in Global Change research together with Geoinformatics specialists to discuss the advantages of a closer cooperation.²²⁹

International Society for Photogrammetry and Remote Sensing (ISPRS)

The International Society for Photogrammetry and Remote Sensing (ISPRS) is a nongovernmental organization devoted to the development of international cooperation for the advancement of knowledge, research, development, education and training in the photogrammetry, remote sensing and spatial information sciences. ISPRS also promotes the application of geospatial information to contribute to the well-being of humanity and the sustainability of the environment. ISPRS has 186 members representing government, academia and industry in over 90 countries. It is a member of ICSU, GEO (The Group on Earth Observation) and is an accredited NGO at the United Nations.

OpenStreetMap

OpenStreetMap (OSM) is a collaborative project founded by Steve Coast in 2004 to create free, editable maps.²³⁰ In 2006, it became a foundation – the OpenStreetMap Foundation – “an international, non-profit organisation dedicated to encouraging the growth, development and distribution of free geo-spatial data and to providing geo-spatial data for anybody to use and share.”²³¹

Maps are created using data from portable GPS devices and other free sources. The map data in the system so far has mostly been built from scratch, through a collaborative mapping process which usually begins with users uploading data onto OSM from their hand-held GPS units or by using GPS navigation software. This is followed by a manual editing process, creating "nodes" and "ways", and tagging these with key-value pairs to represent information about the different types of street, names of the streets etc.

The map data and rendered maps are licensed under a Creative Commons Attribution-ShareAlike 2.0 license. Under an arrangement with Yahoo!, OpenStreetMap makes use of Yahoo!'s vertical aerial imagery. The on-line editing tools display the imagery as an overlay, and OpenStreetMap contributors may create their vector based maps as a derived work, released under an open licence.

International Research Institute for Climate and Society's Climate Data Library

The Climate Data Library established by Columbia University's International Research Institute

²²⁹ See: http://www.geoconnexion.com/geo_news_article/Digital-Earth-Summit-on-Geoinformatics-2008/2814.

²³⁰ <http://www.openstreetmap.org>.

²³¹ See <http://foundation.openstreetmap.org/>.

(IRI) for Climate and Society²³² contains more than 300 datasets related to the earth and the environment. It also provides access to a variety of tools ranging from analytic tools to visualisation and mapping. Data can be downloaded for free in any of a range of formats.²³³

6. Literature on SDI initiatives

There is an extensive body of literature which examines SDI initiatives from an international and comparative perspective.²³⁴ With the development of the internet and advances in information technology since the mid-1990s, it has become increasingly important to adopt an international and global approach towards spatial information. Spatial data infrastructures are being developed in over 100 countries²³⁵, as distributed networks using the internet and geomatics to enable the sharing of interoperable spatially correlated data. Work in the US to develop a National Spatial Data Infrastructure carried through into work on a Global Spatial Data Infrastructure (GSDI).²³⁶ The US Federal Geographic Data Committee (FGDC)²³⁷ is encouraged (under OMB Circular A-16) to participate in building the GSDI as well as carrying out its principal role in developing the US NSDI.²³⁸

²³² See <http://iridl.ldeo.columbia.edu>

²³³ The formats available are: ascii with ArcInfo Header; IDA; ERDAS LAN; netCDF; tables; binary random access; DEC ALPHA direct access; binary FORTRAN sequential access; DEC ALPHA sequential access; JPEG; GIF; PS. See <http://iridl.ldeo.columbia.edu/dochelp/Tutorial/MVD/Download/formats.html>

²³⁴ See, for example, the work of Ian Masser (<http://www.geom.unimelb.edu.au/people/imasser.html>): *An International Overview of Geo-spatial Information Infrastructures: Lessons to be Learnt for the NGDF*, Version 1, July 1998; *All shapes and sizes: the first generation of National Spatial Data Infrastructures*, Int. J. Geographical Information Science 13, 67-84, 1999; *The Indian National Geospatial Data Infrastructure*, GIM International, Vol. 15, No. 8, August 2001; *A comparative analysis of NSDIs in Australia, Canada and the United States*, GINIE: Geographic Information Network in Europe, October 2002; *GIS Worlds: Creating Spatial Data Infrastructures*, ESRI Press, 2005; *Multi-level Implementation of SDIs – Emerging Trends and Key Strategic Issues*, GIM International, Vol. 20, Issue 2, February 2006 at http://www.gim-international.com/issues/articles/id614-Multilevel_Implementation_of_SDIs.html; *Governments and Geographic Information*, Taylor and Francis, 2007; *Building European Spatial Data Infrastructures*, ESRI Press, 2007. See also D Rhind, *Lessons learned from local, National and Global Spatial Data Infrastructures*, GISdevelopment.net, 2001, at <http://www.gisdevelopment.net/policy/gii/gii0006.htm>; A Rajabifard, M Feeney, I Williamson and I Masser, *National spatial data infrastructures*, in I Williamson, A Rajabifard and M Feeney (eds), *Development of Spatial Data Infrastructures: from Concept to Reality*, Taylor and Francis, 2003; I Masser, A Rajabifard and I Williamson, *Spatially Enabling Governments through SDI Implementation*, International Journal of Geographic Information Science, Vol. 21, July 2007; A Rajabifard and I Williamson, *Regional SDI Development*, Journal of Geospatial Today, Vol. 2, Issue 5, Jan-Feb 2004, at http://www.geom.unimelb.edu.au/research/SDI_research/publications/files/India2004.pdf; A Rajabifard, A Binns, I Masser and I Williamson, *The role of sub-national government and the private sector in future Spatial Data Infrastructures*, International Journal of GIS, Vol. 20, No. 7, 2006; A Rajabifard and I Williamson, *SDI Development and Capacity Building*, Proceedings of the 7th GSDI Conference, February 2004, Bangalore, India, at http://www.geom.unimelb.edu.au/research/SDI_research/publications/files/SDI_CB_India2004.pdf; A Rajabifard and I Williamson, *Asia-Pacific Region and SDI Activities*, Journal of GIS Development, Vol. 7, Issue 7, July 2003, at <http://www.geom.unimelb.edu.au/research/publications/IPW/Journal%20of%20GIS%20Development-June2003.pdf>. See also de Sherbinin, A., and R.S. Chen (eds), *Global Spatial Data and Information User Workshop: Report of a Workshop*, 21-23 September 2004. Palisades, NY: Socioeconomic Data and Applications Center, Center for International Earth Science Information Network, Columbia University, 2005, available at http://sedac.ciesin.columbia.edu/GSDworkshop/GlobalDataWorkshop_report_web.pdf

²³⁵ For a listing of SDI initiatives around the world, see <http://www.spatial.maine.edu/~onsrud/GSDI.htm>.

²³⁶ See <http://www.gsdi.org/>.

²³⁷ The FGDC is responsible for the US National Spatial Data Infrastructure (NSDI).

²³⁸ See http://www.fgdc.gov/international/find_world_data.

***“Lessons for the Global Spatial Data Infrastructure: International Case Study”,
Beth Lachman et al (2002)***

International collaboration for the GSDI is the subject of the report by Beth Lachman et al for the Rand Corporation, *Lessons for the Global Spatial Data Infrastructure: International Case Study* (2002).²³⁹

***“Research and Theory in Advancing Spatial Data Infrastructure Concepts”²⁴⁰,
Harlan J. Onsrud (2007)***

This volume on spatial data infrastructure (SDI)²⁴¹, edited by Harlan J Onsrud (past president of the Global Spatial Data Infrastructure Association), is a collection of writings on current research by international experts and provides insights into possible future directions for SDIs. It was produced by the Global Spatial Data Infrastructure (GSDI) Association which solicited contributions from participants in the GSDI-9 Conference held in Santiago, Chile, in November 2006.²⁴²

The studies presented address technical, legal, economic, and institutional issues, with a strong focus on the needs of developing nations. The research analyses models for planning, financing, and implementing SDI initiatives and assesses the extent to which established SDI projects in Australia, India, and the European Union are contributing to national economic competitiveness and social well-being. Onsrud observes that:

[w]hile technological research challenges abound, most of the papers in this volume explore policy and institutional challenges to sharing georeferenced data, implementing or improving infrastructure in order to achieve the desired outcomes, or enhancing the effectiveness and/or efficiency of SDI operations.²⁴³

Several of the chapters examine a particular model for encouraging cross-jurisdictional SDI development or data sharing and services. For example, in *INSPIRE: An Innovative Approach to the Development of Spatial Data Infrastructures in Europe*,²⁴⁴ Max Craglia and Alessandro Annoni describe INSPIRE, an emerging initiative to build a SDI for Europe based on existing national and sub-national initiatives and engaging users in a more structured way by organizing them in spatial data interest communities. On this approach, Onsrud comments:²⁴⁵

In emphasizing partnerships and involvement of stakeholders across European jurisdictions, this new approach strives to balance stability in standards and practices and flexibility in accommodating local circumstances and change. The belief is that the cooperative approach will not only be more responsive to the direct needs of hundreds of governments, communities, and businesses but also facilitate common standards and processes across jurisdictional boundaries for more efficient and effective SDI development and maintenance.

²³⁹ Beth Lachman, Anny Wong, Debra Knopman and Kim Gavin, *Lessons for the Global Spatial Data Infrastructure: International Case Study*, Rand Corporation, Los Angeles, 2002.

²⁴⁰ <http://gis.esri.com/esripress/display/index.cfm?fuseaction=display&moduleid=0&websiteid=122> ISBN: 978-1-58948-162-6.

²⁴¹ Harlan J Onsrud, *Research and Theory in Advancing Spatial Data Infrastructure Concepts*, ESRI Press, Redlands, 2007.

²⁴² Foreword, by Harlan Onsrud and Luis A. Alegria Matta, at p vii.

²⁴³ Introduction, p 2.

²⁴⁴ The acronym INSPIRE stands for Infrastructure for Spatial Information in Europe.

²⁴⁵ Page 3.

In the chapter *Geospatial Data Infrastructure for Sustainable Development in East Timor*,²⁴⁶ Tracey Lauriault and D.R. Fraser Taylor consider the spatial information and technology requirements of East Timor for sustainable development. The authors reason that as East Timor is only a newly emerged and developing state, with its own unique set of political, legal and administrative issues, the SDI models of other nations will of necessity need to be adapted before being considered for application. For example, the local East Timor SDI would need to be integrated into relevant UN and other overseas development agency datasets. Another significant issue is the effort required to enhance the relevant skill sets of East Timor's citizens.

Bastiaan van Loenen and Jitske de Jong,²⁴⁷ in *Institutions Matter: The Impact of Institutional Choices Relative to Access Policy and Data Quality on the Development of Geographic Information Infrastructures*, present an evaluation of the effect of access policies (including charging for government spatial data and imposing restrictions on downstream parties' uses) on the technical attributes of a spatial dataset and its direct uses. The authors set out to test the theory that a high quality, expensive government spatial dataset will have strong constraints or restrictions on use applied and a low-quality government dataset would have only limited or weak restrictions. In a review covering five jurisdictions²⁴⁸, the authors found the theory to be unsupported.²⁴⁹

In a case study examining legal issues in European jurisdictions, Katleen Janssen and Jos Dumortier²⁵⁰ consider three separate, relatively recent legislative enactments having significant impact on the SDIs for individual European states as well as on the development of a European SDI. The authors observe that confusion arises as the various pieces of legislation reflect conflicting public policies with some fostering and others impeding the availability of spatial data. There is a need to resolve these legal policy inconsistencies.

²⁴⁶ at p175.

²⁴⁷ at p215.

²⁴⁸ The Netherlands, Denmark, the German State of North Rhine-Westphalia, the US State of Massachusetts, and the US metro region of Minneapolis-St. Paul.

²⁴⁹ See also, Bastiaan van Loenen, *Developing Geographic Information Infrastructures: The Role of Information Policies*, 2006 at <http://repository.tudelft.nl/file/107024/088301>

²⁵⁰ "Legal Framework for a European Union Spatial Data Infrastructure: Uncrossing the wires", at p231.

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Abbreviations and Acronyms

AGORA	Access to Global Online Research in Agriculture
APSDI	Asia and the Pacific Spatial Data Infrastructure
BOAI	Budapest Open Access Initiative
CAS	CGIAR Central Advisory Service
CBD	Convention on Biological Diversity
CEB	United Nations Chief Executive Board
CEOS	Committee on Earth Observation Satellites
CGIAR	Consultative Group on International Agricultural Research
CI	Communications and Information
CIMMYT	International Maize and Wheat Improvement Centre
CODATA	Committee on Data for Science and Technology
COP	Conference of the Parties
COSPAR	Committee on Space Research
CSI	CGIAR Consortium for Spatial Information
DEST	Department of Education, Science and Training
DNAs	Designated National Agencies
DRM	Digital Rights Management
ECVs	Essential Climate Variables
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FGDC	Federal Government Data Committee
FOSS	Free and Open Source Software
G8	Group of eight countries that come together to discuss current world issues – France, Germany, Japan, the United Kingdom, the United States, Italy, Canada and Russia
GCOS	Global Climate Observing System
GEMIM	IODE Group of Experts on Marine Information Management
GEO	Group on Earth Observations
GEOS	Global Earth Observation System of Systems
GICSI	Global Information Commons for Science Initiative
GML	Geography Markup Language
GNI	Gross National Income
GOOS	Global Ocean Observing System
GSDI	Global Spatial Data Infrastructure
ICSU	International Council for Science
ICTs	Information Communication Technologies
IETF	Internet Engineering Task Force
IGBP	International Geosphere-Biosphere Program
IGF	Internet Governance Forum
IGF3	Third IGF meeting held in Hyderabad, India in December 2008
IOC	International Oceanographic Commission of UNESCO
IODE	International Oceanographic Data and Information Exchange
IPRs	Intellectual Property Rights

ISDE	International Society for Digital Earth
ISP	Internet Service Provider
ISPRS	International Society for Photogrammetry and Remote Sensing
ISSC	International Social Science Council
ITU	International Telecommunication Union
IUGS	International Union of Geological Sciences
JCOMM	Joint WMO-IEC Technical Commission for Oceanography and Marine Meteorology
NII	US National Information Infrastructure
NODCs	National Oceanographic Data Centres
NSDI	National Spatial Data Infrastructure
OAK	Open Access to Knowledge
OARE	Online Access to Research in the Environment
OECD	Organisation for Economic Cooperation and Development
OER	Open Educational Resource
OGC	Open Geospatial Consortium
OMB	US Office of Management and Budget
OSI	Open Source Initiative
OSI (UK)	Office of Science and Innovation (United Kingdom)
OSM	OpenSourceMap
PCGIAP	Permanent Committee on GIS Infrastructure for Asia and the Pacific
PMSEIC	Prime Minister's Science, Engineering and Innovation Council
PSI	Public Sector Information (except in one quote from the OECD Workshop on Public Sector Information: Summary, where it refers to "Public Sector Institutions")
RNODCs	Responsible National Oceanographic Data Centres
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research
SCOSTEP	Scientific Committee on Solar-Terrestrial Physics
SDI	Spatial Data Infrastructure
SSG	Scientific Steering Group
SWCC	Second World Climate Conference
TEMA	Committee for Training, Education and Mutual Assistance in the Marine Sciences
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention on Combating Desertification
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNGIWG	United Nations Geographic Information Working Group
UNRCC-AP	United Nations Regional Cartographic Conference for Asia and the Pacific
URSI	International Union of Radio Science
US	United States
W3C	World Wide Web Consortium
WCP	World Climate Program
WCRP	World Climate Research Program

WCT	WIPO Copyright Treaty
WDC	World Data Centre
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment
WPIE	Working Party on the Information Economy
WPPT	WIPO Performances and Phonograms Treaty
WSIS	World Summit on the Information Society
WSSD	World Summit for Sustainable Development