

THE ROLE OF ICT IN ASSURING ENVIRONMENTAL SUSTAINABILITY

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Information and Communication Technologies (ICT) affect the environment both positively and negatively at various levels. At the most direct level, production, use and disposal of IT equipment is becoming a serious environmental concern. While by many measures the impacts of automobiles are much larger than those of computers, the short lifespan, chemically intensive production processes and content of toxic materials in a computer imply it has a significant environmental impact. There is much that is being done to deal with these issues, such as recently passed EU legislation mandating takeback and recycling systems for electronic goods. Much remains murky, however, about the scope and nature of the problems involved and what should be the appropriate response. There is thus much useful work to be done to realize environmentally friendly computers.

At the same time there is already ample evidence that a focused, micro-level application of ICT can contribute to individual development goals, including health, education, economic opportunity and protection of the environment. Digital lifestyles such as telecommuting to and from work or replacing phone books with websites can be good for the environment. Government and firm policies can act to encourage people to telecommute and thus use their cars less. To a certain extent these things are happening already, driven by cost and convenience, aside from any environmental benefits (or impacts) they have.

ICT, particularly, can make a valuable contribution to sustainable environmental management by improving monitoring and response systems, facilitating environmental activism and enabling more efficient resource use.

Scarcity of relevant and reliable information has always been a substantial obstacle to more effective environmental management. Used to collect, process and disseminate information, ICT enables a better understanding of issues such as climate change and biodiversity and helps to monitor ecological conditions so that prevention and mitigation measures can be activated. SIDSNet, for example, provides a medium for sharing information and good practices among the forty-three Small Island Developing States (SIDS) on common issues such as biodiversity, climate change, coastal and marine management and energy sources. In Nepal, computer imaging has been used to build a land resource database for the Arun River basin. This has generated the first ever basin-wide map of land use indicating forest degradation hotspots. The database, together with simulation models, was crucial to designing and implementing the land management program for the area.

ICT is also being deployed extensively to monitor and respond to environmental disasters in developing countries. This is demonstrated in Mexico, where fire emergency services are using satellite images to direct response teams to critical areas—resulting in significant reductions in casualties and property loss.

The power of ICT as an information and networking medium can also enable citizens to act as environmental enforcement agents, alerting decision makers to compliance infringements and leveraging the power of ICT to reach and influence public opinion. In Indonesia, officials discouraged by weak enforcement of water pollution standards created a public access database for rating the degree of factory compliance. Citizen groups have used the ratings to pressure under-performing factories. Within the first 15 months of activism, one-third of non-complying factories had met regulations.

ICT applications can be used to reduce the consumption of energy, water and other essential natural resources through more efficient agriculture and industrial procedures. For example, precision agriculture techniques using GIS and GPS systems can facilitate weather and soil monitoring, crop forecasting and the ability to optimize farm return on investment ensuring, more efficient use of scarce resources.

Global Forest Watch (GFW) is one of the examples of ICT applications for environment improvement. Global Forest Watch is an international network of more than 90 local forest groups linked by the Internet. It aims to slow forest degradation around the world as well as infuse transparency and accountability into the industry. The initiative was started by the World Resources Institute in 1997 to give the general public a clearer picture of the threats to the world's forests. GFW uses a combination of satellite imagery, Geographic Information Systems (GIS), mapping software, the Internet and on-the-ground observation to record forest coverage and condition, including where and how forest product companies are cutting. GFW compares the activity to forest leases to identify illegal cutting. These maps are posted on the Internet, naming specific companies that fail to comply with environmental policies and agreements.

In the future, ICT may also play an important role in the fight against pollution—not only by providing more useful metrics and information, but also by enabling population decentralization and large-scale telecommuting. The key task is to identify the important aspects that we can affect through social response, and then act to maximize the positive applications of ICT while minimizing the negative ones.