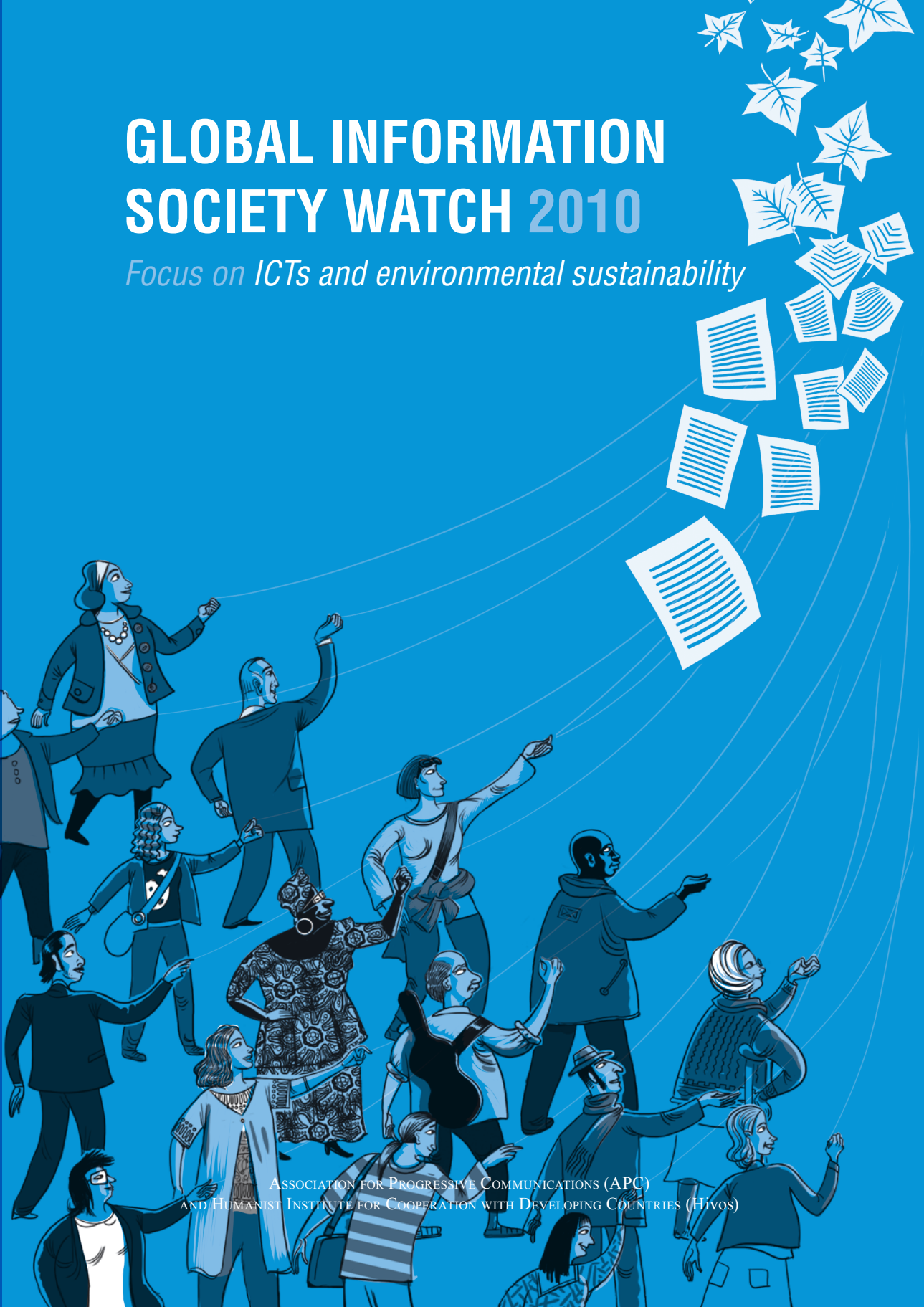
GLOBAL INFORMATION SOCIETY WATCH 2010

Focus on ICTs and environmental sustainability



Association for Progressive Communications (APC)
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Global Information Society Watch

2010

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Consorcio para el Desarrollo Sostenible de la Ecorregión Andina
Jorge Bossio and Miguel Saravia
www.condesan.org

Introduction

For the United Nations World Commission on Environment and Development, sustainable development must meet current needs without compromising the ability of future generations to meet their own.[1] Clearly, we cannot talk about sustainable development while we are using more resources than those we can restore to reach it. Therefore, sustainable development of social groups must combine economic development, social development and environmental protection.[2]

The Andes mountains host an extraordinary ecological and cultural diversity along with a long history and traditions which make them unique. The Andean region spans seven South American countries and is home to approximately 40 million people, most of them descendants of centuries-old cultures. Geographically, the Andes have a wide array of landscapes, where the mountains are divided by inter-Andean valleys with remarkable rivers, ravines and lakes. This mountain relief is naturally covered by fog forests, piedmont forests (bordering the jungle), dry forests, moors, grasslands and high plateaus; at higher altitudes, snow-covered mountains and glaciers. In all of these landscapes we can find a great diversity of wetlands that generate an outstanding hydrological situation. Nevertheless, according to international institutions, Peru will be the only country in the Americas to suffer water stress in the next twenty years because of the irregular temporal and spatial distribution of water along with an inadequate management of resources and increasing pollution.

Disasters are the main cause of non-structural poverty in rural areas since they produce severe shocks in the regional economy and rural survival systems.[3] Desertification has become increasingly problematic since the 1970s because of actions such as deforestation, drainage of the wetlands, indiscriminate logging in order to increase the "agricultural frontier", and overgrazing by livestock, which translates into 60% of the high Andean fields suffering from erosion. These are an important concern, as they contribute to a micro-climate change in the Andean basins.

The report of the Intergovernmental Panel on Climate Change (IPCC) determined consistent scenarios of temperature increase with incidences higher in the Andes than in adjacent lower areas. Impact patterns are found in highly vulnerable contexts in Andean populations, especially in rural areas where systems created by small farmers prevail. Such systems have faced difficult conditions associated with environmental processes such as the degradation of resources and socioeconomic processes affecting the welfare of rural inhabitants. Some of the most important impacts of climate change in the Andean region are:[4]

- An increase in the frequency of extreme events (rain, drought) and associated risks (floods, desertification).
- Direct effects on livestock due to decreases in the availability of fodder.
- An increase in the incidence of diseases associated with changes in temperature and humidity.
- Changes in the availability and spatial and temporal distribution of rainfall. The conversion of critical ecosystems is affecting hydrological regulation and the withdrawal of glaciers is impacting on the availability of water for irrigation. Both factors are having a mixed impact on the livelihoods of Andean communities.
- A net decrease in crop yields and associated impacts on the economy and food security of small farmers devoted to mixed systems (for both subsistence and the market).

What is the role of information and communications technologies (ICTs) regarding this problem? It is estimated that ICTs are responsible for 2% of CO_2 emissions.[5] In the last year, the rapidly growing uptake of mobile phones and internet in Peru has led to an increase in the carbon footprint and electronic waste (e-waste) in the area. Based on Mike Berners-Lee's estimates of the carbon footprint of mobile phone use,[6] carbon emissions in Peru generated by the mobile phone sector would be approximately 4.5% of the country's total emissions (nearly one million tonnes of CO_2 a year).[7]

On the other hand, ICTs facilitate the development of information systems that support early warning, diagnostic and monitoring processes, and are also an aid for awareness

1 www.un-documents.net/wced-ocf.htm

2 Bossio, J. F. and Perona, G. (2009) *Sistemas de información rurales en el Perú: situación y perspectivas*, Lima, CEPES.

3 Soluciones Prácticas ITDG (2009) Cambio climático, tecnología y pobreza rural en el Perú: siete experiencias, *LEISA revista de agroecología*, March.

4 Taken from research in progress: "Andean prospects regarding the impact of and vulnerability to the effects of climate change in the Tropical Andes", Francisco Cuesta, Manuel Peralvo, Andy Jarvis, Julio Postigo, Wouter Buyter et al.; "Indicators to evaluate the impact of climate change on the biodiversity of the Andean Community countries", Francisco Cuesta, Carolina Chiriboga, Manuel Peralvo, Arturo Mora, María Teresa Becerra, Andy Jarvis and Julian Villegas.

5 Gamero, R. (2009) *El cambio climático: una oportunidad para las TIC.* www.enter.es/mybox/cms/9720.pdf

6 Berners-Lee, M. (2010) *How Bad Are Bananas? The carbon footprint of everything*, Profile Books, London.

7 Based on an estimated 57 g per minute for calls originated on mobile networks and 47 kg annually per telephone in service, with 24.7 million mobile phones in service and 17.3 billion minutes of traffic in 2009, according to the national telecommunications regulator, OSIPTEL. www.osiptel.gob.pe

campaigns for the population and corporate sector regarding the responsible management of natural resources.

Finally, we recognise the potential of ICTs to improve the efficiency of the management of resources of other areas, including transportation and energy. Some studies indicate that the use of ICTs could generate reductions of nearly 20% of total emissions.

E-waste

According to the Institute for the Promotion of Sustainable Development (IPES), the market for electronic devices grew over 30-fold between 1997 and 2009. In the last fourteen years, 72,000 tonnes of e-waste have piled up in the country. Considering a seven-year period of useful life, in 2015 Peru will have amassed 208,000 tonnes of e-waste. The national customs authority SUNAD reported that 22,000 tonnes of computers and IT components entered the country in 2009.[8]

Figures from the National Institute of Statistics and Information (INEI) regarding household access to ICTs in 2008 indicate that 29.5% of homes had access to fixed-line telephones, 56.7% to mobile phones (at least one per household) and 16.5% had at least one computer. All these goods and services have increased compared to the data for 2000, especially the number of mobile telephones, which has grown more than 50%, followed by the number of computers (16% growth).[9]

In Peru there were more than 24 million active mobile phone lines as of December 2009, 50% of them outside of the capital city, according to the telecommunications regulator, OSIPTEL.[10] The import of new desktop computers in the second quarter of 2009 (April-June) decreased 32.6% compared to the same quarter of 2008, with a total of 22,600 units; at the same time, laptop computers recorded an increase in the third quarter of 2009 with nearly 130,000 imported units, a figure significantly higher than the 70,000 units recorded for the same period in 2008.[11] These figures show a significant increase overall in imported computers in Peru.

On the other hand, Peru has an important industry of assembly and repair of computers which represented more than 70% the total computers sold in 2008.[12] This industry, mostly informal and low-cost oriented, refurbishes pieces of obsolete computers and supplies "recycled" computers to the cities outside the capital. As researchers at IPES indicate, this informal recycling is helping to cover the internal demand, although this practice has an adverse effect on both health and the environment.[13]

These data indicate that there has been a rapid increase in the use of electronic devices and a need for policies and strategies for the collection of technological waste. As Peru is not a manufacturer of ICT products, there is no pressure from consumers or shareholders regarding the management of e-waste within the country.

In Lima, there are three formal companies that collect e-waste: Rimpe, Coipsa and San Antonio. Nevertheless, these companies only process 3% of the 15,000 tonnes of mobile phones and computers that reach the end of their useful life every year in Peru.[14]

Some companies have initiated waste collection campaigns as a part of their corporate social responsibility programmes, among them mobile phone operators such as Movistar and Claro. The *Reciclame* (Recycle Me) campaign launched in February 2010 by Movistar and Nokia sent 28,000 devices – roughly six tonnes of mobile phones, accessories and batteries – to be recycled in Mexico and the United States. The same month, Claro announced a similar recycling programme with the support of the Ministry of the Environment and the cooperation of Coipsa, a private company. The latter will be responsible for disassembling mobiles and accessories in order to identify the materials that can be recycled in Peru. Cards, plates and batteries will be exported to specialised refineries that treat this type of waste.

A recent joint initiative of IPES, the Ministry of the Environment and the Municipality of Santiago de Surco (Lima) focuses on supporting e-waste collection initiatives. The pilot was launched on 3 June 2010 and it is expected to be replicated nationwide. In its latest National Environmental Action Plan, the Ministry of the Environment describes its strategy as follows: "To develop actions for the treatment and final disposal of electronic waste, focused on the development of initiatives to manage e-waste including spare parts, batteries and other components containing dangerous substances and elements. Actions will be put in place to monitor and supervise the manufacturers and importers of such devices and components to be responsible for their management and final disposal without jeopardising the environment and health of the population."[15]

Impacts of ICTs

Even when it is clear that we still need more research to accurately measure the contribution of ICTs to the reduction of carbon emissions in some manufacturing processes, the SMART 2020 report, *Enabling the Low Carbon Economy in the Information Age*,[16] published by the Global e-Sustainability Initiative (GeSI), estimated that ICTs can contribute to a reduction of more than 15% of carbon emissions up to

8 Espinoza, O., Villar, L., Postigo, T. and Villaverde, H. (2008) *Diagnóstico del Manejo de los Residuos Electrónicos en el Perú*, IPES, Lima. ewasteguide.info/files/Espinoza_2008_IPES-Empa.pdf

9 INEI (2009) *Las Tecnologías de Información y Comunicación en los Hogares*. www.inei.gob.pe

10 www.osiptel.gob.pe

11 Dominio Consultores (2009) *Reporte de Importaciones de Computadoras Portátiles*, Dominio, Lima.

12 Ibid.

13 Espinoza et al. (2008) op. cit.

14 Torres López, F. (2009) Hay 72 mil toneladas de basura electrónica acumuladas en el Perú, *El Comercio*, 2 November.

15 Ministry of the Environment (2010) *Plan Nacional de Acción Ambiental 2010-2021 (Draft)*, MINAM, Lima. www.minam.gob.pe/index.php?option=com_docman&Itemid=65

16 www.smart2020.org/_assets/files/02_Smart2020Report.pdf

2020, which represents five times the carbon footprint estimated for the sector itself. At the same time, other studies estimate a 20-30% reduction for the European Union.[17] This contribution is basically indirect and is a consequence of the increase of energy efficiency and lower consumption of fuel because of the intensive application of ICTs.

An example of these indirect contributions in Peru is the use of intelligent transportation systems that the Ministry of Transportation and Communications has established as mandatory in all main roads throughout the country. This system will allow better vehicle flow and savings in time and resources for the users of the roads.

Other positive impacts in the reduction of carbon derived from a higher use of ICTs is represented by telework, which can potentially lower the need for daily travel for a great number of people, and therefore will result in the lower use of fuel. In addition, the intensive application of ICTs to information systems is providing immediate access to critical information for the management of natural resources. The same logic could be applied regarding the relation between ICTs and risk management.

Telework

Telework is most often given as an example of the use of ICTs to reduce carbon emissions. On the one hand, it cuts down on vehicle emissions through cutting down travel, as well as the emissions related to energy used in workplaces such as lighting, air conditioning, elevators and office equipment. Even when teleworkers use energy at home, there is a net saving of energy because the increase in the energy used by the person at home represents less than a third of the energy used in the workplace.[18] On the other hand, Cairns et al. indicate, after reviewing the literature regarding the impact of telework on traffic, that although teleworking reduces the amount of travel and distances travelled, it can also motivate people to live farther away from their company offices.[19] Nevertheless, empirical studies show that the net result is a decrease in the amount of time spent travelling and distance travelled on average. The magnitude of such reductions depends on the special characteristics of every area of study. Regarding employees who can potentially work remotely, it is important to consider that only 11% of employees in Peru are professionals and an additional 5.8% are office employees, according to figures from the Ministry of Labour. Despite this, according to Cairns et al., results for the United Kingdom indicate that although there are positions and areas of work with higher potential than others, there are possibilities of teleworking for most types of position and kinds of work.[20] The potential for telework has not yet been studied in Peru and therefore constitutes an important pending task.[21]

Information systems

Climate change is a threat, and its level of risk depends on the vulnerability of the population and ecosystems. In the last decade, the use of ICTs has been decisive in the development of information systems to provide critical data that make it possible to measure the threat, monitor vulnerability and build future impact scenarios. The effectiveness of adaptation and mitigation measures depends more and more on timely, accurate and updated information.

In general, as noted by Ospina and Heeks, ICTs have a positive impact on the ability of the society to adapt to climate change by linking resources, institutions and structures. In the same way, ICTs strengthen the resilience capacity of societies by allowing them to rebuild their survival systems and therefore to mitigate the effects of disasters.[22]

Among the most important uses of ICTs in this field are geographical information systems. An example of this is the *Geoservidor*[23] developed by the Ministry of the Environment in the last year, which will serve as a mechanism for the communication and exchange of geospatial information. This will be available for researchers and decision makers to access relevant information through the internet. This initiative joins the National System for Environmental Information (SINIA), a system that integrates the existing capacities of public institutions involved in environmental activities. This system also uses information provided by satellites in order to monitor deforestation processes, such as those used in the REDD (Reducing Emissions from Deforestation and Forest Degradation) initiative that is being implemented by the UN Food and Agriculture Organization (FAO) in Peru. The Andean Regional Project for Adaptation to Climate Change (PRAA) is another example: it is responsible for monitoring the withdrawal of glaciers in the Peruvian Andes. This programme has implemented two new monitoring stations in the Huaytapallana and Salkantay snow peaks.

However, civil society has been developing information systems since 1990 for the management of natural resources.[24] We could mention:

- SIA Huaral, the Agricultural Information System for the Huaral Valley, an information service made up of fourteen community information centres (telecentres) located in rural areas, and an information portal with content that responds to the needs of the farmers in the valley.

17 Gamero (2009) op. cit.

18 Irwin, F. (2004) *Gaining the Air Quality and Climate Benefit from Telework*, World Resources Institute, Washington. pdf.wri.org/teleworkguide.pdf

19 Cairns, S., Sloman, L., Newson, C., Anable, J., Kirkbride, A. and Goodwin, P. (2004) Smarter Choices: Changing the Way We Travel, *Teleworking*, Department for Transport, London.

20 Ibid.

21 A first attempt to solve this question will be the research of economist Rosa Morales of the Institute of Peruvian Studies (IEP) in the next months in order to estimate the potential impact of telework in the reduction of greenhouse gases through the decrease in the consumption of fuel in the city of Lima.

22 Ospina, V. and Heeks, R. (2010) *Linking ICTs and Climate Change Adaptation: A conceptual framework for e-resilience and e-adaptation*, Institute for Development Policy and Management, Manchester.

23 geoservidor.minam.gob.pe/geoservidor/index.aspx

24 Bossio and Perona (2009) op. cit.

- SIRA Arequipa, administered by the most relevant agricultural institution in the region, Sociedad Agricola de Arequipa. As noted by Bossio et al., "the idea is to generate a regional system that organises and provides information to the different stakeholders in the rural environment in order to make decision making easier."[25] This information system helps to build capacity for resilience such as the capacity to face foreseeable climate changes, the management of assets, redundancy of services, shortened response time, flexibility to take action and self-organisation.[26]

Finally, in the risk management area we can highlight a number of ICT applications,[27] including:

- Early warning systems such as the National Information System for Disaster Prevention and Response (SINPAD)[28] and SIAT Piura, which was implemented with the support of Oxfam.
- Events inventory systems such as the DesInventar database.[29]
- Communication systems for emergency situations, for example, those implemented by the government since the earthquake of 2007.

These tools constitute a fundamental contribution to the processes of adaptation to climate change, especially in socially and economically vulnerable contexts. This is the case in Peru, where the capacity to be prepared for and adapt to changes is key for the stability of the livelihood systems of rural populations.

Notes towards action steps

It is important to recognise that even when the use of ICTs generates additional consumption of energy and polluting solid waste, their use has an indirect impact on an efficient use of resources in industry and sectors such as transportation and trade.

Nevertheless, we have no empirical, conclusive evidence to accurately determine the positive impact of the implementation of ICTs in productive and service sectors in Peru.

On the other hand, information systems have proved to be useful instruments for institutions and people involved in or concerned about sustainable development.

Despite this, they cannot reach all of the population effectively except when they are designed and implemented from a local perspective and through the appropriation of the local media and processes to communicate the information. When these conditions are met, they facilitate collaborative learning and the development of communities of practice regarding the responsible management of natural resources. ■

25 Bossio, J. F., López, J., Saravia, M. and Wolf, P. (2005) *Desarrollo Rural y Tecnologías de Información y Comunicación. Experiencias en el Perú: Lecciones aprendidas y recomendaciones*, Intermediate Technology Development Group and Ministry of Agriculture, Lima.

26 Ospina and Heeks (2010) op. cit.

27 For more information see Damman, G. (ed.) (2008) *Sistemas de información y alerta temprana para enfrentar el cambio climático*, Soluciones Prácticas ITDG, Lima and Gómez, C., Prado, G. and Carrasco, H. (2007) *Tecnologías respondiendo a los desastres*, Soluciones Prácticas ITDG, Lima.

28 sinpad.indeci.gob.pe/PortalSINPAD

29 www.desinventar.org/en/projects/promoter

GLOBAL INFORMATION SOCIETY WATCH 2010

GLOBAL INFORMATION SOCIETY WATCH 2010 investigates the impact that information and communications technologies (ICTs) have on the environment – both good and bad.

Written from a civil society perspective, **GISWatch 2010** covers some 50 countries and six regions, with the key issues of ICTs and environmental sustainability, including climate change response and electronic waste (e-waste), explored in seven expert thematic reports. It also contains an institutional overview and a consideration of green indicators, as well as a mapping section offering a comparative analysis of "green" media spheres on the web.

While supporting the positive role that technology can play in sustaining the environment, many of these reports challenge the perception that ICTs will automatically be a panacea for critical issues such as climate change – and argue that for technology to really benefit everyone, consumption and production patterns have to change. In order to build a sustainable future, it cannot be "business as usual".

GISWatch 2010 is a rallying cry to electronics producers and consumers, policy makers and development organisations to pay urgent attention to the sustainability of the environment. It spells out the impact that the production, consumption and disposal of computers, mobile phones and other technology are having on the earth's natural resources, on political conflict and social rights, and the massive global carbon footprint produced.

GISWatch 2010 is the fourth in a series of yearly reports critically covering the state of the information society from the perspectives of civil society organisations across the world.

GISWatch is a joint initiative of the Association for Progressive Communications (APC) and the Humanist Institute for Cooperation with Developing Countries (Hivos).

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