CHAPTER 3
REVIEW OF LITERATURE

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Section Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>55</td>
</tr>
<tr>
<td>3.2</td>
<td>Disasters in General</td>
<td>56</td>
</tr>
<tr>
<td>3.3</td>
<td>Disasters in India</td>
<td>58</td>
</tr>
<tr>
<td>3.4</td>
<td>Disasters and Libraries</td>
<td>59</td>
</tr>
<tr>
<td>3.5</td>
<td>Disaster Experiences</td>
<td>63</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Earthquakes</td>
<td>63</td>
</tr>
<tr>
<td>3.5.2</td>
<td>Water</td>
<td>64</td>
</tr>
<tr>
<td>3.5.3</td>
<td>Mould, Dust, and Pollution</td>
<td>67</td>
</tr>
<tr>
<td>3.5.4</td>
<td>Fire</td>
<td>67</td>
</tr>
<tr>
<td>3.5.5</td>
<td>Vandalism and Other Disasters</td>
<td>68</td>
</tr>
<tr>
<td>3.6</td>
<td>Disaster Preparedness and Prevention</td>
<td>69</td>
</tr>
<tr>
<td>3.6.1</td>
<td>Need and Value of Disaster Plans</td>
<td>70</td>
</tr>
<tr>
<td>3.6.2</td>
<td>Disaster Planning</td>
<td>71</td>
</tr>
<tr>
<td>3.6.3</td>
<td>Plans and Planning in Specific Libraries</td>
<td>74</td>
</tr>
<tr>
<td>3.6.3.1</td>
<td>Actual Plans</td>
<td>74</td>
</tr>
<tr>
<td>3.6.4</td>
<td>Library Building Disasters–Preventive Measures</td>
<td>76</td>
</tr>
<tr>
<td>3.6.5</td>
<td>Digital Disasters–Preventive Measures</td>
<td>77</td>
</tr>
<tr>
<td>3.6.6</td>
<td>Insurance and Funding</td>
<td>79</td>
</tr>
<tr>
<td>3.6.7</td>
<td>Training</td>
<td>79</td>
</tr>
<tr>
<td>3.6.8</td>
<td>Salvaging of Materials</td>
<td>80</td>
</tr>
<tr>
<td>3.7</td>
<td>Other Issues</td>
<td>81</td>
</tr>
<tr>
<td>3.8</td>
<td>Conclusion</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>References</td>
<td>85</td>
</tr>
</tbody>
</table>

3.1: Introduction
Disasters in libraries are not new. Different kinds of disasters affect libraries and a search in library science literature yields a lot of ‘hits’. As early as 1941, Ralph A. Beals divided library literature into three principal types: glad [bad] tidings, testimony, and research. (as cited in Shera, 1964, p.145) This classification is equally true for literature on disaster management of libraries. Library literature is full of news of disaster incidents and the damage caused to the libraries. There is plenty of print and digital literature available which recognizes the importance of disaster preparedness, disaster prevention, and disaster planning and post disaster recovery. Research reports, however, are comparatively fewer. This chapter presents a review of the literature found useful in the preparation of this study report.

The chapter has been organized in the following sections: disasters in general, disasters and libraries: general, specific disasters faced by libraries and how the libraries coped - earthquakes, water related problems, mould and fungus, fire, vandalism. Sections on literature related to disaster preparedness and prevention, disaster planning and salvaging of materials follow. In each section an attempt has been made to review the research studies, before describing other literature. Further, some news items have not been included in the present review, but have been covered in the bibliography at the end of the research report. While many documents are used for more than one sub-issue, it has been placed in the section where it was found most useful. In a few rare cases, an item has been mentioned in more than one section. The literature search is based on print and digital text resources.

A number of bibliographic resources are available, both in print and on the web. Paul Piper (1999) had reviewed internet resources available on disasters in general. He categorised the resources into general disasters, man-made disasters, natural disasters, disasters and human beings, technological disasters and disaster relief work. Brief description of every website is given. Pearce-Moses and Yakel (2007) have identified resources on internet to help cultural institutions including libraries in this endeavour. A useful guide for resources on disaster management including a list of organisations
3.2: Disasters in General

General literature on disasters mainly focuses on what is a disaster, types of disasters, effect on the community and the country, recovery from the disaster and efforts of various government and non-government organisations. This literature was used mainly to understand the basic concept of disaster and its management. Normal routine procedures may not be suitable for handling disasters, as disasters by their definition are non-routine events. Various dictionaries and reports were used for definitions, such as the Oxford English Dictionary, The Merriam Webster Dictionary, and the report by United Nations Development Programme / United Nations Disaster Relief Organization (UNDP/UNDRO). These definitions reflect disaster as a catastrophe which happens slowly or suddenly, cannot be controlled and disrupts human life. A disaster can also happen in an organisation. (Disaster..., 1989, Disaster..., 2012; & United..., 1992)

A handbook by Carter (1991) on disaster management published by the Asian Development Bank provides a comprehensive overview of the issue. Literature on types of disasters mainly categorises them into two types, namely natural or man-made. These disasters not only cause destruction of human life and property, but also loss of cultural heritage which will be lost forever for future generations. Examples of major global disasters have been described by many authors. (Wei, Zhang, & Fan, 2003; Oorio & Hurych, 2004; Pech, & Slade, 2005; Pasricha, 2006; Then & Loosemore, 2006; Al-Tikriti, 2007; Son, Aziz, & Pena-Mora, 2007). Articles describing disasters in general by focussing on one particular type give an understanding about issues related to that kind of disaster. The article by Pollonais (2004) is a general overview of hurricanes and their after effects. Atwater et al. (2005) give guidelines on how to survive from tsunamis.

In the world of information technology, there has been a quantum explosion of digital data. Among the disadvantages of such information is its vulnerability, if destroyed by disaster; data lost may not be recoverable unless properly maintained. Stremple and Martone (2000) categorise digital disasters as – small scale like minor computer problems, power failure, or large scale when digital data can be destroyed due to storms, floods and other disasters.

Many organizations and government disaster management cells are set up to monitor disaster related activities in their countries. For example, the primary mission of the Federal Emergency Management Agency, USA (FEMA) is to reduce the loss of life and property and protect the nation from all hazards, including natural disasters, acts of terrorism, and other man-made disasters, by leading and supporting the United States in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery, and mitigation. FEMA helped libraries in New Orleans State of USA, affected by Katrina Hurricane in August 2005. (USA, The Federal..., n.d.; McEntire & Myers, 2004; Graham & Spennemann, 2006).

Managing disaster is beyond the capacity of one person or one organisation. Various concerned agencies need to cooperate to manage disaster in an area. McEntire (2002) discusses the need for cooperation among various agencies to cope with a large disaster in a community, such as the tornado which struck Fort Worth in USA damaging huge infrastructure in that area.

3.3: Disasters in India
The approach to disaster management by the government of India is reflected in its policy statement and the legislation passed by it. (India…, 2009 & 2005) The web sites of the National Institute of Disaster Management (India…, 2011) and National Disaster Management Division, Ministry of Home Affairs, Government of India (India, Ministry of…, n.d.), provide information related to disaster management activities in India. They describe initiatives taken for disaster management. As per these sites disaster mitigation should be given the first priority, then relief and rehabilitation. Information related to the framework for disaster management set up the Government of India is provided. The Government of India allocates funds for disaster management in its budget and also makes special provisions under its five years plans. (India…, 2004 & 2011) Many State Governments have set up disaster management units to look after disaster management in their state. For example, Gujarat State Disaster Management Authority (Gujarat…, 2011) and Maharashtra State Disaster Management Unit (Maharashtra…, n.d.) manage disaster related activities in the respective states.

The Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), India initiated an effort to build a Disaster Management Information System. It has developed a database-driven information system for Disaster Management Authorities (DMA) in various states, Non-Government Organisations (NGO) and other organisations in India. NGOs, relief workers, DMAPs and individuals share their experiences and volunteer services and resources to maintain this website which is initiated by the Indian Institute of Management, Ahmedabad. The website lists volunteers and organisations and institutions that are ready to help the country in case disaster strikes. (Society…, n.d.)

Among the non-governmental literature is Satish Modh’s book published in 2006 guiding Indian citizens to be prepared for disaster. The focus of the book is on how a human being should protect himself/herself and help others in case of natural or man-made disasters. It explains the different types of disasters a community can face and the role of government.

The three volumes by Goel (2006) provide a guide for understanding the concept of disaster management and issues related to it. Vol. 1 is on disaster management policy and administration, Vol. 2 is on management of natural disasters and Vol. 3 is on management of man-made disasters. Each volume provides a detailed coverage on the topic and the role of the government in preventing disaster.

Many books were published on the 2001 earthquake in Gujarat. An analysis of the earthquake is given by Reddy (2001). The damage and rehabilitation efforts to recover from the earthquake in the Kutch area of Gujarat are described.

3.4: Disaster and Libraries
When a disaster strikes a library it mainly affects the library collection, its premises and library staff. The literature on library disaster management is mainly focused on efforts of various national and international organizations in managing a disaster, disaster management plans of different types of libraries, treatment of various types of damaged collections, how libraries could be made ready to face disaster and roles librarians can play during the disaster.

Types of disasters and managing disasters in libraries have been discussed by many authors in books and journals, based on their personal experiences. In their edited publication, Matthews and Feather (2003) cover all types of topics related to disasters and libraries. Having a disaster control plan, risk management and disaster recovery in libraries, fire and flood affected libraries, cooperative disaster management among libraries and psychological aspects of disaster management issues are covered by different authors.

Miller and Pellen (2006) have brought together 17 articles written by various authors, mainly from USA, on their personal experiences in dealing with natural disasters.
Natural disasters described are fire at University of Georgia, University of New Mexico, Hurricane Katrina affected libraries, water and mould affected libraries. General chapters on disaster planning and recovery are helpful for anyone developing a disaster plan.

Many organisations like UNESCO, IFLA, ALA to name a few, have contributed to disaster management in libraries. The UNESCO website includes in its Communication and Information section various libraries damaged during floods in Europe in 2002 and tsunami in the Asian region in 2004 and support provided by UNESCO to them. (United Nations Scientific..., 2012) The Records and Archives Management Programme (RAMP) of UNESCO developed standards, rules and methods for processing, transfer and creation of an information system. The RAMP study by Buchanan (1988) describes various stages of disaster planning, preparedness and recovery. It includes examples of libraries affected by different types of disasters.

IFLA in its core activities on Preservation and Conservation (PAC) (The International..., n.d.) covers disaster management in libraries; and its website lists a number of publications related to disaster management. IFLA-PAC section is actively involved in providing assistance to libraries. The Unit also responded to libraries in different countries which faced disasters, e.g. 11 September, 2001 attack in USA, tsunami in Indonesia and Sri Lanka. International Preservation News published three times a year by IFLA-PAC is a free journal and has published many articles related to various issues of disaster management in libraries.

IFLA-PAC in collaboration with Bibliotheques National France organized an International Symposium, on ‘The 3D’s of Preservation: Disasters, Displays, Digitization’ in Paris during 8-10, March 2006. The papers presented at the symposium have been brought out as International Preservation Issue No. 7. The papers presented mainly focused on disaster prevention, preparedness and the need to have disaster management plans in libraries. (Koch, 2006)

In the IFLA Conference every year, under the PAC section, many papers related to disasters in libraries of the world are presented. At its 70th General Conference and Council during 22-27, August 2004, at Buenos Aires, Argentina, IFLA had a session on national libraries and disaster preparedness. There were several papers presented on the theme. 73rd IFLA General Conference at Durban, South Africa during 19-23, August 2007 had one of the session themes as ‘Information Providers coping with disaster in Asia-Oceania’. (The International..., n.d.)

The Blue Shield is the protective emblem of the 1954 Hague Convention which is the basic international treaty formulating rules to protect cultural heritage during armed conflicts. The Blue Shield network consists of organisations dealing with museums, archives, audiovisual supports, libraries, monuments and sites. The International Committee of the Blue Shield (ICBS), founded in 1996, comprises representatives of the five NGOs working in this field: The International Council on Archives, The International Council of Museums, The International Council on Monuments and Sites, IFLA, and the Co-ordinating Council of Audiovisual Archives Associations. National Blue Shield Committees have been formed in a number of countries. The Association of National Committees of the Blue Shield (ANCBS) coordinates international efforts to protect cultural property at risk of destruction in armed conflicts or natural disasters. (Blueshield..., n.d.)

Some national libraries are active in helping libraries recover from disaster. Their websites provide guidelines which are useful for any kind of library. The Preservation Advisory Centre of the British Library, UK (The British..., n.d.) and the Preservation Section of the Library of Congress, USA provide guidelines for preservation of damaged materials. (The Library..., n.d) In USA, several libraries, library organisations and agencies are involved in library disaster management. (Table 3.1)

Heritage Preservation, a national non-profit organization, and others in USA are dedicated to preserving the cultural heritage of the United States. By identifying risks, developing innovative programs, and providing broad public access to expert advice, it assists museums, libraries, archives, historic preservation and other organizations, as well as individuals, in caring for endangered heritage. The Heritage Health Index survey conducted by it was the first attempt to give a national picture of the state of collections in all kinds of institutions—museums, libraries, archives, historical societies, and scientific organizations. According to the author, partnership among institutions is a must for being prepared for any kind of emergency. (Long, 2009)
Table 3.1: Library Organisations Working on Disaster Management in USA

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<tr>
<td>The Library of Congress</td>
<td>General information including emergency preparedness. (The Library..., n.d.)</td>
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<tr>
<td>Federal Depository Library Programme, USA</td>
<td>Chapter 14 of the Handbook gives practical guidelines of what to do in case of disaster. (USA, Federal... 2008)</td>
</tr>
<tr>
<td>National Network of Libraries of Medicine's</td>
<td>Prepared a tool kit to help libraries prepare a disaster plan. (National..., 2012)</td>
</tr>
<tr>
<td>Emergency Preparedness &amp; Response Initiative</td>
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<tr>
<td>The Northeast Document Conservation Centre</td>
<td>Information about disaster preparedness, assistance in being prepared for emergency and The Online-Disaster Planning Tool for Cultural and Civic Institutions – dplan. (Northeast..., 2011, 2011a)</td>
</tr>
<tr>
<td>(NEDCC), Massachusetts, USA</td>
<td></td>
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<tr>
<td>Institute of Museum and Library Services</td>
<td>Under 'Connecting to Collections’ section provides full text articles and links to resources on collection care, emergency preparedness etc. (USA,Institute..., n.d.)</td>
</tr>
<tr>
<td>The California Preservation Program (CPP)</td>
<td>Information, education, expert advice and links on preservation of collection. Under Emergency Preparedness and Response section it provides guidelines and exercises on preparing disaster plan for a library. (California..., 2010)</td>
</tr>
<tr>
<td>LYRASIS</td>
<td>Under its Disaster Response and Recovery section links to various resources related disaster management and libraries are provided. (LYRASIS..., n.d.)</td>
</tr>
<tr>
<td>Special Library Association, USA</td>
<td>Links to Disaster Planning and Recovery resources. (Special..., 2007)</td>
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The efforts made by various agencies in Cuba to preserve its cultural heritage are described in a paper that highlights the role played in the preservation of Cuba’s cultural heritage by the Social Science Research Council/American Council of Learned Societies Working Group on Cuba, Academy of Sciences of Cuba, Cuban Blue Shield and the Advisory Council against Disasters and Emergencies in the Heritage (CADEP). The goals and objectives of CADEP are also described. Creating awareness through workshops is stressed. (Pastrana, Lashley & Perez, 2009)

The National Library of Australia website under its collection-disaster-plan provides in-depth information about disaster management in two parts, namely disaster preparedness and prevention policy and disaster actions. The first part is to be used by preservation staff as a manual in routine disaster preparedness and prevention activities. The second part is intended for use by those responsible for managing a disaster. It can be used by any library to understand the importance of planning disaster management in libraries. (National..., n.d.) Other general issues covered are preparation for disaster, funding for damaged libraries, and staff morale in libraries affected by disaster. Fullerton (2004) also attempts to describe National Library of Australia’s approach to disaster management. According to the author, as the library provides services and maintains collections, disaster preparedness is not restricted to its resources, but takes a risk management approach, identifying and assessing risks as they appear and deciding the level of attention they warrant if the library wants to stay in business.

The literature search revealed that most of the resources available are from countries other than India. There is very little Indian literature published on library disasters. Indian library associations like Indian Library Association (ILA) or Indian Association of Special Libraries and Information Centres (IASLIC), going by their conferences, publications and websites seem to have done very little work on disaster management. Newspaper clippings describing disasters in libraries are available, but very brief information is provided in those clippings.

3.5: Disaster Experiences

This section reviews libraries that faced specific disasters and how they coped. Many of these articles are based on the personal experiences of the authors. Van der Hoeven and van Albada (1996) briefly enumerated libraries that have been lost or damaged in the past due to different types of disasters including war and political conflict.

3.5.1: Earthquakes

Finley (1999) and Curzon (2006) describe the effect of an earthquake on California State University Library at Northridge, USA. Several articles (Loftus, 1999; Shah and Surati, n.d.; Shaheen 2007 & 2008; Batori, 2009) have described how earthquakes have affected Stanford University Campus libraries, USA; libraries in the Kutch, Gujarat, in Azad Kashmir, and in Central Italy respectively. Several news items...
described the effect of earthquakes on libraries all over the world—Haiti, Japan, China, USA etc.

### 3.5.2: Water

In the past many libraries and museums have been damaged due to water. According to Bolger (2003), water-related damage is the most common disaster faced by libraries. Frank’s (2011) paper reports the impact of Hurricane Katrina on Gulf Coast libraries including Southeast Louisiana, New Orleans, and Southern Mississippi. A survey of select libraries was conducted to find out the state of damage and how the libraries coped. It was found that even though libraries had disaster management plans, they were not able to handle such a large disaster.

Baryla (2006) examines how Bibliothèque Nationale de France (BnF) has prepared itself for a disaster subsequent to a major library disaster caused by rise in water level in river Seine in 1910. Similarly Lenzuni (1987) vividly describes the flooding of river Arno in Florence, Italy in November 1966, affecting public and private libraries, including the National Library of Italy. Tarman (2000) who was a curator of Innsbruck Museum in Austria describes the first time flooding of the basement of the 450 years old museum which also had a library. Schmidt (1999); Parker (2007); Lande and Smith (2009) studied the effect of flood on Colorado State University library in 1997 due to heavy rains.

Flooding at Stanford University, USA in 1998, (Loftus, 1999) flooding in European countries specially in Czech Republic, Austria, Germany, Slovakia, Poland, Hungary, Romania and Croatia in 2002, (Ray 2006; Polisensky, 2002 & 2007) and flooding at the Boston Public Library in 1998, (Fithian, 1999) have been the subjects of various articles. The paper by Flaherty (2009-2010) narrates the experience of one small rural public library in the same year. How libraries in Iowa, USA in 2008 were affected by floods is described by Baum (2009).


Hurricanes are very common disasters which have affected many libraries in the past. They destroyed many libraries and damaged collections in university and public libraries. Many articles have been published on hurricanes and their effect on libraries. Silverman (2006a) gives an overview of hurricane affected libraries. Damage caused to the collection and recovery efforts made by the affected libraries are described. According to the author, though libraries have made individual efforts, there is a need to have a National Disaster Centre for Cultural Property which would be capable of implementing an effective response in emergency situations in USA.

Explanation of types and dangers of hurricanes are described by Aarons (2003). The author also describes hurricane ’Gilbert’ which hit Jamaica in 1988, while Cassell (2004) describes the effect of hurricane ‘Hugo’ in 1989 in Montserrat Island damaging the Montserrat Public Library. Pinhong (2006) describes the salvaging operations used to save ancient books and manuscripts which were damaged by typhoon Longwang at Yongquan Monstery in China in October 2005. Another example of a hurricane affected archive in the city of Falkenberg, Sweden in January 2005 is described by Cullhed (2006).

Many articles on Katrina hurricane of 2005 and its effect on libraries have appeared. (Frost & Silverman, 2005; Eberhart, 2005). Long (2006) describes the uses public libraries were put to during the relief operations while Ellis in 2007 explains the procedures to recover from the damage caused. Corrigan (2008) too describes the salvaging procedures. Topper (2011) emphasises that in the face of a natural disaster of large magnitude a local disaster management plan is not useful. The author argues for the establishment of a recovery centre in such a calamity: it would help in getting donations, insurance money and technical support. Spencer (2005) and Robertson...
(2005) highlight the role of SLA and other organizations in helping librarians and others who were affected due to hurricane Katrina.

Water damage to library resources can also be caused by emergencies other than floods and heavy rains. Zhaqing & Daying in 2007 assessed damage at the Library of the Culture Palace for Nationalities of China (LCPN) which faced a minor flood in 2005 due to bursting of heating pipe. Calzonetti and Fleischer (2011) report on damage to the Science and Technology Library of University of Akron in 2010 due to bursting of an unwrapped fire suppression pipe.

Collections in Indian libraries have also been damaged due to flood and heavy rains. Trishanjit Kaur (2009) discusses the impact of disaster, losses incurred and action taken in two university libraries in Punjab that faced floods during July 1993. Some libraries in Mumbai faced flooding due to heavy rains on 26 July 2005. But only newspaper clippings and two M.L.I.Sc. dissertations were available on these damaged libraries. Lule (2006) describes the loss of 80,000 books at C.H.M. College Library. Behre (2006) studied how the D.G. Ruparel College Library coped when it was flooded due to heavy rains in July 2005. Several newspaper articles report on damage to other libraries. Some of these are by Karnik (2005); Mulye (2005); Patil (2005) and Rajendra (2005). The disaster damaged many personal collections. Bapat (2005) and More (2005) describe damage to the books and measures taken to salvage them.

Floods also damaged libraries in Gujarat due to heavy rains in August 2006. Desai (2007) has collected newspaper clippings, describing the effect of the flood on Surat and its people, the Government action taken and libraries that were affected. A special issue was published by Kanjibhai Desai Samaj Shikshan Bhavan Trust describing the damage to its library. (Sheeth, 2006) The effect on Kavi Narmad Central Library was the subject of an M.L.I.Sc dissertation by Trupti Mahida (2008). Kothari (2006) compares the efforts at salvaging damaged books in Surat with Sundaraya Vignana Kendram in Hyderabad, Andhra Pradesh, which was damaged due to flood in August 2000. The detailed information about the damage, recovery methods is given on its website. (Sundaraya..., 2000)

Whether a disaster is natural or man-made, library collections are most vulnerable to water. Once damaged by water if early treatment is not given, the collection is likely to be completely destroyed. Mould and fungus are likely to grow on the collection. If these are not treated properly, they can spread very fast to other undamaged items in the library. Further certain types of mould and fungus have been identified as dangerous to human health. Mould and fungus problems are faced by many libraries regularly on a small scale.

3.5.3: Mould, Dust, and Pollution
Lyall in 1994 stressed on having preservation programmes in South-East and Asian Pacific regions as many countries in the area were getting badly affected due to political and physical climate. The articles by Sexton (2001); Dantigny (2007); Reade Fong (2001); Basset (2007a, 2007b) and Dean (2002) were found useful in understanding factors that lead to growth of mould on library resources and how mould can be controlled. The focus of Ketzer’s (2003) article is on controlling of insects – types, damage they can cause and their prevention using chemicals and climate control measures.

Several authors have described dust monitoring at the British Library and explored reasons for dust depositions, measuring of dust levels and controlling and cleaning of dust. (Pimlot & Peach, 2011; Knight, 2011; Smith, Goodhue & Bioletti, 2011; Shah, Hunter, Adams, Bancroft & Blyth, 2011)

3.5.4: Fire
Fire is another disaster threat faced by libraries. Shepilova (1992) presents an analysis of fire hazard in libraries and archives, highlighting the most effective methods of extinguishing fires whilst ensuring that a minimum amount of damage is caused. The Library Disaster Centre formed by DOCUMENT SOS company and it role is described by Thorburn (1994) and Polloni & Harlins (1996). Experiences of fire in libraries are shared by Hammond (1996); Cullhed (2003, 2006); Battersby (2005); Milles (2004) and Holderfield (2007). These articles also provide information and recommendations for fire protection, salvaging, staff training and insurance issues. Silverman (2006) focuses on merits and demerits of various methods used for removal of soot from books.

Conventional and recent options for protecting libraries against fire and the concept of inert air venting is introduced and evaluated by Madsen, Jensen, and Holmberg.
Advantages of water mist systems technology for fire suppression are discussed by Myree (2008). McGinty (2008) also evaluates different types of fire suppression systems along with other safety and security measures relating to the building.

The development of fire safety plans for the University of North Carolina Library at Pembroke, USA is described by Power (2011). The author referred to several fire safety plans of various libraries available on the internet and developed a fire safety plan which included arranging for fire drills, fire safety training for staff.

3.5.5: Vandalism and Other Disasters

War, attacks, vandalism and looting are some of the common reasons which have caused great loss to libraries. The Library History Seminar XI organized by the Graduate School of Library and Information Science, University of Illinois, Urbana Champaign, USA, during 27-30 October 2005 had as its theme ‘Libraries in times of War, Revolution and Social Change’. Papers presented in this seminar have been published as special issue of Library Trends, 2007. The twenty seven articles focus on the effect of World War I/II on libraries, loss of Chinese books during the Peking Siege and destruction of libraries during the Iraq war. (Rayward & Jenkins, 2007)

The participants of the Urgent Regional Workshop “The Cultural Heritage at Risk in the Event of Armed Conflict–Macedonia Case” held in Ohrid, Republic of Macedonia, 20-24 February 2002 identified steps to be taken before and after armed conflict in the Republic. Identification of cultural monuments and administrative and legal action necessary for their protection are discussed. Formation of National Crisis Council and National Blue Shield Committee for Macedonia are suggested. (OHRID, 2002)


The damage to Indian libraries over the centuries due to looting and vandalism is briefly described by Gul & Khan (2008); Bhatt (2009); Walia (2003); Caswell (2009) and Sojitra ... (1986).

Other crisis situations included building collapse and power failure. Iona and Plassmann (2009) describe the rescue operations following the collapse of the City Archives of Cologne, Germany in 2009. A week long power failure in 1998 seriously impacted services of the 13 libraries on the campus of the University of Auckland, New Zealand. (Grant, 2000)

In general it has been observed that the available literature mainly focuses on damage which has happened to libraries and restoration efforts made by them to save their damaged collection. The reports narrate the number of books lost and the time needed to restore library services rather than on consequences of a disaster. Though information is provided on the number of books and other materials destroyed, reports do not provide estimates of the amount of research and new knowledge that is postponed; there is no professional concern for the cost of a disaster in terms of “not provided” library services, and unanswered research questions. The emphasis on direct disaster costs causes a total miss of “what might have been” costs like not improved economic conditions, less democratic forms of government, and the gray quality of life that a lack of knowledge brings. (Smith, 1992)

3.6: Disaster Preparedness and Prevention

If the libraries are prepared or have taken preventive measures against any type of emergency, they would be more resilient to face any disaster situation. In libraries disaster preparedness and prevention involves planning, protection of human lives, saving and salvaging all kinds of resources – print, multimedia, digital and library records and restoration of library services at the earliest.

A few surveys on disaster planning in libraries were located. The development and use of disaster plans in six UK libraries and archives were investigated in detail and
Chapter 3  

Review of Literature

their contents are discussed. (Muir & Shenton, 2002). A project on ‘Safeguarding heritage at risk: disaster management in United Kingdom archives, libraries and museums’ was undertaken by Matthews (2007) during March 2005 – October 2006. Under the project funded by Arts and Humanities Council, UK to Liverpool John Moores University, a survey of libraries, archives and museums in UK and select libraries of the world was undertaken. The project report describes the findings of the survey, disaster management planning in UK libraries and suggests guidelines for libraries on how to prepare disaster management plans. According to the findings, many libraries had disaster plans, but they were not updated regularly. Staff training was conducted regularly. (Matthews, Smith & Knowles, 2004 (sic))

Marie-Therese Varlamoff & Marie-France Plassard conducted a survey on disaster planning in national libraries in 2004 to raise awareness of the importance of preparing for disaster and of writing and implementing disaster plans. The authors resolved that “Considering the many risks that threaten the cultural heritage, all libraries responsible for collections of national significance should set up, test, implement and regularly update a disaster plan”. (p.1)

Questionnaires, interviews and personal observation were tools used for collecting data on how libraries and information centers are prepared for disasters in Botswana. Findings indicate that libraries are ill prepared for disaster. Staff was not trained for disaster and there are no proper policies for disaster management in the institutions. (Hlahlaangani & Mnjama, 2008) A survey of public libraries of KwaZulu-Natal for their disaster preparedness revealed that libraries are not prepared for disaster. Most libraries neither had disaster plans nor had they set adequate procedures for disaster response and recovery. Sufficient staff with knowledge and skills to deal with disasters was also not available. (Ngulube & Magazi, 2006)

3.6.1: Need and Value of Disaster Plans
Several authors have highlighted the need and value of a disaster plan. Steps in disaster planning, developing, and writing and implementing a disaster plan for a library are explained in several articles and are also reflected in the disaster plans of many libraries. These articles also explain recovery methods for salvaging damaged books and other materials – air drying, vacuum freeze drying, and vacuum drying.

Chapter 3  

Review of Literature

(Clareson, 1997; Smith, 1992; Eden & Matthews (1996); Patkus & Motylewski, 2008; Mathews, 2007) Henson (2000) also gives detailed guidelines for any library to prepare its disaster plan. The disaster plan is likely to be a mix of narrative text, emergency plans, recovery instructions and directory information. Elements such as preventive measures, procedures in the event of disaster, contact numbers, list of disaster supplies, salvage techniques and revision procedure are main parts of a disaster plan. Overall, the plan should be comprehensive, simple and flexible. (Muir & Shenton, 2002).

Pearce-Moses and Yakel, (2007) discuss the need to have a yearly programme on disaster preparedness among cultural institutions. The article promotes concrete actions that can be taken to enhance disaster planning and preparedness in cultural institutions. Every year cultural institutions should dedicate one day to be known as May Day for emergency preparedness and planning. Some general resources for disaster planning and preparedness are listed.

It is extremely important to have a disaster plan for a national library of any country. Cruzat (2004, 2006) describes the present and future disaster prevention and emergency response work of the National Library of Chile. The disaster management planning at the British Library can be an example which other libraries may follow. A brief description of the disaster management plan is described by Jenner (2006), and McIntyre (1987) explains the need for disaster control planning using an example of The National Library of Scotland.

3.6.2: Disaster Planning
A manual written for IFLA by John McIwaine (2006) on disaster preparedness and planning explains that the basic objective of a disaster preparedness plan is to minimize risks so far as possible, and maximize the efficiency of response if a disaster occurs. The author describes in detail the steps involved in disaster preparedness plan for libraries. The book by Kahn (2009) is a step-by-step guide for preparing and responding to all types of library disasters. It is an instruction manual for writing a disaster plan that covers all the aspects - response, recovery, prevention, and planning. It provides checklists which can be used by any library.

71
Many museums in different countries have guidelines on how to be prepared for any emergency and the preventive measures to be planned. These measures can also be applied to libraries. U.K., The Council for Museums, Archives and Libraries (2002) has published a self assessment checklist and suggests benchmarks to take care of the collection, building, storage area and furniture, security, emergency preparedness, environment monitoring and control, including temperature, light and humidity control. This was further explained in greater detail in its 2006 publication (U.K., Museums..., 2006)

The National Park Service Museum Handbook Part I by O’Connor (2000) is an excellent guide for emergency planning in museums which can also be used for libraries. It describes what can happen due to natural and man-made disasters like bomb threat, earthquake, fire, structural collapse, civil unrest, vandalism, terrorism, and flood and it provides an idea of the damage it can cause. Survival measures that need to be taken if an emergency occurs are also described.

The National Park Service website under U.S. Department of Interior published a series named ‘Conserve O Grams’. The series consists of short, focused leaflets about caring for museum objects. New topics are added as needed and out-of-date issues are revised or deleted. These leaflets can be used by librarians for management of the library collection. ‘Conserve o Grams’ leaflets on Disaster Response and Recovery issues include salvaging of different types of materials, damage caused by water and seismic activities, disaster preparedness and emergency procedures, health and safety hazards etc. (USA, Department of Interior... 2002-2009) and (North East..., 2011a) has uploaded on the internet leaflets on emergency management written by different authors.

The Western New York Disaster Preparedness and Recovery Manual for Libraries and Archives was prepared in 1992 and a need to revise it was felt after the 9/11 incident. The primary purpose of this manual is to provide information for response to a disaster with some emphasis on the preventative measures or steps that can be taken by individual institutions to minimize the risk of such situations. Because the elements that most often threaten libraries and archives are fire and water, the emphasis of this manual is on preparation for and response to situations that involve these particular elements. (Battleson, 2004)

The basic step by step method to be followed in developing an effective disaster preparedness and recovery plan are outlined by Fleischer and Heppner (2009). A checklist which can be used by a librarian to evaluate if his/her library and its staff are ready for any kind of disaster is provided by Wilson, Yowell and Holst (2009). Ten steps of disaster management from assessment of risk to continuity of services are described by Roze (2002a & 2002b). The author also describes stages and contents of a disaster plan and practical tips, which will be helpful for a library in case of emergency.

Many organisations have prepared readymade templates on web which can be used by librarians to prepare their own disaster plans. The Australian Library and Information Association (ALIA) has provided a guideline in the form of a template for compiling a disaster plan for any library (Australian..., 2010). Several organisations listed earlier also provide detailed guidelines and templates for general use. This include dPlan by NEDCC and the Massachusetts Board of Library Commissioners (MBLC), USA, (NEDCC... , 2011) Amigo Library Services (2008) has provided a disaster management plan sheet which any library and archives can use to fill in and prepare their own disaster plan. It is a very simple plan describing what is required in case of disaster, maintaining a contact list and other useful information.

Cooperative disaster planning is required for managing large scale disasters; it will help in managing economically. It is considered that rather than individual libraries managing preservation activity, if a group of libraries do it co-operatively, it will be more effective and economical. The survey conducted in UK libraries reflected that the most commonly preferred cooperative activities were preservation, conservation, microfilming and disaster management. The authors also discuss the problems encountered during co-operative preservation activities among libraries. (Eden & Gadd, 1999). Lasley (2003) has provided through her research a framework within which research libraries in New York could cooperate effectively in the event of major disaster. Individual libraries need to have effective disaster recovery processes that can help cooperatively in creating defences against large to wide scale disaster.
3.6.3: Plans and Planning in Specific Libraries

3.6.3.1: Actual Plans

Every library must keep handy a disaster plan for emergency use. Proper content of the plan will help the library to cope with disaster in case it happens. Many libraries, archives and museums have given their disaster plans which can be used as models by any library to develop their own disaster plan. Ellen Clarke Bertrand Library has developed a disaster plan in 2005, which describes emergency procedures required to be carried out in case of disaster. (Bucknell..., 2005) James Madison University Library in USA has a library disaster management plan as part of the University disaster management plan. It not only describes what to do and whom to contact in an emergency, but also describes salvage procedures for water damaged material. (James..., 2004) The Disaster Plan for the University of Toronto is limited to procedures for removal and salvage of library collections. Its purpose is to minimize collection loss in the event of a disaster. The plan mainly focuses on water related damage, as that is considered the most common disaster likely to happen in the library. Detailed instruction on what to do, whom to contact, basic prevention to stop further damage are provided with diagrams. The manual covers all types of material from print to audio-visual to digital media. (Toyonaga, 2010) A chronological description of disasters faced from 1999 to 2006 by the University of Delaware is given. A detailed description of disaster management plan includes the following items: 1. Emergency kit in the library. 2. Emergency contact numbers of university officials, companies involved in disaster recovery, freezing units available in the university and outside. 3. Salvaging methods for different types of materials. (The University..., 2004)

The School of Medicine (SOM) Library, at the University of South Carolina decided to develop a disaster plan for its library. The process of developing the plan is spelt out. (Yeh, McMullen, & Kane, 2010)

Two articles by Myrbakk (2003, 2005) explain about climate control and conservation efforts managed at the National Library of Norway. Measures used include the setting up of two vaults – one inside a mountain and one outside for nitrate films. Controlled climate, having tight security, proper shelving, storing collection in acid free containers are conservation efforts that prolong the lifetime of the document. Disaster control measures for these vaults are prevention of earthquake, backup power generator, protection against acts of war, protection against magnetic radiation, flood and fire protection, security system for vandalism and theft.

Some practical tips are given by Geiger (1993) to newspaper librarians in preparing for the unpredictable. For example, to prevent materials getting damaged from a minor fire, cabinets should be made of fire and water resistant material. Also, valuable material can be stored at off-site storage. Nothing should be directly stored on the floor. To avoid structural collapse, floor loads must not exceed the designed strength of the building. Examples of salvaging photographs, video tapes and audio tapes are described. Basic information on care of digital data is given.

The activities related to disaster recovery planning in the Estonian National Archives, Estonia are described by Kuuben (2003). The risks could be both technical and human factors. The coordination between different groups like management, disaster response team, employees and readers is stressed. A positive attitude of the staff towards disaster recovery is necessary.

The workbook by Fox (1998) describes in detail the actions and procedures that need to be taken in case of any type of natural and man-made disasters in US Navy libraries. In case of fire, flood, hurricane, mould, power failure, and earthquake the steps a librarian should take to save and salvage the collection are explained.

The library environment in terms of conservation, disaster planning and external environmental factors for the University of West Indies, Trinidad is examined by Clarke (2002). Factors relating to air-conditioning, microbial content in the air need to be monitored. Since the library is located in an earthquake zone, measures have been taken by bracing all the shelves thus giving them stability.

No Indian library has shared its work in this direction except one. Harish Chandra (2009) stresses on importance of disaster planning and preparedness and gives an overview of how Indian Institute of Technology (IIT), Madras library is prepared for disaster.
3.6.4: Library Building Disasters – Preventive Measures

Foot (1996) emphasises the need for good building condition and describes general measures required to be taken for temperature, humidity control, air quality in storage area and prevention of fire and water damage.

Preventive measures should be taken from the time of planning a new library building. Varlamoff (2005) in her article describes different criteria to be kept in mind like, location of building, use of building material, size and number of windows, location of departments at the time of planning a library building. Giovannini (2000) has emphasised the need for having coherence by bringing together the architect, the librarian, the preservation specialist, and all other specialists like building engineers, climate control engineers and others when construction of a new library building is planned. The author also explains in detail the following factors: the location of the site, inside and outside features required for the new building, internal and external environmental factors to be controlled, temperature level, humidity level and air-conditioning requirement for the new library building.

The first and vital stage of any preventive strategy is a full risk assessment of the building, both inside and outside. Muir & Shenton (2002) suggest a variety of preventive measures to mitigate a disaster; these include regular inspection of the building, electrical, roof and Heating, Ventilation and Air Conditioning (HVAC) equipment maintenance, security in the library, storage systems for the library materials.

Jieyin, Zhonghua, and Zhongxia (2005) in their paper examined the regulations of the Chinese National Standard for Library Building Design for collection preservation and disaster prevention. They describe how the design of the new building of Shanghai Library abides by these regulations, and discuss what special plans are established in the library for disaster preparedness and management.

However, some general methods and conditions can be common to all libraries. For example as an employee and a human being what one should do, post disaster, to take care before taking any action are explained by Silverman (2004); structural stability of the building should be checked before re-entering a building after a disaster. Other

check points to be kept in mind are electrical dangers, harmful hazardous material, collection based hazards, biological hazards like mould growth, insects and diseases.

3.6.5: Digital Disasters – Preventive Measures

Digital disasters can occur in parallel with natural or man-made disasters or can happen on their own accord. The status of preservation of digital resources and disaster recovery measures taken by libraries in China were studied by Jiazhen and Daoling (2007). Findings indicated that physical deterioration of data led to non-renewable data loss, inability to read the data due to obsolete storage media, weak data back-up management system, shortage of relevant knowledge on preserving digital information resources, failure to migrate the obsolete data in time.

A comparative evaluation among three main cultural institutions in Malaysia regarding long term preservation of digital content are described by Manaf and Ismail (2010). To avoid digital disaster, issues relating to hardware and software compatibility, long-term storage, organisation of files for ease of search and retrieval, media quality, disaster recovery, and integrity of original data have to be kept in mind.

Hawkins, Yen and Chou (2000), have highlighted issues related to prevention and recovery from digital disasters. The authors explain the need to have a disaster recovery plan and discuss how to cost it. They also stress the issue of insurance and training of human beings. Tennant (2001) describes how to cope with disasters in digital libraries and what preventive measures should be taken to avoid disaster. Boss (2002) also explains how a proxy-server and firewalls can protect the database server of a library. Georges (2004), emphasises issues related to having properly trained staff, types of servers to have, backup of data, damage assessment and recovery and restoring operations.

According to Robert Fox (2006), although libraries may assign responsibility for information security to a person or department, it is important for everyone to be aware of the potential risks involved in the security of digital data. There is a need to preserve and guard digital content, prevent digital infiltration and protect electronic infrastructure in a digital library as it is open to public. Digital librarians need to be
familiar with basic web application security because library services and content are being distributed on the web. Fox also describes the types of threats that can be faced in a digital library environment and necessary security arrangements to be made.

Edwards and Cooper (1995) emphasise the need to test the feasibility of a disaster recovery plan at regular intervals. They outline a testing methodology for reducing costs by breaking the test procedure into various stages.

Post 9/11 the need for organisations to be prepared was highlighted. Dimattia (2001) explains the need to have necessary information in duplicate locations including on portable devices. System backups for the organisation should also be stored off-site. Every library and information centre should think of the business continuity process in case of emergency.

Jiazheng and Peng in 2009 highlighted that due to lack of the demand analysis of Digital Records Management and Business Process Management, the preservation of digital data is affected in the long term. Archival data requires long term preservation and the difficulties faced are updating of storage media, information transfer and shortage of disaster recovery management plan. According to authors, in the context of deterioration of the natural environment and the globalisation of terrorism, prevention of disaster is extremely significant. Creation of an “e-government disaster recovery centre” is suggested.

Disaster recovery planning (DRP) and business continuity planning (BCP) are two of the most critical components of digital library system infrastructure, yet they are aspects that are often overlooked. According to Cervone (2006) all DRP and BCP efforts fall into three major areas – to ensure the safety and well being of employees and patrons, to coordinate recovery activities, to recover critical business functions.

The recommendations given by Al-Badi, Ashrafi, Al-Majeni, & Mayhew (2009) at the end of their paper with reference to cyclone Gonu which hit Oman in June 2007 are useful for preparedness of IT departments in both public and private sectors.

### 3.6.6: Insurance and Funding

A survey of 36 libraries which were affected due to natural and man-made disasters was undertaken to study funding efforts of libraries, post disaster. The libraries mainly depended on insurance money, and government funding. It was found that insurance money was very little compared to the quantity of damage. A few librarians made efforts to raise money through donations from NGOs. Methods adopted by librarians to generate funding are described. (Peterson, 2008)

Having insurance for the library is one of the measures that help libraries to recover from disaster. Thorpe (1997) and Howes (2003) describe the importance of insurance for libraries, insurance appraisal of the library premises and collection. The author also describes how a repository of the University of Sussex Library, UK handled an insurance claim. Payton and Shields (2008) explored insurance coverage of three damaged libraries due to hurricane Katrina and Rita. Details of type of coverage and awareness about insurance are described.

The focus of the article by Lal, Bose and Agnihotri (2006) is to emphasise the need for libraries to be insured against fire. Detailed explanation of risks a library can face and explanation of various fire policies are explained. The author also explains what type of fire prevention measures a library should implement.

### 3.6.7: Training

Almost all articles emphasise the need for training staff and preparing them for emergency. Ahenkorah-Marfo & Borteye (2010) assess the level of preparedness of the staff at the Kwame Nkrumah University of Science and Technology (KNUST) main library located in Kumasi, Ghana to prevent, fight, and manage disasters. Questionnaire, interview and personal observation tools were used for data collection. The questions focused on handling of emergencies like fire, leakage in roof, knowledge of fire extinguishers in the library, importance of disaster plan, and disaster management team. The results indicated that most of the staff were not aware of, did not know or were not prepared for any kind of disaster. The authors suggest that providing proper training, displaying notices in prime places in the library and having a disaster management plan as well as disaster management team in the library is necessary.
Matthews and Eden long back in 1996 had stressed on training of library staff for disaster management. This training should be frequently conducted and updated with new developments. They stressed that training should be on prevention, preparedness, reaction and recovery of human beings and library resources. Practical training on handling of equipments like fire extinguishers should be conducted. Methods of training and resources required for training are highlighted. Topper (2008) also gives a general overview of security measures required in the library and need for staff training whereas Bertini & Budassi (2010) describe virtual training for an emergency in the library. ‘E-mergency’ is a project to provide tools and useful information for prevention and answers to possible situations of emergency inside libraries and archives.

### 3.6.8: Salvaging of Materials

Almost all books on conservation and preservation deal with factors causing deterioration and damage to materials and their treatment. Many of these include disasters as one damaging cause. In the present review only those resources which focus on post-disaster salvaging have been included. Most of the earlier referred literature describes some methods used for salvaging of the library collection.

The research project carried out by Silverman et.al. (2007) compared five drying techniques (air drying, vacuum freeze drying, thermal drying, vacuum packing and vacuum press drying with Zorbix) and two sterilization techniques (ethylene oxide or gamma irradiation) which would cause the least mechanical damage to 18th – 20th century handmade and machine-made book papers.

Another research focused on comparing surface abrasion on soot covered material by dry ice dusting and conventional dry rubber sponge cleaning. The study measured post-cleaning alterations in surface colour to quantify the effectiveness of both approaches, and also documented the degree of physical damage caused by either approach. Findings indicated that dry ice dusting was less abrasive than rubber sponge cleaning. (Silverman & Irwin, 2009) The article by Walsh (1997) is worth mentioning. The author is an expert in salvaging of wet materials. The complete description of salvaging of different types of media damaged due to water is explained.

### 3.7: Other Issues

Some interesting articles were found on a theme not directly connected to the present research area, but relating to disasters and libraries. They discuss multiple roles libraries and librarians can play at the time of disaster.

Welsh and Higgins (2009) have documented the post-disaster challenges faced by public libraries as well as post-disaster services provided by them. Narcatives of 72 library and information science students enrolled in the University of Southern Mississippi’s School of Library and Information Science, many of whom worked in local libraries, were collected and analyzed. The effects of Katrina on public libraries as narrated by the students were devastating; public libraries were at the same time inundated with patrons seeking information and a way to communicate with others. Services provided by the libraries included meeting the need for information and communication by providing aid organization information and forms and by providing access to computers. Additional services related to public librarianship included listening, volunteering, donating money or materials, and providing comfort and consolation.

A survey of public libraries in Florida, USA focused on the role played by public libraries after the Katrina hurricane. The findings indicate that public libraries helped communities in getting government information, filling up of required documents, internet access, providing disaster information and conducting workshops, providing book mobile services, helping relief agencies etc. (Bertot, Jaeger, Langa & McClure, 2006) A case study method was adopted by McKnight and Zach (2007) to investigate the ways librarians developed new services during disasters. In a hurricane affected library new services provided were continuing services from outside the library, extending service hours, new outreach locations, new websites, and new evacuee-specific services. Special services for displaced adults and children, extended loan periods or suspended fines, wireless internet access, delivery of reading material to evacuee shelters, providing program matching services to guide displaced students in their choice of new schools were some examples of services provided by librarians. Libraries provided office space to displaced librarians, issued temporary borrowing cards to displaced users, provided free photocopying, and read stories to children in evacuee shelters. Some began new computer instruction programs, provided...
refreshments, facilitated communication with their local Emergency Operations Center, arranged transportation for evacuees, collected donations, helped evacuees search online for missing family members and pets, and helped evacuees replace drivers’ licenses, birth certificates, and other important documents.

An oral history project conducted by the National Library of Medicine using interviews of health librarians from North America revealed multiple roles librarians played during a disaster or emergency situation. In addition to managing a disaster in a library, the roles played by them were of being institutional supporters, collection managers, information disseminators, internal planners, community supporters, government partners, educators and trainers, and information community builders. Stories reflected that librarians played multiple roles. (Featherstone, Lyon & Ruffin, 2008)

An online survey and in-depth interviews on use of library services by survivors of Hurricane Katrina is reported by Braquet (2010). The survey results indicate that post disaster the public library was used for many reasons like 1) Internet Access 2) Information and Technology Assistance 3) Mental Escape and 4) Refuge. These findings suggest that people do need information post disaster, want to contact their family and friends through internet, want to read to escape from mental stress and take shelter in the library. The public library should help the community to cope with any disaster and provide services accordingly.

Winston & Quinn (2005) analyzed the role of library leadership in times of crisis. They identified 403 articles from four library science journals. The literature reflected that during war and terrorism, librarians were ready to provide services to the reader.

Many librarians made special efforts in providing services at the time of 9/11 crisis in USA. Librarians worked from home or other offices and provided services through their websites. Matthews and Wiggins (2001) examined the response of libraries and librarians post September 11. The paper describes how librarians responded and provided services to their members. Sidney Eng (2002) was in a college library near the World Trade Centre when the 9/11 incident happened. The author put useful information on the website related to library and provided library services through internet.

A terrorist attack in London happened in July 2005. The paper by Chapman (2006) examines the role of University College London libraries and how these libraries coped with it in terms of service continuity and its effects on staff.

Literature representing the culture of Sri Lanka was destroyed in the ethnic conflicts since the 1970s. The role libraries can play; the services they can provide in these situations are explored by Maheswaran (2008).

The paper by Reynolds and Tamanah (2010) describes the potential role of a medical librarian in disaster management in hospitals. They further highlight the efforts made by medical librarians in emergency preparedness.

In the Indian context Satpathy, (2007) describes the role libraries can play in the management of disasters. The author shares his personal experience of how North East India deals with disaster management and suggests how libraries can play a role in creating awareness in the community.

Few archives were created to store and preserve information related to a disaster incident. When disaster strikes, post disaster plenty of literature is published in the form of newspaper articles, journal articles, books, email messages, condolence cards, photographs, videos and many more. All these may or may not have important information relating to that disaster. An attempt has been made to document this literature. Johns (2007) discusses issues related to creating such archives. The paper examines the best practices for the management and use of the Omagh Bomb Archive, an archive created following the car bomb in Omagh, County Tyrone, Northern Ireland on 15 August 1998. Issues discussed are acquiring, storage, and use of this data. It was observed by the author that special funding is required to manage this data and digital migration needs to be applied over years to keep the digital data usable.

Similarly the Katrina Research Centre which opened in 2007 is a multidisciplinary research centre collecting physical and digital data related to the Katrina hurricane of
Welsh (2010) examines formal and informal communication and documentation related to the creation and development of the Katrina Research Center (KRC) including its mission, vision, organizational structure, funding, collection development, community outreach, research, and educational activities.

3.8: Conclusion

Extensive publications – both in print and digital formats were located. However, as described in the chapter, most of the publications are based on personal experiences of authors who have faced and handled disasters in libraries. Indian literature on the topic is scarce and most of the information is available in newspapers as reports of the incidents faced by libraries. Though ‘tidings’ and ‘testimonies’ over-ride the research materials, several learnings can be drawn from these as well. They helped the researcher to realise severity of damage a disaster can cause and also how libraries have coped with the situation.

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Chapter 3


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Chapter 3

Review of Literature


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Chapter 3

Review of Literature


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**CHAPTER 4
RESEARCH DESIGN**

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Section Heading</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Objectives</td>
<td>106</td>
</tr>
<tr>
<td>4.2</td>
<td>Scope and Limitations</td>
<td>106</td>
</tr>
<tr>
<td>4.3</td>
<td>Concepts and their Operationalization</td>
<td>107</td>
</tr>
<tr>
<td>4.4</td>
<td>Postulates</td>
<td>109</td>
</tr>
<tr>
<td>4.5</td>
<td>Research Methods</td>
<td>109</td>
</tr>
<tr>
<td>4.5.1</td>
<td>Selection of Methods</td>
<td>109</td>
</tr>
<tr>
<td>4.5.2</td>
<td>Quantitative Survey</td>
<td>110</td>
</tr>
<tr>
<td>4.5.2.1</td>
<td>Questionnaire development</td>
<td>110</td>
</tr>
<tr>
<td>4.5.2.2</td>
<td>Universe and Sample</td>
<td>112</td>
</tr>
<tr>
<td>4.5.2.3</td>
<td>Questionnaire Distribution</td>
<td>114</td>
</tr>
<tr>
<td>4.5.2.4</td>
<td>Response Received</td>
<td>116</td>
</tr>
<tr>
<td>4.5.3</td>
<td>Qualitative Narratives</td>
<td>118</td>
</tr>
<tr>
<td>4.5.3.1</td>
<td>Narrative Analysis: Issues Covered</td>
<td>118</td>
</tr>
<tr>
<td>4.6</td>
<td>Data Analysis</td>
<td>120</td>
</tr>
<tr>
<td>4.6.1</td>
<td>Questionnaire</td>
<td>120</td>
</tr>
<tr>
<td>4.6.2</td>
<td>Narratives</td>
<td>121</td>
</tr>
<tr>
<td>4.7</td>
<td>Disaster Guidelines</td>
<td>121</td>
</tr>
<tr>
<td>4.8</td>
<td>Strengths and Limitations of the Research Design</td>
<td>122</td>
</tr>
<tr>
<td>4.8:</td>
<td>References</td>
<td>124</td>
</tr>
</tbody>
</table>