UPES

CENTRE FOR CONTINUING EDUCATION

DISASTER MANAGEMENT ARCHITECTURE IN DEFENCE AVIATION

BY

Saurabh Kala
Major (Army Aviation)
MBA (Aviation management)
SAP ID 500066167

GUIDED BY

Colonel Dhirender Yadav, Sena Medal
Commanding Officer,
Army Aviation Squadron

A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

MBA (AVIATION MANAGEMENT)

OF

The University of Petroleum & Energy Studies
Dehradun, India
December 2019

ACKNOWLEDGEMENT

This is to acknowledge with thanks the help, guidance and support that I have received during the Dissertation.

I have no words to express a deep sense of gratitude to the management of UPES and Indian Army for giving me an opportunity to pursue my Dissertation, and in particular **Col Dhirender Yadav, Sena Medal** for his able guidance and support.

I must also thank **Lt Col Santosh Kumar Yadav** for his valuable support.

I also place on record my appreciation of the support provided by **Maj Anand Singh** for providing me disaster operations related documents.

Major Saurabh Kala
A1/43 Jal Vayu Vihar Phase II,
Sector P , Mansarovar Yojna,
Kanpur Road, Lucknow, UP
Mob :- 9695028800
Email :- 116JAGUAR@gmail.com

Date :- 10 Dec 2019
Place :- Jammu, J&K

Col Dhirender Yadav, SM
Commanding Officer

257 Army Avn Sqn (ALH-WSI)
PIN - 925257
C/o 56 APO

Declaration by the Guide

This is to certify that the Major Saurabh Kala a student of MBA in Aviation Management, SAP ID 500066167 of UPES has successfully completed this dissertation report on "**DISASTER MANAGEMENT ARCHITECTURE IN DEFENCE AVIATION**" under my supervision.

Further, I certify that the work is based on the investigation made, data collected and analysed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfilment for the award of degree of MBA.

Name & Designation:-
Col Dhirender Yadav, Sena Medal
Commanding Officer, Aviation Squadron
Address:-
c/o 56 APO, PIN : 925 257
Mobile - 9454531504
E-mail - nintai201516@gmail.com

Date: Dec 2019

Place : c/o 56 APO

(Dhirender Yadav)
Col
Commanding Officer
257 Army Avn Sqn (ALH-WSI)

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Although man has made tremendous progress in the 21st century, he is still virtually helpless against adversities of nature. Natural disasters such as flood, cyclones, earthquakes and drought ravage man's domain at will and cause much loss to life and property. Having a diverse geographical terrain, India often faces these natural disasters in different parts of the country. All kinds of disasters - Natural or manmade have been an integral part of human history right from the dawn of civilization. Natural disasters comprise of a variety of natural forces that may result in a disaster and can be categorised into Meteorological Disasters, Topological Disasters and Biological Disasters. There are times when nature unleashes fury that is far more formidable than the deadliest weapons of wars and then the nation turns towards the armed forces for help. Since aid to civil administration is a constitutional responsibility of the Armed Forces, soldiers have always risen to the occasion. The Armed Forces are an important tool of response, available with the government, the Defence Aviation being the fastest means. The unique capabilities of an aerial platform make it ideal to reduce the effects of the disaster with much faster speed. The civil administration mandatorily embroil air effort in all their planning processes against any contingency and always fall back to the Defence Aviation in any emergency. Though it may not be feasible to control nature and to stop the development of natural phenomena but the efforts could be made to avoid disasters and alleviate their effects on human lives, infrastructure and property. There is a need to establish a rich disaster management related traditions in India and spread public awareness for disaster reduction. This study will aid the Defence Aviation in carrying out Disaster Management to the best of its capability.

CHAPTER-I

INTRODUCTION

"As long as no one is standing in its way, a wildfire is a natural event. Put people in front of it, and it becomes a stuff of tragedy."

-John Maclean

Overview

1. Although man has made tremendous progress in the 21st century, he is still virtually helpless against adversities of nature. Natural disasters such as flood, cyclones, earthquakes and drought ravage man's domain at will and cause much loss to life and property. Having a diverse geographical terrain, India often faces these natural disasters in different parts of the country. All kinds of disasters - Natural or manmade have been an integral part of human history right from the dawn of civilisation. Natural disasters comprise of a variety of natural forces that may result in a disaster and can be categorised into Meteorological Disasters, Topological Disasters and Biological Disasters. There are times when nature unleashes fury that is far more formidable than the deadliest weapons of wars and then the nation turns towards the armed forces for help.

2. Whenever disasters strike, they do not discriminate or differentiate between men and nations, poor or rich, young or old. They do not negotiate or listen and they do not wait, they simply come, kill and destroy, cause irreparable losses which are irrecoverable. A crisis needs to be examined in terms of its management cycle that would enable us to anticipate the crisis, prevent and mitigate it to the extent possible and deal with the crisis situation as it emerges. This 'life cycle' of crisis management may be divided broadly in three phases - pre-crisis, during crisis and post crisis. There is need to link disasters management and disaster plans. Planned improvement in legal frame work is needed. Bringing community consciousness will help in evading the impact of natural calamities[1].

---

[1] "Natural Disaster management in India" http://www.ukessays.com/essays/tourism/natural-disasters-management-in-india-tourism-essay.php p-5

3. A few of the typical disasters which have occurred in our country in recent times are:-

(a) Uttarkashi earthquake in 1991

(b) Latur earthquake in 1993

(c) Flash floods at Kulu-Manali

(d) Gujarat Cyclone in 1998

(e) Floods in Bihar and Assam

(f) Orissa Cyclone in 1999

(g) Gujarat earthquake in 2001

(h) Tsunami in Indian Ocean in Dec 2004

(j) Avalanche in J & K in Feb 2005

(k) Monsoon floods in Gujarat/Maharastra in Jun-Jul 2005

(l) Uttrakhand flash floods in Jun 2013

(m) Flash floods in J & K region in Sep 2014

4. Since aid to civil administration is a constitutional responsibility of the Armed Forces soldiers have always risen to the occasion. The Armed Forces are an important tool of response, available with the government, the Air Force being the fastest means. The unique capabilities of an aerial platform make it ideal to reduce the effects of the disaster with much faster speed. The civil administration mandatorily embroil air effort in all their planning processes against any contingency and always fall back to the Defence Aviation in any emergency.

5. Disaster reduction is a systematic work which involves different regions, different professions and different scientific fields, and has become an important measure for human, society and nature sustainable development. Management of disasters is like managing a war. One should always be prepared to meet it and do well to survive. It calls for a well formulated procedures and coordinated responses. In our country the main role has always been played by the government itself and the Indian Air Force.

6. Though it may not be feasible to control nature and to stop the development of natural phenomena but the efforts could be made to avoid disasters and alleviate their effects on human lives, infrastructure and property. There is a need to establish a rich disaster management related traditions in India and spread public awareness for disaster reduction.

METHODOLOGY

Statement of Problem

7. The aim of the dissertation is to study the Indian Air Force architecture of Disaster Management and analyze it's preparedness in Disaster Risk Reduction.

Hypothesis

8. India has been subjected to natural disasters since time immemorial. When the nature strikes adversely, Indian Air Force is the first one to be called for assistance. Indian Air Force plays a major role in preparing against natural calamities and expedites the procedure of disaster relief and restoring normalcy. Disaster Management being one of the major roles the Defence Aviation, it's architecture is still not fully organised and formulated to tackle the calamity and minimise the damage.

Justification of the Study

9. India is a large country and prone to a number of natural hazards. Among all the natural disasters that the country faces, river floods and earthquake are the most frequent and often devastating. The country has faced some severe earthquakes causing widespread damage to the life and property. India has a coastline of about 8000 km which is prone to tsunami and very severe cyclonic formations in the Arabian Sea and Bay of Bengal. Another major problem faced by the country is in the form of landslides and avalanches. Fright and panic among the affected people is natural. Because of the large geographical size of the country, the government machinery often faces problems of accessibility and timely relief in the event of a disaster. The Indian Air Force aircraft and its personnel have proved themselves

when deployed to their limits in many of the disasters in past and thus become the most desirable asset to any state government machinery at all the levels. The vulnerability to disaster must and can be brought under control only by means of disaster mitigation. It is therefore very important that we have a standard operating procedure in place to cater for these unforeseen eventualities.

Scope

10. In the study, plan is to first deal with understanding the phenomenon of various disasters, their impact during occurrences within our country and the measures undertaken by various agencies including government to mitigate or prevent them. Finally the architecture of Defence Aviation in disaster management and disaster prevention and issues related to its capabilities and challenges have been deliberated upon.

Method of Data Collection

11. The study for the dissertation has been conducted based on the information gathered from various books and journals written by various authors, papers downloaded from the internet. The researcher himself has been part of various disaster relief operations. Lt Col S Yadav, Flying Supervisor during Assam flood relief operations was also interviewed. Data collected has been undertaken in order to:-

(a) Enhance knowledge in the field of natural disasters.

(b) Understand the problems faced during various relief operations.

(c) Bring forth some recommendations to improve upon the preparedness against natural disasters.

12. A complete bibliography of the sources used during the study is appended at the end of the dissertation.

Organisation of Dissertation

13. The dissertation is presented in the following manner:-

(a) **Types of Natural Disasters in India and its Effects**. This chapter deals with understanding various term related to disaster, types of disasters which affect India on regular basis and their effects.

(b) **Disaster Management Structure in India**. This chapter deals with various disasters management organisations existing in India to deal with natural calamities at national as well as state level.

(c) **Disaster Management Structure in Defence Aviation**. This chapter deals with the architecture of Defence Aviation for preparation against the disasters.

(d) **Case Study Uttarakhand Floods in Jun 2013**. In this chapter a case study on recent flash flood in Uttrakhand has been carried out.

(e) **An Analysis of the Existing Architecture**. Based on the case study in the previous chapter, an analysis of the existing architecture has been carried out and compared with the same in developed countries which also get affected by natural calamities.

(f) **Recommendations and Conclusion**. At the end of the dissertation, certain recommendations have been put forth which will help India to be well prepared to deal with unkind natural calamities.

CHAPTER- II

TYPES OF NATURAL DISASTERS IN INDIA AND THEIR EFFECTS

'Disaster is a crisis situation that far exceeds the capabilities'.
- Quarentelly, 1985.

1. **Disaster.** The Webster's dictionary defines a disaster as ***'a grave occurrence having ruinous results'***. The concise oxford dictionary defines disaster as ***"sudden or great misfortune; calamity or complete failure"***. The World Health Organization (WHO) defines disaster as ***'any occurrence that causes damage, economic destruction, loss of human life and deterioration in health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area'***. In a total it is a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

Natural Disasters in India

2. Natural disasters comprise of a variety of natural forces that may result in a disaster. India is very vulnerable to natural hazards because of its unique geo-climatic conditions. Disasters occur in India with grim regularity causing enormous loss of life and property. Approximately 40 million hectares of the country's land area is prone to flood, about 8% of the total land mass is vulnerable to cyclone and 68% of the area is susceptible to drought. Natural disasters can be categorized into:-

(a) **Meteorological Disasters**. This would include cyclones, hurricanes, cold wave, heat wave and droughts.

(b) **Topological Disasters**. Earthquakes, avalanches, landslides and floods would come under this category.

(c) **Biological Disasters**. This would consist of epidemics of communicable diseases; e.g. Plague in Surat and Malaria in Rajasthan.[2]

3. This categorisation of natural disaster is to some extent an over simplification, as many disasters are actually caused by more than one or combination of various forces. Some disasters set a chain reaction of disasters. For example: Cyclone can be followed by a flood, which may eventually result in an epidemic. The main natural disasters which affect India are:-

(a) **Floods**. The term flood is generally used when the water-flow in rivers, streams and other water bodies cannot be contained. Floods result from natural causes, such as excessive rainfall, melting snow, or ice/vegetation/mud jams. Floods occur regularly in India affecting about 10% of area. According to the estimates of the National Flood Commission (1980), commonly known as the Rashtriya Barh Ayog, Assam and Bihar are the States worst affected by foods followed by U.P. and West Bengal. In many cases, the natural process of flooding is aggravated by man-made hindrances to free out-flow/ absorption of flood water both in agricultural areas and particularly in urban areas due to unplanned or unauthorized construction activities; sudden large releases from upstream reservoirs, which often is more than the carrying capacity of the basin results in massive destruction of river embankments and downstream flooding. The incidence of floods in recent times in urban areas such as Mumbai, Surat, Vadodara and other places is symptomatic of this trend and is the direct result of unauthorised construction activities[3].

(b) **Cyclones**. Cyclones take form of very large revolving and moving form (200-300 miles per day), accompanied by strong winds (80 to 100 miles per day), high tidal waves (10 to 20 feet). More than 8000 km of coastline in the east and the west face the hazard of tropical cyclone. Post-monsoon cyclones are usually more intense both in numbers and intensity. It has been

---

[2] "Public health aspects of disaster management" p 8
[3] "2nd ARC: Disaster Management (3rd report)" p 7-8 http://mrunal.org/2012/09/arc-disaster-mgmt-p1.html

estimated that over 58 per cent of the cyclonic storms that develop in the Bay of Bengal approach or cross the east coast in Oct and Nov. The 'super cyclone' that hit the coastal areas of Orissa on October 29, 1999 caused extensive damage killing about 10,000 people and lakhs of livestock population[4]. It had wind speeds of 270-300kmph accompanied by torrential rains for the next three days.

(c) **Earth Quakes**. The Himalayas - The youngest among the mountain ranges - are still evolving and adjusting to tectonic movements; existence of two major fault lines located on its west and east, have resulted in very severe earthquakes in several parts of the Himalayan and surrounding regions. This makes the entire region covering fourteen states (located in western and central Himalayas, northeast, and parts of Indo-Gangetic basin) highly prone to earthquakes. The hilly regions are also prone to earthquake-induced landslides. The other seismically active regions of the country include the Gulf of Khambhat and Rann of Kutch in Western Gujarat, parts of peninsular India, the islands of Lakshadweep and Andaman and Nicobar Islands. In our present state of knowledge, earthquakes can neither be prevented nor predicted in terms of their magnitude, or place and time of occurrence. Therefore, the most effective measures of risk reduction are pre-disaster mitigation, preparedness and preventive measures for reducing the vulnerability of the built environment combined with expeditious and effective rescue and relief actions immediately after the occurrence of the earthquake.

(d) **Tsunamis**. Tsunamis are large waves generated by sudden movements of the ocean floor that displaces a large volume of water. Although usually associated with earthquakes, tsunamis can also be triggered by other phenomena like submarine or terrestrial landslides, volcanic eruptions, explosions or even bolide (e.g, asteroid, meteor, comet)impacts.Tsunamis have the potential to strip beaches, uproot plantations, and inundate large inland tracts and damage life and property in coastal areas. The tsunami in Dec 2004 cause severe damage to life and property in the coastal areas of

[4] "2nd ARC: Disaster Management (3rd report)" p 5-6 http://mrunal.org/2012/09/arc-disaster-mgmt-p1.html

Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala and Andaman and Nicobar Islands[5].

(e) **Landslides and Avalanches**. Landslides are mass movements of rocks, debris or earth, down mountain slopes or riverbanks. Such movements may occur gradually, but sudden sliding can also occur without warning. They often take place in conjunction with earthquakes, floods and volcanic eruptions. At times, prolonged rainfall causing heavy landslides block the flow of rivers for quite some time, which on bursting can cause havoc to human settlements downstream. The hilly terrains of India, particularly in the Himalayas and the Western Ghats, are most vulnerable to landslides. In contrast to the Western Ghats, Nigiri Hills are geologically stable. The sliding down of snow cover on mountain slope causes avalanches. Avalanches may occur due to a combination of factors such as the slope of the mountain, depth of snow cover, wind velocity and atmospheric temperature, vibrations caused by gunfire and strength of resisting forces like vegetation cover of trees and shrubs. Small rivers may get blocked creating danger of downstream flooding.

(f) **Droughts**. Droughts refer to a serious shortfall in availability of water, mainly but not exclusively due to deficiency of rains, affecting agriculture, drinking water supply and industry. The reasons could be natural or manmade. The impact of droughts on societies varies depending on coping capabilities and the general health of the national economies concerned. Droughts in India have their own peculiarities requiring appreciation of some basic facts. These are:-

(i) India has an average annual rainfall of around 1150 mm; no other country has such a high annual average, however, there is considerable annual variation.

(ii) More than 80% of rainfall is received in less than 100 days during the South-west monsoon and the geographic spread is uneven.

---

[5] "2nd ARC: Disaster Management (3rd report)" p 6-7 http://mrunal.org/2012/09/arc-disaster-mgmt-p1.html

(iii) 21% area receives less than 700 mm rains annually making such areas the hot spots of drought.

(iv) Inadequacy of rains coupled with adverse density ratio compels the farmers to practice rain-fed agriculture in large parts of the country.

(v) Irrigation, using groundwater aggravates the situation in the long run as ground-water withdrawal exceeds replenishment. In the peninsular region availability of surface water itself becomes scarce in years of rainfall insufficiency.

(vi) Per capita water availability in the country is steadily declining.

(vii) As against total annual availability of 1953 km^3, approximately 690 km^3 from surface water and 396 km^3 from ground water resources can be put to use. The rest is wasted due to lack of harvesting systems.

(viii) The traditional water harvesting systems have been largely abandoned[6].

Effects of Disasters

4. Since evolution, men have ceaselessly endeavoured to create a better world for themselves. To reach this goal, tremendous development has taken place in the fields such as science and technology, medicine, commerce and industry, agriculture and in all spheres of human activities. All these achievements can be wiped out with in a flash by a natural or manmade disaster if a country does not prepare totally to face situations of this nature. Most of the natural disasters in the world occur in Asia and the pacific region. They cause enormous distraction and human suffering reducing the pace of reaching economic development forecasted. Some of the effects of disasters which affect India and need attention are as stated below:-

(a) Injury to personnel and loss of life.

(b) Damage and disruption of property inclusive of cash crops.

---

[6] "2nd ARC: Disaster Management (3rd report)" p 14 http://mrunal.org/2012/09/arc-disaster-mgmt-p1.html

(c) Disruption of lifestyle and production inclusive of loss of livelihood.

(d) Disruption to essential services and governmental systems and also causing damage to national infrastructure development programmes.

(e) National economic loss inclusive of sociological and psychological after effects.

5. The effects of natural disasters are more severe if we flout the Coastal Regulation Zone (CRZ) and tamper with the natural eco-systems such as mangroves which are natural speed breakers. Though the tsunami was due to the earthquake in the ocean floor, its capacity to inflict disaster and loss of life was exacerbated due to the factors mentioned above. When a cyclone hit the Orissa coast in 1999, maximum devastation was in the areas devoid of mangroves[7].

[7] USI Journal, Vol CXXXVII, No. 567, Jan-Mar 2007, p 96-97, by Col PK Gautam (Retd)

CHAPTER-III

DISASTER MANAGEMENT STRUCTURE IN INDIA

1. Disaster management occupies an important place in any country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters. Even at the global level, there has been considerable concern over natural disasters. The United Nations General Assembly, in 1989, declared the decade 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR) with the objective to reduce loss of lives and property and restrict socio-economic damage through concerted international action, especially in developing countries. The spate of disasters made the government to enact a law on disaster management to provide for requisite institutional mechanisms. Government of India has brought about a paradigm shift in the approach to disaster management. The Govt's approach to tackle the problem has been translated into a Disaster Management Act, 2005 covering institutional mechanisms, disaster prevention strategy, early warning system, disaster mitigation, preparedness and response and human resource development. This roadmap has been shared with all the State Governments and Union Territory Administrations. Ministries and Departments of Government of India, and the State Governments/UT Administrations have been advised to develop their respective roadmaps taking the national roadmap as a broad guideline.

2. **Disaster Management Act, 2005**. The ***Disaster Management Act, 2005, published*** by Central Government on 26 Dec, 2005, is the "*Act to provide for the effective management of disasters and for matters connected therewith or incidental thereto*".[8] The bill provides for the constitution of the National Fund for Disaster Response and the National Fund for Disaster Mitigation and similar funds at the state and district levels. The bill provides for specific role for local bodies in disaster management including panchayati raj institutions as well as urban local bodies like municipalities.

---

[8] "Disaster Management Act 2005 No 53/2005" p 1

3. **National Disaster Management Authority**. The Disaster Management Act 2005 provides for setting up of a National Disaster Management Authority (NDMA) under the chairmanship of the Prime Minister, state disaster management authorities under the chairmanship of the Chief Ministers and district disaster management authorities under the chairmanship of District Magistrates. It also coordinates to lay down the plan for states and recommend provision of funds, minimum relief standards to be provided after the disaster.[9] NDMA has former army chief, General (Retd) NC Vij as its Vice Chairperson. The NDMA has total nine members.

4. **National Executive Committee**. The roles of the National Executive Committee as defined in the act are as follows:-

(a) Act as the coordinating and monitoring body for disaster management.

(b) Prepare the national plan to be approved by the national authority.

(c) Co-ordinate and monitor the implementation of the national policy.

(d) Lay down guidelines for preparing disaster management plans by different ministries or departments of the government of India and the state authorities.

(e) Provide necessary technical assistance to the state government and the state authorities for preparing their disaster management plans in accordance with the guidelines laid down by national authority.

(f) Monitor the implementation of the national plan and the plans prepared by the ministries or departments of the government of India.

(g) Monitor the implementation of the guidelines laid down by the national authority for integrating of measures for prevention of disasters and mitigation by the ministries or departments in their development plans and projects.

(h) Monitor, co-ordinate and give directions regarding the mitigation and preparedness measures to be taken by different ministries or departments and agencies of the Government.

---

[9] "Disaster Management Act 2005 No 53/2005" para 6(1) p 4

(j) Evaluate the preparedness at all governmental levels for the purpose of responding to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness.

(k) Plan and coordinate specialised training programme for disaster management for different levels of officers, employees and voluntary rescue workers.

(l) Co-ordinate response in the event of any threatening disaster situation or disaster.

(m) Lay down guidelines for, or give directions to, the concerned ministries or departments of the government of India, the state governments and the state authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster.

(n) Require any department or agency of the government to make available to the national authority or state authorities such men or material resources as are available with it for the purposes of emergency response, rescue and relief.

(p) Advise, assist and co-ordinate the activities of the ministries or departments of the government of India, state authorities, statutory bodies, other governmental or non-governmental organisations and others engaged in disaster management.

(q) Provide necessary technical assistance or give advice to the state authorities and district authorities for carrying out their functions under this act.

(r) Promote general education and awareness in relation to disaster management.

(s) Perform such other functions as the national authority may require it to Perform.[10]

[10] "Disaster Management Act 2005 No 53/2005" Para 10(2) p 5

5. **National Disaster Response Force (NDRF).** The **National Disaster Response Force** (**NDRF**) is a disaster response agency under National Disaster Management Authority (NDMA) created by the Ministry of Home Affairs, Government of India. It was established in 2009 in Delhi, for disaster management and specialised response to natural and man-made disasters. A National Disaster Response Force (NDRF) comprising eight battalions of central paramilitary forces has been set up to deal with the aftermath of natural calamities. Two battalions each from the Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) have been earmarked for the force that will be used to mount a professional response during disasters.[11] There will be a total of 144 specialist response teams consisting of 45 personnel each. 72 of these 144 specialist response teams will also be trained and equipped for responding to nuclear, biological and chemical related emergencies. One team in each battalion will also be trained in deep sea diving for the purpose of search and rescue during floods and cyclones.

6. **State Disaster Management Authority.** The responsibility to cope with natural disasters is essentially of State Govt. The role of Central Govt is supportive in terms of supplementation of physical and financial resources. The Chief Minister of the State heads the State Disaster Management Authority which is in overall charge for the planning and policies of the disaster management in the state. He is being helped by eight other members and the chief secretary of the state executive committee.[12]

7. **State Executive Committee**. The state Government shall, immediately constitute a State Executive Committee after issue of notification. This committee will assist the state authorities in the performance of its functions and to co-ordinate actions in accordance with the guidelines laid down by state authority. The Chief Secretary of the State heads a state level committee which is in overall charge of the relief operations in the State and the Relief Commissioners, who are in charge of the relief and rehabilitation measures in the wake of natural disasters in their states, function under the overall direction and control of the state level committee. In many

---

[11] "National Disaster Response Force" http://en.wikipedia.org/wiki/National_Disaster_Response_Force

[12] "Disaster Management: The Development Perspective" Chapter – 7 para 7.22

states, Secretary, Department of Revenue, is also in-charge of relief. State Governments usually have relief manuals and the districts have their contingency plan that is updated from time to time.[13]

8. **National Disaster Mitigation Resource Centres**. The concept of National Disaster Mitigation Resource Centers (NDMRCs) has been evolved to help the states in capacity development, running of mock drills and facilitating the process of central assistance to the states. These will be co-located with the NDRF battalions and set up at nine locations on a pilot basis. A reserve of relief stores for 325,000 persons will be created at the national level, for use in the event of a disaster of a severe magnitude. These will include stores for 100,000 persons affected in high altitude areas. These reserves are intended to augment the resources of the states in case of major disasters and will be stored with the Mitigation Resource Centres[14].

9. **District Disaster Management Authority**. The district administration is the focal point for implementation of all governmental plans and activities. The Collector/ District Magistrate/ Deputy Commissioner heads the District Disaster Management Authority which also consists of all the elected representatives of the local authority. Though it may not be a common phenomenon, there exists by and large in districts also a district level relief committee consisting of officials and non-officials.[15] The 73rd and 74th constitutional amendments recognise Panchayati Raj Institutions as 'Institutions of self- government'. The amendment has also laid down necessary guidelines for the structure of their composition, powers, functions, devolution of finances, regular holding of elections and reservation of seats for weaker sections including women. These local bodies can be effective instruments in tackling disasters through early warning system, relief distribution, providing shelter to the victims, medical assistance etc.

10. Other than the national, state, district and local levels, there are various institutional stake holders who are involved in disaster management at various levels in the country. These include the police and para-military forces, civil defence and

---

[13] "Disaster Management Act 2005 No 53/2005" Para 20(1) p 8
[14] USI Journal, Vol CXXXVii, No. 569, Jul-Sep 2007, p 324, by Gen NC Vij, PVSM, UVSM, AVSM (Retd)
[15] "Disaster Management: The Development Perspective" Chapter – 7. para 7.23

home-guards, fire services, ex-servicemen, Non-Government Organisations (NGOs), public and private sector enterprises, media and HAM operators, all of whom have important roles to play.[16]

Armed Forces

11. The Indian Armed Forces are supposed to be called upon to intervene and take on specific tasks only when the situation is beyond the capability of civil administration. In practice, the Armed Forces are the core of the government's response capacity and tend to be the first responders of the Government of India in a major disaster. Due to their ability to organize action in adverse ground circumstances, speed of operational response and the resources and capabilities at their disposal, the Armed Forces have historically played a major role in emergency support functions such as communications, search and rescue operations, health and medical facilities, transportation, power, food and civil supplies, public works and engineering, especially in the immediate aftermath of disaster. Disaster management plans should incorporate the role expected of them so that the procedure for deploying them is smooth and quick.

12. The following points emerge in favour of employment of Armed Forces during any natural or even manmade disasters.

(a) Indian civil administration is not fully equipped to undertake major disasters.

(b) Indian Armed Forces are one of the most dedicated, professional and modernised Armed Forces in the world with rapid strides in technology, development, adequately equipped with technical competence, manpower, material and resources required to deal with any type of rescue and relief operations on land, in air or water.

(c) They are always in the state of readiness to move to any kind of disaster affected areas and have the daring to work under adverse ground

[16] "Disaster Management: The Development Perspective" Chapter – 7 para 7.25

and climatic conditions, which is of immense help in assisting the civil authorities during disaster.

External Linkages

13. The Government of India is a member of various international organisations in the field of disaster response and relief. While, as a policy, no request for assistance or appeal is made to the international community in the event of a disaster, assistance offered suo-moto is accepted. Linkages exist with the following organisations:-

(a) UN Office for Coordination of Humanitarian Affairs (UN OCHA), which has been made responsible by UN General Assembly mandate for all international disaster response.

(b) United Nations Development Programme (UNDP), responsible for mitigation and prevention aspects of disaster management.

(c) UN Disaster Assessment and Coordination (UNDAC) System.[17]

[17] "Disaster Management: The Development Perspective" Chapter – 7 para 7.27

CHAPTER-IV

DISASTER MANAGEMENT STRUCTURE IN DEFENCE AVIATION

Introduction

1. In Oct 2009, the Union Cabinet approved the National Disaster Management Policy which acknowledges the role of Armed Forces in disaster management. It also states that, the Armed Forces will be called upon only when all the civil administrative options are exhausted.[18] However, in practice, it is the Armed Forces who are first to respond in case of any crisis situation. Our Armed Forces have always lived upto the expectations of our countrymen and have played a vital role during disaster relief operations and provided selfless service in the most inhospitable and inaccessible terrain. Many have laid their lives in this noble cause. The characteristics of discipline, systematic approach, human resource management of Armed Forces make them the most preferred tool to be applied in case of disaster situation. Armed Forces are mainly utilised for relief ops, search and rescue, evacuation of men and material from the affected region.

2. Reach, responsiveness, flexibility and senses of responsibility of Defence Aviation has made it the most preferable tool to tackle with any crisis situation. Keeping up to its reputation, Defence Aviation has always proved its metal and earned glory for itself and served the nation with utmost professionalism. Rescue operations during tsunami, Op Rahat during flash floods in Uttrakhand, rescue and relief operations during yearly land slide and floods in Bhubneshwar and Srinagar are few of the examples where Defence Aviation has participated and saved many lives.

3. Defence Aviation helicopters and transport ac are always in demand by all agencies. Even when private players have stepped in a big way, the 'difficult and riskier' jobs are always left to the Defence Aviation helicopters and transport ac. BRO task at high altitude and helicopter flying in anti-naxal operations are just cases in point. The sense of independent decision making, combat orientation adaptability and mental

---

[18] Shivanand H and PK Gautam. Releasing India's Disaster Management Preparedness and the role of the Indian Armed Forces, (Journal of Defence Studies, Vol 6 No. 1 January 2012), p 107

flexibility are some of the desirable end-products of such operations. It is not for any other reason that Defence Aviation helicopters and transport fleet is considered one of the best in the world today.

Procedure of Tasking for Disaster Relief Operations

4. Defence Aviation in conjunction with the other Armed forces may be called upon to render assistance to civil authorities for disaster relief. The assistance by Defence Aviation is provided with the approval and on orders of the Central Government. In case when the prior approval cannot be obtained from the Govt, local commander may accept the request from local civil authority and subsequently the matter can be regularised through normal channel.

5. Any state which is not able to cope with the emergent situation on its own and after having exhausted all its options of civil resources will request the Central Govt for assistance. Ministry of Defence will direct HQ IDS (Integrated Defence Staff) to take appropriate action and provide necessary assistance.

Present Structure in Defence Aviation for Disaster Management

6. At the apex level, HQ Integrated Defence Staff (IDS) coordinates all the emergency response of the Armed Forces for disaster relief. The response of the Armed Forces would be executed by Joint Operations Committee at HQ IDS. HQ IDS tasks the appropriate service HQ to respond to the emergent situation. Based on the type of relief requirements and core competencies of a Service, HQ IDS will task a particular Service HQ as lead HQ.

Disaster Management at Air Headquarter Level

7. Assistant Chief of Air Staff (ACAS) (Ops) at Air HQ is responsible for co-ordinating the emergency response measures for disaster management and act as the overall of the entire air operations.

8. **Disaster Management Cell, Air HQ**. Disaster Management Cell (DMC) at Air HQ is activated as soon as the warning of an impending disaster is received.

DMC is headed by ACAS (Ops). DCM takes stock of the situation and prepares to handle the emergency situation.[19] The main function of the DMC is to:-

(a) Identify geographical location and severity of disaster.

(b) Allocate, control and co-ordinate the Defence Aviation air effort in conjunction with the Command and Station Relief Cell.

(c) Liaise with external agencies like HQ IDS, MEA and MHA to co-ordinate the relief effort.

9. At Air HQ, under ACAS (Ops), it is Directorate of Operations (Transport and Helicopter) which is responsible to task the concerned Command to activate its stations or units to prepare for operation. Principle Director Operations (T) and Principle Director Operations (H) in Dir of Ops (T & H) are responsible to deal with the disastrous situation.

Disaster Management Cell, Command HQ

10. Command Disaster Management Cell is activated to monitor and co-ordinate all air activities pertaining to disaster relief operations. The cell is headed by SASO of the concerned Command who is overall responsible to exercise control over assets allocated for the task from various other Commands and lead the disaster relief operation. A Disaster Relief Cell is set up in the Command Operations Centre is manned by an officer of the rank of Wing Commander. At Command level, Air-I tasks the concerned station, sqn or unit to prepare for disaster relief operation. If necessary, depending upon the scale of operation, air assets from other Command may also be redeployed.

Disaster Management at Field Level

11. At field level, Defence Aviation helicopters are tasked every year to provide relief material, evacuate personnel, ferry medical supplies during natural disaster and carry out aerial recce of the affected region. Transport fleet is utilised to carry essential supplies and manpower in disaster affected area over large distance in a shortest

---

[19] "Disaster Management and Defence Aviation" http://nidm.gov.in/idmc/Proceedings/Armed ForcesNov29/9.pdf

possible time. Depending upon the strength and resources available within the station, each station will be assigned a geographical area comprising of few districts. The Command and Control of each sector will rest with the Station Commander or AOC of the station. He will liaise with civil authorities, keeping in view the air operations during any disaster situation. It is generally ensured that a particular district of a sector is placed under the nearest station.[20]

12. **Operation Centre**. An Op Centre is established at the operating dispersal area. The officer in charge is to control and co-ordinate the movement of all ac/ helicopters involved in the operations. Representatives of the Army and civil agencies who are involved in providing load must be located nearby so as to remain in contact at all times.

13. Defence Aviation transport and helicopter units are strategically located for disaster management role. The units located in Northwest look after the earthquake/ landslides prone areas of the Himalayan belt. The units located in south, west and central parts of India can cater for flood affected areas.

Helicopters on Defence Aviation Inventory

14. The helicopter fleet of Indian Air Force is divided into four major groups. They are:

(a)	Attack Helicopters	Mi-25 & Mi-35
(b)	Armed/Utility Helicopters	Mi-8, Mi-17, Mi-17 IV,Mi-17 V5 and ALH
(c)	Heavy Transport Helicopters	Mi-26, Chinook
(d)	Light Duty Helicopters	Chetak/ Cheetah

15. Of the available types of helicopters in Indian Air Force inventory, utility helicopters and light duty helicopters play a major role in relief operations. The transport version of these helicopters can be converted into air ambulance to carry between two and twelve stretcher cases with one medical attendant. These

[20] "SOPs for the Defence Aviation for disaster response". As part of Envisaged role of the Defence Aviation in Disaster Management. A paper by Wg Cdr RK Singh presented in Thematic Session- Role of Armed Forces. http://nidm.gov.in/idmc/Proceedings/Armed ForcesNov29/1.pdf

helicopters are provided with external sling system to carry bulky loads underslung and one electrical winch system is also incorporated in the helicopters for various purposes like rescue, dropping the load or winching out a person for help when landing is not possible.

Transport Aircraft on Defence Aviation Inventory

16. Following are the transport ac available on Indian Air Force's inventory.

(a) Avro

(b) Dornier

(c) An-32

(d) IL-76

(e) C-130

(f) C-17

17. All these ac can be utilized to undertake disaster relief missions in terms of supplied drop, casualty evacuation, evacuation of people from disaster affected area and any other specified role.

Rapid Action Medical Team (RAMT)

18. Two Rapid Action Medical Teams of Defence Aviation were raised as lodger units of Air Force Command Hospital and No. 5 Air Force Hospital. These units were established with the aim of providing immediate medical and surgical aid, and establishing a chain of casualty evacuation in the event of any disaster within their area of responsibility. These units are capable of providing the emergency and trauma care for a duration of three to four days at a stretch.

CHAPTER-V

CASE STUDY

UTTRAKHAND FLOODS IN JUN 2013

1. In June 2013, a multi-day cloudburst centered on the North Indian state of Uttarakhand caused devastating floods and landslides, becoming the country's worst natural disaster since the 2004 tsunami. Though some parts of Himachal Pradesh, Haryana, Delhi and Uttar Pradesh in India experienced the flood, some regions of Western Nepal, and some parts of Western Tibet also experienced heavy rainfall, over 95% of the casualties occurred in Uttarakhand. As of 16 July 2013, according to figures provided by the Uttarakhand government, more than 5,700 people were "presumed dead. This total included 934 local residents[21].

2. From 14 to 17 June 2013, the Indian state of Uttarakhand and adjoining areas received heavy rainfall, which was about 375% more than the benchmark rainfall during a normal monsoon. This caused the melting of Chorabari Glacier at the height of 3800 metres, and eruption of the Mandakini River which led to heavy floods near Gobindghat, Kedar Dome, Rudraprayag district, Uttarakhand, Himachal Pradesh and Western Nepal, and acute rainfall in other nearby regions of Delhi, Haryana, Uttar Pradesh and some parts of Tibet.

3. Landslides, due to the floods, damaged several houses and structures, killing those who were trapped. The heavy rains resulted in large flash floods and massive landslides. Entire villages and settlements such as Gaurikund and the market town of Ram Bada, a transition point to Kedarnath, have been obliterated, while the market town of Sonprayag suffered heavy damage and loss of lives. Over 70,000 people were stuck in various regions because of damaged or blocked roads. People in other important locations like the Valley of flower, Roopkund and the Sikh pilgrimage centre Hemkund were stranded for more than three days. National Highway 58, an important artery connecting the region was also

---

[21] "2013 North India Floods" www.cbsnews.com/news/india-raises-flood-death-toll-reaches-5700-as-all-missing-persons-now-presumed-dead

washed away near Jyotirmath and in many other places. Because summers have more number of tourists, the number of people impacted was substantial. For more than three days, stranded pilgrims and tourists were without rations or survived on little food. The roads were seriously damaged at more than 450 places, resulting in huge traffic jams, and the floods caused many cars and other vehicles to be washed away. Bodies of people washed away in Uttrakhand, were found in distant places like Bijnor, Allahabad and Bulandshahr in Uttar Pradesh. Searching for bodies who died during the extreme natural fury of June in Kedar valley continued for several months and even as late as September, 2013, about 556 bodies were found out of which 166 bodies were found in highly decomposed state during fourth round of search operations.

4. Although the Kedarnath Temple itself was not damaged, its base was inundated with water, mud and boulders from the landslide, damaging its perimeter. Most of the destruction at Kedarnath was caused by a sudden rapid melting of ice and snow on the Kedarnath Mountain, 6 km from the temple, which flooded the Charbari lake (upstream) and then Kedarnath. The temple was flooded with water resulting in several deaths due to drowning and panic-driven stampede. No damage at the Kedarnath Temple occurred. The Uttrakhand Government announced that due to the extensive damage to the infrastructure, the temple will be temporarily closed to regular pilgrims and tourists for a year or two, but the temple rituals will still be maintained by priests. The Temple opened for pilgrims on Sunday, 4 May 2014[22].

Rescue Operations

5. The Army, Air Force, Navy, Indo-Tibetan Border Police (ITBP), Border Security Force, National Disaster Response Force (NDRF), Public Works Department and local administrations worked together for quick rescue operations. Several thousand soldiers were deployed for the rescue missions. The Indian Armed Forces had put to use some of the best military skill-sets to great effect in the flash-flood affected zones of Uttrakhand and rescued hundreds of fatigued and exhausted stranded tourists almost seven days after the tragedy struck the Kedar Valley. The rescue operations were undertaken in two phases.

---

[22] "2013 North India Floods" http://en.wikipedia.org/wiki/2013_North_India_floods

First Phase

6. Operation Rahat was the name given to the Indian Air Force's rescue operations to evacuate civilians affected by the 2013 North India floods. Thousands of pilgrims in transit in the hill states of Uttarakhand and Himachal Pradesh were stranded in various valleys. It was one of the largest operations of the Indian Air Force in several decades and Defence Aviation claims it to be the biggest civilian rescue operation in the world carried out by any air force using helicopters. During the first phase of the operation from 17 Jun to 30 Jun 2013, the Defence Aviation airlifted a total of 19,600 people - flying a total of 2,140 sorties and dropping/landing a total of 3,82,400 kg of relief material and equipment.[23]

7. On 16 June, following flash floods due to heavy rains, assistance was sought from the Defence Aviation for rescue operations. The Western Air Command (WAC) responded to the request and undertook simultaneous tasks in the sectors of Yamunanagar, Kedarnath-Badrinath axis, Rudraprayag valley and the Karcham- Puh axis. Air Commodore Rajesh Isser was appointed Task Force Commander of Operation Rahat.

8. The Sarsawa Air Force Station was made the hub centre with helicopters converging from the Bhatinda and Hindon air force bases. A number of helicopters including the newly inducted Mil Mi-17 V5 were positioned on 17 June at Jolly Grant Airport at Dehradun despite inclement weather. By 19 June, the Defence Aviation had deployed 20 aircraft including 8 Mi-17 helicopters, 10 Advanced Light Helicopters (ALH), One An-32 transport aircraft and one HS-748 Transport aircraft to carry out constant missions. Defence Aviation operations covered Phata, Guptakashi, Gaurikund, Kedarnath in Dehradun and Rampur, Karcham, Reckong Peo, Sangla in Himachal. The ALH were positioned at Pithoragarh sector for the rescue and food packet drop effort. Four ALH helicopters of the Sarang display team were also deployed for relief operations[24]. The Defence Aviation activated its advanced landing grounds in Gauchar and Dharasu in Uttarakhand to

---

[23] "Operation Rahat" http://en.wikipedia.org/wiki/Operation_Rahat

[24] "Operation Rahat" http://en.wikipedia.org/wiki/Operation_Rahat

establish an air bridge for chopper movement. Following are the no. of ac used during the operation.

(a) 23 - Mi 17 medium twin-turbine transport helicopters.

(b) 11 - HAL Dhruv, indigenous light utility helicopters

(c) 1 - Cheetah single-engined Helicopter

(d) 1 - Mil Mi-26 heavy transport helicopter

(e) 2 - C130J military transport aircraft

(f) 3 - AN 32s transport aircraft

(g) 1 - HS-748 transport aircraft

(h) 1 - IL-76 heavy transport aircraft

9. Extensive use of helicopters was carried out to rescue people, but due to the rough terrain, heavy fog and rainfall, maneuvering them was a challenge. By 21 June 2013, the Army had deployed 10,000 soldiers and 11 helicopters, the Navy had sent 45 naval divers, and the Air force had deployed 43 aircraft including 36 helicopters. On 25 June, one of 3 Defence Aviation Mil Mi-17 rescue helicopters returning from Kedarnath, carrying 5 Air Force Officers, 9 of the NDRF, and 6 of the ITBP crashed on a mountainous slope near Gauri Kund, killing all on board. In phase one, the Air Force undertook 3,117 sorties, putting in 1,245 hours. It dropped 650 tonnes of relief materials and evacuated 23,221 people. The Air Force decentralized the operations by distributing aircraft to 8-10 airstrips, which operated as small bases, so that they could be closer to the areas of distress. Ways had to be found to fuel the aircraft, which were flying with virtually no air traffic control and negligible ground support. The aircraft managed to carry the fuel in barrels and refueled when necessary. Makeshift helipads were built in Gaurikund and Jungle Chatti in the Kedarnath valley, but in many other places the aircraft landed wherever they found a patch. Looking at the hundreds trapped in narrow strips of land, dead in their midst, in the pieced up route to Kedarnath, helicopter pilots decided it was pointless to rescue a few and so

they dropped army personnel specializing in jungle rescue, with food and medicines for the marooned people so they could survive a few more days[25].

Second Phase

10. The casualties were taken care of and evacuations nearly done, yet the urgency of providing relief remained nearly the same with locals in a hurry to re-establish their villages as this is the time for stocking up on winter supplies. "I have no clue when this can be said to be over," says Air Commodore Rajesh Isser, who was leading the Indian Air Force operations from his temporary base at Jolly Grant airport in Dehradun. "Because of the nature of the disaster, I think we would remain here for some time." Even the then Chief of Air Staff said "The rotors will continue to churn till the last man is evacuated". The Air Force's operations are now in phase two, down to flying 8-10 aircraft as against 45 earlier, all flying into the narrow, mist-filled valleys, delivering what the civil administration and NGOs ask for—ranging from dropping road building machines like bulldozers to materials for use for animal husbandry[26].

[25] Telephonic conversation with AVM Isser, TFC Op Rahat
[26] "How the Uttrakhand disaster was managed" 'Hindustan Times 24 Jul 2013 edition

CHAPTER-VI

ANALYSIS OF EXISTING STRUCTURE

1. As we have seen over the past experience that the Defence Aviation is the first organisation to be dependent upon whenever a disaster strikes India. With the frequency of natural or manmade disasters occurrence in India, disaster management or relief is no more additional responsibility of Defence Aviation rather it has become one of the primary role of Defence Aviation. Since Defence Aviation is a thoroughly professional organisation, it is the responsibility of each and everyone, who is a part of Defence Aviation to contribute towards execution of its role. We must analyse the existing structure which deals with the disaster situation and make all efforts to consolidate the one which is strong and overcome the weaknesses or gaps if they exist. Given below is the analysis of the existing structure of Defence Aviation for preparedness against Disaster situation.

(a) Whenever disaster strikes, we don't have a permanent and specially trained people and permanent infrastructure in place which immediately gets into action following a well formulated SOP. At present the requirement is met with the available assets in the affected region and accretion of assets from other commands if required. At one particular region, the people in the sqn keep changing and there is a disconnect in continuation training in disaster relief operations as that is not the primary role of the sqn. Having faced various types of natural disasters, we are generally aware about the most vulnerable areas to natural disaster. Hence there is a need to earmark these areas and permanently position a well trained and equipped sqn to undertake the relief operations effectively. There is not a single sqn or a unit in Defence Aviation which is identified as a dedicated one for disaster relief operation or undertakes training for the same.

(b) It has also been analysed that at present there is no set disaster management plan existing in all the units/sqns of Indian Air Force. The sqns/units start planning the operations as and when the need arises. There is a need to formulate an extensive and elaborate plan and SOP covering all the

contingencies so as to commence operations without any delay and dilemma at that point in time.

(c) Disaster Management Cell is not a permanent set up at Air HQ or Command level. It is set up as and when the natural calamities strike India. Any set up which is permanent is always kept under review or audit and any shortcomings are identified and rectified immediately.

(d) Requisition procedure is cumbersome wherein a long chain is followed before the order reaches the unit and the unit prepares itself for the operation. If there is a de-centralised control given to the sqns or units in the region or a convenient procedure put in place, the requisition from Indian Air Force will be faster and relief activities can commence well in time before unacceptable damage to human life and property.

(e) To make a disaster management mechanics robust, there must be regular interaction between the civil agency and Armed Forces. Regular meetings or conferences with civil authorities are not frequent or time bound in which exchange of information or readiness status of each other or modus-operandy to tackle any emergent situation is discussed.

(f) Many a times we are not able to utilise all the assets towards disaster relief operations because of shortage of specialised equipment. This aspect poses time delay in conduct of the operation as well as optimum utilisation of the resources. At present, the Defence Aviation transport ac and helicopters lack specialised equipment so as to be able to deal with the crisis situation in a faster time frame.

ROLE OF US ARMED FORCES IN DISASTER RELIEF

2. US has a host of directives of Department of Defence (DoD) which list out the responsibilities of various civil and military leader to deal with disaster situation. The organisational changes have been undertaken with the control presently being exercised by Department of Homeland Security, which includes the function of erstwhile Federal Emergency Management Agency (FEMA). **Defense Support of**

Civil Authorities (DSCA) is the process by which United States military assets and personnel can be used to assist in missions normally carried out by civil authorities. These missions have included: responses to natural and man-made disasters, law enforcement support, special events, and other domestic activities. A recent example of the use of DSCA is the military response to Hurricane Katrina. DSCA is the overarching guidance of how the United States military can be requested by a federal agency and the procedures that govern the actions of the military during employment[27].

3. The "Directorate of military support" (DOMS) for domestic operations (DOMS) who is the functional process manager of DSCA is located inside each state's "Joint Operation Center" (JOC). The normal course of action is for the Office of Emergency Management within the state to request military support through the JOC. In turn, the JOC under the authority of the DOMS will initiate military support in the form of equipment that supports the Federal Emergency Management Agency (FEMA) Emergency Support Functions.

4. **Federal Emergency Management Agency**. On the civilian side, the Federal Emergency Management Agency or better known as FEMA, is the main federal responder when a disaster overwhelms a state(s). When a state exhausts all of its resources or is lacking a unique capability during a disaster, it will turn to the federal government for assistance. The agency that usually responds and will coordinate the overall federal effort will be FEMA. FEMA has a cornucopia of options available to help a state in need, one of those options is to turn to the military. FEMA has the ability to direct most other federal resource under its statutory authority, but it can not direct the military, it must request the assistance. Military support is a last resort; all other local, state and federal resources must be exhausted prior to the military providing support or a unique requirement that can not be found within the civilian or federal system[28].

---

[27] "Defense support to civil authorities"
http://en.wikipedia.org/wiki/Defense_Support_of_Civil_authorities

[28] Defense support to civil authorities"
http://en.wikipedia.org/wiki/Defense_Support_of_Civil_authorities

5. **Foreign Disaster Relief**. For foreign disaster relief operations, the Department of State serves as the U.S. lead federal agency (LFA), relying on the regional bureau responsible for the area where the disaster has struck and on the U.S. Agency for International Development (USAID) to coordinate the overall response. Once the government of a disaster-stricken nation has requested assistance, the local U.S. embassy reaches out immediately to the Operations Center within the Executive Secretariat of the State Department via a disaster declaration cable. For large-scale events, the U.S. ambassador will probably also contact the relevant U.S. military regional combatant command (COCOM) directly, such as U.S. Pacific Command (PACOM) in Honolulu, though this depends largely on the personal ties between the ambassador in question and the COCOM commander. For its part, the Operations Center, which maintains a twenty-four hour watch on emerging or rapid-onset crises overseas, will quickly set up an interagency standing committee (or IASC) led by the appropriate regional bureau to monitor the situation and facilitate interagency coordination[29].

6. **Pre Disaster Mitigation Program**. FEMA's Mitigation Directorate is responsible for programs that take action before a disaster, in order to identify risks and reduce injuries, loss of property, and recovery time. The agency has major analysis programs for floods, hurricanes, dams, and earthquakes. FEMA works to ensure affordable flood insurance is available to homeowners in flood plains, through the National Flood Insurance Program, and also works to enforce no-build zones in known flood plains and relocate or elevate some at-risk structures. Pre-Disaster Mitigation grants are available to acquire property for conversion to open space, retrofit existing buildings, construct tornado and storm shelters, manage vegetation for erosion and fire control, and small flood control projects[30].

7. **Response Capability**. FEMA's emergency response is based on small, decentralized teams trained in such areas as the National Disaster Medical System

---

[29] "The US foreign disaster response process" p 2
http://www.ifpa.org/pdf/DisasterRelief.pdf
[30] "Federal Emergency Management Agency"
http://en.wikipedia.org/wiki/Federal_Emergency_Management_Agency

(NDMS), Urban Search and Rescue (USAR), Disaster Mortuary Operations Response Team (DMORT), Disaster Medical Assistance Team (DMAT), and Mobile Emergency Response Support (MERS)[31].

(a) **National Disaster Medical System (NDMS)**. NDMS is made of teams that provide medical and allied care to disaster victims. These teams include doctors, nurses, pharmacists, etc., and are typically sponsored by hospitals, public safety agencies or private organizations. Also, Rapid Deployment Force (RDF) teams, composed of officers of the Commissioned Corps of the United States Public Health Service, were developed to assist with the NDMS[32].

(b) **Urban Search and Rescue (USAR)**. The Urban Search and Rescue Task Forces perform rescue of victims from structural collapses, confined spaces, and other disasters, for example mine collapses and earthquakes.

(c) **Mobile Emergency Response Support (MERS)**. These teams provide communications support to local public safety. For instance, they may operate a truck with satellite uplink, computers, telephone and power generation at a staging area near a disaster so that the responders can communicate with the outside world. There are also Mobile Air Transportable Telecommunications System (MATTS) assets which can be airlifted in. Also portable cellphone towers can be erected to allow local responders to access telephone systems.

(d) **Training**. FEMA offers a large number of training classes, either at its own centers, through programs at the state level, in cooperation with colleges and universities, or online. The latter are free classes available to anyone, although only those with U.S. residency or work eligibility can take the final examinations. More information is available on the FEMA website

---

[31] ibid

[32] Federal Emergency Management Agency"
http://en.wikipedia.org/wiki/Federal_Emergency_Management_Agency

under the "Emergency Personnel" and "Training" subheadings. Other emergency response information for citizens is also available at its website.

CHAPTER-VII

RECOMMENDATIONS AND CONCLUSION

1. The growing havoc caused by the disasters and the requirement for efficient mechanism to manage it has lead to far greater reliance on the Defence Aviation. To derive the maximum out of the Defence Aviation, it is essential that plans are so made that everyone knows what steps have to be taken at what time after the disaster has hit the nation. An efficient disaster management plan should aim at providing immediate relief to the affected population. To achieve this, a disaster management plan should have the components of risk analysis, vulnerability assessment, response plan and mitigation strategy.

2. The primary role of Defence Aviation is to defend the sovereignty and integrity of our country. Its organisation, training and equipment are tailored to meet this requirement. It is also seen that Defence Aviation is increasingly being involved in combating manmade as well as natural disasters. Therefore training and educational programme of Defence Aviation is required to be restructured to suit the requirement of combating the natural disasters in the most efficient manner.

3. To make Defence Aviation the most enabling to handle the crisis situation, the following is recommended:-

(a) **Disaster Response Squadron**. To respond to manmade and natural disasters, it is required to have a dedicated Disaster Response Squadron. This Sqn can be the part of transport Sqn and is co-located. This sqn will be specially trained and equipped with special search and rescue equipment. A team of medical personnel will also be part of the sqn. This sqn must be raised as per International standards approved by United Nations so that it can be utilised overseas also if the situation demands.

(b) **Disaster Management Plan at Each AF Station**. Based on the geographical location and risk analysis, each AF Station must formulate its Disaster Management Plan and forward it to Air HQ for approval. The plan must encompass explicit instructions to be followed and a certain course of action to

be taken when the disaster strikes. The plan must cater for safety, security and safe evacuation of station personnel and their families. Station must be fully equipped to handle the emergency without any dependency on outside agency.

(c) **Liaison with Civil Organisation**. There must be regular and scheduled conferences with the civil authorities on the subject. There should be mutual exchange of the disaster management plan and the gaps and void, if exist, must be identified and a joint solution to the problem must be found and put in place. Such conferences must be held at least once a year. A consolidated list of the persons to be contacted must be prepared and also a list of hospitals as per the geographical area where the casualties can be evacuated for treatment. Also there must be a permanent Disaster Management Cell established at Air HQ and similar cells at Command level to cater for the requirement of disaster relief operations.

(d) **Awareness Programme**. The basic awareness of various natural disasters, the preventive measures, mitigating procedures and first aid procedures must be inculcated amongst all the air warriors as well as their families so as to be well prepared for it and help out the civil population as and when required.

(e) **Peace Time Practice**. To review and check the efficiency of our personnel, equipment as well as disaster management plan, mock drills must be conducted at regular basis. Any void or shortcomings in the system noticed during the mock drill must be addressed at the earliest. DASI/ DAI/ DMI must conduct such mock drills during the visit to various stations.

(f) **Essential Equipment**. All essential equipment required for disaster relief operations must be procured in advance to avoid unnecessary delay once the disaster strikes. Some specialised equipment necessary for transport aircraft and helicopters are:-

(i) Transport aircraft.

(aa) Air transportable mechanised trolleys for loading / offloading bulky cargo.

(ab) Cargo pallets for transport of relief material.

(ii) Helicopters.

(aa) Rescue bucket or a user-friendly winch strap for simultaneous winching up of two or more casualties from twin-engine helicopters.

(ab) Special ambulance version pallets that will permit minor operations in flight or critical patients to be placed on a ventilator/specialised medical attention during the airlift to a hospital.

(ac) Stretchers that may be winched up.

(ad) Powerful night search light for undertaking search and rescue operations at night.

(ae) Palletised cargo dropping.

(g) **Conduct of Operation**. With the advent of advanced technology, adequate forewarning of likely natural disasters like floods, cyclones etc is available. The disaster management plan must include the conduct of operation in anticipatory, preparatory and execution phase.

CONCLUSION

4. Since the evolution of mankind, natural disasters have caused heavy destruction and loss of lives. With the passage of time and invention of technology, we have been able to enhance our awareness about the disasters. Most of the states in our country are prone or vulnerably to natural disaster. Physical losses, added to the cost of reconstruction and rehabilitation places the civil government resources in tremendous strain.

5. In our country, whenever a natural disaster occurs, invariably we find that the State Government always requisitions the Armed Forces and the Armed Forces swing into action immediately and commence relief operations. Disaster management in India

is a very critical task. Over the years, the scope of role of Defence Aviation in disaster management has enlarged. It is invariably the first one to respond to the disaster situation. Defence Aviation aircraft stood always in forefront for relief operations during all types of disasters in India. Over the years, having carried out numerous disaster relief operations, the Defence Aviation has learnt a few lessons and identified shortcomings in the procedural aspects as well as shortage of modern equipment. If these lacunae are identified correctly and eliminated, the operations of disaster relief can be conducted more efficiently, professionally and with least amount of risk.

6. The Disaster Management Act-2005 has ensured that the Indian Armed Forces role in disaster response remains focussed on critical issues, with optimal utilisation of dedicated resources. In order to take on the capacity building of trained manpower, training program needs to be organised for pilots as well as personnel. As regards capacity building in terms of specialised equipment is concerned, the central government must consider the same so that this potent force can be gainfully employed in the most effective manner whenever called upon to deliver.

7. Disaster also provides an opportunity for neighbours to come together to share common grief and help get over long standing sticking points and disputes. Following the Kashmir earthquake, India and Pakistan did work together to provide relief to the affected areas. LoC was also opened to allow people from both sides to meet. More importantly, the earthquake hastened the decision by India and Pakistan to formally open the LoC between Punch and Rawalkot. Disaster relief is one of the means for Indian to advance its diplomatic and strategic objectives in the region. Therefore Indian must prepare itself to be a formidable force to help out any disaster contingency in the neighbourhood as well[33].

8. To combat the natural disaster and make rehabilitation more effective, a lot needs to be done. It is necessary for Defence Aviation to thoroughly investigate its preparedness for natural disasters and device the drill and procedures for co-ordination between itself and civil administration. The Defence Aviation disaster relief mission can be as effective as the intelligence, communication and co-ordination by the civil

---

[33] India's Disaster Relief Diplomacy, Indian Foreign Affairs Journal Vol. 4, No. 2 Apr-Jun 2009, p 72-73

administration. Therefore it is very important to have a effective two-way communication between Defence Aviation and civil administration to tackle the emergent situation most effectively. Hence the hypothesis is proved.

BIBLIOGRAPHY

Books

1. Goel SL and Ram Kumar Disaster Management Deep and Deep publications pvt ltd, New Delhi 2001.

2. IB Tauris and Co Disaster Management and Civil Society Ozerden Alphaslan and Jacoby Tim 2006

3. Narayan B Disaster Management APH Publications Co-orporation, New Delhi 2009..

Government Publications

4. "Disaster Management Act 2005 No 53/2005"

5. "SOPs for the Defence Aviation for disaster response". As part of Envisaged role of the Defence Aviation in Disaster Management. A paper by Wg Cdr RK Singh presented in Thematic Session- Role of Armed Forces.

Journals/Periodicals

6. "Disaster Management: The Development Perspective" Chapter – 7

7. "Public health aspects of disaster management"

8. India's Disaster Relief Diplomacy, Indian Foreign Affairs Journal Vol. 4, No. 2 Apr-Jun 2009, p 72-73

9. Shivanand H and PK Gautam. Releasing India's Disaster Management Preparedness and the role of the Indian Armed Forces

10. USI Journal, Vol CXXXVii, No. 569, Jul-Sep 2007, p 324, by Gen NC Vij, PVSM, UVSM, AVSM (Retd)

11. USI Journal, Vol CXXXVII, No. 567, Jan-Mar 2007, p 96-97, by Col PK Gautam (Retd)

Articles/News Paper

12. "Disaster Management and Defence Aviation" http://nidm.gov.in/idmc/Proceedings/Armed ForcesNov29/9.pdf

13. "How the Uttrakhand disaster was managed" 'Hindustan Times 24 Jul 2013 edition

Internet Source

14. "2nd ARC: Disaster Management (3rd report)" http://mrunal.org/2012/09/arc-disaster-mgmt-p1.html

15. "2013 North India Floods" www.cbsnews.com/news/india-raises-flood-death-toll-reaches-5700-as-all-missing-persons-now-presumed-dead/

16. "Defense support to civil authorities" http://en.wikipedia.org/wiki/Defense_Support_of_Civil_authorities

17. "Federal Emergency Management Agency" http://en.wikipedia.org/wiki/Federal_Emergency_Management_Agency

18. "National Disaster Response Force" http://en.wikipedia.org/wiki/National_Disaster_Response_Force

19. "Natural Disaster management in India" http://www.ukessays.com/essays/tourism/natural-disasters-management-in-india-tourism-essay.php

20. "Operation Rahat" http://en.wikipedia.org/wiki/Operation_Rahat

21. "The US foreign disaster response process" https://www.ifpa.org/pdf/DisasterRelief.pdf

Others

22. Telephonic conversation with Lt Col S Yadav, Flying Supervisor in Assam floods