DISASTER CLINIC

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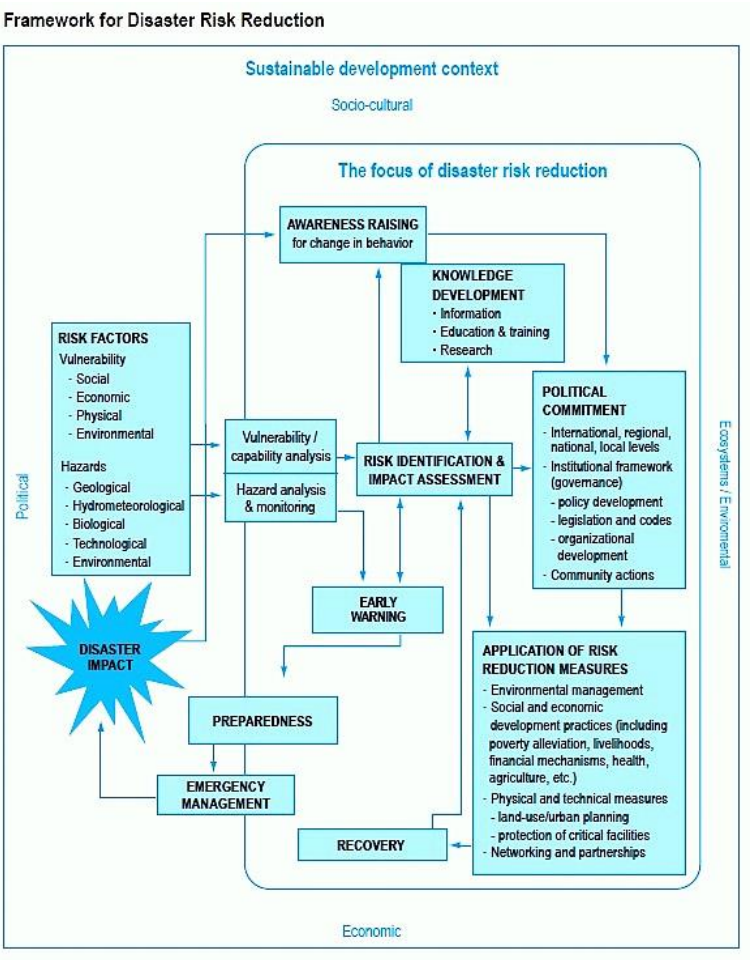
Disaster Risk Reduction and Climate Change

Disaster Risk Reduction

There has been a major conceptual shift in managing disasters. Disasters are no longer perceived as interruptions to development or poverty reduction goals that require reactive services to save life, reduce distresses of the affected people and restore *development gains*. The current models of disaster management focus on "collective efforts to reduce the number and effects of natural and man-made disasters".[1] It underpins the notion that "disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities and that sustainable development, poverty reduction, good governance and disaster risk reduction are mutually supportive objectives".



The International Strategy for Disaster Reduction (ISDR), launched in 2000 by

[1] Road map towards the implementation of the United Nations Millennium Declaration: Report of the Secretary-General (New York, 2001) http://www.un.org/documents/ga/docs/56/a56326.pdf

the Economic and Social Council and the General Assembly as an inter-agency framework and mechanism (inter-agency task force on disaster reduction and an inter-agency secretariat) to serve as a focal point within the United Nations system, defines *Disaster Risk Management* as

> "The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards".

ISDR also defines *Disaster Risk Reduction* as

> "The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.
>
> "*The disaster risk reduction framework is composed of the following fields of action, as described in ISDR's publication 2002 "Living with Risk: a global review of disaster reduction initiatives", page 23:*
>
> - *Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis;*
> - *Knowledge development including education, training, research and information;*
> - *Public commitment and institutional frameworks, including organisational, policy, legislation and community action;*
> - *Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments;*
> - *Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities.*

The key elements of disaster risk reduction are

a) Mainstreaming disaster risk reduction – that the risk reduction is an integral part of sustainable development, " risks related to changing social, economic, environmental conditions and land use, and the impact of hazards associated with geological events, weather, water, climate variability and climate change, are addressed in sector development planning and programmes"[2] and that the development processes will
   - sustain and protect their accumulated gains during disasters;
   - never induce any additional risk to the people;
   - contribute to reducing current disaster risks.

b) Culture of disaster resilience - that the communities have "knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge"[3].

c) Managing residual risk - responding to the threat environment that to intervene for preventing losses, reducing distresses of the affected people and early recovery from disruptions through better preparedness.

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[2] Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, www.unisdr.org/wcd

[3] Ibid

The shift from traditional disaster response to risk reduction was prompted by the rising human and economic cost of the disaster. It has been noted that the numbers of people affected globally by disasters are increasing by an estimated 50,000 to 60,000 per decade, since the early 1970s, with 250 million affected per year over the last decade.[4]

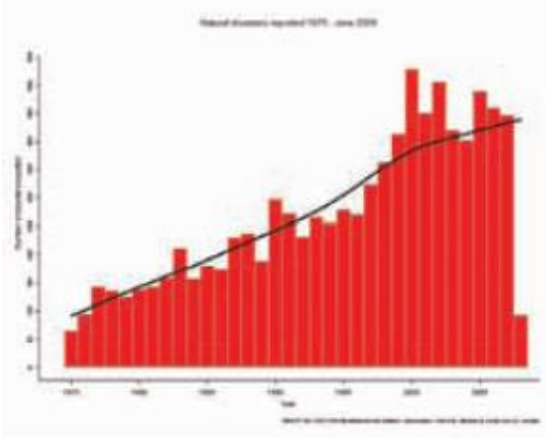


Figure 1. The recent rise in number of disasters
(Source: CRED EM-DAT)

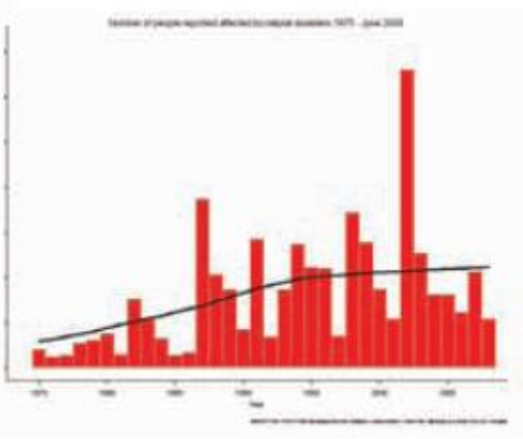
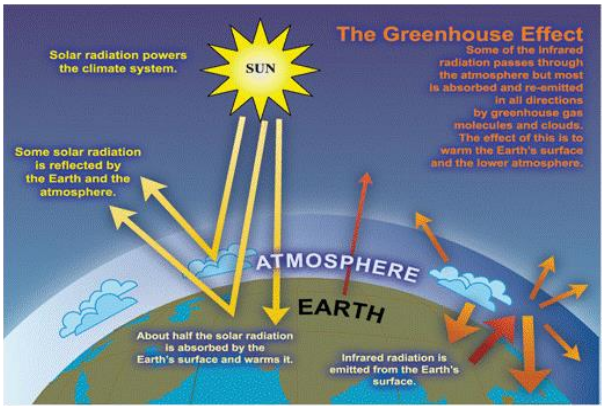


Figure 2. The number of people affected by recent disasters

The resulting rising cost makes spending on humanitarian assistance unsustainable. Therefore, it makes economic sense to invest in risk reduction although it is less visible and less headline-grabbing. The trend of increase in the frequencies and magnitudes of natural hazards has often been attributed to global warming and climate change.

Climate Change

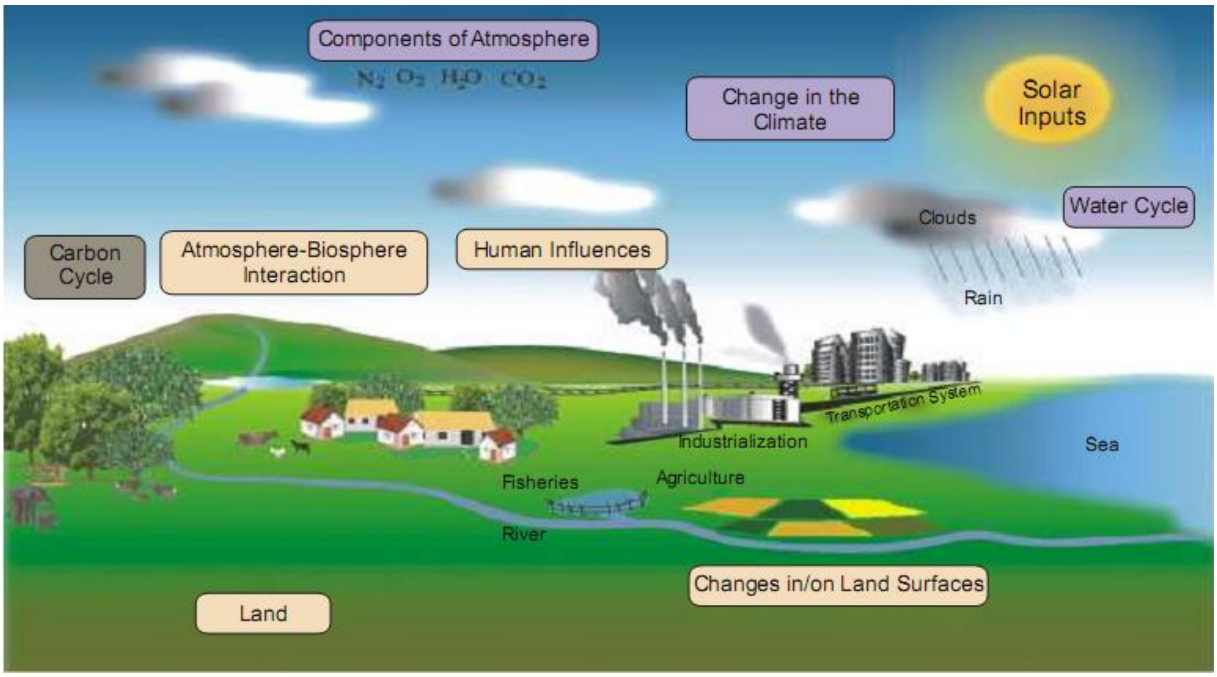
IPCC described climate in terms of *"the mean and variability of temperature, precipitation and wind over a period of time, ranging from months to millions of years (the classical period is 30 years)"*. The climate system evolves under its internal as well due to changes in external factors that include natural phenomena such as volcanic eruptions and solar variations, as well as human-induced changes in atmospheric composition. Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.[5]



[4] Humanitarian Costs of Climate Change, 2009 - jointly authored by Mackinnon Webster, Justin Ginnetti, and Peter Walker of the Feinstein International Center at Tufts University; Daniel Coppard from Development Initiatives; and Randolph Kent from the Humanitarian Futures Program at King's College London.

[5] Climate Change 2007: Synthesis Report

The climate system is powered by solar radiation. About 30% of the sunlight that reaches the top of the atmosphere is reflected back to space. The Earth's surface absorbs the remaining incoming solar radiation, then, transfers it to the atmosphere by warming the air, evepotranspiration and long wave radiation. The atmosphere in turn radiates energy back to the Earth as well out to the space. The greenhouse gases act as blanket and keep the long wave radiation trapped in the atmosphere. It keeps Earth warm. Changes in the volume of incoming solar radiation, fraction solar radiation reflected (e.g. by cloud cover, atmospheric particles or vegetation and proportion of long wave radiation from Earth back towards space could alter the radiation balance of the Earth.



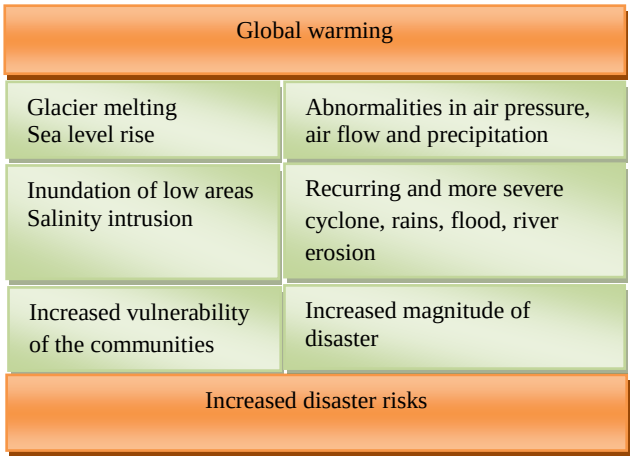
A major concern in climate change is the global warming that the increase in the average temperature Earth's atmosphere. To large extent, human activities contributed to this change "by causing changes in Earth's atmosphere in the amounts of greenhouse gases, aerosols (small particles), and cloudiness. The largest known contribution comes from the burning of fossil fuels, which releases carbon dioxide gas to the atmosphere." [6] The Climate Change 2007: Synthesis Report noted that the global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004. It has caused warming and induced many changes in the global climate system; and it is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.

The Climate Change 2007: Synthesis Report further noted that the frequencies hot extremes, heat waves and heavy precipitation events are very likely to increase whereas the intensities of the tropical cyclone are likely to increase. Also, according the report, there is "high confidence, based on substantial new evidence, that observed changes in marine and freshwater biological systems are associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation".

[6] Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

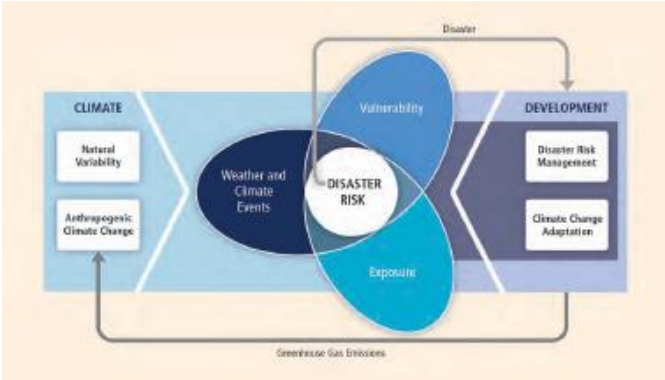
Climate Change and Disaster Risk Reduction

Climate change and disaster risk are closely interlinked. It change increases the vulnerability of communities to natural hazards. Increase in the average temperature, changes in the seasonal pattern and abnormalities in precipitation cause degradation of ecosystem, reductions in water availability and disruption of agriculture. It adversely affects life and livelihoods of the communities. Moreover, increased salinity in surface and ground water and extended tidal inundation make coastal region increasingly unsuitable for living. "Such conditions will increase the risks for populations dependent on subsistence agriculture, through food and water shortage and higher incidence of malnutrition, water-borne and food-borne diseases, and may lead to displacements of populations."[7]



Climate change also contributes, directly, to increases frequencies or intensities of the natural hazards. Hot extremes and heat waves may cause loss of life "particularly among the elderly, the very young, or among people who are chronically ill, socially isolated or otherwise especially vulnerable". Tropical cyclones with magnified intensity are likely to damage environment, infrastructure and other assts. Increased frequency of high precipitation in some regions may trigger secondary hazards, such as floods and landslides, with potentially large losses of life and assets; and it may disrupt agriculture, settlements, commerce and transport.

Climate change mitigation *includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks*. For example, reducing GHG emission through more efficient furnace systems, new low-energy technologies for industry and transport and switching to renewable forms of energy; and capture carbon dioxide through forest and vegetation. Impacts of climate change are managed through adaptation which refers to "*the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*".[8] Examples of adaptation include preparing risk assessments, protecting ecosystems, improving agricultural methods, managing water resources, building settlements in safe zones, developing early warning systems, instituting better building designs, improving insurance coverage and developing social safety nets. Both the mitigation and adaptation measures are intrinsically linked to sustainable development, and



[7] Briefing Note 01 – Climate Change and Disaster Risk Reduction 2008 UNISDR

[8] IPCC Fourth Assessment Report, Working Group II, Glossary of Terms: http://195.70.10.65/pdf/glossary/ar4-wg2.pdf.

they reduce disaster risks through minimizing exposure and enhancing resilience to disaster.

Climate change is likely to increase occurrence and vary the location of some physical events. It increases exposure and vulnerability of the communities to natural hazards, thereby, their disaster risk; and it seriously constraints the communities to allocate their efforts for disaster risk management. Also, disaster risk reduction efforts are based on experiences and under the notion that the future events will resemble that of the past. However, climate change introduces considerable uncertainties and contributes to potential changes in the frequency as well the nature of such events. Therefore, risk reduction may require transformation that refers to "altering of fundamental attributes of a system (including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems)".[9]

Zahid Hussain, 25 February 2013

[9] Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation IPCC Special Report 2012