Research Paper

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ICT for Sustainability of Environment

Computer Science

KEYWORDS :

Ms. Nidita Karkare — Teaching Assistant , Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Prof. Anjali Pahad — Professor, Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

ICTs stand for information and communication technologies and are defined, for the purposes, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." **ICT** has made global social and cultural interaction very easy. We now live in an interdependent global society, where people can interact and communicate swiftly and efficiently. Usually, ICT is employed for three major actions: (1) to record data and information, (2) to transform the data and information into knowledge which can be shared and, eventually (3) Broadcast and communicate the data, information and knowledge. The issue of Information and Communication Technologies (ICT) and Environment is a complex and multifaceted one. ICT can play both positive and negative roles in environmental sustainability. It is possible to apply the three main functions of ICTs to the development of an adaptation strategy in a specific community. First, data collection is important to constantly monitor the status of the Environment. Second, it is essential to have tools for processing data and information that can guide the stakeholders in the analysis, planning and implementation of possible adaptation strategies. Finally, communication tools are needed to manage the adaptation process and build on the knowledge which is generated in order to strengthen capacities and relationships among the stakeholders within and outside the given system. From this perspective, the large-scale economic and social choices made by individuals, organizations and communities about how to use ICTs to change their structures and behaviours will play a potentially significant role in determining whether there is a successful global response to the challenge of achieving sustainable development.

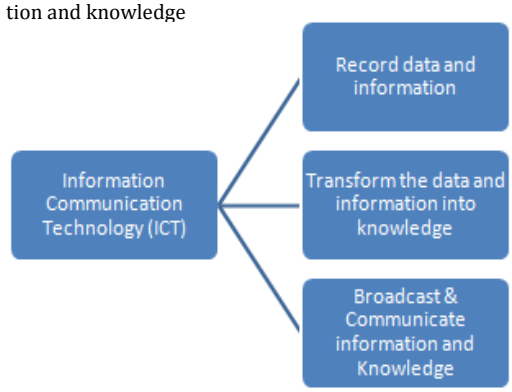
ICTs stand for information and communication technologies and are defined, for the purposes, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broad casting technologies (radio and television), and telephony.

ICT refers to the devices used to communicate between computers. Information communication technology **(ICT)** has greatly impacted and enhanced global socialization and interactions. In fact information technology has taken over nearly every aspect of our daily lives from commerce (buying and selling) to leisure and even culture. Today, mobile phones, desktop computers, hand held devices, emails and the use of Internet has become a central part of our culture and society. These technologies play a vital role in our day to day operations.

ICT has made global social and cultural interaction very easy. We now live in an interdependent global society, where people can interact and communicate swiftly and efficiently. News and information can now be transmitted in minutes. Individuals can easily stay in contact with members of their families who reside in other countries or make new friends across the world.

Examples of information and communication technology **(ICT)** tools used for these purposes are emails, instant messaging (IM), Chat rooms and social networking websites, such as Facebook and Twitter, Skype, iPhones, cellular phones and similar applications.

Within the ICT domain, what is typically stressed by the users" communities is the great potential of ICT tools regardless of their ultimate goals. Usually, ICT is employed for three major actions: (1) to record data and information, (2) to transform the data and information into knowledge which can be shared and, eventually (3) Broadcast and communicate the data, information and knowledge



Functions of ICT

The issue of Information and Communication Technologies (ICT) and Environment is a complex and multifaceted one. ICT can play both positive and negative roles in environmental sustainability. This feature aims to show that the positive impact of ICT on the environment is immeasurably high and so, outweighs its potentially negative impact. Technological advances require systems that can make optimum use of informatics and telecommunications infrastructures to address environmental management needs. Yet these can be open, flexible, modular and inexpensive to implement and operate.

It is becoming increasingly clear that we are unlikely to avoid major environmental challenges resulting from unsustainable practices to date. The most prominent example, climate change, is already noticeably triggering changes in agriculture, the incidence of forest fires, flood and drought patterns, the movement of invasive species, and biodiversity, just to name a few.

In a larger perspective, however, ICTs and the environment have a much deeper connection. "Environment relates to the profound relationship between matter, nature, and society, and in such a context ICTs bring new ways of living in a more interconnected society, all of which reduces our dependency on matter and affects our relationships with nature" (Hargroves K. C. and Smith H., (2005). Today the impact of ICT on the Environment is one of the broadest issues. It relates to one of the Millennium Development Goals (MDG), as ICT in national and international efforts assures environmental sustainability.

"ICT in the environment sector is often used to:

- Communicate traditional forms of environmental knowledge to communities and to facilitate the citizen monitoring of environmental issues
- Make a valuable contribution to sustainable environmental management by improving monitoring and response systems, facilitating environmental activism and enabling more efficient resource use
- Reduce the consumption of energy, water and other essen-

tial natural resources through more efficient agriculture and industrial procedures
- 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
- Provide an ideal platform for local voices to be heard, overcoming physical and social barriers, and for allowing special-interest groups and virtual communities to be formed" (http://www.opt-init.org/framework/pages/2.2.5.html)

ICTs are a powerful tool for civil society in protecting environment. But more is needed to streamline ICT work of different groups and communities.

The application steps of ICT for Environment Sustainability. It is possible to apply the three main functions of ICTs to the development of an adaptation strategy in a specific community. First, data collection is important to constantly monitor the status of the Environment. Second, it is essential to have tools for processing data and information that can guide the stakeholders in the analysis, planning and implementation of possible adaptation strategies. Finally, communication tools are needed to manage the adaptation process and build on the knowledge which is generated in order to strengthen capacities and relationships among the stakeholders within and outside the given system. Figure 2 provides a visual representation of the application domain of ICT within the Environment sustainability.

In the main steps of every adaptation process a range of ICT tools can be employed according to the specific local conditions. Particularly, the ICTs can contribute in the following seven actions:

1. Observation. This phase is crucial to understand how environment sustainability is occurring in a specific (regional/national/local) area. Observations can be carried out through data collection tools, such as remote sensing techniques and sensor based networks. Data can then be stored in digital repositories and shared among the institutions committed to develop an appropriate adaptation strategy. Online surveys, online discussion forums, blogs can also provide information.

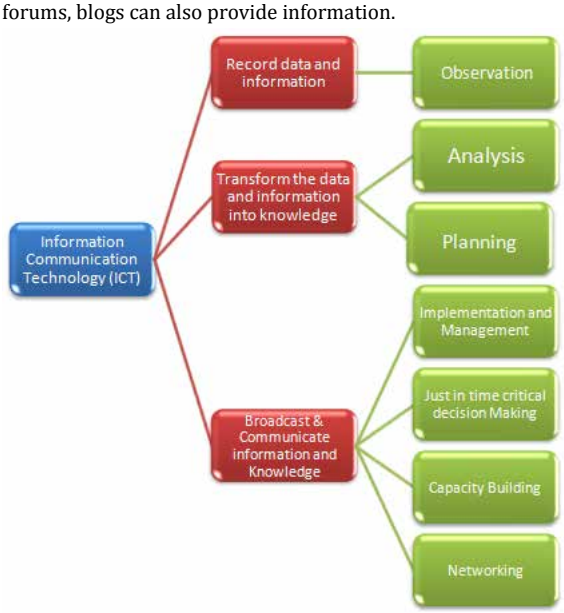


Figure 2 The Role of ICT within the Environment Sustainability

Facilitate data collection at local level with tracking tools, handheld devices, etc.

Integrate indigenous and scientific knowledge through knowledge bases, databases, Geographic information system etc.

2. Analysis and planning. Data can be analyzed by scientists and policy makers in order to plan and design information communication strategies. ICT supports the analysis of environment scenarios through software based modeling systems, like the graphs different available software for given information facilitate the development of adaptation plans capable to carry out a what if analysis for different sectors on a multi stakeholder basis.

Facilitate of participatory problem analysis and adaptation planning through the participatory application of downscaling tools, modeling software and decision support systems among others.

Facilitate the translation of uncertainty into practical policies through support systems, collaborative project management tools, monitoring systems etc.

3. Implementation and management. The nature of adaptation interventions arise depending on a wide range of elements, such as the set of stakeholders, the sector and the scale of application. As a result, ICT supports the implementation and management of adaptation strategies with a wide variety of tools: among them being forecasting tools, early warning system and resource management systems play a prominent role in this phase.

Ensure information flows among concerned groups through information systems and networking tools.

4. "Just in Time" Critical Decision Making. ICTs can help to get the right information to the right people at the right time to enable them to respond properly to risks. This step is particularly important in those initiatives targeting the existing environment vulnerabilities, whether they are related to natural disasters or climate change which affect people"s livelihood.

Channel information at the right time through appropriate media through community based early warning systems, mobile phones, radios, etc.

5. Capacity building. In this phase ICT can be employed for raising awareness and advocacy (particularly through the use of the Internet), as well as for providing temporary on and off-line training for facing environmental challenges.

Empower local people to manage their adaptation efforts, providing them with guidelines, media, e-learning modules etc.

6. Networking. ICTs play a key role in producing, storing, retrieving and comparing information related to environment issues. The increasing diffusion of ICT applications, from interactive Web portals, text messages (SMS), community radio, mobile phone-based monitoring systems, community mapping or social media tools such as Twitter and Facebook, among others, is offering new mechanisms for **empowerment, engagement** and **multi-stakeholder participation** in the processes of change and transformation that surround us.

Promote local information networks through web portals, virtual consultations and other traditional and web tolls that are useful to discuss and define agendas for adaptation, disseminate best practices, monitor initiatives and so on.

7. Monitoring and evaluation. The final stage of any adaptation process embeds monitoring and evaluation activities. Rather than being the last activity in chronological terms, it must be highlighted that the performance of any initiative must be constantly verified in order to reach the goal previously defined in the planning step. ICT tools provide an effective way to analyse, store and communicate the impact of an adaptation strategy.

Link rural knowledge and information systems through intermediate agents and adequate information management tools that can promote data integration across different areas.

ICT-enabled systemic effects could dramatically impact economic and social parameters such as the attitudes, expectations and behaviour of individuals as consumers, citizens and members of communities; the demand and supply of goods and services; organizational structures; production, distribution and service processes; and governance in the private and public sectors. From this perspective, the large-scale economic and social choices made by individuals, organizations and communities about how to use ICTs to change their structures and behaviours will play a potentially significant role in determining whether there is a successful global response to the challenge of achieving sustainable development.

REFERENCE

• http://www.iisd.org/infosoc/icts/ | • http://www.oecd.org/sti/43539507.pdf | • http://www.niccd.org/ICTs_and_Climate_Change_in_Rural_Agric_Communities_Strategy_Brief.pdf | • World Commission on Environment and Development (1987) Our Common Future, Oxford University Press, Oxford, p. 43. | • The Climate Group (2008) SMART 2020: Enabling the Low Carbon Economy in the Information Age. www.smart2020.org/_assets/files/02_Smart2020Report.pdf | • Vetter, T. (2009) Resource Wars and Information and Communication Technologies, paper by the International Institute for Sustainable Development. www.iisd.org/pdf/2008/com_resource_wars.pdf | • Robinson, B. H. (2009) E-waste: An Assessment of Global Production and Environmental Impacts, Science of the Total Environment 408 (2), p. 183-191. | • United Nations Environment Programme (2010) Recycling – from E-waste to Resources. www.unep.org/PDF/PressReleases/E-Waste_publication_screen_FINAL-VERSION-sml.pdf | • OECD (2009) The Impact of the Crisis on ICTs and their Role in the Recovery. www.oecd.org/dataoecd/33/20/43404360.pdf. |