



**ICTs and environmental sustainability:
Mapping national policy contexts
in India, Bangladesh, Egypt,
Costa Rica and Mexico**

APC

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1. Introduction

Given the growing importance of environmental sustainability in social and economic development, much global attention has been given to the role of information and communications technologies (ICTs), both as tools to address sustainability imbalances and as the source of environmental challenges in themselves. Over the last 10 years several prominent projects and multi-stakeholder networks have unfolded in the areas of ICTs and climate change and e-waste, including but certainly not limited to important work by the Swiss government,¹ the International Telecommunication Union (ITU), the Organisation for Economic Co-operation and Development (OECD), the Global e-Sustainability Initiative (GeSI), the International Institute for Sustainable Development (IISD) and Manchester University.

The pioneering role ICT4D organisations across the globe played in the early internet in those countries meant that many served a critical historical function in linking up social and environmental activists, some as far back as the 1980s.² Over the years, ICT4D interventions close to the field of environmental sustainability have included experiments with technologies such as solar panels or wind-up radios in communities that lacked infrastructure (lessons that now can be applied in energy-saving practices), and a groundbreaking role in the use of refurbished computers in education and community access. This in turn led to practitioners being amongst the first to advocate on the issue of e-waste dumping in developing countries in the 1990s, and to begin to call for multi-national vendors to take responsibility for the safe recycling of discarded computers. The historical importance – and thematic significance – of environmental issues to the ICT4D sector is highlighted by the 2003 World Summit on the Information Plan of Action, where “e-environment” (C7, 20) is one of the activity areas alongside e-government, e-learning and e-health, amongst others.³

Yet despite this engagement, it remains an evolving task for the ICT4D activist to properly understand and articulate the specific challenges that a country faces when it comes to ICTs and environmental sustainability, so that appropriate advocacy interventions can be developed. One of the challenges is for activists to understand policy contexts in which they operate, in a way that is comprehensive enough for broad-level engagement on the topic of environmental sustainability. While it might make strategic advocacy sense for some to engage on sector-specific issues, such as e-waste or climate change, many feel that an awareness of environmental sustainability implies a broader approach and attitude, encompassing organisational practice, behaviour and consciousness, as much as specific and detailed policy engagement. In this sense issues such as e-waste and a changing climate, as well as the role of environmental protection and conservation generally, all share an equal purpose as far as the role of ICTs is concerned.

Many organisations are relatively new to the field of ICTs and environmental sustainability

¹ <http://www.ewaste.ch/>; see also : Step (www.step-initiative.org/) and the Partnership for Action on Computing Equipment (PACE) (<http://www.basel.int/industry/compartnership/index.html>).

² GreenNet in the United Kingdom, Pegasus Networks in Australia, and SANGONeT in South Africa serve as early examples of these organisations, most of them offering the first internet access for environmentalists.

³ WSIS, 2003

– and for most advocacy interventions are as much a learning experience as an opportunity to bring about change. This is particularly the case in a field such as ICTs and environmental sustainability, with its complex and sometimes contradictory policy landscapes, with its cross-sectoral implications and contested scientific and technical terrain that can be challenging for the layperson to properly understand. A cycle of learning and action is inevitable and necessary in a field that demands a push for change at both the global and local levels. How ICT4D activists are able to position themselves knowledgeably in this field will remain an ongoing challenge.

It is with this in mind that the Association for Progressive Communications (APC) commissioned member research into five countries on the topic of ICTs and environmental sustainability. The countries where the research was conducted and APC members who complete the research were: India (Digital Empowerment Foundation, www.defindia.net), Bangladesh (BytesForAll, www.bytesforall.org), Egypt (ArabDev, www.arabdev.org), Costa Rica (Sulá Batsú, www.sulabatsu.com) and Mexico (LaNeta, www.laneta.apc.org). In each country researchers were asked to map challenges in the policy terrain with a particular (although not exclusive) emphasis on ICTs and climate change and e-waste, identify key stakeholders operating in the field, as well as advocacy tasks that lay ahead for civil society.

This report is a consolidation and summary of their key findings. It should be read in conjunction with the national-level reports which offer more country-level detail. These can be downloaded off APC's website (www.apc.org). We hope that the research done by the organisations helps civil society activists gain insight into some of the difficult challenges that lie ahead for a sustainable future, and point to new directions that can be taken.

2. Background to research

The five research projects discussed here are part of a new APC programme area in the field of ICTs and environmental sustainability. They accompany an inventory of sustainable ICT tools and practices (developed by GreenNet, www.gn.apc.org) and a survey of organisational-level policies on ICTs and environmental sustainability carried out by Colnodo (www.colnodo.apc.org), with the assistance at the regional level of GreenNet, the ICT Policy Centre for Eastern and Southern Africa (CIPESA, www.cipesa.org), Alternatives (www.alternatives.ca), and BytesforAll Pakistan (pakistanictpolicy.bytesforall.net). Outputs from the survey and inventory can be downloaded off the APC website.⁴

⁴ As part of its new programme area, and in collaboration with the Dutch-donor Hivos, APC also focused on the topic of ICTs and environmental sustainability in 2010 in its annual publication Global Information Society Watch (www.giswatch.org). The thematic and country-level reports for GISWatch 2010 can be downloaded off the GISWatch website.

2.1. Objectives of research

The following were the key objectives to the country-level studies discussed here:

- To map the policy terrain as it relates to the use of and impact of ICTs on environmental sustainability, with a particular emphasis on climate change and e-waste
- To identify key stakeholders active in the field of ICTs and environmental sustainability
- To offer advocacy interventions in the field of ICTs and environmental sustainability.

2.2. Definition of ICTs and environmental sustainability and methodologies

The term 'ICTs and environmental sustainability' was taken in the research to be a broad and inclusive definition. It involved the environmentally sound and sustainable management of ICTs, including their production, use, re-use and disposal, as well as the use of ICTs to mitigate and adapt to climate change. Although not a primary emphasis in this research, the term was also taken to refer more generally to using ICTs to support of environmental causes, or as tools to assist in protecting and preserving the environment.

The methodologies followed by the country-level researchers varied, but included desk research and literature reviews as well as face-to-face interviews with key stakeholders in the field.

2.3. Acknowledgements

The country-level reports research, inventory of tools and practices and survey of practitioners have been made possible through the generous support of the International Development Research Centre (IDRC). We would also like to thank all the researchers involved in the production of these reports.

3. Comparative summary of key findings

	India	Bangladesh	Egypt	Costa Rica	Mexico
ICT policy	<p>Emphasis on sustainable use of ICTs missing, especially in ministerial and departmental procurement and usage policies as well as in programmes and schemes meant for local governments</p> <p>Use of ICTs encouraged through govt. policy (such as subsidies) but no mention of environmental sustainability</p>	<p>Brief mention of e-waste in ICT policy</p>	<p>ICTs and environmental sustainability not articulated in policy</p>	<p>ICTs and environmental sustainability not articulated in policy</p>	<p>Policy gap between digital agenda and environmental concerns</p>
ICTs and climate change	<p>Lack of comprehensive policies articulating role of ICTs in climate change (particularly in Ministries of Environment & Forests and Ministry of Communications & IT)</p> <p>Only indirect reference to ICTs in climate change policy</p>	<p>Bangladesh Climate Change Strategy and Action Plan talks about research and knowledge management, and capacity building and institutional integration that may result in ICT components</p> <p>However, few practical initiatives responding to policy context (i.e. policy is not creating a sufficient stimulus to sectoral engagement on issues such as climate change).</p>	<p>There is low awareness among the public regarding the concept of green ICTs and sustainable computing</p> <p>Environmental laws do not cover ICTs</p> <p>Govt. has been championing green ICTs, but primarily as a strategy to attract foreign investment.</p> <p>Challenges around implementation of ICTs for environmental sustainability strategies</p>	<p>Public sector taking the lead in climate change initiatives</p> <p>However, initiatives across sectors that have been developed on ICTs and climate change are isolated from each other</p>	<p>Strong institutional structure for dealing with climate change</p> <p>Little awareness of impact of consumption patterns of ICTs and climate change amongst public and policy-makers</p> <p>Diluted and unconcretised application of ICTs in the context of climate change</p>

e-waste	<p>Low public awareness of e-waste hazards in particular</p> <p>Actions taken on e-waste lack drive and effectiveness because of the absence of oversight authority</p> <p>Surts of progress around e-waste rather than systematic approach</p> <p>Reliance on civil society and private sector to develop e-waste initiatives.</p> <p>Collaborative approach amongst stakeholders missing</p> <p>E-waste policy incentive-based, but flaws (e.g. does not legislate shared responsibility in the supply chain)</p>	<p>Low public awareness of e-waste hazards in particular</p> <p>There is no comprehensive e-waste policy</p> <p>Contradictory policy is encountered</p> <p>Mixed response by businesses to e-waste (some sporadic e-waste management initiatives exist)</p>	<p>Low public awareness of e-waste hazards in particular</p> <p>Country has no specific policy on ICT e-waste. However, general e-waste covered under hazardous waste legislation.</p>	<p>E-waste regulations ratified</p> <p>Reliance on civil society and private sector to develop e-waste initiatives</p> <p>Given relatively newness of regulations/legislation on e-waste, some interesting collection initiatives, but few recycling initiatives</p> <p>Private sector initiatives involve global companies first, and only then local development</p>	<p>Recognised importance, but nascent policy development regarding e-waste at the local level</p> <p>Active private sector response to e-waste</p>
Stakeholders	<p>Need for inter-departmental and inter-sectoral co-ordination among key ministries and agencies</p> <p>Limited policy engagement amongst civil society – however signs of increased interest</p>	<p>Policy gaps because of sectoral/silo development</p> <p>A complex cross-sectoral response is necessary to properly address the use of ICTs in environmental sustainability</p>	<p>Sectoral cross-collaboration is weak</p>	<p>Active sectoral responses in the field of ICTs and environmental sustainability generally</p>	<p>While private sector initiative is encouraged in both the field of climate change (e.g. adaptation technologies) and e-waste, little state co-ordination of these activities</p>

4. Overview of national policy environments

The five countries overviewed here show both similar and dissimilar trends in policies impacting on ICTs and environmental sustainability. Given that environmental sustainability is a cross-sectoral issue, inter-sectoral collaboration and co-operation is key to creating a successful policy environment. As these country studies show, this is not always possible. While policy intention is evident through signing various global conventions impacting on the environment, their application at the national level is uneven, and the potential for strong policy environments to catalyse responses on the ground diluted by fractured and independent sectoral responses. In Bangladesh, for example, this has created some measure of policy contradictions – and even conflict.

In most instances the role of ICTs in mitigating and adapting to climate change is poorly articulated in national policy, even when strong policies dealing with climate change are in place. This reflects a number of difficulties, including the challenge of concretely articulating a strong vision for the use of ICTs in the context of climate change, but also whether or not ICTs should be reflected in policy specifically or taken for granted as one of the ways to achieve policy outcomes – one is reminded of calls for the technology-neutral ICT policy in many regions of the world. A concern here, however, is that if ICTs are not specifically identified, to what extent does this reflect an ignorance by policy-makers of the critical role ICTs need to play in climate change mitigation and adaptation? When should the ICT4D activist intervene? Finally, the absence of a clear vision for ICTs in climate change policy also possibly suggests an uneasiness of where to locate mention of ICTs – should they be dealt with in ICT policy or environmental policy, and how does policy reflect the specific sector responses that are necessary?

The research overviewed here also captures the avoidance in policy discussions of the impact consumerism, the mainstay of the ICT industry, is having on the environment. Linked to this, and with the possible exception of India and Costa Rica, government policy appears to avoid apportioning direct responsibility to the industry for e-waste management, even if this is a responsibility that is to be shared with the consumer. Notably absent from most ICT policies are clear directives governing e-waste, even while the real problems of unmanaged e-waste have been on the global agenda for several years, and while the countries are party to important conventions such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (www.basel.int). Given the impact hazardous toxins are having in communities on the ground in countries like India, this very clearly is a human rights concern and an omission of people's rights on the policy agenda – it is not just a business concern. Hand-in-hand with this absence is the ongoing and quite startling lack of awareness amongst the general public about the hazards of e-waste reported in most of the research.

Finally, in most countries overviewed here, the policy approach appears to be less prescriptive than an attempt to create an environment where initiatives by the private sector, and, to a lesser extent civil society are catalysed – whether through new services or products, or, one presumes, community interventions funded by international donors. As some of these countries show, this approach is only proving partially successful – in the

case of India, a government fund set up for technological innovation in the context of climate change has received few proposals. In the case of Mexico, it appears that international businesses that are already established are the first to benefit from e-waste legislation, rather than policy building new locally-owned businesses on the ground.

Moreover, business development even in a positive policy space takes time – several years or more. This time scale is somewhat at odds with the various predictions of climate disaster put forward, suggesting a stronger policy hand is necessary in the short-term, one that may have to be prescriptive and interventionist at the state level.

India

India is signatory to the Kyoto protocol and climate change is integrated in the country's national development planning process. However the various policy drives dealing with climate change, such as the National Environment Policy and the National Action Plan on Climate Change, do not refer specifically to how ICTs can be used. The National Environment Policy suggests the general adoption of clean technologies by industry, in particular the small and medium business sector, and talks of capacity building in the financial sector for appraising clean technology. The government also offers a 30% subsidy to companies that power their telecom towers with solar energy. But at best these are sector-specific policies and initiatives that explore the adoption of ICTs, for instance in power, iron and steel sector, rather than overarching policies that systematically deal with the use of ICTs for environmental sustainability. The National IT Policy, even though it was passed in 2000, has no mention of the environmentally sustainable management of ICTs and their use to adapt to or mitigate climate change – common to most countries discussed here.

India is also signatory to the Basel Convention. The focus at the national level has been on e-waste management spearheaded by the Ministry of Environment and Forests with the latest e-waste draft policy out for public review. Already it is reported that there are differences emerging – especially in the ICT industry – on various clauses such as the one that puts the onus of e-waste management on producers.

The policy, which will come into effect from January 2012, lends importance to citizen awareness and community-based participation as the first step in trying to address the e-waste problem. It has given priority to centralised recycling facilities and different states co-operating in e-waste management. However, the policy process is absent in terms of ensuring an ecosystem where the entire supply chain of ICT procurement, usage and disposal involves shared responsibility of various stakeholders. Rather it looks to offer incentives for entrepreneurs.

In what has until now effectively been a policy vacuum at the national level, only a few States like Delhi, Karnataka and Tamil Nadu have taken the initiative and adopted some form of proactive e-waste policy.

Bangladesh

As in many other countries, policies in Bangladesh are developed from a sectoral perspective, which complicates a systematic response to environmental policy given that it is a cross-sectoral issue. For example, the Environment Policy of Bangladesh (1992) covered almost 15 sectors, including agriculture, industry, energy, health, and land. However, there is a need to synchronise these efforts to avoid them conflicting with each other. At the same time different policies have been adopted, but either the policies have not been internalised within a proper institutional framework or there is no monitoring mechanism available to study the effects of the implementation.

The two most important policies that the government has formulated so far with regard to climate change are the National Adaptation Programme of Action (2009) and the Bangladesh Climate Change Strategy and Action Plan (2010). The latter addresses climate change issues and their impacts on society, the economy, and ecosystems. In practice this means policies on areas such as food security, agriculture, disaster management, as well as ICTs. Yet policy contexts does not necessary translate to initiatives on the ground. The climate change fund that the government has created has received almost no project proposals related to ICTs and environment sustainability. The only significant initiative that is visible in government is the Comprehensive Disaster Management Programme (CDMP - <http://www.cdmp.org.bd/>) that uses mobile phone-based early warning and forecasting services for floods and other natural disasters.

As with the other countries discussed here, Bangladesh is also signatory to the Basel Convention. However, the country has no comprehensive e-waste policy. While some sectoral policies refer to e-waste, the overall effect is one of a contradictory policy environment for the management of e-waste. For instance, it is briefly mentioned as an action item in the country's ICT policy which calls for the safe disposal of toxic wastes resulting from use of ICTs, but it is not listed as a sectoral concern in the Environment Conservation Rules of 1997 which outlines waste management rules for different sectors. In contrast, the Medical Waste Management Rules (2008), which addresses waste management issues for the medical sector, include e-waste in its rules.

Egypt

Amongst the countries surveyed here, Egypt lags the furthest behind in articulating the need to systematically use ICTs to respond to climate change. While the country has various environmental protection laws, these do not define the use of ICTs to help adapt to or mitigate to climate change. For instance, Law No. 4 of 1994, and its amendment Law No. 9 of 2009, which govern environmental protection in Egypt, have no special stipulation for ICT climate change mitigation or adaptation.

There are also no policies governing the management of ICT e-waste in Egypt. Despite a promising Green ICT Strategy, which came into effect in 2010, few demands are placed on industry regarding the correct disposal of e-waste – in the main allowing scrap dealers to control the e-waste market when it comes technology.

Regulations controlling e-waste generally are found in the country's hazardous waste rules

– but these do not refer specifically to ICTs. However, the Ministry of Trade requires that imported computers be no more than five-years old from production date. Any product brought into the country also has to have a certificate of origin from the country of manufacturing.

In the absence of policies, laws and, in most cases regulations, there are several recent initiatives addressing ICTs, climate change and sustainable environment in the form of loosely defined strategies, roadmaps and memorandums of understanding. But these documents have not yet materialised into substantive work to combat climate change or to manage the growing problem of e-waste.

Costa Rica

Costa Rica has made several commitments in line with the international community, such as Law 7414 ratifying the United Nations Framework Convention on Climate Change in 1994, the Regional Convention in 1995 and Law 8219 approving the Kyoto Protocol. In 2009 the National Strategy for Climate Change was formulated, establishing the action lines for the following years.

But while climate change is of national and government interest – reflected in the drafting of a National Climate Change Strategy and the development of related policies – the strategic use of ICTs for climate change is very poorly developed in these strategies. Only the National Development Plan defines strategic areas for the use of ICTs for environmental sustainability. However it does not specify actions on the issue of climate change. A similar situation is found in the National Climate Change Strategy where the use of ICTs is not defined.

There was a major breakthrough in 2010 when legislation for the integrated management of e-waste was passed in Costa Rica. Within this regulatory framework, entrepreneurs and civil society are expected to develop e-waste initiatives. However, global recycling businesses appear to be the primary beneficiaries of this legislation which affords them opportunity to enter new markets.

Mexico

In Mexico, there is a very weak link between the country's digital strategies and environmental strategies involving climate change or e-waste. Public policies in the two fields do not overlap. Various attempts have been made in the country to formulate digital agendas and public policies on ICTs. However, the proposals for a digital agenda do not consider the issue of climate change or the need for initiatives to deal with it.

Mexico has developed several policy instruments dealing with areas such as mitigation, adaptation and prevention and early warning. The role of ICTs are suggested in these policy positions in various ways. For example, the Programa Especial de Cambio Climático –PECC) suggests the potential of using ICTs as a communications tool, and emphasises the need to create an effective mitigation strategy that should include the identification of innovative technologies, the strengthening of mitigation and adaptation technologies available in the market, and the necessary incentives for their development, while at the same time promoting the development of clean technologies. However, in the first

instance, the potential application of ICTs needs to be read into the policy document, and is not concretised by way of a clear strategy for the application of ICTs. In the case of mitigation, while there is a recognition that technologies are important tools for reducing GHG emissions, ICTs are not presented as active agents in the mitigation actions in the material reviewed in the research.

Nevertheless, despite these conceptual flaws, ICTs are at least on the climate change agenda as a broad area of focus. In particular, there has for some years been considerable emphasis placed on using ICTs in the prevention and early warning of natural disasters.

Mexico has developed a series of legal provisions at the federal level that constitute a general framework for waste management. E-waste is considered waste requiring special handling, and its regulation falls under state and municipal jurisdiction. Nevertheless, regulations at these levels are only beginning to be established, or existing regulations are only currently being reviewed in order to include the corresponding provisions.

Legislation emphasises the creation of markets for by-products or derived products (lead, cadmium, silver etc.) that are generated due to various recycling processes. This encourages private capital to invest in the development of these markets, as well as minimising the extraction of natural resources.

5. Key stakeholders

The complex and fragment policy environments provoked by the issue of ICTs and environmental sustainability are reflected in the difficulty in maintaining cross-sectoral collaborations in the field. While a country like Mexico offers a strong institutional structure for dealing with environmental issues, this is less the case in India, where a disconnect between stakeholders is evident. At the same time, initiatives in the private sector and civil society tend to be independent from government strategies, even if they are to some extent catalysed by government policy.

In all countries overviewed here there is some level of response to both ICTs and climate change and e-waste in the three key sectors: government, private sector and civil society. While the interactions between these initiatives within and between sectors may not be synchronised, this is a promising sign. It does suggest that while there is a direct link between initiatives on the ground and opportunities created by policy clarity and progressive policy positions, the involvement of stakeholders, whether in business or civil society, is not dependent on policy windows. All countries suggest some level of robust independence at the grassroots level in responding to environmental issues, even while these may in instance be hampered by policy and legislative lag.

Key questions provoked by the stakeholder overviews offered here include: How can government policy unplug the bottlenecks at the local level so that widespread and competitive initiatives can emerge in response to both climate change and e-waste? How can governments respond to the interest and energy shown in the field of environmental sustainability? How can policy achieve a fair balance between opportunities offered to local and global stakeholders operating in a country? And how can active responses from civil

society be encouraged?

As the country overviews suggest, something of the key lies in inter-sectoral co-ordination, but this is clearly not sufficient. Further research is necessary to determine the exact issues that prevent the different sectors from responding to climate change and e-waste, including business opportunities, consumer awareness, financing, access to technology, and the ability to respond and support widespread government roll-out plans.

India

Most initiatives to do with ICTs and climate change, as well as e-waste, have been sporadic rather than systematic and there is a sense of a disconnect between the different stakeholders in India when it comes to ICTs and environmental sustainability. For instance, ICTs and climate change initiatives have been launched by select government departments and ICT industry players. This reflects something of the need for inter-departmental and inter-sectoral co-ordination among key ministries and agencies.

In the absence of any government policy or legislation the role of the IT industry is restricted to independent measures to manage its own procurement, use, re-use and disposal. The economics of e-waste management and production, usage and roll-out of environment friendly devices and applications is being considered and adopted by the industry. However, e-waste advocacy and programmes set up by industry are not necessarily in line with the larger national focus.

Advocacy and initiatives to do with e-waste at state or provincial government level are marginal, except for a few notable instances like the governments in Karnataka, Tamil Nadu and Delhi.

Yet the sporadic initiatives have borne some fruit. The Municipal Corporation of Delhi government has brought out enforcement mechanisms for effective disposal of e-waste. Tamil Nadu has become the first state in India to come up with a separate e-waste policy in the country. India's first e-waste collection initiative, involve a recycler called E-Parisaraa, has also been launched.

The role of the civil society and other stakeholders in the field of ICTs and environmental sustainability is a nascent one. Advocacy has been seen in pockets such as in state of Karnataka and led by bodies like Centre for Science and Environment. It is only in recent times that the focus has shifted to the impact of ICTs on the environment and on climate change due to the pressure of energy and carbon footprint challenges.

Bangladesh

Many institutions, directly and indirectly, are involved in managing or shaping the environment sector in Bangladesh. At state level these include, amongst several others, the Planning Commission, Department of Forest, Department of Environment, Ministry of Agriculture, Ministry of Fisheries and Livestock, Ministry of Water Resources, Ministry of Energy and Ministry of Health and Family Welfare. However, the Ministry of Environment and Forestry bears the responsibility for working with other ministries to ensure that environmental concerns are given due recognition in their development programmes.

There is a general sense in the private sector that it would lose its competitive edge if environmental concerns are integrated or pushed too far. Many in the private sector see concerns for environment as efforts to control development. Nevertheless, there are a number of businesses that are directly engaged or have stake in ICT and environmental issues – some perhaps unexpected stakeholders. For instance, the Bangladesh Garment Manufacturers and Exporters Association (BGMEA- <http://www.bgmea.com.bd>) BGMEA has two types of roles in the area of environment protection. One is to participate in different national consultations to voice their positions on the environment, waste management, and climate change issues and the second is to showcase best practices in using energy-efficient environment friendly technologies and waste treatment mechanisms.

Few companies in Bangladesh have taken the initiative regarding e-waste. For example, while the Association of Mobile Phone Telecom Operators in Bangladesh (AMTOB) has been very vocal on SIM tax withdrawal or reforming the telcom regulatory environment in the country, it has paid less attention to cell phone waste management. Mobile phone manufacturer Nokia has collected used mobile phones for its recycling plant, while Standard Chartered Bank has distributed used PCs to schools.

Civil society organisations in Bangladesh are starting to become more active in the field of environmental sustainability. Organisations are also emerging that are solely mandated to work on environmental issues. Either they are working independently or in a coalition with environmental protection as their goal. These include the Bangladesh Environmental Lawyers Association (BELA - <http://www.belabangla.org/>) a legal advocacy group that deals with the legal regime of environment protection, The Bangladesh Paribesh Andolon (BAPA - <http://www.bapa.org.bd/>), a forum for citizens and organisations working on environment protection issues, and Waste Concern (<http://www.wasteconcern.org/>), a social business enterprise that contributes to waste recycling, environmental improvement, renewable energy, and poverty reduction through job creation and sustainable development.

Egypt

While the Ministry of Communication and Information Technology (MCIT) is the driving force for extending ICT services in Egypt – and some applications developed by MCIT address climate change issues such as the greening of ICTs and the establishment of ICT tools for monitoring and reporting on climate change and developing environmental baselines – sectoral cross-collaboration is weak.

Without collaborative macro planning by the leading authorities, the different stakeholders are developing strategies according to sectoral interests and by what markets demand at the time. The result is there is little coherence in the myriad initiatives and no proper follow-through in many of the strategies, plans and initiatives laid out.

The use of ICT tools – mostly databases – for monitoring and reporting of climate change adaptation, mitigation and environmental sustainability overall is lacking a focal agency. Line ministries have their own databases and the sharing of information and data with Egyptian Environmental Affairs Agency (EEAA) is not always adequate. Data is often outdated, sporadically collected and is analysed by different stakeholders using different

methods. The institutional and financial capacity to co-ordinate environmental issues is lacking.

This fragmentation is also found in the waste sector. There are data gaps regarding the numbers of computers and mobile phones in Egypt. The absence of studies and reliable quantitative data makes it a challenge to assess the size of the problem and to plan appropriate e-waste management systems.

The private sector seems to be taking the lead in the management of ICT e-waste in Egypt. Small individual efforts are being made by telecommunication and computer companies to improve their e-waste management. In contrast, the involvement of civil society in ICT e-waste management is limited and is mostly concentrated in the hands of groups traditionally involved in waste handling and recycling.

Costa Rica

Despite the lack of definition of national strategies on using ICTs for climate change, there are several actors who have developed initiatives on the strategic use of ICTs for mitigation and adaptation to climate change and dealing with awareness-raising, advocacy and green outreach initiatives. Some government stakeholders stand out, such as the Meteorological Institute of Costa Rica, the Vulcanology and Seismologic Observatory and the National Emergency Commission on the use of ICTs.

In the private sector there are some initiatives in the ICT sector that help to better manage their physical and energy resources and protect the environment. These initiatives are part of internal policies adopted by these companies and are also seen as competitive strategies in the global market.

Civil society also promotes other initiatives for the use of ICTs in the areas of awareness and advocacy on diverse topics such as climate change, energy consumption, and sustainable energy use. Civil society organisations active in the area include the CO2 Neutral 2021 group, which is a group of young professionals that have organised themselves with the purpose of achieving the goal of a carbon neutral country by 2021. However, many initiatives where they occur are isolated from each other.

In line with the new e-waste legislation, municipalities have a leading role regarding the implementation of the integrated waste system in the country. They are responsible for establishing and implementing municipal waste planning, designing and implementing the regulations on collection and have an Environmental Management Unit in each local government. Currently, municipalities are in the process of formulating their waste plans.

However, given that the laws and the regulations for e-waste are relatively new, there are few substantial e-waste collection programmes. There are some business initiatives (although involving very few Costa Rican companies) that buy e-waste from institutions. This suggests that while policies seek to catalyse private sector and civil society response to climate change, frequently this does not have the desired effect – it is not enough to stimulate sector response to critical issues. Instead, Costa Rica suggests that policy creates a platform for established global companies to increase their global business foothold.

In the civil society sector, e-waste collection campaigns have been carried out by associations such as Terra Nostra, the Rotaract Club of San Pedro and Curridabat and others. Many of these campaigns are conducted jointly with business or universities.

Mexico

As in the other countries overviewed here, the ICT sector in Mexico has multiple stakeholders, including government, business, academic institutions and civil society organisations. However, only a small number of them participate in the ICT4D sector, and even fewer are involved in initiatives dealing with ICTs and climate change.

Nevertheless, the country boasts a strong institutional structure for dealing with climate change. Institutions set up to tackle climate change include: Comisión Intersecretarial de Cambio Climático (CICC) (Inter-sector Commission on Climate Change), which coordinates initiatives on GHG emissions, adaptation and climate action strategies and programmes; Consejo Consultivo de Cambio Climático (CCCC) (Advisory Council on Climate Change), which monitors the CICC's compliance with its functions; and Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT) (Ministry of the Environment and Natural Resources), which has the responsibility of guiding national policies on climate change as well as e-waste.

A number of the initiatives for collecting and disposing of e-waste have been set up in the private sector. Civil society has also been active in environmental sustainability, and several prominent organisations have been noted by the research. For example, Greenpeace México, has a climate change campaign and promotes the Guide to Greener Electronics, which ranks the 18 top manufacturers of personal computers, mobile phones, TVs and games consoles according to their policies on toxic chemicals, recycling and climate change. Others include Asamblea de afectados ambientales (Assembly of Persons Affected by the Environment), a network of organisations that seeks to end social and environmental destruction; Otros mundos – Chiapas (Other Worlds – Chiapas), an interdisciplinary collective that seeks alternatives to social, economic, political and environmental crisis; and Proyecto Ecovía, a non-profit recycling programme run by volunteers.

6. Advocacy for civil society

The country research highlighted several advocacy priorities in the field of ICTs and environmental sustainability. For example, the case of India suggests that civil society organisations need to first make the link between ICTs and environmental sustainability in their own advocacy agendas clear before lobbying for inclusive and participative policies on environmental sustainability that draw on the potential of ICTs to achieve this. Currently this clear link is absent from civil society advocacy agendas. In Bangladesh, strong opportunities exist for civil society to impact on the management of e-waste, including pushing for an e-waste policy to be developed, and setting up pilot recycling initiatives. Egypt (like Bangladesh) shows a need for civil society to intervene in the creation and systematic management of knowledge resources around ICTs and environmental sustainability. Civil society also has a role to play in the country in raising awareness

around e-waste at the policy-maker level, and at the grassroots. Costa Rica sees a strong role for civil society in awareness-raising, training and institutional support; while Mexico highlights the fact that ICT4D organisations need to continue to push for universal access, which will become critical for the success of any climate change intervention.

Despite these and other unique differences in the country advocacy needs, as the points below suggest, many of the advocacy tasks are shared in the countries overviewed, in particular around awareness raising, training, support.

The following are key advocacy needs shared by the countries overviewed:

- *Continue to push for sustainable universal access.* A broadbased response to climate change adaptation using ICTs will only be possible if communities have affordable access to technology.
- *Clarify role of ICTs and their link with environmental sustainability.* There is a need for civil society to develop a clear link between ICTs and environmental sustainability in advocacy agendas.
- *Advocate for participative and inclusive environmental sustainability policies.* This relates both to a policy response to climate change, and to the development of inclusive e-waste policies that involve the poor.
- *Push for the link between ICTs and environmental sustainability to be made explicit in policy documents.* Frequently the role of ICTs in climate change mitigation and adaptation is gestured towards rather than being explicitly spelled out.
- *Awareness raising and public education.* There still remains a need to raise awareness around the hazards of e-waste, particularly in poor and marginalised communities. There is also a need to educate the public more generally about sustainable computing, and the impact consumer behaviour has on the environment.
- *Raise awareness amongst policy-makers.* Although the negative impact unmanaged e-waste has on the environment and on communities has been widely publicised, policy-makers in some countries have yet to develop a systematic government response to e-waste. Policy-makers also need to be made aware that an incentive-based policy environment that encourages entrepreneurial activities in response to climate change may not be sufficient in the short-medium term, and that rapid state intervention is probably necessary to address climate change impacts.
- *Lobby for vendors to take a pro-active and environmental friendly approach to business.* Many ICT vendors remain on the periphery on issues such as e-waste management, rather than committing to a central role. At the same time, marketing agendas that encourage disposable technology and high product churn rates, as well as production processes that do not consider the environmental

impact, are not sustainable in the long-term.

- *Training and support.* The core role of civil society in providing training and support for community initiatives in marginalised communities remains. Curricula could include e-waste recycling skills and exploring the potential of ICTs in community-level climate change adaptation strategies.
- *Develop and maintain knowledge banks.* Civil society has for decades responded to the need for online information. This remains a critical need in the context of climate change mitigation and adaptation and for a localised information response to e-waste (e.g. markets, sources, collection depots and recyclers). These initiatives could support relevant institutional policies, such as the Bangladesh Climate Change Strategy and Action Plan which refers to research and knowledge management on climate change-related issues.
- *Support institutions that have been set up to respond to climate change and e-waste.* As in Costa Rica, there remains a task for civil society to identify positive institutional responses to climate change and e-waste, to participate in fora established by these institutions, and to support their processes and projects in order to help them achieve their objectives. A key challenge for most countries is the fragmented response to environmental sustainability, and civil society can play a role in helping to lessen this fragmentation, while offering a critical voice in decision-making processes.

References

The following reports, which can be downloaded from www.apc.org, were used to compile this comparative analysis:

ArabDev (2011) *ICTs and environmental sustainability: Mapping national policy contexts – Egypt baseline study*. (Author: Leila Hassanin and Nahla Hassan). APC, Montevideo.

Bytesforall Bangladesh (2011) *ICTs and environmental sustainability: Mapping national policy contexts – Bangladesh baseline study* (Authors: Partha Sarker and Munir Hasan). APC, Montevideo.

Digital Empowerment Foundation (2011) *ICTs and environmental sustainability: Mapping national policy contexts – India baseline study* (Authors: Syed S. Kazi, Divya Menon and Ashok Karna). APC, Montevideo.

LaNeta (2011) *ICTs and environmental sustainability: Mapping national policy contexts – Mexico baseline study* (Authors: Olinca Marino and Enrique Rosas). APC, Montevideo.

Sulá Batsú (2011) *ICTs and environmental sustainability: Mapping national policy contexts – Costa Rica baseline study*. APC, Montevideo.