# ICT for Disaster Risk Reduction

**Information and Communication Technologies for Environmental Sustainability (ICT Ensure)** is a general term referring to the application of Information and Communication Technologies (ICTs) within the field of environmental sustainability. Information and Communication Technologies (ICTs) are acting as integrating and enabling technologies for the economy and they have a profound impact on our society. Recent changes in ICT affect as well the environmental sustainability regarding the Millennium Development Goal (MDG) set up to ensure environmental sustainability in this century. With the usage of new technologies the global community, can be supported in their collaboration to preserve the environment in the long term. New technologies provide utilities for Knowledge acquisition and awareness, early evaluation of new knowledge, reaching agreements and communication of progress in the interest of the human welfare. This includes ethical aspects of protecting human life as well as aspects of consumer safety and the preservation of our natural environment.
[Excerpted from http://en.wikipedia.org/wiki/Information_and_communication_technologies_for_environmental_sustainability]

## The Millennium Development Goals


Goal 1: Eradicate extreme poverty and hunger


Goal 2: Achieve universal primary education


Goal 3: Promote gender equality and empower women


Goal 4: Reduce child mortality


Goal 5: Improve maternal health


Goal 6: Combat HIV/AIDS, malaria and other diseases


Goal 7: Ensure environmental sustainability


Goal 8: Develop a Global Partnership for Development

Source: http://www.undp.org/mdg/goal7.shtml

## Application areas

More and more application areas are becoming relevant to sustainable development in industry, health care, agriculture and the information society. And they have an impact on the perspectives of ICT, the environment, policy and science. More and more interest has been emerged as well to risk and disaster management, adaptation to climate change and resource use.

- ICT in Energy Consumption/Efficiency
- ICT in Climate Change
- ICT and Sustainable Use of Natural Resources
- ICT for Biodiversity
- Eco-industrial Applications and ICT for Industrial Ecology
- ICT in Agriculture
- ICT for Landscape Ecology
- Personal Information Systems and Quality of Life
- ICT for Sustainable Urban Development
- ICT in Health Care
- ICT for Environmental Risk Management

## Natural Disaster

[Excerpted from http://en.wikipedia.org/wiki/Natural_disaster]

A natural disaster is the effect of a natural hazard (e.g., flood, tornado, hurricane, volcanic eruption, earthquake, or landslide). It leads to financial, environmental or human losses. The resulting loss depends on the vulnerability of the affected population to resist the hazard, also called their resilience. This understanding is concentrated in the formulation: "disasters occur when hazards meet vulnerability." A natural hazard will hence never result in a natural disaster in areas without vulnerability, e.g. strong earthquakes in uninhabited areas. The term natural has consequently been disputed because the events simply are not hazards or disasters without human involvement. A concrete example of the division between a natural hazard and a natural disaster is that the 1906 San Francisco earthquake was a disaster, whereas earthquakes are a hazard.



"Since the 1990s, natural disasters have killed on average some 60,000 people a year and have also undermined decades of investment in infrastructure and social development. Developing countries' losses due to natural disasters are estimated to be 20 times greater (as a percentage of GDP) than those of industrialized nations. For example, during the 1990s the cumulative loss of economic assets due to natural disasters is

*Compiled by :*
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estimated at about 16% for Nicaragua (World Bank, 2008). This loss included network infrastructure (e.g. bridges, power transmission lines, pipelines, etc.) and most visibly, urban infrastructure. Climate change is expected to increase this vulnerability. Developing countries are at highest risk from climate change because they lack the financial and material resources, including technological and institutional capacity, to prepare and to respond. In this context, it is important to support leading international initiatives such as the International Strategy for Disaster Reduction (UN/ISDR), aimed at building disaster-resilient communities through more integrated sustainable development. The ISRD has recognized the important role that can be played by information and communication technologies (ICTs) in fostering disaster resilience."

*infoDev, "Disaster Risk Reduction in the Information Age", June 2009*

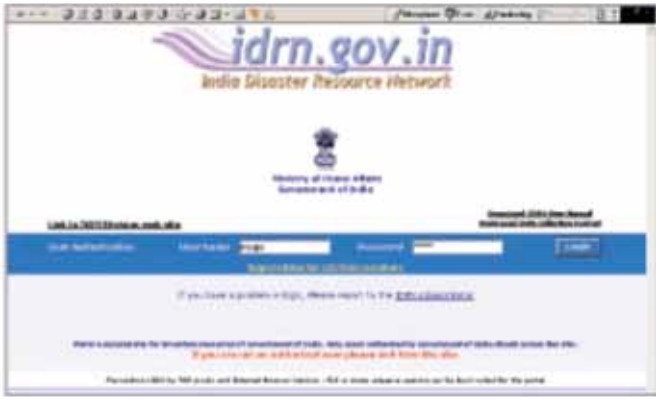
## ICT for Disaster Risk Reduction – The Indian Experience

[Based on report by the Government of India, Ministry of Home Affairs, National Disaster Management Division]

The unique geo-climatic conditions have made India highly vulnerable to natural disasters. In India, 54% of landmass is prone to earthquakes, 40 million hectares of landmass is prone to floods, 8000 km of coastline is prone to cyclones and almost 68% of total geographical area is vulnerable to droughts. The recent occurrence of massive Tsunami on 26.12.2004 has worsened the situation. Though complete prevention of natural disasters is beyond human capabilities, the adverse impact of any disaster on human lives and their livelihoods can be minimized by taking adequate early warning, preparedness and mitigation measures. The state-of-art Information and Communication Technology (ICT) systems play a crucial role for implementing such preventive measures.

## The IDRN (India Disaster Resource Network)

The IDRN (**India Disaster Resource Network – www.idrn.gov.in**) is a nation-wide electronic inventory of essential and specialist resources for disaster response, covering specialist equipment, specialist manpower resources and critical supplies. IDRN has been initiated by Ministry of Home Affairs (MHA) in collaboration with United Nations Development Program (UNDP) to systematically build the disaster resource inventory as an organized information system for collection and transmission of information about specific equipments, human expertise and critical supplies database from District level to State level to provide availability of resources for disaster response, so that disaster managers can mobilize the required resources within least response time.




*The Home Page of IDRN*

The IDRN lists out the equipment and the resources by type and by the functions it performs and it gives the contact address and telephone numbers of the controlling officers in-charge of the said resources so that the equipment can be promptly mobilized. The IDRN is a live system providing for updating of inventory every quarter. Entries into the inventory are made at two levels – District and State level.

This online information system can be accessed by authorized Government officials, District level nodal persons, corporate bodies and public sector units. District nodal authority will be responsible for collecting, compiling and updating their inventory data to the central server with the help of concerned District departments. Adequate authorization and security has been in-built and is being maintained in the portal to prevent unauthorized access to this inventory. The user may avail the facilities like analyzing or querying the information resource inventory through given user friendly

interfaces to get a list of resources available in the District and State level.

## Target Audience

The users and partners of IDRN initiative are: 602 District administrations of 35 States and UTs, all 35 State/ UT administration of India, around 5000 member corporate bodies with Confederation of Indian Industry (CII), around 33,000 builders, contractors and construction companies with Builders' Association of India (BAI), the entire Indian Railways and numerous public sector undertakings in the country.

## How it works?

The India Disaster Resource Network is a web-based application with controlled access to the database. 226 items mainly consisting of equipments, human resources and critical supplies are categorized in the system. The data related to these items are collected from the line departments and various organizations at the District level. The data is entered in to the portal at the District level.

## GIS in Disaster Management

During any emergency situation, the role of a reliable Decision Support System is very crucial for effective response and recovery. Geographic Information System (GIS) provide most versatile platform for Decision Support by furnishing multilayer geo-referenced information which includes hazard zoning, incident mapping, natural resources and critical infrastructure at risk, available resources for response, real time satellite imagery etc. GIS-based information tools allow disaster managers to quickly assess the impact of the disaster/ emergency on geographic platform and plan adequate resource mobilization in most efficient way.

## National Emergency Communication Plan

In emergency response and management, it is extremely important to have the communication links operational between decision makers at various levels and operational response teams/personnel on the site. Unfortunately at the time of emergency situations such as natural or man-made disasters, the first casualty is the regular telecommunications infrastructure of public wired and wireless (GSM/CDMA) telephones. Considering the crucial role of MHA during such emergencies, it is essential to set-up reliable information and communication network employing both terrestrial and satellite-based communication technologies with redundancies to establish a network for emergency communications.