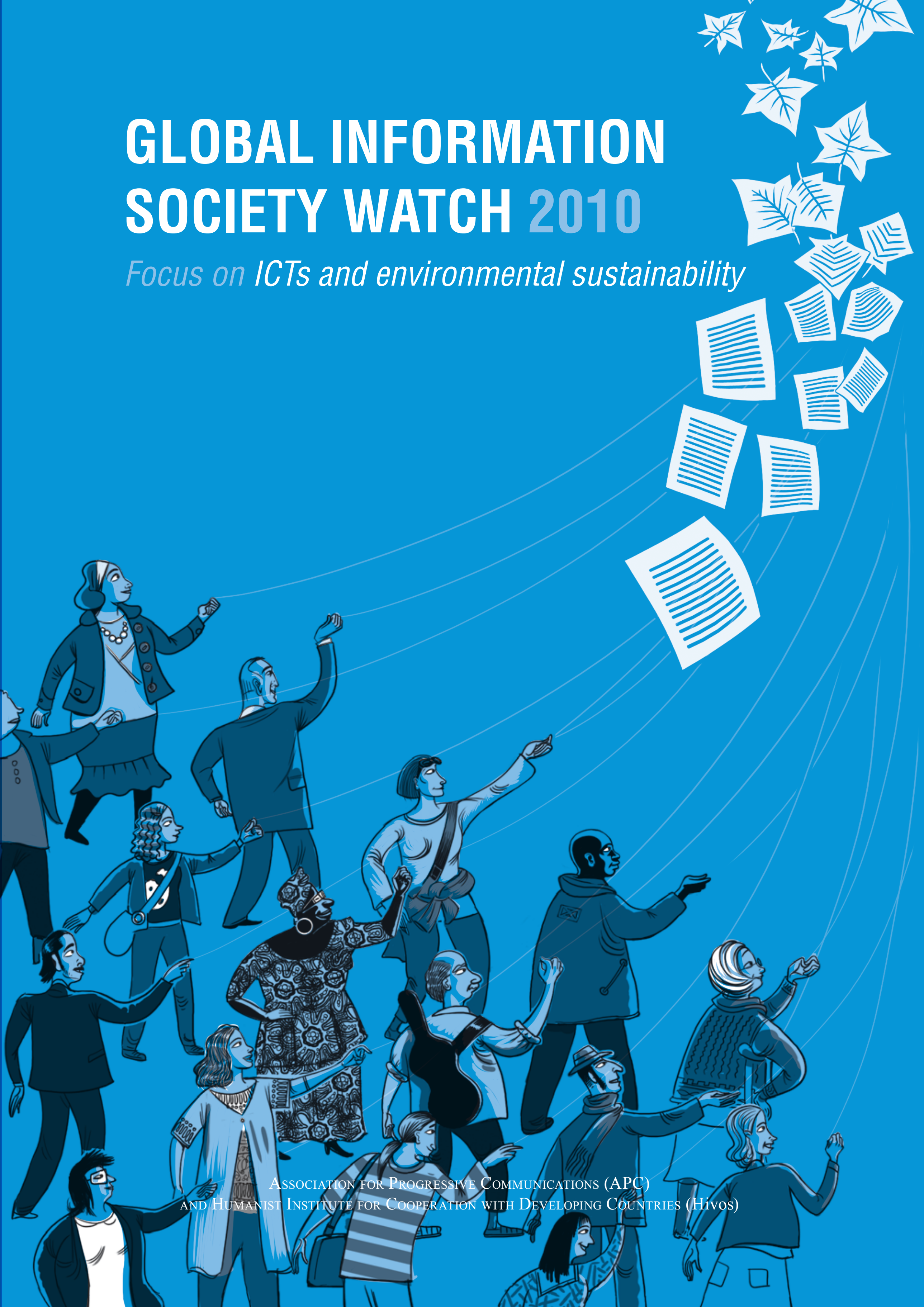
GLOBAL INFORMATION SOCIETY WATCH 2010

Focus on ICTs and environmental sustainability



Association for Progressive Communications (APC)
and Humanist Institute for Cooperation with Developing Countries (Hivos)

Global Information Society Watch

2010

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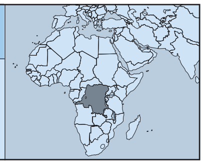
CONGO, DEMOCRATIC REPUBLIC OF (DRC)



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Introduction

As key players in the earth's carbon cycle, tropical rainforests contain a myriad of living organisms that use photosynthesis to remove carbon from the atmosphere by incorporating it into organisms that respire by breaking down carbohydrates. While the role of undisturbed tropical forests as a net source or sink of carbon is still debated by the scientific community, global warming is widely recognised as a result of the effects of a human-driven deforestation process whereby the carbon stored in the wood is released into the atmosphere when forests are cleared for crop or grazing land. This leads to the soils becoming a large source of carbon emissions that exacerbate the greenhouse effect, depending on how the cleared land is managed.

Stretching across the heart of Africa, the tropical rainforest of the Congo Basin has the greatest expanse of rainforest in all of Africa. Located in the heart of the African tropics, the Democratic Republic of Congo (DRC) is custodian to the world's second largest area of tropical rainforest after South America's Amazon rainforest, covering 58.9% of its territory and storing 8% of global forest carbon. The DRC tropical rainforest is a true natural treasure, home to over a thousand species of plants and hundreds of species of mammals, birds, reptiles and amphibians, and which enjoys considerable leverage in attracting the international mobilisation of funds to mitigate greenhouse gas (GHG) emissions.

As a country with almost universal extreme poverty, with 70% of its population living on subsistence rain-fed farming and non-timber forest activities, the DRC faces numerous climate change-related challenges. These include:

- The uncertain and unreliable predictions of climate computer models
- Little consistency in projections of rainfall patterns in its four climatic zones
- The impact of higher temperatures on the sensitive tropical ecosystem of the rainforest attracting little attention in reports about climate change in DRC
- The effect of deforestation on micro-climatic conditions in the forest region.

Alignment of the DRC to the REDD mitigation and adaptation strategies

Mitigation of climate change consists of reducing the amount of future climate change using activities that reduce GHG emissions, or enhancing the capacity of carbon sinks to absorb GHGs from the atmosphere. For many countries, such activities include the use of cleaner and less-polluting technologies to aid mitigation and reduce CO_2 emissions. Mitigation may also involve carbon capture and storage, a process that traps CO_2 produced by factories and gas or coal power stations and then stores it, usually underground.

The use of policies for climate change mitigation includes using targets for emissions reductions, increased use of renewable energy, increased energy efficiency for future reductions in emissions, and the adoption of adaptation to climate change measures, either planned, for example, by local or national government, or spontaneously, when done privately without government intervention. The engineering of climate change – also referred to as geoengineering – is another policy response to climate change which is sometimes associated with mitigation.

Reducing Emissions from Deforestation and Forest Degradation (REDD) is a global initiative that plays a key role in the context of fighting climate change. Some of the mitigation strategies proposed[1] in the context of REDD include:

- Setting mitigation targets using carbon budgeting, setting emission reduction targets, and resolving targeting problems in carbon budgeting.
- Putting a price on carbon, including benefiting from cap-and-trade lessons from the European Union Emission Trading Scheme.
- Involving regulation and government action through power generation, changing the emissions trajectory, residential sector low-cost mitigation, setting standards for vehicle emission and using research and development and the deployment of low-carbon technologies.
- Using international cooperation to expand the role for technology transfer and finance and reducing forest deforestation.

The DRC has entered the implementation phase of its REDD national programme towards readiness through coordinated efforts of the United Nations-REDD Programme and an initial grant from the Forest Carbon Partnership Facility.[2] These efforts involve the engagement of a wide range of national stakeholders, such as indigenous peoples and other forest-dependent communities. The efforts have the

1 de Wasseige, C. et al. (2009) The Forests of the Congo Basin: State of the Forest 2008, Office of the European Union.

2 UN-REDD Programme (2009) *Engaging Civil Society in REDD – Best Practice in the Democratic Republic of Congo.*

objective of addressing key issues, such as rights to lands, territories and resources and social justice, and how the estimated 400,000 to 600,000 indigenous pygmy peoples in the DRC could be involved in the conservation efforts and benefit directly from the economic, environmental and social benefits resulting from REDD.

A Climate-REDD working group was established in June 2009 by civil society. As a result of this process of engagement with representatives from *Groupe de Travail Forestier*, the National League of Indigenous Pygmy Organisations of the Congo (LINAPYCO), *Dynamique des Groupes des Peuples Autochtones*, and the National Resources Network, among others, a decree supporting REDD by establishing a National Coordination Committee, an Interministerial Committee and a National REDD Committee was approved by the Council of Ministers in October 2009, with the expectation of being signed subsequently by the prime minister.[3]

It has been recommended that countries develop their own adaptation plans, but with the assistance of the international community made available to developing countries through initiatives such as the United Nations Environment Programme and United Nations Development Programme partnership launched in Nairobi during the climate convention in November 2006. The objective of this adaptation strategy is to provide assistance in reducing vulnerability and building the capacity of developing countries to more widely reap the benefits of the Clean Development Mechanism (CDM). This particularly in areas such as the development of cleaner and renewable energies, climate proofing and fuel-switching schemes. Following this adaptation initiative, the DRC has started its own adaptation initiative under the National Adaptation Programme of Action (NAPA). Among its actions, NAPA revealed in 2006 that DRC rural communities have identified greater intensity of rainfall and periods of extreme heat as their major concerns. Its report also revealed that they witnessed during that period primitive farms and freshwater structures being destroyed by flooding and outbreaks of disease associated with the explosion of insect populations and shortages of safe water that often occur during heat waves.

Using ICTs for climate change mitigation

As established in 2000, one of the UN Millennium Development Goals consists of making the benefits of new technologies – especially information and communications technologies (ICTs) – available to both industrialised nations and developing regions. Following these goals, many projects have been founded by the International Telecommunication Union (ITU), Organisation for Economic Co-operation and Development (OECD), World Wide Fund for Nature (WWF) and other organisations with the aim of looking into ICTs and climate change.

3 Ibid.

Despite this engagement, one of the main challenges faced by many African countries with regards to the concerns and effects of climate change lies in the uncertain predictions of climate computer models, and the lack of appropriate climate sensors to be used for accurate assessment of changes in the climate. In the case of the DRC, this might hinder consistent projections of rainfall patterns in its four separate climatic zones. Furthermore, the efficiency and role played by civil society may be reduced if the policies defined and actions planned within the context of the REDD programme are not supported by preventive actions resulting from climate data obtained using the climate sensors launched into the environment.

As currently implemented, climate change monitoring is based on macro-infrastructures that use climate monitors sparsely deployed at a relatively small number of fixed locations by governmental organisations. This creates a visibility gap that needs to be addressed through complementary technologies, systems and strategies. To bridge this gap, civil society needs to use micro-infrastructures using off-the-shelf devices to extend the available climate maps by:

- Collecting climate data using climate sensors
- Analysing this data
- Modelling climate change in cities and the whole country
- Deriving sound policies based on the derived climate models
- Providing awareness to citizens, official organisations, NGOs and private organisations.

Actions steps: The need for participatory sensing

Participatory sensing using mobile phones and sensor/actuator technologies is one of the enabler technologies which can be used to support this process due to the wide penetration of mobile phones in Africa and the emergence of general packet radio service (GPRS)-enabled sensor/actuator devices. A participatory sensing system is one that allows individuals and communities to collect, share and organise information through data collection using mobile phones and other mobile platforms, in order to make a case for change, and to explore and understand their life and relationship with the environment.[4]

Participatory sensing emphasises the involvement of citizens and community groups in the process of sensing. It can range from private personal observations to the

4 Burke, J. et al. (2006) Participatory sensing, *Proceedings of the World Sensor Web Workshop*, ACM SENSYS, Boulder; Shilton, K. et al. (2008) Participatory Privacy in Urban Sensing, *Proceedings of the MODUS Workshop*, St. Louis; Campbell, A. T. et al. (2006) People-Centric Urban Sensing, *Proceedings of the 2nd ACM/IEEE Annual International Wireless Internet Conference*, Boston; Reddy, S. et al. (2007) Sensor-Internet share and search: Enabling collaboration of citizen scientists, *Proceedings of the Workshop for Data Sharing and Interoperability*.

combination of data from hundreds or even thousands of individuals that reveals patterns across an entire city. Most important, participatory sensing begins and ends with people, both as individuals and members of communities. The type of information collected, how it is organised and how it is used, may be determined in a traditional manner by a centrally organised body, or in a deliberative manner by the collection of participants themselves.

The main features of mobile phones that make them a special and unprecedented tool for engaging participants in sensing their local environment include:

- Their sheer ubiquity across the demographic and geographic spectrum.
- The broad proliferation of cellular infrastructure and mobile phone usage making it possible to collect data over large areas for little incremental cost.
- The possibility for participants scattered across a city or the world to easily coordinate activities and upload data to servers that can process it and integrate it with other data.
- The possibility for most modern phones to record images, motion, and other signals, automatically associating them with location and time.

As an example of a participatory sensing process, a multi-interface device endowed with GPRS, Wi-Fi and Bluetooth connectivity, and different gas sensors and a GPS, can be used in DRC cities, villages and its rainforest to measure ground-level ozone, particle pollution also known as particulate matter (PM), sulphur dioxide, carbon monoxide, nitrogen oxides, temperature and humidity. Using its Bluetooth module, it can connect to the user's own mobile phone. It can be programmed to send SMS messages using its GPRS interface to some defined mobile phone numbers in the case that some of the sensed values have reached a given threshold in a given place.

Wireless sensor nodes (or motes, as they are commonly called) may also be used to provide a quasi-static sensing infrastructure where the motes are launched into the environment and probed periodically to measure climate change variables. The values of these variables can also be used to build a climate map which can be analysed and used for climate change mitigation through awareness. Current generation motes can use different means of radio communication to send data to a gateway where measured data are stored. Several motes can be equipped with external GPRS modules and use the ubiquitous GSM network to send data either as SMS or with a GPRS data connection. Some of the emerging motes can be equipped with different 802.15.4/ZigBee transceivers, while also hosting a GPRS module which, when programmed, is capable of sending and receiving SMS, making and receiving calls and connecting to the GPRS network to transfer data.

However, some requirements should be met for mote deployment in climate change. These include:

- Minimum power consumption with hibernate mode capability
- Flexible architecture allowing extra sensors (such as gas or physical events) to be easily installed in a modular way
- The provision of GPS for positioning and a secure digital (SD) card for storing data on board
- The presence of a lithium battery and/or possibility of recharge through a solar panel. This option is especially interesting for deployments in developing countries where power supply is not stable. ■

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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