

**DEVELOPMENT OF E-CONTENT FOR AWARENESS
ABOUT DISASTER MANAGEMENT AMONG
SECONDARY SCHOOL STUDENTS**

Minor Research Project
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Declaration

I hereby declared that the Minor Research Project entitled '**Development of E-Content for Awareness about Disaster Management among Secondary School Students**' completed and written by me and has not previously formed the basis for the award of any degree or any other similar title of this or any other university

Place : Barsi

Date :

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Place: Barshi
Date :

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Chapter I

INTRODUCTION

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Chapter I

INTRODUCTION

1.1 Introduction

The term 'disaster' meaning 'bad star' in Latin, is defined as an impact of a natural or manmade hazard that causes human suffering or creates human needs that the victims cannot alleviate without assistance. The word root is from astrology and implies that when the stars are in a bad position, a bad event is about to happen.

Man is concurring an environment for fulfilling his need, similarly he knows that there is a decay in natural resources though he knows it, he is avoiding importance of nature in his life. Due to lack of natural resources, their arise global warming. We see effect of global warming on living things. Hence natural and man made hazards are appearing as a challenges. While accepting these challenges and finding the solution on it, man thought about living things on Moon and Jupiter, but he should think about the living things on earth. Man thought himself to be a master, not a slave and he started utilizing his environmental resources to meet his ever-increasing wants for a better living. But now he has trespassed too far, to the extant of causing serious ecological and environmental imbalance.

The United Nations convened the conference on Human Environment in Stockholm in June 1972 which was a major event for those concerned with the quality of world's environment. The concept of environmental education has its inception.

The first Inter-governmental conference on Environmental Education was held at Tbilisi Georgian from 14th to 26th Oct 1977. The conference was organized by UNESCO in cooperation with the United Nations Environmental Program (UNEP) at the kind invitation of the Government of USSR. Tbilisi conference was the starting point for an international environmental education program consisted with the wishes of all the member states including India. Declaration of the Tbilisi conference is environmental education should be provided for all ages, at all levels and in both formal and non-formal education. Environmental education must look outward to the community. It should involve the individual in an active problem solving process within the context of specific realities, and it should encourage initiative a sense of responsibility and commitment to build a better tomorrow. In order to achieve these goals, environmental education requires a number of specific actions to fill the gaps that outstanding endeavors, continue to exist in our preset education system.

The National Policy on Education 1986 has envisaged protection of the environment as all core element of education at all levels. It should be developed as one value among the children. The policy has also recommended the creation of environmental consciousness among all ages starting with school education, s NCERT developed environmental concepts in the curriculum at all level of education with the objectives of Awareness, knowledge skill, attitude, participation.

Good environment education, like any good education must lead students out and on from their immediate perceptions and experience to a wider understanding. It must develop their capacity. Pupils must first learn about natural phenomena in order to understand complex environmental matters. The

importance of environmental education is that it sensitizes us to the causes and effects of problems, of which for long. We have been only dimly aware. The environment involves our children's future and many already know that we must encourage them to think positively about it. In our country too, people conscious of the future survival of the society initiated number of activities to highlight the importance of ecological balance for the sustainable development of the human race.

The Chinese say about the need to educate. If you plan for a year plant rice, if you plan for the years plant trees, but if you plan for the century educate the people. We this we can say that educate the people about environment to protect the human race and the planet earth. There are a lot of environmental problems which are related to natural disasters and man made hazards. Disasters do occur, but, preventing them is everyone's responsibility and fighting through them is everyone's duty. Any disaster is an unwanted event, its mitigation is an event that has a sense of deliberation. Disasters may be planned but their mitigation warrants planned actions.

If 'mitigation' is treated as an event then it requires a methodological management to achieve better results. Thus, mitigation has to be put through all the management philosophies and leadership interventions. That is where the concept of Disaster management comes into play. It simply means that disaster management has to be put through a scale of structured regime of activities with scientific base, leadership strategies and management techniques where the entire mankind contributes to it and everyone reaps its benefits.

Syllabi are developed for awareness of disaster management but we are so serious about management of such hazards. Common man and students should first know that how and why these hazards appear, but can we face these hazards. Hazards happens without prior intimation and we lost millions energy and resources as well as we have to face physical and environmental problems hence researcher has taken the following problem for his research work.

1.2 Statement of the Problem

Development of E-Content for Awareness about Disaster Management among Secondary School Students.

1.3 Need of the Research Study

We cannot develop serious awareness among students by giving just lecture or by using few charts or teaching aids. It is necessary to aware secondary school students through E-content.

Students are enthusiastic for viewing audio-visual aids, hence through e-media we can develop awareness about hazards and management of hazards.

Maharashtra State Board started personality development program in secondary school curriculum. Among these programs there is one of the important aspects of disaster management. Hence it is needed to develop e-media for developing awareness of disaster management.

In term disaster management is closely related to all human beings and living things. It affect on global industries, atmosphere, existence of earth. While

thinking of these problems we have to think about science, life science, physics, chemistry, engineering field, geographical science. Through these all media such as National Geographic Channel, but students are not viewing it regularly and sincerely. Hence to face problems arises due to disaster, it is necessary to aware about it and its management.

1.4 Significance of the Research Study

This study aims to develop awareness about disaster management hence its major findings are useful not only for secondary school children, but to society also. Due to this study, e-media source will be made available while teaching and learning concepts related to environment and disaster management. There will be positive attitude for having awareness of disaster management. Awareness can help to save life of all living things. Through e-content we can develop serious attitude towards disaster management. E-media is a audio-visual aids, which is helpful for concentrating and understanding the concepts related to disaster management It also helps students to classify disaster, conclusions of research will be helpful to apply various teaching-learning methods and techniques which understanding disaster and its management.

1.5 Objectives of the Research Study

The following objectives are decided by researcher for the study.

- 1) To develop e-media for awareness about disaster management.
- 2) To implement developed e-media program for awareness about disaster management.
- 3) To find its effect on awareness development.
- 4) To suggest various innovative methods and programs while teaching disaster management.

1.6 Null Hypothesis

There is no significant difference of applying e-content on awareness of disaster management.

1.7 Methodology of Study

a) Research Method

Researcher used experimental method because researcher wants to find out effect of e-content on awareness about disaster management.

b) Sampling

Researcher selected samples from Maharashtra Vidyalaya, Barshi of IX class students by random sampling method and fifteen teachers also.

c) Tools

Researcher used pre-test for students and questionnaire for teachers, researcher developed e-content about disaster management.

d) Research Design

Researcher used single group pre-test post-test experimental design.

$R \rightarrow O_1 \rightarrow X \rightarrow O_2$

R - Group

O₁ - Pre-test

X - Treatment

O₂ - Post-test

e) Statistical Terms

Mean, S.D. and t-test for analyzing and interpreting the conclusions.

1.8 Conclusion

This chapter is related with introduction, objectives, methodology of the study. In second chapter review of related literature and research is given.

Chapter II

REVIEW OF RELATED LITERATURE AND RESEARCH

- 2.1 Introduction
- 2.2 Review of Related Literature
- 2.3 Review of Related Researches
- 2.4 How Present Research Study is Different

Chapter II

REVIEW OF RELATED LITERATURE AND RESEARCH

2.1 Introduction

The phrase “Review of Related Literature“ consists of two words viz Review and Literature. The term review means to organize the specific area of research, to evolve an edifice of knowledge to show that his study would be an addition to this field. The term literature refers to the knowledge of a particular area of investigation of any discipline which include theoretical, practical and its research studies.

The term review of literature has been defined as “Review of literature means a survey of printed material dealing with or bearing on a given subject or problem a summary embodying the finding of such a research.” **Good.**

Practically all human knowledge can be found in books and libraries. Unlike other animals that must start a new with each generation. Man builds upon the accumulated and recorded knowledge of the past; his constant adding to the vast store of knowledge makes possible progress in all areas of human endeavor – **Best W John.**

Research is like a flow of river which is always in action. Best (1963) considered the survey of related literature as an important pre-requisite to actual planning and execution of an research project to support his views by putting forward the statement.

Every research must result in some new knowledge, some new discovery, new interpretation of already known facts or some new relationship among some

variables. A review of related literature is not just desirability but a condition of research. It is by reviewing the related literature only the researcher gets complete clarity about the problem under investigation, saves the researcher from wasting time, energy and resources in unfruitful and useless pursuits. Thus we can say that review of related literature becomes a piece of research in itself.

2.2 Review of Related Literature

1) Ramesh Ghanta, Bhaskaran Rao Dignmarti (2006)

Environmental Education Problems and Prospects, Discovery Publishing House, New Delhi.

Researcher was aware of the need of the protection of nature and its resources in order to save the mankind from the natural and man-made disasters. This book also helps for how to respond to the environmental issues.

4) P. Yendi Rayn (2014)

Global Warning and Environmental Problems - Issues and Initiatives, Dominant Publisher and Distributors, New Delhi.

When research gone through this book by the reading, he realize that, global warming, green house effect, dwindling forests, industrial status, water contamination, depletion of ozone layer affects on living things on earth.

Water issue is the most important problem which has to face by future generation. We must want to find out remedies on such problems otherwise natural disaster can catch human life.

5) Amardeep Kaur, Kavita Mittal, Meena Sharma (2003)

Scientific Approaches to Environmental Education, Tondon Publications, Ludhiyana.

Researcher gets aware about India's environment by reviewing this book. Indian environment is deteriorating at an alarming rate because of depletion of natural resources. This situation is equally grim in respect of all types of pollution both in the urban and rural. Toxic pollution is yet another consequence of industrial development. Thus, the issue of environment and its protection is a serious one in both the developed and developing countries.

6) Mahendra, Pandey (2014)

Global Warming and Climate Change, Dominant Publishers and Distributors Pvt. Ltd., New Delhi.

Researcher gain knowledge about indicators of climate change, how global warming affects health, how sea level rises along the coast. Climate change can adversely impact on the crops also

7) Singh, S.K. (2012)

Natural Disasters Treats, Patterns and Social Work, Sublime Publications, Jaipur.

Author defined the term natural disaster, it is the effect of a natural hazards e.g. floods, tornado, hurricane, volcano eruption, earthquake or land slide. It leads to financial, environmental and human losses. A natural disaster is the consequence of the combination of natural hazard and human activities. Researcher knows about the cyclones, Tsunami, landslide etc.

8) Marathe, P.P. (2006)

Practical Disaster Management, Diamond Publications, Pune 30.

This book reveals about causes, effect and characteristics of disasters, various organizations involved in disaster management. Researcher also get information about rescue and relief, practical tips in disaster management.

9) Marathe, P.P. (2007)

Concepts and Practices in Disaster Management, Diamond Publications, Pune.

Researcher understands concepts in disaster management, he also get knowledge about community preparedness and response, rescue and relief.

10) Rayan Kumar Sahoo, Tilottama Senapathi (2014)

Disaster Management and Mitigation, Dominant Publishers and Distributors Pvt. Ltd., New Delhi.

Researcher get clarified about issues and challenges about disaster management in India, classification of hazards.

11) Solanki, S. P. (2013)

Disaster Management, Astha Publishers and Distributors, New Delhi.

Information in this book gives researcher a valuable knowledge about climate change and disaster management also integrating community bases disaster risk reduction and climate change adaption.

12) Nidhi Gauba Dhawan, Ambrina Sardar Khan (2014)

Disaster Management and Preparedness, CBS Publishers and Distributors Pvt. Ltd.

This book helps researcher to know about classification, causes, impacts of disasters, approaches to disaster risk reduction and management in India.

13) Ray, P.K.S. (2014)

Educational Technology of Instructional Design, Part I, Dominant Publishers and Distributors Pvt. Ltd., New Delhi.

From this book researcher understands about components of effective instruction i.e. planning, designing, developing and evaluating instructions. A system approach to instruction, instructional strategies and techniques, measuring learning outcomes, use of technology while instructing.

14) Yadav Rajesh, Raybir Singh (2013)

Disaster and Rehabilitation Management, Oxford Book Company, Jaipur.

This helps researcher to know about reconstruction after natural disaster, communication in post-disaster reconstruction, training requirements in reconstruction.

2.3 Review of Related Researches

A summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with that is already known and what is still unknown and untested. Since effective research is based upon past knowledge. This step helps to eliminate the

duplication of what has been done. It provides useful hypotheses and helpful suggestions for significant investigation. It provides a background for the research project. It makes the reader aware of the status of the issue.

Good research is based upon everything that is known about a problem, this part of the report gives evidence of the investigators knowledge of the field.

Researcher reviewed the following researches -

1. **Dasgupta, Dipti, 1988, 'Teaching school economics by the Personalized System of Instruction (PSI)', Ph.D., Edu., University of Calcutta.**

Objective -

In the study, PSI was used as a method for teaching Economics at Class (IX) (school level) to obtain specific results.

Methodology -

The sample consisted of 50 students from Class IX of a school situated at Chandannagar in the district of Hooghly West Bengal. The sample group belonged to the age group 14-15 years. The sample group was divided into two equivalent groups - the PSI and the CLP groups. The two groups were taught separately by the same teacher with equal consideration. In this study the traditional lesson-plan method and the PSI method were used. The lesson plan method was used as the conventional method. ANOVA and 't' value were used to treat the data.

Major Findings -

- i) There was a significant difference between PSI group and CLP group in six unit-end test out of a total of 15 unit-end tests.
- ii) On comprehensive retention and attitude tests there was no significant difference between the two groups (SPB 0191).

2. Debi, Meena Kumari, 1989, 'Developing and testing the effectiveness of programmed learning material in the syllabus of principles of education in the B.T. course of Gauhati University, Ph.D., Phil., Gauhati Univ.

Objectives -

- i) To conduct and standardize a criterion test in the principles of education for B.T. students.
- ii) To construct, develop and validate programmed material in the principles of education, and
- iii) To test the effectiveness of the programmed learning material (PLM) over the traditional method of class teaching.

Methodology -

The B.T. course students of Gauhati University comprised the sample of the tryout. A criterion test was developed and used. Programmed materials were developed and validated and effectiveness was utilized using inferential statistics.

Major Findings -

- i) The (PLM) was found to effective compared to the traditional method of teaching, in achievement in 'Principles of Education' in sub-tests 1, 2 and 3.

- ii) PLM was found to be effective for both the higher-level and lower-level objectives when compared with the class-teaching method.
- iii) There was a significant difference between the pre-tests scores and the experimental group and those of the control group (RD 013).

3. Idayavani, S., 1991, 'Developing a video program on weathering and work of rivers in physical geography for higher secondary students', M.Phil, Edu., Madurai Kamaraj Univ.

Objectives -

- i) To prepare a video program on 'weathering' and 'work of the rivers' for instructional use for higher secondary students.
- ii) To find out whether the video method is more effective than the traditional lecture method in teaching the concepts on 'weathering' and 'work of the rivers'.
- iii) To find out whether the higher secondary students improve their achievement after viewing the video program.

Methodology -

The sample of the study constituted 60 students (30 males and 30 females) of standard XII of the O.C.P.M. Girls Higher Secondary School, Madurai. The pre-test and post-test equivalent groups design was employed. A video-lesson and lecture methods were used. Mean, SD and 't' test were used to treat the data.

Major Findings -

- i) The higher secondary students improved their learning of the concepts on 'weathering' and 'work of the rivers' after viewing the video program.

- ii) The higher secondary students taught by the video method performed better than the students taught by the traditional lecture method. (M.K.U. 1078).

4. Jeyamani, P., 1991, 'Effectiveness of the simulation model of teaching through Computer Aided Instruction (CAI)', M.Phil., Edu., Arinashilingam Institute for Home Science and Higher Education for Women.

Objectives -

- i) To find out the effectiveness of the simulation model of teaching as compared to the traditional method.
- ii) To utilize the growing use of computers in education.

Methodology -

The sample for this investigation consisted of students of standard XI for the two schools selected. The Pre-test, Post-test method was used. Mean, SD and 't' test were used to treat the data.

Major findings -

- i) The experimental group obtained a higher mean than the control group.
- ii) The sex-wise comparison proved to be insignificant.
- iii) There was no significant difference in learning level between Tamil medium and English medium students.
- iv) On the basis of the research findings, it was concluded that the experimental group performed significantly better than the control group. (MC 1758).

5. **Joshi, V., 1987, 'A study of effectiveness of school television programs in science at the secondary school level', Ph.D., Edu., The Majaraja Sayajirao Univ., Baroda.**

Objectives -

- i) To study the STV programs in science in terms of instruction objectives, number of programs, content coverage, its suitability and resources required.
- ii) To study the impact of STV programs on the scholastics achievement and scientific attitude of students.
- iii) To study the effect of intervention activities on the achievement and attitudes of students.

Methodology -

The sample include all the personnel from the production end of STV programs to the utilization end, covering 50 school principals, 180 school teachers and 200 students. The tools used included Questionnaires, Checklists, unstructured interviews, Ravens Progressive Matrices, Vardhini and Ravindranath's Scientific Attitude Scale. The collected data were treated by content analysis, percentages and ANCOVA.

Major Findings -

- i) The STV programs had not changed over the years and the coverage of different science subjects was inappropriate although 40% of the total course was covered.
- ii) The time given for preparation of STV programs was insufficient.
- iii) The quality of STV programs was poor although the timing and duration were appropriate.

- iv) No significant difference was found in the scientific attitude of students exposed and students not exposed to STV programs in the three groups.
- v) No significant difference was found in the scholastic achievement of students in three groups (MSY 0925).

6. Kalimuthu, T., 1991, 'Developing video program on environmental pollution in Biology for higher secondary students', M.Phil, Edu., Madurai Kamraj Univ.

Objectives -

- i) To prepare a video program on environmental pollution for instructional use for higher secondary students.
- ii) To find out whether the video method is more effective than the traditional lecture method in teaching the concepts on environmental pollution.

Methodology -

The sample of the study constituted 60 students (30 males and 30 females) of standard XI at K.R. Government Higher Secondary School, Ottanchatram and S.M. Girl's Higher Secondary School, Chatrapatty.

The Pre-test, Post-test equivalent groups design was employed in the study. The experimental group was taught through video lesson on environmental pollution and the same topic was taught to the control group by the lecture method. A video lesson on environmental pollution, lasting for 60 minutes was prepared for this study. Mean, SD and 't' tests were applied for statistical analysis.

Major Findings -

- i) The higher secondary students taught through the video program learnt more of the concepts on environmental pollution than those who were taught by the lecture method.
- ii) The higher secondary students improved their achievement on environmental pollution after viewing the video program (MKU 1077).

7. **Passi, B.K. and Pal, H.R., 1982, 'Preparation of a multimedia instruction module for developing the skill of observing classroom behavior through Flander's Interaction Analysis Category System (FIACA)', Independent study, Devi Ahilya Vishwavidyalaya.**

Objectives -

- i) To prepare instructional materials for developing skills of observing classroom behavior through the FIACS.
- ii) To study the effectiveness of the instructional materials in terms of the achievement of trainees on the criterion test and favorable opinion of trainees on different materials.

Methodology -

Self-instructional material was developed by the investigators with components like objectives, need and importance of the observation system, definition and assumptions, preparation of interaction matrix, qualitative analysis, quantitative analysis, limitation of FIACS, inter-observer reliability, episodes, learning exercises, glossary, references, criterion test and opinionnaire. A preliminary tryout was done through

experts judgment and students reaction. Modifications were made in the light of the above. The test was developed in Hindi language. Two groups of randomized subjects and the pre-test-post-test design was used in testing the hypothesis of the study. A random sample of 40 basic training institute trainees was selected from Indore. The tools used for data collection were FIACS criterion test and FIACS opinionnaire. Descriptive statistical techniques along with 't' test and chi-square test were employed for analysis of data.

Major Findings -

- i) The experimental group studying through instructional material obtained a significantly higher mean score on the criterion test than the control group. The treatment was found effective in developing classroom observation skills through the FIACS.
- ii) The reactions gathered during the study indicated a favorable opinion by the trainees on all its aspects, namely, objectives, examples, contents, language, learning exercise, glossary, utility, general appearance and cartoons (PKS 0648).

8) Singh Indubala Umed, Ph.D. (Edu.) South Gujrath University, Surat (1999).

Environmental Education through Video Instructional Package. An Exploration. *Buch Fifth volume.

9) Ravindranathan D., Ph.D. (Edu.) Osmania University, Hyderabad.

A Study of Scheme of Environmental Orientation to School Education. 1997. *Buch Fifth volume.

2.4 How Present Research Study is Different

Researcher is going to develop e-content for developing awareness about disaster management which is not done yet before yet any researcher. Hence it is different research from other researches.

Chapter Three

RESEARCH PROCEDURE

- 3.1 Introduction
- 3.2 Research Methodology
- 3.3 Development of E-Content:
- 3.4 E-Content Development by Researcher
- 3.5 Conclusion:

Chapter Three

RESEARCH PROCEDURE

3.1 Introduction

In the first chapter the need of such a research project is discussed fully. The objectives of the study were also stated. Various definitions of the terms used in this research, scope and limitations of the study are also given in that chapter.

In the second chapter the researcher had taken the review of some related literature and related researches.

In this chapter the researcher explains the research process. Method is the mean of achieving predetermined ends. Method is middle link, which connects in an organized way the objectives with its values. Counterpart method determines the quality of results. There is also the need for a thorough understanding of all research methods with particular reference to their strengths, limitations, applicability and appropriateness.

"Educational research aims to make contributions towards the solution of problems in the field of education by the scientific philosophical method" -F. L. Whitney

- **Disaster Management in India by Government, Other Institutions and Stakeholders**

Natural and manmade calamities are as old as Human civilizations. Many human civilizations had witnessed their downfall owing to the wrath and ravages of calamities. Frequencies of occurrences of both types of calamities are increasing all over the world. But occurrences and magnitude of manmade

calamities are more frequently felt all over the world with the advent of industrial Modern Civilization.

The state was playing prime role in teaching traumatic effects of calamity. Over a period of time, many new stakeholders are playing equally important roles in areas of disaster preparedness, rescue and relief operation, reconstructions and rehabilitation measures. They are striving hard to prevent occurrence of such disasters by adopting various short term and long term policies, programmes etc. They also put their concerted efforts to reduce catastrophic fallout of Disasters. Besides States, the other institutions and stakeholders are international organizations like UNO, UNDP, UNICEF, European Union, World Bank, IMf, Voluntary Organizations, NGO, Media, Members of Civil Society, Members of Panchayati Raj Institutions, Urban Bodies, Planning Authorities, Corporate Sectors, Industrial Houses, Educational Institutions, Research Bodies who are contributing immensely to mitigate and reduce vulnerability of disaster.

The Government of India enacted Disaster Management Act 2005. It mandates creations of the National Disaster Management Authority. The NDMA is headed by the Prime Minister of India as Chairman, a Vice Chairman with status of a Cabinet Minister and 8 members of the status of State Ministers. Each member heads a disaster specific division. It is the apex authority to look after all types of Disasters that engulfs India. Its objectives are prevention, mitigation, preparedness and response to Disasters. It mandated constitution of National Disaster Management Force which is multi-disciplined, multiskilled and highly technical force. It shall work in the event of onset of Disaster. The strength of Force is about 8 battalions and they are in place in most of the Disaster Prone

States. The Act also provided for constitution of State Disaster Management Authority and State Disaster Management Force. Odisha has taken a lead on this score. It had created Odisha State Disaster Management Authority since December 1999 and Orissa Disaster Rapid Action Force since 2001 about 13 units of Force are on the job in Odisha. The Act too provided for National Disaster Response Fund and State Disaster Response Fund to meet disaster related expenditures. Almost all States of India have provided such fund. Besides, it also created National Institute of Disaster Management to act as a centre of Excellence.

A new policy on Disaster Management in India was formulated by Ministry of Home Affairs, Government of India in 2009. It envisages setting up of National Disaster Management Authorities and Disaster Management Authorities at State level and Dist. Level. National Executive Committee, State Executive Committee and District Executive Committee at respective levels. At the National Level there is National Crisis Managerial Committee headed by Secretary of Home Affairs, Government of India and representative of Ministry of Agriculture, Atomic energy, Defense, Drinking Water, Environment and Forest, Finance (Expenditure) Health, Power, RD, Science and Technology Space, Telecom, Urban, External Affairs, HRD, Mines, Shipping and Road Transport and Highways. Chief of integrate Defense Staff is also a member of NEE. Similarly there are State Level Executive Committees headed by Chief Secretary and all other counterpart departments of Government who are related to Disaster management. Besides, there are Committees, like Cabinet Committee on management of Natural Calamity and Cabinet Committee on Security (CCS). In case of severe calamity, Inter-Ministerial Group operates. It is headed by Home Minister of Union Government. Besides, there is High Level Committee which is

headed by Finance Minister. Home Minister, Minister of Agriculture and Deputy Chairm"n of Planning Commission are its members. It is pertinent to mention that the Central Government deploys Armed Forces for disaster management for Communication, Search, Health, Medical facilities, Airlift and Helilift of food and Shelter materials also. The State Government and Union Territories of India undertake preventive measures, relief and rescue operation, rehabilitation and reconstruction measures through their various departments like Home, Revenue and Disaster Management, Health, Transport, RD, PWD, Irrigation, Civil Supply and Agriculture etc. The district level officers like Collector, SP, CDMO, CDVO, Executive Engineers, CSO, DAO, Sub-Collectors, Tahasildars, BDOs, RTO and the Block Tahasillevel field functionaries of Home, Revenue, Irrigation, PWD, RD, Health, Animal Husbandry, Agriculture, Food and Civil Supplies, Transport departments work in field at the time of calamity. They are assisted by Army and Paramedical Forces in case calamity of severe nature.

The corporate sectors have evinced their keen interest in tackling all stages of calamity. Disaster Management has become a major ingredient of Corporate Social Responsibility. Corporate Sector has played critical and catalytic role in mainstreaming disaster management. It is now inalienable part of Corporate Social Responsibility. It contributes to Disaster Management phenomenally in creating awareness generation, sensitization, training of personnel associated with disasters, cooperation in planning process and implementation of various schemes and programmes in a holistic way to combat disasters on short term and long term basis. Confederation of Indian Industry with more than 5000 industrial Houses have embarked on creating Environment Management Division for safer and disaster free society, Corporate Houses have

huge rich resources, *i.e.* -Human, financial, material and technical at its command. It can tap and influence flow of any type of resource from their counter parts in other countries. They have played key role in Gujarat Cyclone in 1998, Orissa Super Cyclone of 1999, Bhuj Earthquake-2001, Tsunami-2004. They are also promoting Public Private Partnership to meet challenges of disasters. The Corporate Houses work towards shifting of relief centric approach to protective assault-on vulnerability through various risks management measures. Insurance Companies have also started playing dynamic roles in all types of disasters by contributing to reduce burdens of loss inflicted on victims of calamity.

The role of NGOs/VOs in tackling menace of Disaster is nevertheless insignificant. The NGOs have assumed their importance by their relentless, dedicated, determined, selfless services in creating awareness, sensitization and reduction of suffering of victim of disaster. Their missionary zeal at the time of disaster, creativity and constructive approach at the time of rehabilitation and reconstruction are undoubtedly laudable. Their presence boosts morale of personnel of Government and Semi Government and other allied Organizations who work at the time of calamity. Red Cross, Ramkrishnan Mission and other leading Non-Government Organizations do a lot to reduce adverse impact of any type of disaster. The NGOs work in tandem with Government and other stakeholders. They have successfully extended desired, support to different Agencies of Government by virtue of their rich experience and professional expertise.

The role of Civil Society has also assumed importance in crystallizing opinion on various aspects of disaster management. It has shaped plans, policies and programmes on Disaster . management. It too has kept all actors including Government Department to be on their toe to act with

sincerity, dedication, promptness at the time of occurrence of any type of calamity.

In recent years, the media, both print and electronic have launched massive awareness programmes on all facets calamities. They have influenced Governments to chalk _t long term prospective plan and policies for mitigating reducing adverse effect of calamity. The deficiencies in naging different types of calamities by the Government more particularly at the time of occurrence of disaster, rehabilitations and reconstruction measures are highlighted in media. It acts as facilitator. It makes victims and other non-affected people more responsive at the time of any calamity. Flow of resource, like manpower, relief material, and technical support to mitigate suffering of victims of calamity is augmented by contribution from non-affected Governments, Corporate Sector and other International Agencies. Media also acts as a deterrent force against corruption which takes place during and after calamity.

The representative of Panchayati Raj Institutions, Urban bodies, Planning authorities of the country are rendering valuable service in making India a resilient country to meet any type of calamity. They constitute base of relief operation system at the grass root level. They too play positive role in post-disaster period, *i.e.* rehabilitation and reconstruction stage.

The Universities, IITs, NITs, Research Institutions of Government, Corporate Houses and MNC also contribute immensely in formulating polices and programmes of Government and other stakeholders. They explore new avenues to reduce effects of calamity.

The Planning Commission of India has recognized importance of Disaster since 10th Five Year Plan. It is now laying more emphasis on

allocation of funds to various Ministries/ Department of Government of India and State Governments as multipronged long term measures to tame disasters.

Disaster management has become concern of financial institutions. The RBI, Nationalized Banks and other Banks are also involved in addressing various issues of disasters by adopting suitable credit and .lending policies at the time of occurrence of disasters and in rehabilitation and reconstruction areas. The international

Organization, United Nation Development Project, UNICEF, European Union have associated themselves all over the world in adopting suitable policies and programmes to reduce impact of any type of calamity. Similarly international financial institutions like -World Bank and IMF etc. are actively funding schemes and Programmes relating to disaster management.

At present, Disaster Management is not the only concern of the State. Civil Societies, NGOs, Corporate Houses, PRIs, Educational and Research Institution, Media, Financial Institutions and International organizations like UNO, UNDP, UNICEF, World Bank, IMF, and Red Cross etc. must work jointly and cohesively for evolving a suitable strategy to manage disasters. Similarly statesmen, thinkers, Environmentalists, Research Scholars, Academicians, Scientists, Bureaucrats, Industrialists, Technocrats, Planners, Architects, Philanthropists, Engineers, Business magnates and Financers, who are devoting their talent, knowledge, skill around the year to assault the wrath of the Disaster must work in tandem to make the world and more particularly India free from menace of all types of Disasters.

3.2 Research Methodology

3.2.1 Research

"Research is the challenge that removes the threat of stagnation delay from all society." - **Ghormode 2008**

"Research is careful inquiry or examination to discover new information or relationship and to expand and to verify existing knowledge." -

Francis Rummel

Research is composed of two words 'Re' and 'search' which means to search again or a careful investigation to re understand or re-examine the facts or to search for new facts or to modify older ones in any branch of knowledge. In simple words research can be defined as school investigation in search for truths, for facts, for certainties systematized efforts to gain new knowledge is also known as research .

In teaching terms scientific research is systematic, controlled, empirical and critical investigation of hypothetical prepositions about the presumed relations among natural and human phenomena.

3.2.2 Educational Research

Research is also considered as the application of scientific method in solving the problem. It is a systematic, formal and intensive process of carrying on the science method of analysis.

"Educational research aims to make contributions towards the solution of problems in the field of education by the scientific philosophical method."

Whitney

"Educational research is that activity which is directed towards development of a science of behavior in educational situations. The

ultimate aim of such a science is to provide knowledge that will permit the educator to achieve his goal by the most effective methods.”

Travers M.W.

“Educational Research is study and investigation in the field of education or bearing upon educational problems.” - Good C.V.

3.2.3 Characteristics of Research:

1. Research gathers new knowledge or data from primary.
2. Research places emphasis upon the discovery of general principles.
3. Research is an exact, systematic and accurate investigation.
4. Research is logical and objective carefully recorded and reported.
5. Research used certain valid data gathering devices.
6. The researcher resists the temptation to seek only the data that support his hypothesis.
7. In research conclusions and Generalization made carefully.

(Saxena, Mishra, Mohanty ; 2006 p -24)

3.2. 4 Methodology of the Research:

It is necessary to think about research method while doing research work in the educational field. After having selected Research problem, the researcher has to select the proper research method.

The research method would be decided according to the nature of research problem. An educational research method has been classified into three groups on the basis of objectives of research, techniques of data collection, establishing control field etc. There are three types of educational research.

3.2.5 Types of Research Method

- 1. Historical Method**
- 2. Descriptive Method**
- 3. Experimental Method**

1. The Historical Method:

The signified knowledge gained by the process of research.. History gives an exact knowledge of the part and enables one to interpret the future. History is an integrated narrative of past events representing a critical search for the whole truth. History is often called as reconstruction of the past.

2. The Descriptive Method:

The Survey method investigate which attempts to describe and interpret what exists at present in the report the present status of a social institution , group or area, it deals with a cross section of the present, of duration sufficient.

Descriptive research describes what is it involves the description, recording, analysis and interpretation of conditions that exists; it involves some type of comparison or contrast and attempts to discover relationship between existing non manipulated variables.

3. Experimental Research Method:

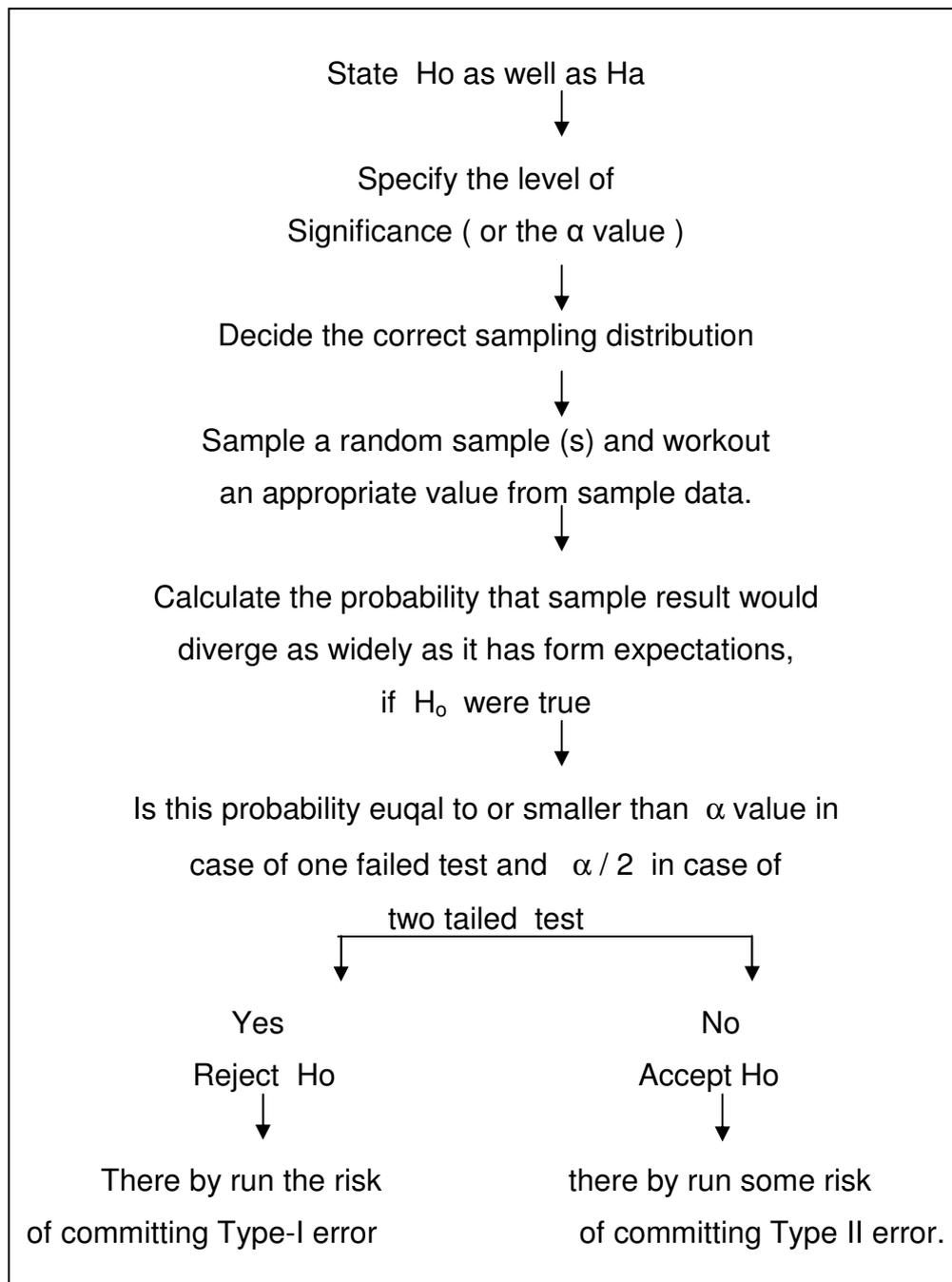
Experimental research provides a systematic and logical method for answering the question. If this is done under carefully controlled conditions, what will happen?" Experimenters manipulate certain stimuli treatments on environmental condition and observe how the condition or behavior of the subject is affected or changed. Their manipulation is deliberate and systematic.

3.2.6 Selection of Method:

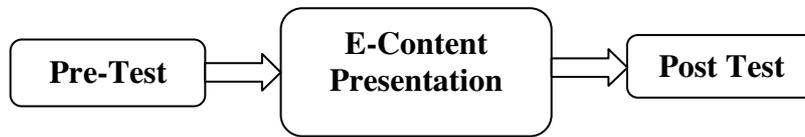
Experimental Method was selected and its implementation:

"The hypothesis is a tentative generalization, the validity of which remains to be tested. In its most elementary ideas, which becomes the basis for the action or investigation?" - George A. Lumberg

3.2.7 Research Design:



Researcher has decided to select '*Single Group Design*' for the implementation of programme.



3.2.8 Sample Selection:

1. Sample:

Sampling is the process by which a relatively small number of individuals or measures of individuals, objects or events is selected and analyzed in order to find out something about the entire population from which it was selected sampling procedures provide generalizations on the basis of a relatively small proportion of the population.

“A sample as the name implies, is smaller representative of a larger whole.” **George and Hatt**

“In every branch of science we lack the resources, to study more than a fragment’ of the phenomena that might advance our knowledge”.

W.G. Cochran

2. The Value of Sampling Technique:

In the quantified research, the sampling technique is made maximum use of, and in no field of research can its importance and value belittled. In researches in the educational, economic, commercial and scientific domains, the sampling technique is used and considered most apt. for research.

Sampling technique also has very high value in day-to-day activity. It is not considered necessary to examine each and every piece of the

commodity only a handful of goods are examined and the idea about the whole is formed and this usually proves a justified procedure. In education, sampling is a widely used technique. The census technique is rarely used, its most striking example being population count.

3.2.9 Methods of Sampling:

Sampling methods can be classified into two broad categories

- 1.) Probability Sampling
- 2.) Non-Probability Sampling

1) Probability Sampling:

In Probability sampling the unit of the population is not selected at the direction of the researcher but by means of certain procedures. Such method is also called random sampling in this methods following methods are included.

- a. Simple Random sampling
- b. Systematic sampling
- c. Stratified Random sampling
- d. Multistage sampling

It is a method of sampling which gives the probability that a sample is representative of population.

“A probability sample is one that has been selected in such way that every element chosen has a known probability of being included”.

G.C. Halmstadter (Koul, 1984, p. 112)

Probability sampling is generally used in fundamental research in which the purpose is to generalize the results.

2) **Non-Probability Sampling:**

In non-probability sampling the units are selected at the direction of the researcher. Such samples derive their control from the judgment of the researcher in this method following methods are include.

- a. Incidental sampling
- b. Quota Sampling
- c. Purposive sampling

Choice of sampling method depends upon many considerations unique to each individual project. These include the definition of the population available information the objectives of analysis and the financial other resources available for the project.

3.2.10 **Sample for Research:**

Researcher has selected '*Non probability: Purposive Sampling* i.e. students STD IX of Maharashtra Vidyalaya, Barshi, Solapur for the implementation of E-Content programme and 15 teachers of various schools.

3.3 **Development of E-Content:**

Guidelines for E-Content Development by UGC:

The e-content development and associated web based learning described here does not seek to replace traditional teaching and learning, but is expected to supplement them.

The product of e-content should be:

- a. **Technologically Friendly** so as to be downloaded and used on any computer either independently or in a LAN situation.
- b. **Learner Friendly** for easy navigation.

- c. **Learner Centric** to be useful in self-instructional mode.
- d. **Teacher Friendly** so as to be used in various teaching-learning methods such as classroom lectures, tutoring to a group, lab session etc.
- e. **Learner Centric Pedagogy** be employed. Specifically the designer of the e-content should pay attention to the teaching model used _ such as simple information communication, exploratory approach, discovery approach, mastery learning etc. Many types of interactive should be included to make learning effective and efficient.
- f. **Self-evaluation:** The e-content should use plenty of evaluation material to give feedback to the learner as to his/her achievements in a topic of course. It should include formative as well as summative evaluation.
- g. **Object Based Learning/Teaching:** The content should specifically state the objects of learning/teaching and should employ different strategies for skill, competency and functionality developments.

- **E-Content Module & Content Duration**

Content duration has been estimated on the basis of the number of hours that are required to transact the content in the classroom. For example, a course in the classroom requires one credit and a credit is equivalent to 15 hours. The content of a course will be taken as 15 hours classroom teaching. On an average, UG students have to take 6 to 8 papers in an academic year. Therefore, during the study period of 3 years a student may take 18 - 24 papers.

Each paper requires 20 - 25 lessons. Presuming that a lesson will take three hours of teaching, 60 to 75 hours will be required to complete one paper. Two and a half hours of classroom lecture is normally covered by an e-content Module of minute's duration. So, on an average, 300 Modules are required for completion of the full course. Similarly, duration of Video programmes produced by the Programme Developer concerning each module shall be about 30 minutes.

Production of 'Learning object Repository' (LoR) related to the modules also produced by the Programme Developer and for use in PC and internet shall be of 1-2 minutes of duration.

- **Content Development & Subject Experts**

The syllabus proposed for creation of e-Content shall be as per UGC Model Curricula for Undergraduate level courses. However, the Course Coordinator in consultation with the Subject Experts is expected to incorporate the latest developments that have taken place in that particular subject. The intention here is to provide scope for value added information on the subject.

With the help of these guidelines researcher has developed E-Content of 'Disaster Management' for Ninth Standard.

3.4 E-CONTENT DEVELOPMENT BY RESEARCHER:

Step 1: Selection of Topic. (Disaster Management for STD IX.)

Step 2: Development of Modules.

Step 3: Topic Wise Presentation preparation and Use of readymade videos.

Step 4: Topic wise Flash video conversion.

Step 5: Experts Guidance and Final preparation of E-Content.

Step 6: Actual presentation of E-Content in the classroom.

3.4.1 Disaster Management and Module details:

Any occurrence, that causes damage ,ecological disruption loss of human life, deterioration of health & health service, on a scale sufficient to warrant an extraordinary response from outside the affected community or area.

(WHO defines Disaster as)

"A disaster is an over whelming ecological disruption occurring on a scale sufficient to require outside naissance.

"A disaster is an event located in time & space which produces conditions whereby the continuity of structure & Process of social unit becomes of social unit becomes problematic."

A planned approach for the perception of Disaster, preparedness and response to Disaster and recovery following Disaster.

The emotional, economical and ecological toll of the disaster can't be calculated. Many villages have lost an entire generation. This was the biggest earthquake to hit the world in 40 years and no one could have thought that its effects would ripple worldwide overnight.

1. Tsunami

The term 'Tsunami' has been coined from the Japanese term Tsu meaning 'harbour' and name meaning 'waves'. Tsunamis are waves generated by earthquakes, volcanic eruptions, or underwater landslides and can reach 15m or more in height devastating coastal communities. In

recorded history, tsunamis worldwide have killed hundreds of thousands of people. Tsunamis caused by nearby earthquakes may reach the coast within minutes. When the waves enter shallow water, they may rise to several feet or, in rare cases, tens of feet, striking the coast with devastating force. The Tsunami danger period can continue for many hours after a major earthquake. Tsunamis may also be generated by very large earthquakes far away in other areas of the Ocean. Waves caused by these travel at hundreds of kilometers per hour, reaching the coast several hours after the earthquake. Unlike ordinary tides, which are short, frequent and surface level, tsunami, are barely noticeable in their deep-sea formation stage.

At this point despite a wavelength up to 100 km, they are shallow in depth and move at hundreds of kilometer per hour. If a quake hits Los Angeles, a Tsunami can reach Tokyo in a time less than a Jet would take to traverse the same distance.

- **Important Facts About Tsunamis**

- Some tsunamis can be very large. In coastal areas their height can be as great as 10m or more (30m in extreme cases), and they can move inland several hundred meters.
- All low-lying coastal areas can be struck by tsunamis.
- A tsunami consists of a series of waves. Often the first wave may not be the largest. The danger from subsequent tsunami waves can last for several hours after the arrival of the first wave.
- Tsunamis can move even 50 km per hour on coastal plain, faster than a person can run.

- Sometimes a tsunami causes the water near the shore to recede, exposing the ocean floor. This is nature's Tsunami warning and should be heeded.

The force of some tsunamis is enormous. Large rocks weighing several tons along with boats and other debris can be moved inland several meters by tsunami wave activity. Homes Tsunamis may also be generated by very large earthquakes far away in other areas of the Ocean.

Waves caused by these travel at hundreds of kilometers per hour, reaching the coast several hours after the earthquake. Unlike ordinary tides, which are short, frequent and surface level, tsunami, are barely noticeable in their deep-sea formation stage. At this point despite a wavelength up to 100 km, they are shallow in depth and move at hundreds of kilometer per hour. If a quake hits Los Angeles, a Tsunami can reach Tokyo in a time less than a Jet would take to traverse the same distance.

In 1883, the violent explosion of the famous volcano, Krakatoa in Indonesia, produced tsunamis measuring 40 meters which crashed upon Java and Sumatra. Over 36,000 people lost their lives as a result of tsunamis that are capable of crossing oceans. Tsunamis are nearly always created by movement of the sea floor associated with earthquakes which occur beneath the sea floor or near the ocean.

Tsunami wave train formation: Seen in the figure is the rupture in the seafloor shunted in the vertical direction. This movement displaces hundreds of cubic kilometres of the overlaying water, generating a massive tsunami, or sea surge.

- Tsunamis can occur at any time of day or night.
- Tsunamis can travel up rivers and streams that lead to the ocean.
- **What to do BEFORE a Tsunami**
 - Find out if your home, school, workplace, or other frequently visited locations are in tsunami hazard prone areas.
 - Know the height of your street above sea level and the distance of your street from the coast or other high-risk waters.
 - Plan evacuation routes from your home, school, workplace or any other place you could be where tsunamis present a risk.
 - Practice your evacuation routes
 - Have disaster supplies on hand.
 - Discuss tsunamis with your family.
 - Develop an emergency communication plan. In case family members are separated from one another during a tsunami have a plan for getting back together. Ask an out-of-state relative or friend to serve as the family contact (After a disaster, it is often easier to call long distance).

If you are at risk from tsunamis, you should:

- Avoid building or living in buildings within several hundred feet of the coastline.
- Make a list of items to bring inside in the event of a tsunami.
- Elevate coastal homes. Most tsunami waves are less than 10 feet (3 meters). Elevating your house will help reduce damage to your property from most tsunamis.

- Take precautions to prevent flooding.
- Have an engineer check your home and advise about ways to make it more resistant to tsunami water.
- Use a local radio or television station for updated emergency information.
- Follow instructions issued by local authorities.

What to do DURING a Tsunami -

- If you are at home and hear there is a tsunami warning, you should make sure your entire family is aware of the warning. Your family should evacuate the house if you live in a tsunami prone area. Evacuate to a safe elevated area and move in an orderly, calm and safe manner to the evacuation site.

After a tsunami, you should:

- Continue using a radio or television for updated emergency information. The tsunami may have damaged roads, bridges, or other places that may be unsafe.
- Check yourself for injuries and get first aid if necessary before helping injured or trapped persons. If someone needs to be rescued, call professionals with the right equipment to help. Many people might get killed or injured while trying to rescue others in flooded areas.
- Help people who require special assistance-infants, elderly people, those without transportation, large families who may need additional help in an emergency situation, people with disabilities, and the people who care for them.

- Avoid disaster areas. Your presence might hamper rescue and other emergency operations and put you at further risk from the residual effects of floods, such as contaminated water, crumbled roads, landslides, mudflows, and other hazards.
- Use the telephone only for emergency calls. Telephone lines are frequently overwhelmed in disaster situations. They need to be cleared for emergency calls to get through.
- Stay out of a building if water remains around it. Tsunami water, like floodwater, can undermine foundations, causing buildings to sink, floors to crack, or walls to collapse.
- When re-entering buildings or homes, be very careful ! Tsunami-driven floodwater may have damaged buildings where you least expect it. Carefully watch every step you take.
- Wear long pants, a long-sleeved shirt, and sturdy shoes. The most common injury following a disaster is cut feet.
- Use battery-powered lanterns or flashlights when examining buildings. Battery powered lighting is the safest and easiest to use and it does not present a fire hazard for the user, occupants, or building. Do not use candles.

2. **Earthquake**

Ground Movements

The ground movements caused by earthquakes can have several types of damaging effects. Some of the major effects are:

1. Ground shaking, i.e. back-and-forth motion of the ground, caused by the passing vibratory waves through the ground.

2. Soil failures, such as liquefaction and landslides, caused by shaking;
3. Surface fault ruptures, such as cracks, vertical shifts, etc.
4. Tidal waves (tsunamis), i.e. large waves on the surface of bodies of water that can cause major damage to shoreline areas.

Protection Movements -

The primary objective of earthquake resistant design is to prevent collapse during earthquakes thus minimizing the risk of death or injury to people in or around the buildings. There are certain features which if taken into consideration at the stage of architectural planning and structural design of buildings, their performance during earthquakes will be appreciably improved.

Reinforced concrete bands in masonry buildings For integrating the walls of an enclosure to perform together like a rigid box reinforced concrete bands are provided which run continuously on all external and internal walls including fixed partition walls. One or more of the following bands may be necessary in a building. Plinth band, lintel band, roof band, and gable band are names used for the band depending on the level of the building where the band is provided.

Vertical reinforcement -

Vertical reinforcement should be provided at corners and junction of walls. It shall be passing through the lintel bands and floor slabs or floor level bands in all storeys.

Earthquake doesn't kill people. It is the badly designed buildings that kill the people. So to prevent an earthquake hazard from becoming a

disaster our buildings should be properly designed incorporating the earthquake resistant design features into it.

3. Landslides

Landslides are among the major natural disasters or calamities in the world. In hilly terrains of India, including Himalayan mountains landslides have been a major and widely spread natural disasters that strike life and property almost perennially and occupy a position of major concern. These landslides, year after year, bring about untold misery to human settlements apart from causing devastating damages to transportation and communication network.

Landslides, debris fall, debris slide, debris flow, rock toppling etc. cause destruction of slope and ground surface, initiating the change of uncontrolled erosion in the mountain terrains.

Factors That Cause Landslides:

Landslides occur because of the interplay of several factors.

Natural factors:

- Intensity of rainfall
- Steep slopes
- Stiffness of slopes
- Highly weathered rock layers
- Soil layers formed under gravity
- Seismic activity
- Poor drainage

Man made factors:

- Deforestation leading to soil erosion
- Non-engineered excavation
- Mining and quarrying
- Non-engineered construction
- Land use pattern

Most Venerable Homes:

- Vulnerable houses are those which are situated on:
- Existing landslides area.
- Steep natural slopes.
- Areas in or at the mouths of drainages (such as canyons).
- houses constructed near foothills.

PROTECTION MEASURES FROM DAMAGE TO BUILDINGS:

Site Selection:

Landslides generally happen where they have occurred in the past, and in identifiable hazard locations. Areas that are typically considered safe from landslides include areas that have not moved in the past; relatively flat areas away from sudden changes in slope; and areas at the top of or along ridges. Houses built at the toe of steep slopes are often vulnerable to slides and debris flows.

Signs and Warnings:

If your house is on a hill, you can detect possible slope failure if you watch for these signs:

- Doors or windows stick or jam for the first time.

- New Cracks appear on plaster, tile, brick or foundations.
- Outside walls, walks or stairs begin pulling away from the building.
- Slowly developing, widening cracks appear on the ground or on paved areas such as streets or driveways.
- Underground utility lines break.
- Fences, retaining walls, utility poles or trees tilt or move.
- Water or bulging ground appears at the base of a slope.

Take Preventive Action:

The potential for landslides and destructive erosion can be greatly reduced or prevented with proper development, sound construction techniques, seasonal inspections and regular maintenance of drainage facilities.

Protect Vulnerable Areas:

Keep surface drainage water away from vulnerable areas, such as steep slopes, loose soils and non-vegetated surfaces. Collect Runoff Collect and direct water from patios, driveways, non-vegetated surfaces, into catch basins; and confine water flow in drainpipe such as a drainage ditch, drywell, gutter, natural drainage or holding pond. Roof water may go directly to the drainpipe.

Intercept Surface Water:

When surface water flows onto your property, and where a discharge point is available, dig a shallow, gently sloping ditch to intercept the water and direct it into a natural water course, vegetated drainage area, street pavement, or road drainage ditch. Your intercepting ditch

should be nearly horizontal, with a minimum slope, sufficient to allow water to flow slowly. Smoothen the sides of the ditch and grow vegetation; keep all ditches free of debris.

Stabilize Slopes:

Improve your soil's ability to resist erosion by stabilizing slopes by increasing vegetation and trees.

Straw, woodchips, or bark applied to a depth of at least one inch are effective in holding soil in place on slopes.

Barriers:

Property owners at the toe of steep slopes may be able, in some situations, to create barriers or catchments that trap smaller landslides. Such structures must be designed to withstand the volumes and velocities of material in any potential slide. In addition, designs must allow removal of trapped material. Barriers may consist of reinforced walls on the side of a building facing the slope.

4. Floods

Form of floods takes away thousand of human and cattle lives. More than one million huts and poor houses are lost every year in floods in India.

Can we prevent this loss?

Most Vulnerable Homes:

1. Buildings, which are constructed with earth-based materials or using stone and brick in mud mortar are highly vulnerable to damage in heavy rains and/or floods.
2. The huts made from biomass materials like bamboo, leaves, thatch or light construction using metal sheets are easily destroyed in floods and washed away.

3. The occupation of areas within the flood plain of rivers has increased the vulnerability, especially in areas of high population concentration. Flood plains attract poor people because of inexpensive land values.

Effects on Buildings:

The damage to buildings due to floods are as follows:

- 1) Houses are washed away due to the impact of the water under high stream velocity. The houses are commonly destroyed or dislocated so severely that their reconstruction is not feasible.
- 2) Houses constructed out of light weight materials like wood float when they are not anchored properly.
- 3) Damage caused by inundation of house. The house may remain intact on its foundation, but damage to materials may be severe. Repair is often feasible but may require special procedures to dry out properly.
- 4) Undercutting of houses. The velocity of the water may scour and erode the foundation of the house or the earth under the foundation. This may result in the collapse of the house or require substantial repair.
- 5) Damage caused by debris. Massive floating objects like trees, electric poles, etc. may damage the standing houses.

PROTECTION MEASURES FROM DAMAGE TO BUILDINGS:

The most effective measures for prevention against inundation are:

1. to avoid residing on river banks and slopes on river side's and the sides of gorges.

2. to build at least 250 meters away from the sea coast/river banks
3. to build proper drainage system in all flood prone areas, so that the water can be drained off quickly to prevent accumulation.
4. to construct the building with a plinth level higher than the known high flood level.
5. to construct the whole village *or* settlement on a raised platform higher than the high flood level.
6. to construct buildings on stilts or columns with wall-free space at ground level permitting free flow of water (inundation or flowing), provided that columns are circular and strong. In dry weather condition the ground area could be fenced and used for cattle, sheep poultry farming, or storage etc.

Not only do we contribute to the causes of floods, but reckless building in vulnerable areas, poor watershed management, and failure to control the flooding also help create the disaster condition. Therefore there is an urgent need to mitigate the flood hazard by proper habitat management, watershed management and incorporating flood resistant features in our buildings.

5. Cyclones

Cyclones pose a major threat to life and property in many parts of the world. Every year these sudden, violent cyclones bring widespread devastation to coastlines and islands lying in their erratic paths. A windstorm's destructive work is done by the high wind; flood producing rains and associated storm surges.

On November 19, 1977, a cyclone, which had been expected to hit Tamil Nadu, instead struck the central coast of Andhra Pradesh State in the Krishna Godavari Delta. Many people perished because advance warning was either too slowly or too narrowly disseminated.

Damage in Andhra Pradesh was caused primarily by a storm surge that devastated some 65 villages, about 21 of which were completely washed away. The storm surge was reported to have been 5.7 meters (19 feet) high, 80 kilometers (50 miles) long, 16 kilometers (10 miles) wide, with a speed of 190 kilometers per hour (120 miles per hour). Many of the victims of the Andhra Pradesh cyclone were migrant laborers. This made identification of the dead difficult.

MOST VULNERABLE HOMES -

The vulnerability of a human settlement to a cyclone is determined by its location, the probability that a cyclone will occur, and the degree to which its structures can be damaged by it. Buildings are considered vulnerable if they cannot withstand the forces of high winds and storm surge. Generally those most vulnerable to cyclones are lightweight structures with wooden frames, especially older buildings where wood has deteriorated and weakened the walls. Houses made of poorly constructed concrete blocks are also vulnerable.

Urban and rural communities on low islands or in unprotected low-lying coastal areas or river floodplains are considered vulnerable to cyclones. Furthermore, the degree of exposure of land and buildings will be affected by the velocity of the cyclone wind at ground level.

EFFECTS ON BUILDINGS -

As a consequence of the storm surge and high wind speed following types of damage are commonly seen :

- Uprooting of trees which disrupt transportation and relief supply missions.
- Damage to signposts, electric poles and transmission line towers.
- Damage to improperly attached windows or window frames.
- Damage to roof/lintel projections.
- Failure of improperly attached or constructed parapets.
- Overturning failures of compound walls of various types.
- Failure of roofing elements and walls along the gable ends particularly due to high internal pressures.
- Failure of large industrial buildings with lightweight roof coverings and long/tall walls due to combination of internal & external pressures.
- Brittle failure of asbestos.
- Punching and blowing off of corrugated iron roofing sheets attached to steel trusses

Protection Measures For Damage To Buildings:

1. Site selection

Cyclonic windstorms commonly generate storm tides leading to coastal inundation. In cyclonic regions, close to the coast, a site above the likely inundation level should be given preference. In case of non availability of high elevation natural ground, construction should be done on stilts with

no masonry or bracings upto maximum surge level, or raised earthen mounds as shown to avoid flooding/inundation.

2. Platforms and Orientation

- (a) For individual buildings, a circular or polygonal plan shape is preferred over rectangular or square plans.
- (b) A symmetrical building with a compact plan-form is more stable than an asymmetrical building with a zig-zag plan, having empty pockets as the latter is more prone to wind/cyclone related damage.

3. Foundations

The following parameters need to be properly accounted for in the design of foundation.

- (a) *Effect of Surge or Flooding:* Invariably a cyclonic storm is accompanied by torrential rain and tidal surge (in coastal areas) resulting into flooding of the low-lying areas. The flurry of tidal surge diminishes as it travels on shore, which can extend even upto 10 to 15 km.
- (b) *Building on Stilts:* Where building is constructed on stilts, it is necessary that stilts are properly braced on both the directions.

4. Wall Openings

- (a) Openings just below roof level are avoided except that two small vents without shutters are provided in opposite walls to prevent suffocation in case room gets filled with water if people try to climb up on lofts.
- (b) Doors and windows should have strong closing/ locking arrangements and glass/wooden panels be securely fixed.

5. Glass Paneling

- (a) One of the most damaging effects is the extensive breakage of glass panes caused by high wind pressure or impact of flying objects in air. The large size door or window glass panes may shatter because they are too thin to resist the wind pressures.
- (b) Reduce the panel size to smaller dimensions. Pasting thin plastic film or paper strips can strengthen Glass panes.
- (c) Provide a metallic fabric/mesh outside the panels.
- (d) Provide proper locking arrangement of shutters. Securely fix the frames to walls.

3.5 Conclusion

In this chapter Researcher has described the complete procedure of research. Researcher wants to check the effectiveness of E-Content on IX STD Students. That's why Researcher has selected Experimental Method of research. From this method 'Single Group Design' has been selected for the implementation. Researcher has developed E-Content on "Disaster Management". Researcher decided to implement the programme with the help of this E-Content.

Chapter IV

ANALYSIS, INTERPRETATION, CONCLUSIONS AND RECOMMENDATIONS

- 4.1 Introduction
- 4.2 Interpretation
- 4.3 Conclusions
- 4.4 Recommendations

Chapter IV

ANALYSIS, INTERPRETATION, CONCLUSIONS AND RECOMMENDATIONS

4.1 Introduction

In chapter third research procedure with e-content development procedure is given. Researcher has also conducted pre and post-test on awareness about Disaster Management. Pre-test was conducted after traditional teaching on 5th December 2013. Students performance in test was analyzed and mean of test score was decided.

In the month of January 2014 to March 2014, E-content development procedure was decided by visiting to Jaykar Library, Pune University and Library of Shivaji University, Kolapur. Experts were interviewed for E-content development, UGC guideline was also followed. Researcher also consulted with experts in Ahilyadevi Vishwavidyalaya, Indore. After discussion with experts, researcher developed E-content about Disaster Management. In the month of September 2014 teachers were asked to fill-up the questionnaire. In the month of December 2014 lecture of expert was arranged with demonstration of E-content, then after a gap of one month in the month of February 2015 post-test was conducted. Students performance was analyzed and mean of test score was decided.

Researcher used the One group pre-test post-test design.

$O_1 + O_2$

O_1 - Pre-test

O_2 - Post-test

This design provides some improvement over the first, for the effects of the treatment and judged by the difference between the post-test scores.

Researcher computed the mean difference between the pre-test and the post-test scores and found that the mean has increased from 27.16 to 29.16, a mean gain of 2 score points. Researcher detected temporary improvement in awareness about disaster management among secondary school students.

It is concluded that there has been a significant improvement in awareness about Disaster Management as a result of the students' viewing E-content.

4.2 Interpretation

a) The following table shows Mean and SD of pre and post-test.

	Mean	SD
Pre-test	27.16	4.08
Post-test	29.16	3.66
N	60	60

Above table shows mean difference as 2.00 and standard deviation of post-test was 3.66 i.e. each score is deviated less from mean compare to pre-test.

b) The conclusions from Teachers Questionnaire are as follows.

- 1) Teachers were having 13 years experience of teaching environmental education.
- 2) Most teachers were using graphs and charts of drawing while teaching environmental concepts.

- 3) Teachers were not trained about use of ICT.
- 4) Teachers were using internet sometimes.
- 5) Teachers were not aware about development of E-content with the help of E-media.
- 6) Teachers used lecture method while teaching about Disaster Management.
- 7) Teachers were not trained about awareness of Disaster Management.
- 8) Teachers used photographs of news papers and some video clips to give opportunity of observing Disaster to students.
- 9) Computer and internet facility is available in schools.
- 10) Teachers were not using internet facility for taking reference for Disaster Management.

4.3 Conclusions

- 1) Development of E-content was useful for developing awareness about Disaster Management.
- 2) Teachers are not trained for development of E-content about Disaster Management
- 3) E-content was developed and its CD is attached with this report.

4.4 Recommendations

- 1) Teachers should be trained for E-content development.
- 2) Students should be motivated to know about various hazards and disasters.
- 3) Government should renewed curriculum with content of Disaster Management.

- 4) Students should be aware about social responsibilities.
- 5) Teachers and students should conduct project about Disaster Management.
- 6) Every citizen should know about Disaster Management, preparedness, mitigation etc.
- 7) Teachers and students should also know about various institutes of Disaster Management and their functions.
- 8) Government should introduce various types of disaster in syllabus of secondary education, higher education.
- 9) The key actions for developing a culture of prevention are...
 - a. Awareness raising
 - b. Societal arrangements
 - c. Accountability forging
 - d. Empowerment
- 10) Implementation of training and educational programs to build knowledge, educate civil society and policy makers and develop local and global capacity.
- 11) Teachers and students should be trained for Disaster Assessment, Disaster Preparedness, Disaster Response and Relief, Disaster Mitigation.

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APPENDICES

Appendix - A

**LIST OF THE STUDENTS WITH PRE-TEST AND
POST-TEST SCORES**

Sr. No.	Name	Pre-test Score	Post-test Score
1	Kadam Vishal Hambirrao	32	34
2	Akashay Rajendra Karlase	24	26
3	Tushar Preveen Mahamuni	24	26
4	Nihal Mannan Monim	22	24
5	Mule Rushikesh Kundlik	30	32
6	Pawar Pratik Kiran	26	28
7	Saptale Abhishek Ramchandra	32	34
8	Aditya Dattatraya Shinde	24	30
9	Shivaji Suresh Shinde	26	30
10	Swaraj Dashrath Shinde	30	34
11	Khandare Samarth Suresh	30	34
12	Prasad Hari Lokhande	22	28
13	Mirgane Akshay Rajesh	28	32
14	Vishwajeet Pandurang Kale	30	34
15	Shinde Chinmaya Sunil	24	30
16	Kambale Tushar Gaurishankar	32	34
17	Kharde Pratik Shivaji	18	22
18	Disale Sameer Shivaji	34	36
19	Shirsat Rushikesh Dattatraya	22	26
20	Anbhule Rohan Dhanaji	28	30
21	Akash Manik Anandkawalas	34	36
22	Andhare Aniket Shrikant	16	20

Sr. No.	Name	Pre-test Score	Post-test Score
23	Vishwajit Sanjay Ambure	32	34
24	Ashish Pramod Burade	30	32
25	Harshad Santosh Chaudhari	18	20
26	Jagdale Rohit Ramesh	30	28
27	Pardeshi Pratik Jayshing	26	28
28	Shinde Pratik Parmeshwar	32	34
29	Pawar Sagar Siddheshwar	30	32
30	Shinde Vijay Anil	26	28
31	Onkar F. Jadhwar	26	28
32	Nikam Shivam Narayan	30	32
33	Shishir Shivaji Gaikwad	30	32
34	Gadhawe Pankaj Parmeshwar	28	30
35	Gund Aaditya Deepak	18	20
36	Kadam Vivek Vitthal	26	28
37	Jagdale Sumeet Tukaram	18	22
38	Sujit Chandrakant Mirgane	32	34
39	Mayur Rajendra Gund	34	36
40	Raturaj Rajendra Jawale	26	28
41	Ike Ajay Laxman	26	28
42	Gholave Rushikesh Laxman	24	28
43	Kadam Akash Hambirrao	32	34
44	Abhijeet Anil Gund	22	30
45	Vinod Dattatraya Zalake	32	34
46	Pankaj Shivaji Waghmare	26	28
47	Chaitanya Nihalkumar Vankalas	24	26
48	Vankalas Avinash Bhaskar	28	28

Sr. No.	Name	Pre-test Score	Post-test Score
49	Shubham Ramesh Vare	30	30
50	Tambare Sanket Sahebrao	32	34
51	Takmoge Sarthak Balaji	30	32
52	Vinay Vithal Kshirsagar	22	26
53	Tanmay Harish Kshirsagar	20	22
54	Pawan Shivaji Kshirsagar	34	36
55	Jadhav Somesh Balasaheb	20	22
56	Jawale Sudhaunshu Shyam	26	28
57	Bhushan Shreenivas Gotkhind	22	26
58	Gaurav Pradeep Gaikwad	26	28
59	Saurabh Satish Gade	32	34
60	Kashet Farooq Inamdar	28	30

Appendix - B

QUESTIONNAIRE FOR TEACHERS

- १) आपणास पर्यावरण शिक्षण विषय अध्यापनाचा अनुभव किती?
- २) आपण अध्यापनासाठी कोणती शैक्षणिक साधने वापरता?
- ३) आपण माहिती संप्रेषण तंत्रविज्ञानाचे प्रशिक्षण घेतले आहे का?
- ४) आपण ज्ञान अद्ययावत करताना आंतरजाल (Internet) चा वापर करता का?
- ५) आपणास ई-माध्यमाद्वारे ई-आशय विकसित करता येतो का?
- ६) आपण आपत्ती व्यवस्थापनासंबंधी मार्गदर्शन करताना कोणते साहित्य वापरले?
- ७) आपत्ती व्यवस्थापनाबद्दल आपले प्रशिक्षण झाले आहे का?
- ८) विद्यार्थ्यांना आपत्तीचे निरीक्षण कसे घडविले?
- ९) आपल्या विद्यार्थ्यांसाठी संगणक व इंटरनेट सुविधा आहे का?
- १०) इंटरनेटचा वापर करून अध्यापनात संदर्भाज्ञान स्पष्ट करता का?

Appendix - C

प्रश्नावली

- १) पर्यावरणामध्ये अचानक घडून येणाऱ्या विनाशकारी बदलांना पर्यावरणीय असे म्हणतात.
अ) घटक [] ब) बदल []
क) हानी [] ड) आपत्ती []
- २) खालीलपैकी हा नैसर्गिक आपत्ती प्रकार आहे.
अ) चेंगराचेंगरी [] ब) वणवा []
क) बॉम्बस्फोट [] ड) घरगुती अपघात []
- ३) आपत्तीचा कमीत परिणाम कसा होईल असा विचार मध्ये केला जातो.
अ) पर्यावरण [] ब) परिसर []
क) विमोचन [] ड) कृती []
- ४) आपत्ती कोसळल्यानंतर परिस्थितीवर मात करणे, उपाय करणे व पुनर्वसन करणे या प्रक्रियेस असे म्हणतात.
अ) सज्जता [] ब) प्रतिबंध []
क) प्रतिसाद [] ड) आघात []
- ५) आपत्ती व्यवस्थापनात यास महत्त्वाचे स्थान आहे.
अ) लोक [] ब) भौतिक घटक []
क) प्रसंग [] ड) समन्वय []
- ६) रस्ता अपघात ही प्रकारची आपत्ती आहे.
अ) नैसर्गिक [] ब) मानव निर्मित []
क) 'अ' व 'ब' [] ड) यापैकी नाही []
- ७) महापूर येण्याचे कारण आहे.
अ) अवर्षण [] ब) अतिवृष्टी []
क) निकृष्ट दर्जा बांधकाम [] ड) सर्व []
- ८) महापूर आपत्ती कल्पना आल्यावर प्रथम हे कार्य महत्त्वाचे आहे.
अ) जीवितांना सुरक्षित स्थळी स्थलांतरित करणे []
ब) सर्व अधिकाऱ्यांना मुख्यालयी थांबविणे []
क) पंचनामे करणे [] ड) पुनर्वसन करणे []
- ९) पूर व्यवस्थापनासाठी हे क्षेत्र महत्त्वाचे आहे.
अ) पूर्व सूचना, इशारा व सेवांचा विस्तार []
ब) पूर क्षेत्रात विमा योजना सुरू करणे []
क) आरोग्य देखरेख सेवा उपलब्ध करून देणे []
ड) वरील सर्व []

- १०) भूकंप म्हणजे होय.
- अ) भूकवचाखाली हालचाली होणे []
- ब) जमीनीत खडकांना धक्का बसणे []
- क) भूस्तराखाली दगडांवर दाब पडून पृष्ठभागावर कंपणे जाणवणे []
- ड) पृथ्वी गरगर फिरणे []
- ११) आपत्तीचे परिणाम जास्त विघातक असतात.
- अ) भूकंप [] ब) महापूर []
- ड) रोगराई [] ड) अवर्षण []
- १२) भूकंपाचा धक्का बसत असताना ठिकाण हे सर्वात सुरक्षित असते.
- अ) टेबलाखाली लपणे [] ब) उगड्या माळावर किंवा रानावर []
- क) मोटारीत बसणे [] ड) यापैकी थांबणे नाही []
- १३) जंगलात आग लागण्याचे कारण आहे.
- अ) आकाशातील वीज पडणे []
- ब) कडक उन्हामुळे वाळलेला पालापाचोळा पेटतो []
- क) जंगलातील शिबिरांमध्ये वापरण्यात आलेली चूल []
- ड) वरील सर्व []
- १४) वणव्यामुळे हा परिणाम होतो.
- अ) जमीन स्वच्छ होते [] ब) अनावश्यक झाडे नष्ट होतात []
- क) जैविक घटक स्थलांतर करतात []
- ड) जैवविविधता झपाट्याने कमी होते []
- १५) जंगलातील आग व्यवस्थापनासाठी प्रयत्न चांगला आहे.
- अ) जळते थोटूक व्यवस्थित इतर ठिकाणी फेकणे []
- ब) शेकोटी विझवणे []
- क) जंगलाच्या कडेला मानवी स्थलांतर होऊ देऊ नये []
- ड) जंगलात डांबरी रस्ते तयार करणे []
- १६) ऍंशी टक्के रोगांचा प्रसार माध्यमातून होत असतो.
- अ) दूषित पाण्याच्या [] ब) हवा []
- क) धुर [] ड) यापैकी नाही []
- १७) खालीलपैकी हा साथीचा आजार आहे.
- अ) त्वचेवरील खाज [] ब) डोळ्यांना न दिसणे []
- क) पोलिओ [] ड) सांधे दुखणे []

- १८) साथीच्या रोगाचे नियंत्रण करण्यासाठी हे व्यवस्थापन उत्तम आहे.
- अ) लोकांमध्ये जाणीव जागृती करणे []
- ब) सतत प्रतिबंधात्मक उपाययोजना राबविणे []
- क) शुद्ध पाणीपुरवठा करणे []
- ड) वरील सर्व []
- १९) अतिशय कमी पावसामुळे निर्माण झालेली स्थिती म्हणजे होय.
- अ) भीषण पाणी टंचाई [] ब) कुपोषण []
- क) अवर्षण [] ड) आणीबाणी []
- २०) अपघात टाळण्यासाठी खालीलपैकी व्यवस्थापन सर्वोत्तम आहे.
- अ) वाहण सुस्थितीत ठेवणे []
- ब) वाहन चालवितांना वाहतुकीचे नियम काटेकोरपणे पाळणे []
- क) समोरासमोर होणारी धटक टाळा []
- ड) भरपूर हॉर्न वाजविणे []
- २१) देशातील हवा व पाणी गुणवत्ता विश्लेषणाचे व प्रसाराचे काम ही संस्था करते.
- अ) नैसर्गिक साधनसंपत्ती विकास आणि ऊर्जा प्रकल्प, कन्याकुमारी []
- ब) विज्ञान व पर्यावरण केंद्र, दिल्ली []
- क) राष्ट्रीय पर्यावरणीय अभियांत्रिकी संशोधन संस्था, नागपूर []
- ड) भारतीय वन्यजीव संस्था, डेहराडून []
- २२) जीवावरणातील साठ्यांचे जागतिक जाळे प्रस्तापित करण्याचे कार्य ही आंतरराष्ट्रीय संस्था करते.
- अ) मानव व जीवावरण कार्यक्रम (Man and Biosphere Program), युनेस्को []
- ब) निसर्ग संवर्धन जागतिक निधी (World Wide Fund) []
- क) निसर्ग व साधनसंपत्ती संवर्धन आंतरराष्ट्रीय संघ, स्वित्झर्लंड []
(International Union for Conservation of Nature and Natural Resources)
- ड) यापैकी नाही []