



**ICTs and environmental sustainability:
Mapping national policy contexts –
Bangladesh baseline study**

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1. Introduction

Bangladesh is one of the countries most vulnerable to climate change. It has three big river systems, a large deltaic floodplain, and a long coast, all susceptible to frequent floods, cyclones, tidal surges, salinity intrusion, and sea-level rise. Different areas of Bangladesh have different types of environmental threats. For example, the long coastal area on the South experience high salinity, inundation of lands by tidal surges, cyclone or sea level rise, while some upland area at the northwest, northeast and southeast experience heavy rainfall in some years. The Northwestern region is affected by drought and low rainfall (Mallick, Rahman 2010).

Bangladesh initially pursued a development policy that has little concern for environmental issues. Therefore the majority of the government policies focused mainly on poverty alleviation through creating employment and economic growth, but did not integrate the issues of environmental protection.

The relationship between environmental quality and income level has been found to vary widely across regions – even for the same level of income the pollution level can vary depending on the policies pursued. While Nigeria pursued economic growth without much environmental concern Costa Rica's example illustrates that the goals of economic growth and environmental protection can be complementary [Aminuzzaman, 2010].

The Bangladesh State of Environment¹ report (2001) identified several key environmental concerns, including land degradation, water pollution and scarcity, urban air pollution, loss of biodiversity, and the impact of natural disasters on economy and livelihood systems. The two most important policies that the Bangladesh government has formulated so far with regard to climate change include: National Adaptation Programme of Action (NAPA) in 2009 and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2010.

In recent years the uses of mobile phones, PCs, laptops, printers, and scanners have witnessed tremendous growth in Bangladesh. It is generally thought that computer dismantling and recycling is a growing business in the informal sector, but no baseline data is available to show how these computers and mobile phones are being dismantled and recycled or left to be mixed up with other trash. General statistics show that 120,000 urban poor from the informal sector are involved in the recycling trade chain of Dhaka city, and 15% of the total generated waste in Dhaka, which is mainly inorganic, is recycled daily [GISWatch Report 2010]. All these make ICTs connection to environment an important issue to follow that this report has tried to address.

¹ <http://www.ekh.unep.org/?q=node/289>

2. Overview of key findings

The research indicates that information and communications technologies (ICTs) and environment sustainability issues are still not on the policy radar of the Bangladeshi policy decision-makers who have sporadically tried to address the key issues. The climate change fund that the government had created had 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.

The Bangladesh Bank – the central bank of Bangladesh – has adopted a paperless green banking policy where ICTs have been introduced as an enabler. The National ICT Policy 2009 is one of the policy frameworks that deliberately tried to connect ICTs with environment mentioning environmental protection as one of its ten objectives. Two out of five strategic areas identified under this objective talk about promotion of environmentally friendly green technology (9.1) and safe disposal of toxic waste resulting from use of ICTs (9.4).

Policies in Bangladesh are developed from a sectoral perspective that makes the environment a complicated issue to handle because it is a cross-sectoral subject. The Environment Policy of Bangladesh 1992 covered almost 15 sectors. The National Adaptation Programme of Action (NAPA) in 2009 and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2010 addressed 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, and ICTs. However, there is a need to synchronize these efforts to avoid them conflicting with each other. Some inconsistencies are already visible that this research report has noted.

It is also important to have a strong implementation mechanism. Different policies have been adopted but either the policies have not been internalised within a proper institutional framework or there no monitoring mechanism available to study the effects of the implementation.

The Environment Conservation Amendment ACT (ECA) has established the Department of Environment (DOE) and has authorised its Director General (DG) to take all the necessary steps for the conservation of environment, improvement of environmental standards and the control and mitigation of pollution. But sometimes the co-ordination between the DoE, the Ministry of Environment and Forests (MOEF) and line ministries is weak. A recent media report suggested that no single person has been convicted in Bangladesh for polluting rivers, canals or wetlands in the capital in the last decade since the Wetland and Open Space Conservation Act, 2000 came into effect – this despite widespread pollution of these water resources. The government passed the Act with the aim of conserving the environment in the capital, as well

as in other urban areas. However no concrete evidence is available that public interest is duly preserved under this law.

There is a lack of awareness and citizen campaigning on the issue of electronic waste (e-waste). There is no comprehensive e-waste policy, although it is briefly mentioned as an action item in the country's ICT policy. One strategic area under ICT policy suggests safe disposal of toxic wastes resulting from use of ICTs (9.4). The subsequent rules under the ECA, the Environment Conservation Rules of 1997, divided industries and projects into different categories depending upon the pollution load and likely impact on the environment. There are some provisions and mandatory rules to build a waste management system within the industry sectors. However, e-waste does not require any compliance under the Act or Rules. E-waste, nevertheless, does from time to time get discussed in the media, and some research has been conducted to try to determine its impact.

This research suggests that there is space for civil society advocacy pushing for a comprehensive e-waste policy, for setting up pilot recycling centres, and for creating a knowledge-base on ICTs and environmental sustainability.

There is an increased interest both from the government and civil society organizations to focus on climate change issue but there is a general lack of institutional framework together with the appropriate supporting organizational processes to align and integrate the efforts [Kundale.K 2008]. A centralized approach to acquisition, management and dissemination of knowledge can strengthen the institutional capacity to work on climate change related issues.

3. Objectives of the study

There were several objectives to this study:

The first was to understand the entire landscape of ICTs and environment sustainability both from the policy and initiative perspective in Bangladesh. No such study has been conducted where ICTs have been seen as a tool to tackle environmental issues. In fact there is no resource available that has collected all environment-related initiatives in one place. The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2010 talked about creating a central repository of knowledge, but that has yet to be established.

Another objective was to map out a list of different policies that were designed for different sectors, but have environmental components, to see what gap exists within these policies that can be addressed through new policy intervention. The study therefore aimed at creating a chart of different policies and a synopsis to show how environmental issues have cut across sectors such as, agriculture, fisheries and industry.

It was also important to see how ICTs can add to environmental problems (such as e-waste) while also offering a solution to environment sustainability.

The report is part of the newly-created programme by the Association for Progressive Communications (APC) in the field of ICTs and environmental sustainability. It accompanies a survey and inventory of sustainable tools and practices, and policy research into ICTs and environmental sustainability in four other countries: India, Egypt, Mexico and Costa Rica. The survey, inventory and research have been made possible through funding from the International Development Research Centre (IDRC). This research and other activities in the APC programme area can be accessed on the organisation's website: www.apc.org.

4. Methodology

The term 'ICTs and environmental sustainability' is defined broadly to refer to the environmentally sound and sustainable management of ICTs, including their production, use, re-use and disposal, as well as using ICTs to mitigate, and adapt to climate change. ICTs can be used more generally in support of environmental causes, or as tools to assist in protecting and preserving the environment. Although the report has a focus on issues such as e-waste and climate change, it is not limited to these issues.

The report relies on both primary and secondary sources of data. Primary data includes data obtained through interviews and surveys, while the secondary sources of data include literature reviews focusing on different publications dealing with ICTs and environment sustainability. Desk research was also conducted to study different policy and strategy documents, newspaper articles, reports etc. Interviews were conducted face-to-face on the basis of an open-ended and descriptive questionnaire. The answer sheets were then analysed in the light of the objectives of this research.

Relevant stakeholders that served as sources for information included: the private sector bodies, business groups, non-profit organisations, research organisations, government organisations, academic institutions and the media.

5. Key data for analysis

1 Telecommunication indicators in Bangladesh²

Item	2008	2006	2004
Population (million)	140.40	138.8	135.2
Mobile Phones (million)	43.70	21.88	4.15
Fixed Lines (PSTN)(million)	1.28	1.0	0.9
Total Telecom Users	44.98	22.98	5.05
Teledensity	32.04	16.48	3.74

2 Estimated Internet Users³:

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	0.07	0.13	0.14	0.16	0.20	0.24	0.29	0.32	0.35	0.38
	Estimated Internet users per 100 inhabitants									

3 Human Development Indicators for Bangladesh⁴

Health	Life expectancy at birth (years) 66.9
Education	Mean years of schooling (of adults) (years) 4.8
Income	GNI per capita (2008 PPP US\$) LN 7.4
Inequality	Inequality-adjusted HDI value 0.331
Poverty	Multidimensional poverty index (k greater than or equal to 3) 0.291
Gender	Gender Inequality Index (updated) 0.712
Sustainability	Adjusted net savings (% of GNI) 23.7
Human Security	Refugees (thousands) 10.1
Human Development Index	Rank 129

² Bangladesh Telecom Regulatory Commission (BTRC, June 2008)

³ International Telecommunication Union (ITU) Country Data 2000-2009

⁴ International Human Development Indicator (UNDP, 2010)

4 Global Environmental Outlook: Climate Change Data on Bangladesh ⁵

ECOSYSTEM MANAGEMENT

Forest Harvest Rate [Percent of Total Forest Volume]	25.10	-2010
Forests Certified by FSC- Accredited Certification Bodies [Hectares]	x	(x)
Proportion of Land Area Covered by Forest [Percent of Land Area]	11.10	-2010

ENVIRONMENTAL GOVERNANCE

Improved Drinking Water Coverage - Total Population [Percent of Total Population]	80.00	-2008
Improved Sanitation Coverage - Total Population [Percent of Total Population]	53.00	-2008
ISO 14001 Certifications [Number of Certifications]	42.00	-2009
Participation in Treaties - Basel Convention [----]	ratificated/accepted/approved	-1993
Participation in Treaties - Convention on Biological Diversity [----]	ratificated/accepted/approved	-1994
Participation in Treaties - Convention on International Trade in Endangered Species of Wild Fauna and Flora [----]	ratificated/accepted/approved	-1981
Participation in Treaties - Convention on the Conservation of Migratory Species of Wild Animals [----]	x	(x)
Participation in Treaties - Kyoto Protocol [----]	ratificated/accepted/approved	-2001
Participation in Treaties - Ramsar Convention on Wetlands [----]	ratificated/accepted/approved	-1992
Participation in Treaties - Rotterdam	x	(x)

⁵ Global Environmental Outlook, United Nations Environment Programme (UNEP) 2010
([http://geodata.grid.unep.ch/mod_table/table_profile.php?
selectedKeyword=Bangladesh&selectedDatasettype=National&selectedLanguage=en](http://geodata.grid.unep.ch/mod_table/table_profile.php?selectedKeyword=Bangladesh&selectedDatasettype=National&selectedLanguage=en))

Convention
[----]

Participation in Treaties - Stockholm Convention on Persistent Organic Pollutants [----]	ratificated/accepted/approved	-2007
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Participation in Treaties - United Nations Convention on the Law of the Sea [----]	ratificated/accepted/approved	-2001
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Participation in Treaties - United Nations Convention to Combat Desertification [----]	ratificated/accepted/approved	-1996
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Participation in Treaties - United Nations Framework Convention on Climate Change (National Reports, UNFCCC) [----]	ratificated/accepted/approved	-1994
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Participation in Treaties - Vienna Convention and Montreal Protocol [----]	ratificated/accepted/approved	-1990
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Participation in Treaties - World Heritage Convention [----]	ratificated/accepted/approved	-198
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HARMFUL SUBSTANCES AND HAZARDOUS WASTE

Consumption of Ozone-Depleting Substances - Chlorofluorocarbons (CFCs) [ODP Metric Tons]	127.60	-2009
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Consumption of Ozone-Depleting Substances - Hydrochlorofluorocarbons (HCFCs) [ODP Metric Tons]	67.70	-2009
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RESOURCE EFFICIENCY

Aquaculture Production - Marine [Metric Tons]	67197.00	-2008
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Fish Catch - Marine [Metric Tons]	497573.00	-2008
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Municipal Waste Collection [Thousand Tons]	x	(x)
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Proportion of Total Renewable Water Resources [Percent]	6.60	-2000
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6. Key stakeholders and initiatives

Key stakeholders that have interest on ICTs and environmental sustainability issues can be grouped in three categories: public, private and civil society. Apart from public stakeholders, only a small number of private and civil society groups are involved in policy issues. Their main focus is advocacy and campaign. Following is the list of stakeholders and initiatives that are worth mentioning.

6.1. Public sector

The Ministry of Environment and Forest (MOEF - <http://www.moef.gov.bd/>) is the key ministry which looks after the environmental issues through its various agencies, including the DOE, Department of Forests (DOF), Bangladesh Forests Research Institute (BFRI), Bangladesh National Herbarium (BNH) and Bangladesh Forests Industries Development Corporation (BFIDC). According to the MOEF: 'The principal activities undertaken by Ministry...consist of conservation and survey of flora, fauna, forests and wildlife, prevention and control of pollution, forestation and regeneration of degraded areas and protection of the environment, within the framework of legislations'.⁶ In order to accomplish these tasks, MOEF uses various tools including surveys, impact assessments, regeneration programmes and supports organisations in doing research to find solutions, facilitate the collection and dissemination of environmental information and create mass awareness. It is also a key body that co-ordinates the formulation of environmental-related policies, Acts and legislations.

The DOE (<http://www.doe-bd.org/>) is the major implementation body of environmental-related rules and regulations. For example, they continuously monitor the environment and impose regulatory measures on industry and vehicle emissions, amongst others [Alam, Z]. They also collect and examine river water samples, and list industries in three different categories - Green, Orange and Red – depending on levels of pollution.

The Ministry of Agriculture (MOA - <http://www.moa.gov.bd/>) develops and monitors the implementation of agricultural related policies and Acts, and plays an indirect role in environmental protection issues by improving agricultural resource management, encouraging environmental friendly technology and the effective use of pesticides and other fertilizers for sustainable agriculture sector development. The Ministry of Food and Disaster Management (<http://www.dmr.gov.bd/>) works on environmental risk mitigation, disaster preparedness and food security issues.

The Water Resources Planning Organisation (WARPO - <http://www.warpo.gov.bd/>) works on water resource management. It's also responsible for national water planning; monitoring; the formulation of water legislation and regulations; the inter-sectoral co-ordination of water plans; and the maintaining of a central data system.

⁶ Ministry of Environment and Forest (MOEF - <http://www.moef.gov.bd/>)

The Ministry of Industries (<http://www.moind.gov.bd/>) is primarily responsible for developing new policies and strategies for the promotion, expansion and sustainable development of the industrial sector in the country. Given increased industrial activities, this ministry has a role to play in developing and implementing policies on issues such as toxic material imports, supporting environmentally friendly businesses, industrial pollution control etc. The ministry has several departments and corporations such as the Bangladesh Standards and Testing Institution (BSTI), Bangladesh Sugar and Food Industries Corporation (BSFIC), and the Department of Patent, Design and Trademarks (DPDT). These may have policy influence regarding sustainable environmental development.

The Ministry of Science and Information & Communication Technology (MoSICT, www.mosict.gov.bd) is the premier body for formulating national policies on science and technology and co-ordinating science and technology-based initiatives and activities of different Ministries. It also develops policies related to radio-activity and atomic energy and supports potential new technology-based research activities in the country. The Bangladesh Computer Council (www.bcc.net.bd) provides policy and logistics support to MoSICT for ICT implementation-related issues, including the development and delivery of ICT-based training courses and supporting the expansion of uses of computers and IT in the country.

The Bangladesh Telecommunication Regulatory Commission (BTRC - www.btrc.gov.bd) was set up as an independent commission under the Bangladesh Telecommunication Act, 2001, and is responsible for regulating all matters related to telecommunications including wire, cellular, satellite and cable. It has a stated objective of increasing the tele-density to 10 telephones per 100 inhabitants by 2010. It has so far issued 832 licences including cellular mobile telecom operator licences and broadband wireless access licenses.

The Ministry of Post and Telecommunication (www.mopt.gov.bd) looks after the telecom infrastructure of the country and has formulated a number of policies and laws, including the Telecommunications Act 2001 and the Bangladesh Telegraph and Telephone Board (BTTB) Act 2009.

6.2. Private sector

The Private sector is the major source of employment and livelihood in Bangladesh. There is a general sense amongst private sector bodies that the private sector would lose competitive edge if environmental concerns are integrated or pushed too much. Many of them see concerns for environment as efforts to control development. Nevertheless, there are a number of private sector bodies that are directly engaged or have stake in ICT and environmental issues.

The Bangladesh Computer Samity (BCS - <http://www.bcs.org.bd/>) is the national association of ICT companies in Bangladesh. This comprises distributors, dealers, resellers of computer and allied products, locally assembled computer vendors, software developers and exporters, internet service providers, ICT-based educational institutions and training houses, ICT-

embedded services providers etc. It has contributed to the development of ICT policy and organised different training programmes and information sessions to encourage the use of ICT devices. In the wake of the evident e-waste challenges, the role of BCS is important. In an interview with Bytesforall, Mustafa Jabbar, the president of BCS, said that private sector companies can employ strategies such as clean-up and eco-design policies to reduce the toxicity of the components and/or facilitate recycling. He thinks it is important to link extended producer responsibility (EPR) to individual producer responsibility (IPR), where the producer is responsible for its product.

The Bangladesh Garment Manufacturers and Exporters Association (BGMEA-<http://www.bgmea.com.bd>) is the apex trade body of garment manufacturers and exporters that earns almost 78% of the yearly foreign exchange. About 3.5 million people are employed in the sector out of whom the majority are women. 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. BGMEA, together with the South Asia Enterprise Development Facility (SEDF), has set up a programme named 'SEDF-BGMEA-BEOGWIOA Environmental Compliance Programme' to monitor and advise its members on the issues of environment compliance by doing environment audits.

The Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) is the association of 1700 knitwear manufacturers in the country. Currently, Bangladesh is the third largest knitwear exporter after China and Turkey. BKMEA has set up a mandatory requirement of membership for environmental compliance. It participated in the environment strategy development national consultation process⁷ organised by World Bank Group in Dhaka on March, 2010. BKMEA, in a recent consultation⁸ with the Ministry of Environment and Forestry (MoEF), has agreed with government plan that factories that emit excessive carbon should pay carbon tax.

The Real Estate and Housing Association of Bangladesh (REHAB -<http://www.rehab-bd.org/>) is the association of real estate developers in Bangladesh whose work has an impact on the protection of environment in Bangladesh. REHAB published a code of conduct for its members that touches on the issue of the environment. This with the aim to keep project premises clean and free from any health hazards and so that there is no environmental damage to the surrounding areas. REHAB also participated in different environment policy consultations in Bangladesh.

The Association of Mobile Phone Telecom Operators in Bangladesh (AMTOB) has a stake into waste management issues. However, while they seem to be very vocal on SIM tax withdrawal

⁷ <http://siteresources.worldbank.org/ENVIRONMENT/Resources/244380-1250028593656/6382907-1252510780845/6428643-1256655379723/6510806-1270468173931/20100302-Bangladesh-Country-Consultation-Report.pdf>

⁸ <http://www.thedailystar.net/newDesign/news-details.php?nid=159117>

or reforming the telcom regulatory environment in the country, they seem to have paid less attention to cell phone waste management.

6.3. Civil society

Different NGOs have worked closely with the government in the preparation of National Environment Management Action Plan (NEMAP). A growing number of NGOs and civil society organisations are working on natural resource management, women's empowerment, and rural development etc. They are aware of environment conservation and are trying to integrate climate change adaptation or environment protection issues into their development programmes (Mallick, Rahman 2010). The media are giving more exposure and priorities to environmental problems.

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.

The following are worth mentioning:

The Bangladesh Environmental Lawyers Association (BELA - <http://www.belabangla.org/>) is a legal advocacy group that deals with the legal regime of environment protection in the country. Its research and publication wing has conducted a number of studies on issues related to environment protection, river pollution control, inland fisheries and forestry protection etc. and contributed to the development of different policies or Acts. It has also used public interest litigation (PIL) as a tool to address various environmental injustices and to seek remedy for these. PIL was initiated by BELA back in 1996, and the Bangladesh judiciary system soon recognised PIL as a way to give the voiceless access to the formal justice system. BELA has initiated more than 40 cases on environmental issues including river pollution, industrial pollution, motor vehicle pollution, labour welfare, encroachment on important wetlands, relocation of industry etc. Major achievements include the recognition of 'right to environment' as part of the Constitutional 'right to life' due to PIL. BELA also organises workshops, and training sessions for media and local government organisations, and raises awareness.

The Bangladesh Paribesh Andolon (BAPA - <http://www.bapa.org.bd/>) is a forum for citizens and organisations working on environment protection issues. It organises seminars, meetings, conferences and workshops to draw attention to general and specific problems in the environment and to educate the public on these issues. By organising different advocacy campaigns, BAPA has given its input to different policy development and implementation issues including the Urban Water Body Protection law and draft River Protection Act.

Waste Concern (<http://www.wasteconcern.org/>) is a social business enterprise that contributes to waste recycling, environmental improvement, renewable energy, and poverty

reduction through job creation and sustainable development. It is working with the government to prepare an action plan for solid waste management in 19 different towns of Bangladesh, based on 3R principle and carbon financing. Waste Concern has developed different waste management models which are replicable both in rural and urban settings.

The Bangladesh Centre for Advanced Studies (BCAS <http://www.bcas.net/>) is a renowned organisation that works on sustainable development through four interactive themes (A) environment development and integration (B) good governance and people's participation (C) poverty alleviation and sustainable livelihoods and (D) economic growth and public-private partnership. At local and grassroots levels it has set up eco-specific research centres such as the Wetlands Research and Training Centre (WRTC) in Chanda Beel, disseminated renewable energy technology (solar photovoltaic) among the islands dwellers in the River Meghna, developed a local-level Water Resources Management Study Centre in Tangail, supported fisheries resource improvements through community husbandry in Maulavibazar, Gazipur, and Sherpur, and provided environmental education to non-formal schools in Dhaka, Gazipur and Chanda Beel areas. At the national level, BCAS has spearheaded and initiated numerous activities, including the National Environment Management Action Plan (NEMAP), Sustainable Environment Management Programme (SEMP), National Conservation Strategy (NCS), different aspects of the Social Forestry, Integrated Coastal Zone Management (ICZM) Strategy, New Fisheries Management Programmes and the New Fisheries Management Policy etc. At the regional level, BCAS is the secretariat for the Climate Action Network South Asia (CANSAs) working on climate change-related issues.

6.4. Initiatives

Numerous individual initiatives are contributing to sustainable development and environment protection in Bangladesh.

The government has established a climate change fund and has allocated USD100 million to this fund from its own budget sources.⁹ Some projects have already received support from the fund,¹⁰ including one by the Bangladesh University of Engineering and Technology (Buet) on 'Institutional Strengthening of Climate Change Study Cell for Knowledge Generation'. This fund also offered a climate change fellowship through different universities to allow more research around the topics of climate change and sustainable development.

The Food and Agricultural Organization (FAO) and Asian Disaster Preparedness Centre (ADPC) has completed an interesting study on adaptation in drought-prone areas in Bangladesh. The study conducted a climate risk assessment at the community level to improve the community's understanding of climate variability and its impacts on agriculture and livelihoods in northwestern Bangladesh. It is expected that the recommended adaptation options and strategies will facilitate agricultural and sectoral development in the region.

⁹ <http://blogs.climatenetwork.org/?p=677>

¹⁰ <http://www.thedailystar.net/newDesign/news-details.php?nid=136084>

The Comprehensive Disaster Management Programme (CDMP - <http://www.cdmp.org.bd/>), under the Ministry of Food and Disaster Management, has been working to introduce mobile phone-based early warning and forecasting services for flood and other natural disasters. Warning messages are collected from two government organisations. One is the Flood Forecasting and Warning Centre (FFWC), which is focused on flood warning, and another is the Bangladesh Meteorological Department (BMD), which focuses on cyclone warnings. From these bulletins, warning messages are coded and published through cell phone broadcasting services (CBS).

Improving the workplace through the effective use of ICTs has turned out to be a new trend in the country, and has resulted in increased awareness of green activities. Recently two corporate organisations converted their head office into a green building. One is Grameen Phone – the largest mobile phone operator in Bangladesh – and the other is Mutual Trust Bank, a private bank. Cogeneration, recirculation of the water use, remote working and less paper-based work is now evident given increased awareness of environmental sustainability. Bangladesh Bank, the central bank of the country, has also adopted a green banking policy (<http://www.bangladesh-bank.org/mediaroom/circulars/openpdf.php?urlpdf=brpd/feb272011brpd02e.pdf>). The policy directives require all banking institutes to adopt a green banking policy. This policy also recognises ICTs as one of the enablers of achieving the goal.

On the e-waste front there are some individual interventions where people have tried to extract parts of used PCs to reuse them in re-assembling a product for the local market. One such initiative in the southern district of Bagerhat involves the conversion of a monitor into a television. Some corporate offices have taken the initiative of re-distributing their used PCs to local or rural schools instead of dumping them on the landfills. One of the largest foreign banks in Bangladesh – Standard Chartered Bank – tries to redistribute their used PCs to schools. They have a programme with the NGO D.Net and Computer Jagat, an IT magazine, to redistribute the used computers to schools in remote areas. In Bangladesh mobile phone manufacturer Nokia has tried to promote its green technology campaign in order to collect used mobile phones for its recycling plant. Each of its eighteen customer centres has a designated collection box for collecting old and used mobile phones.

7. Policy and legislative analysis

Bangladesh is vulnerable to climate change mostly 'due to its unique geographic location, hydro-geological characters like the dominance of floodplains, low elevation from the sea and lastly the socio-economical characters like high population density, high levels of poverty, and overwhelming dependence on nature' [Aminuzzaman, 2010]. The country's economy is still dependent on natural resources – around 80% of the total population depends to some extent on the utilisation of natural resources or on processing of products from these resources. The agriculture sector, for example, makes up 25% of total GDP [Nishat, 2007].

The first Water Pollution Control Ordinance was promulgated in 1973 followed by the promulgation of the Environment Pollution Control Ordinance in 1977. The Department of Pollution Control Ordinance, located within the Ministry of Local Affairs, was the first unit to look after environmental policy issues in Bangladesh. It was later re-named and re-structured as the DOE, which is the major policy implementation agency. But the formal responsibilities of overall environment sector are vested with the MoEF.

However, many other institutions, directly and indirectly, are involved in managing or shaping the environment sector. These institutions may include: the Planning Commission, Department of Forest, Department of Environment, Ministry of Agriculture, Ministry of Fisheries and Livestock, Ministry of Water Resources, Ministry of Energy, Ministry of Health and Family Welfare, Ministry of Education, and Ministry of Housing and Public Works. There are two high levels authority on environment. One is 'National Environment Council' (NEC) which is headed by the Prime Minister, and the other is 'Executive Committee of National Environment Council' (ECNEC), which is headed by the Minister for Ministry of Environment and Forest. Both of these provide guidance to the sectoral Ministries/Agencies on matters of national environmental management. At the Divisional level, Divisional Environment Committee, chaired by a Commissioner, with representation from all government are supposed to deal with environmental issues at the local level. However, MoEF bears the responsibility for working with other ministries to ensure that environmental concerns are given due recognition in their development programme [Aminuzzaman, 2010].

There are also other external actors such as bilateral and multi-lateral donor agencies, donor-supported national and international consultants, NGOs dealing with the environment and social activists, all playing an active role in developing policy. A good example is the kind of policy development influenced by these actors is the National Environment Policy, which was supposed to be drafted by MoEF, but in reality was technically supported by an informally organised task force composed of the major actors including donor agency representatives, experts from selected NGOs and some civil society bodies. One expert observed that the "draft of Environment Policy was the by-product of the National Environment Management Action Plan (NEMAP) project in which the role of the ministry was far too limited in the technical

aspects of the preparation of the policy". Another observer therefore noted that "Environment Policy was essentially a brilliant policy document produced by a collation of external actors who not only drafted the policy but also helped the government to get it operational" [Islam, 2007].

Bangladesh has the following list of policies and Acts to cover the areas of environment, climate change and its inter-linkages with ICTs:

- Bangladesh Climate Change Strategy and Action Plan 2008
- Bangladesh National Adaptation Programme of Action 2005
- Bangladesh Environment Policy 1992
- The Bangladesh Environment Conservation Act, 1995
- The Environment Conservation Rules, 1997
- The Environment Court Act, 2000
- National Water Policy 1999
- National Water Management Plan 2001
- Renewable Energy Policy of Bangladesh 2008
- Burning of Bricks (Control) Act, 1989
- Poverty Reduction Strategy Paper (PRSP) 2005
- National Environment Management Action Plan (NEMAP)
- National Land Use Policy 2001
- National Industrial Policy 2005
- National Forest Policy initially formulated in 1979, revised in 1994
- National Agriculture Policy 2010
- National Fisheries Policy 1998
- National Health Policy 2005
- Import Policy of Bangladesh 2006
- National Tourism Policy announced in 1992
- National ICT Policy Bangladesh 2009
- The Fisheries Policy 1998
- Coastal Zone Policy 2005

The most comprehensive national policy on climate change is the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2008. The strategy and the action plan were formulated in the aftermath of COP13 in Bali and the National Adaptation Programme of Action (NAPA). Their main purpose is to articulate a strategy to manage climate change and its impacts in

Bangladesh. The strategy prioritises adaptation and disaster risk reduction, low carbon development, mitigation, technology transfer and the provision of adequate finance.

The Climate Change Action Plan is based on six pillars:

1. Food security, social protection and health: To ensure that the poorest and most vulnerable in society, including women and children, are protected by climate change and that all programmes focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
2. Comprehensive disaster management: To further strengthen the country's already proven disaster management system to deal with increasingly frequent and severe natural calamities.
3. Infrastructure: To ensure the existing assets (e.g. coastal and river embankments) are well maintained and fit-for-purpose and that urgently needed infrastructure (e.g. cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
4. Research and knowledge management: To predict the likely scale and timing of climate change impacts on different sectors of the economy and socio-economic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.
5. Mitigation and low carbon development: To evolve low carbon development options and implement these as the country's economy grows over the coming decades.
6. Capacity building and institutional strengthening: To enhance the capacities of government ministries and agencies, civil society and the private sector to meet the challenge of climate change.

The National Adaptation Programme of Action (NAPA) 2005 was formulated by the Ministry of Forest and Environment following COP-13 in Bali. The types of adaptation projects and interventions proposed in NAPA are as follows:

- Health: Includes expanding control of water and vector-borne diseases beyond current boundaries.
- Water Resources: Rain water harvesting and storage for domestic and irrigation water supplies; Protection of water supply resources.

- Food Security and Agriculture: Improvement of seasonal weather forecasting for crops; increased use of traditional crops to reduce crop-production variability; development of drought and salt tolerant varieties.
- Disaster Preparedness and Risk Management: Community-based adaptation; mangrove restoration; sustainable fisheries.

The **Environment Policy** was enacted in 1992 with an objective to:

- Maintain ecological balance and overall development through protection and improvement of the environment;
- Protect the country against natural disasters;
- Identify and regulate activities which pollute and degrade the environment;
- Ensure environmentally sound development in all sectors;
- Ensure sustainable, long-term and environmentally sound use of all national resources; and,
- Actively remain associated with all international environmental.

It was drawn up with the aim of providing protection and ensuring the sustainable management of the environment. The policy touches on a number of sectors including agriculture, industry, health, energy, water, land, forest, fisheries, marine, transport, housing, population, education and science. The National Environment Policy has introduced a number of salient environment principles like the precautionary approach and **Environmental Impact Assessments (EIA)**. It also assigned the MoEF with the responsibility of co-ordinating the implementation of the policy.

The **Environment Conservation Act (ECA)**, 1995, was introduced to reinforce the Environment Policy 1992 and was later amended in 2000. The act defines what activities should be avoided and the punishments that should be provided by the authorities if the law is broken. Though the Act does not specifically mention climate change, the regulations are provided in order not to create any imbalance in the environment. Some of the features include restrictions regarding vehicles emitting smoke and remedial measures for damaging the ecosystem. The Environment Conservation Rules are an extension of the Environment Conservation Act, and support the Act itself.

To implement the Environment Conservation Act, the government established one or more Environment Courts in each division. Each court is constituted with one judge. In consultation with the Supreme Court it also appoints an officer of the judicial service. Each Environment Court has its office at the Divisional Headquarters; however, if the government wishes it can specify places outside the Divisional Headquarters where the court can set up. If more than

one Environmental Court is established in any Division then the government usually specifies the territorial jurisdiction of each court.

The **National Water Policy** was signed by the Ministry of Water Resources in 1999. It emphasised that water is the central way of life in Bangladesh and the single-most important resource for the well-being of its people. Given that water sources are not infinite, it is the policy of the government that all necessary means and measures are taken to manage the resources of the country in a comprehensive, integrated and equitable manner. The policy is the guide to country's water resource management for all the concerned ministries, agencies, departments and local bodies that are assigned responsibilities for the development, maintenance and delivery of water-related services, as well as private users and developers of water resources.

The **National Water Management Plan (NWMP)** 2001 looks at implementation of critical priorities identified in the National Water Policy. Despite the severity of climate change impact on water resources, NWMP does not mention anything explicitly about this issue. The NWMP however recognises climate change as one of the factors that will determine future demand and supply of water. The summary section on agriculture and water management states that 'in undertaking these works the potential impacts on climate change and sea-level rise will be factored in'.

The **National Fisheries Policy** 1998 has as one of its objectives to maintain the ecological balance and conserve biodiversity.

In the **Renewable Energy Policy** of Bangladesh, 2008, the government outlines the vision to provide energy to the country by 2020 in a phase-by-phase approach. The policy anticipates that renewable energy in the form of traditional biomass could be the main source of primary energy in the country, comprising some 35-60% of total primary energy use. The size and economic potential of the renewable energy resources in Bangladesh (e.g. solar photovoltaic, solar thermal power, wind power, biogas, hydro-electric etc.) are yet to be determined and the capacity of renewable energy development is presently very low. Although investment costs of renewable energy are generally higher compared to fossil fuel alternatives, this option becomes economically viable when all externalities (e.g. environmental cost, health hazards etc.) and lower operating costs are taken into consideration.

The objectives of this policy are to:

- Harness the potential of renewable energy resources and dissemination of renewable energy technologies in rural, peri-urban and urban areas;
- Enable, encourage and facilitate both public and private sector investment in renewable energy projects;
- Develop sustainable energy supplies to substitute indigenous non-renewable energy supplies;

- Scale up contributions of renewable energy to electricity production;
- Scale up contributions of renewable energy both to electricity and to heat energy;
- Promote appropriate, efficient and environment friendly use of renewable energy;
- Train;
- Create an enabling environment and legal support to encourage the use of renewable energy;
- Promote development of local technology in the field of renewable energy;
- Promote clean energy for clean development mechanisms (CDM) and;
- Set policy targets for developing renewable energy resources to meet 5% of the total power demand by 2015 and 10% by 2020.

The **Burning of Bricks (Control) Act**, 1989, was established to make provisions for the control of burning of bricks. It provides a licensing regime where no one can burn bricks without a license under this Act and no person can use firewood for burning bricks.¹¹

The second **Poverty Reduction Strategy Paper (PRSP)** recognised environmental degradation as one of the most crucial factors that causes and perpetuates poverty in Bangladesh. The PRSP also asserted the need for a comprehensive strategic approach to address environmental challenges and issues [Aminuzzaman, 2010].

Bangladesh's **National Environmental Management Action Plan 1995 (NEMAP)** was formulated in consultation with different stakeholders, to prepare an action plan to respond to environmental issues and to promote sustainable development.

The **National Land Use Policy (NLUP)** 2001 does not make direct reference to climate change. NLUP however aims to bring 25% of the land under forest cover and highlights mangrove plantations in char lands and coastal green belts more generally as a priority. It also advocates conservation of existing forest lands, including the Sundarbans.

The goal of the **National Forest Policy (NFoP)** 1994 is to bring 20% of the total land under forest cover. Forest conservation priorities in NFoP and NLUP could help reduce some of the other stresses on ecosystems such as the Sundarbans, thereby increasing their resilience to the impacts of climate change. Further, policies such as the development of coastal green belts would be a good adaptation response to reduce the vulnerability of the coastline to cyclones and storm surges.

The **National Industrial Policy** 2005 has the objective of providing all necessary assistance for producing environment-friendly products with the aim of creating a pollution-free environment in the industrial sector, and assisting in the development of an environment friendly industrial production sector. It also introduces a strategy for arranging incentives for

¹¹ Brick burning is one of the major causes of air pollution in Bangladesh. These bricks are made out of clay and are burnt on open air.

environment-friendly appropriate technology transfer, making environment clearance mandatory and supporting pollution control etc. It also seeks to provide assistance to waste management development in order to ensure proper waste minimisation and waste removal, and the production of pollution-free goods.

The rationale for the **Coastal Zone Policy (CZP) 2005** is contained in the policy itself. The country has a coastline of 710 km along the Bay of Bengal which is prone to natural disasters like cyclones, storm surges and floods. Other hazards such as erosion, high arsenic content in ground water, water logging, and water and soil salinity have adversely affected lives and livelihoods in the coastal zone. The zone, on the other hand, also has a diversity of natural resources, including strong marine resources, forests, salt and minerals. This coastal zone includes Sundarban, the world's largest stretch of mangrove ecosystem, which has been declared a World Heritage Site. It also has the coral ecosystems of St Martin's Island. The goal of integrated coastal zone management is to create conditions in which the reduction of poverty and the development of sustainable livelihoods and the integration of the coastal zone into the developmental mainstream can take place.

The objectives of the **Import Policy of Bangladesh 2006** are amongst others to provide for easy-enough import of technology to help disseminate the latest technology in Bangladesh; to facilitate the import of products to support export-oriented industries; and to make industrial raw materials available for increasing competition and efficiency. The policy also co-ordinates with industrial policy, export policy and other development programmes. Apart from some waste such as aluminum, paper or paper board waste, all other imports of waste materials are banned according to this policy. The policy requires a pre-shipment inspection certificate for imported materials to make sure that there is no toxic or radioactive substance that can contaminate the environment.

In the adopted **National ICT Policy 2009**, the environment, climate and disaster management are identified as one of its 10 objectives. The policy statement aims to 'enhance the creation and adoption of environment-friendly green technologies, ensure safe disposal of toxic wastes, minimise disaster response times and enable effective climate change management programmes through the use of ICTs'. It says that Bangladesh is facing the dual scourge of environmental pollution due to rising industrial and consumer wastes and also global-warming-induced climate-change due to excessive carbon emissions of industrialised countries. Two out of five strategic areas identified under this objective talk about promotion of environmentally friendly green technology (9.1) and safe disposal of toxic wastes resulting from use of ICTs (9.4). In this policy, there are 306 action items.

Under strategic area 9.1, three action items were proposed:

249: Make energy saving and low-power consumption ICT devices for all government procurement mandatory based on pre-determined, internationally accepted consumption benchmarks.

250: Set and enforce regulatory standards to control dumping of ICT devices to prevent e-waste. Establish safe disposal and recycling mechanisms and recycling organisations.

251: Reduce the use of paper in offices by increasing electronic communication, file processing, information sharing and archiving.

Under strategic area 9.4, one action item has been proposed:

263: Support the installation of plants to re-cycle the metal products extracted from old PCs and other electronic equipment.

8. Findings and analysis

The research has established the following findings and observations around the issues of ICTs and environmentally sustainable development.

1. The private sector in Bangladesh has a tendency to consider environment protection as a corporate social responsibility but not as a mode of doing business. This takes environment more as a charitable concern rather than part of sustainable development. Dr. Ainun Nishat, Country Representative of IUCN (the World Conservation Union), suggests in a presentation that there is a general sense amongst private sector bodies in Bangladesh that businesses would lose their competitive edge if environmental concerns are integrated into everyday practice. Many businesses see concerns for the environment as efforts to control development (Nishat, 2009). Even the Industrial Policy 2010 in Bangladesh considered environmental protection as corporate social responsibility. In a recent study conducted by Planning Commission and UN Development Programme, Bangladesh shows that only 11% of private firms that are interviewed on corporate social responsibility practice waste management, focusing mostly on recycling and energy saving. Other external corporate social responsibility activities include: raising awareness on global warming and the carbon footprints of daily activities; helping farmers along the coastal belt to shift into alternative income-generation activities; and supporting social forestry [Planning Commission & UNDP, 2009]. A study conducted among 82 companies listed on the Dhaka Stock Exchange shows that very few companies in Bangladesh make an effort at providing environmental information on a voluntary basis that is qualitative in nature (Hossain, 2000). The Environment Protection ACT 1995, amongst other laws, does not make it mandatory for private companies to disclose environmental information in their Corporate Annual Reports.
2. Few companies in Bangladesh have taken the initiative regarding their e-waste. As per different corporate policies, businesses are supposed to replace their existing computer setup every few years. Some of them literally dump the old computers in junkyards. Some have tried to distribute them to

different organisations. At the corporate level, it is believed that only Standard Chartered Bank has tried to redistribute their used PCs to schools.

3. Mobile phone manufacturer Nokia tried to promote its green technology campaign in order to collect used mobile phones for its recycling plant. Each of its eighteen customer centres has a designated collection box for collecting old and used mobile phones. However, the response has not been significant for two reasons: there is a lack of awareness and unfamiliarity with the concept of recycling; and people are interested in getting paid for their old technology. Even a journalist we interviewed asked, "What will I get by handing my old set in?"
4. Policies in Bangladesh are developed from a sectoral perspective. This causes problems for environment policy development, which is likely to be a cross-sectoral issue. For example, the Environment Policy of Bangladesh, 1992, covered almost 15 sectors including agriculture, industry, energy, health, and land etc. The government of Bangladesh formulated the National Adaptation Programme of Action (NAPA) in 2009 and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2010 to address climate change issues and their impacts on society, the economy and ecosystems. The second part of BCCSAP elaborates a set of programmes based on six key pillars including food security and social protection, comprehensive disaster management, protection of resources and infrastructure, mitigation and a low carbon economy, research and knowledge management, capacity building and institutional integration [Mallick, Rahman 2010]. This also means policies on areas such as food security, agriculture, disaster management, ICTs etc. need to accommodate or synchronise these recommendations or else there would be conflicts or 'broken' policy connections.
5. One study [Aminuzzaman, 2010] has highlighted some examples of inconsistencies around policies related to the environment. For example, environment policy encourages the use of natural fertilizer and insecticides and recognises that chemical fertilizers and pesticides used for increased crop production may lead to 'environment pollution'. But it does not explain how high-yielding variety seeds would not involve the use of chemical fertilizers and pesticides. It also talks about crop diversification but provides specific emphasis only on crops such as rice, wheat and maize. Its failure to address other non-traditional crops did not make it bio-diversity friendly.
6. Similarly the Fishery Policy also has failed to properly address the issue of small and indigenous fish species, which are gradually disappearing. Industry policy, for example, did not spell out how the constant release of untreated effluents from the industries into the water body is causing harm to the environment; neither has it provided any explicit guidelines for impact assessment. Export policy in some cases looks like it conflicts with environment policy. For example, environment policy talks about the need for encouraging land use systems compatible with various eco-systems including the measures to 'prevent spread of salinity and alkalinity on the land'. On the

- contrary, the Export Policy 1993-1995 emphasizes the rapid expansion of traditional/semi-intensive cultivation of shrimp to increase export.
7. Different 'Structural Adjustment Policies' (SAP) adopted by the government have also had an adverse environmental impact. As major shifts occur in production and cropping patterns in response to the adjustment policies, resource degradation has been manifesting itself as a by-product of this particular pattern of growth. For example, the 'Shrimp Culture Project' funded by World Bank in the late 80s stated that project would not have any detrimental effect on the environment. But the coastal shrimp farming areas in the south have suffered environmental degradation; increased salinity of soil, canals and the ponds within the polders; reduction in grazing land and a consequent reduction of livestock; destruction of mangrove forests; adverse affects on the potential crop-mix, cropping intensity, crop calendar and the overall cropping pattern in the areas concerned; and a reduction in soil quality [UNEP, CPD, 2000].
 8. Contradictory policy is encountered in the field of ICTs. For example, the import policy of Bangladesh 2003 allows for the importing of old computers and accessories under the supervision of the Bangladesh Computer Council and according to pre-shipment inspection rules. The subsequent rules under the Environment Conservation Act, the Environment Conservation Rules of 1997, divide industries and projects into different categories depending upon the pollution load and likely impact on the environment. There are some provisions and mandatory rules to build a waste management system within the industry sectors. However, e-waste does not require any compliance under the Act or Rules.
 9. The government is only now preparing a solid waste management policy which may cover e-waste. Meanwhile, the Medical Waste Management Rules, 2008, address waste management issues for the medical sector, including e-waste. Moreover, Bangladesh has been a signatory to the Basel Convention prohibiting transboundary movement of hazardous waste. [GISW, 2010].
 10. Bangladesh lacks a strong implementation mechanism for its environment-related policies. According to one analyst: 'In Bangladesh, policy and legal instruments for the management of environment and natural resources focus... on issues related to sustainable development and are more or less commensurate with global approaches; however these instruments have not been effectively internalised, as the institutional framework has not evolved appropriately due to a lack of commitment of policy makers and politicians.' [Nishat, 2010]. The Bangladesh NAPA followed the UN guidelines, while BCCSAP upheld the four building blocks of the UNFCCC Bali Action: adaptation, mitigation, technology generation, and capacity building. BCCSAP has six priorities that include: (1) food security, social protection and health; (2) comprehensive disaster management; (3) infrastructure development; (4) research and knowledge management; (5) mitigation and low-carbon development; and (6) capacity building and institutional strengthening.

11. A recent news media report suggests that no person has been jailed in Bangladesh for polluting rivers, canals or wetlands in the capital in the last decade since the Wetland and Open Space Conservation Act, 2000, came into effect. The government in 2000 formulated the Wetland and Open Space Conservation Act with the aim of conserving the environment in the capital as well as in other urban areas. But in some cases the government agencies themselves violated the laws and polluted rivers and other water bodies [The Daily Start, 2011].
12. The Environment Conservation Amendment Act (ECA) has established the Department of Environment (DoE) and has authorized its Director General (DG) to take all such steps as are necessary for the conservation of environment, improvement of environmental standard and control and mitigation of pollution¹². Section 2(1) of the Act defines 'wastes' and authorizes the Government to determine the standard for discharge and emission of waste including radioactive wastes [Section 20(2)(e)]. Hazardous substance has also been defined [Section 2(i)]. The government has been authorized to lay down rules for the environmentally sound management of hazardous substances and toxic wastes but it is yet to exercise that power. Various operational rules for the effective implementation of the Act would require complementary and detailed operational rules, many of which have not yet been formulated. Furthermore, floods and cyclones are major concerns for environmental management in Bangladesh but the Environmental Protection Act still has limited concern with such disasters, and proposes few interventions.
13. Coordination between the DoE, MOEF and line ministries is weak. Under the national Fisheries Policy, the Ministry of Fisheries and Livestock (MoFL) is expected to "control all aspects of the fisheries sector". However, no reference was made to the required linkage with the numerous agencies and ministries who manage different aspects of fisheries. Though the policy states that coordination will be established, the mechanism for that has not been spelled out [Aminuzzaman 2010].
14. Often it is not too clear whose jurisdiction 'ICTs for environment' is. Both the Ministry of ICTs and MoE have a stake in this. In the adopted National ICT Policy, 2009, environment, climate and disaster management are identified as one of the 10 objectives. Two out of five strategic areas identified under this objective talk about the promotion of environmentally friendly green technology (9.1) and safe disposal of toxic wastes resulting from use of ICTs (9.4). The Bangladesh Climate Change Strategy and Action Plan (BCCSAP), on the other hand, talks about research and knowledge management that encompasses various issues of ICTs. For example, it talks about establishing a web portal that would track all national or country policies, rules and regulations, and news related to climate change. The comprehensive disaster management strategy talked about early warning system development using

¹² Section 4(1) of the Environment Conservation (Amendment) Act, 2002 (Act No. IX of 2002)

- digital elevation models (DEM) and information dissemination across the community. One of the areas where the National Environment Policy has a focus includes science, technology and research. This emphasises the inclusion of environment pollution control and environment management in the jurisdiction of science and technology policy and calls for the long-term research on the environmentally friendly management of natural resources.
15. Two things are very important for Bangladesh regarding e-waste: lack of awareness among the citizens and policy-makers, and a resulting lack of a proper policy framework exclusively related to e-waste. No social movement or civil society activities are visible. PCs have been a familiar part of society from the early 1980s, and so a good number of PCs have already been discarded in the country. It was also found that due to the absence of e-waste policy and management strategy, most of them were discarded in an environmentally unsound way. In general, there is a tendency in the country to reuse electronic gadgets. A good number of repairing and maintenance shops for electronic devices are now available in the country. People try to use mobile phones and computers to their maximum life span. But once the use is over, people have a tendency not to care about the disposal of these devices and discard them randomly in the general waste stream.
 16. There is no comprehensive e-waste policy, although it is briefly mentioned as an action item in the country's ICT policy. The subsequent rules under the ECA, the Environment Conservation Rules of 1997, divided industries and projects into different categories depending upon the pollution load and likely impact on the environment. There are some provisions and mandatory rules to build a waste management system within the industry sectors. However, e-waste does not require any compliance under the Act or Rules.
 17. The government is now preparing a solid waste management policy which may cover e-waste. The existing import policy allows importation of old computers higher than Pentium III, but importation of old computer parts is not allowed.
 18. E-waste, nevertheless, does from time to time get discussed in the media, and some research has been conducted to try to determine its impact. One study conducted by D.Net (Ahmed, 2010) aimed at quantifying e-waste and assessing the awareness level of residents regarding e-waste in Dhaka city. The findings of the study revealed that a huge quantity of e-waste is generated each year in Dhaka in the form of PCs and mobile phones. The majority of the respondents supported the need for developing a hazard-free e-waste management system in the country. There is a similar study by Brainstorm Researchers that is an overview of awareness and practices regarding the disposal and recycling of mobile phone batteries in the country. However, there are few activities at the grassroots level.

9. Advocacy opportunities

The observations of the report suggest that the following advocacy opportunities with regard to ICTs and environment sustainability exist in Bangladesh:

There is a need to organise research and an advocacy campaign on the e-waste issue. This would include educating the media and organising civil society around the issue. With the increased penetration of ICT devices, including mobile phones, the issue of the proper management of discarded technology has become even more important. Different chemical elements within mobile phones and computers are very harmful, both for the environment and for human health.

A solid waste management policy is underway in the country. However, no e-waste policy is in sight.

Bangladesh needs a comprehensive e-waste policy. The policy advocacy plans should include a facts-based campaign targeting policy-makers, and efforts to sensitise lawmakers.

Based on the research findings, civil society should organise an advocacy drive to launch pilot recycling initiatives. This will go some way towards establishing environmentally and socially friendly e-waste recycling processes in the country.

There is also a need to develop a knowledge bank on all best practices related to ICT usage for environment sustainability, particularly on how ICTs can be used to minimise environmental degradation. ICTs should be seen as part of the solution too.

Climate change in Bangladesh is likely to affect many sectors including water resources, agriculture and food security, ecosystems and biodiversity, and human health and coastal zones. Some of the Millennium Development Goals (MDGs) goals may face a reverse impact due to global warming and climate change. Particularly agriculture and food security issues have direct linkage to the MDG goal of halving the poor people population. Because of this it is important both for the government and for the civil society to establish accurate data/information on climate change. For example, it is important to understand how sea level rise is affecting food security in coastal areas. Critically there is a need for civil society organisations to build capacity to develop ICT-based models to create a knowledge bank on climate change-related impact and issues. This should precede advocacy initiatives in order for these initiatives to be clear and meaningful.

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