International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878
Volume 1 Issue 1, September 2013

Disaster Management: "Managing the Risk of Environmental Calamity"

Shubhendu S. Shukla

Asst. Professor, SR Group of Institute, Lucknow, India

Abstract: ***"The author dedicates this study to all innocent pilgrims and residents who have become victims of recent past natural calamity which we have witnessed in Uttarakhand, India". All communities and countries are vulnerable to disasters, both natural and man-made. India's geo-climatic conditions as well as its high degree of socio-economic openness, makes it one of the most disaster prone country in the world to suffer very often from various natural disasters, namely drought, flood, cyclone, earth quake, landslide, forest fire, hail storm, locust, volcanic eruption, etc. Which strike causing a devastating impact on human life, economy and environment? Various disasters like earthquake, landslides, volcanic eruptions, fires, flood and cyclones are natural hazards that kill thousands of people and destroy billions of dollars of habitat and property each year. The rapid growth of the world's population and its increased concentration often in hazardous environment has escalated both the frequency and severity of natural disasters. With the tropical climate and unstable land forms, coupled with deforestation, unplanned growth proliferation non-engineered constructions which make the disaster-prone areas mere vulnerable, tardy communication, poor or no budgetary allocation for disaster prevention, developing countries suffer more or less chronically by natural disasters. Asia tops the list of casualties due to natural disaster. Among various natural hazards, earthquakes, landslides, floods and cyclones are the major disasters adversely affecting very large areas and population in the Indian sub-continent. The perception about disaster and its management has undergone a change following the enactment of the Disaster Management Act, 2005.***

Keywords: National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF), National Institute of Disaster Management (NIDM), The International Association (IAEM), The International Recovery Platform (IRP), World Conference On Disaster Reduction (WCDR), International Strategy For Disaster Reduction (ISDR).

1. Introduction

Disaster management is the discipline of dealing with and avoiding both natural and manmade disasters. It involves preparedness, response and recovery in order to lessen the impact of disasters. All aspects of emergency management deal with the processes used to protect populations or organizations from the consequences of disasters, wars and acts of terrorism. Disaster management doesn't necessarily avert or eliminate the threats themselves, although the study and prediction of the threats is an important part of the field. The basic levels of emergency management are the various kinds of search and rescue activity.

Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. The whole cycle of Disaster Management can be depicted by following figure 1.1.

Figure 1.1: Etymology

The word 'Disaster' derives from Middle French désastre and that from Old Italian disastro, which in turn comes from the Greek pejorative prefix δυσ-, (dus-) "bad"+ αστήρ (aster), "star". The root of the word disaster ("bad star" in Greek and Latin) comes from an astrological theme in which the ancients used to refer to the destruction or deconstruction of a star as a disaster.

2. Definition of Disaster Management

Disaster is an event or series of events, which gives rise to casualties and damage or loss of properties, infrastructures, environment, essential services or means of livelihood on such a scale which is beyond the normal capacity of the affected community to cope with. Disaster is also sometimes described as a "catastrophic situation in which the normal

pattern of life or eco-system has been disrupted and extra-ordinary emergency interventions are required to save and preserve lives and or the environment".

3. Types of Disasters

There is no country that is immune from disaster, though vulnerability to disaster varies. There are four main types of disaster.

3.1 Natural disasters

These disasters include floods, hurricanes, earthquakes and volcano eruptions that can have immediate impacts on human health, as well as secondary impacts causing further death and suffering from floods causing landslides, earthquakes resulting in fires, tsunamis causing widespread flooding and typhoons sinking ferries.

3.2 Environmental Emergencies

These emergencies include technological or industrial accidents, usually involving hazardous material, and occur where these materials are produced, used or transported. Large forest fires are generally included in this definition because they tend to be caused by humans.

3.3 Complex Emergencies

These emergencies involve a break-down of authority, looting and attacks on strategic installations. Complex emergencies include conflict situations and war.

3.4 Pandemic Emergencies

These emergencies involve a sudden onset of a contagious disease that affects health but also disrupts services and businesses, bringing economic and social costs.

3.5 Man-made Disaster

Disasters caused by chemical or industrial accidents, environmental pollution, transport accidents and political unrest are classified as "human-made" or "human-induced" disasters since they are the direct result of human action.

4. Institutional and Legal Arrangements of Disaster Management

The Act lays down institutional, legal, financial and coordination mechanisms at the national, state, district and local levels. These institutions are not parallel structures and will work in close harmony.

4.1 Institutional Framework under the Disaster Management Act

4.1.1 National Disaster Management Authority (NDMA)

The NDMA, as the apex body for disaster management, is headed by the Prime Minister and has the responsibility for laying down policies, plans and guidelines for DM (and coordinating their enforcement and implementation for ensuring timely and effective response to disasters). It will approve the National Disaster Management and DM plans of the Central Ministries/Departments. NDMA has the power to authorize the Departments or authorities concerned, to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster.

4.1.2 The National Executive Committee

The National Executive Committee (NEC) comprises the Union Home Secretary as the Chairperson, and the Secretaries to the GOI in the Ministries/Departments of Agriculture, Atomic Energy, Defense, Drinking Water Supply, Environment and Forests, Finance (Expenditure), Health, Power, Rural Development, Science and Technology, Space, Telecommunications, Urban Development, Water Resources and the Chief of the Integrated Defense Staff of the Chiefs of Staff Committee as members. Secretaries in the Ministry of External Affairs, Earth Sciences, Human Resource Development, Mines, Shipping, Road Transport & Highways and Secretary, NDMA will be special invitees to the meetings of the NEC.

4.1.3 State Disaster Management Authority (SDMA)

At the State level, the SDMA, headed by the Chief Minister, will lay down policies and plans for DM in the State. It will, inter alia approve the State Plan in accordance with the guidelines laid down by the NDMA, coordinate the implementation of the State Plan.

4.1.4 District Disaster Management Authority (DDMA)

The DDMA will be headed by the District Collector, Deputy Commissioner or District Magistrate as the case may be, with the elected representative of the local authority as the Co-Chairperson. DDMA will act as the planning, coordinating and implementing body for DM at District level and take all necessary measures for the purposes of DM in accordance with the guidelines laid down by the NDMA and SDMA.

4.1.5 National Disaster Response Force (NDRF)

The DISASTER MANAGEMENT Act, 2005 has made the statutory provisions for the constitution of the National Disaster Response Force (NDRF) for the purpose of specialized response to natural and man-made disasters. According to Section 45 of the Act, the Force has to function under the general superintendence, direction and control of the National Disaster Management Authority (NDMA) and

under command and supervision of Director General, NDRF. Though the units of this Force were nominated in 2003, it is only after the establishment of NDMA that their training and equipping were vigorously pursued. In lieu with the Section 44 (i) of the Act that states NDRF a specialist force, the force is gradually emerging as the most visible and vibrant multi-disciplinary, multi-skilled, high-tech force of the NDMA capable of dealing with all types of natural and man-made disasters. For the purpose of specialized response to a threatening disaster situation or disasters/emergencies both natural and man-made such as those of Chemical, Biological, Radiological and Nuclear origin, the Act has mandated the constitution of a National Disaster Response Force (NDRF). The general superintendence, direction and control of this force shall be vested in and exercised by the NDMA and the command and supervision of the Force shall vest in an officer to be appointed by the Central Government as the Director General of Civil Defense and National Disaster Response Force. Presently, the NDRF comprises eight battalions and further expansion may be considered in due course. These battalions will be positioned at different locations as may be required.

4.1.6 National Institute of Disaster Management (NIDM)

The National Institute of Disaster Management constituted under the Disaster Management Act 2005 has been entrusted with the nodal national responsibility for human resource development, capacity building, training, research, documentation and policy advocacy in the field of disaster management. Upgraded from the National Centre for Disaster Management of the Indian Institute of Public Administration on 16th October, 2003, NIDM is steadily marching forward to fulfill its mission to make a disaster resilient India by developing and promoting a culture of prevention and preparedness at all levels. The NIDM, in partnership with other research institutions has capacity development as one of its major responsibilities, along with training, research, documentation and development of a national level information base. It will network with other knowledge-based institutions, and function within the broad policies and guidelines laid down by the NDMA.

List of ten deadliest disasters which have occurred across the world and in India in the known history and in the last century may be seen from the Table 1.1

Table 1.1: India's Deadliest Disaster

S.N	Name of Event	Year	State and Area	Fatalities
1	Earthquake	1668	Mumbai, Maharastra	2000 deaths
2	Bengal Earthquake	1737	Bengal	3,00,000 deaths
3	Cyclone	1864	Kolkata, West Bengal	60,000 deaths
4	The Great Famine	1876 – 1878	Southern India	58.5 Million people affected 5.5 million deaths due to starvation
5	Cyclone	1882	Mumbai, Maharastra	1,00,000 deaths
6	The Indian Famine	1896 – 1897	Whole India	1.25 million to 10 million deaths
7	Earthquake	1934	Bihar	6000 deaths
8	Bhola Cyclone	1970	West Bengal	5,00,000 deaths (including Hindu Kush Himalayas and surrounding areas)`
9	Drought	1972	Large part of the country	200 million people affected
10	Drought	1987	Haryana	300 million people affected
IN THE LAST CENTURY				
1	Earthquake	1905	Kangra, Himachal Pradesh	20,000 deaths
2	Cyclone	1977	Andhra Pradesh	10,000 deaths Hundreds of Thousands homeless 40,000 cattle deaths, destroyed 40% of India's food grain
3	Lature Earthquake	1993	Lature, Marthawada, region of the Maharastra	7,928 people died and another 30,000 were injured
4	Orrisa Super Cyclone	1999	Orissa	10,000 deaths
5	Gujrat Earthquake	2001	Bhuj, Bachau, Anjar, Ahmedabad, and Surat in Gujarat State	25,000 deaths, 6.3 million affected
6	Tsunami	2004	Coastline of Tamilnadu, Kerala, Andhara Pradesh & Pondecherry as well as Andaman and Nicobar Island of India	15,749 deaths 5640 person missing 2.79 million people affected 11,827 hectares of crops damaged 3,00,000 fishers folk lost their livelihood
7	Maharastra Flood	2005 july	Maharastra State	1094 deaths, 167 injured, 55 missing
8	Kashmir Earthquake	2005	Kashmir State	86000 deaths (including Kashmir and surrounding Himalayan reagion)
9	Kosi Floods	2008	North Bihar	527 Deaths, 19,323 Livestock perished 2,22,754 house damaged 33,29,423 persons affected

10	Cyclone Nisha	2008	Tamil Nadu	204 deaths, $800 Million worth damage

5. Distribution of People Affected By Disaster in India

Figure 1.2 shows the distribution of people affected by disaster in the world between 1975 and 2001.

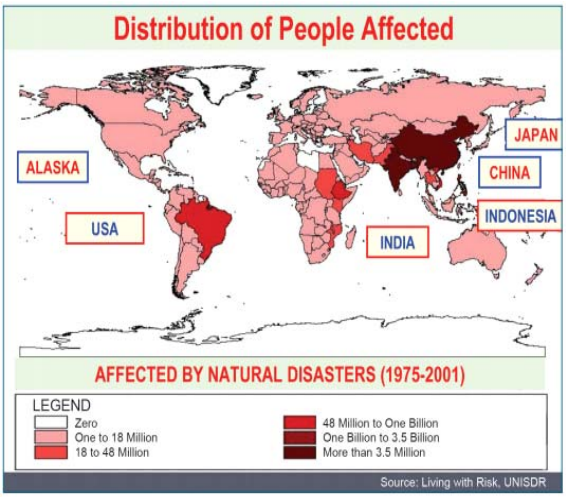


Figure 1.2: From the above figure we can easily understand that Alaska, North America, Australia are the safe place while the India is most dangerous place to live on the view of Disaster

6. The Indian Scenario for Disaster Management

India due to its geo-climatic and socio-economic condition is prone to various disasters. During the last thirty years' time span the country has been hit by 431 major disasters resulting into enormous loss to life and property. According to the Prevention Web statistics, 143039 people were killed and about 150 crore were affected by various disasters in the country during these three decades. The disasters caused huge loss to property and other infrastructures costing more than US $ 4800 crore. In India, the cyclone which occurred on 25th November, 1839 had a death toll of three lakh people. The Bhuj earthquake of 2001 in Gujarat and the Super Cyclone of Orissa on 29th October, 1999 are still fresh in the memory of most Indians and cloud burst and mudflow in Leh and surrounding areas in the morning of 6th August, 2010.

The most recent natural disaster of a cloud burst resulting in flash floods and mudflow in Utterakhand and Kedarnath areas in the early hours of 16th June, 2013, caused severe damage in terms of human lives as well as property. There was a reported death toll of 1200 persons, about 5000 missing persons, 4200 pets (have economic value) 3,661 damaged houses in about 500 villages and 27,350 hectares of affected crop area**.

Source**- Assumed Casualty by several News Papers 24 June 2013 Lucknow Edition

http://www.business-standard.com/article/current-affairs/uttarakhand-death-toll-may-cross-reported-1-000-mark-shinde-113062400276_1.html
http://www.business-standard.com/article/current-affairs/rain-fury-death-toll-may-cross-1-000-113062200642_1.html

7. India - Disaster Statistics

Data related to human and economic losses from disasters that have occurred between 1980 and 2010 (table 1.2).

Table 1.2: Natural Disasters from 1980 – 2010

No of events:	431
No of people killed:	143,039
Average killed per year:	4,614
No of people affected:	1,521,726,127
Average affected per year:	49,087,940
Economic Damage (US$ X 1,000):	48,063,830
Economic Damage per year (US$ X 1,000):	1,550,446

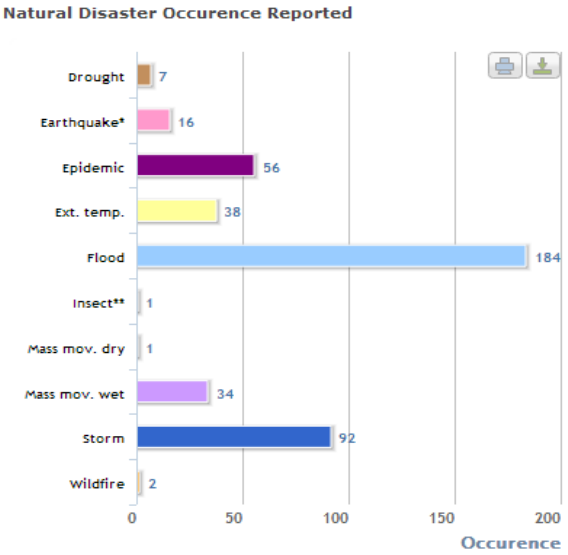


Figure 1.3: Top 10 Natural Disasters Reported

Affected People

Disaster	Date	Affected (no. of people)
Drought	1987	300,000,000
Drought	2002	300,000,000
Flood	1993	128,000,000
Drought	1982	100,000,000
Drought	2000	50,000,000
Flood	2002	42,000,000
Flood	1982	33,500,000
Flood	2004	33,000,000
Flood	1995	32,704,000
Flood	1980	30,000,023

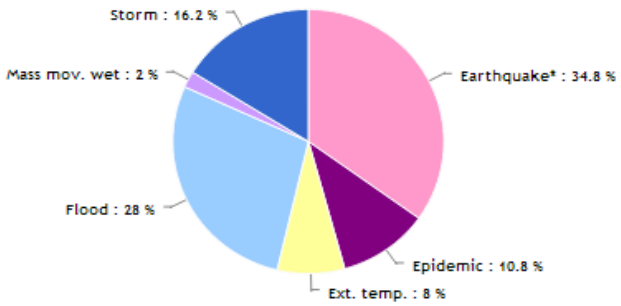
Figure 1.4: Top 10 Natural Disasters Reported

Killed People

Disaster	Date	Killed (no. of people)
Earthquake*	2001	20,005
Earthquake*	2004	16,389
Storm	1999	9,843
Earthquake*	1993	9,748
Epidemic	1984	3,290
Epidemic	1988	3,000
Storm	1998	2,871
Extreme temp.	1998	2,541
Flood	1994	2,001
Flood	1998	1,811

Figure 1.5: Number of people killed in various disasters

Statistics by Disasters Type Percentage of Reported People Killed by Disaster Type



*Source of data: "EM-DAT: The OFDA/CRED International Disaster Database, University catholique de Louvain, Brussels, Bel." Data version: v11.08

Table 1.3: The most severe disasters in the country and their impact in term of people affected, lives lost and economic damage

Year	*Type Of Disaster*	*People Affected*	*Life Lost*	*Economic Damage (USD X 1,000)*
1980	Flood	30,000,023		
1982	Drought	100,000,000		
	Flood	33,500,000		
1984	Epidemic		3290	
1987	Drought	300,000,000		
1988	Epidemic		3000	
1990	Storm			2,200,000
1993	Flood	128,000,000		7,000,000
	Earthquake		9,748	
1994	Flood		2001	
1995	Flood	32,704,000		
1996	Storm			1,500,300
1998	Storm		2871	
	Extreme Temp		2541	
	Flood		1811	
1999	Storm		9843	2,500,000
2000	Drought	50,000,000		
2001	Earthquake		20,005	2,623,000
2002	Drought	300,000,000		
	Flood	42,000,000		
2004	Flood	33,000,000		2,500,000
	Earthquake		16,389	
2005	Flood			3,330,000
	Flood			2,300,000
2006	Flood			3,390,000
2009	Flood			2,150,000

*(Includes Tsunami)
** Source "EM-DAT: THE OFDA/CRED International Disaster Database

8. International Organizations of Disaster Management

8.1 International Association of Emergency Managers

The International Association of Emergency Managers (IAEM) is a non-profit educational organization dedicated to promoting the goals of saving lives and protecting property during emergencies and disasters. The mission of IAEM is to serve its members by providing information, networking and professional opportunities, and to advance the emergency management profession.

It currently has seven Councils around the World, Asia, Canada, Europe, International, Oceania, Student and USA

The Air Force Emergency Management Association (www.af-em.org, www.3e9x1.com, and www.afema.org), affiliated by membership with the IAEM, provides emergency management information and networking for US Air Force Emergency Managers.

8.2 International Recovery Platform

The International Recovery Platform (IRP) was conceived at the World Conference on Disaster Reduction (WCDR) in Kobe, Hyogo, Japan in January 2005. As a thematic platform of the International Strategy for Disaster Reduction (ISDR) system, IRP is a key pillar for the implementation of the Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters, a global plan for disaster risk reduction for the decade adopted by 168 governments at the WCDR.

The key role of IRP is to identify gaps and constraints experienced in post disaster recovery and to serve as a catalyst for the development of tools, resources, and capacity for resilient recovery. IRP aims to be an international source of knowledge on good recovery practice.

8.3 Red Cross/Red Crescent

National Red Cross/Red Crescent societies often have pivotal roles in responding to emergencies. Additionally, the International Federation of Red Cross and Red Crescent Societies (IFRC or "The Federation") may deploy assessment teams, e.g. Field Assessment and Coordination Team – (FACT) to the affected country if requested by the national Red Cross or Red Crescent Society. After having assessed the needs Emergency Response Units (ERUs) may be deployed to the affected country or region. They are specialized in the response component of the emergency management framework.

8.4 United Nations

Within the United Nations system responsibility for emergency response rests with the Resident Coordinator within the affected country. However, in practice international response will be coordinated, if requested by the affected country's government, by the UN Office for the Coordination of Humanitarian Affairs (UN-OCHA), by deploying a UN Disaster Assessment and Coordination (UNDAC) team.

8.5 World Bank

Since 1980, the World Bank has approved more than 500 operations related to disaster management, amounting to more than US$40 billion. These include post-disaster reconstruction projects, as well as projects with components aimed at preventing and mitigating disaster impacts, in countries such as Argentina, Bangladesh, Colombia, Haiti, India, Mexico, Turkey and Vietnam to name only a few.

Common areas of focus for prevention and mitigation projects include forest fire prevention measures, such as early warning measures and education campaigns to discourage farmers from slash and burn agriculture that ignites forest fires; early-warning systems for hurricanes; flood prevention mechanisms, ranging from shore protection and terracing in rural areas to adaptation of production; and earthquake-prone construction.

In a joint venture with Columbia University under the umbrella of the ProVention Consortium the World Bank has established a Global Risk Analysis of Natural Disaster Hotspots.

In June 2006, the World Bank established the Global Facility for Disaster Reduction and Recovery (GFDRR), a longer term partnership with other aid donors to reduce disaster losses by mainstreaming disaster risk reduction in development, in support of the Hyogo Framework of Action. The facilities helps developing countries fund development projects and programs that enhance local capacities for disaster prevention and emergency preparedness.

8.6 European Union

Since 2001, the EU adopted Community Mechanism for Civil Protection, which started to play a significant role on the global scene. Mechanism's main role is to facilitate co-operation in civil protection assistance interventions in the event of major emergencies which may require urgent response actions. This applies also to situations where there may be an imminent threat of such major emergencies.

The heart of the Mechanism is the Monitoring and Information Centre. It is part of Directorate-General for Humanitarian Aid & Civil Protection of the European Commission and accessible 24 hours a day. It gives countries access to a platform, to a one-stop-shop of civil protection means available amongst the all the participating states. Any country inside or outside the Union affected by a major disaster can make an appeal for assistance through the MIC. It acts as a communication hub at headquarters level between participating states, the affected country and dispatched field experts. It also provides useful and updated information on the actual status of an ongoing emergency.

8.7 India

The role of emergency management in India falls to National Disaster Management Authority of India, a government agency subordinate to the Ministry of Home Affairs. In recent years there has been a shift in emphasis from response and recovery to strategic risk management and reduction, and from a government-centered approach to decentralized community participation. The Ministry of Science and Technology, headed by Dr Karan Rawat, supports an internal agency that facilitates research by bringing the academic knowledge and expertise of earth scientists to emergency management.

A group representing a public/private has recently been formed by the Government of India. It is funded primarily by a large India-based computer company and aimed at improving the general response of communities to emergencies, in addition to those incidents which might be described as disasters. Some of the groups' early efforts

involve the provision of emergency management training for first responders (a first in India), the creation of a single emergency telephone number, and the establishment of standards for EMS staff, equipment, and training. It operates in three states, though efforts are being made in making this a nation-wide effective group.

8.8 Aniruddh Sharma's Academy of Disaster Management (AADM)

Aniruddh's Academy of Disaster Management (AADM) is a Non-Profit Organization in Mumbai, India with 'Disaster Management' as its principal objective.

9. Conclusions

Apart from loss of human lives, natural disasters inflict severe damage to ecology and economy of a region. With installation of new technologies and by adopting space technology as INSAT and IRS series of satellites, India has developed an operational mechanism for disaster warning especially cyclone and drought, and their monitoring and mitigation. However, prediction of certain events likes earthquake, volcanic eruption and flood is still at experimental level. Disasters disrupt progress and destroy the hard-earned fruits of painstaking developmental efforts, often pushing nations, in quest for progress, back by several decades. Thus, efficient management of disasters, rather than mere response to their occurrence has, in recent times, received increased attention both within India and abroad. This is as much a result of the recognition of the increasing frequency and intensity of disasters as it is an acknowledgement that good governance, in a caring and civilized society, needs to deal effectively with the devastating impact of disasters.

References

[1] Final report on study of Brahmaputra river erosion and its control study conducted by Department of Water Resources Development and Management Indian Institute of Technology Roorkee for National Disaster Management Authority of India May 2012.
[2] Technical report on Geotechnical / Geophysical Investigations for Seismic Microzonation Studies of Urban Centers in India by National Disaster Management Authority Government of India August 2011.
[3] Disaster management. (2006). In BUSINESS: The Ultimate Resource – Dictionary of Business and Management. Retrieved from
[4] http://www.credoreference.com/entry/ultimatebusiness/disaster_management.
[5] Shankar, K. (2008). Wind, water, and Wi-Fi: New trends in community informatics and disaster management. The Information Society, 24(2), 116-120. Retrieved from www.emeraldinsight.com/10.1108/01435120210697216.
[6] Introduction to Disaster Management Virtual University for Small States of the Commonwealth (VUSSC) Disaster Management Version 1.0
[7] http://ndma.gov.in/ndma/
[8] http://nidm.gov.in/default.asp
[9] http://www.business-standard.com/article/current-affairs/uttarakhand-death-toll-may-cross-reported-1-000-mark-shinde-113062400276_1.html

Author Profile

Shubhendu S. Shukla, has completed his MA (Economics) in 2005 and MBA in 2007, and M. Phil (Management) in 2010. He has done Post Graduated Diploma in Computer Applications from IGNOU and Post Graduated Diploma in International Business from Annamalai University. He is Member of Editorial Board in Reviewer Panel of International Journal of Science and Research (IJSR) ISSN: 2319-7064 (www.ijsr.net/editorial.php), International Journal of Scientific Engineering and Research (IJSER) (www.ijser.in/members.php) and International Journal of Engineering Research and Technology (IJERT). He has worked with a prominent IT Company (Wipro Technologies) as Project Manager for e-Governance that was a Central Govt. Project, during his job he was responsible for Dealing with Consultant (Wipro), dealing with Techo team i.e. Trainer and other staff, he also Co-ordinate with District Administrative staff for monitoring, reporting, and his proposals and finally developed the Study materials. Author has more than 6 years of experience in academics as he is currently working as Asst professor in SR Group of Institutions, Lucknow. With the academics author has publish 9 International Research Paper, 5 national Research Papers, attended 7 National Conferences and Seminars, 4 International Seminars. Apart from SR Group of Institutions, Lucknow, he is Guest and Visiting Faculty of Study Centers of Global Open University Nagaland, Karnataka State Open University, Sikkim Manipal University. He has taught variety of subjects as Marketing, Sales and Distribution, Production and Operation management, System Analysis & Design and Software Engineering, Database Management System, Electronic Commerce (Specialized subjects of Information Technology).