EFFECTIVENESS OF A DISASTER MANAGEMENT EDUCATION PROGRAMME TO ENHANCE THE AWARENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS OF KERALA

UDAYASREE. K

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DECLARATION

I, **UDAYASREE K.**, do here by declare that this thesis entitled as '**EFFECTIVENESS OF A DISASTER MANAGEMENT EDUCATION PROGRAMME TO ENHANCE THE AWARENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS OF KERALA**' is a genuine record of research work done by me under the supervision of **Dr. P. REKHA**, Assistant Professor, Farook Training College, Research Centre in Education, University of Calicut, and that no part of the thesis has been presented earlier for the award of any Degree, Diploma, or Associateship in any University.

Place : Farook College

Date : **UDAYASREE. K**

Dr. P REKHA
Assistant Professor,
Farook Training College,
Research Centre in Education,
Kozhikode

CERTIFICATE

This is to certify that the thesis entitled '**EFFECTIVENESS OF A DISASTER MANAGEMENT EDUCATION PROGRAMME TO ENHANCE THE AWARENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS OF KERALA**' is an authentic record of research work carried out by **UDAYASREE. K** for the degree of Doctor of Philosophy in Education, Farook Training College, Research Centre in Education, University of Calicut, under my supervision and that no part thereof has been presented before any other Degree, Diploma, or Associateship in any other University.

Place:Farook College **Dr. P. REKHA**

Date: (*Supervising Teacher*)

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Date: UDAYASREE.K

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INTRODUCTION

Earth is our home and hence significant for us. Our earth is formed almost 4.5 billion years ago. The living world in this earth is rich in variety. Millions of plants and animals are there in this world. What is important here is the interaction and interrelationship between these plants and animals. This interaction is the basis of life in this earth. This biological wealth and its amazing relation are presently in danger. The accusing finger is clearly pointing to human beings and their activities.

Human population size has grown rapidly in the last 100 years. Imagine the needs of primitive man of our earlier times and the modern man. The increase in demand for food, water, home and other commodities exert pressure on the earth which results in degradation of the earth's resources. We the people have a moral responsibility to protect this earth and pass it on to the future generations. The Millennium Summit of the United Nations in 2000 declared eight international development goals for the year 2015. One of the eight goals is to ensure environmental sustainability. Environmental Sustainability is the process to ensure the needs of today's population along with meeting the needs of future generations. A sustainable environment is the very important aim of present system of education at all levels.

Education will direct an individual to the right path in life at all times. So the present problems in one's life - social, environmental, ethical, cultural or any other- demand a change in the system of education. The very opening words of Kothari

Commission Report 'the destiny of India is now being shaped in her class rooms' emphasis the growth of our country depends on the rate of literacy and the availability of skilled and educated man power. Proper education surely will improve the knowledge, attitude and skills of an individual and make him/her ready to practice what has learnt from education.

School provides a variety of experiences to an individual. In the ancient period the house of Guru was the primary educational institution to the student. Later on education became more organised and large educational institutions were established in different places. Now school is a part of life. In this institution teaching is performed by teachers and the important tool in the hands of teachers is the text books. The focus of education is mastering the basic maths, history, science and languages with high standards and expectations.

Every subject is introduced in the curriculum at all levels with particular aims. Memory is best trained by languages and history; observation and concrete reasoning by science; abstract reasoning by Mathematics; Nature study for the faculty of observation etc. Thus the schooling is an organized and deliberate attempt of the society to educate its young members in pre-specified ways to realize the pre-determined goals. Even though these particular aims every subject find a place to make aware the students of the present day problems and its solution through education. Environmental education is one such subject which is introduced as interdisciplinary subject since environmental education has the productive role in improving life and values.

Our environment is facing a number of problems which are known as environmental issues. Pollution, population explosion, disasters, climate change etc. are some problems which needs special attention. All the people share a common environment and hence the problems to any part of environment affect all other people. Take the example of different disasters of the time. Earth quakes, tsunami, flood, storms etc. are affecting all parts of the world. All these are disasters because the loss of life and property is beyond the limits of the control. So education for preventing disaster is an urgent need of the hour.

Our country experienced various kinds of disasters in past years. Here is a focus to such disasters.

Disaster	Place	Year	Deaths
Cyclone	Andhra pradesh	1990	10,000
Earth quake	Uttar kashi	1991	100
Flood	Punjab	1993	200
Cyclone	Tamil Nadu	1993	9475
Heat wave	Uttar pradesh	1995	2000
Earth quake	Lattur	1996	962
Super cyclone	Orissa	1999	39
Earth quake	Chamoli	1999	359

A natural calamity like the worst Indian Ocean tsunami hit the South Indian states on 26, December 2004 destroy and devastate the coastal areas of Tamil Nadu, Kerala and Pondicherry. Most of the affected persons are from the coastal region. In Kerala alone about 171 people died mainly due to lack of awareness of the Disaster

comes. The tragedies cause a great loss of life and property. The death toll some time it may be a few or large number. The common natural causes such as heavy rain, cyclones etc., and common cause of manmade disaster is the negligence of human towards the environment. Disaster management helps to reduce all these disasters.

Every day we are awakened by hearing one or more this types of tragic news happened in our country. During these disasters several agencies both governmental and non-governmental come forward and provide help. But the local people they are affected by such a disaster are unaware of the management of that particular situation. In India, the death due to disasters is increased recently because the persons encounter with these disasters is not known how to manage such situation.

According to National Policy on Disaster Management (2009) “Expanding population, urbanisation and industrialisation, development within high-risk zones, environmental degradation and climatic change are the major reasons for the disasters. The economically and socially weaker segments of the population, elderly persons, women, and children orphaned and differently abled persons are highly vulnerable to disasters”. Hence the education system in India needs an inclusion of Disaster Management Education in Public education sector.

The main focus of the present study is disasters and its management.

Need and Significance of the study

India is vulnerable, in varying degrees, to a large number of natural as well as manmade disasters. 58.6 percentage of the land mass is prone to earthquakes of

moderate to very high intensity; over 40 million hectors (12 percentage of the land) is prone to floods and river erosion: of the 7,516 Km long coastline, close to 5,700 km is prone to cyclones and tsunamis; 68 percentage of the cultivable area is vulnerable to drought and hilly areas are at risk from landslides and avalanches. Vulnerability to disasters/ emergencies of chemical, biological, radiological and nuclear (CBRN) origin also exists.

Disaster education is recognized by United Nations Educational, Scientific and Cultural Organization (UNESCO) as an essential element in sustainable development since it hastens the progress of societies towards disaster resilience. When a disaster strikes, our Government spent lot of resources for relief and rehabilitation measures. By educating a generation, we can save all these resources and thousands of lives. So it is better to say prevention is better than cure. Curriculum should be revised in tune with the recent demands for disaster management education. A life oriented approach can be given in this respect to enable the students to implement directly in to their life.

Disaster related education is imparted in many parts of the country. The countries like Canada, Japan, China, Bangladesh, Kenya, Indonesia, Thailand, Africa and Latin America provide disaster management education from primary level. They make packages and plans for providing awareness to school students and public. Some examples are:

- In South Africa, no national curriculum exist that deals specifically with disaster; but the same time various individual states are pursuing relevant educational initiatives, these curricula deal with life and safety education,

and violence prevention. Songs are used to teach the basics of safety to younger children.

- In China, there is a prescribed text book for senior middle schools on natural hazards and their mitigation.

- In Japan, disaster education is a community priority. Children grow up seeing adults practicing civil responsibility in a myriad ways. In residential areas and urban homes, small red buckets of water are kept outside the front door as a remnant of traditional community of fire brigades, which have existed in many cities since 1700s. Disaster preparedness and mitigation are taught in Japanese schools by way of lectures.

- In Germany, there are 16 different curricular arrangements that entrust the responsibility for education to sub National States. The text books focus on regions of the world at risk, the natural reason of risk, and the impact of hazard on surroundings. The teachers attempt to sensitive students to the difference between a natural event and a disaster, and show the requirement of early warning system in disaster management. The schools carry out voluntary workshops. A group of students indulge in research work relating to earthquakes and floods in their own region.

- In Algeria, the mode of education about natural disasters is through the stories at the rate of one lesson per year. In the pre- university years, the teaching gets more systematic and students are taught geology, plate tectonics and, again, earthquakes.

- In Jamaica, Disaster Preparedness Day is celebrated in schools. These events takes place in January and June as the later month signals the start of Hurricane season. Disaster preparedness is introduced in the curriculum for different subjects at primary, secondary and the tertiary levels. School children take part in an innovative disaster- themed culinary competition which is organised each year at the annual independence festival. Children prepare meals using only the ingredients that would be available after a disaster. In Jamaica, an annual hazard awareness month is celebrated in June every year. On this day, schools are encouraged to make their students more aware of the types of hazards that affect Jamaica and also to involve them in hazard awareness activities such as creating original items in dance, drama, song and poetry to express themselves about their vulnerabilities to all types of disasters.

As evident, different countries have different modes of educating individuals about disasters. The main aim of each mode is to reduce the impact of disasters. It is important to note here that disaster education is not merely an academic exercise. Its benefits are many and it can make a difference between life and death, between economic progress and penury, and between sustainable development and environmental degradation.

Disaster education for children promotes awareness about the immediate environment in which they and their families live and work, and helps them understand how disaster loss reduction strategy can be implemented. Children are effective communicators and influencers and thus the lessons learnt at school are

transmitted to the homes. The three aspects that are critical to reduction of losses from disasters are education, knowledge and awareness. These are the building blocks of any disaster mitigation strategy. They equip the community with the necessary information and help to build the capacity to respond and recover effectively from the extremities of disastrous events. According to Pandey (2014) for any disaster management plan to be successful, it is essential to have public education and awareness embedded in the structure of programme. Without education, awareness and knowledge, even the best of strategies are bound to fail. These references show knowledge of disasters and its management is very relevant area to be studied.

Govt. of India under the ministry of Human Resource Development in the X^{th} five year plans emphasized the need for integrating disaster management in the education system. Thus the Central Board of Secondary Education (CBSE) started the concept disaster management education in their curriculum. For empowering the younger generation, Disaster management is included in social sciences in the school curricula for Class VIII, IX, and X by the Ministry of Human Resources Development (HRD). This is continued by all schools under CBSE.

Vijayakumari and Sabitha (2015) conducted a study on "Awareness on Disaster Management: An exploration among secondary school students in Kerala based on their gender locale and experience with disaster". The study found that the secondary school students of Kerala are not having satisfactory level of awareness in disaster management. It is revealed from the study that there is an urgent need to provide awareness on disaster management for secondary school students.

References show that certain disasters are only mentioned somewhere but without proper information on disasters and management in SCERT secondary school curriculum. Disaster education is aimed at developing a culture of preparedness and safety besides implementing school DM plans. State Governments will also ensure the inclusion of disaster management curriculum through State School Boards. The education content is to be so designed as to inculcate basic awareness, skill-based training, psychological resilience, and qualities of leadership among students with regard to disasters. The role of the NCC, Scout and Guides is also being included in schools and colleges for disaster management related works. It is the time to develop the students as disaster managers in their life.

Disaster management education aimed at developing a culture of safety and prevention in the minds of future generation. Hence disaster management education should start from primary class itself. So schools are the best place in disseminating the awareness on disaster management. SEEDS, India (2005) conducted a project on school safety activities were held in Nangarhar. The activities were effective in raising general awareness of safety issues related to disasters and specifically about earthquake safety in schools.

The objectives of the project were to

1. Introduce concepts of disaster management to school teachers and students.

2. Orient teachers and students on their role during a disaster.

3. Form a search and rescue team of students and provide training to students on various rescue methods.

4. Form a first aid team of students and provide training to students on first aid.

5. Develop an evacuation plan for the school and train the teachers and students to implement it.

The project reveals that in the absence of such work, schools will continue to suffer from disasters and will take decades to recover from the effect of conflict.

The people should be aware of the vision of Disaster Management Act 2005 - 'to build safe and disaster resilient India'. This is possible through a holistic, proactive, multi-disaster and technology-driven strategy for prevention and mitigation. The disaster management education helps to develop a disaster resilient country by promoting a culture of prevention in the mind of pupil. This education develops ability to prepare and plan for hazards, as well as to implement technical measures before, during and after a hazard event.

A child may become an active member of the society by playing different roles like doctors, engineers, teachers, along with the roles in the family. The basic lessons they got from school years surely help them to do these roles better. So knowledge about disasters and its prevention is to be provided to our students. The investigator has taken secondary school students as the sample of the study to carry out the experiment.

Special Significance of the Study

Kerala, India's most literate state with 93.19 percentage of literacy when compared to other states according to the report of the data collected in 2011. Among the 14 districts Kottayam is the most literate with 97.21 percentage and

Wayanad is the least literate district with 89.32 percentage literacy, but it is higher than the national rate. The life expectancy at birth in Kerala is 71.61 for males and 75 for females. Infant mortality rate per 1000 live births is 10 in Kerala; birth rate per 1000 people is 16.9 in Kerala. And death rate per 1000 people is 6.4 in Kerala. Kerala is with the high of HDI 0.790, which is on par with some European countries in the world. The characteristics of the Kerala model is based on the achievement in some social indicators like education, health care, high life expectancy, low infant mortality and low birth rate. Considering all these concepts, Kerala model is being discussed around the world.

Kerala has been experiencing various kinds of disasters in recent years. One of them is tsunami in 2004, which is the worst disaster Kerala ever experienced. Thereafter all authorities are more concerned about disasters and which is followed by discussions about the causes of disasters and its management. The Disaster Management Act and The Disaster Management Authority at National and State levels were formed. An analysis of the disasters beaten in Kerala is given below.

Disaster	Place	Year	Deaths
Flood	Kerala	1924	Approximately 1000
Railway accident	Peruman	1988	105
Stampede	Sabarimala	1999	53
Train accident	Kadalundi	2001	57
Tsunami	Kollam, Alappuzha	2004	132
Boat accident	Thekkady	2009	45
Stampede	Sabarimala	2011	106
Fire work disaster	Puttingal	2016	111
Cyclone (Okhi)	Southern Coastal areas of Kerala and Tamilnadu	2017	218
Nipah virus infection	Kozhikkode and Malappuram	2018	17
Flood	Kerala	2018	487

The great flood of ’99 occurred in the month of July 1924 because of the over flowing of Periyar river. The catastrophic flood took thousands of lives and animals, birds and crops were destroyed. Many districts have been submerged.

Peruman railway accident happened in July 8, 1988. The Bangalore – Thiruvananthapuram Central Island Express train derailed on the Peruman Bridge over Ashtamudi Lake in Kerala and fell in to the lake. About 105 people killed in this accident. The exact cause of this tragedy has not yet been revealed. It was revealed from the railway commissioner’s enquiry that a Tornado had caused the accident.

A human stampede that was happened in Sabarimala in 1999 January 14 Makarajyothiday at Pamba base camp. About 53 people, majority from outside Kerala was died in this disaster because of the collapse of the side of a hillock near Pullumedu route to Sabarimala temple Kerala.

Kadalundi train disaster happened in 22 June 2001. The Mangalore- Chennai mail passenger train crossing the bridge over Kadalundi River near Kozhikkode, four carriages derailed and fell in to the river. About 57 people were killed or reported missing. Between 117 and 300 were injured and transported to the hospitals.

The boat disaster in Thekkady happened on 30 September 2009. Jalakanyaka, a double-decker passenger boat sank in the Thekkady Lake in Periyar National Park in Kerala. The reports say that about 45 tourists died and a few are rescued. The reason for this disaster was a combination of drivers' negligence and overloading.

Sabarimala stampede again happened in the year 2011 January 14 during Makarajyothi day at Pullumedu, in Kerala. About 106 were died and 100 pilgrimes were injured. Since then, the disaster stampede has been declared as a national tragedy.

A major fire work disaster happened in the Puttingal temple in Paravur, Kollam, Kerala on 10 April 2016. An explosion happened after a fire work celebration. The eye witnesses says that a spark from the fire crackers cause the explosion. About 350 were injured and 111 people were killed in this disaster. After

that Kerala High Court banned the display of fire woks during night in all places of worship.

Okhi the strong cyclonic storm originated from the eastern Andaman Sea on November 21, 2017. The cyclone headed away from India caused severe damage, loss of life and property. About 218 people died in this disaster in the southern parts of Tamilnadu and Kerala along its way.

The outbreak of Nipah virus declared in the Kerala was on June 10, 2018. The outbreak were localised in Kozhikkode and Malappuram districts of Kerala. The disaster claimed 17 lives and the people of these districts were kept under observation during this period. This was the third outbreak reported in India. The previous outbreaks occurred in 2001(claimed 45 lives) and 2007 (claimed 5 lives).

Kerala received 75% and more than the usual rain fall during the Monsoon in the beginning of **August 2018**. The water level of all the dams of the Kerala rise close to the over flow level because of the heavy rain fall. 35 of the 54 dams in Kerala had been opened for the first time in the history. That was a worst flood ever happened in the Kerala since all the 14 districts of Kerala were placed on red alert. The death toll of this worst disaster was considered about 487 and 15 persons were missing. All the people were evacuated from the affected area and reside in the emergency relief camps in each district. The flood declared as a level 3 calamity or calamity of severe nature by the Government of India.

The 2004 Indian Ocean tsunami hit three South Indian states Tamil Nadu, Pondicherry and Kerala, islands of Andaman and Nicobar. Tamil Nadu was the most

affected state. In Kerala the Tsunami hit at 11 am on December 26, 2004. The lack of awareness causes the devastation and loss of life. In Kerala Kollam district and Alappuzha district were mostly affected. About 132 people died in Alappad village of Kollam, 39 people died in Aratupuzha of Alappuzha District. Most of the houses were destroyed, or need reconstruction.

Now all the people of Kerala are concerned about disasters of different nature at different times. Hence Awareness on Disasters and its Management is very essential among the people.

The investigator has started her work with the thoughts of worst disaster Tsunami and its consequences to the people of Kerala which motivated her to conduct a study on disasters and its management.

Text books play a pivotal role to clear the doubts or for clarity of concepts. Hence the investigator decided to analyse the text books of secondary level to find out the concept of disasters and its management.

Each district of Kerala is with its own physical or geographical features. That is why they are prone to different disasters. Hence the investigator decided to conduct a survey on the awareness of students from all the 14 districts of Kerala.

To make the study more useful to the people it was decided to prepare a Disaster Management Education Programme to the students and to conduct an experiment with the developed programme at secondary level.

In view of all these aspects the study is entitled as follows:

Statement of the Problem

The study is entitled as "EFFECTIVENESS OF A DISASTER MANAGEMENT EDUCATION PROGRAMME TO ENHANCE THE AWARENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS OF KERALA". The main focus of the study is to develop a Disaster Management Education Programme for secondary school students of Kerala to enhance their awareness on disaster management. Further the study aims to find out the effectiveness of the developed programme experimentally.

Definitions of Key Terms

Effectiveness

"Effectiveness is the capability of producing a desired result or the ability to produce desired output. When something is deemed effective, it means it has an intended or expected outcome, or produces a deep, vivid impression" (Dictionary.com)

In the present study the term effectiveness refers to the effect of the Disaster Management Education Programme for secondary school students to enhance their awareness on disasters and its management.

Disaster

"Disaster is a crisis situation that far exceeds our capabilities to cope" – Quarentelly (1985)

In the present study the different types of disasters- natural and manmade - were selected. The developed Disaster Management Education Programme provides awareness on natural and manmade disasters.

Disaster Management

According to International Federation of Red cross and Red Crescent societies Disaster Management can be defined as "the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters" Disaster management is a cyclic process for management of disaster like, mitigation, preparedness, response and recovery.

Disaster Management Education Programme

It is a programme aimed to enhance disaster management awareness in secondary school students. The programme improves their awareness in basic knowledge of disaster management, awareness on natural and manmade disasters and awareness on management of natural and manmade disasters.

Awareness

"Awareness is defined as a state wherein a subject is aware of some information when that information is directly available to bring to bear in the direction of a wide range of behavioural processes" (David J. Chalmers – 1996)

In the present study awareness means getting Basic knowledge of disaster management, knowledge of natural and manmade disasters and its management which will be helpful to reduce the aftermath of disasters.

Secondary School Students of Kerala

Secondary school students are those students undergoing secondary school education. In this study 8th standard students of Kerala undergoing state syllabus are taken as the sample.

Variables of the Study

Variables are the conditions or characteristics that the investigator manipulates, control or observes.

Independent variable

The independent variables are the conditions or characteristics that the experimenter manipulates or control in his/her attempt to ascertain their relationships to observed phenomena. It is under the direct control of the experimenter. The independent variable selected for this study was 'Disaster Management Education Programme'.

The Disaster Management Education Programme developed by the investigator in this study aimed at enhancing awareness on disaster management among secondary school students.

Dependent variable

The dependent variables are the conditions or characteristics that appear, disappear or change as the experimenter introduces removes or change the independent variable. The dependent variable of the study is Secondary School Students Awareness on Disaster Management. In the study the awareness on disaster

management includes the components namely basic knowledge of disaster management, natural and manmade disasters and management of natural and manmade disasters.

Objectives of the Study

The Major Objectives of the Study are as follows

1. To Develop a Disaster Management Education Programme to enhance the Awareness on Disaster Management among Secondary School Students of Kerala

2. To find out the effectiveness of the developed Disaster Management Education Programme

The Specific Objectives of the Study

1. To analyse the general science and social science text books for standard VIII and Biology for standards IX and X to locate the concepts of Disaster Management.

2. To find out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the Whole sample

3. To find out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the sub sample based on Gender and Locale

4. To find out the existing level of awareness on Disaster Management in total and its components among secondary school students of different Districts of Kerala

5. To test the difference between pre-test and post- test mean scores of awareness on Disaster Management in total and its components for its significance in the whole experimental sample.

6. To test the difference between pre-test and post- test mean scores of awareness on Disaster Management in total and its components for its significance in the sub samples based on Gender and Locale.

7. To test the difference between post- test and retention test mean scores of awareness on Disaster Management in total and its components for its significance in the whole experimental sample.

8. To test the difference between post- test and retention test mean scores of awareness on Disaster Management in total and its components for its significance in the sub samples based on Gender and Locale.

9. To validate the developed Disaster Management Education Programme

Hypotheses of the Study

The following hypotheses are formulated for the study.

1. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the whole sample

2. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the sub samples based on Gender

3. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the sub sample based on Locale

4. There is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on Gender

5. There is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on Locale

6. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the whole sample

7. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the sub samples based on Gender

8. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for sub sample based on Locale

9. The developed Disaster Management Education Programme will be effective to enhance awareness on Disaster Management among Secondary School Students.

Methodology

The methodology of the present study is provided below in brief:

a. Design of the Study

The purpose of the study was to find out the effectiveness of the developed Disaster Management Education Programme in enhancing the Awareness on Disaster Management among secondary school students of Kerala. For this study both survey and experimental methods were used. The present study was conducted in three phases.

First phase

The first phase was focused on the need of a Disaster Management Education Programme for secondary school students. For finding out the need, content analysis and survey method were used. The content analysis is done to find out the concept of disaster management in secondary school text books. Survey method was used to find out the existing level of awareness of secondary school students on disasters and its management.

Second phase

The second phase of the study was a developmental phase. Based on the first phase, a Disaster Management Education Programme was developed to enhance the awareness of secondary school students on disaster management.

Third phase

The third phase was an experimental validation phase. For experimentation single group pre-test- treatment- post-test- retention test design was adopted. Based on the analysis of the comparisons between pre-test and post-test, post-test and retention test the effectiveness of the Disaster Management Education Programme for secondary school students was established.

b. Sample for the Study

The study was based on both survey and experimentation. The survey was conducted among 532 secondary school students from different schools of 14 districts of Kerala. Random sampling method was used for the selection of schools in the survey method. Data was collected from all the 14 districts of Kerala. The different factors selected while deciding the sample were gender, and locale of school. About 280 boys and 252 girls were involved in the survey.

In the experimentation phase the experiment was conducted on 8^{th} standard students from two schools of Kozhikode district. Total samples of 68 students from two schools were participated in the experiment. The characteristics of the schools selected for experimentation was an urban and a coastal type. The other factor considered was gender.

c. Tools used for the Study

The following Tools were used in the study,

1. Disaster Management Awareness Test (Udayasree&Rekha ,2017)
2. Disaster Management Education Programme (Udayasree&Rekha ,2017)
3. Lesson Transcripts for transacting Disaster Management Education Programme

d. Procedure

The procedure adopted for the study is as follows:

1. Analysing the General Science and Social Science text books for standard VIII and Biology for standards IX and X to locate the concepts of Disaster Management.
2. Finding out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the Whole sample
3. Finding out the existing level of Awareness on Disaster Management in total and its components for the sub sample based on Gender
4. Finding out the existing level of Awareness on Disaster Management in total and its components for the sub sample based on Locale.
5. Finding out the existing level of Awareness on Disaster Management in total and its components among students of different Districts of Kerala

6. Development of a Disaster Management Education Programme for Secondary School Students.

7. Conducting a pre-test of Awareness on Disaster Management among experimental sample.

8. Transaction of the developed Disaster Management Education Programme in the experimental sample.

9. Conducting a post-test of Awareness on Disaster Management among experimental sample.

10. Testing the difference between pre-test and post-test scores for its significance in the total sample and sub samples based on Gender and Locale.

11. Finding out the mean gain scores of Awareness on Disaster Management between pre-test and post- test for the sub sample based on Gender and Locale.

12. Conducting a retention test of Awareness on Disaster Management for the experimental sample.

13. Testing the difference between post-test and retention test scores for its significance in the total sample and sub samples based on Gender and Locale.

14. Validation of the developed Disaster Management Education programme.

e. Statistical Techniques

Statistical techniques used in the present study were,

Preliminary analysis,

Test of significance of difference between means (t-test),

Cohen's d.

Scope and Limitations of the Study

The present study has adopted survey and experimental methods for finding out the necessity of development of a programme for enhancing awareness on disasters and its management among secondary school students. Presently all parts of the world experienced a number of disasters and its consequences are the destruction of lives and nature itself. Many countries already started a number of programmes to reduce the risk of disasters and from this we can understand it is the high time to develop disaster management programmes at various levels of education. Disaster Management is to be incorporated in the curriculum from the primary level onwards. Thus the concept Disaster Management is found to be relevant.

In Kerala, 2018 year is very significant because of the worst disaster happened here during August. People of Kerala never experienced such type of flood and torrential rain. The great loss of lives and destruction of properties necessitates the awareness of disasters and its management among all people. Thus

the variables of the study are Awareness on Disaster Management and a Disaster Management Education Programme for secondary school students.

Secondary school students are the sample of the study. This is the early adolescent stage and what is given to this target group has a long term effect also. After the secondary stage they are channelized to their areas of interest. Hence the Disaster Management incorporated in the general education have an application in the future specialisation. In Kerala the school curriculum did not give importance to disaster management yet. After the severe disasters of the 2018, the Government of Kerala is in the process of restructuring the school curriculum with inputs of disaster management.

The necessary tools prepared for the study were Disaster Management Awareness Test, Disaster Management Education Programme and Lesson Transcripts for secondary school students. The tools were appropriate and adequate for the purpose. The test is with components of basic knowledge of disaster management, different types of disasters and its management. The awareness test was evaluated by experts in the field. Disaster Management Education Programme was prepared by adopting the procedure followed by the disaster management authority for preparing brochures for the people.

Simple experimental design with pre-test, post- test and retention test was used in the same group of students. The effectiveness of the programme was based on the significance of the scores on the test. Appropriate statistical techniques were applied to find out the significance. Thus the findings are generalizable.

Maximum effort has taken by the investigator to conduct the study and to generalise the findings. Even though, there is a limitation that has crept in to the study:

1. Disaster management includes skill oriented programmes like mock drill to the participants. It could not be given to the sample of students due to some practical difficulties.

Organisation of the Report

The whole report is presented in five chapters

Chapter I is the I**ntroduction**. It includes Need and significance of the study, Statement of the problem, Definition of the key terms, and Objectives of the study, Hypotheses, Methodology, Scope and limitations of the study.

Chapter II is the **Review of Related Literature.** The first part of this chapter is Theoretical overview of the variable and the second part contains the survey of related studies with a Conclusion.

Chapter III is the **Methodology.** It includes a detailed description of the methodology adopted for the study. Design of the study, Variables, Sample selected, Tools used in the study, Procedure in detail, Data collection procedure, Scoring and consolidation of the data and Statistical techniques used for the study are the different aspects of the chapter.

Chapter IV of the report is **Analysis and Interpretations.** This includes statistical Analysis of the data, Discussion of results and Tenability of hypotheses.

Chapter V is the **Summary of findings, Conclusion and Suggestions.** Restatement of the problem, Variables of the study, Objectives, Hypotheses, Methodology, Major findings, Conclusion, Educational implications and suggestions for further research are the aspects of the chapter.

REVIEW OF RELATED LITERATURE

- *Theoretical overview*
- *Survey of related studies*

REVIEW OF RELATED LITERATURE

Review of related literature helps the student to discover what is already known, what others have attempted to find out, what methods of attacks have been promising or disappointing and what problems remain to be solved (Best and Khan.2016)

This chapter is treated under two sections, first section is the theoretical overview of the problem of the study and the second section provides a review of the studies conducted in the field.

Theoretical Overview

Theories enrich and enlarge the information network that provides primary foundation to transform a disaster management organisation into a learning organisation. In the area disaster management, we want to encounter the losses, damages, destructions and disturbances around us and try to improve the post disaster conditions for a better social set up.

Before entering into the theory, it is necessary to define related terminologies in the area in terms to express knowledge and information in a precise and meaningful manner.

Meaning of Disaster

'The word 'disaster' has its roots in the Italian word *disastro.* Disaster has a greek pejorative prefix 'dis' which means 'bad', and the word 'aster' has its origin

in the word ‘astro’, which means ‘star’. Thus the meaning of the term refers to ‘Bad or Evil star’

Evidently, disaster means any calamitous situation blamed on an unfavourable position of star’ (Pandey, 2017)

Disaster is an occurrence that causes widespread damage and destruction or a sudden catastrophe leading to loss of life and property.

“A disaster is a serious disruption, occurring over a relatively short time, of the functioning of a community or a society involving widespread human, material, economic or environmental loss and impacts, which exceeds the ability of the affected community or society to cope using its own resources”

“In contemporary academia, disasters are seen as the consequence of inappropriately managed risk. These risks are the product of a combination of both **hazards** and **vulnerability**. Hazards that strike in areas with low vulnerability will never become disasters, as in the case of uninhabited regions” (Quarantelli, 1998)

Classification of disasters

The magnitude of any disaster is ascertained through the level of vulnerability of the area exposed to a natural phenomenon. Vulnerability always counters hazard. Disaster is always defined in the perspective of losses and these losses manifest vulnerability.

Disaster management always concern with analysing potential threats, protecting against those threats, having contingency plans ready should materialise

threats and finally have a concrete plan or systems in place to repair any damage sustained.

Emergency management gives priority to preparedness and response and its sole focus is to be prepared to respond to a disaster.

Theoretical framework in disaster management is not an easy task and the core reason is its variability and unprediction. Disaster is a multidimensional and very complex phenomenon that undertakes damage, loss, destruction, devastation, hazard and other related perspectives. The five core disciplines or dimensions contributing to theories of disaster management are Geographical, Geological, Sociological, Psychological and Environmental.

Geographical dimension: Geographical dimension provides the idea that impact of disaster varies from region to region as level of vulnerability and risk is closely related to human geography. It is sure that every region of the universe maintains diverse physical geography. It relates with location, place, human/environment interaction, movement and regions. The environmental geography exhibits multi-dimensional relationship between human and their natural environment; this interaction varies from region to region and it is difficult to find fundamental commonality among this interaction in different societies and places round the globe.

Geological dimension: Most of the hazardous processes are geological processes and they occur differently in the different regions of the world; earthquake, volcano, landslide, tsunami, flood, drought, hurricane, tornado etc. are varied geological processes.

Sociological dimension: Sociology of disaster is a sub branch of sociology; it does not only include the impact of disaster on regional level but also undertakes the catastrophic impact on macro level. The empirical data presented in the research of O'Keefe, K.W. (1976), manifests that natural disasters increased in last 50 years and even the loss of precious human lives and most of these disasters concentrated in under-developed countries where vulnerability was on the rise.

Psychological dimension: The psychological influence of disaster directly relates to core social factors that vary from society to society; for instance, many communities continue living in hazard prone areas; even they know the magnitude and frequency of risk being there. Universal perception, preparedness, response to disaster, rehabilitation and reconstruction initiatives depend upon cultural background of affected societies and it is difficult to find any commonality between two societies, even if the nature and magnitude of disaster seems same.

Environmental dimensions: Environment is a multi-dimensional phenomenon and environmental impact of disaster undertakes social (demographic, economic, political and psychological) facet of environment. An enhanced understanding of disasters' social effect can offer a foundation for pre-impact forecast and the advance of contingency plans to avert adversative consequences from happening. Environmental disruption caused by natural disaster varies from region to region. It has been observed that under-developed and developing economies are more vulnerable to disasters, the magnitude and quantum of loses in developing societies seem far greater than industrialised countries. Theoretical configuration and knowledge based scholarships in disaster management is not an

easy task and the core reason is its variability and unpredictability. The knowledge in these five core dimensions contribute to the management of disasters.

Disasters are classified based on different criteria. Based on the origin of disaster they are classified as natural and manmade disasters. Based on the severity of disasters they are major and minor disasters.

However, a High Powered Committee constituted in August, 1999 by the Government of India, under the Chairmanship of J. C. Pant adopted origin as the criterion for the classification of disaster.

The fundamental task of the committee was to prepare comprehensive model plans for disaster management at district, state and national level. The committee has identified 30 disasters and categories them in the following five groups.

1. Water and Climate Disaster

This includes flood, cyclones, heat and cold waves, cloudburst, hailstorms, snow avalanches, drought, sea erosion, thunder and lightning.

2. Geological Disaster:

Such as landslides and mud flows, earthquakes, mine fires, dam failures and general fires

3. Biological Disaster:

Such as epidemics, pest attacks, cattle epidemic and food poisoning

4. Nuclear and Industrial Disaster:

Such as chemical and industrial disasters and nuclear accidents

5. Accidental Disaster:

Such as urban and forest fires, oil spill, mine flooding incidents, collapse of huge building structures, bomb blasts, air, road and rail misshapes, boat capsizing and stampede during congregation.

At central level, an administrative ministry has been identified as nodal agency for each disaster to coordinate the activities of disaster management operations at different levels.

Natural disaster

Natural disaster is a natural phenomenon that causes loss of life, damage of property, loss of livelihood, social, economic and environmental disruption. These are the highest category of disasters.

Earthquakes, landslides, volcanic eruptions, floods, tsunamis, and cyclones are the natural disasters that kill thousands of people and destroy billions of natural habitat and property. The reasons are manmade like, population explosion, which directly related to over exploitation of natural resources. The vulnerability of disasters is increased due to the manmade activities like deforestation, unauthorised constructions etc. Developing countries suffer more or less chronically from natural disasters due to ineffective communication combined with insufficient budgetary allocation for disaster prevention and management. Asia tops the list of casualties caused by natural hazards.

Flood: a flood occurs when water flows or rises above and beyond its normal place or course. The danger this causes to people and buildings is called the flood hazard.

The most common kind of flood happens when a river over flows its banks, and water spreads on to the surrounding land, called riverine flood.

Causes: flood caused by rain water, melting snow draining into the river faster than the river can discharge water in to sea, storms at sea, cyclones, tsunamis and sediment deposition etc.

North and eastern India are particularly prone to floods. Ganga and Brahmaputra cause maximum flooding the season for floods in India is the west Monsoon period of June to September.

Effects: flooding is one of the most destructive of all forms of natural disasters causing heavy economic and human losses. Floods are an annual feature in some part of India. Flooded areas may get isolated from the rest of the country. Regions near coastal areas and rivers are more vulnerable to flooding.

Cyclones: a cyclone is a region of low atmospheric pressure, which occurs in the hot oceans of temperate and tropical latitudes. It is a swirling atmospheric disturbance, accompanied by powerful winds (exceeding the 300km/hr. sometimes) blowing in a clockwise direction in the northern hemispheres and anticlockwise direction in the southern hemisphere, by pouring rain and enormous waves in the ocean. Cyclone usually occurs between 5-20 degree latitude, north and south of the equator. Cyclones are arising mainly in the Bay of Bengal. Along the Arabian Sea on the west coast, the Gujarat and Maharashtra coast are more vulnerable when compared to the southern part.

The Indian Meteorological Department (IMD) is responsible for cyclone tracking and warning – done through INSAT satellite and 10 cyclone detection radars.

Precautions: listen to radio TV weather reports, identify safe shelters, keep an emergency kit ready at home, check your house and surrounding areas to see if it is secure (door, windows, roof and wall should be strengthened), store adequate food grins and water, keep a list of emergency addresses and phone numbers, conduct a mock drill for your selves.

Drought: The word drought instantly brings images of dry, parched land, no rain fall, crop failure, starvation and bad living conditions to our mind. "Drought is condition of acute scarcity of water, food, fodder and employment due to scantly rain fall in an area". Shortage of water for agriculture operations

Causes: cutting down trees, soil erosion, excessive use of ground and surface water, loss of biodiversity, global warming, and crop failure is a serious consequence of drought.

Impact: lack of drinking water, malnutrition, spread infectious diseases, leads to unemployment.

Preparedness: conserve natural resources, prevent misuse of land and water, construction of community based rain water harvesting structures, promoting water conservation, increasing forest cover through plantations, using alternative crop in drought condition, encourage crop and seed insurance schemes, conserve and harvest rain water.

Earthquake: An earthquake is in simple terms is a sudden trembling or shaking movement of the earth surface called the crust. Most earthquakes are minor tremors. A larger earthquake usually begins with slight tremors but rapidly takes the form of

one or more violent shocks, and end in vibrations of gradually diminishing force called after shocks.

Effect: Effect is diverse, people are more likely to die or be injured. About 95% of people are killed in an earthquake by falling building. Earthquakes are more dangerous when they happen during night. An earthquake can cause other dangerous events, such as landslides, floods, fires and tsunamis. The severity of earthquake is related to magnitude that is, the seismic energy recorded on a seismograph and intensity meaning the observed effects that the ground shaking has on people, buildings, man-made structures and natural features. Earthquake measuring on Richter scale.

Preparedness: Buildings that are not earthquake resistant may fall; the walls may collapse trapping people under the rubble. Help survivors quickly. Train ourselves in basic rescue and first-aid functions. In case of tremors, duck (bend down) under the desk. Stay away from windows, book case, filing cabinets, heavy mirrors, hanging objects. If you are in a high rise building, do not use the lift, use stair case. If you are in outdoors move to a clear area away from trees, buildings, electrical wires and poles.

Tsunami: A tsunami also known as seismic sea wave or tidal wave is a series of waves in a body of water caused by the displacement of the large volume of water, generally in an ocean or a large lake.

Causes: The geological movement that cause tsunamis are produced in three major ways. The most common of these are fault movement on the sea floor, accompanied

by an earthquake. They release huge amount of energy and have the capacity to cross oceans. The degree of movement depends on how fast the earthquake occurs and how much water is displaced. The second most common cause of the tsunami is a landslide and the third major cause of tsunami is volcanic activity.

General characteristics: Tsunami differs from ordinary ocean waves which are produced by wind blowing over water. The tsunami travel much faster than ordinary waves. Compared to normal waves speed of100km/hr. tsunami in the deep water of the ocean may travel the speed of a jet air plane 800km/hr. and yet in spite of their speed, tsunami increases the water height only 30-45cm and often passes unnoticed by ships at sea. Contrary to the popular belief, the tsunami is not a single giant wave. It is possible for a tsunami to consist of ten or more waves which are then termed as 'tsunami wave train'. The waves follow each other 5 to 90 minutes apart. Tsunami normally causes flooding as a huge wall of water enters the main land.

Predictability: International Tsunami Warning System, Regional Warning System (Pacific Tsunami Warning system)

Tsunamis have occurred in all the oceans and in the Mediterranean Sea but the great majority of them have occurred in the Pacific Ocean. Since scientists cannot exactly predict earthquakes, they also cannot exactly predict when a tsunami will be generated.

Landslides: A landslide also known as a landslip, is a geological phenomenon that includes a wide range of ground movements, such as rock falls, deep failure of slopes and shallow debris flows. Landslides can occur in offshore, coastal and

onshore environments. The action of gravity is the primary driving force for a landslide. There are other contributing factors affecting the original slope stability. Typically pre-conditional factors build up specific sub-surface conditions that make the area/slope prone to failure, whereas the actual landslide often requires a trigger before being released.

Causes: ground water (pore water) pressure acting to destabilise the slope. Absence of vertical vegetative structure, Erosion of slopes by rivers or ocean waves, Weakening of a slope through saturation by snow melt, glaciers melting or heavy rains. Earthquakes adding loads to barely stable slope, volcanic eruptions, deforestation, vibration from machinery or traffic, unscientific and unsystematic constructions on the hill tops.

Although landslides, a high impact and sudden natural or man-made phenomenon, receives far less attention compared to other high impact disasters, like earthquakes, cyclones, tsunamis and floods, the mortality due to this in 2005 was 30,000globally. Landslides are predictable with the help of satellite imageries; GIS maps scientists are now able to pinpoint the possibility of landslides anywhere in the world.

Volcanic eruptions: A volcano is a vent in the earth's crust through which molten rock (magma), rock fragments, gases and ashes are ejected from the earth's interior. A volcano is created when magma erupts on to the surface of the earth.

Consequences: the most common consequences of this are population movements as large numbers of people are often forced to flee the moving lava flow. Volcanic

eruption often causes temporary food shortages and volcanic ash landslides called Lahar.

Snow avalanches: An avalanche is a rapid flow of snow down a slopping surface. Avalanches are typically triggered in a starting zone from a mechanical failure in the snow pack (slab avalanche) when the forces on the snow exceed its strength but sometimes only with gradually widening (loose snow avalanche). After initiation, avalanches usually accelerate rapidly and grow in mass and volume as they entrain more snow. If the avalanche moves fast enough some of the snow may mix with the air forming a powder snow avalanche, which is a type of gravity current. Slides of rocks or debris, behaving in a similar way to snow, are also referred to as avalanches.

Thunder storms: A thunder storm, also known as an electricalstorm, a lightning storm, or a thunder shower, is a type of storm characterized by the presence of lightning and its acoustic effect on the earth's atmosphere known as thunder. Thunder storms occur in association with a type of cloud known as cumulonimbus. Thunder storms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus cloud that can reach heights of over 20km (12.45 miles).

Heat wave: A heat wave is a prolonged period of excessively hot weather, which may be accompanied by high humidity, especially in oceanic climate countries. A heat wave is a delayed period of exceptionally hot and sometimes sultry weather relative to normal climate patterns of a certain region.

Cold wave: A cold wave can be both a lengthened period of terribly cold weather and the sudden assault of very cold air over a large area.

Hail storm: Any thunder storm which produces hail that reaches the ground is known as hail storm. Hail has a diameter of 5 millimetres. Stones larger than 2cm (0.80 in) are usually considered large enough to cause damage. Hail can cause serious damage, notably to automobiles, aircraft, skylights, glass-roofed structures, and livestock and most commonly farmer's crops. Hail is a form of precipitation that fall from the sky as pellets of ice. The formation of hail means a severe thunderstorm is likely in your vicinity; you should monitor your weather situation closely for thunder, lightning, torrential rain, and possibly even tornados. Thunder storms cause hail when strong winds push rain drops upward in to the atmosphere where the extremely cold air super cools the water and causes it to freeze in to spheres of ice.

Cloudburst: A cloudburst is sudden copious rainfall. It is a sudden aggressive rainstorm falling for a short period of time limited to a small geographical area. Meteorologists say the rain from a cloudburst is usually of the shower type with a fall rate equal to or greater than 100mm (4.94 inches)/hr. a cloudburst is an extreme amount of precipitation in a short period of time, sometimes accompanied by hail and thunder that is capable of creating flood conditions. The result of cloudburst can be disastrous. Cloudburst is also responsible for flash flood creation. Consequences of a cloudburst such as landslides and flash floods lead to widespread death and destruction.

Mud flow: The rapid movement of a large mass of mud formed from lose soil and weathered rocks are known as mud flow. Heavy precipitation and snow melt flowing through the weathered bed rock is the primary cause of mud flow. Mud flows can attain a speed of roughly 50km/hr. it is unstoppable and has massive weight that can cause widespread damages to the human life and the life of the cattle, buildings and other infrastructure and agriculture.

Man-made disasters

Manmade disasters are also known as anthropogenic disasters and they as a result of human intent, error or as a result of failed systems. Human made disasters or emergencies can be fast or of slow attack. Human made disasters admits that all disasters are caused by humans.

Setting of fires / Forest fires

It refers to all uncontrolled fires that burn surface vegetation (grass, weeds, grain fields, bushes, chaparrals, tundra, and forest and woodland)

Most of these are caused by human beings, directly or indirectly. There are a number of varied causes of forest fires however, the most common one is open flames other causes include smoking, lightning, fireworks and arsonists among others. Forest fires usually start with one careless act. All it takes is one spark in the right conditions and the flame will spread out of control. It is very important to be very careful. It is not just the dead vegetation that fall to the forest floor that secures the top layer of the soil. Living plant secure the soil too. Small plants root systems weave the forest.

To control the forest fire, precautions are to be taken they are: obtaining a burning permit for burning grass, bush, slash, or other debris within a prescribed distance of forest land, a work permit for any work in forest land involving two or more people, be prepared to extinguish the fire if it becomes a nuisance, smoking should not be done while moving from one place to another in forest land, know your local emergency telephone number if a fire becomes uncontrollable.

Forest fire can have an extra ordinarily negative impact on the environment. They can cause deforestation; fire can be extremely dangerous, causing damage to property and causing humans and wild animals to lose their lives and homes.

Deforestation

Deforestation is the process of destroying a forest, like cutting the trees and replacing it with something else, logging or burning of trees in forested areas. Deforestation is when human remove or clear large areas of forest lands and related ecosystems for non- forest use. These include clearing for farming purpose, ranching and urban use. In these cases trees are never replanted.

The main causes of deforestation are agriculture and cattle rearing. Where by people clear rain forests to make way for agriculture and cattle. Road improvement, while providing access to remote areas. It kills animals and destroys habitats. In order to stop deforestation community awareness needs to be made and another alternative needs to be set in order for animals to survive without destroying natural forests, can be stopped by us people just stop chopping trees. It is the key contributor of global warming and is often cited as one of the major causes of the enhanced greenhouse effect, also affect the water cycle since the trees no longer

evaporate away the ground water, increase the rate of soil erosion, it degrade environment and reduce biodiversity.

Pollution

Pollution is the introduction of contaminants in to the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be foreign substances/ energies or naturally occurring contaminants. The major forms of pollution are: Air pollution, water pollution, Noise pollution, Soil contamination, radioactive contamination, Thermal pollution.

Air pollution caused by the release of gases like carbon monoxide, sulphur dioxide, CFCs nitrogen oxides, photochemical oxide, smog etc.

Water pollution caused by discharge of waste water, industrial waste in to surface waters domestic sewage, chemical contaminants, such as chlorine, urban waste, chemical fertilizers and pesticides. Noise pollution caused by road way noise, air craft noise, industrial noise. Soil contamination caused by soil contaminants are hydrocarbons, heavy metals herbicides, pesticides and chlorinated hydrocarbons. Radioactive contamination resulting from nuclear power generation, nuclear weapons research. Thermal pollution caused by temperature change in natural water bodies caused by human influence such as use of water as coolant in a power plant.

To control pollution provide an orientation to the methods that are applied to control and prevent environmental pollution. We can control air pollution by reducing the amount of smoke we release in to air. We can control water pollution by not dumping harmful chemicals, waste, in to the water bodies. We can control

soil pollution by removing heavy metals, herbicides, pesticides from the soil. We can encourage our political leaders to keep passing legislation to limit the pollution that factories and manufacturers are allowed to put out. Over the last three decades there has been increasing global concern over the public health impacts attributed to environmental pollution, in particular, the global burden of disease. The World Health Organization (WHO) estimates, about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution. Most of these environment-related diseases are however not easily detected and may be acquired during childhood and manifested later in adulthood.

Epidemic

Epidemic occurs when a disease attacks a large number of people at one time. It spreads at rapid rate among human population. Most of diseases are spread after natural disaster like tsunami, flood etc. Epidemic spread by infection through contaminated water and food, through viruses, bacteria, fungi, and protozoa. Infection is mainly because of lack of hygiene, clean water, clean food, clean hands, and isolating infected people reduces the chance of epidemics.

Precautions are: ensure safe drinking water, sanitation after a disaster, health workers should be trained, covering of stored water containers, surveillance should be established to detect out breaks.

Nuclear disasters

It is a type of explosion deriving its force from nuclear reactions of fission and fusion. It is of two types' fission and fusion. Examples of fission are atomic

bombs, A-bombs, fission bombs. Examples of fusion are hydrogen bombs, H-bombs and fusion bombs etc. It occurs often as a result of intent and the end results are even more catastrophic with a large percentage of those involves losing their lives. Nuclear disasters are caused mainly of mismanagement at nuclear facilities, non-compliance with the standards for the establishment and running of such nuclear facilities. Natural disasters like earthquakes and tsunamis can cause some serious nuclear disasters like Fukushima in Japan 2011 due to tsunamis. Deliberate attacks on nuclear plants cause radiation accidents due to mismanagement and human error.

Common indicators of these disasters are vomiting, nausea, and dizziness etc. close all doors and windows as radio activity doesn't penetrate into solid structures. Cover all food and water and listen Govt. orders.

Biological disasters

Biological disasters spread through the organism that is developed in the form of bacteria or microbes. These are referred to as poor man's nuclear bombs as these are easy to manufacture, transport and have the ability to kill hundreds and thousands of people. Microbes' spreads fast in the environment and make an attack on human beings. When these microbes find themselves a host body, they start affecting the immune systems of the body. The attack of these microbes is generally slow but once they are spread in the body it becomes difficult to control them. It takes the life of the affected persons. Whenever we learn or here type of danger of communicable diseases through official announcements on Radio or TV then we can take adequate preventive or protective measures. The WHO should lay emphasis on

prohibition against biological war fares, we should immediately get away from a suspicious thing, cover your mouth with a cloth, listen to TV and Radio for further Govt. instructions.

Chemical disasters

Disasters that are caused by the excessive use and misuse of chemicals in industries are called chemical disasters. Chemicals can be corrosive, toxic, and they may react, often explosively. The impact of chemical accidents can be deadly, for both human beings and environment. The irresponsible handling of powerful chemicals can cause wide spread devastation. Chemical disasters are also caused by industrial accidents. The poisonous gases spread in the atmosphere and the people who inhale the same air face dangerous consequences. Those industries which use hazardous chemicals or produce such chemicals should have contingency action plan to help people if such a disaster take place. Such industries should have warning systems so that people can immediately take safety measures such as locking their houses and taking the family and animals away to a safe place. Stringent safety measures and check-ups in the factory and critical analysis of the working condition of the factory will help to take timely measures to check up any disaster. The Govt. should formulate an emergency plan to in case of an accident.

Accidents

The accidents are quite common. An accident in which a number of people involve becomes a disaster. Cause of our many accidents was properly understood more care would be taken by the corporations, employees and persons at fault to reduce the number. Accidents caused because of carelessness, thoughtlessness, or

neglect of employees. Most of the accidents are caused by the increased number and speed of trains, increase in the population of the territory through which the roads run, by the failure to always give the required signal of the approach of the train transport. Such incidents often receive considerable media coverage as they generally involve larger numbers of people. Road accidents are often treated in a more mundane manner by the media, despite the fact that the vast majority of transport accidents and deaths occur on the road; the high number of deaths related to road transport reflects in part the high level of road traffic. If an accident may occur all efforts should be made to carry victims to nearby hospitals, if possible first aid can be given to victims, it is the duty of people present there to get trapped people out, if we smell fuel at accident site, warn people and don't light fire.

Riots / Terrorism

This is another type of disaster that results in loss of life and property. Terrorist use violence and strike without warning. They use bombs, guns etc. to terrorize people. We must inform police if we come across any suspected group of people and must stay away from any suspicious thing and inform police about that. Do not accept packages from strangers, do not leave luggage unattended while travelling.

Food poisoning

Any disease, infectious or toxic nature caused by the consumption of food or drink. The term is most often used to describe the illness, usually diarrhoea and vomiting caused by bacteria, viruses or parasites. Very occasionally poisoning from

chemicals may be the cause. Bacteria like Campylobacter (present in unpasteurized milk), Salmonella (present in raw meat, poultry and occasionally eggs), and *Staphylococcus*, *Aureus*, *Clostridium perfringens* and *Basillus cereus* produce toxins or poisons in food may result in severe vomiting and diarrhoea are the most common symptoms. Fever, abdominal pain or blood in the stool may occur. The illness is usually short lived but can be very serious or even life threatening, particularly at the extremes of life. The most important thing is to avoid food poisoning is keep personal hygiene, always wash your hand after handling raw meat or egg. Do not reuse utensils without washing then in hot water and detergent, avoid eating raw egg or un cooked foods made from them, and wash thoroughly before eating, do not drink any type of unpasteurized milk.

Principles of Disaster management

There are certain principles of disaster management which act as guidelines for effectively managing disasters. Pandey (2014) identified certain principles of Disaster Management

Principle of comprehensiveness: This principle states that disaster management should consider and take in to account all hazard and all stages irrespective of the nature, location and affected community.

Principle of prevention and protection: this states that in anticipating future disasters, a preventive approach should be followed as far as practicable. The quest should be to prevent what can be prevented, and for disasters which cannot be prevented, a protective mechanism which helps to reduce damage to life and

property should be followed. The focus should be to build disaster-resistant and disaster-resilient communities.

Principle of shared responsibility: Disaster management is everyone's responsibility. Any sole individual or department is not capable of handling disaster effectively. Therefore, individuals, communities and nations should play an active and responsible role in disaster management.

Principle of judicious use of available resources: the resources available specifically for handling disasters are limited. It is impractical to build and maintain large holdings of dedicated disaster resources. Therefore, this principle states that by judicious use of available resources budget and minimum allocation, coupled with effective management strategies, the menace of disasters can be managed well.

Principle of collaboration and coordination: Disasters are events which are beyond the capacity of individuals to respond to; therefore, this principle of collaboration and coordination states that the various agencies working for response and rescue should be well coordinated and collaborate in their efforts for disaster management.

Principle of flexibility: This states that there should be room for adoption and practice of innovative approaches for responding to disasters. Moreover, there should be space for deviation of plans, if required, to manage disasters.

Principle of practice of ethical standards: In disaster situations, many persons face trauma, but for many, it is a good chance to earn money by siphoning funds through illegal means. The highest ethical and moral standards should be practiced by all who are aiding in management of disasters.

Principle of prioritisation: This principle states that priorities should be assigned to different job categories and available resources, and accordingly, relief and rescue operations should be carried out.

Principle of risk-driven hazard identification: All hazards are different and so are the impacts; therefore, a differentiated approach to hazard identification is required. Moreover, impact of each disaster differs according to intensity and location, and therefore, these vital points should be considered in disaster management.

Principle of initiative: For proper and effective disaster management, everyone should take initiative. It is not just the job of an organisation; it is every individual's prerogative, which should be followed. For ensuring unity of effort among all levels of government and community, everyone should try and take initiative.

Principle of accountability: This principle states that in the case of disasters, individuals, communities and persons holding responsible positions should take responsibility of their actions. It is essential to ensure effective response mechanism and that there is no passing the buck in crisis situations.

Principle of equity: Victims should be treated as equally as possible. There can be a system of grading the affected population on the basis of the injury, and medical and rescue services should be provided accordingly. However, equal treatment is a must.

Principle of subordination of individual interest to common interest: The interest of individuals should not take precedence over the interests of the affected population. All should rise above their self and help the community in coping with disasters.

Principle of order and discipline: To work efficiently and in a coordinated manner, the management of rescue materials and men involved should have a disciplined approach. The right things should be made available at the right time and place.

Principle of unity: A feeling of harmony and unity among those who are serving the affected population is a pre-requisite. People should rise above their self, personal gains and selfish intent and work in a dedicated manner. Caste, creed, culture and region should not hinder the management of disasters people should unite and work together.

Disaster Management Cycle

Mitigation is the measures that prevent or reduce the impact of disasters

Preparedness is the planning, training, & educational activities for things that can be mitigated.

Response is the immediate aftermath of a disaster.

Recovery is the long-term aftermath of a disaster, when restoration efforts are in addition to regular services.

Disaster Management is the discipline dealing with disasters and avoiding its risks. The discipline which involves preparing, supporting, and rebuilding society when natural or human-made disasters occur.

Disaster Management is the continuous process by which all individuals, groups, and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards

Phases of Disaster management cycle:

Mitigation

Mitigation involves steps to reduce vulnerability to disaster impacts such as injuries and loss of life and property. This might involve changes in local building codes to fortify buildings; revised zoning and land use management; strengthening of public infrastructure; and other efforts to make the community more resilient to a catastrophic event.

Preparedness

Preparedness focuses on understanding how a disaster might impact the community and how education, outreach and training can build capacity to respond to and recover from a disaster. This may include engaging the business community, pre-disaster strategic planning, and other logistical readiness activities. The disaster preparedness activities guide provides more information on how to better prepare an organization and the business community for a disaster.

Response

Response addresses immediate threats presented by the disaster, including

saving lives, meeting humanitarian needs (food, shelter, clothing, public health and safety), clean up, damage assessment, and the start of resource distribution. As the response period progresses, focus shifts from dealing with immediate emergency issues to conducting repairs, restoring utilities, establishing operations for public services (including permitting), and finishing the clean-up process.

Recovery

Recovery is the fourth phase of disaster and is the restoration of all aspects of the disaster's impact on a community and the return of the local economy to some sense of normalcy. By this time, the impacted region has achieved a degree of physical, environmental, economic and social stability.

The recovery phase of disaster can be broken into two periods. The short-term phase typically lasts from six months to at least one year. The long-term phase, which can range up to decades, requires thoughtful strategic planning and action to address more serious or permanent impacts of a disaster. Investment in economic development, capacity building becomes essential to foster economic diversification, attain new resources, build new partnerships and implement effective recovery strategies and tactics. Communities must access and deploy a range of public and private resources to enable long-term economic recovery.

Disaster management Act, 2005

"The Act provides an effective management of disaster and for matters connected therewith or incidental thereto. It provides institutional mechanisms for drawing up and monitoring the implementation of the disaster management. The Act

ensures measures by the various wings of the Government for prevention and mitigation of disasters and prompts response to any disaster situation. The Act provides for setting up of a National Disaster Management Authority (NDMA) under the Chairmanship of the Prime Minister, State Disaster Management Authorities (SDMAs) under the Chairmanship of the Chief Ministers, District Disaster Management Authorities (DDMAs) under the Chairmanship of Collectors/District Magistrates/Deputy Commissioners, and constitution of different Executive Committee at national and state levels. The National Institute of Disaster Management (NIDM) for capacity building and National Disaster Response Force (NDRF) for response purpose have been set up under this Act. It also mandates the concerned Ministries and Departments to draw up their own plans in accordance with the National Plan. The Act further contains the provisions for financial mechanisms such as creation of funds for response, National Disaster Mitigation Fund and similar funds at the state and district levels for the purpose of disaster management. Further the enactment of 73rd and 74th Amendments to the constitution and emergence of local self- government, both rural and urban, as important tiers of governance, the role of local authorities becomes very important. The DM Act, 2005 also envisages specific roles to be played by the local bodies in disaster management" (The DM Act, 2005).

NATIONAL LEVEL INSTITUTIONS

National Disaster Management Authority (NDMA)

"The National Disaster Management Authority (NDMA) was initially constituted on May 30, 2005 under the Chairmanship of Prime Minister vide an

executive order. Following enactment of the Disaster Management Act, 2005, the NDMA was formally constituted in accordance with Section-3(1) of the Act on 27th September, 2006 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice-Chairperson. The duties of NDMA are with laying down policies on disaster management and guidelines which would be followed by different Ministries, Departments of the Government of India and State Government in taking measures for disaster risk reduction.

NDMA also to laid down guidelines to be followed by the State Authorities in drawing up the State Plans and to take such measures for the management of disasters, the responsibilities or NDMA are as follows.

(a) Laid down policies on disaster management;

(b) Approve the National Plan;

(c) Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;

(d) Laid down guidelines to be followed by the State Authorities in drawing up the State Plan;

(e) Laid down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;

(f) Coordinate the enforcement and implementation of the policy and plan for disaster management;

(g) Recommend provision of funds for the purpose of mitigation;

(h) Provide such support to other countries affected by major disasters as may be determined by the Central Government;

(i) Take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;

(j) Laid down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

Composition of NDMA: Besides the nine members nominated by the Prime Minister,

Chairperson of the Authority**,** the Organisational structure consists of a Secretary and five Joint Secretaries including one Financial Advisor. There are 10 posts of Joint Advisors and Directors, 14 Assistant Advisors, Under Secretaries and Assistant Financial Advisor and Duty Officer along with supporting staff. Further, Recruitment Rules have been notified as

(a) National Disaster Management Authority, Group-'C' posts Recruitment Rules, 2009.

(b) National Disaster Management Authority (Group 'A') Recruitment Rules, 2009.

Under Section 7 (1) of DM Act an Advisory Committee with 12 Members has been constituted during 2007.

National Executive Committee (NEC)

A National Executive Committee is constituted under Section 8 of DM Act,

2005 to assist the National Authority in performing its functions. NEC consists of Home Secretary as its Chairperson, ex-officio, with other Secretaries to the Government of India in the Ministries or Departments having administrative control of the agriculture, atomic energy, defence, drinking water supply, environment and forest, finance (expenditure), health, power, rural development science and technology, space, telecommunication, urban development, water resources. The Chief of Integrated Defence Staff of the Chiefs of Staff Committee, ex-officio, is also its Members.

NEC may as and when it considers necessary constitute one or more sub-committees for the efficient discharge of its duties. For the conduct of NEC, Disaster Management National Executive Committee (Procedure and Allowances) Rules, 2006 has been issued which may be visited at www.mha.nic.in. The responsibility of NEC is to act as the coordinating and monitoring body for disaster management, to prepare a National Plan, monitor the implementation of National Policy etc. vide section 10 of the DM Act.

STATE LEVEL INSTITUTIONS OF DISASTER MANAGEMENT

State Disaster Management Authority (SDMA)

The DM Act, 2005 provides for constitution of SDMAs and DDMAs in all the states and UTs. As per the information received from the states and UTs, except Gujarat and Daman & Diu, all the rest have constituted SDMAs under the DM Act, 2005. Gujarat has constituted its SDMA under its Gujarat State Disaster Management Act, 2003. Daman & Diu have also established SDMAs prior to enactment of DM Act 2005.

State Executive Committee (SEC)

The Disaster Management Act envisages establishment of State Executive Committee under Section 20 of the Act, to be headed by Chief Secretary of the state Government with four other Secretaries of such departments as the state Government may think fit. The responsibility is for coordinating and monitoring the implementation of the National Policy, the National Plan and the State Plan as provided under section 22 of the Act.

DISTRICT LEVEL INSTITUTIONS OF DISASTER MANAGEMENT

District Disaster Management Authority (DDMA)

Section 25 of the DM Act 2005 provides for constitution of DDMA for every district of a state. The District Magistrate/ District Collector/Deputy Commissioner head the Authority as Chairperson besides an elected representative of the local authority as Co-Chairperson except in the tribal areas where the Chief Executive Member of the District Council of Autonomous District is designated as Co-Chairperson. Further in district, where ZilaParishad exists, its Chairperson shall be the Co-Chairperson of DDMA. Other members of this authority include the CEO of the District Authority, Superintendent of Police, Chief Medical Officer of the District and other two district level officers are designated by the state Government. The responsibility of the District Authority is planning, coordination and implementation of disaster management and to take such measures for disaster management as provided in the guidelines. The District Authority also has the power to examine the construction in any area in the district to enforce the safety standards and also to arrange for relief measures and respond to the disaster at the district level.

Institutional Framework for Metropolitan Cities

In the larger cities (with population exceeding 2.5 million), the recommendation of the second Administrative Reforms Commission has suggested that the Mayor, assisted by the Commissioner of the Municipal Corporation and the Police Commissioner to be directly responsible for Crisis Management. It has now been accepted by the Government.

Hierarchical Structure of Authority and Committee

National Disaster Management Authority is the authority for formulation of policy and guidelines for all disaster management work in the country. The state authorities further laid down the guidelines for departments of the state and the districts falling in their respective jurisdictions. Similarly, district authorities direct the civil administration, departments and local authorities such as the municipalities, police department and civil administration. The State Executive Committees are responsible for execution of the tasks envisaged by the authorities.

National Disaster Response Force (NDRF)

Constitution and role of NDRF: The National Disaster Response Force (NDRF) has been constituted under Section 44 of the DM Act, 2005 by up-gradation/conversion of eight standard battalions of Central Para Military Forces i.e. two battalions each from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CRPF) to build them up as a specialist force to respond to disaster or disaster like situations.The eight battalions (1 battalion comprised of nearly 1000 person) of

NDRF consist of 144 specialised teams trained in various types of natural, manmade and non-natural disasters. 72 of such teams are designed to cater to the Chemical, Biological, Radiological and Nuclear (CBRN) calamities besides natural calamities. Each NDRF battalion consists of 1149 personnel organised in 18 teams comprising of 45 personnel, who are being equipped and trained for rendering effective response to any threatening disaster situation or disaster, both natural and manmade. All these eight battalions are being trained in natural disasters while four of them are being additionally trained for handling CBRN disasters. The Government of India has approved the raising of two additional battalions of National Disaster Response Force by up gradation and conversion of one battalion each of BorderSecurity Force and Central Reserve Police Force to be located in the states of Bihar (Bihata,Patna) and Andhra Pradesh (Vijaywada) respectively. The administrative approval for rising the two battalions was issued on 13-10- 2010.

State Disaster Response Force (SDRF)

The states/UTs have also been advised to set up their own Specialist Response Force for responding to disasters on the lines of National Disaster Response Force vide Ministry of Home Affairs letter dated 26th July 2007 and 8th March, 2011. The Central Government is providing assistance for training of trainers. The state governments have been also advised to utilise 10 percentages of their State Disaster Response Fund and Capacity Building Grant for the procurement of search and rescue equipment and for training purposes of the Response Force.

Civil Defence

Aims and Objectives of Civil Defence Act: The Civil Defence Policy of the Govt. of India, until 1962 was confined to making the states and UTs conscious of the

need of civil protection measures and to keep in readiness civil protection plans for major cities and towns under the Emergency Relief Organisation (ERO) scheme. The legislation on Civil Defence (CD) known as Civil Defence Act was enacted in 1968 which is in force throughout the country. The Act defines CD and provides for the powers of Central Government to make rules for CD, spelling out various actions to be taken for CD measures. It further stipulates for constitution of CD corps, appointment of members and officers, functions of members etc. The Act has since been amended in 2010 to cater to the needs of disaster management so as to utilise the services of Civil Defence volunteers effectively for enhancement of public participation in disaster management related activities in the country. The CD Organisation is raised only in such areas and zones which are considered vulnerable to enemy attacks. The revision and renewal of categorised CD towns is done at regular intervals, with the level of perceived threat or external aggression or attacks by anti- national elements or terrorists to vital installations.

Compendium of instructions

CD deals very briefly with all different aspects of CD in India and includes references to important policy letters including legal aspects. It was first published in February 1969. Subsequently, its scope was enlarged by including the Master Plan of Civil Defence, Civil Defence Act 1968, training courses conducted at NCDC, Nagpur, training syllabus of states.

Role of Civil Defence

During times of war and emergencies, the CD organisation has the vital role of guarding the hinterland, supporting the armed forces, mobilising the citizens and

helping civil administration for saving life and property, minimising damage, maintaining continuity in production centres and raising public morale. The concept of CD over the years has changed from management of damage against conventional weapons to also include threat perceptions against nuclear weapons, biological and chemical warfare and environmental disasters. Three tier structure has been created to formulate CD policy and for coordinating and supervising measures to implement it.

- Civil Defence Advisory Committee under the Chairmanship of Union Home Minister,
- Civil Defence Committee under the Chairmanship of Home Secretary and
- Civil Defence Joint Planning Staff Committee under the Chairmanship of Director General Civil Defence" (NPDM, 2009).

Eligibility to become volunteers

(a) A person who intends to apply for appointment to a Civil Defence Corps must fulfil the following conditions:-

- To be a citizen of India or Bhutan or of Nepal;
- To have completed the age of 18 years provided that this age limit may be relaxed at the discretion of the competent authority up to a maximum of three years for any branch or category of the Corps,
- To have passed at least the primary standard, that is to say, the fourth class; and this condition may be relaxed by the Controller at his discretion.

(b) A person shall not be entitled to be appointed to the Corps unless he is found to be physically fit and mentally alert.

(c) Any service in the National Volunteer Force and in the armed forces of the Union shall be a special qualification

(d) Such persons shall ordinarily serve in a voluntary and honorary capacity and they are required to perform the duties assigned to them by order under the Civil Defence Regulations, 1968 or under any other law for the time being in force, for the protection of persons and property against hostile attack

(e) A candidate who has been accepted for appointment to the Corps shall be formally enrolled in such manner as the Controller may, by order, determine and at the time of enrolment shall make an oath or affirmation before such officer as the Controller may, by order, appoint.

Directorate General of Civil Defence (DGCD)

DGCD was established in 1962 with its headquarters at New Delhi in the Ministry of Home Affairs to handle all policy and planning matters related to Civil Defence, Home Guards and Fire Services including the functioning of National Civil Defence College, and National Fire Service College, Nagpur. An IPS officer in the rank of Director General of Police heads the organisation. He has dual charge of D.G. National Disaster Response Force and Civil Defence (DG, NDRF & CD).

Civil Defence Setup in the States

The state government for the purpose of coordinating the activities of the Controllers of Civil Defence within the state appoints a Director of Civil Defence

and also may constitute, for any area within the state a body of a person to be called the Civil Defence Corps. Out of 225 tons from 35 states notified as CD towns, currently the CD organisations at only 130 towns have been activated. Each town has nucleus of four Permanent Staff along with 400 CD Volunteers for a two lakh population. It is expected that each state will have one CD Training Institute with permanent strength of 36 personnel, five vehicles and other equipment. The District Magistrate is designated as a Controller for CD Towns. The present strength of CD volunteers is 5.72 lakhs, out of which 5.11 lakhs are already trained. The target strength of CD volunteers has been fixed at 13 lakhs based on the population of CD towns as per 2001 census. In accordance with the directions issued by Hon'bleHome Minister, one member high powered committee was constituted on 7th February, 2006 under the chairmanship of one of the member of NDMA to analyse the existing functions of Civil Defence Organisations and suggest changes required to enlarge its role to include Disaster Management.

Civil Defence at District level

"The state government may appoint a person, not being in its opinion, below the rank of a District Magistrate to be known as the "Controller". Under certain conditions, the state government may also appoint a Deputy Controller of Civil Defence in appropriate rank up to that of Deputy Collector, but not inferior to that of a Sub-Divisional Magistrate.

Fire Services

Fire services are mandate of the Municipal Bodies as estimated in item 7 of Schedule 12 under Article 243W of the constitution. The structure across is not

uniform. Presently Fire prevention and Fire Fighting Services are organized by the concerned States and UTs. Ministry of Home Affairs, Govt. of India, renders technical advice to the States and UTs and Central Ministries on Fire Protection, Fire Prevention and Fire Legislation.

In 1956, the Government of India formed a "Standing Fire Advisory Committee" under the Ministry of Home Affairs. The mandate of the committee was to examine the technical problems relating to Fire Services and to advise the Government of India for speedy development and up gradation of Fire Services all over the country. This committee had representation from each State Fire Services, as well as the representation from Ministry of Home, Defence, Transport, Communication and Bureau of Indian Standards. This Committee was renamed as "Standing Fire Advisory Council" (SFAC) during the year 1980. Fire Services in Gujarat, Chhattisgarh, Punjab, Maharashtra, Himachal Pradesh, Haryana and Madhya Pradesh excluding Indore are under the respective concerned Municipal Corporations. In other remaining States it is under the Home Department. While some States have enacted their own Fire Act, some others have not. As on today, there is no standardization with regard to the scaling of equipment, the type of equipment, or the training of their manpower. In each state it has grown according to the initiatives taken by the States and the funds provided for the Fire Services. Presently the only Basic Life Line of Fire & Emergency Services which is fully committed to the common public is the Municipal in some states and State Fire Services. The Airport Authority, Big Industrial Establishments, CISF and Armed Forces, however also have their own Fire Services and many a times in case of need

rush in aid to the local Fire Services. Apart from the lack of being a proper government department with a complete developmental plan, State Fire Services have their own organizational structure, administrative setup, funding mechanism, training facilities and equipment.

Home Guards

The role of Home Guards is to serve as an auxiliary to the police in the maintenance of law and order, internal security and help the community in any kind of emergency such as air-raid, fire, cyclone, earthquake, epidemic etc. They help the police in maintenance of communal harmony, assist the administration in protecting weaker sections, participate in socio-economic and welfare activities and perform Civil Defence duties. Home Guards are of two types – rural and urban besides in Border States, Border Wing Home Guards Battalions at national level. Border Wing, Home Guard serves as an auxiliary to the Border Security Force. The total strength of Home Guards is 5, 73,793 against which the raised strength is 5, 00,410. The organisation is spread over all states and UTs except in Kerala. Eighteen Border Wing Home Guards (BWHG) Battalions have been raised in the Border States viz. Punjab (6 Bns.), Rajasthan (4 Bns.), Gujarat (4Bns.) and one of Bn each. For Assam, Meghalaya, Tripura and West Bengal to serve as an auxiliary to Border Security Force for preventing infiltration on the international border and coastal areas, guarding of vital Installations and lines of communication in vulnerable areas at the time of external aggression.

The **National Policy on Disaster Management (NPDM): The NPDM** has been prepared in tune with and in pursuance of the **Disaster Management Act,**

2005. National Policy on Disaster Management (NPDM) will provide the framework/roadmap for handling disasters in a holistic manner. The vision of NPDM is to build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response. The Policy covers **all aspects of disaster management** with institutional, legal and financial arrangements; disaster prevention, mitigation and preparedness, techno-legal regime; response, relief and rehabilitation; reconstruction and recovery; capacity development; knowledge management and research and development.

It focuses on the areas where action is needed and the institutional mechanism through which such action can be channelized.

The NPDM addresses the concerns of all the sections of the society **including differently abled persons, women, children and other disadvantaged groups.** In terms of grant of relief and formulating measures for rehabilitation of the affected persons due to disasters, the issue of equity/inclusiveness has been considered with due importance.

The NPDM aims to bring in **transparency and accountability** in all aspects of disaster management through **involvement of community**, community based organizations, Panchayati Raj Institutions (PRIs), local bodies and civil society" (NPDM, 2005).

Kerala is multi-hazard prone. HDI being a composite index of consumption rate (proxy to purchasing power), education and health, is an indicator of the socio-

economic vulnerability Kerala State Disaster Management Plan, 2016of the population. The higher the HDI, the higher is the coping capacity, but greater is the cumulative loss potential and thus a higher degree of risk. Thus Kerala has a higher degree of disaster risks as compared to the rest of the country. The Kerala State Disaster Management Plan (KSDMP) is an ever evolving document formulated under the Disaster Management Act, 2005 (DM Act, 2005) which establishes a multi stakeholder framework for the partnership of governmental entities, non-government agencies, sector enterprises and individuals for Disaster Risk Reduction in the State.

The spirit of the DM Act, 2005 is in ensuring disaster risk reduction and thus KSDMP Also focus on disaster risk reduction.

Disaster Management Training & Information Materials:

Training to stakeholders in disaster management is imparted through the Disaster Management Centre at Institute of Land and Disaster Management and the Civil Defence Institute Thiruvananthapuram, Kerala. The Disaster Management Centre trained over 5683 stakeholder representatives in 2015-16. Training was being conducted in the Centre since 2010. The State Disaster Management Authority through the Centre has already provided training on precautionary and preventive measures to be taken in the case of petro-chemical transportation accidents to 426 Police, Fire and Rescue Services and Revenue officials in the state. The above training yielded high results in as much as it can be seen that there is a steep declination of inferno and fatality due to BLEVE (Boiled Liquid Evaporation Vapour Explosion) in such accidents. The Civil Defence Institute which began functioning in June 2016 has already imparted training to 60 Excise Officers in the

month of July with the assistance of National Disaster Response Fund. The Authority has published information brochures of Landslides, Lightning, Coastal Erosion, Fire Safety, Floods, Drought, Sun Burn, Cyclones, Earthquake, Chemical Accidents, Drowning and Family Disaster Management Preparedness and has circulated widely. As recently as in 2016, audio brochures and brochures in brail text have also been released by the State Authority under its scheme for 'strengthening emergency response capabilities with emphasis on differently abled'. The Authority also regularly conducts FM Radio campaigns to educate public regarding disaster risk reduction measures. KSDMA has also published a video documentation on Operation Anantha for training young executives. KSDMA publishes an annual calendar which provides specific precautionary measures against potential disasters based on occurrence probability in each month following specialized trainings were also conducted by KSDMA:

A detailed training need assessment (TNA) was carried out for the Medical Professionals in the State with the help of Indian Institute for Emergency Medical Services, Kottayam. Based on this TNA report, a training programme on emergency management was conducted in the Kerala State Institute of Health & Family Welfare on 21stand 22ndDecember 2015 for enhancing the role of medical/health professionals towards disaster related emergencies

Basic & intermediate course on Incident Response System (IRS) for Thiruvananthapuram City Corporation was conducted from 26th to 30th May 2014 so as to equip the staff of the Corporation on emergency response Formation of School Safety Clubs, 10th and 11th January 2012.

Training for school bus drivers, 10th and 11th December 2011

Safe driving – training and health camp for Government Drivers, 20thNovember 2011

Role of Teachers in Disaster Management

The role and responsibility of teacher is critical in the disaster preparedness, prevention and its management. One of the major responsibilities of teachers was to give training, practice of mock drill and counselling to students is the basic action plan of the teachers followed in their schools. The students take decisions according to the type of disaster and educate the students to be calm and not to create any panic. Students' safety would be their first responsibility when any disaster strikes while teaching a full class.

Teachers play three crucial roles during and after disasters:

i) Taking care of them: A teacher's ability to understand her/his own response to the disaster is the first step. Only then she/he can take on the greater responsibility of helping children and their parents regain their strength and a sense of trust in their lives.

ii) Emerging as a team member: we encourage teachers to form a support network among themselves and with community members to create a supportive environment and a means to leverage help, strength, and arrive at practical solutions for dealing with the crisis.

iii) Facilitator and a leader's role: A teacher can play a crucial and important role in bringing the community together for rebuilding of homes and schools,

ensuring good hygiene and health seeking practices, addressing protection issues related to children separated from families and creating trust and team work within the community as she/he is the link between the child, parents and the larger community

Role of schools in Disaster Management

Schools play certain roles in Disaster Management:

- Schools, plan for the safety measures that need to be taken during the time of various kinds of disasters, internal and external
- Schools link with departments like Fire services, Police, Ambulance for an emergency management
- Provide training to School staffs
- Evaluate and improve the emergency management plans
- Circulate disaster plans in each classroom
- Determine which kind of disaster has taken place and take appropriate action for it, though this work is mainly done by the principal
- Ensure that the doors are locked and locate whether the students are in safe places or not

Schools involved in Disaster Management, means all stake holders can share and provide their equal contribution in the procedure of Disaster Management in the Schools.

Education is the best measure to reduce the risk of disasters. Students can act as disaster risk reduction managers along with teachers and other members of the community in all the three phases of disaster Management.

Survey of Related Studies

Bennet and Kottasz (2000) conducted a case study on Emergency fund raising for disaster relief. They interviewed 200 members from the public in high street and railway station locations in central London. They studied about the considerations that encourage the people to donate generously to a disaster relief fund- raising appeal. It is found that the major fund raising triggered by media representations of the indigence of recipient. The discouraging factors include media reports of unfair aid distributions, warfare and inefficiency in the relief operation. The findings of the study revealed that the peoples with young children gave to disaster appeals more frequently than the rest of the people.

Dewolfe (2000) prepared a training manual for mental health human service workers in major disasters. This manual introduces a trainer to the crisis counselling program model, the scope and limits of the program and elements required for effective service design and delivery. The manual provide essential information on 1. How the disasters affect children and adults 2. The importance of tailoring the program to fit the community descriptions of effective disaster mental health interventions strategies for preventing and managing worker stress.

Smith and Dowell (2000) conducted a case study of multi- agency response to a railway accident at Ais Gills in Cumbria, UK in January 1995. Interviews were conducted with individuals who played a key role in the incident and various documents were examined. The study focused on the three chief responding agencies at Ais Gill. They are the Cumbrian Fire Brigade, the British Transport Police and Cumbrian Ambulance service. This case study provides a rich account of a single instance of inter- agency co- ordination in Disaster Management.

Christoplos, Mitchell and Liljelund (2001) explained issue of Disasters explores the roles of NGOs and other actors in disaster mitigation and preparedness. They reviewed the broad international trends in disaster prevention and risk management. To address risk and to improve disaster mitigation and preparedness fallen between grander frame work of development co-operation and humanitarian assistance seemingly reduce the adverse impact of floods, droughts and wars. The disaster mitigation and preparedness, seeming either directly saving live or providing an escape from poverty. This study provides how to deal with risk, new approaches, priorities and institutional configurations.

Weichselgartner (2001).Explains literature on natural risks typically examines either biophysical process characteristics or human pre- or post-disaster activities. This paper takes a somewhat different track; first, it argues that also natural disasters are socially constructed and therefore, second, it resets the framework in which disaster management has to be placed. While most researchers usually focus on risk assessment it is suggested that the concept of vulnerability can provide a vehicle to explore a contextual approach to the reduction of losses due to natural hazards. In a brief overview the conceptualization of vulnerability is presented. Since precise measurement of uncertainties and exact prediction of damages is hardly feasible, a conceptual approach in vulnerability assessment is proposed. Qualities that determine potential damage are identified and characteristics described. It is suggested that, even without assessing risk exactly, vulnerability reduction decreases damages and losses.

Dhara and Dhara (2002) conducted a case study of human health effects due to the exposure of methyl isocyanate gas leaked from the Union Carbide plant in

Bhopal, India in 1984. The studies were conducted during both the early and late recovery periods. Major organs exposed were the eyes, respiratory tract, and skin. Although mortality was initially high, it declined over time, but remained elevated among the most severely exposed population. Studies conducted during the early recovery period focused primarily on ocular and respiratory systems. Major findings included acute irritant effects on the eyes and respiratory tract. In follow-up studies, investigators observed persistent irritant effects, including ocular lesions and respiratory impairment. Studies conducted during the late recovery period focused on various systemic health endpoints. Significant neurological, reproductive, neurobehavioral, and psychological effects were also observed. Early and late recovery period studies suffered from several clinical and epidemiological limitations, including study design, bias, and exposure classification. The authors herein recommend long-term monitoring of the affected community and use of appropriate methods of investigation that include well-designed cohort studies, case-control studies for rare conditions, characterization of personal exposure, and accident analysis to determine the possible components of the gas cloud.

Vari (2002) conducted a study on public involvement in flood risk management in Hungary. Data collected by using a questionnaire survey and a series of semi structured interviews conducted in three flood basins of the Tisza river indicates that although the highly centralised system of flood control, and especially its strong financial back ground, a characteristic of state socialism, has significantly weakened since the political transition, forms of public participation. The research suggest that in the case of natural disasters of uncertain and changing character, public education, information, participation and co-operation are particularly

important tools for coping. The finding of the study reveals that to reduce the flood risk by building on a more conscious and responsible attitude of the citizens have not developed yet. Paternalists and elitist attitudes prevail on the part of the authorities, contributing to the passivity of the public. In certain places, local government leaders take responsibility for building communication networks to raise public awareness and mobilize the public more effectively.

Ferrier and Haque (2003) studied hazards Risk Assessment Methodology for Emergency Managers a Standardized Framework for Application. In this study, researchers attempted a review of the existing literature on both the conceptual underpinnings of risk and its assessment. They proposed a standardized framework for use by all emergency managers, regardless of training or education. The framework includes the numerical ranking of the frequency of the event in the community, multiplied by a numerical ranking of the severity or magnitude of an event in a given community, based upon the potential impact characteristics of a 'worst-case' scenario. The resulting score, permits emergency managers from a variety of backgrounds to compare levels of community exposure to such disparate events as hazardous materials, tornadoes and spills to set priorities for both mitigation efforts and for the acquisition of response needs, within the availability of community resources.

Klein, Nicholls, and Thomalla (2003) explained resilience is widely seen as a desirable system property in environmental management. This paper explains the concept of resilience to natural hazards, using weather-related hazards in coastal megacities as an example. The paper explains on the wide literature on megacities,

coastal hazards and hazard risk reduction strategies and on resilience within environmental management. Some analysts define resilience as a system attribute, whilst others use it as an umbrella concept for a range of system attributes deemed desirable. The concept of adaptive capacity, which has emerged in the context of climate change, can then be adopted as the umbrella concept, where resilience will be one factor influencing adaptive capacity. We propose the use of adaptive capacity as the umbrella concept that includes the ability to prepare and plan for hazards, as well as to implement technical measures before, during and after a hazard event.

Urbina and Wolshon (2003) studied the events of recent hurricane seasons have made evacuation a leading emergency management issue. In 1998 and 1999, the two largest evacuations due to Hurricanes Georges and Floyd precipitated in the history of the United States and perhaps, its two largest traffic jams. The study was conducted in response to the problems experienced during evacuation in these events, a review of the traditional transportation literature and a survey of department of transportation and emergency management officials in coastal states threatened by hurricanes. The highlights of the findings are the survey portion of the study. It explains the current practices in states using reverse flow operations and intelligent transportation system and similarities and differences in innovative, unique useful used in states.

Comerio (2004) prepared a Public policy for reducing earthquake risks: a US perspective although many countries have experienced significant losses from earthquakes, governments have a difficult time creating effective seismic hazard mitigation policies. Traditional building-oriented policy mechanisms, such as land-

use regulation and building codes, are minimum standards for public health and safety, but more specialized hazard zone development restrictions are difficult to enforce at the local level where more salient issues typically dominate. Some hazards' insurance policies link the cost of coverage to mitigation, but as a broad policy, the availability of insurance often encourages rather than discourages poor site selection and development planning. In recent years, there has been a strong divergence between knowledge and policy. Public utilities, large corporations, museums and educational institutions have developed risk management models to safeguard critical functions, protect valuable contents and limit downtime. These self-generated mitigation plans could be replicated in other organizations and institutions if hazard mitigation policies were designed to reward innovation and allow flexibility. Policies such as performance-based design standards that create incentives for mitigation, accommodate change and allow the negotiation of means for desired objectives are needed to replace rigid and prescriptive regulatory models.

Spence (2004) in his article ‘risk and regulation: can improved government action reduce the impact of natural disasters? Explain 3 types of regulations. When applied improved codes can substantially reduce the impact of natural disasters. 1. Regulations for constructing new buildings and code enforcement 2. Regulation for intervening in or upgrading the existing building stock 3.Regulation of the insurance industry. The success of any government actions depends equally on the development in society of a ‘safety culture’ in which citizens both understand the risks they face and are prepared to participate in the management of them.

Srivastava and Gupta (2004) conducted a study on disaster mitigation vis-à-

vis time of occurrence and magnitude of earthquakes in India. In this study it is found that in general, the percentage of earthquakes occurring during evening / early morning is larger than that during the day time. However, the difference in time of occurrence is not significant at 95% level of confidence using chi square test. Keeping in view that most of the earthquakes in India of magnitude more than 6 have caused significant damage in the last decade and have occurred in the night / early morning, disaster management plans need to be designed for awareness and education separately for the night and day times.

Trim (2004) explained disaster management and planning needs to be placed in a holistic setting and new initiatives found in order to ensure that a disaster is viewed as a shared responsibility. One area that needs further attention is the concept of community policing incorporates. Often, a disaster is on such a scale that local community leaders need to be consulted during the disaster limitation of containment stage. This paper reveals the essential that experts from seas countries brought in to the disaster area, are able to communicate fully and open with community leaders in order to gain the support of the community.

Vermaak and Niekerk (2004) describe disaster risk reduction initiatives in South Africa under taken by government departments and non- governmental organization from 1994 to 2003. It describes the various methods and systems employed to reduce risk and vulnerability. The resilience and coping mechanisms of communities affected by disasters have demonstrated the importance of local and traditional knowledge in the reduction of risk and the effect of Hazards. A case study of the February 2000 floods in Limpopo province of South Africa provides insight into local coping mechanism and indigenous methods of risk reduction.

Broughton (2005) conducted a review of The Bhopal disaster and its aftermath. On December 3 1984, more than 40 tons of methyl isocyanate gas leaked from a pesticide plant in Bhopal, India, immediately killing at least 3,800 people and causing significant morbidity and premature death for many thousands more. The company involved in what became the worst industrial accident in history immediately tried to dissociate itself from legal responsibility. Eventually it reached a settlement with the Indian Government through mediation of that country's Supreme Court and accepted moral responsibility. It paid $470 million in compensation, a relatively small amount of based on significant underestimations of the long-term health consequences of exposure and the number of people exposed. The disaster indicated a need for enforceable international standards for environmental safety, preventative strategies to avoid similar accidents and industrial disaster preparedness.

Narayana, Tatavarti and Shakdwipe(2005) studied the need of the hour is to have capabilities to predict tsunami occurrence. To forecast tsunamis, tsunami measurements from the deep ocean are required. The idea of measuring tsunamis in the deep ocean and actually reporting such data in real time is scientifically challenging but feasible. India has the means and technology to establish tsunami warning systems once the political will is in place. At present, there is no completely satisfactory explanation for the occurrence of disproportionately large tsunamis, but it is an area that will require further research by tsunami scientists. As brought out in the recommendations of the March 2004 workshop on “Seismo-Acoustic Applications in Marine Geology and Geophysics”, at the Woods Hole

Oceanographic Institution, USA; it is important to look at the role of seismo-acoustics (T-phases) in understanding the dynamics of earthquakes and tsunamis. Another area that needs research attention is the role of resonance amplification in explaining why along the coastlines of bays and gulfs the tsunami amplitudes are so large while at other nearby locations the amplitudes are considerably smaller. Therefore scientific emphasis should be on better predictions of earthquake epicenter and intensity, the physics of tsunamis, and the consequent run up and inundation patterns. It pays to prepare detailed run up and inundation maps to understand the consequences of tsunamis. The same information is vital for flooding and storm surge eventualities. Increasing the public awareness, and dissemination of run up and inundation patterns to civic administration for evacuation management, would certainly curtail the intensity of devastation of life and property.

Rautela and Pande (2005) conducted a study traditional input in disaster management, a case study of Amparav, North India. The study reveals that critical lack of awareness of the plan among ordinary villagers' led to its being rendered inoperable: culminating in Amparav tragedy that took three human lives and destroyed huge amounts of public and private property and infrastructure. Vinh Hung, Shaw and Kobayashi (2007) the main aim of their paper was to investigate reasons for unusual over development of flood plain areas outside river dyke, and provide an insight in to the importance of community perception of catastrophic flood risk in the river side urban areas (RUA) of Hanoi and establishes the need for participatory disaster management planning and disaster management education in the study location. A structured survey was used to collect data and examines the

community perception of flood risk and availability of option for housing. The result of the study shows that the students increased perception in their competency in disaster management and develop a positive attitude for effective inter professional team work. The study gives a direction for further development of similar online courses.

SEEDS, India (2005) conducted a project on school safety activities were held in Nangarhar. The activities were effective in raising general awareness of safety issues related to disasters and specifically about earthquake safety in schools. The objectives of the project were to 1) Introduce concepts of disaster management to school teachers and students. 2) Orient teachers and students on their role during a disaster. 3) Form a search and rescue team of students and provide training to students on various rescue methods. 4) Form a first aid team of students and provide training to students on first aid. 5) Develop an evacuation plan for the school and train the teachers and students to implement it. The project reveals that in the absence of such work, schools will continue to suffer from disasters and will take decades to recover from the effect of conflict.

Graham and Spennemann (2006) studied Heritage managers and their attitudes towards disaster management for cultural heritage resources in New South Wales, Australia. This study was designed to investigate this current gap in our understanding of attitudinal barriers for disaster planning for cultural heritage. A self-administered postal survey was designed and distributed to heritage managers from each local government in New South Wales (NSW), providing a cross-sectional view of the current range of attitudes towards disaster planning for cultural

heritage resources. Results generated by the study are significant as they provide empirical evidence of the extent of this problem. Although heritage managers acknowledged the threat of natural disasters in their shire, they were not considered a priority.

Hosseini and Izadkhah (2006) studied Earthquake disaster risk management planning in schools. This paper aims to develop an appropriate earthquake disaster management system for Iranian schools with a main focus on non-structural problems of schools during disasters. A framework is proposed for disaster management planning regarding earthquakes in three phases: before, during, and after an earthquake. A detailed description of the proposed management system is also presented with special application to schools, focusing mainly on non-structural problem. There is a need to emphasise on a national-level contingency planning that includes developing and designing detailed plans for a proper response and training of relevant personnel. Another important issue, which needs special attention, is the material which should be taught to the commanders of emergency activities at various levels in order to help them to control an effective emergency situation. By using the "emergency management system" proposed in this paper for Iranian schools the authorities can make sure that they have utilized all of their resources for an efficient disaster risk management. It is hoped that other developing countries can also benefit from the proposed programme. The originality of this paper is in the comprehensiveness of the "emergency management system" proposed for the schools, and the approaches it suggests for constructing the "safety culture" in society. Natural disasters such as earthquakes often result in extensive casualties and

damage. The disaster management system proposed in this paper addresses different phases of the disaster by assigning responsibilities to various operational teams inorder to mitigate the consequences of the disaster.

Lin Moe and Pathranarakul (2006) studied an integrated approach to natural disaster management Public project management and its critical success factors. With an aim to develop an integrated approach for effectively managing natural disasters, this paper has three research objectives. First, it provides a framework for effective natural disaster management from a public project management perspective. Second, it proposes an integrated approach for successfully and effectively managing disaster crisis. Third, it specifies a set of critical success factors for managing disaster related public projects. A detailed case study of the tsunami was carried out to identify specific problems associated with managing natural disaster in Thailand. The investigations reveal that the country lacked a master plan for natural disaster management including prediction, warning, mitigation and preparedness, unspecified responsible governmental authority, unclear line of authority, ineffective collaboration among institutions in different levels, lack of encouragement for participation of local and international NGOs, lack of education and knowledge for tsunami in potential disaster affected communities, and lack of information management or database system. This study identifies the specific problems associated with natural disasters management based on a detailed case study of managing tsunami disaster in Thailand in 2004.

Ofrin and Salunke (2006)this article presents an overview of risks and hazards in the South East Asia Region, as well as disaster preparedness and response

in countries in South East Asia (SEA) before and after the Tsunami of 26 December 2004. This event has become a reference point and turning point for most countries and organizations in improving and reforming disaster risk management. Changes have been put in place as to how emergencies are managed and these were largely brought about by taking forward lessons that were drawn from the Tsunami experience. Benchmarking for preparedness and response has been a critical step in the standardization of systems for emergency preparedness and response.

Van Niekerk (2006) explains in his article the importance of disaster risk management as an integral part of developmental plans of each municipality. The main aim of the article is to emphasise the importance of disaster management activities in developmental planning. The article describes the importance of parallel planning process to integrate disaster management plans in to each municipality's integrated developmental process in a democratic way.

Bourque, Siegel, Kano and Wood (2007) conducted a study on weathering the Storm: The Impact of Hurricanes on Physical and Mental Health. The authors briefly reviewed the deaths, injuries, and diseases attributed to hurricanes that made landfall in the United States prior to Hurricane Katrina; recent hurricane evacuation studies and their potential for reducing death, injury, and disease; information available to date about mortality, injury, and disease attributed to Hurricane Katrina; and psychological distress attributable to hurricanes. Drowning in salt water caused by storm surges has been reduced over the past thirty years, while deaths caused by fresh water (inland) flooding and wind have remained steady. They found that well-planned evacuations of coastal areas can reduce death and injury associated with

hurricanes. Preliminary analysis indicated that vulnerable elderly people were substantially over represented among the dead and that evacuees represent a population potentially predisposed to a high level of psychological distress, exacerbated by severe disaster exposure, lack of economic and social resources, and an inadequate government response.

Kano and Bourque (2007) this study examined the correlates of public schools' preparedness for emergencies and disasters. Hypotheses for the study were derived from the social science literature on disaster preparedness among schools, households, and organizations. It was hypothesized that preparedness would be associated with demographic factors, general and preparedness-specific resources, and prior experience. A mail survey was conducted with a sample of 470 public schools in California between September 2005 and February 2006. Responses were obtained from 157 schools. Multivariate regression analyses were performed with unweights data. Having funding for preparedness activities and a school-based emergency preparedness coordinator were positively associated with measures of school preparedness, including perceived level of preparedness, availability of emergency equipment and supplies, extent of interagency coordination, and provision of in-service training. School characteristics, such as size, urban city, general resource base, and prior experience with emergencies or disasters were not associated with levels of preparedness.

Pande and Pande (2007) studied Resettlement and rehabilitation issues in Uttaranchal (India) with reference to natural disasters. The purpose of this paper was to devise Uttaranchal's disaster management mechanism for reduction of effects of

disaster, i.e. damage to property and loss of life and the rapid and effective rescue, relief and rehabilitation of the victims. Uttaranchal's location and geographical features shows its vulnerability to minor changes. Hence any activity disapproved by mountain ecosystem triggers a disaster. One cannot stop disaster but can certainly take some steps to reduce its effects. The study reveals that 83 villages in Uttaranchal need rehabilitation but, Uttaranchal has no resettlement and rehabilitation policy yet. The study is based on secondary data; however, sufficient care has been taken to consider all important factors for suggesting Rehabilitation Policy for Uttaranchal State. The study suggests a Resettlement and Rehabilitation Policy for the state, Uttaranchal.

Willey, Hendershot and Berger (2007) this paper provides insight into the Bhopal site as attendees found it in December 2004. Since 1984, many positive steps worldwide have been made in regard to improvements in process safety and protection of personnel within chemical plants and of people in the surrounding communities. However, little visible progress has been made in decommissioning and decontaminating the Bhopal plant site, now under control of the Indian state of Madhya Pradesh. Many plant chemicals, abandoned there in 1985, were still at the site in 2004, mostly in substandard storage conditions. Mitigation recently commenced, but unconfirmed reports of the mitigation methods are concerning. The lesson learned: we all have a responsibility to ensure that events which follow a chemical accident reach a proper conclusion; and that no further undue suffering results to the general public and our fellow employees.

Shaluf (2008) studied Technological disaster stages and management. This paper aims to provide graduate students, researchers, governmental and independent

agencies with an overview on the stages and management of technological disasters. The technological disasters are a subject of concern to the researchers, the academicians, the governmental and independent agencies. The disasters, which involve major hazard installations (MHIs), are known as technological disasters. They used technical and general articles, internet web sites, and internal reports as sources for information. This paper presents an overview on the technological disaster management cycle. The paper presents definition and stages of management. It provides the MHIs management and the related authority with a background on the technological disaster management cycle. It motivates the members of the MHIs, particularly managerial staff, and the emergency planners to continually improve the control of MHIs. It provides the background and basis for further research in disaster and disaster management.

Nath, Roy and Thingbaijam(2008) examined predominant natural hazards in west Bengal and analyse the existing disaster mitigation and management perspective in West Bengal. They prepared a vulnerability map by the interaction of flood, earthquake, cyclone, land slide and wind vulnerability components represented by the district wise population density. The result shows there is a need of a combined management strategy has been thought to be more practical than separated efforts.

Peek (2008) explores the concepts children and disasters. His findings are, 1.children are among those most at risk for the negative effects of disaster, 2. Children are psychologically vulnerable and may develop post-traumatic stress disorder or related symptoms; are physically vulnerable to death, injury, illness, and

abuse; and often experience disruptions or delays in their educational progress as a result of disasters, 3. Children have special needs and may require different forms of physical, social, mental, and emotional support than adults. Even though children are more vulnerable, they also have the capacity to contribute to disaster preparedness, response, and recovery activities. In order to promote children's resilience to disasters, we must improve their access to resources, empower them by encouraging their participation, offer support, and ensure equitable treatment.

Shiwakuand Shaw (2008). The aims of this paper are to point out the effectiveness of the education at Maiko and show the direction of effective school disaster education. The questionnaire survey was conducted in 12 schools (1,065 students) from different parts of Japan, including that of Maiko, to understand the linking between disaster education and students' awareness. The questionnaire results show a distinct higher risk perception and risk reduction actions of the students in the Maiko, as compared to other schools. The Maiko focuses on mitigation and preparedness, mainly teaches about the social environment, and makes students think of the importance of implementation. This learning process is found to be effective in reducing the gap between intention and action. This study points out the crucial points of disaster education based on the education at Maiko. The specific case of disaster education should be developed in each school, adapting local situation. The study findings are of significant importance for school-teachers or education departments, while designing the curriculum for disaster education. The paper shows that education at Maiko is one of the best practices of school based disaster education and the findings and recommendations can be effective at other schools.

Williams, Alexander, Bolsover and Bakke (2008) studied Children, resilience and disasters: recent evidence that should influence a model of psychosocial care. This paper draws on articles and chapters published mainly in 2006 and 2007 to identify implications for designing sustainable programmes of psychosocial care for children and young people who are affected by disasters and terrorism. Recent research confirms previous knowledge that most children and young people are resilient, but also very vulnerable to the psychosocial effects of disasters. Most children are distressed in the immediate aftermath when they gain their sense of safety from adults, predictable routines and consistent support systems. Others may develop serious mental disorders though post-traumatic mental disorders may not develop until weeks, months or years later. Research instruments may be sensitive to cultural variability; simply translating measures into other languages is insufficient. International experience of different types of disaster and terrorist incidents suggests that the broad principles of good service design include integrating responses to the psychosocial needs of children and adolescents into general disaster preparedness and recovery plans; working with families rather than individual children to address their needs; identifying professionals who specialize in responding to disasters and are skilled in working with children prior to events; and focusing resources on increasing the capabilities of staff of community facilities to recognize and respond to children's common reactions to trauma and provide assistance.

Ablah, Konda and Kelley (2009) analysed Factors Predicting Individual Emergency Preparedness:A Multi-state Analysis of 2006 BRFSS Data. This study

attempted to identify the factors most likely to predict individual disaster preparedness. They used 2006behavioral Risk Factor Surveillance System (BRFSS) data from the 5 states that included the optional general preparedness module. Respondents were defined as being ‘‘prepared’’ if they were deficient in no more than 1 of the 6actionable preparedness measures included on the BRFSS. Analysis was conducted comparing preparedness rates based on medical and demographic factors. Using logistic regression, a predictive model was constructed to identify which factors most strongly predicted an individual's likelihood of being prepared. Although 78% of respondents reported feeling prepared for a disaster, just 45% of respondents were actually prepared by objective measures. Factors predicting an increased likelihood of preparedness included feeling ‘‘well prepared’’ (OR 9.417), having a disability or health condition requiring special equipment (OR 1.298), being 55 to 64 years old (OR 1.794), and having an annual income above $50,000 (OR 1.286). Among racial and ethnic minorities, an inability to afford medical care in the previous years(OR .581) was an important factor in predicting a decreased likelihood of being prepared. This study revealed a pervasive lack of disaster preparedness overall and a substantial gap between perceived and objective preparedness. Income and age were important predictors of disaster preparedness. Results of this study revealed a pervasive lack of disaster preparedness among the populace, particularly in having an actual written preparedness plan. There is also a substantial gap between perceived preparedness and having taken corresponding steps to actually become prepared

Atack, Parker, Rocchi, Maher and Dryden(2009) studied the impact of an online inter professional course in disaster management competency and attitude

towards inter professional learning. The main aim of the study was to examine changes in disaster management competency and inter professional attitudes after students completed simulation and online courses with a view to enhancing inter professional attitude and disaster management practice. The sample constitutes under graduate students from health and allied field were taken. Pre - test Post- test quasi experimental design were used as method. Survey and focus group method were used. Three surveys, including demographic survey, disaster management competency survey, inter professional learning survey were administered to 588 students. Online course provided to 74 students in which 64% completed the course. The majority of students show interest and of most of them were women. The study revealed that the course improved their awareness of disaster management and learners are ready to work in collaborative practice.

Basolo, Steinberg, Burby, Levine, Cruz, A. M., & Huang, C. (2009) studied the Effects of Confidence in Government and Information on Perceived and Actual Preparedness for Disasters. This research examines perceived and actual preparedness for two types of natural hazard risks: earthquakes in the Los Angeles County area and hurricanes within the New Orleans metropolitan area. Using data collected from a sample of households in these regions, the influence of individuals' confidence in local government to manage a disaster and exposure to disaster preparedness information sources were tested as explanations for levels of perceived and actual preparedness. Regression analyses show that a high level of confidence in local government to manage a disaster and exposure to more preparedness information sources were associated with a higher level of perceived preparedness.

No support for a potential dampening effect of Environment and Behaviour. The results also reveal only limited support for the impact of information exposure on actual preparedness. The results for actual preparedness vary between the study areas; therefore, we follow the analysis with a discussion of these differences and the implications drawn from the research. Overall, the study results confirm the results of previous research on the under preparedness of households for disasters.

Becker and Becker (2009) explained in this article about the stresses the significance of recognising interdependencies between factors determining disaster risk in any attempts to integrate disaster risk reduction in international development cooperation. It bases its arguments on the case studies of four past projects in Sri Lanka and Tajikistan, which are scrutinised using a theoretical framework based on systems approaches. It appears that the results of ignoring interdependencies may (1) cause sub-optimisation problems where the desired outcome is not reached as the factor focused on and/or the desired outcome are dependent on other factors, and (2) make it difficult or impossible to monitor and evaluate the actual effects of international development cooperation projects in disaster risk reduction. Disaster risk reduction, systems approaches, complexity and interdependence.

Das, Kumar and Sampath (2009) studied about the mechanisms of involvement of objects and personnel in lightning disasters. Investigated the incidents from Kerala and find out in 51% cases objects and personnel were involved. Some of these are unusual and damage caused due to the presence of continuing current component. The study discussed about the role of objects in charge collection and dissipation. The earthing is important to control lightning but

it is inefficient in G24 and G20 incidents of lightning. Protect the vegetation and soil resistivity is of prime consideration in Kerala.

Kaklauskas, Amaratunga and Haigh (2009) this article describes the development of a knowledge model for post disaster management. The study aims to help post- disaster managers to find out most rational solutions by using advanced knowledge and developed model. Activities are conducted based on common understandings and stakeholder formulate decisions regarding post- disaster management success. Activities are conducted based on common understandings and stakeholder formulate decisions regarding post- disaster management success.

Kaur (2009) studied Disaster planning in university libraries in India: a neglected area. India is prone to natural disasters and disaster planning at the government level has gained momentum as new initiatives have been taken which are discussed briefly. But disaster planning in the university libraries in India remains a neglected area. This paper aims to address these issues. This paper is a case study of two university libraries in Punjab state of India that faced the fury of floods during July 1993. Their experience with disaster, losses incurred and action taken in libraries is discussed. The paper concludes with a few suggestions. For collecting information, annual reports of universities were consulted and face to face interviews were carried out for data collection from the librarian and the deputy librarian of the two university libraries who had experienced the floods. Among the two, one university library lost just over 70 per cent of its collection in flood. The other was fortunate and only minor loss was reported. Both the university libraries under study did not have a disaster plan then and neither have they now. This is a

case study of two university libraries only. A survey of all the university libraries in India would provide more information. This paper looks into the neglected area of disaster planning in university libraries in India.

Lee, Shen and Tran (2009) explained in this study about Hurricane Katrina was one of the most devastating natural disasters in the U.S. history. The economic, physical, and psychological damage to survivors of Katrina may ultimately be incalculable. While this natural disaster affected all racial groups, it was low-income African Americans who disproportionately experienced the greatest suffering. This study examines factors related to psychological resilience in the Hurricane Katrina evacuee sample (N = 363) drawn from the Kaiser Washington Post Harvard Poll #2005 WPH020. The structural equation model (SEM) used explains 34% of the total variance on Katrina victims' resilience measured by their perceived sense of recovery. Findings suggest that those evacuees who reported psychological distress as a reaction to the disaster were less likely to report that they would fully recover from the disaster. All three Hurricane Katrina experience-related variables— being insured, home destruction, and human loss—have significant effects on psychological distress, with human loss having the strongest effect. Implications for practice and research are discussed.

Matilal and Höpfl (2009) The aim of this paper is to find the relationship between the purely representational aspects of the statements of account and the everyday lived experiences of those who were directly affected by the Bhopal Gas Tragedy in India in 1984. The paper seeks to consider the rhetorical force of photography in capturing the tragic and to compare this with the position adopted by

Union Carbide in accounting for the catastrophe. The paper reviews the Bhopal Gas Tragedy and draws on the works of Philippe Lacoue-Labarthe and Julia Kristeva to examine the relationship between photographic representation and statements of account. The rhetorical character of the ways in which the tragedy has been represented and the impact of the photographic image when set against the statement of account is considered. The photographic image is an attempt to restore the body to the text, to bear in mind that, in the face of inevitable abstract, it is important to remember the body, albeit with the caveat that the image too succumbs to the force of rhetoric. Nonetheless, the image reminds one that one is dealing not only with figures and statements but also with life and death. The paper contributes to discussions about the need for a dialogic approach to accounting. Frequently, in disaster analysis, the co-existence of multiple perspectives and fragmented stories i.e. a dialogic approach is paramount to gaining an insight into the complexity of the system which has failed. The paper demonstrates how images can complement cosy, coherent, monologic statements of accounts and help to retain the human character of disaster.

Mishra, Samarth, Pathak, Jain, Banerjee and Maudar (2009) reviewed, Bhopal Gas Tragedy: clinical and experimental findings after 25 years. The Bhopal gas tragedy is undoubtedly one of the worst industrial disasters in the history of mankind resulting in mortality of 2500–6000 and debilitating over 200 000 people. Inhabitants in the township were exposed to different degrees and there are more than 500 000 registered victims that survived the tragedy. Clinical studies have shown chronic illnesses such as pulmonary fibrosis, bronchial asthma, chronic

obstructive pulmonary disease (COPD), emphysema, recurrent chest infections, keratopathy and corneal opacities in exposed cohorts. Survivors continue to experience higher incidence of reported health problems including febrile illnesses, respiratory, neurologic, psychiatric and ophthalmic symptoms. *In-utero* exposureto methyl isocyanate in the first trimester of pregnancy caused a persistent immune system hyper-responsiveness, which was in an evident way genetically linked with the organic exposure. Recent experimental studies have provided mechanistic understanding of methyl isocyanate exposure at a molecular level. Immunotoxic implications, toxico-genomic effect, inflammatory response, elicitation of mitochondrial oxidative stress, chromosomal and microsatellite instability have been studied comprehensively in cultured mammalian cells. Besides providing a framework for understanding potential mechanisms of toxicity of a host of other exposures, these studies may also uncover unique abnormalities thereby stimulating efforts to design newer and effective diagnostic and therapeutic strategies. The authors recommend long-term monitoring of the affected area and use of appropriate methods of investigation that include well-designed cohort studies, case-control studies for rare condition, characterization of personal exposure and accident analysis to determine the possible elements of the gas cloud.

Vinodkumar and Bhasi (2009) studied safety in the chemical industry. The study mainly focused on the climate factors in the chemical industries in Kerala. 2536 employees worked in eight major accident hazard chemical industrial units in Kerala were included in a survey using a questionnaire. The sample consists of both workers and supervisors. The safety climate scores calculated were found to have

significant negative correlation with self- reported accident rates revealing good predictive validity. The result shows that different organizations have different safety climate levels.

Grosskopf (2010) studied Post-disaster recovery and reconstruction safety training. The purpose of this paper is to identify safety hazards likely to be encountered during post-disaster recovery and reconstruction, identify barriers to effective safety training and hazard mitigation, and provide actionable guidance on methods to safely avoid and abate such hazards. Surveys were administered to 400 participants at 13 training sites to evaluate safety practices among reconstruction contractors and workers. A comparison of survey results to hazards likely to cause injuries and fatalities during post-disaster reconstruction indicates that little effort is made to assess workers' physical condition or immunization records prior to deployment. Furthermore, data suggest that workers lack safety training in reconstruction-specific hazards such as electrocution, falls, chemical and biological hazards (e.g. contaminated flood water), and equipment hazards (aerial lifts, ladders, electric equipment, generators, etc.). Findings also indicate that training effectiveness is further compromised by limited language and literacy skills of workers, high turnover of workers, and insufficient resources for adequate safety training frequency and duration, especially among smaller contractors (<100 workers).The paper is based on original research funded by the US Government following Hurricane Katrina and is intended to aid in the development of targeted training to reduce worker injuries and fatalities during post-disaster reconstruction.

Kangabam, Panda and Kangabam (2010) conducted a case study of Disaster

Preparedness among the Resident Community. A critical component of disaster preparedness is the knowledge of available local resource information and how to response at the time of disaster. Impacts of natural disasters can be reduced through pre-disaster activities for mitigating risks and such activities are among the most crucial aspects of disaster risk reduction to consider in forming a coordinated strategy or plan. Mobilising resources raises the awareness level within the community and aids in assessing local knowledge and resources. This paper presents the results of a pilot study on awareness level among the different community of Rajiv Gandhi University which is located in one of the high seismic zone in the North eastern part of India. The study concludes that disaster awareness among the community varies with the educational background, origin and age and the level can be strengthened through a combination of appropriate community based disaster preparedness, information technology and collaborative relationships between government, Non-Government Organizations and community-based organisations.

Karunasena, Amaratunga and Haigh (2010) studied Capacity Building towards Sustainability: Context of Post Disaster Waste Management. Concept of Capacity Building is an essential component in development theory and practice. Indeveloping countries, it is identified as a key concept in achieving sustainability. In particular, inpost disaster scenarios, focus have been placed upon local capacity building as a means of increasing resilience to natural hazards. In this context, this paper focuses on concept of capacity building and its role on achieving sustainable post disaster waste management. A literature review and pilot study have been conducted to gather information on post disaster waste management in Sri Lanka.

Semi-structured interviews were held as the main data collection method and content analysis was used to analyse collected data. Unavailability of a centralized body, poor implementation of rules and regulations; lack of skills and confidence, inadequate funds, lack of communication and coordination were identified as prevailing capacity gaps in post disaster waste management. Thus, finally paper proposes a framework for capacity building for sustainable post disaster waste management.

Amaratunga, Siriwardena, Malalgoda, Pathirage, and Thayaparan, M. (2011) explored, in the built environment, lifelong learning needs for disaster management education. The study explored the complexity of disaster management in terms of its body of knowledge and modes of education. Increased occurrence of disasters cause the increased need of response to recover, rebuild or reinstate the built environment. They suggested a lifelong learning to cater the needs of disaster management.

Boon.et al., (2011) explained a critical review of school disaster planning for children with disabilities. The aim of the review was to identify and evaluate the evidence base for school emergency plans and policies. To address environmental disasters such as flash floods, cyclones and hurricanes, tornadoes and heat waves, schools should be having discussions with the local emergency planning committees. Together the school can identify and catalog potential climate change induced disasters and resources to mitigate them. The local emergency-planning groups can work with schools to address local environmental vulnerabilities and provide resources for examining the school risk potential. Schools can then translate this information into school protocol and emergency/crisis plans.

Park (2011) conducted a cross analysis Man-made disasters. Research investigates the impact of national culture and several institutional factors on the safety performance of society and establishes statistically significant relationships between those variables. As expected, the research results reveal that some cultural variables such as uncertainty avoidance, gender orientation and institutional variables such as the degree of law avoidance can directly influence the safety performance of the society. The findings also support the inverted *u*-curve (Safety Kuznet curve) hypothesis indicating even if we expect a negative trend at the beginning stage of industrialization, we can expect a positive trend in safety performance as their income level continues to improve beyond a certain point.

Issac and Mini (2011) study the extent of awareness and management skills internalised by secondary school students about manmade disasters. The sample of the study constituted 300 eighth standard students of Kerala state. A test battery developed by the investigators used as a tool for testing the awareness and management skills about manmade disasters. The study revealed that significant, positive and substantial correlation exists between manmade disaster awareness and management skill among secondary school students.

Suryani, Tatik and Djuwari (2011) conducted a case study of the students' attitude towards disaster in their environment. The findings of the study show that a superstitious power produces all the disasters so they cannot be avoided. What the society does is, by the disasters, accepting the condition and doing nothings except when the disasters are over. In other words, there is nothing to do with efforts of responding to the disasters while happening in their environment. On the contrary,

the students who think rationally of the disasters behave rationally toward the disasters. Other positive aspect is that the students who don't believe in a mystic think that it is important to be proactive to such disasters. Thus, in general, the students being surveyed in this research have less awareness of their environment in relation to disasters. Changing their behaviour and moulding their attitude toward the disasters will make them aware that their responsibility, as the members of the society includes not only digesting their discipline of science but also for social understanding by means of participating in the efforts of coping with the disasters in Indonesia. Higher education or universities are expected to have done efforts for managing these disasters by providing assistance in the form of better solution and ways out of overcoming such calamities. Therefore, fostering students by means of making them aware of their environment will make them have better attitude toward the disasters.

Edwin and Mini Kumari (2012) conducted a study aimed to finding out the mental health status of Tsunami – affected students. The objectives were to compare the mental health status of male and female tsunami affected students, students belonging to different age groups, different economic levels and different religions. Students who lost their houses and family members and those who haven't lost their houses and family members. The method adopted was normative survey method. The sample consisted of 300 Tsunami affected students of age group 12-17. They used standardised 'Mental Health Status Inventory' to collect data. The study revealed that the Tsunami – affected students had moderate Mental Health Status. Sex and loss also influenced mental health status of Tsunami affected students. Religion, caste and the monthly family income had no influence on the Mental Health Status of Tsunami affected students.

Izadkhah, Hosseiniand Heshmati (2012) explained about various training techniques especially in-service training to teachers in disaster risk reduction. Training a core group of teachers with special techniques and teaching guidelines is vital in providing sustainable earthquake education. This requires immediate attention by the MOE and other involved organizations. It is believed that 'Teacher Orientation Workshops' should be conducted to secure the active participation of those involved in the definition and development of the content and approach of the textbooks and the special disaster lessons. After development of the teaching materials and guidelines, they should be incorporated in small scale pilot implementation studies run by teachers in order to determine whether the approach assists in easier and more effective transmission of information from teachers to other teachers. Evidence has shown the manner in which teachers interact with other teachers to raise their awareness of disaster issues. Consequently, the first requirement should be to provide 'Awareness training' courses for the teachers. Teachers should be inducted into training programs conducted or organized by the appropriate authoritative institutions. These institutions can provide information about past disasters and the natural hazards within the country. Authoritative institutions should cooperate and coordinate in the provision of a special program to provide educational training and resources in respect of emergencies and disaster issues. It is believed that a communication system needs to be gradually implemented between teachers through schools and this process of communication and sharing of information should be more developed and structured. There can also be "Summer Courses" for teachers while they are in their school holidays during the summer time. More groups of teachers can get the opportunity to meet and exchange

knowledge and experience. This can be arranged by the MOE. These courses can be held in multi-purpose complexes with suitable facilities which provide an appropriate space for drill performance. One of the benefits of holding summer school training for teachers is the possible presence of the related experts in the field. The capability of selected trainees for transferring the material to other teachers can be assessed through observation by the expert groups in order to evaluate the effectiveness of training courses. To conclude, it is hoped that the proposed training scheme can be implemented in near future for all teachers in disaster-prone developed countries.

Jordan, E. (2012) studied cross case comparison of causal conditions of disasters to post-disaster recovery. These cross case comparison results in successful post disaster recovery. The research identified recovery indicators and important casual conditions for community recovery across multiple disciplinary perspectives, measured casual conditions and recovery indicators for villages in India affected by the 2004 Indian Ocean Tsunami and used qualitative comparative analysis to determine what combinations of conditions led to recovery in the case study communities. The results will helps community planners to focus their efforts on the conditions that best strengthen the community's ability to recover from a disaster and also contributes to the development of a disaster recovery framework.

Joshith and Jayaprakash (2012) in their paper explains the need of developing an educational system with a curriculum of disaster management and practical ways to reduce vulnerability to natural hazards. The paper describes role of education in disaster mitigation. The priority areas of, Asia Pacific Regional

workshop on school Education and Disaster Risk Reduction in the year 2007 and recommendations.Role of teachers in Disaster Management. New Educational programme initiatives in India and the need of Disaster Management Education in Teacher Education Curriculum.

Thummarukudy (2012) conducted a study on Disaster Waste Management. All disasters produce wastes of some kind, be it the trees fallen by a cyclone, a house destroyed by an earthquake, a beach coated by an oil spill, or animals killed by a flood. Post disaster responses also produce wastes – from the human excreta of people staying in the camp to day-to-day household wastes. The issue of management of wastes created by disasters is becoming an increasingly important issue to be addressed in post disaster response due to their scale, complexity, and cost. The cost of disaster waste management (DWM) has crossed the billion dollar mark in some of the major disasters, which is necessitating and prompting the emergence of a separate stream of expertise in DWM.

Wang (2012) developed an integrated model which combined land use planning and disaster management. The study aims to find out the frequency of hazards becoming a disaster. Besides the factors like climate variation and errors in decision making are the critical in disaster management. Hence, the purpose of this paper is to focus on exploring the relationship between land use planning, development, and disaster management. This study takes hazards cape as the basis of a dialogue platform for land use planning and disaster management. The first portion of this study is to discuss the needed disaster management items in the planning process through thematic analysis; the second portion is to construct the

relationship between disaster management and land use planning by the paired comparison method. This study proposes the model for integrating planning and disaster management as the foundation of interdisciplinary collaboration. The phase of site choosing and assessment is the most critical point for starting the works of disaster prevention. The major works includes all-hazard identification/hazards cape analysis and physical vulnerability: damage potential assessment. This model is helpful to apply to land-use decision making for evaluating the issues concerning disasters, and avoiding the increasing loss of lives and property. As the next step, attributes of people and environments and assessment techniques from different disciplines can also be included in the model, to achieve the ultimate goal of an environment. Should disasters strike despite all relevant measures, the associated planning programs monitored and reviewed to enable necessary adjustments?

Baroudi and Rapp (2013) conducted an exploratory study aims to identify stakeholder issues on disaster restoration projects. The project promotes mitigation of disaster and repair of buildings and structures affected by disaster. Likert rating scale survey and an online questionnaire survey was used as the method of data collection. The result shows that there is a significant issue and challenges in disaster restoration projects from conventional construction and the work of first responders to disaster situations. So keep the unique identity of disaster restoration projects. The focus of this research is on repairing and restoration of disaster affected structures and buildings. Hence the findings were useful to the global disaster restoration projects and related fields.

Irshad (2013) Disaster risk reduction is an institutional intervention

programme and there are both global and local strategies and approaches available. Regulating natural resource is one among them. This paper attempts to analyse the globally and nationally existing water governance approaches and their relative failure to impede the large scale river pollution in India's mining areas. The diversion of river for mining have resulted in multiple hazards in the mineral deposits areas of India. These approaches are advocating for 'sustainable development' and offer an institutional mechanism to integrate disaster risk reduction with environmental security. The regulatory measures are also being regulated by the economic interests of mining.

Kalyani, Sharma and Murthy (2014) developed an e-learning self-study programme in disaster management in association with CDAC Noida in collaboration with NIDM. This paper describes the different aspects of development and delivery of e-learning self- study programme. The issues and challenges also described. This e- learning courses is the first and foremost self-study programme in the area. The learning provides useful first-hand information of disaster and their management. The e- content prepared was self-explanatory. Videos and related aspects are included in the e- contents. The contents may be accessible for different types of users including students, teachers, Government organizations, public sector, private corporate sector, working professionals and common people. This self-study programme we can access freely from anywhere in the world as per users convenience.

Santha, Gahana and Aswin (2014) examine the proverbs as an integrated component of traditional knowledge system. The proverbs have an important role in

enhancing local knowledge systems that enables fish workers to deal with coastal hazards. Proverbs helps fishing communities in monitoring and forecasting of coastal hazards. Analysing the primary functions of such proverbs, this paper shows that proverbs could be a valuable tool in predicting the onset of a natural event as well as in measuring the intensity and duration of such hazard events. Adapting a design of thin ethnography, this particular study was conducted among four hundred fish-workers a significant characteristic of most of the proverbs illustrated in the present paper has been that these proverbs have an important role in enhancing local knowledge systems and thereby enabling fish workers' capacities to deal with coastal hazards. Nevertheless, one needs to be cautious towards the dynamics and fragility of such knowledge systems as well. For instance, each of these proverbs mentioned in this paper has a primary indicator, which is the source indicator such as sun, rainbow or month and a reference indicator to which the primary one is attached with. Thus, proverbs are a connection between two to three natural indicators and the inferential relationship laid out of them.

Vijaya, R. (2014) Disaster Management is the term which is recently popular in India. The National Disaster Management Authority (NDMA) has been constituted under the Disaster Management Act 2005, with the Prime Minister of India as its Chairman. The Government urges the importance of disaster management strongly and advised all the Academic Staff Colleges to conduct a Refresher Course on disaster management. In this context, it is essential to analyze the awareness about natural disasters and the management of disasters among the teachers of higher education. A questionnaire was administered among the University and College teachers and their answers were analyzed and computed.

This study shows that the awareness about disaster management should be improved among the teachers of higher education. It also reveals that both the male and female teachers should be given in-service training in general awareness, activities and administration related to disaster management. This study shows that Disaster Management Awareness is the most wanted and essential knowledge which should be improved among the teachers of higher education. Curricular and extracurricular activities of Disaster Management which are to be included in the school and college curricula should be given more attention. Readiness to help the affected people at the time of disasters, humanity towards affected people, planning, preparedness, precautions, rescue methods – both the male and female teachers should be given in-service training in all these categories. Concepts of Disasters and Disaster Management aspects should be included in the Curricula of Post Graduate and Master of Philosophy degrees.

Pantino (2015) proposed a policy that aims to disaster risk reduction and management (DRRM) formally in the Philippines by integrating a DRRM unit to the science subjects in the elementary and secondary level of education and a creation of a required disaster risk reduction and management. But there are certain issues based on the proper implementation of this. This policy may face all those issues and gaps by integrating DRRM in to the curricula of schools in the country to create a better disaster preparedness culture in the country. This policy helps to reduce the loss of GDP due to natural disasters.

Vijayakumari and Sabitha (2015) conducted a study of awareness on disaster management among secondary school students in Kerala based on gender, locale and experience with disaster. A survey was conducted among 500 secondary school

students. The data were collected from five revenue district of Kerala. The study found that the secondary school students awareness on disaster management is not satisfactory. Coastal area students showed a significant difference from urban and rural students in their awareness on disaster management. Urban and rural students do not differ significantly in their mean score of awareness on disaster management but there is a significant difference found in the mean score of awareness on disaster management between secondary school students who have experienced disaster and those who have without an experience. The study revealed that there is an urgent need to provide awareness on disaster management for secondary school students.

Yun and Hamada (2015) conducted a case study of evacuation behaviour and fatality rate during the 2011 Tohoku- Oki earthquake and tsunami. Data collected from 1,153 witnesses of 2011 Tohoku- Oki earthquake and tsunami for study evacuation behaviour. To study fatality rate 101 localities were studied. The results provide lessons that communities threatened by tsunami need to develop integrated disaster preparedness, taking into account evacuation behaviour, refuge sitting, the topography, and community age distribution This study investigated the difference in behaviour between the survivors and the dead or missing by using witness data in the inundated areas, and analysed factors influencing fatality rate in order to develop a formula for estimated fatality rate.

Joseph, Babu, Dev and Pradeepkumar (2016) studied stampede in the mass gathering in Sabarimala. Sabarimala is one of the most crowded sacred places in India and the most crowded in the state of Kerala, in southern India. This pilgrim destination attracts over 30 million pilgrims in a short period of 41 days (during

which the temple is open to the devotees). Such mass gatherings pose special challenges for the community's existing health system. The present study aims to identify the potential health risk and the main difficulties faced by health care professionals in this world famous mass gathering destination. A total number of 46 doctors were interviewed with a structured questionnaire. The data thus obtained was analysed with a modified health risk ranking method developed for this study based on literature survey and Microsoft Excel spread sheet. Risk prioritization index (RPI), likelihood level index (LLI) and corresponding consequences level index (CLI) were determined for the risk ranking. Human stampedes and person-to-person communicable disease have the highest rank in the risk identification. Lack of coordination, difficulty in access to medical facilities and shortage of paramedical staff are the main issues faced by doctors. The tools developed in this study can be effectively used in any mass gathering destination for identifying key health risks.

Bhat, Sidrat, Nusrat and Zargar (2017) studied the disaster awareness and preparedness among college students. The data collected by using questionnaires, analysed and made interpretation by using statistics. The study finds out the lack of awareness about disaster and its preparedness among college students. Hence there is a need of disaster safety education. The study suggested the inclusion of disaster management in the curriculum, development of training manuals and booklets, posters, magazines. Documentaries and videos are to be showed and should conduct mock drills and evacuation drills.

Kim and Hastak (2018) explained social media, such as Twitter and Facebook, plays a critical role in disaster management by propagating emergency

information to a disaster-affected community. It ranks as the fourth most popular source for accessing emergency information. Many studies have explored social media data to understand the networks and extract critical information to develop a pre- and post-disaster mitigation plan. The 2016 flood in Louisiana damaged more than 60,000 homes and was the worst U.S. disaster after Hurricane Sandy in 2012. Parishes in Louisiana actively used their social media to share information with the disaster-affected community – e.g., flood inundation map, locations of emergency shelters, medical services, and debris removal operation. This study applies social network analysis to convert emergency social network data into knowledge. We explore patterns created by the aggregated interactions of online users on Facebook during disaster responses. It provides insights to understand the critical role of social media use for emergency information propagation. The study results show social networks consist of three entities: individuals, emergency agencies, and organizations. The core of a social network consists of numerous individuals. They are actively engaged to share information, communicate with the city of Baton Rouge, and update information. Emergency agencies and organizations are on the periphery of the social network, connecting a community with other communities. The results of this study will help emergency agencies develop their social media operation strategies for a disaster mitigation plan.

Parida, Dash, Bhardwaj and Chowdhury (2018) studied the effects of drought and flood on farmer suicides using state-level panel data from 17 Indian states for the period 1995–2011. The empirical estimates based on unconditional fixed effect Negative Binomial model show that while drought significantly

increases farmer suicides, flood has no direct impact on the same. The results also show that incidence of farmer suicides is higher in cotton producing states of India because these states experience frequent drought conditions. Furthermore, our findings reveal that states with high levels of rural poverty experience a higher number of farmer suicides as a result of frequent occurrence of droughts and moderate floods. To obtain robust results, fixed effect Poisson model has been used in the study. Overall, the findings are consistent with unconditional fixed effect Negative Binomial model. Hence, in light of the results obtained by this study, it is important for the government to devise suitable policies such as loan waiver for poor farmers, compulsory crop insurance scheme, improving farm income through revamping of agricultural marketing policies, creating public awareness among farmers and providing micro-irrigation facilities as well as introducing alternative cropping pattern in the drought prone areas in order to reduce the occurrence of farmer suicides.

Conclusion

The investigator has analysed 70 studies in the area disasters and its management. Out of 70 studies reviewed 63 studies were international. Only eight studies reviewed from Kerala. A general trend of studies reviewed is as follows,

- Education in disaster management is helpful to change the students as disaster managers.
- Disaster management is a shared responsibility, awareness in this regard will be helpful to mobilise the public effectively.

- The knowledge in disaster management will reduce the gap between thought and action.
- Information about the already happened disaster will be useful to reduce the risk of disasters.
- Disaster management programme is helpful to plan for hazards as well as to implement measures before, during and after a hazard.
- To reduce the risk of disasters build more conscious and responsible attitude of the citizens
- Make aware the students and also the community to apply indigenous methods and local coping mechanisms to reduce the impact of disasters.

An analysis of studies shows that only few studies are there in disaster management and studies focusing on the role of education in disaster management are very few. This gap is to be filled with plenty of researches as disasters are more common everywhere. Besides, the suggestions of reviewed studies motivated the investigator to conduct such a study.

METHODOLOGY

- *Variables*
- *Design of the study*
- *Sample selected for the study*
- *Tools used in the study*
- *Procedure*
- *Data collection procedure*
- *Scoring and Consolidation of the Data*
- *Statistical techniques used for the Study*

METHODOLOGY

Research methodology is a systematic way to solve the research problem. Methodology provides a clear outline of the procedure used for the study. The present study was intended to develop and test the effectiveness on a Disaster Management Education Programme for secondary school students.

The methodology of the present study has been described under the following heads.

- ***Variables***
- ***Design of the study***
- ***Sample selected***
- ***Tools used in the study***
- ***Procedure***
- ***Data collection procedure***
- ***Scoring and consolidation of the data***
- ***Statistical techniques used for the study***

Each of the above has been described below in detail.

Variables

"Variables are the conditions or characteristics that the experimenter manipulates, controls or observes" (Best 1995). Variables are the measurable characteristics that can be vary.

Independent variable

The independent variables are the conditions or characteristics that the experimenter manipulates or control in his/her attempt to ascertain their relationships to observed phenomena. It is under the direct control of the experimenter. The independent variable selected for this study was 'Disaster management Education Programme'.

"Disaster is a crisis situation that far exceeds our capabilities to cope" – Quarentelly (1985). Disaster management Education deals with the disasters and its management. The United Nations defines a disaster as a serious disruption of the functioning of a community or a society. Disasters involve widespread human, material, economic or environmental impacts, which exceed the ability of the affected community or society to cope using its own resources. In the study Disaster Management Education Programme is developed by the investigator by including basic concepts of disaster management and different types of natural and manmade disasters that has happened in Kerala.

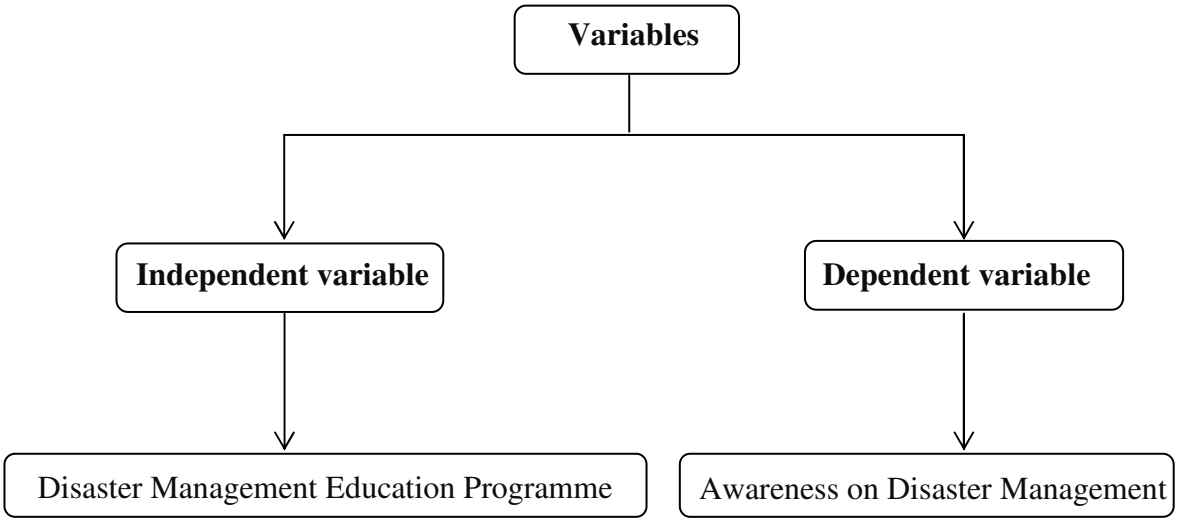
Dependent variable

The dependent variables are the conditions or characteristics that appear, disappear or change as the experimenter introduces removes or change the independent variable. The dependent variable of the study is 'Awareness on Disaster Management of Secondary School Students'. Disaster management with its five components namely Basic knowledge about Disasters and its management, Awareness on Natural disasters, Awareness on Manmade disasters, Awareness on

management of Natural disasters, Awareness on management of Manmade disasters was selected as the dependent variable of the study.

Variables of the study is shown in the figure 3.1

Variables of the study



Design of the Study

Research design is an outline of the investigation conducted by the researcher. The purpose of the study was to find out the effectiveness of a Disaster Management Education Programme in enhancing the Awareness on Disaster Management among secondary school students of Kerala. For this study both qualitative and quantitative methods were adopted.

The present study was conducted in three phases.The first phase is focused on the need of a Disaster Management Education program. It included content analysis of secondary school text books to find out the concept of disaster

management and awareness of secondary school students on disaster management. Survey method was used to find out the awareness of secondary school students.

The second phase of the study was a Developmental phase. Based on the first phase, a Disaster Management Education Programme was developed to enhance the awareness of students on disaster management.

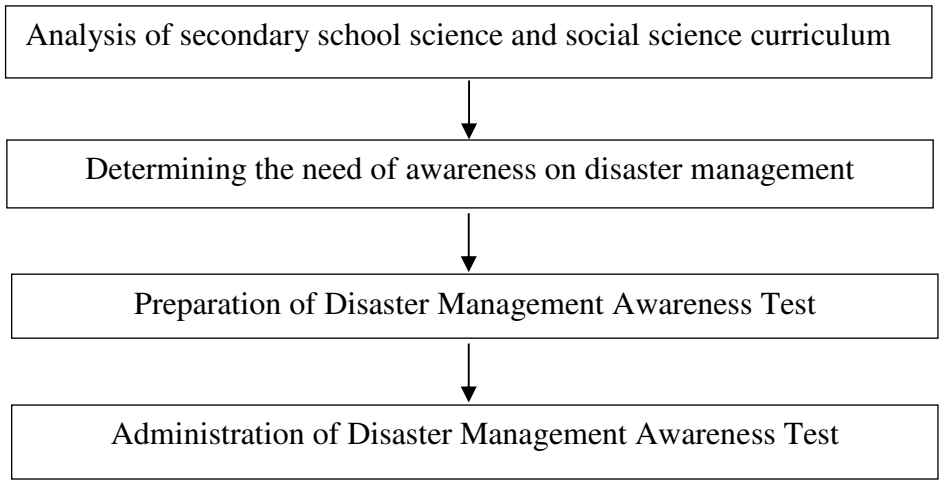
The third phase was an experimentation phase. For experimentation single group pre-test- experiment-post-test- retention test design was adopted. This design is the same as the classic controlled experimental design except that the subjects cannot be randomly assigned to either the experimental or the control group, or the researcher cannot control which group will get the treatment. In other words, participants do not all have the same chance of being in the control or the experimental groups, or of receiving or not receiving the treatment.

For obtaining summary view of methodology at a glance, an outline of the total procedure is given as Figure. 3.2

Summary view of methodology at a glance

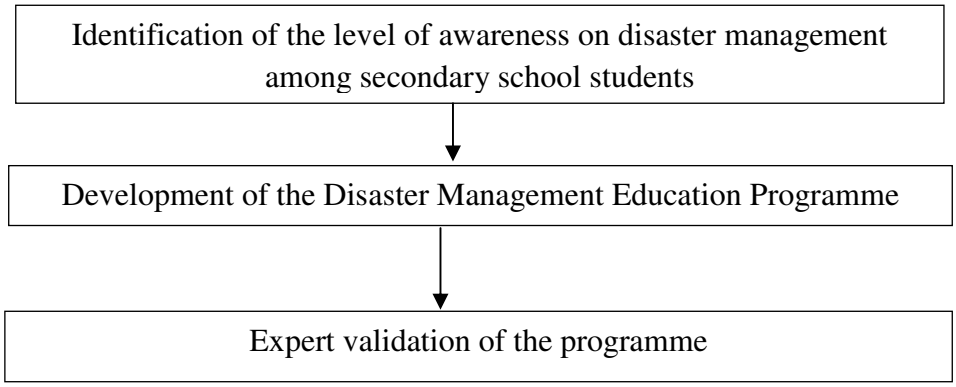
Phase I

Need analysis phase



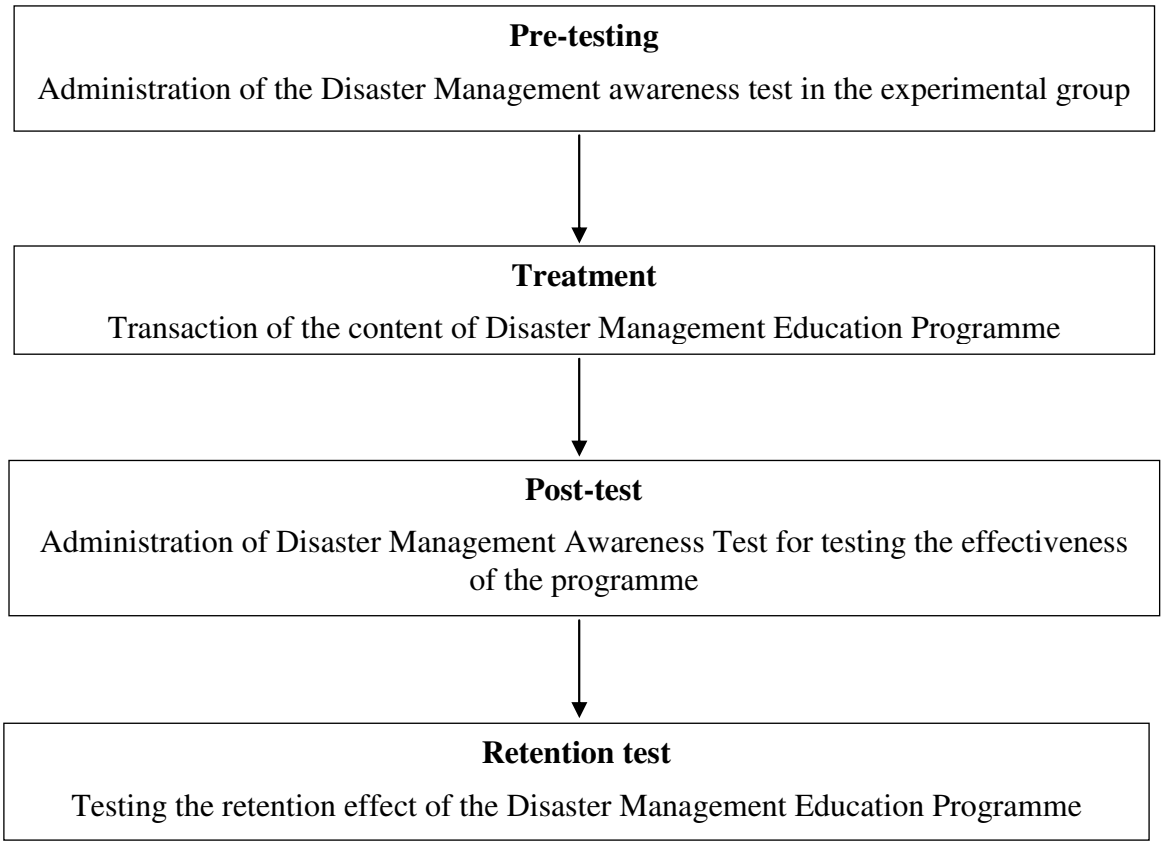
Phase 11

Developmental phase



Phase III

Experimentation phase



Sample Selected for the Study

The study was based on both survey and experimental methods. The survey was conducted among 532 secondary school students from different schools of 14 districts of Kerala. Random sampling method was used for the selection of schools in the survey method. The different factors selected while deciding the sample were gender, locale and district of school.

1. Sample of students selected for conducting survey based on Gender

The sample selected for the study comprised of boys and girls of secondary schools from 14 districts of Kerala. It is shown in Table 3.1

Table.3.1

Details of the sample selected for the study based on Gender

Basis of classification	Sub groups	Number of students	Total
Gender	Boys	280	532
	Girls	252	

2. Sample of students selected for conducting survey based on Locality

The schools selected for the study includes secondary schools from urban, rural and coastal areas of 14 districts of Kerala. It is given in Table 3.2

Table 3.2

Details of schools selected for survey based on Locale of school.

Sl.No.	Schools selected for the study	Locale	Number of students
1	GHS Vazhamuttom	Coastal	29
2	GVHSS Cheriyazheekkal	Coastal	33
3	GGHSS Adoor	Urban	20
4	GBHSS Adoor	Urban	28
5	VHSS Chathiyara	Rural	72
6	GHSS Thrikodithanam	Rural	35
7	GVHSS Kumily	Rural	27
8	SNMHSS Moothakunnam	Rural	27
9	GVHSS Desamangalam	Rural	38
10	GVHSS Vattenad	Rural	40
11	GHSS Kuttippuram	Rural	24
12	GBHSS Tirur	Rural	35
13	GHSS Beypore	Coastal	25
14	GHSS Vythiri	Rural	28
15	GBHSS Thalassery	Urban	38
16	GVHSS Thrikkarippur	Rural	33
	Total		**532**

3. **Sample of students from all the 14 districts of the Kerala**

Table 3.3

Details of sample selected for the study based on Districts of the school

Sl.No.	Schools selected for the study	Number of students
1	GHS.Vazhamuttom, Thiruvananthapuram	29
2	GVHSS Cheriyazheekkal, Kollam	33
3	GGHSS Adoor, Pathanamthitta	20
4	GBHSS Adoor, Pathanamthitta	28
5	VHSS Chathiyara, Alappuzha	72
6	GHSS Thrikodithanam, Kottayam	35
7	GVHSS Kumily, Idukki	27
8	SNMHSS Moothakunnam, Eranakulan	27
9	GVHSS Desamangalam,Thrissur	38
10	GVHSS Vattenad, Palakkad	40
11	GHSS Kuttippuram, Malappuram	24
12	GBHSS Tirur, Malappuram	35
13	GHSS Beypore, Kozhikkode	25
14	GHSS Vythiri, Wayanad	28
15	GBHSS Thalassery, Kannur	38
16	GVHSS Thrikkarippur, Kasargode	33
	Total	**532**

In the experimentation phase, the experiment was conducted on VIIIth standard students from two schools of Kozhikode district. The schools were GVHSS Meenchanda and UHHSS Chaliyam. A total sample of 68 students from these schools was participated in the experiment. The characteristics of the schools selected for experimentation was an urban and a coastal. The other factor considered was gender. Since the main objective of the study was to find out the effectiveness

of the developed Disaster Management Education programme, the experiment was conducted among the sample of students in this phase.

The details regarding the break-up of the sample selected for the experiment is given below.

Sample selected for the experiment based on gender is given in table 3.4

Table 3.4

Break-up of the sample selected for the experiment based on Gender

Basis of classification	Sub groups	Number of students	Total
Gender	Boys	36	68
	Girls	32	

Sample selected for the experiment based on locale is given in Table 3.5

Table 3.5

Break-up of the sample selected for the experiment based on Locale

Basis of Classification	School	Number of students	Total
Locale	GVHSS Meenchanda (Urban)	33	68
	UHHS Chaliyam (Coastal)	35	

Tools Used in the Study

Collection of relevant data is an important aspect of any research work. Selection of valid and reliable tool for data collection necessitates utmost care from

the part of the researcher. Tools are the instruments used for the collection of data. The following tools were used in the present study.

A. Disaster Management Awareness Test

B. Disaster Management Education Programme

C. Lesson transcripts for transacting Disaster Management Education Programme

Description of the Tools

All the tools were prepared by the investigator with the help of supervising teacher.

A. Disaster Management Awareness Test

The disaster Management awareness test was developed to assess the Awareness on disaster management among secondary school students. The test measures student's awareness on disasters management in total and its components. The procedure followed in the construction of Disaster Management Awareness Test is given below.

a. Planning and preparation of the test

While planning the test the investigator went through the available literature related to disaster management and a number books in the area. The prominent books referred were Disaster Management by Pandey (2014), Disaster Science and Management by Bhattacharya (2015), Disaster Management by Arulsamy and

Jeyadevi (2016). The investigator consulted Resource Persons at Secondary Level, members of disaster management authority and internet sources. The investigator went through State and CBSE text books of secondary level besides the expert consultation before preparing the Disaster Management awareness test.

The Disaster Management is comparatively new to students and relevant at present. The components to be included in the test are one of the major tasks to the investigator. But the literature shows that there are different types of disasters like natural and manmade and the knowledge in management of these disasters is very essential in the present context. Thus the investigator selected the following components in the awareness test.

1. Awareness on Basic knowledge of Disasters management
2. Awareness on Natural disasters
3. Awareness on Manmade disasters
4. Awareness on management of Natural disasters
5. Awareness on management of Manmade disasters

Based on the components viz., awareness on Basic knowledge of Disaster management, Awareness on Natural disasters, Awareness on Manmade disaster, Awareness on management of Natural Disasters and Awareness on management of Manmade Disasters, the investigator wrote a number of items. First, number of items was written in each component with the options. Then the suitable ones for the target group were selected for the final tool with the help of supervising teacher. The tool is given to experts to check the appropriateness of items in the area and its

suitability to measure the awareness of target group. The prepared items are in the format of multiple choice type.

b. Finalization of the test

The present test being an awareness test, maximum numbers of items were included in the test to find out the awareness of students on disasters and its management. The investigator selected 10 items under Awareness on Basic knowledge of Disaster management, 23 items under Awareness on Natural disasters, 43 items under Awareness on Manmade disaster, 17 items under Awareness on management of Natural Disasters and 15 items under Awareness on management of Manmade Disasters.

The investigator gave priority to manmade disasters more because the disasters are mainly human negligence. Thus final form of the test consisted of 108 multiple choice test items in five components. The details of the components with example are given below.

1. Awareness on Basic Knowledge of Disasters Management

Disaster management is the continuous process by which all individuals, groups, and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards. Under this component the items related to awareness on basic knowledge of disaster management are included. The items included in this section were intended to check the awareness of respondents about basic knowledge of disaster management. The numbers of items included in this component is 10.

Example:

Who is the chairman of the National Disaster Management Authority?

a. Prime minister
b. President
c. Speaker
d. Deputy Prime minister

2. Awareness on Natural Disasters

The natural environment, which comprises the flora and fauna of the region, is affected at times of natural disasters such as drought, flood, earthquake, volcanic eruption and storms. Disasters are primarily natural events. These are naturally occurring physical phenomena caused by either rapid or slow onset of events which can cause great harm to lives and property. Under this component the items related to awareness on Natural Disasters are included. The natural disasters included in this component are earthquake, flood, drought, tsunami, landslide, lightning, cyclones, avalanche, hail storm, volcanic eruption, cloud burst, heat wave and cold wave. The items included in this section were intended to check the awareness of respondents about Natural Disasters. The number of items included in this component is 23.

Example:

When is lightning dangerous?

a. When it is likely to rain
b. It happen when the inter mission of lightning in one tenth of seconds within moments

c. When the cumulus- nimbus clouds are formed in the sky

d. When heat up the clouds

3. Awareness on Manmade Disasters

Manmade disaster admits that all disasters are caused by humans. Manmade disaster involves an element of human intent, negligence, or error; or involving a failure of a manmade system. The manmade disasters included in this component are Pollution, deforestation, accidents, epidemics, terrorism, food poisoning, fire, stampede, nuclear disasters, oil spill, chemical disasters and drowning. The items included in this section were intended to check the awareness of respondents about Manmade Disasters. The number of items included in this component is 43.

Example:

Select the main reason for chemical disasters from the following

a. Excessive use of plastics

b. Excessive use of chemicals

c. Water pollution

d. Rotten vegetables

4. Awareness on Management of Natural Disasters

Management of disaster is an important task to reduce and control hazardous event before it become a dangerous disaster. Management of Natural Disasters includes different steps to address natural disasters. Proper Disaster Management involves phases of disaster Management like mitigation, preparedness, response and recovery. **Mitigation**: Measures that prevent or reduce the impact of disasters.

Preparedness: Planning, training, & educational activities for things that can't be mitigated **Response**: The immediate aftermath of a disaster. **Recovery**: The long-term aftermath of a disaster, when restoration efforts are in addition to regular services. Disaster Management involves activities aimed at minimising the destructive effect of disasters. It entails taking precautionary measures to reduce the effect of impending disasters by assessing, developing and implementing plans for reducing threats and vulnerabilities. The items included in this section were intended to check the awareness of respondents about Management of Natural Disasters. The number of items included in this component is 17.

Example:

Which one of the following we cannot do during an earth quake?

a. Stooping at the base of a strong table or desk
b. Stay away from the window side
c. Get being calm without panic
d. If you are within a building use the lift to come out

5. Awareness on Management of Manmade Disasters

Management of manmade disaster involves the phases of disaster management cycle such as mitigation, preparedness, response and recovery. Through the disaster management we can control manmade disaster to a certain extent. The items included in this section were intended to check the awareness of respondents about Management of Manmade Disasters. The number of items included in this component is 15.

Example:

How can we escape from huge buildings when a fire or other accidents occur?

a. Use stair case

b. Use lift

c. Sit down the bottom of the stair case

d. Sit down the bottom of the furniture

Details regarding the items under each components of disaster management awareness test are given below in the table 3.6

Table 3.6

Items under each component of Disaster Management Awareness Test

Components	Item number	Total
Basic knowledge of Disaster Management	1, 2, 6, 12, 22, 23, 28, 30, 37, 39. (Part- A)	10
Awareness on Natural Disasters	3, 5, 9, 10, 11, 13, 14, 17, 18, 19, 20, 21, 29, 31, 34, 40, 42, 44, 46, 47, 48, 49, 50. (Part- A)	23
Awareness on Manmade Disasters	1, 3, 5, 6, 7, 9, 10, 11, 13, 18,19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 54, 55, 56, 58.(Part- B)	43
Awareness on Management of Natural Disaster	4, 7, 8, 15, 16, 24, 25, 26, 27, 32, 33, 35, 36, 38, 41, 43, 45. (Part- A)	17
Awareness on Management of Manmade Disaster	2, 4, 8, 12, 14, 15, 16, 17, 29, 36, 39, 41, 49, 53, 57. (Part-B)	15
	Total	108

c. Mode of Answering

The tool was prepared with necessary instructions to students. The tool was in Malayalam language. The entire question have four options of a, b, c and d. For the easy administration of tool it is changed in to Part A and Part B. The time limit for each part is 45 minutes. Thus two period of 45 minutes duration was taken to complete the Part A and Part B of the test. Necessary response sheets containing four options to answer the items were prepared.

A sample copy of the test, its English version, Response Sheets and Scoring Key are provided as appendix V, VI, VII, VIII, IX and X respectively.

d. Scoring Procedure

Since the test is a multiple choice one, one mark is given for right answer and zero for incorrect answer. Thus the maximum score in the test was 108. A copy of the Scoring Key is given as appendix IX and X.

e. Reliability and Validity of the Tool

Reliability is the extent to which test results are consistent, stable, and free of error variance. According to Best and Khan (2006) 'reliability is the degree of consistency that the instrument or procedure demonstrates, whatever it is measuring, it does so consistently'. The reliability of the present test was found out by test retest method. The test was administered to a group of 33 secondary school students and again repeated in the same group by giving an interval of one month. The scores obtained for the first test was correlated with the scores of the retest. The reliability coefficient was found to be .866, which indicates the test is reliable for measuring

secondary school students' awareness on Disaster management. The reliability of the test is also measured using Cronbach's Alpha which was found to be .845. This shows the test is highly reliable

Validity is that quality of a data gathering instrument or procedure that enables it to measure what it supposed to measure (Best and Khan 2006). The Validity of the present test was ensured by using face validity and content validity.

"A test is said to have face validity when it appears to measure whatever the author had in mind namely what he thought he was measuring" (Garrett, 1993). For ensuring face validity the investigator consulted experts during the development of the test. After the test construction the test was given to the experts for the approval of items and they approved the test is an appropriate tool for measuring secondary school student's Awareness on Disaster Management. This ensured face validity.

'Content validity refers to the degree to which the test actually measures or is specifically related to the trait for which was it designed.' 'Content validity is based upon careful examination of course, text book, syllabi, objectives and the judgment of subject matter specialist'(Best & Khan, 2006). For ensuring content validity, while preparing the items due weightage was given to select each component of Disaster Management. Thus content validity of the tool was ensured.

B. Disaster Management Education Programme

Disaster Management Education Programme was developed by the investigator with the help of supervising teacher for enhancing the awareness on

Disaster Management among Secondary School Students of Kerala. The development of the programme is as follows.

Development of the Programme

The programme is developed by following particular steps. The steps are:

a. Planning of the programme
b. Design of the programme
c. Validation

Planning of the Programme

Based on the need of a Disaster Management Education Programme for secondary school students the investigator went through the related references of disaster management. The investigator approached State Disaster Management Authority and District Disaster Management Authority to get a support from them to prepare a Disaster Management Education Programme for secondary school students. From SDMA the investigator collected brochures of different disasters they prepared for public awareness, projects done on Disaster Management, booklet on the maps showing Disaster prone areas of various parts of Kerala. The experts of SDMA shared their views on different disasters and the measures to reduce the impact of disasters that had happened in Kerala about the past years. From the discussion with the SDMA the investigator arrived at a conclusion about the disasters happened and the way to reduce its risks. Instructional materials and brochures were also collected by the investigator from the Fire and Rescue Office and Public Health Centre.

The investigator also approached Resource Persons of SCERT at secondary level. Discussions with these resource persons helped the investigator to come to a conclusion to include the various types of disasters and its management for the target group in the programme. Thus the investigator prepared a design for the Disaster Management Education Programme.

Thus the programme includes basic concepts of disaster management, various types of disasters and their management.

Design of the Programme

The programme begins with a general introduction which gives an over view of the content. Introduction is followed by the programme objectives. The structure or content part of the programme comes next. The content is designed with three units. The first unit of the programme gives importance to basic Knowledge of disaster management. This includes the characteristics of disaster, classification of Disasters, Disaster Management phases, Disaster Management Cycle, Disaster Management Act, Disaster Management systems at Government level.

The second unit of the programme provides detailed description of natural disasters and its management. For the management of disaster, knowledge of the disaster is essential. Disaster management includes a cyclic process. The cyclic process includes three phases these are pre-disaster, during disaster and post-disaster phases. **'Pre-disaster phase'** includes mitigation and preparedness stages of disaster management cycle. In this phase an individual have to do minimize after effects of the disaster. **'During disaster phase'** is the response stage of disaster management

cycle. That means when a disaster happens, what should be the action of an individual to manage the disaster comes. **'Post-disaster phase'** is the recovery stage of disaster management cycle. This is the phase for rehabilitation and the necessary help given to the victims. This unit is for providing knowledge on natural disasters and the management of these disasters. The natural disasters considered are earthquake, flood, drought, tsunami, landslide, lightning, cyclones, avalanche, hail storm, volcanic eruption, cloud burst, heat wave and cold wave.

The third unit of the programme provides importance to the manmade disasters and its management. The manmade disaster means the disasters because of the human negligence or error. The manmade disasters included were pollution, deforestation, accidents, epidemics, terrorism/war, and food poisoning, setting of fires, stampede, nuclear disasters, oilspill, and chemical disaster / industrial disasters and drowning. Management of these manmade disasters includes the same steps of disaster management cycle explained under natural disasters. There may have some differences in the management of disasters with respect to the type of disaster.

Each disaster in the programme is presented by giving an introduction first, then definition, reasons, consequences and its management. Introduction is given in the form of presenting a local incident of the disaster.

Conclusion of the programme highlights the social commitment of an individual. This includes the resilience of the affected.

An outline of the Disaster Management Education Programme is given below.

DISASTER MANAGEMENT EDUCATION PROGRAMME

INTRODUCTION
OBJECTIVES
STRUCTURE

UNITS	CONTENTS	
Unit I	1.1	Disaster – Characteristics
Basic Knowledge of disaster management	1.2	Disaster – Classification
	1.3	Disaster Management – Phases
	1.4	Disaster Management Cycle
	1.5	Disaster Management Act 2005
	1.6	Disaster Management systems at Government level
Unit II	2.1	Earth quake
Natural Disasters – Disaster Management	2.1	Flood
	2.3	Drought
	2.4	Tsunami
	2.5	Landslides
	2.6	Lightning
	2.7	Cyclone
	2.8	Hail storm
	2.9	Cloud burst
	2.10	Heat wave and cold wave
	2.11	Avalanche
	2.12	Volcanic eruption
Unit III	e.	Pollution
Manmade Disaster – Disaster Management	f.	Deforestation
	g.	Accidents
	h.	Epidemics
	i.	Fire
	j.	Drowning
	k.	Stampede
	l.	Food Poisoning
	m.	Chemical / industrial Disasters
	n.	Nuclear Disasters
	o.	Oil Spill
	p.	Terrorism/ War

CONCLUSION

c. Validation of the programme

Evaluation of the programme is done by giving the programme to some experts in the field for ensuring quality of the programme. The experts were District Disaster Management Authorities, Secondary School Teachers, and Higher Education Experts and Authorities of Public Health Department. The criteria for evaluation were Selection of the content, Organization of the content, Presentation of the content, Appropriateness of the content and Language used. Modifications were done by considering the suggestions of the experts in the field.

The complete Disaster Management Education Programme in Malayalam and English and its Evaluation Proforma is given as appendix II, III and IV.

C. Lesson Transcripts for Transacting Disaster Management Education Programme

Lesson transcripts are prepared for transacting the developed Disaster Management Education Programme. The investigator prepared 32 lesson transcripts in accordance with the content of the Disaster Management Education Programme. Constructivist method was adopted to prepare the lesson transcripts. Each transcript is with objectives, main concepts, instructional materials, activities and follow-up. Multiple methods were used in the form of activities to transact the content. The methods used were, sharing of experiences, discussions, lecture, video presentation, day celebration, poster presentation. Each Lesson is started with the local incident of the disaster with sharing of experiences of students. All the methods were selected and followed in accordance with the content of the Programme. Group discussions

was encouraged and enough time given to record their responses and to reflect their views. Each class has taken 45 minutes duration.

The complete lesson transcripts used for transacting the Programme were given as appendix XI.

A sample lesson transcript is given below.

LESSON TRANSCRIPT 1

- **Topic:** Disaster Management cycle
- **Objectives:** To discuss different types of disasters

  To understand the phases of disaster management

  To understand Disaster Management Cycle
- **Main concept:** Disaster, disaster management cycle.
- **Instructional materials:** video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Disasters – types	Sharing of experiences Group discussions, video presentation	15 mts
2	Disaster management phases	Group discussion followed by presentation Lecture	15 mts
3	Disaster management cycle	Video presentation group discussion and Lecture, followed by presentation	15 mts

Activity 1

Teacher started the class by asking about some disasters happened in Kerala. Teacher asked the experience of students in such disasters. By showing the pictures of different disasters, the teacher asked to form four groups. The groups are provided with discussion points like some hints related to natural disasters and manmade disasters. Teacher encouraged the group discussion. One of the members reflects the views after discussion. Teacher summarized the discussion by showing the related aspects of natural and manmade disasters using power point presentation.

Activity 2

Teacher asked the students about the management of the said disasters for this teacher encouraged the group discussion by providing hints like activities before the disaster, during disaster and after disaster. The discussion is followed by the presentation of the students. Teacher interferes and with the help of power point presentation, disaster management phases are introduced in the class.

Activity 3

Teacher introduces disaster management cycle with the help of video. Each step of the cycle is introduced and made familiar to the students by forming three groups. From the group discussion with the help of teacher, students understood three phases and the disaster management cycle.

Responses

All the students were participated very well in group discussions. Some students gave suggestion for disaster management. Students shared their views on the disaster management activities of their area. The new terms in disaster management cycle understood by the students along with the local disaster they experienced.

Follow up activities

Collect the pictures of disasters and classify them in to natural and manmade disasters.

Procedure

The procedure adopted for the study is as follows:

1. Analysing the General Science and Social Science text books for standard VIII and Biology for standards IX and X to locate the concepts of Disaster Management.

2. Finding out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the Whole sample

3. Finding out the existing level of awareness on Disaster Management in total and its components for the sub sample based on Gender

4. Finding out the existing level of awareness on Disaster Management in total and its components for the sub sample based on Locale.

5. Finding out the existing level of awareness on Disaster Management in total and its components among students of different Districts of Kerala

6. Development of a Disaster Management Education Programme for Secondary School Students.

7. Conducting a pre-test of Awareness on Disaster Management among experimental sample.

8. Transaction of the developed Disaster Management Education Programme in the experimental sample.

9. Conducting a post-test of Awareness on Disaster Management among experimental sample.

10. Testing the difference between pre-test and post-test scores for its significance in the total sample and sub samples based on Gender and Locale.

11. Finding out the mean gain scores of awareness on disaster management between pre-test and post- test for the sub sample based on Gender and Locale.

12. Conducting a retention test of Awareness on Disaster Management for the experimental sample.

13. Testing the difference between post-test and retention test scores for its significance in the total sample and sub samples based on Gender and Locale.

14. Validation of the developed Disaster Management Education programme.

Procedures one to five were the actual need analysis phase. Procedure step six was the development phase, procedures step seven to twelve were the experimental validation phase and the last procedure was the expert validation phase.

1. Need analysis of Disaster Management Education Programme for Secondary School Students

As part of the need analysis the investigator analyzed the content to find out the concepts of Disaster Management in secondary school curriculum. For this the investigator selected General Science and Social Science of Standard VIII and Biology text books of standards IX and X.

There are 14 chapters in standard VIII Basic Science text book and 9 chapters in Social Science text book. In the procedure of content analysis chapter heading considered as the Major concept and sub headings are taken as the Minor concepts. It is revealed from the analysis that none of the headings or major concepts is about Disaster Management.

In the first chapter '**Life's Mysteries in Little Chambers'**, the minor concepts identified are Compound microscope, Observation material, Discovering the cell, Milestones in the history of cell biology, cell structure, Stages of development, Prokaryotes and eukaryotes. After searching for the topics of disaster management as chapter heading and minor headings, the investigator gone through the complete content of all the chapters.

It is found from the analysis that no minor concepts are dealing with Natural and Manmade disasters. The same procedure is followed for all the 18 chapters of General Science of standard VIII even a single concept can identify as disasters or disaster Management in Basic Science.

The analysis of the complete chapters of Basic Science is given as appendix I.

Social Science

There are 9 chapters in Social Science text book of standard VIII. All the chapters are analysed for finding out the concepts of disaster management.

The same procedure is followed for all the chapters taken for analysis from standards VIII, IX and X. From the content analysis of chapters of standard IX it was found that no concept is there about disasters and disaster management. From the analysis of the chapters of Xth standard it was found that Vth Chapter with the heading '**When balance is broken'** is dealing with a manmade disaster, Epidemics. The minor concepts identified were typhoid, cholera, diarrhoea, tuberculosis, chicken pox, malaria, elephantiasis, dengue fever, chikkun guinea, swine flu. Each epidemic is presented with the causative agent and its consequences but not how to manage or reduce the risk of the disaster.

The complete Content Analysis is given as appendix I.

As part of need analysis phase the investigator conducted a survey on a large sample of students from all the 14 districts of Kerala to analyse the Awareness on Disaster Management. 532 students were taken as sample among which 280 were boys and 252 were girls.

Procedure **step six** was the development of a Disaster Management Education Programme. The investigator developed a Disaster Management Education Programme for secondary school students of Kerala to enhance the Awareness on Disaster Management. The programme was developed on the basis of the steps followed by the SDMA to provide awareness to the public. It includes introduction of the disaster with its history, definition of the disaster; it's after effects and disaster management phases of particular disaster

After the development of the programme, next was the experimental validation.

Administration of pre-test: As part of the experimentation phase, the investigator approached the heads of the schools to conduct the pre-test with sufficient number of instruments. The investigator conducted the pre- test in the two samples. First it was conducted in GVHHS Meenchanda and then in UHHSS Chaliyam. In the first school it was conducted during September 2017 and in the next school it was in June 2018.

Treatment: After the pre-test the investigator applied the Disaster Management Education Programme in the field. For that the investigator conducted classes based the 32 lesson transcripts dealing with basic knowledge of disaster management, natural and manmade disasters, management of natural and manmade disasters.

Administration of the post- test: Immediately after the treatment the investigator conducted the post –test with the same tool of pre-test. After the post-test analysed

the scores for the total sample and subsamples based on gender and locale in the disaster management and its components.

Retention test: After a gap of one month from the post- test the retention test was conducted among the samples in both the schools.

Data Collection Procedure

In the first phase of the study, for conducting the survey, the investigator contacted and took permission from the school heads to administer the instrument. With sufficient copies of tool and response sheets, the investigator collected data. The tools were in two sets part A and part B. Each set was given one after the other with necessary instructions. A uniform procedure of administration of the tools was adopted in all schools.

The same tool was administered in both the experimental sample of students by adopting the same procedure.

Scoring and Consolidation of Data

Soon after the collection of the data the investigator valued the data sheets of survey and experimental samples. Incomplete answer sheets were rejected. The marks were given as per the Scoring Key of the tool. All the scores were entered in a consolidation sheet in a systematic way for analysis so that the sub samples also could be identified easily.

Statistical Techniques Used for the Study

Statistical techniques used in the present study were Preliminary analysis, Test of significance of difference between means (t-test) and Cohen's d. For the analysis of data SPSS software was used.

1. Preliminary analysis

The important statistical techniques like mean, median, mode, standard deviation, skewness and kurtosis of disaster management awareness were computed for the total sample and relevant sub samples.

2. Test of significance of difference between means (t-test)

In the present study, the test of significance of difference between means of independent samples was used to find out if there exists any significant difference in the awareness on disaster management for the whole sample and relevant sub samples

The critical ratio was calculated by the formula:

$$t = \frac{\text{Difference between means}}{\text{Standard Error of the difference}}$$ (Best and Khan 2006)

If the obtained 't' value is greater than the required table value at 0.05/0.01 levels of significance, the mean difference is considered to be significant.

3. Cohen's d

Cohen's *d* is used to find out the effect size to indicate the standardised difference between two means. Cohen's *d* can be calculated as the difference between the means divided by the pooled SD:

$$\mathrm{d} = \frac{\mathrm{M}_2 \_ M_1}{\text{Pooled standard deviation}}$$

The analysis and the findings of the study are presented in the next chapter.

ANALYSIS AND INTERPRETATIONS

ANALYSIS AND INTERPRETATIONS

This chapter deals with the statistical analysis of the collected data and its interpretations. According to Best (2016), 'analysis is the heart of the research report. For the present study, a combination of survey, content analysis and experimental methods were adopted'. The survey was conducted to know the awareness on disasters and its management among secondary school students to find out the need for a Disaster Management Education Programme. To test the effectiveness of the developed programme, single group pre- test post-test quasi-experimental design was used. The results of the comparison between pre-test and post-test scores, and post- test and retention test scores were used to find out the effectiveness of the developed programme.

By keeping the objectives in mind which are already cited in the introduction chapter, the investigator classified the collected data. After that they were subjected to analysis based on the hypotheses formulated. Statistical techniques used in the study were preliminary analysis, test of significance of difference between means for different categories and Cohen's d.

The analysis of the data and the results are presented in two sections. The first section deals with the analysis of the data obtained in the survey. The second section deals with the analysis of the data obtained in the experiment.

SECTION-I. EXISTING LEVEL OF AWRENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS

The section 1 provides the data and results of the analysis of the existing level of Awareness on Disaster Management and its components viz., Basic knowledge on Disaster Management, Awareness on Natural Disasters, Awareness on Manmade Disasters, Awareness on Management of Natural Disasters, and Awareness on Management of Manmade Disasters. For this Disaster Management Awareness Test was administered on a sample of 532 secondary school students selected from 14 districts of Kerala. The details are presented as follows.

a) Existing level of Awareness on Disaster Management and its components among secondary school students for the whole sample

b) Existing level of Awareness on Disaster Management and its components among secondary school students for the subsamples based on gender and locale

c) District wise Awareness on Disaster Management and its components among secondary school students

a) Existing level of Awareness on Disaster Management and its components among secondary school students for the whole sample

Existing level of Awareness on Disaster Management in total and its components among secondary school students for the whole sample were established by using mean and percentiles, and it is given in the Table 4.1.

Table 4.1

Descriptive Statistics of Awareness on Disaster Management and its Components for the Whole Sample (N=532)

Variable	Mean	Median	Mode	Standard deviation	Skewness	Kurtosis
Disasters Management (Total)	32.03	30.00	25.00	11.62	0.54	-.009
Basic knowledge of Disaster management	3.33	3.00	3.00	1.74	0.13	-0.53
Awareness on Natural disasters	6.21	6.00	7.00	2.87	0.44	0.09
Awareness on Man-made disasters	12.89	12.00	10.00	5.40	0.63	0.27
Awareness on management of Natural disasters	4.20	4.00	3.00	2.70	1.11	3.25
Awareness on management of Manmade disasters	5.37	5.00	4.00	2.77	0.46	-0.18

Table 4.1 indicates that mean and median of Awareness on Disaster Management for total sample are almost equal but mode is slightly below the other two averages. The standard deviation obtained is 11.62, indicating the scores in the distribution are not highly deviating from the central value. The value of skewness is 0.54, showing that the distribution is slightly positively skewed. The value of kurtosis -.009 indicates a mesokurtic curve for the variable Awareness on Disaster Management. Hence the distribution of Awareness on Disaster Management can be considered as not highly deviating from the normality.

It is also evident from the table that mean, median, and mode obtained for the component Basic Knowledge of Disaster Management are almost equal. The standard deviation 1.74 indicates the distribution is not highly deviating from the central value. The value of skewness is 0.13 which means the distribution is slightly positively skewed. The value of kurtosis -0.53 which means the distribution is mesokurtic.

Regarding the component Awareness on Natural Disasters the measures of central tendency viz., mean, median and mode are almost equal. The standard deviation 2.87 indicates the scores in the distribution are not highly deviating from the central value. The value of skewness 0.44 indicates the distribution is slightly positively skewded. The measure of Kurtosis 0.09 shows the distribution is mesokurtic.

Table 4.1 also reveals that the mean, median, and mode of the component Awareness on Manmade Disaster do not vary much. The standard deviation obtained is 5.40, indicating the scores in the distribution are not highly deviating from the central value. The value of skewness 0.63 indicates the distribution is slightly positively skewed. The measure of kurtosis is 0.27, which means that the curve is leptokurtic.

Table 4.1 also depicts that the mean median, and mode of the component Awareness on Management of Natural disasters are almost equal.The standard deviation obtained is 2.70, indicating the scores in the distribution are not highly deviating from the central value. The value of skewnes1.11 shows the distribution is

slightly positively skewed. The measure of kurtosis is 3.25 indicating the curve is leptokurtic.

Regarding the component Awareness on Management of Manmade Disasters the measures of central tendency viz., mean, median and mode are almost equal. The standard deviation 2.77 indicates the scores in the distribution are not highly deviating from the central value. The value of skewness 0.46 indicates the distribution is slightly positively skewed. The measure of Kurtosis -0.18 shows the distribution is mesokurtic.

Graphical representations of the scores of the variable Awareness on Disaster Management and its components among secondary school students are presented as Figure 4.1

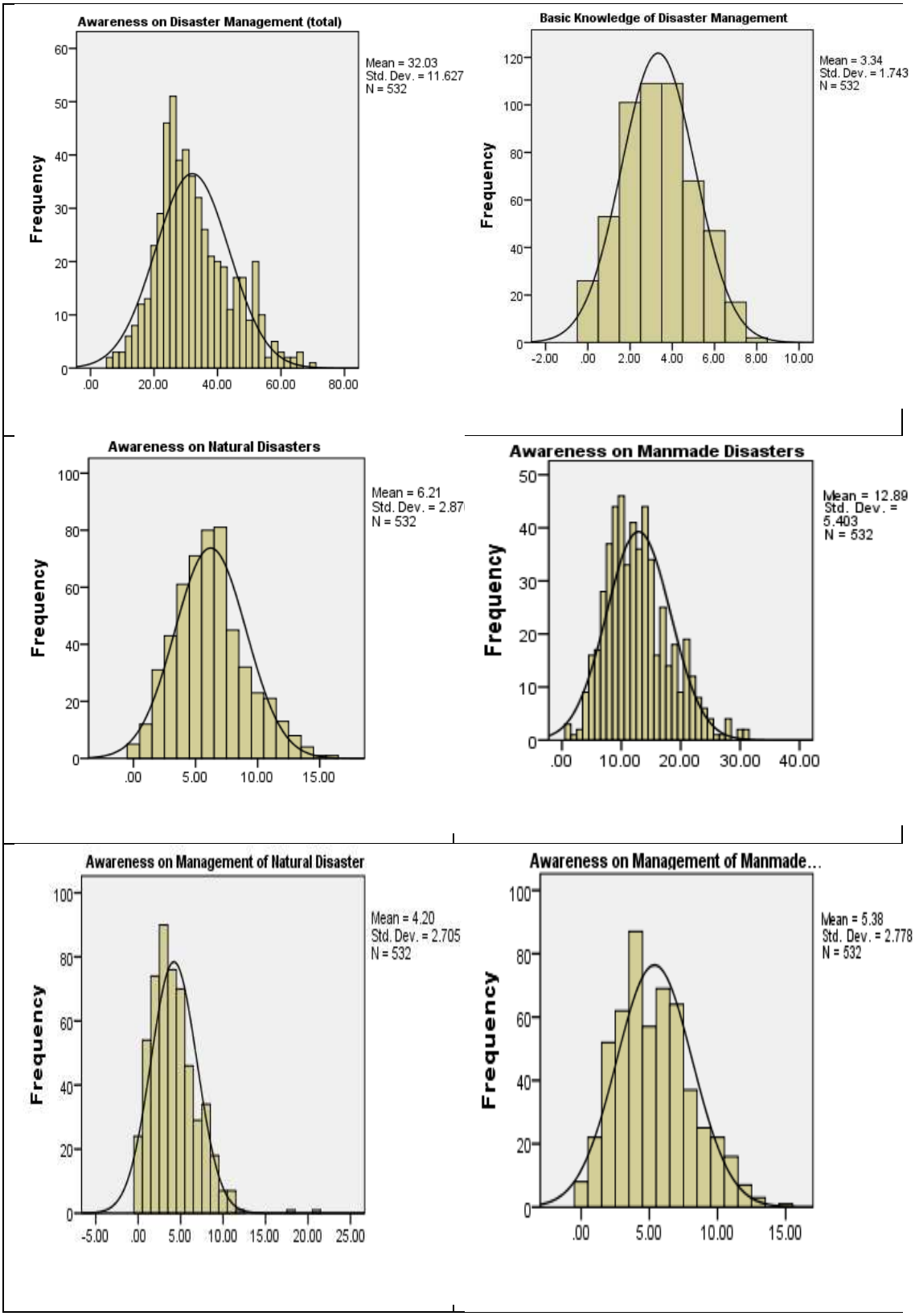


Figure 4.1: Histogram with normal curve of the variable Awareness on Disaster Management in total and its components for the whole sample.

To have a clear picture about the nature of data, percentile scores are calculated for Awareness on Disaster Management and its components for the total sample and is given in the Table 4.2.

Table 4.2

Percentile scores of Awareness on Disaster Management and its components for the whole sample

Percentile	Awareness on Disaster Management (total) Max.score-108	Basic Knowledge of Disaster Management Max.score-10	Awareness on Natural Disasters Max.score-23	Awareness on Manmade Disasters Max.score-43	Awareness on Management of Natural Disasters Max.score-17	Awareness on Management of Manmade Disasters Max.score-15
P_{10}	19.00	1.00	3.00	7.00	1.00	2.00
P_{20}	23.00	2.00	4.00	8.00	2.00	3.00
P_{30}	25.00	2.00	5.00	10.00	3.00	4.00
P_{40}	27.00	3.00	5.00	11.00	3.00	4.00
P_{50}	30.00	3.00	6.00	12.00	4.00	5.00
P_{60}	33.00	4.00	7.00	14.00	5.00	6.00
P_{70}	37.00	4.00	7.00	15.00	5.00	7.00
P_{80}	42.00	5.00	8.00	17.00	6.00	8.00
P_{90}	49.00	6.00	10.00	21.00	8.00	9.00

Table 4.2 shows that 10^{th} percentile of the score of the Awareness on Disaster Management is 19. This means only 10 percentages of the secondary school students lie below the score 19 and 90 percentage of the students lie above the score. The 50^{th} percentile indicates that 50 percentage of the students lie above and below the score 30. The 90^{th} percentile of the score of the Awareness on Disaster Management is 49. This means only 10 percentages of Secondary School Students lie above the score 49, and 90 percentage of Secondary School Students lie below that score. The maximum score obtainable is 108.

It is observed from Table 4.2 that 10th percentile of the score of Basic Knowledge of Disaster Management is 1.00. This means only 10 percentages of the secondary school students lie below the score 1.00 and 90 percentage of the students lie above the score. The 50th percentile indicates that 50 percentage of the students lie above and below the score 3.00. The 90th percentile of the score of Basic Knowledge of Disaster Management is 6.00. This means only 10 percentages of Secondary School Students lie above the score 6.00, and 90 percentage of secondary school Students lie below that score. The maximum score obtainable is 10.

It is evident from Table 4.2 that 10th percentile of the score of Awareness on Natural Disasters is 3.00. This means only 10 percentages of the secondary school students lie below the score 3.00 and 90 percentage of the students lie above the score. The 50th percentile indicates that 50 percentage of the students lie above and below the score 6.00. The 90th percentile of the score of Awareness on Natural Disasters is 10.00. This means only 10 percentages of secondary school students lie above the score 10.00, and 90 percentage of secondary school Students lie below that score. The maximum score obtainable is 23.

It is evident from Table 4.2 that 10th percentile of the score of Awareness on Manmade Disasters is 7.00. This means only 10 percentages of the secondary school students lie below the score 7.00 and 90 percentage of the students lie above the score. The 50th percentile indicates that 50 percentage of the students lie above and below the score 12.00. The 90th percentile of the score of Awareness on Manmade Disasters is 21.00. This means only 10 percentages of secondary school Students lie

above the score 21.00, and 90 percentage of secondary school students lie below that score. The maximum score obtainable is 43.

It is evident from Table 4. 2 that 10^{th} percentile of the score of Awareness on Management of Natural Disasters is 1.00. This means only 10 percentages of the secondary school students lie below the score 1.00 and 90 percentage of the students lie above the score. The 50^{th} percentile indicates that 50 percentage of the students lie above and below the score 4.00. The 90^{th} percentile of the score of Awareness on management of Natural Disasters is 8.00. This means only 10 percentages of secondary school students lie above the score 8.00, and 90 percentage of secondary school students lie below that score. The maximum score obtainable is 17.

It is clear from Table 4.2 that 10^{th} percentile of the score of Awareness on Management of manmade Disasters is 2.00. This means only 10 percentages of the secondary school students lie below the score 2.00 and 90 percentage of the students lie above the score. The 50^{th} percentile indicates that 50 percentage of the students lie above and below the score 5.00. The 90^{th} percentile of the score of Awareness on Management of Manmade Disasters is 9.00. This means only 10 percentages of secondary school students lie above the score 9.00, and 90 percentage of secondary school students lie below that score. The maximum score obtainable is 15.

The existing level of awareness of secondary school students on Disaster Management in total and its components among secondary school students shows that they are not having satisfactory level of awareness on Disaster Management in total and its components.

b) Existing level of Awareness on Disaster Management and its components among secondary school students based on Gender and Locale

Based on locale the subsample consists of three groups' viz., urban, rural, and coastal areas. The existing level of Awareness on Disaster Management and its components among secondary school students based on Gender and Locale are given in Table 4.3.

Table 4.3

Descriptive statistics of the variable Awareness on Disaster Management and its components based on Gender and Locale

Variable	Subsamples	N	Mean	S D
Awareness on Disaster Management (total)	Boys	280	30.00	10.02
	Girls	252	34.27	12.82
	Urban	86	32.66	11.79
	Rural	359	31.09	11.64
	Coastal	87	34.96	11.60
Basic Knowledge of Disaster Management	Boys	280	3.26	1.59
	Girls	252	3.42	1.89
	Urban	86	3.56	1.60
	Rural	359	3.18	1.71
	Coastal	87	3.82	1.86
Awareness on Natural Disasters	Boys	280	6.42	2.83
	Girls	252	5.96	2.90
	Urban	86	6.54	2.80
	Rural	359	5.90	2.77
	Coastal	87	7.44	3.04
Awareness on Manmade Disasters	Boys	280	11.48	4.58
	Girls	252	14.45	5.81
	Urban	86	13.16	5.50
	Rural	359	12.61	5.23
	Coastal	87	13.27	6.11

Variable	Subsamples	N	Mean	S D
Awareness on Management of Natural Disasters	Boys	280	4.01	2.32
	Girls	252	4.41	3.06
	Urban	86	3.93	2.27
	Rural	359	4.08	2.76
	Coastal	87	5.13	2.84
Awareness on Management of Manmade Disasters	Boys	280	4.80	2.58
	Girls	252	6.01	2.84
	Urban	86	5.45	2.90
	Rural	359	5.31	2.75
	Coastal	87	5.27	2.85

The mean and standard deviation of the variable Disaster Management for boys are 30.00 and 10.02 respectively. The mean and standard deviation of the variable Disaster Management for girls are 34.27and 12.82 respectively. The mean and standard deviation of the variable Disaster Management for urban students are 32.66, and 11.79 respectively. The mean and standard deviation of the variable Disaster Management for rural students are 31.09, and 11.64 respectively. The mean and standard deviation of the variable Disaster Management for coastal students are 34.96, and 11.60 respectively.

The mean and standard deviation of the component Basic Knowledge of Disaster management for boys are 3.26, and 1.59 respectively. The mean and standard deviation of the component Basic Knowledge of Disaster management for girls are 3.42, and 1.89 respectively. The mean and standard deviation of the component Basic Knowledge of Disaster management for urban students are 3.56, and 1.60 respectively. The mean and standard deviation of the component Basic Knowledge of Disaster management for rural students are 3.18, and 1.71

respectively. The mean and standard deviation of the component Basic Knowledge of Disaster management for coastal students are 3.82, and 1.86 respectively.

The mean and standard deviation of the component awareness on natural disaster for boys are 6.42, and 2.83 respectively. The mean and standard deviation of the component awareness on natural disaster for girls are 5.96, and 2.90 respectively. The mean and standard deviation of the component awareness on natural disaster for urban students are 6.54, and 2.80 respectively. The mean and standard deviation of the component awareness on natural disaster for rural students are 5.90, and 2.77 respectively. The mean and standard deviation of the component awareness on natural disaster for coastal students are 7.44, and 3.04 respectively.

The mean and standard deviation of the component awareness on manmade disaster for boys are 11.48, and 4.58 respectively. The mean and standard deviation of the component awareness on manmade disaster for girls are 14.45, and 5.81 respectively. The mean and standard deviation of the component awareness on manmade disaster for urban students are 13.16, and 5.50 respectively. The mean and standard deviation of the component awareness on manmade disaster for rural students are 12.61, and 5.23 respectively. The mean and standard deviation of the component awareness on manmade disaster for coastal students are 13.27, and 6.11 respectively.

The mean and standard deviation of the component awareness on management of natural disaster for boys are 4.01, and 2.32 respectively. The mean and standard deviation of the component awareness on management of natural disaster for girls are 4.41, and 3.06 respectively. The mean and standard deviation of

the component awareness on management of natural disaster for urban students are 3.93, and 2.27 respectively. The mean and standard deviation of the component awareness on management of natural disaster for rural students are 4.08, and 2.76 respectively. The mean, and standard deviation of the component awareness on management of natural disaster for coastal students are 5.13and 2.84 respectively.

The mean and standard deviation of the component awareness on management of manmade disaster for boys are 4.80, and 2.58 respectively. The mean and standard deviation of the component awareness on management of manmade disaster for girls are 6.01, and 2.84 respectively. The mean and standard deviation of the component awareness on management of manmade disaster for urban students are 5.45 and 2.90 respectively. The mean and standard deviation of the component awareness on management of manmade disaster for rural students are 5.31, and 2.75 respectively. The mean, and standard deviation of the component awareness on management of manmade disaster for coastal students are 5.27, and 2.85 respectively.

Since the number of items in the different components differ each other, the mean scores obtained were divided by the number of items to get a common meaning.

Graphical representation of comparison of percentage mean scores of Awareness on Disaster Management in total and its components based on the subsamples gender and locale are given as Figure 4.2 and Figure 4.3 respectively.

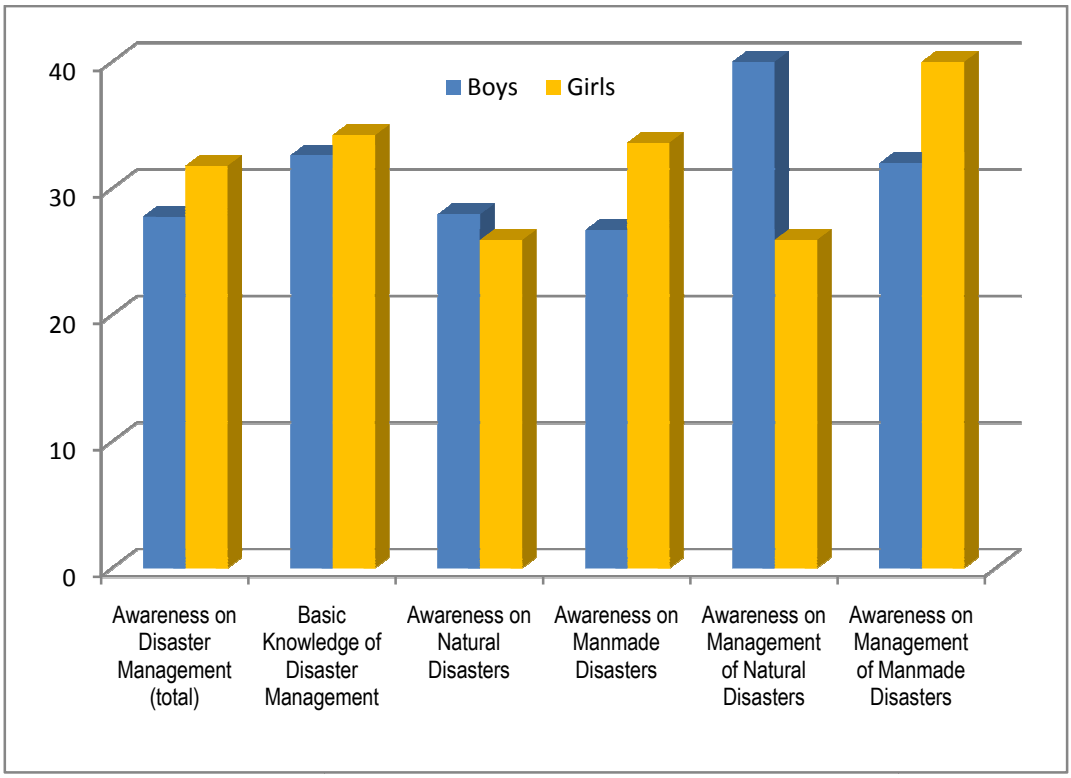


Figure 4.2 Graphical representation of percentage means score of Awareness on Disaster Management in total and its components based on gender.

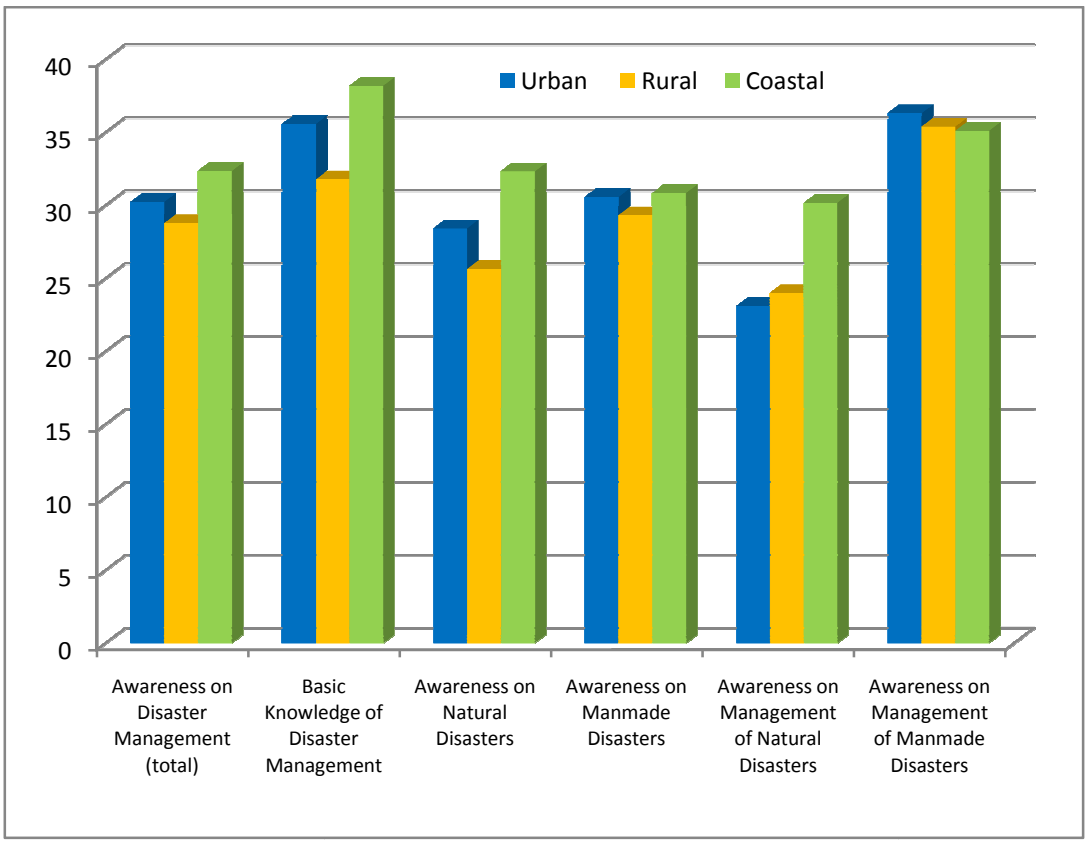


Figure 4.3 Graphical representation of percentage means score of Awareness on Disaster Management in total and its components based on locale.

The mean scores obtained for total sample, boys, girls, urban, rural and coastal students' shows that they are not having satisfactory level of awareness on disaster management in total and its components.

c) Awareness on Disaster Management and its components among secondary school students based on District

The existing level of Awareness on Disaster Management and its components among secondary school students based on district are given in Table 4.4

Table 4.4

Awareness on Disaster Management for the whole sample based on District (N=532)

District	N	Mean
Thiruvananthapuram	29	38.34
Kollam	33	37.51
Pathanamthitta	48	32.00
Alapuzha	72	32.37
Kottayam	35	22.62
Idukki	27	26.81
Ernakulam	27	26.22
Trissur	38	35.07
Palakkad	40	42.67
Malappuram	59	25.88
Kozhikkode	25	27.68
Wayanad	28	31.89
Kannur	38	33.50
Kasargode	33	35.51

Mean score of awareness on Disaster Management among secondary school students of various schools of 14 districts of Kerala is shown from the Table 4.4 The possible minimum value for Disaster Management awareness test is zero and possible maximum value is 108. The mean scores from the table revealed that the students of Palakkad district have the mean score 42.67, which is highest mean score when compared to the students of other districts. This shows that the Awareness on disaster Management is better among students at Palakkad than when compared to the other districts. Students of Kottayam district possess mean score of 22.62, which

is lesser than the other districts. This shows that the Awareness on disaster Management is less when compared to the other districts.

Table 4.5

District wise Awareness on Basic Knowledge of Disaster Management for the Whole sample (N=532)

District	N	Mean
Thiruvananthapuram	29	4.65
Kollam	33	4.03
Pathanamthitta	48	3.79
Alapuzha	72	2.88
Kottayam	35	2.82
Idukki	27	3.66
Ernakulam	27	2.81
Trissur	38	3.76
Palakkad	40	4.15
Malappuram	59	2.71
Kozhikkode	25	2.60
Wayanad	28	2.89
Kannur	38	3.28
Kasargode	33	3.12

Mean score of awareness on Basic knowledge on Disaster Management among secondary school students of various schools of 14 districts of Kerala is evident from the Table 4.5.The possible minimum value for the component basic knowledge on Disaster Management in the Disaster Management awareness test is zero and possible maximum value is 10. The mean scores from the table revealed that the students of Thiruvanthapuram district have the mean score 4.65, which is highest mean score when compared to the students of other districts. This shows that

the Awareness on basic knowledge on disaster Management is better among students of Thiruvananthapuram when compared to the other districts. Students of Kozhikode district possess mean score of 2.60, which is lesser than the other districts. This shows that the Awareness on basic knowledge on disaster Management is less among students of Kozhikode than when compared to the other districts.

Table 4.6

District wise Awareness on Natural Disasters for the whole sample (N=532)

District	N	Mean
Thiruvananthapuram	29	9.27
Kollam	33	7.00
Pathanamthitta	48	6.60
Alapuzha	72	6.15
Kottayam	35	4.42
Idukki	27	5.18
Ernakulam	27	6.07
Trissur	38	7.05
Palakkad	40	8.17
Malappuram	59	4.25
Kozhikkode	25	5.92
Wayanad	28	4.96
Kannur	38	6.47
Kasargode	33	6.27

Mean score of awareness on Natural Disasters among secondary school students of various schools of 14 districts of Kerala is evident from the Table 4.6the possible minimum value for the component awareness on Natural Disaster in the Disaster Management awareness test is zero and possible maximum value is 23. The

mean scores from the table revealed that the students of Thiruvanthapuram district have the mean score 9.27, which is highest mean score when compared to the students of other districts. This shows that the Awareness on disaster Management based on the component awareness on Natural Disasters is better when compared to the other districts. Students of Malappuram district possess mean score of 4.25, which is lesser than the other districts. This shows that the Awareness on disaster Management based on the component awareness on Natural Disaster is less when compared to the other districts. The mean score obtained for the Disaster Management Awareness test based on the component awareness on Natural Disaster for all the students of 14 districts of Kerala is less than neutral value (12) which means that the level of awareness on Natural Disaster for secondary school Students was not satisfactory

Table 4.7

District wise Awareness on Manmade Disasters for the Whole sample (N=532)

District	N	Mean
Thiruvananthapuram	29	12.41
Kollam	33	16.06
Pathanamthitta	48	12.87
Alapuzha	72	13.13
Kottayam	35	8.88
Idukki	27	10.03
Ernakulam	27	9.85
Trissur	38	13.73
Palakkad	40	17.52
Malappuram	59	11.44
Kozhikkode	25	10.60
Wayanad	28	14.14
Kannur	38	13.52
Kasargode	33	14.66

Mean score of awareness on Manmade Disasters among secondary school students of various schools of 14 districts of Kerala is shown in the Table 4.7. The possible minimum value for the component awareness on Manmade Disaster in the Disaster Management awareness test is zero and possible maximum value is 43. The mean scores from the table revealed that the students of Palakkad district have the mean score 17.52, which is the highest mean score when compared to the students of other districts. This shows that the Awareness on disaster Management based on the component awareness on Manmade Disaster is better when compared to the other districts. Students of Kottayam district possess mean score of 8.88, which is lesser than the other districts. This shows that the Awareness on disaster Management based on the component awareness on Manmade Disaster is less when compared to the other districts.

Table 4.8

District wise Awareness on Management of Natural Disasters for the Whole sample (N=532)

District	N	Mean
Thiruvananthapuram	29	6.89
Kollam	33	4.36
Pathanamthitta	48	3.75
Alapuzha	72	4.13
Kottayam	35	3.08
Idukki	27	4.25
Ernakulam	27	2.77
Trissur	38	4.39
Palakkad	40	6.22
Malappuram	59	2.74
Kozhikkode	25	4.12
Wayanad	28	3.60
Kannur	38	4.15
Kasargode	33	5.36

Mean score of awareness on Management of Natural Disasters among secondary school students of various schools of 14 districts of Kerala is found in the Table 4.8. The possible minimum value for the component awareness on Management of Natural Disaster in the Disaster Management awareness test is zero and possible maximum value is 17. The mean scores from the table revealed that the students of Thiruvananthapuram district have the mean score 6.89, which is highest mean score when compared to the students of other districts. This shows that the Awareness on disaster Management based on the component awareness on Management of Natural Disaster is better than when compared to the other districts.

Students of Malappuram district possess mean score of 2.74, which is lesser than the other districts. This shows that the Awareness on disaster Management based on the component awareness on Management of Natural Disaster is less when compared to the other districts. The mean score obtained for the Disaster Management Awareness test based on the component Awareness on Management of Natural Disaster for all the students of 14 districts of Kerala is less than the neutral value (9) which means that the level of awareness on Management of Natural Disaster for secondary school Students was not satisfactory

Table4.9

District wise Awareness on Management of Manmade Disasters for the Whole sample (N=532)

District	N	Mean
Thiruvananthapuram	29	5.10
Kollam	33	6.06
Pathanamthitta	48	4.97
Alapuzha	72	6.05
Kottayam	35	3.40
Idukki	27	3.66
Ernakulam	27	4.70
Trissur	38	6.13
Palakkad	40	6.60
Malappuram	59	4.72
Kozhikkode	25	4.44
Wayanad	28	6.28
Kannur	38	6.05
Kasargode	33	6.09

Mean score of awareness on Management of manmade Disasters among secondary school students of various schools of 14 districts of Kerala is evident from the Table 4.9. The possible minimum value for the component awareness on Management of Manmade Disaster in the Disaster Management awareness test is zero and possible maximum value is 15. The mean scores from the table revealed that the students of Palakkad district have the mean score 6.60, which is highest mean score when compared to the students of other districts. This shows that the Awareness on disaster Management based on the component awareness on Management of Manmade Disaster is better than when compared to the other districts. Students of Kottayam district possess mean score of 3.40, which is lesser than the other districts. This shows that the Awareness on disaster Management based on the component awareness on Management of Manmade Disaster is less when compared to the other districts.

The number of items in the different components differ each other, the mean scores obtained were divided by the number of items to get a common meaning. Graphical representation of comparison of percentage mean scores of Awareness on Disaster Management in total and its components based on district are given as Figure 4.4

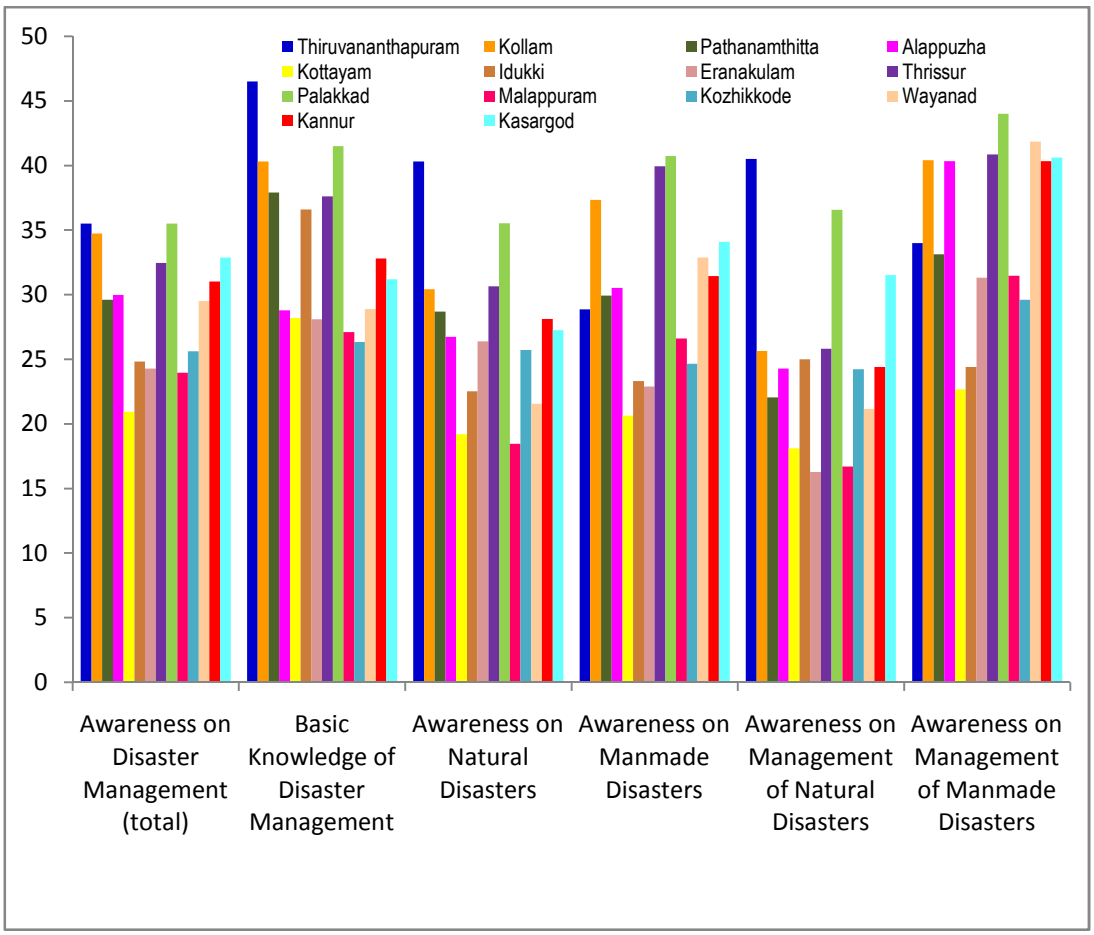


Figure 4.4 Graphical representation of percentage means score of Awareness on Disaster Management in total and its components based on district.

The mean scores of awareness on Disaster Management and its components among the students of all the 14 districts of Kerala also shows that they are not having satisfactory level of awareness on Disaster Management in total and its components.

Discussion

Analysis of mean scores of Awareness on Disaster Management and its components of secondary school students revealed that students are not having satisfactory level of Awareness on Disaster Management. The mean scores are even

below the half of the obtainable scores. Hence it is identified that it is relevant to develop a programme on Awareness on Disaster Management for secondary school students.

SECTION II -EFFECTIVENESS OF DISASTER MANAGEMENT EDUCATION PROGRAMME

This section assess the effectiveness of Disaster Management Education Programme in enhancing secondary school students Awareness on Disaster Management and its components viz., Basic knowledge on Disaster Management, Awareness on Natural Disasters, Awareness on Manmade Disasters, Awareness on Management of Natural Disasters, and Awareness on Management of Manmade Disasters. Section II presents the data of comparison between the pre-test and post-test scores, post-test and retention test scores of Awareness on Disaster Management and its components for total sample and subsamples based on gender and locale by using paired sample 't' test.

The analysis of data and results are presented under the following heads.

a) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management in total and its Components for whole experimental Sample

b) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for sub sample based on Gender

c) Comparison between mean gain scores of awareness on Disaster Management and its components for the sub sample based on Gender

d) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for sub sample based on Locale

e) Comparison between mean gain scores of awareness on Disaster Management and its components for the sub sample based on Locale

f) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management in total and its Components for whole experimental Sample

g) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management in total and its Components for Subsample based on Gender

h) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management and its components for the sub sample based on Locale

a) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management in total and its Components for whole experimental Sample

To find out whether the Disaster Management Education Programme has significant effect in enhancing secondary school students Awareness on Disaster Management and its components the investigator compared the pre-test and post-test score, of Awareness on Disaster Management in total and its components for the total sample is given in the Table 4.10

Table 4.10

Data and Results of Test of Significance of Difference between Mean Pre-Test and Post Test Scores of Awareness on Disaster Management and its Components for the whole Sample

Variables	Pre-test		Post-test		r	t-value	Cohen's d
	M1	S.D1	M2	S.D2			
Awareness on disaster management (total)	31.47	9.09	54.69	12.89	.110	12.82**	1.55
Basic Knowledge of Disaster Management	2.64	1.37	5.85	1.78	-.003	11.71**	1.42
Awareness on Natural Disaster	5.48	2.04	10.01	3.31	.050	9.82**	1.18
Awareness on Manmade Disaster	13.23	4.21	21.63	5.18	-.003	10.34**	
Awareness on Management of Natural Disaster	4.42	2.63	8.58	3.10	.029	8.55**	1.04
Awareness on Management of Manmade Disaster	5.38	2.60	8.05	2.88	.120	6.06**	0.73

(N=68)
** Significant at 0.01 level

From the Table 4.10, the calculated value of 't' for Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster are 12.82, 11.71, 9.82, 10.34, 8.55 and 6.06 respectively. All these values are greater than the tabled value 2.58 required for significance at 0.01 levels. This means that there is significant difference between pre-test and post-test scores in the Awareness on Disaster Management and its components. Hence the Disaster Management Education Programme shows significant effect. The table also reveals the effect size of the programme on the awareness on Disasters and its

Management. The developed programme has strong effect in enhancing secondary school students' awareness on disaster management (total), basic knowledge of disasters, and awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohens d > 1. Whereas the programme has moderate effect in enhancing their awareness on management of manmade disaster since the effect size 0.73 lies between 0.51 and 1.00.

For easy visualisation of comparison between pre–test and post–test scores of Awareness on Disaster Management and its components for whole sample is graphically represented as Figure 4.5.

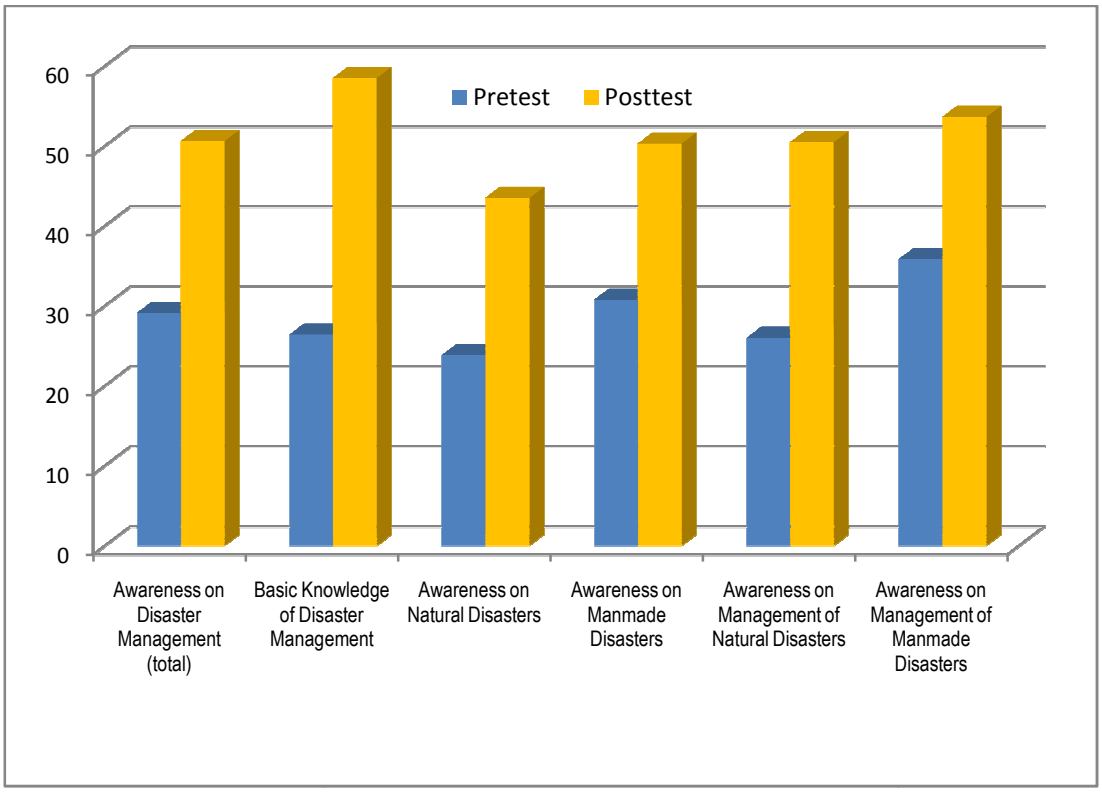


Figure 4.5 Graphical representation of comparison between meanpre-test and post test scores of Awareness on disaster management and its components for total sample

b) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for the sub sample based on Gender

Comparison between mean pre–test and post–test scores of Awareness on Disaster Management and its components for the sub sample based on gender was calculated by using paired sample t test. The details of comparison are given in Table 4.11.

Table 4.11

Data and Results of Test of Significance of Difference between Means of Pre-Test and Post Test Scores of Awareness on Disaster Management and its Components for the Subsample Based on Gender

Variables	Subsample	Pre-test		Post-test		r	t-value	Cohen's d
		M1	S.D1	M2	S.D2			
Awareness on disaster management (total)	Boys	28.58	6.54	53.38	14.02	-.035	9.48**	1.58
	Girls	34.72	10.47	56.15	11.53	.184	8.61**	1.52
Basic Knowledge of Disaster Management	Boys	2.50	1.36	5.80	1.65	.057	9.52**	1.59
	Girls	2.81	1.40	5.91	1.94	-.066	7.09**	1.25
Awareness on Natural Disaster	Boys	5.25	2.01	9.72	3.30	.032	7.05**	1.17
	Girls	5.75	2.079	10.34	3.34	.045	6.73**	1.18
Awareness on Manmade Disaster	Boys	11.86	3.21	21.11	6.17	-.035	7.87**	1.31
	Girls	14.78	4.702	22.22	3.81	-.064	6.74**	1.19
Awareness on Management of Natural Disaster	Boys	3.83	2.01	8.55	3.37	.147	7.83**	1.30
	Girls	5.09	3.104	8.62	2.89	-.071	4.54**	0.80
Awareness on Management of Manmade Disaster	Boys	4.86	2.36	7.61	2.87	-.054	4.32**	0.72
	Girls	5.96	2.76	8.56	2.85	.227	4.20**	0.74

Boys N=36, Girls N=32
** Significant at 0.01 level

It is evident from Table 4.11, the calculated value of 't' for secondary school boys' Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disasters, awareness on Manmade Disasters, awareness on Management of Natural Disasters and awareness on Management of manmade disasters are 9.48, 9.52, 7.05, 7.87, 7.83 and 4.32respectively. All these values are greater than the tabled value 2.58 required for significance at 0.01 levels. This means that there is significant difference between pre-test and post-test scores in the Awareness on Disaster Management and its components. Hence the Disaster Management Education Programme shows significant effect in improving secondary school boys 'Awareness on Disaster Management and its components. The developed programme has strong effect in enhancing boys' awareness on disaster management (total), basic knowledge in disasters, and awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohens d > 1. Whereas the programme has moderate effect in enhancing the awareness on management of manmade disaster since the effect size 0.73 lies between 0.51 and 1.00.

From the Table 4.11, it can be seen that, the calculated value of 't' for secondary school girls 'Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster are 8.61, 7.09, 6.73, 6.74, 4.54 and 4.20 respectively. All these values are greater than the tabled value

2.58 required for significance at 0.01 levels. This means that there is significant difference between pre-test and post-test scores in the Awareness on Disaster Management and its components viz., hence the Disaster Management Education Programme shows Significant effect in secondary school girls. The developed programme has strong effect in enhancing girls' awareness on disaster management (total), basic knowledge in disasters, awareness on natural disaster, and manmade disasters. Whereas the programme has moderate effect in enhancing the awareness on management of natural disasters and manmade disaster since the effect size 0.73 lies between 0.51 and 1.00.

Graphical representation comparison between mean pre-test and post test scores of Awareness on disaster management and its components for the subsample boys and girls are given as Figure5 and Figure 4.6 respectively.

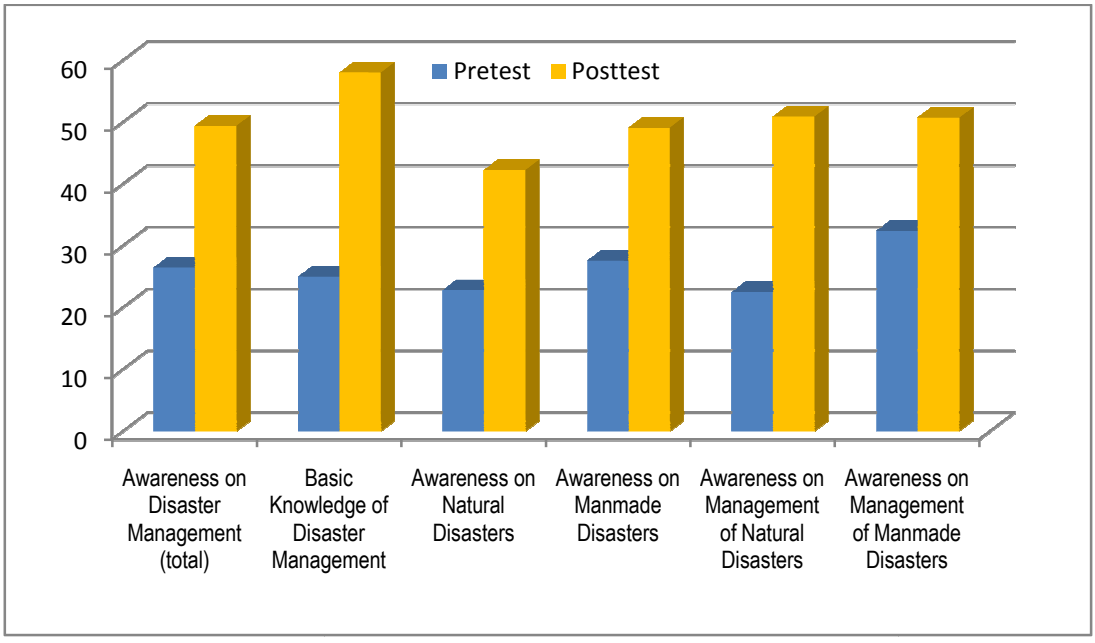


Figure 4.6 Graphical representation of comparison between mean pre-test and post test scores of Awareness on disaster management and its components for boys

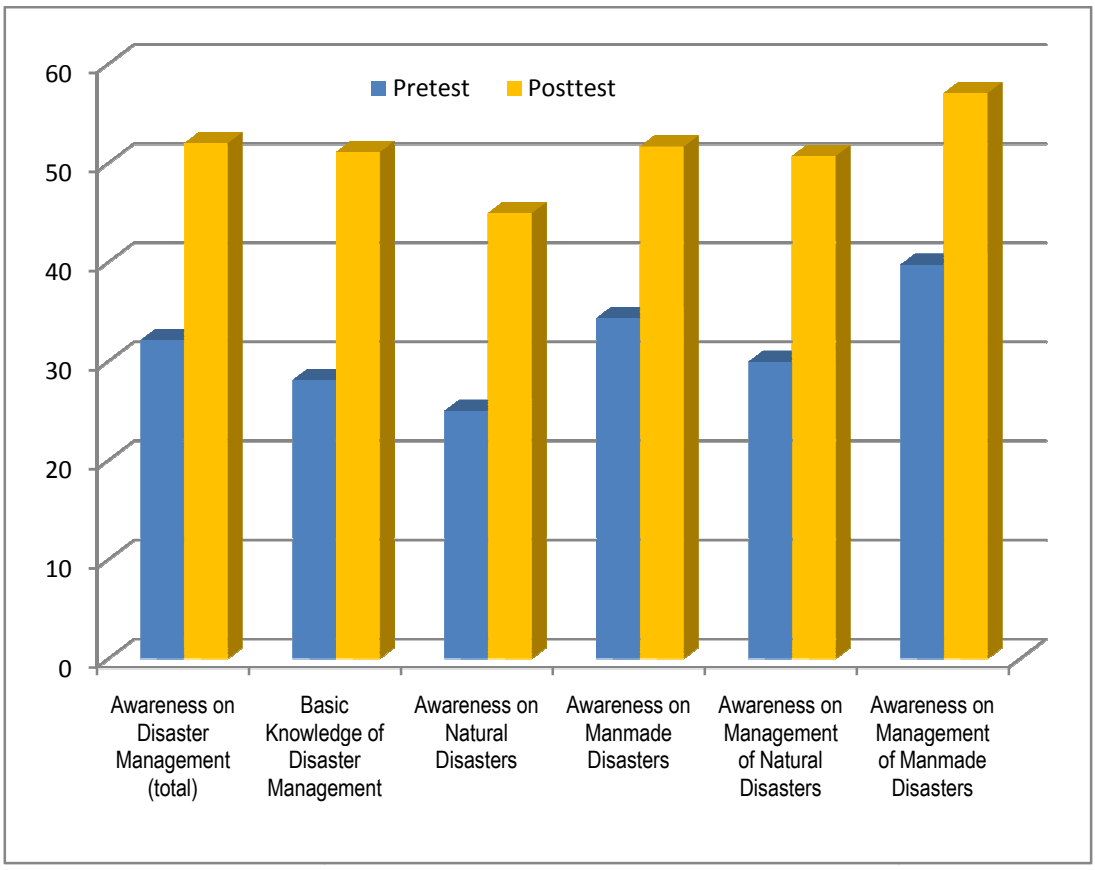


Figure 4.7 Graphical representation of comparison between mean pre-test and post test scores of Awareness on disaster management and its components for girls

c) Comparison between mean gain scores of Awareness on Disaster Management and its components for the sub sample based on Gender

To know which group benefitted more from the programme the investigator compared the mean gain scores of boys and girls. Comparison of mean gain score of awareness on Disaster Management and its components between Pre–test and Post–test for the sub sample based on gender is given below in the Table 4.12.

Table 4.12

Data and results of Comparison of mean gain scores of Disaster Management and its components between Boys and Girls

Variable	Group	N	Mean	Std. Deviation	t-value
Awareness on disaster management (total)	Boys	36	24.80	15.68	.927
	Girls	32	21.43	14.07	
Basic Knowledge of Disaster Management	Boys	36	3.30	2.08	.384
	Girls	32	3.09	2.46	
Awareness on Natural Disaster	Boys	36	4.47	3.80	.131
	Girls	32	4.59	3.85	
Awareness on Manmade Disaster	Boys	36	9.25	7.05	1.11
	Girls	32	7.43	6.23	
Awareness on Management of Natural Disaster	Boys	36	4.72	3.61	1.22
	Girls	32	3.53	4.39	
Awareness on Management of Manmade Disaster	Boys	36	2.75	3.82	.175
	Girls	32	2.59	3.49	

From Table 4.12, the calculated value of 't' for Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, Awareness on Natural Disaster, Awareness on manmade Disaster, Awareness on Management Natural disaster, Awareness of Management of Manmade Disaster are .927, .384, .131, 1.11, 1.22 and .175 respectively. These values are less than 1.96 required for the significance at 0.05 levels hence there is no significant difference in mean gain score between boys and girls in the Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, Awareness on Natural Disaster, Awareness on Management

Natural disaster, Awareness on manmade Disaster and Awareness of Management of Manmade Disaster

Graphical representation of Comparison of mean gain scores of Disaster Management between Boys and Girls is given in Figure 4.8

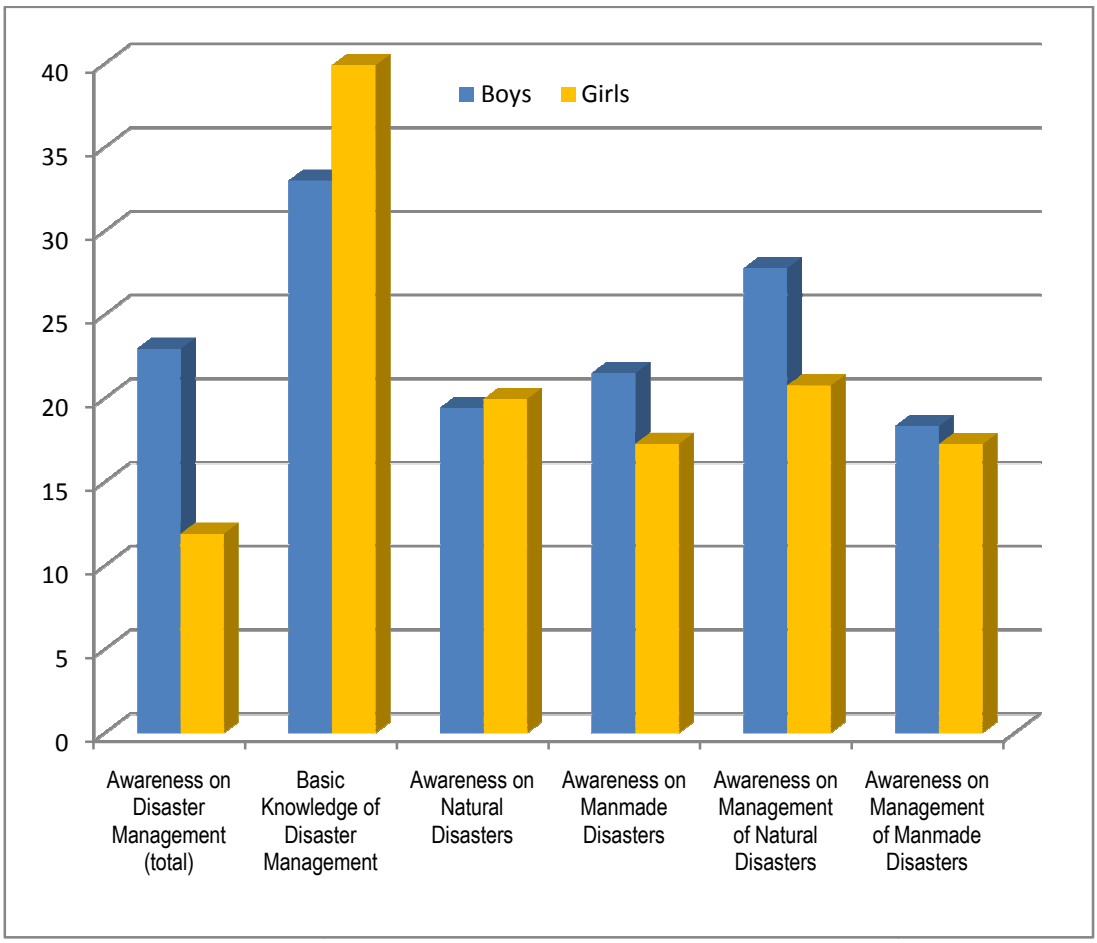


Figure 4.8 Graphical representation of Comparison of mean gain scores of Disaster Management between Boys and Girls

d) Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for sub sample based on Locale

Comparison between mean pre–test and post–test scores of Awareness on Disaster Management and its components for the sub sample based on locale was calculated by using paired sample t test. The details of comparison are given in Table 4.13.

Table 4.13

Data and results of test of significance of difference between means of Awareness on disaster management and its components between pre-test and post-test test for subsamples based on locale

Variables	Sub sample	Pre-test		Post-test		r	t-value	Cohen 's d
		M1	S.D1	M2	S.D2			
Awareness on disaster management (total)	Urban	34.30	9.458	52.90	15.40	-.01	5.86**	1.02
	Coastal	28.80	7.96	56.37	9.91	0.47	17.49**	2.95
Basic Knowledge of Disaster Management	Urban	3.00	1.36	5.72	2.019	-.03	6.32**	1.10
	Coastal	2.31	1.32	5.97	1.54	0.07	11.07**	1.87
Awareness on Natural Disaster	Urban	5.78	1.84	9.30	3.62	.118	5.22**	0.91
	Coastal	5.20	2.21	10.68	2.87	0.05	9.18**	1.55
Awareness on Manmade Disaster	Urban	14.39	4.18	20.51	6.27	.002	4.66**	0.81
	Coastal	12.14	4.00	22.68	3.69	0.15	12.44**	2.10
Awareness on Management of Natural Disaster	Urban	5.48	2.79	8.45	3.50	-.09	3.64**	0.63
	Coastal	3.42	2.06	8.71	2.71	0.28	10.76**	1.82
Awareness on Management of Manmade Disaster	Urban	5.27	2.45	8.30	3.45	.030	4.16**	0.72
	Coastal	5.48	2.76	7.82	2.22	0.25	4.50**	0.76

Urban N=33, Coastal N=35
** Significant at 0.01 level

From the Table 4.13, the calculated value of 't' for urban students 'Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster are 5.86, 6.32, 5.22, 4.66, 3.64 and 4.16 respectively. All these values are greater than the tabled value 2.58 required for significance at 0.01 levels. This means that there is significant difference between pre-test and post-test scores in the Awareness on Disaster Management and its components viz., hence the Disaster Management Education Programme shows Significant effect in urban students. The developed programme has strong effect in enhancing urban students' awareness on disaster management (total), basic knowledge in disasters as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing the awareness on natural disaster and manmade disasters, management of natural disasters and manmade disaster since the effect sizes lie between 0.51 and 1.00.

The calculated value of 't' for coastal students' Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disasters are 17.49, 11.07, 9.18, 12.44, 10,76 and 4.50 respectively. All these values are greater than the tabled value 2.58 required for significance at 0.01 levels. This means that there is significant difference between pre-test and post-test scores in the Awareness on Disaster Management and its components viz., hence the

Disaster Management Education Programme shows Significant effect in coastal students. The developed programme has strong effect in enhancing coastal students' awareness on disaster management (total), basic knowledge in disasters and awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing the awareness on management of manmade disastersince the effect sizes lie between 0.51 and 1.00.

Graphical representation comparison between mean pre-test and post test scores of Awareness on disaster management and its components for the subsample urban and coastal are given as Figure 4.9 and Figure 4.10 respectively.

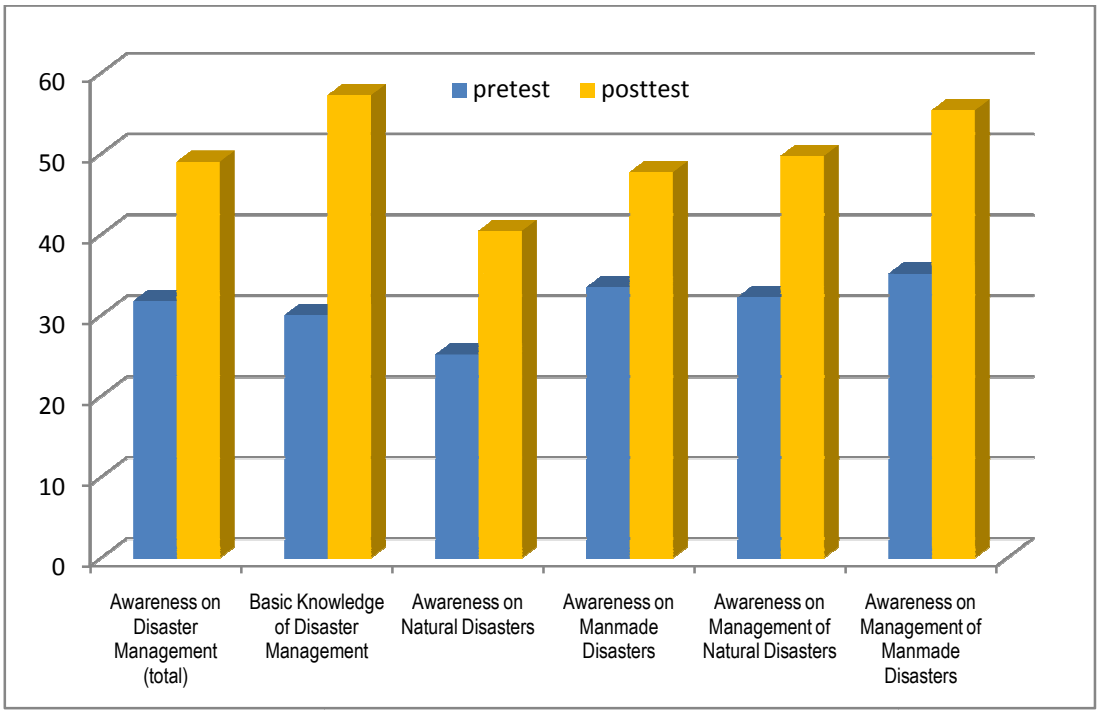


Figure 4.9 Graphical representation of comparison between mean pre-test and post test scores of Awareness on disaster management and its components for the urban students

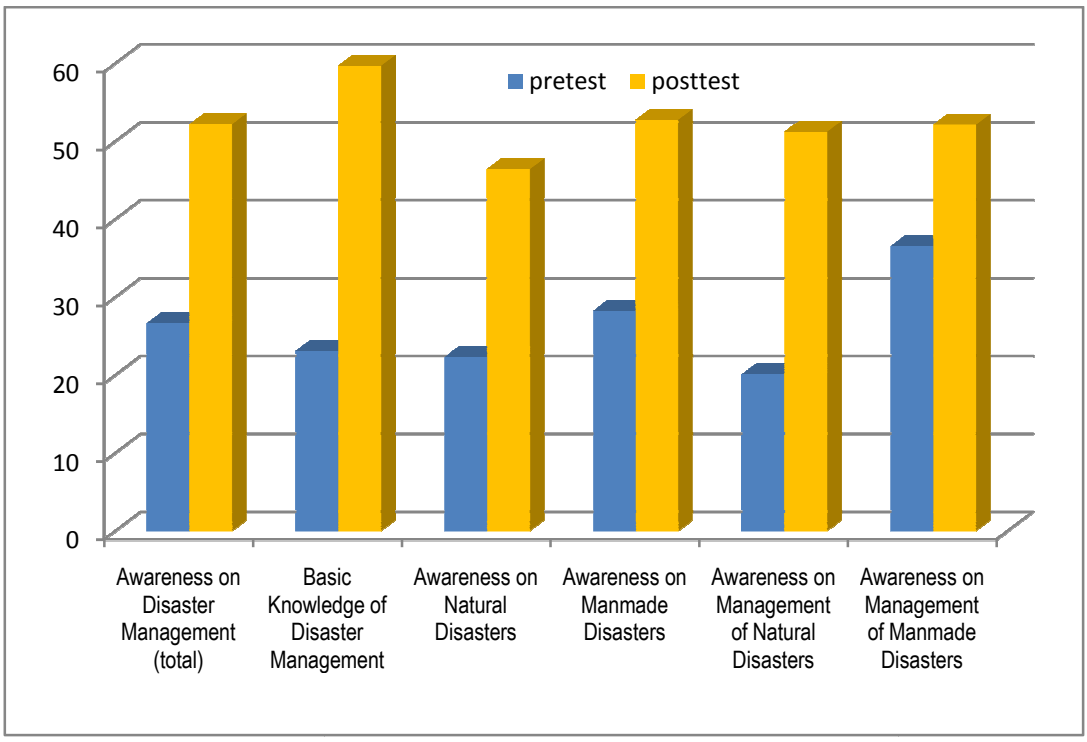


Figure 4.10 Graphical representation comparisons between mean pre-test and post test scores of Awareness on disaster management and its components for coastal students

e) Comparison between mean gain scores of Awareness on Disaster Management and its components for the sub sample based on Locale

To know which group benefitted more from the programme the investigator compared the mean gain scores of urban and coastal students. Comparison of mean gain score of awareness on Disaster Management and its components between Pre–test and Post–test for the sub sample based locale is given below in the Table 4.14.

Table 4.14

Data and results of Comparison of mean gain scores of Disaster Management and its components between urban and Coastal students

Variable	Group	N	Mean	Std. Deviation	t-value
Awareness on Disaster Management (total)	Urban	33	18.60	18.22	2.53*
	Coastal	35	27.57	9.32	
Basic Knowledge of Disaster Management	Urban	33	2.72	2.47	1.72
	Coastal	35	3.65	1.95	
Awareness on Natural Disaster	Urban	33	3.51	3.86	2.19*
	Coastal	35	5.48	3.53	
Awareness on Manmade Disaster	Urban	33	6.12	7.53	2.86**
	Coastal	35	10.54	5.01	
Awareness on Management of Natural Disaster	Urban	33	2.96	4.68	2.43*
	Coastal	35	5.28	2.90	
Awareness on Management of Manmade Disaster	Urban	33	3.03	4.17	0.76
	Coastal	35	2.34	3.07	

** Significant at 0.01 level * Significant at 0.05 level

From the Table 4.14, the calculated value of 't' for Awareness on Disaster Management in total and its components viz., Awareness on Natural Disaster, Awareness on Management of Natural disaster are 2.53, 2,19, 2.43 respectively. All these values are greater than the tabled value 1.96 required for the significance at 0.05 levels. This means that there is a significant difference in mean gain score between urban and coastal students in the Awareness on Disaster Management in total and its components viz., Awareness on Natural Disaster, Awareness on

Management Natural disaster. The 't' value obtained for awareness on manmade Disaster 2.86, which is greater than the tabled value 2.58 required for significance at 0.01 levels. This means that there is a significant difference in mean gain score between urban and coastal students in the Awareness on Manmade Disaster. The 't' value obtained for Awareness on basic knowledge of Disaster Management and awareness of Management of Manmade Disaster 1.72 and 0.76 respectively. These values are less than 1.96 required for the significance at 0.05 levels hence there is no significant difference in mean gain score between urban and coastal students in the Awareness on Basic knowledge of Disaster Management and Awareness on Management of Manmade Disaster.

Graphical representation of Comparison of mean gain scores of Disaster Management between urban and coastal is given in Figure 4.11

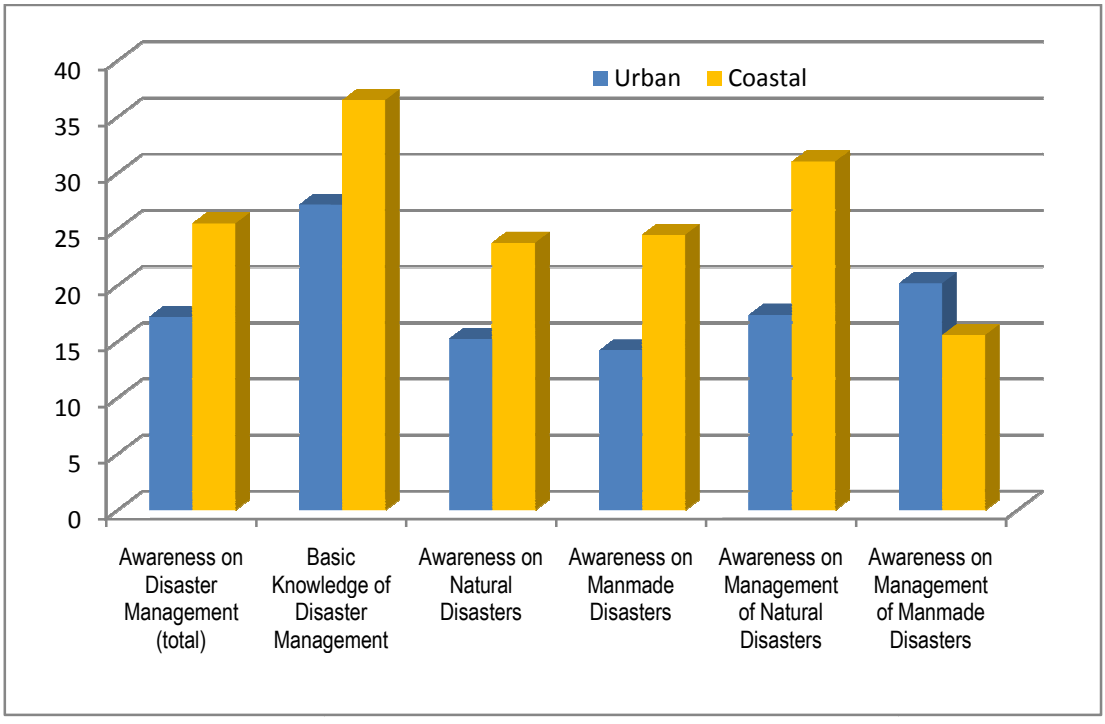


Figure 4.11 Graphical representation of Comparison of mean gain scores of Disaster Management between urban and coastal students

Discussion

To assess the effectiveness of Disaster Management Education Programme in enhancing secondary school students Awareness on Disaster Management and its components viz., Basic knowledge of Disaster Management, Awareness on Natural Disasters, Awareness on Manmade Disasters, Awareness on Management of Natural Disasters, and Awareness on Management of Manmade Disasters and the comparison between the pre-test and post-test scores of Awareness on Disaster Management and its components for total sample and subsamples based on gender and locale by using paired sample 't' test.

Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management in total and its Components for whole experimental Sample shows that the developed programme has strong effect in enhancing secondary school students' awareness on disaster management (total), basic knowledge of disasters, awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohens d > 1. Whereas the programme has moderate effect in enhancing their awareness on management of manmade disaster since the effect size 0.73 lies between 0.51 and 1.00.

Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for sub sample based on gender shows that the Disaster Management Education Programme shows significant effect in improving secondary school boys 'Awareness on Disaster Management and its components. The developed programme has strong effect in enhancing boys' awareness on disaster management (total), basic knowledge in disasters, and

awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohens d > 1. Whereas the programme has moderate effect in enhancing the awareness on management of manmade disaster since the effect size 0.73 lies between 0.51 and 1.00. The Disaster Management Education Programme shows significant effect in secondary school girls. The developed programme has strong effect in enhancing girls' awareness on disaster management (total), basic knowledge in disasters, awareness on natural disaster, and manmade disasters. Whereas the programme has moderate effect in enhancing the awareness on management of natural disasters and manmade disaster since the effect size 0.73 lies between 0.51 and 1.00.

Comparison between mean gain scores of awareness on Disaster Management and its components for the sub sample based on gender shows that there is no significant difference in mean gain score between boys and girls in the Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, Awareness on Natural Disaster, Awareness on manmade Disaster, Awareness on Management Natural disaster, and Awareness of Management of Manmade Disaster

Comparison between mean Pre–test and Post–test Scores of Awareness on Disaster Management and its components for sub sample based on locale results that the developed Disaster Management Education Programme shows significant effect in urban students. The developed programme has strong effect in enhancing urban students' awareness on disaster management (total), basic knowledge in disasters as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect

in enhancing the awareness on natural disaster and manmade disasters, management of natural disasters and manmade disaster since the effect sizes lie between 0.51 and 1.00. The Disaster Management Education Programme shows significant effect in coastal students. The developed programme has strong effect in enhancing coastal students' awareness on disaster management (total), basic knowledge in disasters and awareness on natural disaster, manmade disaster, and management of natural disaster as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing the awareness on management of manmade disaster since the effect sizes lie between 0.51 and 1.00.

Comparison between mean gain scores of awareness on Disaster Management and its components for the sub sample based on locale shows that that there is a significant difference in mean gain score between urban and coastal students in the Awareness on Disaster Management in total and its components viz., Awareness on Natural Disaster, Awareness on Manmade Disaster, and Awareness on Management Natural disaster. There is no significant difference in mean gain score between urban and coastal students in the Awareness on Basic knowledge of Disaster Management and Awareness on Management of Manmade Disaster.

f) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management in total and its Components for whole experimental Sample

The investigator conducted a retention test in the possible samples which was done after a gap of one month from the post test. This included 68 students belonging to total experimental sample in which, boys and girls, urban and coastal

students. This test is aimed to know retention of awareness on disaster management and its components for the total sample. The data and results of the test of significance of difference in means of the variable disaster management and its components between the post test and retention test for the whole sample is given in Table 4.15.

Table 4.15

Comparison of mean scores of Awareness on disaster management in total and its components between post- test and retention test for whole sample

Variables	Post-test		Retention-test		r	t-value
	M1	S.D1	M2	S.D2		
Awareness on Disaster Management (total)	54.69	12.89	53.01	12.12	.968	4.26**
Basic Knowledge of Disaster Management	5.85	1.78	6.14	1.971	.733	1.75
Awareness on Natural Disaster	10.01	3.31	9.77	3.36	.790	0.89
Awareness on Manmade Disaster	21.63	5.18	21.25	4.87	.948	1.91
Awareness on Management of Natural Disaster	8.58	3.10	7.86	2.83	.853	3.64**
Awareness on Management of Manmade Disaster	8.05	2.88	7.85	2.55	.935	1.64

N=68

** Significant at 0.01 level * Significant at 0.05 level

The ‘t’ value obtained for total disaster management awareness, Basic Knowledge of disaster management, awareness on natural disasters, awareness on manmade disasters, awareness on management of natural disasters and awareness on management of manmade disasters are 4.26, 1.75, 0.89, 1.91, 3.64 and 1.64 respectively.

From the Table 4.15 it is found that the 't' value of total disaster management awareness and awareness on management of natural disaster are higher than the level of significance that is they exceed 1.96. That means retention test means scores were lower than post-test means and hence retention of these variable is not found. But the critical ratios of components of disaster management viz, Basic Knowledge, awareness on natural disaster, awareness on manmade disaster and awareness on management of manmade disasters are less than the level of significance that is 1.96. That means the effect found in the post-test through the experiment is retained after one month and thus the effect is found long lasting.

g) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management in total and its Components for Subsample based on Gender

The data and results of the test of significance of difference in means of the variable disaster management and its components between the post test and retention test for the sub sample based on gender is given in Table 4.16.

Table 4.16

Comparison of mean score of Awareness on disaster management and its components between post- test and retention test for subsample based on gender

Variables	Subsamples	Post-test		Retention test		r	t-value
		M1	S.D1	M2	S.D2		
Awareness on Disaster Management (total)	Boys	53.38	14.02	51.94	13.37	.974	2.72**
	Girls	56.15	11.53	54.21	10.62	0.95	3.29**
Basic Knowledge of Disaster Management	Boys	5.80	1.65	6.08	2.07	.713	1.13
	Girls	5.90	1.94	6.21	1.87	.76	1.33
Awareness on Natural Disaster	Boys	9.72	3.30	9.88	3.65	.753	0.40
	Girls	10.34	3.34	9.65	3.06	.86	2.29*
Awareness on Manmade Disaster	Boys	21.11	6.16	20.69	5.69	.955	1.35
	Girls	22.21	3.80	21.87	3.74	.92	1.36
Awareness on Management of Natural Disaster	Boys	8.55	3.31	7.69	2.68	.868	3.11**
	Girls	8.62	2.89	8.06	3.02	.85	1.98
Awareness on Management of Manmade Disaster	Boys	7.61	2.87	7.41	2.82	.966	1.55
	Girls	8.56	2.85	8.34	2.14	.90	0.96

Boys N=36, girls N=32
** Significant at 0.01 level * Significant at 0.05 level

The ‘t’ value obtained for total disaster management awareness, Basic Knowledge, awareness on natural disaster, awareness on manmade disaster, awareness on management of natural disaster and awareness on management of manmade disaster for boys are 2.72, 1.13, 0.40, 1.35, 3.11 and 1.55 respectively.

From the Table 4.16 it is found that the obtained ‘t’ value of total disaster management awareness and awareness on management of natural disaster are higher than the level of significance that is they exceed 1.96. That means retention test means scores were lower than post-test means and hence retention of these variable

is not found. But the critical ratios of components of disaster management viz, Basic Knowledge of disaster management, awareness on natural disaster, awareness on manmade disaster and awareness on management of manmade disasters are less than the level of significance that is 1.96. That means the effect found in the post-test through the experiment is retained after one month and thus the effect is found long lasting.

The critical ratios obtained for total disaster management awareness, Basic Knowledge, awareness on natural disaster, awareness on manmade disaster, awareness on management of natural disaster and awareness on management of manmade disaster for girls are 3.29, 1.33, 2.29, 1.36, 1.98 and 0.96 respectively.

From the table 4.16 it is found that the critical ratios of total disaster management awareness, awareness on natural disaster, and awareness on management of natural disaster are higher than the level of significance that is they exceed 1.96. That means retention test means scores were lower than post-test means and hence retention of these variable is not found. But the critical ratios of components of disaster management viz, Basic Knowledge of disaster management, awareness on manmade disaster and awareness on management of manmade disasters are less than the level of significance that is 1.96. That means the effect found in the post-test through the experiment is retained after one month and thus the effect is found long lasting.

h) Comparison between mean Post–test and Retention Test Scores of Awareness on Disaster Management and its components for the sub sample based on Locale

The data and result of the test of significance of difference in means of the variable disaster management in total and its components between the post test and retention test for the sub sample is given in Table 4.17.

Table 4.17

Comparison of mean score of Awareness on disaster management and its components between post- test and retention test for subsamples based on locale

Variables	Subsample	Post-test		Retention-test		r	t-value
		M1	S.D1	M2	S.D2		
Awareness on Disaster Management (total)	Urban	52.90	15.40	52.09	14.64	.965	1.16
	Coastal	56.37	9.91	53.88	9.28	.98	7.49**
Basic Knowledge of Disaster Management	Urban	5.72	2.01	6.39	2.34	.624	2.00*
	Coastal	5.97	154	5.91	1.54	.98	1.43
Awareness on Natural Disaster	Urban	9.30	3.62	10.27	4.00	.812	2.35*
	Coastal	10.38	2.87	9.31	2.60	.92	7.28**
Awareness on Manmade disaster	Urban	20.51	6.27	20.30	5.81	.932	0.53
	Coastal	22.68	3.69	22.14	3.65	.98	4.88**
Awareness on Management of Natural Disaster	Urban	8.45	3.50	7.48	3.13	.788	2.54*
	Coastal	8.71	2.71	8.22	2.50	.95	3.67**
Awareness on Management of Manmade Disaster	Urban	8.30	3.45	7.90	3.06	.919	1.65
	Coastal	7.82	2.22	7.80	1.99	.97	0.32

Urban N=33, coastal 35
** Significant at 0.01 level * Significant at 0.05 level

The ‘t’ value obtained for total disaster management awareness, Basic Knowledge of disaster management, awareness on natural disaster, awareness on

manmade disaster, awareness on management of natural disaster and awareness on management of manmade disaster for urban students are 1.16, 2.00, 2.35, 0.53, 2.54 and 1.65 respectively.

From the Table 4.17 it is found that the 't' value of components of disaster management viz, basic knowledge of disaster management, awareness on natural disaster and awareness on management of natural disaster are higher than the level of significance that is they exceed 1.96. That means retention test means scores were lower than post-test means and hence retention of these variable is not found. But the critical ratios of total disaster management awareness, components of disaster management viz, awareness on manmade disaster and awareness on management of manmade disasters are less than the level of significance that is 1.96. That means the effect found in the pot-test through the experiment is retained after one month and thus the effect is found long lasting.

The 't' value obtained for total disaster management awareness, Basic Knowledge of disaster management, awareness on natural disaster, awareness on manmade disaster, awareness on management of natural disaster and awareness on management of manmade disaster for coastal students are 7.49, 1.43, 7.28, 4.88 3.67 and 0.32 respectively.

From the Table 4.17 it is was found that the 't' value of total disaster management awareness, awareness on natural disaster, awareness on manmade disaster and awareness on management of natural disaster are higher than the level of significance that is they exceed 1.96. That means retention test means scores were lower than post-test means and hence retention of these variable is not found. But

the critical ratios of components of disaster management viz, Basic Knowledge of disaster management and awareness on management of manmade disasters are less than the level of significance that is 1.96. That means the effect found in the post-test through the experiment is retained after one month and thus the effect is found long lasting

Discussion

The results of Comparison between Post-Test and Retention Test scores shows that awareness on disaster management in total is retained by urban students only. Basic knowledge is retained by total sample, boys, girls and coastal students. Awareness on natural disasters is retained by total sample and boys. Awareness on manmade disaster is retained by total sample, boys, girls and urban students. Awareness on management of natural disaster is retained by none of the sample. Awareness on management of manmade disaster is retained by all samples.

From the results it was also found that awareness on management of natural disaster is retained by none of the samples. This may be due to the fact that disaster management is the new area to the students of Kerala and one month classroom experience is not enough to retain what they learned. A continued effort in this regard should be there to give a positive result.

Validation of the Programme

The evaluation of the Disaster Management Education Programme was done by the experts on the basis of the selected criteria for evaluation such as Selection of the content, Organisation of the content, Presentation of the content,

Appropriateness of the content and Language used. Out of the five experts 80 percent of them reported that the Selection of content, Presentation of the content and Language used are good. According to all the experts the Appropriateness of the content is good. About 60 percent experts found that Organisation of the content is satisfactory. Among which 20 percent experts reported that Selection of the content, Organisation of the content, Presentation of the content and Language used are satisfactory. Only 20 percent of experts found that Organisation of the content is not satisfactory.

Tenability of Hypotheses

The tenability of hypothesis was established based on the analysis findings

The first hypotheses states there is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the whole sample

The results revealed that there is significant difference between pre-test and post-test in their Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster for whole sample.

Thus the first hypothesis is completely substantiated.

The second hypothesis states that there is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the sub samples based on gender

The results revealed that the secondary school boys showed there is significant difference between pre-test and post-test mean scores in their Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster.

The results revealed that the secondary school girls showed there is significant difference between pre-test and post-test mean scores in their Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster.

Hence the second hypothesis is completely substantiated.

The third hypothesis states that there is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for sub sample based on locale

The results revealed that the urban students showed there is significant difference between pre-test and post-test mean scores in their Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster.

The results revealed that the coastal students showed there is significant difference between pre-test and post-test mean scores in their Awareness on Disaster Management in total and its components viz., Awareness on basic knowledge of Disaster Management, awareness on Natural disaster, awareness on Manmade Disaster, awareness on Management of Natural Disaster and awareness on Management of manmade disaster.

Hence the third hypothesis is completely substantiated.

The fourth hypothesis states that there is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on gender

The result revealed that there is no significant difference in mean gain score between boys and girls in the Awareness on Disaster Management and its components viz., Awareness on basic knowledge of Disaster Management, Awareness on Natural Disaster, Awareness on manmade Disaster, and Awareness on Management Natural disaster, and Awareness of Management of Manmade Disaster.

Thus the fourth hypothesis is not substantiated.

The fifth hypothesis states that There is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on Locale

The result revealed that there is a significant difference in mean gain score between urban and coastal students in the Awareness on Disaster Management in

total and its components viz., Awareness on Natural Disaster, Awareness on Manmade Disaster, and Awareness on Management Natural disaster. There is no significant difference in mean gain score between urban and coastal students in the Awareness on Basic knowledge of Disaster Management and Awareness on Management of Manmade Disaster.

Hence the hypothesis is partially substantiated

The sixth hypothesis states that there is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the whole sample

The results revealed that there is significant difference between post- test and retention test in their total disaster management awareness and awareness on management of natural disaster for the whole sample. There is no significant difference between mean scores of post-test and retention in the components of disaster management viz, Basic Knowledge of disaster management , awareness on natural disaster, awareness on manmade disaster and awareness on management of manmade disasters for the total sample.

Hence the sixth hypothesis is partially substantiated.

The seventh hypothesis states that there is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the sub sample based on gender

The results revealed that there is significant difference between post-test and retention test in their total disaster management awareness and awareness on management of natural disaster for boys. There is no significant difference found between post-test and retention in the components of disaster management viz, Basic Knowledge, awareness on natural disaster, awareness on manmade disaster and awareness on management of manmade disasters for boys.

The result revealed that there is significant difference between post-test and retention test in their total disaster management awareness, awareness on natural disaster, and awareness on management of natural disaster for girls. There is no significant difference between post-test and retention test in their components of disaster management viz, Basic Knowledge, awareness on manmade disaster and awareness on management of manmade disasters for girls.

Hence the seventh hypothesis is partially substantiated.

The eighth hypothesis states that there is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for sub sample based on locale.

The results revealed that there is significant difference between post-test and retention test in the components of disaster management viz, basic knowledge of disaster management, awareness on natural disaster and awareness on management of natural disaster for urban students. There is no significant difference between post-test and retention test in their total disaster management awareness,

components of disaster management viz, awareness on manmade disaster and awareness on management of manmade disasters for urban students.

The results revealed that there is significant difference between post-test and retention test in their total disaster management awareness, awareness on natural disaster, awareness on manmade disaster and awareness on management of natural disaster for coastal students. There is no significant difference between post-test and retention test in their components of disaster management viz, Basic Knowledge, and awareness on management of manmade disasters for coastal students.

Thus the eighth hypothesis is partially substantiated.

The last hypothesis states that the developed Disaster Management Education Programme will be effective to enhance awareness on Disaster Management among Secondary School Students.

The findings of the study revealed that the developed programme was very effective to enhance the awareness on disaster management among secondary school students.

Hence the last hypothesis is fully substantiated.

SUMMARY, CONCLUSIONS AND SUGGESTIONS

- *Restatement of the problem*
- *Variables*
- *Objectives*
- *Hypotheses*
- *Methodology*
- *Design of the Study*
- *Major Findings*
- *Conclusions*
- *Educational Implications*
- *Suggestions for Further Research*

SUMMARY, CONCLUSIONS AND SUGGESTIONS

This chapter summarises the entire study done. It provides an overall view of findings, conclusions, educational implications and suggestions resulting from the study.

Restatement of the Problem

The study was entitled as "EFFECTIVENESS OF A DISASTER MANAGEMENT EDUCATION PROGRAMME TO ENHANCE THE AWARENESS ON DISASTER MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS OF KERALA".

Variables

Independent variable

The independent variables are the conditions or characteristics that the experimenter manipulates or control in his/her attempt to ascertain their relationships to observed phenomena. It is under the direct control of the experimenter. The independent variable selected for this study was 'Disaster management Education Programme'.

"Disaster is a crisis situation that far exceeds our capabilities to cope" – Quarentelly (1985) Disaster management Education deals with the disasters and its management.

The United Nations defines a disaster as a serious disruption of the functioning of a community or a society. Disasters involve widespread human, material, economic or environmental impacts, which exceed the ability of the affected community or society to cope using its own resources.

The Red Cross and Red Crescent societies define disaster management as the organisation and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters.

Dependent variable

The dependent variables are the conditions or characteristics that appear, disappear or change as the experimenter introduces removes or change the independent variable. The main variable of the study is 'Awareness on Disaster Management of Secondary School Students'. Disaster management with its five components namely Basic knowledge about Disaster and its management, Awareness on Natural disasters, Awareness on Manmade disasters, Awareness on management of Natural disasters, Awareness on management of Manmade disasters was selected as the dependent variable of the study.

Objectives

The major objectives of the study

1. To Develop a Disaster Management Education Programme to Enhance the Awareness on Disaster Management among Secondary School Students of Kerala

2. To find out the effectiveness of the developed programme on Disaster Management Education

The specific objectives of the study

1. To analyse the general science and social science text books for standard VIII and Biology for standards IX and X to locate the concepts of Disaster Management.

2. To find out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the total sample

3. To find out the existing level of awareness of Secondary School Students on Disaster Management in total and its components for the sub sample based on gender and locale

4. To find out the existing level of awareness on Disaster Management in total and its components among secondary school students of different districts of Kerala

5. To test the difference between pre-test and post- test mean scores of awareness on Disaster Management in total and its components for its significance in the whole experimental sample.

6. To test the difference between pre-test and post- test mean scores of awareness on Disaster Management in total and its components for its significance in the sub samples based on gender and locale.

7. To test the difference between post- test and retention test mean scores of awareness on Disaster Management in total and its components for its significance in the whole experimental sample.

8. To test the difference between post- test and retention test mean scores of awareness on Disaster Management in total and its components for its significance in the sub samples based on gender and locale.

9. To validate the developed Disaster Management Education Programme

Hypotheses

1. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the whole sample

2. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for the sub samples based on gender

3. There is significant difference in the mean scores of awareness on disaster management in total and its components between pre-test and post-test for sub sample based on locale

4. There is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on gender

5. There is significant difference in the mean gain scores of Awareness on Disaster Management between pre-test and post-test among secondary school students based on Locale

6. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the whole sample

7. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for the sub samples based on gender

8. There is no significant difference in the mean scores of awareness on disaster management in total and its components between post-test and retention test for sub sample based on locale

9. The developed Disaster Management Education Programme will be effective to enhance awareness on Disaster Management among Secondary School Students.

Methodology

The methodology of the study is provided below in brief. Purpose of the study was to develop a Disaster Management Education Programme in enhancing the Awareness on Disaster Management among secondary school students of Kerala.

Design of the Study

In this study both survey and experimental methods were used. For that experimental and non-experimental designs were used. The present study was conducted in three phases.

First phase

The first phase focused on the need of a disaster management education program. This was a non-experimental research design. It included content analysis of secondary school text books to find out the concept of disaster management, and awareness of secondary school students on disaster management. Survey method was used to find out the awareness of secondary school students.

Second phase

The second phase of the study was a Developmental phase. Based on the first phase a programme was developed to enhance the awareness of secondary school students on disaster management.

Third phase

The third phase was an experimental validation phase. For experimentation single group pre-test post-test design was adopted. Compare the pre-test post-test scores were analysed. Based on the analysis of the comparisons between pre-test post-test and post-test retention test comparison the effectiveness of the disaster management programme for secondary school students were established.

Sample

The study was based on both survey and experimentation. The survey was conducted among 532 secondary school students from different schools of 14 districts of Kerala. Random sampling method was used for the selection of schools in the survey method. Data was collected from all the 14 districts of Kerala. The different factors selected while deciding the sample were gender, and locale of school. About 280 boys and 252 girls' were involved in the survey.

In the experimentation phase the experiment was conducted on 8th standard students from two schools of Kozhikode district. A total sample of 68 students from two schools was participated in the experiment. The characteristics of the schools selected for experimentation was an urban and a coastal type. The other factor considered was gender.Since the main objective of the study was to develop a Disaster Management Education programme, the experiment was conducted to find out the effectiveness of the Disaster Management Education programme.

Tools used for the study

The following Tools and Techniques were used in the study,

1. Disaster Management Awareness Test(Udayasree&Rekha ,2017)
2. Disaster Management Education Programme (Udayasree&Rekha ,2017)
3. Lesson transcripts for transacting Disaster Management Education Programme

Statistical techniques used

Statistical techniques used in the present study were

- Preliminary analysis
- Test of significance of difference between means (t-test)
- Cohen's d

Preliminary Analysis

The important statistical techniques like mean, median, mode, standard deviation, skewness and kurtosis of disaster management awareness were computed for the total sample.

Test of significance of difference between means (t-test)

In the present study, the test of significance of difference between means of independent samples was used to find out if there exists any significant difference in the awareness on disaster management and relevant sub samples

The critical ratio was calculated by the formula:

$$t = \frac{\text{Difference between means}}{\text{Standard Error of the difference}}$$ (Best and Khan 2006)

If the obtained't' value is greater than the required table value at 0.05/0.01 levels of significance, the mean difference is considered to be significant.

Cohen's d

Cohen's *d* is an effect size used to indicate the standardised difference between two means. Cohen's *d* can be calculated as the difference between the means divided by the pooled SD:

$$d = \frac{M_2 - M_1}{\text{Pooled standard deviation}}$$

Major Findings of the Study

The main objectives of the study were, to develop a Disaster Management Education Programme to enhance the awareness on Disaster Management and to find out the effectiveness of the developed Disaster Management Education Programme. Before developing the programme, the need was established by content analysis of text books at secondary level. Existing level of awareness on Disaster Management among secondary school students was also found out. The analysis of the text books shows that the secondary level Basic Science and Social Science and Biology text books are devoid of having the concept of Disaster Management. The other major findings of the study are as follows.

- The means score obtained for total sample, boys, girls, urban, rural, and coastal and the students of all the 14 districts of Kerala.

  Analysis of mean scores of Awareness on Disaster Management and its components of secondary school students revealed that students are not

having satisfactory level of Awareness on Disaster Management. The mean scores are even below the half of the obtainable scores.

- Significant difference exists between pre-test and post-test mean scores of Awareness on Disaster Management in total and its components for the whole sample.

The developed Programme has strong effect in enhancing secondary school students' Awareness on Disaster Management (total), Basic Knowledge of Disaster Management, and Awareness on Natural Disasters, Awareness on Manmade Disasters, and Management of Natural Disasters as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing their Awareness on Management of Manmade Disasters since the effect size 0.73 lies between 0.51 and 1.00.

- Significant difference exists between pre-test and post-test mean scores of Awareness on Disaster Management in total and its components for the subsample boys.

The developed programme has strong effect in enhancing boys' Awareness on Disaster Management (total), Basic Knowledge of Disaster Management, and Awareness on Natural Disasters, Awareness on Manmade Disasters, and Management of Natural Disasters as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing the awareness on Management of Manmade Disasters since the effect size 0.73 lies between 0.51 and 1.00.

- Significant difference exists in the pre-test and post-test mean scores of awareness on Disaster Management in total and its components for the subsample girls.

  The developed programme has strong effect in enhancing girls' awareness on disaster management (total), Basic Knowledge of Disaster Management, Awareness on Natural Disasters, and Awareness on Manmade Disasters. Whereas the programme has moderate effect in enhancing the awareness on Management of Natural Disasters and Management of Manmade Disasters since the effect size 0.73 lies between 0.51 and 1.00.

- Significant difference exists in the pre-test and post-test mean scores of awareness on Disaster Management in total and its components for the subsample urban students.

  The developed programme has strong effect in enhancing urban students' awareness on disaster management (total), Basic Knowledge of Disaster Management as the obtained values of Cohen's $d > 1$. Whereas the programme has moderate effect in enhancing the Awareness on Natural Disasters and Awareness on Manmade Disasters, Management of Natural Disasters and Management of Manmade Disasters since the effect sizes lie between 0.51 and 1.00.

- Significant difference exists in the pre-test and post-test mean scores of awareness on Disaster Management in total and its components for the sub sample coastal students.

The developed programme has strong effect in enhancing coastal students' awareness on disaster management (total), Basic Knowledge of Disaster Management and Awareness on Natural Disasters, Awareness on Manmade Disasters, and Management of Natural Disasters as the obtained values of Cohen's d > 1. Whereas the programme has moderate effect in enhancing the awareness on Management of Manmade Disasters since the effect sizes lie between 0.51 and 1.00.

- The results of Comparison between Post-Test and Retention Test scores shows that awareness on disaster management in total is retained by urban students only. Basic Knowledge of Disaster Management is retained by total sample, boys, girls and coastal students. Awareness on Natural Disasters is retained by total sample and boys. Awareness on Manmade Disasters is retained by total sample, boys, girls and urban students. Awareness on Management of Natural Disasters is retained by none of the sample. Awareness on Management of Manmade Disasters is retained by all samples.

- The developed programme was very effective in enhancing disaster management awareness in secondary school students.

The mean score comparison between pre-test and post –test score reveal that there exist a significant difference in the mean score. Then the post-test retention test means score comparison reveals that there exists no significant difference between the scores. Hence the result shows that the Disaster Management Education Programme was very effective in enhancing disaster management awareness in secondary school students.

Conclusions

The findings of the study lead to the following conclusions.

A Disaster Management Education Programme is essential to enhance the awareness on Disaster Management among Secondary School Students of Kerala. The developed Disaster Management Education Programme is found effective in enhancing the Awareness on Disaster Management among Secondary School Students of Kerala. The effect of the programme is found long lasting.

Educational Implications of the Study

The results of the present study have various implications in the education field.

Findings showed that Disaster Management Education is very essential among students. As our country is vulnerable to all types of disasters – natural and manmade – disaster management is to be considered as a major priority area in our curriculum. Knowledge is to be pooled by incorporating the expertise of all strata of people while restructuring curriculum with the concept of disaster management. Mock Drills, First aid training and swimming are to be given to students. Teachers are to be trained through In-service courses to make the student generation aware of Disaster management. Separate packages on Disaster management to be prepared for all people like the other nations. Talks, awareness classes, campaigns ... to be conducted to all people. Knowledge in disaster management will surely help

the students to become better planners and professionals in their future life. The results of the study deserve serious attention of the policy makers. The study in this particular situation is a warning signal for the actual transformation of an individual in accordance with the nature.

Suggestions for Further Research

On the basis of the present study the investigator suggests the following areas for further research

- The study can be replicated to primary, higher secondary and higher education levels
- A study can be conducted on the awareness and attitude of teachers of primary level, secondary level, higher secondary level and higher education level.
- A comparative study can be conducted between CBSE and State syllabus students
- A study can be conducted for the attitude of participation in disaster management activities among secondary, higher secondary and higher education levels
- The study can be replicated for the physically challenged students in all levels

- A comparative study can be conducted for the awareness and attitude toward natural and manmade disaster among secondary, higher secondary and higher education levels.

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APPENDICES

APPENDIX I

CONTENT ANALYSIS

BASIC SCIENCE

Chapter 1: LIFE'S MYSTERIES IN LITTLE CHAMBERS

Major concept: Life's Mysteries in Little Chambers.

Minor concepts

1. Compound microscope
2. Observation material
3. Discovering the cell
4. Milestones in the history of cell biology
5. Cell structure
6. Cell stage.

There is no minor concept with Natural and Manmade disasters

Chapter 2: CELL CLUSTERS

Major concept: Cell Clusters

Minor concepts

1. Diversity among cells
2. Tissues
3. Stem cells
4. Plant tissues
5. Vascular tissues
6. Organs
7. Organ system
8. Organism
9. Population
10. Community.

There is no minor concept with Natural and Manmade disasters

Chapter 3: LET'S REGAIN OUR FIELDS

Major concept: Let's regain our Fields

Minor concepts

1. Food scarcity
2. Food security
3. Rice production
4. Fertile soil
5. Microbes provide fertilizers
6. To control pests
7. Modern technology and pests
8. Pests and their natural enemies
9. Integrated pests management
10. Waste management and sustainable agriculture
11. Livestock management
12. Seri culture
13. Pisci culture
14. Floriculture
15. Apiculture
16. Cuni culture
17. Mushroom culture
18. Horticulture
19. Poly house farming
20. Precision farming
21. Cultivation without soil
22. Native varieties.

There is no minor concept with Natural and Manmade disasters

Chapter 4: PROPERTIES OF MATTER

Major concept: Properties of Matter

Minor concepts

1. Solid, liquid, gas
2. Plasma and other states
3. Tiny particles in matter
4. Diffusion of substances
5. Pure substances and mixtures
6. Distillation
7. Separating funnel
8. Sublimation
9. Centrifugation
10. Chromatography.

There is no minor concept with Natural and Manmade disasters

Chapter 5: BASIC CONSTITUENTS OF MATTER

Major concept: Basic Constituents of Matter

Minor concepts

1. Elements and compounds
2. Symbols
3. Atom and molecule
4. Chemical equations.

There is no minor concept with Natural and Manmade disasters

Chapter 6: CHEMICAL CHANGES

Major concept: Chemical Changes

Minor concepts

1. Physical changes
2. Chemical changes
3. Reactants and products
4. Thermo chemical reactions
5. Photochemical reactions
6. Electrochemical reactions
7. Electroplating
8. Dry cell
9. Mercury cell
10. Nickel-cadmium cell
11. Lithium ion cell
12. Charged particles.

There is no minor concept with Natural and Manmade disasters

Chapter 7: METALS

Major concept: Metals

Minor concepts

1. Malleable metal
2. Reaction of metals with air, water, acids
3. Corrosion of Metals, Gold, Copper
4. Zinc, Aluminium, and Iron.

There is no minor concept with Natural and Manmade disasters

Chapter8: MEASUREMENTS AND UNITS

Major concept: Measurements and Units

Minor concepts

1. Length,
2. Smaller unit of Length
3. Measurement of thickness of a paper
4. Length of a curved line
5. Diameter of a sphere
6. Mass
7. Time
8. Temperature
9. Electric current
10. Amount of substance
11. Luminous intensity
12. SI Units, symbols
13. Volume and density
14. Potential difference
15. Pressure
16. Force.

There is no minor concept with Natural and Manmade disasters

Chapter 9: MOTION

Major concept: Motion

Minor concepts

1. Distance and Displacement
2. Speed and Velocity
3. Nautical mile
4. Acceleration
5. Initial velocity and final velocity
6. Retardation.

There is no minor concept with Natural and Manmade disasters

Chapter 10: FORCE

Major concept: Force

Minor concepts

1. Push and Pull
2. Contact force and non-contact force
3. Frictional force
4. Thrust and Pressure
5. Weight
6. Liquid pressure
7. Atmospheric pressure.

There is no minor concept with Natural and Manmade disasters

Chapter 11: MAGNETISM

Major concept: Magnetism

Minor concepts

1. Lodestone
2. Natural magnets and artificial magnets
3. Magnetic compass
4. Earth as a magnet
5. Magnetic field
6. Magnetic flux density
7. Magnetic Induction
8. Susceptibility
9. Retentivity
10. Permeability
11. Electromagnet.

There is no minor concept with Natural and Manmade disasters

Chapter 12: WHY CLASSIFICATION

Major concept: Why Classification

Minor concepts

1. Keys for identification
2. Taxonomy
3. Taxonomic hierarchy by Linnaeus
4. Species, genus, Family, Order, Class, Phylum, Kingdom
5. Diversity in names
6. Binomial nomenclature
7. Kingdom Monera, Protista, Fungi, Plantae, Animalia
8. Modern trends in Taxonomy.

There is no minor concept with Natural and Manmade disasters.

Chapter 13: SOLUTIONS

Major concept: Solutions

Minor concepts

1. Concentration of solution
2. Saturated Solution
3. Super saturated solution
4. Growing crystal
5. Classification of mixtures
6. True solution
7. Colloid
8. Suspension.

There is no minor concept with Natural and Manmade disasters.

Chapter 14: REFLECTION OF LIGHT IN SPHERICAL MIRRORS

Major concept: Reflection of Light in Spherical Mirrors

Minor concepts

1. Spherical mirrors
2. Centre of curvature
3. Radius of curvature
4. Aperture
5. Pole
6. Principal axis
7. Focus and focal length of a spherical mirror
8. Principal focus of a concave mirror
9. Principal focus of a convex mirror
10. Focal length
11. Focal plane
12. Ray diagrams of spherical mirrors
13. Magnification.

There is no minor concept with Natural and Manmade disasters.

SOCIAL SCIENCE

Chapter 1: EARLY HUMAN LIFE

Major concept: 1. Early Human Life

Minor concepts

1. Palaeolithic age
2. Mesolithic age
3. Neolithic age
4. Chalcolithic age.

There is no minor concept with Natural and Manmade disasters.

Chapter 2: THE RIVER VALLEY CIVILIZATION

Major concept: The river valley civilization

Minor concepts

1. Indus Valley civilization
2. The river valley civilization
3. Egyptian civilization
4. Mesopotamian civilization
5. Chinese civilization.

There is no minor concept with Natural and Manmade disasters.

Chapter 3: IN SEARCH OF EARTH'S SECRETS

Major concept: In search of Earth's Secrets

Minor concepts

1. Crust, Mantle, and Core
2. Lithosphere and Asthenosphere
3. Weathering and Humans
4. Soil for sustenance.

There is no minor concept with Natural and Manmade disasters.

Chapter 4: OUR GOVERNMENT

Major concept: Our Government

Minor concepts

1. Government of India
2. Functions of Parliament
3. State Legislature
4. State Executive and Judiciary in India.

There is no minor concept with Natural and Manmade disasters.

Chapter 5: ANCIENT TAMILAKAM

Major concept: Ancient Tamilakam

Minor concepts

1. Megalithic Monuments
2. Sangam Literature
3. Sangam Works
4. Social life
5. Karippadappai
6. Punam Cultivation
7. Exchange System
8. Moovendans.

There is no minor concept with Natural and Manmade disasters.

Chapter 6: READING MAPS

Major concepts: Reading Maps

Minor concepts

1. Classification of Maps
2. Small Scale Maps
3. Large Scale Maps
4. Map reading essentials
5. Scale
6. Direction,
7. Conventional Signs and Symbols
8. Statement of Scale
9. Representative Fraction
10. Linear Scale.

There is no minor concept with Natural and Manmade disasters.

Chapter 7: ECONOMIC THOUGHT

Major concept: Economic Thought

Minor concepts

1. Fundamental problems faced by an economy
2. Economic thinking
3. Economic thinkers
4. Gandhian economics
5. Indian Economic thinkers.

There is no minor concept with Natural and Manmade disasters.

Chapter 8: TOWARDS THE GANGETIC PLAIN

Major concept: Towards the gangetic plain

Minor concepts

1. SaptaSindhuregio
2. Rigveda
3. Pastoral life
4. Gangetic Valley
5. Sama Veda
6. Yajur Veda
7. Atharva Veda
8. Agriculture, Trade, Cities
9. Jainism
10. Budhism
11. Mahajanapadas
12. Magadha
13. Foreign relations
14. Persia, Macedonia.

There is no minor concept with Natural and Manmade disasters.

Chapter 9: FROM MAGADHA TO THANESWAR

Major concept: From Magadha to Thaneswar

Minor concepts

1. The Mouryas
2. The Kushanas
3. The Satavahanas
4. The Guptas, and the Vardhanas.

There is no minor concept with Natural and Manmade disasters.

Analysis of the content of Secondary School Biology curriculum

BIOLOGY

Chapter 1: THE SIGN OF LIFE

Major concept: The sign of life

Minor concepts

1. Life the wonder of earth
2. Origin of life
3. Autotrophs and heterotrophs
4. Photosynthesis
5. Protein synthesis
6. Anabolism
7. Catabolism, and metabolism
8. Green leaves
9. Chloroplast
10. Chlorophyll
11. Xanthophyll
12. Carotene
13. Accessory pigments
14. Sunlight
15. Light reaction
16. ATP
17. Dark reaction.

There is no minor concept with Natural and Manmade disasters.

Chapter 2: CHEMICAL CHANGES OF FOOD

Major concept: Chemical changes of food

Minor concepts

1. Nutrition
2. Carbohydrates, Fat, Proteins, Vitamins, Minerals and Water
3. Mono saccharides, Disaccharides and Polysaccharides
4. Digestion
5. Mechanical and chemical digestion
6. Enzyme
7. Arrangement of teeth
8. Passage of food
9. Mucus
10. Salivary amylase
11. Peristalsis
12. Small intestine
13. Digestion in small intestine
14. Traditional food and fast food
15. Nutrition in other animals

There is no minor concept with Natural and Manmade disasters.

Chapter 3: THE WAYS OF TRANSPORT

Major concept: The ways of transport

Minor concepts

1. Absorption of nutrients in to the cells
2. Structure of small intestine
3. Absorption of glucose, Amino acid and fatty acid
4. Blood
5. Amino acids, enzymes and Hormones
6. Monitoring the blood cells
7. Transport through lymph
8. The liver is a refinery
9. Glucose converted in to glycogen
10. Formation of urea
11. Heart structure and function
12. Nutrient transport in other animals
13. Amoeba and paramecium- cyclosis
14. Open circulation and closed circulation
15. Haemolymph, nutrient transport in plants
16. Essential elements and transport
17. Xylem and phloem
18. Sieve tubes
19. Companion cells.

There is no minor concept with Natural and Manmade disasters.

Chapter 4: FOR ENERGY

Major concept: For energy

Minor concepts

1. Oxygen to the blood
2. From nostrils to the lungs
3. Respiration, Inspiration and Expiration
4. Changes in thoracic cavity
5. Transport of oxygen
6. Transport of carbon dioxide
7. RBC
8. Haemoglobin
9. Oxy haemoglobin, the way of energy release
10. Glycolysis
11. Krebs' cycle
12. Formation of ATP
13. Respiration in other organisms
14. Anaerobic respiration
15. Respiration in plants
16. Transport of respiratory gases through stomata and lenticel
17. From food to energy.

There is no minor concept with Natural and Manmade disasters.

Chapter 5: MOVEMENT AND LOCOMOTION

Major objective: Movements and Locomotion

Minor objectives

1. Involuntary movements – heart
2. Voluntary muscles, Skeletal muscles
3. Muscle fatigue
4. Non-striated muscles
5. Cardiac muscles
6. Skeletal system- axial skeleton and appendicular skeleton
7. Joints – movable joints and immovable joints
8. Skeleton – within and out, endoskeleton, exoskeleton
9. Movement and locomotion
10. Flying organism - pterodactyl
11. Swimming animals – locomotion of fishes
12. Traveling wonders
13. The journey of eals
14. Different ways of locomotion
15. Movements in plants- tropic movements
16. Nastic movement.

There is no minor concept with Natural and Manmade disasters.

Chapter 6: THE MEANING OF GROWING

Major concept: the meaning of growing

Minor concepts

1. Growth and multiplication
2. Cell growth
3. Cell division
4. Nucleus
5. Nucleoplasm
6. Chromatin reticulum
7. Chromatids
8. Adolescent- characteristics
9. Changes during adolescent period
10. Body growth
11. Old age
12. Death- brain death
13. Clinical death
14. Growth of plants
15. Meristematic tissue
16. Growth of meristems
17. Growth in microorganisms- cell growth and cell division.

There is no minor concept with Natural and Manmade disasters.

Chapter 7: THE CONTINUATION OF LIFE

Major concept: The continuation of life

Minor concepts:

1. Growth and maturation
2. Male- accessory glands
3. Vas deference, testis, penis
4. Female- fallopian tube
5. Ovary, uterus, vagina
6. Sex hormones
7. Secondary sexual characters
8. Test tube babies
9. In vitro fertilization
10. Reproduction in other animals
11. External fertilization
12. Fertilization in birds- internal fertilization
13. Egg laying mammals-echidna
14. Platypus
15. Reproduction in plants- monoecious
16. Dioeciously
17. Pollination
18. Endosperm
19. Vegetative reproduction- bryophyllum.

There is no minor concept with Natural and Manmade disasters.

Chapter 8: THE SECURITY OF LIFE

Major concept: the security of life

Minor concepts

1. Nutrition
2. Hyper tension
3. Cholesterol
4. Artificiality in foods
5. Natural and artificial
6. A healthy mind in a healthy body
7. Cleanliness for health
8. Protection of – skin, eye, ear, teeth
9. Occupational diseases
10. Silicosis, asbestosis.

There is no minor concept with Natural and Manmade disasters.

10 th STANDARD BIOLOGY CURRICULUM

Chapter 1: BEYOND THE SENSES

Major concept: Beyond the senses

Minor concepts

1. The Eye –the window open to nature
2. Brain the centre of wonder
3. Ear- behind the Hearing
4. How did you taste?-sense of taste
5. To know the smell
6. Skin- the big sense organ
7. Structure of eye
8. Structure of brain
9. Structure of ear
10. Touch, Taste and Smell.

There is no minor concept with Natural and Manmade disasters.

Chapter 2: RESPONSES ARE LIKE THIS

Major concept: Responses are like this

Minor concepts

1. Reflex, reflex action, reflex arc, conditioned reflexes
2. Nervous system
3. Sympathetic nervous system
4. Para sympathetic nervous system
5. Chemo receptors
6. Baro receptors
7. Cranial nerves
8. Parts of central nervous system
9. Alzheimer disease
10. Parkinson disease
11. Epilepsy
12. Unicellular animals
13. Nerve net
14. Omattidium
15. Ultrasonic sounds
16. Jacobson’s organ
17. Photo morphogenesis
18. Pkytochrome.

There is no minor concept with Natural and Manmade disasters.

Chapter 3: CHEMISTRY BEHIND THE RESPONSES

Major concept: Chemistry behind the responses

Minor concepts

1. Chemo receptors
2. Hypothalamus
3. Pituitary
4. Pineal gland
5. Thyroid
6. Para thyroid
7. Adrenal
8. Pancreas
9. Adrenalin, nor adrenalin
10. Cortisol, insulin
11. Glucagon thyroxin
12. Somatotropin
13. Circadian rhythm
14. Melatonin
15. Vasopressin
16. Antidiuretic hormone-ADH
17. Diabetes insipidus
18. Aldosterone
19. Calcitonin
20. Parathormone
21. TSH, ACTH, GTH, releasing hormone
22. Inhibitory hormone
23. Co-existance
24. Pheromones
25. Messengers in plants
26. auxins, cytokinins, gibberellins, ethylene, abscisic acid
27. Chemistry of growing curved

There is no minor concept with Natural and Manmade disasters.

Chapter 4: AFTER THE METABOLISM

Major concept: After the Metabolism

Minor concepts

1. Formation of urea
2. Experiment, urease
3. Kidneys
4. Components of urine
5. Kidney failure
6. Nephritis
7. Renal failure
8. Kidney stone
9. Kidney transplantation
10. Dialysis, donor
11. Other excretory organs of body
12. Lungs, skin, liver
13. Excretion in other animals
14. Contractile vacuoles
15. Nephredia
16. Malpighian tubule, gills
17. Uric acid
18. Excretion in plants.

There is no minor concept with Natural and Manmade disasters.

Chapter 5: WHEN BALANCE IS BROKEN

Major concept: When balance is broken

Minor concepts

1. Typhoid, cholera, diarrhoea
2. Tuberculosis, chiken pox
3. Malaria, elephantiasis
4. Dengue fever, chikkun guinea
5. Swine flu, disease causing micro-organism
6. Virus, bacteria, protozoa, fungus
7. Bad habits and diseases
8. Carcinogens
9. Alcohol and drugs
10. Cancer, genetic diseases
11. Haemophilia
12. Sickle cell anaemia
13. Anaemia, urinary tract, plant diseases.

The content of this chapter related with manmade disaster but this chapter only describe just what are these diseases but not sufficient for disaster management.

Chapter 6: SAFETY AND TREATMENT

Major concept: Safety and treatment

Minor concepts

1. Immunity
2. White blood cells
3. Phagocytosis
4. Clotting of blood
5. Immunity power
6. Immunity response
7. Organ transplantation
8. Organ donation
9. HIV
10. Pace maker
11. Angiogram
12. Telemedicine
13. Genetic engineering
14. Nano technology
15. Gene therapy
16. C T scan, bypass surgery
17. Endoscopy
18. Medicines from microorganisms

There is no minor concept with Natural and Manmade disasters.

Chapter 7: HOW DO WE FORMED

Major concept: How do we formed

Minor concepts

1. Genetics, father of genetics
2. Pea plants
3. Law of dominance, Law of segregation
4. Law of independent assortment
5. F1 generation
6. Mile stones in genetics
7. DNA, functioning of genes
8. RNA, crossing over
9. Gene distribution
10. Recombinant DNA Technology
11. Molecular scissors
12. Restriction endo nuclease
13. DNA ligase, molecular glue
14. Bacillus thurungiensis
15. Super bugs
16. DNA Finger printing
17. Human genome Project

There is no minor concept with Natural and Manmade disasters.

Chapter 8: THE STORY OF LIFE AND ANIMALS

Major concept: The story of life and animals

Minor concepts

1. formation of cell
2. Oparin – Haldane hypothesis
3. Miles stones in genesis
4. Darwin
5. Galapagos' Islands
6. Darwin finches
7. Mutation theory
8. Neo Darwinism
9. Fossils
10. Paleontology
11. Molecular Biology
12. Palaeoanthropology
13. Dryopithecus
14. Ardipithecus
15. Homohabilis
16. Australopithecus
17. Homo erectus
18. Homo Neanderthalensis
19. Homo sapiens.

There is no minor concept with Natural and Manmade disasters.

APPENDIX II

ദുരന്തനിവാരണ വിദ്യാഭ്യാസ പ്രോഗ്രാം

സെക്കണ്ടറി തലത്തിലുള്ള വിദ്യാർത്ഥികൾക്ക്

ദുരന്തനിവാരണ വിദ്യാഭ്യാസ പ്രോഗ്രാം

സെക്കണ്ടറി തലത്തിലുള്ള വിദ്യാർത്ഥികൾക്ക്

ആമുഖം

സെക്കണ്ടറി സ്കൂൾ കുട്ടികൾക്ക് ദുരന്തനിവാരണത്തിൽ അവബോധം ഉണ്ടാക്കുന്നതിനു വേണ്ടിയാണ് ഈ പ്രോഗ്രാം തയ്യാറാക്കിയിരിക്കുന്നത്. സെക്കണ്ടറി തലത്തിലുള്ള കുട്ടികൾക്ക് വളരെ എളുപ്പം മനസ്സിലാകുന്ന വിധത്തിൽ ലളിതമായാണ് ഇതുണ്ടാക്കിയിട്ടുള്ളത്. ഇതിൽ ദുരന്തങ്ങളെക്കുറിച്ചുള്ള ഒരു പൊതുധാരണയും, പലതരത്തിലുള്ള ദുരന്തങ്ങളും, അവയുടെ നിവാരണ മാർഗ്ഗങ്ങളെക്കുറിച്ചുള്ള അവബോധവും ആണ് ഉൾപ്പെടുത്തിയിട്ടുള്ളത്. മൂന്നു യൂണിറ്റുകളായി തിരിച്ചിട്ടുള്ള ഈ പ്രോഗ്രാമിൽ ഒന്നാമത്തെ യൂണിറ്റിൽ ദുരന്തനിവാരണവുമായി ബന്ധപ്പെട്ട പൊതുധാരണയും, രണ്ടാമത്തെ യൂണിറ്റിൽ പ്രകൃതി ദുരന്തങ്ങളും അവയുടെ നിവാരണ മാർഗ്ഗങ്ങളും, മൂന്നാമത്തെ യൂണിറ്റിൽ മനുഷ്യ നിർമ്മിത ദുരന്തങ്ങളും അവയുടെ നിവാരണ മാർഗ്ഗങ്ങളെക്കുറിച്ചും പ്രതിപാദിച്ചിരിക്കുന്നു. ഒരു സംഗ്രഹത്തോടുകൂടി ഈ പ്രോഗ്രാം അവസാനിക്കുന്നു.

ലക്ഷ്യങ്ങൾ

- സെക്കണ്ടറി തലത്തിലെ വിദ്യർത്ഥികളിൽ ദുരന്തങ്ങളെ ക്കുറിച്ചും, ദുരന്ത നിവാരണ മാർഗ്ഗങ്ങളെ ക്കുറിച്ചും, ഒരു പൊതു അവബോധം ഉണ്ടാകുവാൻ സഹായിക്കുന്നു.

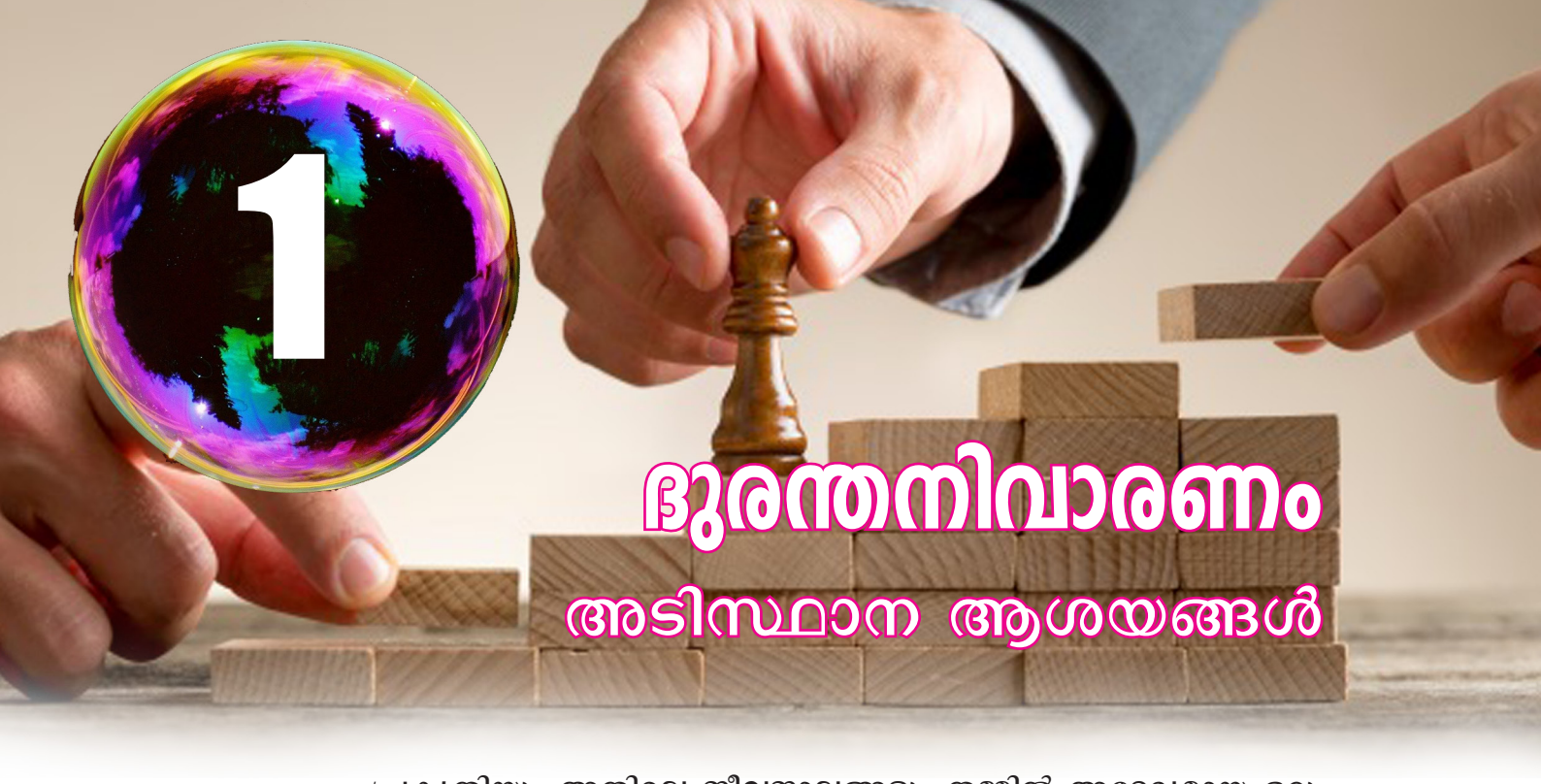
- വിവിധ ദുരന്തങ്ങളെക്കുറിച്ച് അറിവുണ്ടാകുന്നു.

- ദുരന്തനിവാരണ ചക്രം പരിചിതമാകുവാൻ സഹായി ക്കുന്നു.

- വിവിധ ദുരന്തങ്ങൾ, അവയുടെ നിവാരണ മാർഗ്ഗങ്ങൾ എന്നിവയിൽ അറിവുണ്ടാകാൻ സഹായിക്കുന്നു.

ഉള്ളടക്കം

Page No.



1

ദുരന്തനിവാരണം
അടിസ്ഥാന ആശയങ്ങൾ

പ്രകൃതിയും അതിലെ ജീവജാലങ്ങളും തമ്മിൽ അഭേദ്യമായ ഒരു പരസ്പര ബന്ധം നില നിൽക്കുന്നു. ഈ ബന്ധം നില നിർത്താൻ പ്രകൃതി എപ്പോഴും സന്തുലനാവസ്ഥ പാലിക്കുന്നു. പ്രകൃതി സന്തുലനത്തിന് കോട്ടം തട്ടുമ്പോൾ ജീവജാലങ്ങളുടെ നിലനിൽപിന് ഭീഷണിയാവുന്നു.

മനുഷ്യർ പ്രകൃതി വിഭവങ്ങൾ അമിതമായി ചൂഷണം ചെയ്യുന്നത് പ്രകൃതിയിലെ സന്തുലനം നഷ്ടപ്പെടുത്തി. നഗരവൽക്കരണം, വ്യവസായ വൽക്കരണം, ജനപ്പെരുപ്പം എന്നിവ വർദ്ധിച്ചു വരുന്ന ഈ കാലഘട്ടത്തിൽ മനുഷ്യന്റെ പ്രകൃതിയിലുള്ള അമിതമായ കൈകടത്തലുകൾ പലതരം ദുരന്തങ്ങളിലേക്ക് നയിക്കാൻ കാരണമായി.

1.1. ദുരന്തങ്ങൾ - പ്രത്യേകതകൾ

തികച്ചും അപ്രതീക്ഷിതവും ആപത്കരങ്ങളുമായ സംഭവങ്ങളാണ് ദുരന്തങ്ങൾ.

വേഗത്തിൽ സംഭവിക്കുന്നതും, ജീവനും സ്വത്തിനും നാശനഷ്ടങ്ങളും ദുരവസ്ഥയും ഉണ്ടാക്കുന്ന പ്രകൃതിദത്തമോ അല്ലാത്തതോ ആയ ഏതൊരു അവസ്ഥയെയും ദുരന്തമെന്നു പറയാം.

ഉദാ: ഭൂകമ്പം, വെള്ളപ്പൊക്കം, തീപിടുത്തം, സുനാമി, ഭക്ഷ്യ വിഷബാധ തുടങ്ങിയവ

ദുരന്തങ്ങളുടെ സ്വഭാവം

- പ്രവചനാതീതം
- സാമ്യമില്ലായ്മ
- വേഗത
- ശീഘ്രത
- അനിശ്ചിതത്വം
- ഭീഷണി

1.2. ദുന്തങ്ങൾ - വർഗ്ഗീകരണം

ദുരന്തങ്ങളെ പ്രധാനമായും രണ്ടായി തിരിക്കാം.

1. പ്രകൃതി ദുരന്തങ്ങൾ
2. മനുഷ്യ നിർമ്മിത ദുരന്തങ്ങൾ

പ്രകൃതി ദുരന്തങ്ങൾ

അപ്രതീക്ഷിതമായി പ്രകൃതിയിലുണ്ടാകുന്ന അസന്തുലനാവസ്ഥ യാണ് പ്രകൃതി ദുരന്തങ്ങൾ. ഉദാ: ഭൂകമ്പം

മനുഷ്യ നിർമ്മിത ദുരന്തങ്ങൾ

മനുഷ്യന്റെ അശ്രദ്ധയും അനാവശ്യമായി പ്രകൃതി വിഭവങ്ങളെ ചൂഷണം ചെയ്യുന്നതും മൂലമുണ്ടാകുന്നതാണ് മനുഷ്യ നിർമ്മിത ദുരന്തങ്ങൾ.

ഉദാ: തീപിടുത്തം

ഉത്ഭവത്തിന്റെ അടിസ്ഥാനത്തിൽ ദുരന്തങ്ങളെ വർഗ്ഗീകരിക്കാം

1. ഭൂമിശാസ്ത്രപരമായ കാരണങ്ങളാൽ ഉണ്ടാകുന്നത്. (ഭൂമിശാസ്ത്രപരം)
   - ഭൂകമ്പം
   - സുനാമി
   - അഗ്നിപർവ്വത സ്ഫോടനം
   - മണ്ണിടിച്ചിൽ / മലയിടിച്ചിൽ

2. കാലാവസ്ഥാപരമായ കാരണങ്ങളാൽ ഉണ്ടാകുന്നത് (കാലാവസ്ഥാപരം)
   - പേമാരി
   - ചുഴലിക്കാറ്റ്
   - വരൾച്ച
   - ഇടിമിന്നൽ
   - ഉഷ്ണതരംഗം
   - ശൈത്യതരംഗം

3. ജലജന്യമായ കാരണങ്ങളാൽ ഉണ്ടാകുന്നത് (ജലജന്യം)
   - ഉരുൾപ്പൊട്ടൽ
   - വെള്ളപ്പൊക്കം
   - അണക്കെട്ടുകൾ തകരുന്നത്

4. രാസ ദുരന്തങ്ങൾ / വ്യാവസായിക ദുരന്തങ്ങൾ

- വിഷവാതകങ്ങൾ ചോരുന്നത്
- രാസമാലിന്യങ്ങൾ ശുദ്ധജലസ്രോതസ്സുകളിൽ കലരുന്നത്
- ആണവ ചോർച്ച
- രാസായുധങ്ങൾ പ്രയോഗിക്കുന്നത്

5. ജൈവ ദുരന്തങ്ങൾ
   - പകർച്ച വ്യാധികൾ
   - ജൈവായുധങ്ങൾ പ്രയോഗിക്കുന്നത്
6. ടെക്നാളജിക്കൽ ആയ കാരണങ്ങളാൽ ഉണ്ടാകുന്നത് (സാങ്കേതികപരം)
   - വാഹന ദുരന്തങ്ങൾ (റോഡ്, റെയിൽ, ജലം, വായു)
   - കെട്ടിടങ്ങൾ പാലങ്ങൾ എന്നിവ തകരുന്നത്
   - അഗ്നിബാധ
7. മനുഷ്യന്റെ ഇടപെടലുകൾ മൂലമുണ്ടാകുന്നത് (മനുഷ്യ നിർമ്മിതം)
   - രാസദുരന്തങ്ങൾ
   - ജൈവ ദുരന്തങ്ങൾ
   - വാഹന ദുരന്തങ്ങൾ
   - ഭക്ഷ്യ വിഷബാധ
   - അഗ്നി ബാധ
   - കൂട്ട മരണങ്ങൾ (യുദ്ധം, കലാപം) തുടങ്ങിയവ

1.3 ദുരന്ത നിവാരണം - ഘട്ടങ്ങൾ

വ്യാവസായികാവശ്യങ്ങൾക്കും കൃഷി ചെയ്യുന്നതിനും, മറ്റു വികസനാവശ്യങ്ങൾക്കുമായി നാം പ്രകൃതി വിഭവങ്ങളെ ചൂഷണം ചെയ്യുന്നു. ഇതിന്റെ പരിണിത ഫലങ്ങൾ ചിലപ്പോൾ പ്രകൃതി ദുരന്തങ്ങളിലേക്കും, മനുഷ്യ നിർമ്മിത ദുരന്തങ്ങളിലേക്കും വഴി വെക്കുന്നു. ഇത്തരം അവസ്ഥകളെ തടയാനും നേരിടാനുമുള്ള നടപടികളാണ് ദുരന്ത നിവാരണത്തിലൂടെ നാം സാധ്യമാക്കേണ്ടത്.

ദുരന്ത നിവാരണം

പ്രകൃതിപരമോ, മനുഷ്യനിർമ്മിതമോ ആയ ഒരു ദുരന്തത്തിന്റെ പ്രത്യാഘാതങ്ങൾ ലഘൂകരിക്കുന്നതിനുള്ള ഒരു കൂട്ടം പ്രവർത്തനങ്ങൾ ആണ് ദുരന്തനിവാരണം അഥവാ ഡിസാസ്റ്റർ മാനേജ്മെന്റ്.

ദുരന്ത നിവാരണം എന്നതുകൊണ്ട് ഉദ്ദേശിക്കുന്നത് ദുരന്തം വരാതെ നോക്കുക, വരുമെന്നുറപ്പുള്ള ദുരന്തത്തെ നേരിടാനുള്ള നടപടികൾ സ്വീകരിക്കുക, ദുരന്തത്തിനു ശേഷമുള്ള രക്ഷാപ്രവർത്തനം നടത്തുക, ദുരന്തത്തിൽ നിന്ന് രക്ഷപ്പെട്ടവരെ പുനരധിവസിപ്പിക്കുക എന്നിവയാണ്.

ദുരന്ത നിവാരണ ഘട്ടങ്ങൾ

ദുരന്തങ്ങൾ അത് പ്രകൃതിപരമോ മനുഷ്യനിർമ്മിതമോ ആവട്ടെ അവയെ തടയുന്നത് ചിലപ്പോൾ അസാധ്യമായേക്കാം. പക്ഷെ അവയെ ലഘൂകരിക്കാൻ ദുരന്ത നിവാരണ ലഘൂകരണ പ്രവർത്തനങ്ങളിലൂടെ നമുക്ക് കഴിയും. ഇതുവഴി ദുരന്തങ്ങളുടെ പ്രത്യാഘാതങ്ങൾ കുറക്കുവാനും ദുരന്തത്തിനിരയായവരെ സംരക്ഷിക്കാനും, പുനരധിവസിപ്പിക്കാനും നമുക്ക് കഴിയും.

ദുരന്ത നിവാരണ ഘട്ടങ്ങളെ മൂന്നായി തിരിക്കാം

1. ദുരന്തത്തിന് മുമ്പുള്ള ഘട്ടം
2. ദുരന്ത സമയത്തുള്ള ഘട്ടം
3. ദുരന്തത്തിന് ശേഷമുള്ള ഘട്ടം

ദുരന്തത്തിന് മുമ്പുള്ള ഘട്ടം

- അപകട സാധ്യത (റിസ്ക്) മനസ്സിലാക്കുന്നു - വിലയിരുത്തുന്നു.
- വൾണറബിലിറ്റി കുറക്കുന്നു - തയ്യാറെടുക്കുന്നു

- നിയമ നിർമ്മാണം
- ബോധവൽക്കരണം
- ബഡ്ജറ്റിങ്ങ്
- മോക്ക് ഡ്രിൽ

ദുരന്ത സമയത്തുള്ള ഘട്ടം

- പെട്ടെന്നുള്ള രക്ഷാപ്രവർത്തനം
- മുന്നറിയിപ്പ് ശ്രദ്ധിക്കുക
- ആൾക്കാരെ മാറ്റി പാർപ്പിക്കൽ
- വൈദ്യ സഹായം നൽകുക
- റിലീഫ് ക്യാമ്പുകൾ ഒരുക്കൽ

ദുരന്തത്തിന് ശേഷമുള്ള ഘട്ടം

- പുനരധിവാസം
- പുനരുദ്ധാരണം
- വൈദ്യസഹായം
- കൗൺസിലിങ്ങ്

ദുരന്ത നിവാരണവുമായി ബന്ധപ്പെട്ട പദങ്ങൾ

ഹസാർഡ്: ദുരന്തത്തിലേക്ക് വഴിതെളിയിക്കുന്ന അവസ്ഥയാണ് ഹസാർഡ്. ജീവനോ സ്വത്തിനോ ഭീഷണി ഉയർത്തുന്ന അവസ്ഥ.
ഉദാ: മലിനീകരണം, വനനശീകരണം

വൾണറബിലിറ്റി: ഏതെങ്കിലും ഒരു പ്രദേശമോ ആളുകളോ ഏതെങ്കിലും തരത്തിലുള്ള ഒരു ഹസാർഡിനോട് എന്തുമാത്രം അടുത്തു നിൽക്കുന്നു എന്നതാണ് ഇതുകൊണ്ടുദ്ദേശിക്കുന്നത്.
ഉദാ: തീരപ്രദേശത്ത് താമസിക്കുന്നവർ

റിസ്ക് (അപകട സാധ്യത):
നിശ്ചിത സമയത്തിനുള്ളിൽ ഒരു ഹസാർഡ് മൂലം പ്രതീക്ഷിക്കുന്ന നഷ്ടത്തെയാണ് റിസ്ക് എന്ന പദം കൊണ്ട് ഉദ്ദേശിക്കുന്നത്. മലിനീകരണം, വനനശീകരണം, അപകടങ്ങൾ തുടങ്ങിയവ മനുഷ്യ ജീവന് ഭീഷണിയായേക്കാം. റിസ്കിനെ സ്വാധീനിക്കുന്ന ഘടകങ്ങൾ ഇവയാണ്.

- ഹസാർഡിന്റെ സ്വഭാവം
- വൾണറബിലിറ്റി
- ഉൾപ്പെട്ട വസ്തുക്കളുടെ സാമ്പത്തികമൂല്യം

അപകടം: ആകസ്മികമായി ഉണ്ടാകുന്ന അനിഷ്ട സംഭവങ്ങളാണ് അപകടങ്ങൾ. അപകടത്തിൽ നാശനഷ്ടങ്ങൾ ഉണ്ടാകാനും ഉണ്ടാകാതിരിക്കാനും സാധ്യതയുണ്ട്.

1.4 ദുരന്ത നിവാരണ ചക്രം

ദുരന്ത നിവാരണ ചക്രം എന്നാൽ ദുരന്ത നിവാരണ പ്രക്രിയകളെ വിവിധ ഘട്ടങ്ങളായി ചാക്രിക ക്രമത്തിൽ ലഘൂകരിച്ചു കാണിക്കുന്ന ഒരു മാതൃകയാണ്. ഇതിൽ ദുരന്ത നിവാരണത്തിലെ മൂന്ന് ഘട്ടങ്ങൾ ഉൾക്കൊള്ളുന്നു.

ഇതിൽ ആദ്യഘട്ടത്തിൽ ലഘൂകരണ പ്രവർത്തനങ്ങളും തയ്യാറെടുപ്പും ഉൾപ്പെടുന്നു.

രണ്ടാം ഘട്ടത്തിലാണ് പ്രതികരണം

മൂന്നാം ഘട്ടത്തിൽ വീണ്ടെടുപ്പ്

1. ലഘൂകരണം (Mitigation)

ഈ ഘട്ടത്തിൽ ദുരന്തത്തിന്റെ പ്രത്യാഘാതങ്ങൾ കുറയ്ക്കുക എന്ന ലക്ഷ്യത്തോടെ അപകട സാധ്യതകൾ വിശകലനം ചെയ്യുന്നു. ഉദാഹരണമായി കെട്ടിട നിർമ്മാണ കോഡുകളും, സോണിംഗും ബോധവൽക്കരണ പ്രവർത്തനങ്ങളും നടത്തുന്നു.

2. തയ്യാറെടുപ്പ് (Preparedness)

ഈ ഘട്ടത്തിൽ ഒരു ദുരന്തം വന്നാൽ എങ്ങനെ പ്രതികരിക്കണം എന്ന് ആസൂത്രണം ചെയ്യുന്നു. ഉദാഹരണമായി തയ്യാറെടുപ്പ് പദ്ധതികൾ ആവിഷ്കരിക്കുന്നു. അടിയന്തര പ്രവർത്തനങ്ങളിൽ പരിശീലനം, മുന്നറിയിപ്പ് സംവിധാനം സ്ഥാപിക്കുക, എന്നിവ ചെയ്യുന്നു. എമർജൻസി കിറ്റ് തയ്യാറാക്കി വെക്കുന്നു.

3. പ്രതികരണം (Response)

ഈ ഘട്ടത്തിൽ ഒരു ദുരന്തം സൃഷ്ടിച്ച അപകടം കുറക്കുന്നതിനുള്ള ശ്രമങ്ങൾ നടക്കുന്നു. ഉദ്ദാഹരണമായി തിരച്ചിൽ, രക്ഷാപ്രവർത്തനങ്ങൾ, അടിയന്തിര സഹായമെത്തിക്കൽ എന്നിവ.

4. വീണ്ടെടുക്കൽ (Recovery)

ഈ ഘട്ടത്തിൽ ദുരന്തത്തിൽപ്പെട്ടവരെ സാധാരണ നിലയിലേക്ക് തിരിച്ചു കൊണ്ടു വരുന്നു. ഉദ്ദാഹരണമായി താൽക്കാലിക ഭവന നിർമ്മാണം, ധനസഹായം, കൗൺസലിങ്, വൈദ്യസഹായം എന്നിവ എത്തിച്ചു കൊടുക്കുന്നു.

ദുരന്ത നിവാരണത്തിന്റെ ലക്ഷ്യങ്ങൾ
(**Goals of Disaster Management**)

1. അപകടംമൂലം ഉണ്ടാകുന്ന നഷ്ടം കുറയ്ക്കുക അല്ലെങ്കിൽ ഒഴിവാക്കുക.
2. ദുരന്തത്തിനിരയായവർക്ക് അടിയന്തിര സഹായം ഉറപ്പാക്കുക.
3. ദ്രുതവും ഫലപ്രദവുമായ വീണ്ടെടുക്കൽ കൈവരിക്കുക.

1.5 ദുരന്ത നിവാരണ നിയമം 2005

(Disaster Management Act 2005)

2005 ഡിസംബർ 23ന് ഈ നിയമം നിലവിൽ വന്നു. ഈ നിയമം രാജ്യസഭ 28 നവംബർ 2005ലും ലോകസഭ 12 ഡിസംബർ 2005ലും പാസാക്കി. 2006 ജനുവരി 9ന് രാഷ്ട്രപതി ഈ നിയമത്തിന് അനുമതി നൽകി. ഇതിൽ 11 അധ്യായങ്ങളും 79 വിഭാഗങ്ങളുമുണ്ട്. ഈ നിയമം ഇന്ത്യ മുഴുവൻ വ്യാപകമാണ്. ദുരന്തങ്ങളും അതിനോടനുബന്ധമായ പ്രശ്നങ്ങളും അവയുടെ ഫലപ്രദമായ നിവാരണവുമാണ് ഈ നിയമം അനുശാസിക്കുന്നത്.

1.6 ദുരന്ത നിവാരണ സംവിധാനങ്ങൾ സർക്കാർ തലത്തിൽ

1. ദേശീയ ദുരന്ത നിവാരണ അതോറിറ്റി

(National Disaster Management Authority - NDMA)

ദേശീയ തലത്തിൽ ദുരന്ത നിവാരണ അതോറിറ്റി നിലവിൽ വന്നത് 2005ൽ ആണ്.

ദേശീയ ദുരന്ത നിവാരണ അതോറിറ്റിയുടെ ചെയർപേഴ്സൺ പ്രധാനമന്ത്രിയാണ്.

ദേശീയ ദുരന്ത നിവാരണ അതോറിറ്റിയുടെ കീഴിൽ ഓരോ ഇന്ത്യൻ സംസ്ഥാനങ്ങളിലും സംസ്ഥാന ദുരന്ത നിവാരണ അതോറിറ്റി (**State Disaster Management Authority - SDMA**) പ്രവർത്തിക്കുന്നു.

2. സംസ്ഥാന അടിയന്തിരഘട്ട കാര്യനിർവ്വഹണ കേന്ദ്രം

(State Emergency Operation Centre - SEOC)

സംസ്ഥാന ദുരന്ത നിവാരണ അതോറിറ്റിയുടെ ചെയർപേഴ്സൺ മുഖ്യമന്ത്രിയാണ്.

ഓരോ ജില്ലകളിലേക്കുമുള്ള ദുരന്ത നിവാരണ മാർഗ്ഗനിർദ്ദേശങ്ങൾ നൽകുന്നത് സംസ്ഥാന അടിയന്തിരഘട്ടകാര്യ നിർവ്വഹണ കേന്ദ്രങ്ങളിൽ നിന്നാണ്.

സംസ്ഥാന ദുരന്ത നിവാരണ അതോറിറ്റിയുടെ കീഴിൽ എല്ലാ ജില്ലകളിലും ജില്ലാ അടിയന്തിരഘട്ട കാര്യനിർവ്വഹണ കേന്ദ്രങ്ങൾ പ്രവർത്തിക്കുന്നു.

3. ജില്ലാ അടിയന്തിരഘട്ട കാര്യ നിർവ്വഹണ കേന്ദ്രം

(Disaster Emergency Operation Centre - DEOC) - ജില്ലാ ദുരന്ത നിവാരണ അതോറിറ്റി (District Disaster Management Athority) DDMA

ജില്ലാ തലത്തിൽ ദുരന്ത നിവാരണ പദ്ധതികൾ തയ്യാറാക്കുകയും നിയന്ത്രിക്കുകയും ചെയ്യുന്നത് ജില്ലാ കലക്ടറാണ്.

ജില്ലാ അടിയന്തിരഘട്ട കാര്യ നിർവ്വഹണ കേന്ദ്രങ്ങളിൽ നിന്നാണ് ഓരോ പ്രദേശങ്ങളിലുമുള്ള ദുരന്ത നിവാരണ പ്രവർത്തനങ്ങൾക്ക് മാർഗ്ഗ നിർദ്ദേശം നൽകുന്നത്.

ഓരോ പ്രദേശത്തും ദുരന്ത നിവാരണവുമായി ബന്ധപ്പെട്ട തുടർ നടപടികൾക്ക് മുൻകൈ എടുക്കുന്നത് വില്ലേജ് ഓഫീസറാണ്.

4. കേന്ദ്ര സർക്കാർ (Central Government)

ദുരന്ത നിവാരണം അനേകം നടപടി ക്രമങ്ങൾ ചേർന്ന ഒരു പ്രക്രിയ ആയതിനാൽ കേന്ദ്ര മന്ത്രാലയത്തിന്റെ എല്ലാ വകുപ്പുകളും ദുരന്ത നിവാരണ പ്രവർത്തനങ്ങളിൽ പങ്കുവഹിക്കുന്നു. (ഉദാ: കൃഷി, അറ്റോമിക് എനർജി, സിവിൽ ഏവിയേഷൻ, ഏർത്ത് സയൻസ്, പരിസ്ഥിതി, വനം, ആഭ്യന്തരം, ആരോഗ്യം, ഖനികൾ, റെയിൽവേ, സ്പേസ്, ജലവിഭവം മുതലായ മന്ത്രാലയങ്ങൾ) ഓരോ വിഭാഗത്തോടും അനുബന്ധിച്ച് ദുരന്തങ്ങളുടെ മാനേജ്മെന്റ് കൈകാര്യം ചെയ്യുന്നു. കേന്ദ്ര സർക്കാർ എല്ലാത്തരത്തിലുള്ള ദുരന്തങ്ങൾക്കുമുള്ള ഫണ്ട് വകയിരുത്തുകയും ആവശ്യമായ തയ്യാറെടുപ്പുകൾ നടത്തുകയും എല്ലാ ദുരന്തങ്ങളോടും ഫലപ്രദമായി പ്രതികരിക്കുന്നുണ്ടെന്ന് ഉറപ്പു വരുത്തുകയും ചെയ്യുന്നു.

5. സംസ്ഥാന സർക്കാറുകൾ (State Governments)

ദുരന്ത നിവാരണത്തിനുള്ള പ്രാഥമിക ഉത്തരവാദിത്തങ്ങൾ സംസ്ഥാന സർക്കാരിൽ നിക്ഷിപ്തമായിരിക്കുന്നു. കേന്ദ്ര, സംസ്ഥാന, ജില്ലാതലത്തിൽ സ്ഥാപിച്ചിട്ടുള്ള ദുരന്ത നിവാരണ സ്ഥാപനങ്ങൾ ഫലപ്രമായ രീതിയിൽ സഹായിക്കും. ഡിസാസ്റ്റർ മാനേജ്മെന്റ് പ്ലാനുകൾ തയ്യാറാക്കാനുള്ള നടപടികൾ കൈകൊള്ളുക, ദുരന്തങ്ങൾ തടയുന്നതിനും, വികസന പദ്ധതികൾ നടപ്പിലാക്കുന്നതിനും, മുന്നറിയിപ്പ് സംവിധാനം സ്ഥാപിക്കുന്നതിനുമുള്ള ഫണ്ട് കേന്ദ്രസർക്കാർ അനുവദിക്കണമെന്ന് നിയമം അനുശാസിക്കുന്നു.

മറ്റ് സുപ്രധാന സ്ഥാപനങ്ങൾ

6. സായുധ സേന (Armed Forces)

പ്രതികൂല സാഹചര്യത്തിൽ ദുരന്ത പ്രതികരണത്തിന് ബുദ്ധിമുട്ടുണ്ടാവുമ്പോൾ സർക്കാർ സായുധ സേനയുടെ സഹായം ആവശ്യപ്പെടും. അടിയന്തിര സാഹചര്യത്തിൽ പല പ്രതികൂല സാഹചര്യങ്ങളിലും സായുധ സേനകൾ ചരിത്രപരമായ പ്രധാന പങ്കു വഹിച്ചു. അതിൽപ്പെടുന്നതാണ് ആശയവിനിമയം, തെരച്ചിൽ, രക്ഷപ്പെടുത്തൽ, ആരോഗ്യവൈദ്യസഹായം, ഗതാഗതം, എയർലിഫ്റ്റിംങ്ങ് (ഹെലി ലിഫ്റ്റിംഗ്) എന്നിവ. അയൽ രാജ്യത്തിന് ഇത്തരം പ്രതിസന്ധിയുണ്ടാകുമ്പോൾ രാജ്യം ഇവരുടെ സഹായം അവിടെയെത്തിക്കുന്നു. ഹെലിലിഫ്റ്റിംഗ്, ഉയരം കൂടിയ സ്ഥലങ്ങളിൽ നിന്നുള്ള രക്ഷപ്പെടുത്തൽ, പാരാ മെഡിക്കലിൽ പരിശീലനം എന്നിവയിൽ ദുരന്തനിവാരണ പ്രവർത്തകർക്ക് സായുധ സേന പരിശീലനം കൊടുക്കുന്നു. ദേശീയ തലത്തിൽ ചീഫ് ഓഫ് ദ ഇന്റെഗ്രേറ്റഡ് ഡിഫൻസ് സ്റ്റാഫ് ചെയർമാൻ, ചീഫ് ഓഫ് സ്റ്റാഫ് കമ്മറ്റി എന്നിവരും NEC യിൽ ഉൾപ്പെടുന്നു. സമാനമായി സംസ്ഥാന, ജില്ലാ തലത്തിൽ സായുധ സേനയുടെ പ്രാദേശിക പ്രതിനിധികൾ എക്സിക്യൂട്ടീവ് കമ്മറ്റികളിൽ പ്രധാന പങ്കു വഹിക്കുന്നു.

7. സെൻട്രൽ പാരാ മിലിട്ടറി ഫോഴ്സ് (Central Para Military Forces)

സായുധ സേനകളായ കേന്ദ്ര അർധസൈനിക വിഭാഗങ്ങൾ ദുരന്തങ്ങൾക്ക് അടിയന്തിര പ്രതികരണം നൽകുന്നതിൽ ഒരു പ്രധാന പങ്കു വഹിക്കുന്നു. NDRF ന്റെ സംഭാവന കൂടാതെ, അവർ തങ്ങളുടെ സ്വന്തം സേനയിൽ മതിയായ ദുരന്ത നിവാരണ ശേഷി വികസിപ്പിക്കുകയും അവർ പോസ്റ്റു ചെയ്യപ്പെടുന്ന മേഖലകളിൽ ഉണ്ടാകാനിടയുള്ള ദുരന്തങ്ങളോട് പ്രതികരിക്കുകയും ചെയ്യുന്നു. സംസ്ഥാന എക്സിക്യൂട്ടീവ് കമ്മറ്റിയിൽ CPMF ന്റെ പ്രതിനിധികളെ ക്ഷണിക്കുന്നു.

8. സംസ്ഥാന പോലീസ് സേനയും അഗ്നിരക്ഷാസേനയും (State Police Forces and Fire and Rescue Services)

സംസ്ഥാന പോലീസ് ഫോഴ്സും, അഗ്നി രക്ഷാ സേനയും

ദുരന്തങ്ങൾക്ക് അടിയന്തിര പ്രതികരണം നൽകുന്നു. പോലീസ് സേനയെ പരിശീലിപ്പിക്കുകയും, അഗ്നിരക്ഷാസേന മൾട്ടി ഹസാർഡ് റെസ്ക്യൂ കഴിവ് വർദ്ധിപ്പിക്കുകയും ചെയ്യുന്നു.

9. സിവിൽ ഡിഫൻസ് ആൻഡ് ഹോം ഗാർഡ്സ്

(Civil Defence and Home Guards)

ദുരന്ത നിവാരണ പ്രവർത്തനങ്ങളിൽ പ്രധാന പങ്കു വഹിക്കുന്നു. കമ്മ്യൂണിറ്റി തയ്യാറെടുപ്പിനും പൊതുജന അവബോധത്തിനും വേണ്ടി അവരെ വിന്യസിക്കുന്നു. ഏതെങ്കിലും ദുരന്ത സാഹചര്യത്തിൽ വൊളണ്ടറി റിപ്പോർട്ട് ചെയ്യാനുള്ള സംവിധാനങ്ങൾ പ്രോൽസാഹിപ്പിക്കുന്നു.

10. സംസ്ഥാന ദുരന്ത നിവാരണ സേന

(State Disaster Response Forces - SDRF)

സംസ്ഥാനങ്ങൾ അവരുടെ നിലവിലുള്ള വിഭവങ്ങളിൽ നിന്നും പ്രതികരിക്കാനുള്ള കഴിവുകൾ സൃഷ്ടിക്കാൻ പ്രോൽസാഹിപ്പിക്കുന്നു. ഓരോ സംസ്ഥാനങ്ങളുടെയും ലക്ഷ്യം ഒരു ബറ്റാലിയൻ തുല്യമായ സേന ഉറപ്പാക്കാൻ പരിശ്രമിക്കുകയാണ്. സ്ത്രീകളുടെയും കുട്ടികളുടെയും ആവശ്യങ്ങൾ പരിഗണിക്കുന്നതിനായി അവർ സ്ത്രീ അംഗങ്ങളെ ഉൾപ്പെടുത്തുന്നു. **NDRF** ബറ്റാലിയനുകളും അവരുടെ പരിശീലന സ്ഥാപനങ്ങളും ഈ ഉദ്യമത്തിൽ സംസ്ഥാന ബറ്റാലിയനെ സഹായിക്കും. ഗസറ്റഡ് നോൺ ഗസറ്റഡ് ഓഫീസർമാർക്കായി ബന്ധപ്പെട്ട പോലീസ് പരിശീലന കോളേജുകളും അടിസ്ഥാന ഇൻസർവ്വീസ് കോഴ്സുകളും നടത്തുന്നു.

11. ദേശീയ കേഡറ്റ് കോർപ്സ്, നാഷണൽ സർവ്വീസ് സ്കീം, നെഹ്റു യുവകേന്ദ്ര എന്നിവയുടെ പങ്ക്

(RoleofNationalCadetCorps(NCC),NationalServiceScheme (NSS) and Nehru Yuva Kendra Sangatan (NYKS)

എല്ലാ യുവജന സംഘടനകളേയും സാമൂഹിക സംരംഭങ്ങളെയും പിന്തുണയ്ക്കുന്നു. ദുരന്തനിവാരണത്തിലുള്ള പരിശീലനം പരിപാടികളിൽ ഉൾപ്പെടുത്തുന്നു.

2004 ലെ സുനാമിയ്ക്കു ശേഷം ലോക രാജ്യങ്ങൾ ജപ്പാനിലെ കോബേയിൽ ഒത്തുകൂടി ദുരന്ത ലഘൂകരണത്തിന് ഒരു മാർഗ്ഗരേഖയുണ്ടാക്കി അതാണ് ഹ്യോഗോ ഫ്രെയിം വർക്ക് ഫോർ ആക്ഷൻ **(Hyogo Frame work for Action 2005 - HFA)** ദുരന്ത പ്രവചനം മുതൽ ദുരന്തമുണ്ടായിക്കഴിഞ്ഞുള്ള ഇടപെടൽ വരെ അതിൽ പറയുന്നു.

ഒക്ടോബർ 13

അന്തർദേശീയ ദുരന്ത നിവാരണ ദിനം

കണ്ട്രോൾ റൂം നമ്പറുകൾ - ഓരോ ജില്ലയിലേയും

ജില്ല	ഫോൺ നമ്പർ
തിരുവനന്തപുരം	0471-2730045
കൊല്ലം	0474-2794002
പത്തനംതിട്ട	0468-2222515
ആലപ്പുഴ	0477-2238630
കോട്ടയം	0481-2304800
ഇടുക്കി	0486-2233111
എറണാകുളം	0484-2423513
തൃശ്ശൂർ	0487-2362424
പാലക്കാട്	0491-2505309
മലപ്പുറം	0483-2736320
കോഴിക്കോട്	0495-2371002
വയനാട്	0493-6204151
കണ്ണൂർ	0497-2713266
കാസർഗോഡ്	0499-4257700

2 പ്രകൃതി ദുരന്തങ്ങളും ദുരന്ത നിവാരണവും

മനുഷ്യനും മറ്റുജീവജാലങ്ങൾക്കും അവയുടെ ചുറ്റുപാടിനും സാരമായ നാശനഷ്ടങ്ങൾ വരുത്തുന്ന രീതിയിൽ പ്രകൃതിയിൽ സംഭവിക്കുന്ന മാറ്റങ്ങൾ പ്രകൃതി ദുരന്തങ്ങൾ എന്നറിയപ്പെടുന്നു.

2.1 ഭൂകമ്പം

2001 ജനുവരി 26നു രാജ്യത്തിന്റെ റിപ്പബ്ലിക് ദിനാഘോഷങ്ങൾ നടന്നുകോണ്ടിരിക്കുമ്പോൾ ഇന്ത്യയുടെ കിഴക്കൻ സംസ്ഥാനമായ ഗുജറാത്ത് ഭൂകമ്പത്തിൽ തകരുകയായിരുന്നു. രാജ്യത്തെ നടുക്കിയ ഈ ദുരന്തത്തിൽ 20,000 ത്തോളം ജീവനുകളാണ് പൊലിഞ്ഞത്. ഗുജറാത്തിലെ കച്ച് ജില്ലയിലാണ് റിക്ടർ സ്കെയിലിൽ 7.7 രേഖപ്പെടുത്തിയ ഈ ഭൂകമ്പത്തിന്റെ ഉൽഭവം.

നിർവ്വചനം

ഭൂമിക്കടിയിലെ പാറകൾ പൊട്ടുമ്പോഴും തെന്നിമാറുമ്പോഴും ഉണ്ടാകുന്ന കമ്പനമാണ് ഭൂകമ്പം.

ഭൂകമ്പത്തെക്കുറിച്ചുള്ള പഠനത്തിന് ഭൂകമ്പ വിജ്ഞാനശാസ്ത്രം (Seismology) എന്ന് പറയുന്നു.

ഭൂകമ്പ തീവ്രത അളക്കാൻ ഉപയോഗിക്കുന്ന ഉപകരണമാണ് റിക്ടർ സ്കെയിൽ (The Moment Magnitude Scale - (MMS) - Formerly Richter Scale) ഭൂകമ്പ സാധ്യതാ മേഖലകൾ തിരിച്ചറിയാൻ ഭൗമശാസ്ത്രപഠനങ്ങൾ വഴിയും സാറ്റലൈറ്റ് പഠനങ്ങൾ വഴിയും സാധിയ്ക്കും.

ഭൂകമ്പത്തിന്റെ പരിണിത ഫലങ്ങൾ

- ഭൂകമ്പത്തിൽ കെട്ടിടങ്ങൾ പാലങ്ങൾ എന്നിവ തകരുന്നു.
- അണക്കെട്ടുകൾ തകരുന്നു
- തറയിൽ വിള്ളലുകൽ ഉണ്ടാകുന്നു.
- മണ്ണിന്റെ ദ്രവീകരണം സംഭവിക്കുന്നു.
- ഫാക്ടറികളിൽ നിന്നുള്ള രാസവസ്തുക്കളുടെ ചോർച്ചയുണ്ടാകുന്നു.
- ആണവ നിലയങ്ങളിൽ നിന്നും ആണവ വികിരണമുണ്ടാകുന്നു.
- ഇലക്ട്രിക് ഷോർട്ട് സർക്യൂട്ടു മൂലം തീപിടുത്തമുണ്ടാകുന്നു.
- സുനാമിത്തിരകളുണ്ടാവാനും, ഉരുൾപ്പൊട്ടലിനും കാരണമാകുന്നു.

ദുരന്ത നിവാരണം

മുൻകരുതലുകൾ

- ദുരന്ത നിവാരണ സംഘങ്ങളെ പരിശീലിപ്പിച്ച് തയ്യാറാക്കി നിർത്തുക.
- കേടായ ഇലക്ട്രിക് ഉപകരണങ്ങൾ, പൈപ്പുകൾ എന്നിവ നന്നാക്കുക.
- വീട്ടിലെയും ഓഫീസിലെയും സുരക്ഷാ സ്ഥാനങ്ങൾ ഏതൊക്കെയെന്നു മനസ്സിലാക്കുകയും ചെയ്യേണ്ട കാര്യങ്ങളെപ്പറ്റി ഒരു പ്ലാൻ തയ്യാറാക്കുകയും ചെയ്യുക.
- വൈദ്യുതി, പാചകവാതകം എന്നിവയുടെ പ്രധാന സ്വിച്ചുകൾ അണയ്ക്കേണ്ടത് എങ്ങനെയെന്ന് കുട്ടികളടക്കമുള്ള കുടുംബാംഗങ്ങളെ പരിശീലിപ്പിക്കുക.
- അത്യാവശ്യ ഫോൺ നമ്പറുകൾ ഓർത്തു വയ്ക്കുകയോ, എഴുതി സൂക്ഷിക്കുകയോ ചെയ്യുക.
- അടിയന്തിര സാഹചര്യങ്ങളിൽ ജീവൻ നിലനിർത്താനാവശ്യമായ സാധനങ്ങളും, മരുന്നുകളും, ഭക്ഷണവും, ജലവും ഒരു എമർജൻസി കിറ്റിൽ തയ്യാറാക്കി വെക്കുക

- അത്യാവശ്യ സർവ്വീസുകളായ പോലീസ്, അഗ്നിശമന സേന, ഡോക്ടർമാർ, വൈദ്യുതി ഓഫീസ്, പൊതുമരാമത്ത് ഓഫീസ്, സന്നദ്ധ സംഘടനകൾ എന്നിവയുടെ ഫോൺ നമ്പർ സൂക്ഷിക്കുക.

ഭൂകമ്പ സമയത്ത് നമ്മൾ ചെയ്യേണ്ടത്

- പരിഭ്രാന്തരാകരുത്. സംയമനം പാലിക്കുക
- പുറത്തെ സ്ഥിതി സുരക്ഷിതമെങ്കിൽ മാത്രം പുറത്തേക്ക് ഓടി രക്ഷപ്പെടുക.
- ബലമുള്ള മേശയുടെയോ, ഡസ്കിന്റെയോ ചുവട്ടിൽ കുനിഞ്ഞിരുന്ന് ഒരു കൈ കൊണ്ട് തല മറച്ചു പിടിച്ച് മറ്റേ കൈ കൊണ്ട് മേശയുടെ കാലിൽ പിടിയ്ക്കുക. അങ്ങനെ നേരിട്ടുള്ള ആഘാതത്തിൽ നിന്ന് ഒരു പരിധി വരെ രക്ഷ നേടാം.
- ബലമുള്ള മേശയോ ഡസ്കോ ഇല്ലെങ്കിൽ മുറിയുടെ മൂലയിൽ കുനിഞ്ഞിരുന്ന് തല കൈകൊണ്ട് മറച്ചു പിടിക്കുക.
- താഴെ വീഴാൻ സാധ്യതയുള്ള വസ്തുക്കളിൽ നിന്നും ജനലുകളുടെ അരികിൽ നിന്നും മാറി നിൽക്കുക.
- കട്ടിലിൽ ഇരിയ്ക്കുകയാണെങ്കിൽ കട്ടിയുള്ള തലയിണ തലയ്ക്കു മുകളിൽ പിടിയ്ക്കുക.
- പുറത്താണെങ്കിൽ വീഴാൻ സാധ്യതയുള്ള സാധനങ്ങളിൽ നിന്നും അകന്നു നിൽക്കുക.
- ബഹുനില കെട്ടിടത്തിനകത്താണെങ്കിൽ ഭൂകമ്പ സമയത്ത് കോണിപ്പടിയോ ലിഫ്റ്റോ ഉപയോഗിക്കരുത്.
- ആലോചിച്ച് തീരുമാനമെടുക്കുക വെപ്രാളപ്പെട്ട് ഓടാതെയിരിക്കുക.
- ഓടിക്കൊണ്ടിരിക്കുന്ന വാഹനത്തിനകത്താണെങ്കിൽ, നിർത്തി പുറത്തിറങ്ങി ഇരിയ്ക്കുക.
- കെട്ടിടത്തിന്റെ അവശിഷ്ടങ്ങൾക്കിടയിൽ കുടുങ്ങി പോവുകയാണെങ്കിൽ വാതക, വൈദ്യുതി ചോർച്ച ഇല്ലെന്നു ഉറപ്പുണ്ടെങ്കിൽ മാത്രം വൈദ്യുത സ്വിച്ച് ഓൺ ചെയ്യുക.

- റാന്തൽ, ബാറ്ററി കൊണ്ട് പ്രവർത്തിക്കുന്ന ടോർച്ച് ലൈറ്റ് എന്നിവ ഉപയോഗിക്കുക.
- വൈദ്യുതി ചോർച്ചയില്ലെന്ന് ഉറപ്പു വരുത്തിയ ശേഷം മാത്രം ലാൻഡ് ഫോൺ ഉപയോഗിക്കുക.

ഭൂകമ്പ രക്ഷാപ്രവർത്തനത്തിൽ ആയിരിക്കുമ്പോൾ നമ്മൾ ചെയ്യേണ്ടത്

- ഗുരുതരമായി പരിക്ക് പറ്റിയവരെ ആശുപത്രിയിലേക്ക് മാറ്റുക.
- വൈദ്യുതി ചോർച്ച സംശയിക്കുന്നുണ്ടെങ്കിൽ മെയിൻ സ്വിച്ച് ഓഫാക്കുക.
- ആവശ്യമെങ്കിൽ കൃത്രിമ ശ്വാസോച്ഛ്വാസം നൽകുക.

ഭൂകമ്പ സമയത്ത് ജീവൻ പൊലിയാനുള്ള മറ്റു കാരണങ്ങൾ

- കെട്ടിടങ്ങളുടെ തകർച്ച
- പകർച്ച വ്യാധി
- മണ്ണിടിച്ചിൽ

ഭൂകമ്പത്തിന് ശേഷം

- ഭൂകമ്പത്തിന് ശേഷം തുടർ ചലനങ്ങൾ ഉണ്ടാകുമെന്നതിനാൽ കരുതിയിരിക്കുക.
- ഗുരുതരമായി പരിക്കു പറ്റിയവരെ ആശുപത്രിയിലേക്ക് മാറ്റുക.
- ബോധം നഷ്ടപ്പെട്ടു കിടക്കുന്നവരുടെ കഴുത്തും, നട്ടെല്ലും പരമാവധി അനക്കാതെ മാറ്റുക.
- തുണികൊണ്ട് വായും മൂക്കും മറയ്ക്കുക.
- പുറത്തു കടക്കുമ്പോൾ കട്ടിയുള്ള പാദരക്ഷകൾ ധരിക്കുക.
- തീ പിടിക്കാൻ സാധ്യതയുള്ള വസ്തുക്കൾ ഉടനടി നീക്കം ചെയ്യുക.
- വൈദ്യുത ചോർച്ച സംശയിക്കുന്നുണ്ടെങ്കിൽ മെയിൻസ്വിച്ച് ഓഫാക്കുക.
- ഡ്രെയിനേജ് പൈപ്പ് തകർന്നിട്ടുണ്ടോയെന്ന് നോക്കിയ ശേഷം മാത്രം ഫ്ളഷ് ഉപയോഗിക്കുക.
- വൈദ്യുത ചോർച്ചയില്ലെന്ന് ഉറപ്പു വരുത്തിയ ശേഷം മാത്രം

ലാൻഡ് ഫോൺ ഉപയോഗിക്കുക.

- പുറത്ത് പൊട്ടിക്കിടക്കുന്ന വൈദ്യുത കമ്പികളിൽ തട്ടാതെ സൂക്ഷിക്കുക.
- പാലങ്ങൾ, റോഡുകൾ എന്നിവ തകരാൻ സാധ്യതയുണ്ടെന്ന് ഓർക്കുക.
- തീരപ്രദേശത്തു താമസിക്കുന്നവർ സുനാമി തിരമാലകളുടെ സാധ്യതയെ പറ്റിയുള്ള അറിയിപ്പ് ശ്രദ്ധിക്കുക.

2.2 വെള്ളപ്പൊക്കം

അതിശക്തമായ മഴയെത്തുടർന്ന് 2018 ജൂലൈ, ഓഗസ്റ്റ് മാസങ്ങളിൽ കേരളത്തിലെ മിക്ക ജില്ലകളിലും വെള്ളപ്പൊക്കവും മലയോര മേഖലകളിൽ ഉരുൾപൊട്ടലുമുണ്ടായി. പതിനാല് ജില്ലകളിലും അതീവ ജാഗ്രത (റെഡ് അലർട്ട്) പ്രഖ്യാപിച്ചു. തെക്കു പടിഞ്ഞാറൻ കാലവർഷക്കാലത്ത് ഉയർന്ന അളവിൽ മഴ പെയ്തതും, അണക്കെട്ടിലെ ജലനിരപ്പ് ക്രമാതീതമായി ഉയർന്നതിനാൽ ഷട്ടറുകൾ തുറന്നതും വെള്ളപ്പൊക്കത്തിന്റെ ആഘാതം വർദ്ധിപ്പിച്ചു. 54 അണക്കെട്ടുകളിൽ 35 എണ്ണത്തിന്റെയും ഷട്ടറുകൾ തുറന്നു. നദികൾ കരകവിഞ്ഞു. റോഡ്, റെയിൽ വ്യോമഗതാഗത ശൃംഖലകളെ പ്രതികൂലമായി ബാധിച്ചു. തൊണ്ണൂറ്റൊമ്പതിലെ വെള്ളപ്പൊക്കം എന്നറിയപ്പെടുന്ന 1924 ലെ പ്രളയത്തിനു ശേഷം ഉണ്ടായ ഏറ്റവും വലിയ പ്രളയമാണ് 2018ലുണ്ടായത്, കനത്ത മഴയെ തുടർന്നുണ്ടായ ഉരുൾപൊട്ടലിലും വെള്ളപ്പൊക്കത്തിലും കൂടി ഏകദേശം 483 പേർ മരിച്ചു. 14 പേരെ കാണാതായി. 140 പേർ ആശുപത്രിയിലായി. 2018 ഓഗസ്റ്റ് 21ന് 3,91,494 ലക്ഷം കുടുംബങ്ങളിൽ

നിന്നായി 14,50,707 പേർ ദുരിതാശ്വാസ ക്യാമ്പിലെത്തി.

നിർവ്വചനം

ഒരു പ്രദേശം മുഴുവൻ വെള്ളത്തിനടിയിലാകുന്ന അവസ്ഥയാണ് വെള്ളപ്പൊക്കം. മഴ, ചുഴലിക്കാറ്റുകൾ, സുനാമി, മേഘ സ്ഫോടനം എന്നിവയെല്ലാം കാരണമാവാം. പെട്ടെന്നുള്ള നഗരവൽക്കരണവും നദികളുടെ സ്വാഭാവിക ഒഴുക്കിനെ തടസ്സപ്പെടുത്തുന്ന മനുഷ്യന്റെ പ്രവർത്തനങ്ങളുമാണ് പ്രധാന കാരണം. കേരളത്തിൽ ഉണ്ടാകുന്ന പ്രകൃതി ദുരന്തങ്ങളിൽ ഏറ്റവും കൂടുതൽ നാശനഷ്ടങ്ങൾ വരുത്തുന്ന ഒന്നാണ് വെള്ളപ്പൊക്കം.

വെള്ളപ്പൊക്കത്തിന്റെ പരിണിത ഫലങ്ങൾ

- മനുഷ്യർക്കും മറ്റു ജീവികൾക്കും ജീവനും, നിലനിൽപിനും ഭീഷണിയാവുന്നു.
- വീടും വസ്തുവകകളും നശിക്കാനിടയാകുന്നു.
- കൃഷിയിടങ്ങൾക്കും, വിളകൾക്കും, കന്നുകാലികൾക്കും നാശം സംഭവിക്കുന്നു.
- ആശുപത്രികൾ, സ്കൂൾ, റോഡുകൾ, ടെലിഫോൺ, ഇലക്ട്രിസിറ്റി റെയിൽവേ എന്നീ അടിസ്ഥാന സൗകര്യങ്ങൾ നശിക്കാനിടയാകുന്നു.
- ജലസ്രോതസ്സുകൾ മലിനീകരിക്കപ്പെടുന്നു.
- സാംക്രമിക രോഗങ്ങൾ പിടിപെടാൻ കാരണമാവുന്നു.
- ജലജന്യ രോഗങ്ങൾക്ക് കാരണമാവുന്നു.
- വെള്ളപ്പൊക്കത്തിൽ എല്ലാം നഷ്ടപ്പെട്ടവർക്ക് മാനസിക സമ്മർദ്ദം ഉണ്ടാകുന്നു.

ദുരന്ത നിവാരണം

വെള്ളപ്പൊക്കത്തിനു മുമ്പ്

- സുരക്ഷിത സ്ഥലത്തേക്ക് പോകേണ്ട മാർഗ്ഗങ്ങൾ ഏതെല്ലാമാണെന്ന് കുടുംബാംഗങ്ങൾ എല്ലാവരും മനസ്സിലാക്കി വെയ്ക്കുക.

- വെള്ളപ്പൊക്ക സാധ്യതയുള്ള സ്ഥലങ്ങളിൽ താമസിക്കുന്നവർ സിമന്റും ഇഷ്ടികയും ഉപയോഗിച്ച് ഉറപ്പുള്ള ഭിത്തികൾ നിർമ്മിക്കുക
- അടുപ്പുകൾ, വാട്ടർ ഹീറ്റർ എന്നിവ ഉയർത്തി സ്ഥാപിക്കുക.
- വെള്ളപ്പൊക്കം ഉണ്ടായാൽ വീട്ടിൽ നിന്നും അത്യാവശ്യമായി മാറ്റേണ്ട സാധനങ്ങൾ ഏതൊക്കെയെന്ന് തീരുമാനിക്കുക.
- അത്യാവശ്യ ഘട്ടങ്ങളിൽ ഉപയോഗിക്കുവാൻ ഒരു എമർജൻസി കിറ്റ് തയ്യാറാക്കി വെയ്ക്കുക.

എമർജൻസി കിറ്റിൽ കരുതേണ്ട സാധനങ്ങൾ

- റേഡിയോ
- ടോർച്ച്, ബാറ്ററികൾ
- ശുദ്ധജലം
- പെട്ടെന്നു കേടു വരാത്ത ഭക്ഷണ പദാർത്ഥങ്ങൾ (ബിസ്ക്കറ്റ്, റൊട്ടി)
- പഞ്ചസാര, ഉപ്പ്
- മണ്ണെണ്ണ
- മെഴുകുതിരി
- വിലപിടിപ്പുള്ള സാധനങ്ങൾ
- വിലയേറിയ രേഖകൾ
- അവശ്യ വസ്ത്രങ്ങൾ എന്നിവ സൂക്ഷിക്കുന്നതിനായി പ്ലാസ്റ്റിക് ബാഗ്, കുട
- പാമ്പുകളിൽ നിന്ന് രക്ഷ നേടുന്നതിന് മുളവടി, (പ്രഥമ ശുശ്രൂഷ ഉപകരണങ്ങൾ, മരുന്നുകൾ)
- ആവശ്യമായ വെള്ളം, ഭക്ഷണം, വസ്ത്രങ്ങൾ എന്നിവ തയ്യാറാക്കി വയ്ക്കുക.

വെള്ളപ്പൊക്ക സമയത്ത്

- പരിഭ്രാന്തരാകാതിരിക്കുക, റേഡിയോ, ടി.വി. എന്നിവയിൽ വരുന്ന മുന്നറിയിപ്പ് ശ്രദ്ധിക്കുക
- വളർത്തു മൃഗങ്ങളെ സുരക്ഷിത സ്ഥാനത്തേയ്ക്ക് മാറ്റുക
- ചൂട് നൽകുന്ന വസ്ത്രങ്ങൾ, അത്യാവശ്യ മരുന്നുകൾ, വിലപിടിപ്പുള്ള വസ്തുക്കൾ, വിലയേറിയ രേഖകൾ എന്നിവ പ്ലാസ്റ്റിക് കവറിൽ പൊതിഞ്ഞ് കൂടെ കരുതുക.
- രക്ഷാപ്രവർത്തകരുടെ നിർദ്ദേശങ്ങൾക്കനുസരിച്ച് പ്രവർത്തിക്കുക.
- തിളപ്പിച്ചാറിയ വെള്ളം മാത്രം കുടിക്കുക.
- കട്ടൻചായ, കഞ്ഞിവെള്ളം, കരിക്കിൻ വെള്ളം എന്നിവ ഉപയോഗിക്കുക.
- ഭക്ഷണ സാധനങ്ങൾ മൂടി വെയ്ക്കുക, അമിത ഭക്ഷണം ഒഴിവാക്കുക.
- വയറിളക്കം ഉണ്ടായാൽ അടുത്തുള്ള ആരോഗ്യ കേന്ദ്രത്തിൽ നിന്നും ഒ.ആർ.എസ് പൊടി വാങ്ങി ഉപയോഗിക്കുക.
- നിങ്ങൾ പോകുന്ന സുരക്ഷിത സ്ഥാനത്തെപ്പറ്റി പ്രാദേശിക സന്നദ്ധ പ്രവർത്തകരെ വിവരമറിയിക്കുക.
- വിലപിടിപ്പുള്ള വീട്ടുപകരണങ്ങളും മറ്റും ഉയർന്ന സ്ഥലത്തേക്ക് കയറ്റി വെയ്ക്കുക.
- വീട്ടിലേയ്ക്കുള്ള വൈദ്യുത ബന്ധം വിച്ഛേദിക്കുക.
- കക്കൂസ്, കുളിമുറി, ഡ്രെയിനേജ് എന്നിവിടങ്ങളിൽ മണൽ നിറച്ച ചാക്ക് ഇടുക. പുറമെ നിന്നുള്ള അഴുക്ക് അകത്തേക്ക് കയറുന്നത് തടയുന്നതിനാണിത്.
- അപകടകരമായ തരത്തിലേക്ക് വെള്ളപ്പൊക്കം മാറുമെന്ന് സൂചന ലഭിച്ചാൽ എത്രയും പെട്ടെന്ന് വാതിൽ പൂട്ടി ഏറ്റവുമടുത്തുള്ള സുരക്ഷിത സ്ഥാനത്തേയ്ക്കു മാറുക.
- വെള്ളക്കെട്ട്, ഒഴുക്കുള്ള സ്ഥലങ്ങൾ എന്നിവിടങ്ങളിൽ ഇറങ്ങരുത്. ആറ് ഇഞ്ച് ഘനത്തിൽ ഒഴുകുന്ന വെള്ളത്തിന് നിങ്ങളെ വീഴ്ത്താൻ സാധിക്കും.
- വെള്ളത്തിലൂടെ നടക്കേണ്ടി വരുമ്പോൾ ഒഴുക്കില്ലാത്ത ഭാഗം

തിരഞ്ഞെടുക്കുക. ഒരു വടി കയ്യിൽ കരുതുക. ഇഴജന്തുക്കളിൽ നിന്ന് രക്ഷ നേടുക.

- വെള്ളപ്പൊക്ക പ്രദേശത്ത് വാഹനങ്ങൾ ഓടിക്കുന്നത് ഒഴിവാക്കുക.
- പെട്ടെന്നുള്ള വെള്ളപ്പൊക്കമാണെങ്കിൽ വാഹനം നിർത്തി സുരക്ഷിത സ്ഥാനത്തേക്ക് നീങ്ങുക.
- റേഡിയോ, ടി.വി. എന്നിവയിലൂടെ തരുന്ന നിർദ്ദേശങ്ങൾ പാലിക്കുക.
- കെട്ടിക്കിടക്കുന്ന വെള്ളത്തിൽ കുട്ടികളെ കളിയ്ക്കുവാൻ അനുവദിക്കരുത്.
- വെള്ളത്താൽ ചുറ്റപ്പെട്ട കെട്ടിടങ്ങളിൽ നിന്ന് തീർച്ചയായും മാറുക.
- മഴവെള്ളം ശേഖരിച്ച് ഉപയോഗിക്കുക.
- ടാപ്പിലൂടെ വരുന്ന വെള്ളം നേരിട്ട് ഉപയോഗിക്കരുത്.

വെള്ളപ്പൊക്കത്തിനു ശേഷം

- വീടും പരിസരവും ബ്ലീച്ചിംഗ് പൗഡർ ഉപയോഗിച്ച് വൃത്തിയാക്കുക.
- വൈദ്യുത ഉപകരണങ്ങൾ അവയുടെ അപകട സാധ്യത ഒഴിവാക്കിയ ശേഷം മാത്രം ഉപയോഗിക്കുക.
- വെള്ളപ്പൊക്കത്തിൽ നനഞ്ഞു കുതിർന്ന ധാന്യങ്ങൾ, മറ്റു ഭക്ഷണ പദാർത്ഥങ്ങൾ എന്നിവ ഒഴിവാക്കുക.
- കെട്ടിക്കിടക്കുന്ന വെള്ളത്തിൽ കളിക്കരുത്.
- വീടു വൃത്തിയാക്കുമ്പോൾ ഇഴജന്തുക്കൾ വീട്ടിൽ ഇല്ലെന്ന് ഉറപ്പു വരുത്തുക.
- കിണർ വൃത്തിയാക്കിയ ശേഷം ബ്ലീച്ചിംഗ് പൗഡർ വിതറുക
- ടി.വി, റേഡിയോ എന്നിവയിലൂടെ തരുന്ന നിർദ്ദേശങ്ങൾ പാലിക്കുക.
- ആരോഗ്യ പ്രവർത്തകരുടെ നിർദ്ദേശങ്ങൾക്കനുസരിച്ച് വീടുകൾ വീണ്ടും താമസയോഗ്യമാക്കുക.
- പകർച്ച വ്യാധികൾ പിടിപെടാതെ നോക്കുക.

2.3 വരൾച്ച

ഏറ്റവും കൂടുതൽ ജലസമൃദ്ധിയുള്ള ദക്ഷിണേന്ത്യൻ സംസ്ഥാനമായ കേരളവും കൊടും വരൾച്ച അനുഭവിക്കുന്നുണ്ട്. തുലാവർഷത്തിന്റെ കുറവ് മണ്ണിലെ ഈർപ്പം കുറയ്ക്കുകയും ഭൂഗർഭ ജലലഭ്യത കുറയാനിടയാക്കുകയും ചെയ്യുന്നു. ഇത് കിണറുകളിലെ ജലം താഴുന്നതിന് കാരണമാവുന്നു. നാൽപത്തിനാലു നദികളും ഇരുപത്തൊൻപത് തടാകങ്ങളും വിശാലമായ വയലുകളും ശരാശരി മൂവായിരും മില്ലിലിറ്റർ വർഷപാതവും കൊണ്ട് സമ്പന്നമായ ദൈവത്തിന്റെ സ്വന്തം നാടായ കേരളവും കൊടും വരൾച്ചയുടെ ഭീതിയിലാണ്. പുഴകളും തടാകങ്ങളും ശോഷിച്ചു വന്നു. ജലസ്രോതസ്സുകൾ പലതും മലിനമാകുന്നു. കൃഷിയിടങ്ങൾ ഇല്ലാതാവുന്നു.

ഇന്ത്യൻ കാലാവസ്ഥാ കേന്ദ്രത്തിന്റെ നിർവ്വചനം അനുസരിച്ച് ദീർഘകാല ശരാശരി മഴയേക്കാൾ 26% വരെ കുറവു വരുന്ന വരൾച്ചയും 20% നും 30% നും ഇടയ്ക്കാണെങ്കിൽ ഇടത്തരം വരൾച്ചയും 50% കൂടുതൽ ആണെങ്കിൽ രൂക്ഷ വരൾച്ചയും ഉണ്ടാകുന്നു.

തെക്ക് പടിഞ്ഞാറൻ മൺസൂൺ കുറയുന്നതാണ് കേരളത്തിലെ വരൾച്ചയ്ക്ക് കാരണം. കേരളത്തിൽ ഏകദേശം 17,128 ഹെക്ടർ കൃഷി വരൾച്ച ഭീഷണി നേരിടുന്നുണ്ട്. നെൽകൃഷി, പച്ചക്കറി കൃഷി എന്നിവയും തോട്ട വിളകളും വരൾച്ച ഭീഷണിയിലാണ്.

നിർവചനം

വർഷപാതത്തിലുണ്ടാകുന്ന ഗണ്യമായ കുറവ് ഭൗമോപരിതലത്തിലെ ജല ലഭ്യത കുറയ്ക്കുന്നു. ഈ പ്രതിഭാസമാണ് വരൾച്ച.

പരിണിത ഫലങ്ങൾ

- മരങ്ങളും മറ്റു ചെടികളും നശിക്കാൻ കാരണമാകുന്നു.
- വൻ തോതിലുള്ള കൃഷിനാശം സംഭവിക്കാനിടയാകുന്നു.
- വെള്ളം ലഭിക്കാതെ കന്നുകാലികളും മറ്റു പക്ഷിമൃഗാദികളും ചത്തൊടുങ്ങാൻ കാരണമാകുന്നു. മീൻ വളർത്തലിന് ബുദ്ധിമുട്ടുണ്ടാകുന്നു.
- ജല സ്രോതസ്സുകൾ വറ്റി വരളുന്നു.
- വനം, വന്യജീവികൾ എന്നിവയുടെ നാശത്തിന് കാരണമാവുന്നു.
- വരൾച്ച കർഷകരെ വലയ്ക്കുന്നു. വെള്ളമില്ലാതെ കൃഷി നശിക്കാനിടയാകുന്നു.
- വരൾച്ച കൃഷിയുടെ കുറഞ്ഞ വിളവിന് കാരണമാകുന്നു.
- വരൾച്ച കാരണം ലഭ്യമായ ജലത്തിന്റെ ഗുണനിലവാരം താരതമ്യേന കുറയാനിടയാക്കുകയും ജലജന്യരോഗങ്ങൾ, പകർച്ചവ്യാധികൾ എന്നിവ പടരാൻ കാരണമാവുകയും ചെയ്യും.
- ഏറ്റവും പ്രധാനമായി ശുദ്ധജല (കുടിവെള്ളം) ലഭ്യത കുറയുന്നു.

ദുരന്ത നിവാരണം

വരൾച്ചയെ പ്രതിരോധിക്കാനുള്ള മുൻകരുതലുകൾ (Pre Disaster)

- പുഴയോരങ്ങളിലെ മണ്ണെടുപ്പും മണൽ വാരലും തടയുക.
- ജലം പാഴാക്കി കളയാതെ കൃത്യമായി വിളകൾക്ക് കിട്ടുന്ന രീതിയിൽ കൃഷി ചെയ്യുക.
- ജലത്തിന്റെ ഉപയോഗത്തിൽ മിതത്വം പാലിക്കുക.
- ലഭ്യമായ ജലസ്രോതസ്സുകൾ മാലിന്യ മുക്തമാക്കുക.
- തണ്ണീർത്തടങ്ങൾ സംരക്ഷിക്കുക
- വീട്ടിൽ ഒരു മഴവെള്ള സംഭരണി സ്ഥാപിക്കുക. മഴവെള്ളം

ശുദ്ധീകരിച്ചുപയോഗിക്കുക.

- വീടിനു ചുറ്റുമുള്ള തൊടിയിൽ മഴക്കുഴികളെടുത്ത് അതിലേക്ക് മഴവെള്ളം തിരിച്ചു വിടുക.
- വരൾച്ചാകാലരോഗങ്ങളെക്കുറിച്ച് മനസ്സിലാക്കാൻ തൊട്ടടുത്ത ആരോഗ്യ കേന്ദ്രം സന്ദർശിക്കുക.
- വരൾച്ചയെ ചെറുത്തു നിൽക്കുന്ന ചെടികൾ നടുകയും, കൃഷിരീതി അവലംബിക്കുകയും ചെയ്യുക.

വരൾച്ചയെ നേരിടുമ്പോൾ (During Disaster)

- വീട്ടിലെ പൈപ്പ്, വാൽവ്, ജോയിന്റുകൾ എന്നിവയിൽ ചോർച്ചയില്ലെന്ന് ഉറപ്പു വരുത്തുക.
- കുളിമുറിയിൽ ഷവർ ഉപയോഗിക്കുന്നതിനു പകരം ആവശ്യമായ വെള്ളം ബക്കറ്റിൽ പിടിച്ച് ഉപയോഗിക്കുക.
- വാഷ് ബേസിനുകളിൽ പൈപ്പ് തുറന്നു വിടാതെ കപ്പിൽ വെള്ളമെടുത്ത് ഉപയോഗിക്കുക.
- ഫ്ളഷ് ടാങ്കുകളിലെ വെള്ളം നിയന്ത്രിതമായി മാത്രം ഉപയോഗിക്കുക.
- സോപ്പും, ഷാമ്പുവും മറ്റും ഉപയോഗിക്കുമ്പോൾ അനാവശ്യമായി വെള്ളം തുറന്നു വിടാതിരിക്കുക
- വലിയ ഫ്ളഷ് ടാങ്കുകളിൽ കുപ്പി നിറയെ വെള്ളമെടുത്ത് അടച്ച് ഇടുക. ഇത് അമിതമായ വെള്ളം ഒഴുകുന്നത് തടയും
- വാഷിംഗ് മെഷിനിൽ ആവശ്യത്തിനുമാത്രം വെള്ളം ഉപയോഗിക്കുക.
- പാത്രങ്ങൾ, വസ്ത്രങ്ങൾ എന്നിവ കഴുകുമ്പോൾ ടാപ്പ് തുറന്നുവിടാതിരിക്കുക.
- സോപ്പുപൊടിയുടെ ഉപയോഗം മിതമാക്കുക. ഇത് വെള്ളത്തിന്റെ അളവ് കുറയ്ക്കാൻ സഹായിക്കും.
- പഴങ്ങളും പച്ചക്കറികളും കഴുകുമ്പോൾ പാത്രത്തിൽ വെള്ളമെടുത്ത് കഴുകുക.
- ആവശ്യത്തിനു വെള്ളം വന്നശേഷം പൈപ്പുകൾ ഓട്ടോമാറ്റിക്കായി അടയുന്ന സംവിധാനം ഏർപ്പെടുത്തുക.
- വീടും വാഹനവും കഴുകുന്നതിനു പകരം തുണി നനച്ച്

തുടക്കുക.

- വേനൽക്കാലത്ത് ചെടികൾക്ക് വളപ്രയോഗമോ കീടനാശിനി പ്രയോഗമോ നടത്താതിരിക്കുക. ഇത് വെള്ളം കൂടുതൽ ഒഴിച്ചു കൊടുക്കേണ്ടതിനിടയാക്കുന്നു. ചെടി നനയ്ക്കുന്നത് അതിരാവിലെയോ വൈകീട്ടോ ആക്കുക. ഇത് ജല നഷ്ടം കുറയ്ക്കുന്നു.

വരൾച്ചയ്ക്കു ശേഷം (Post-Disaster)

- മോട്ടോർ ഉപയോഗിച്ച് ടാങ്ക് നിറയ്ക്കുമ്പോൾ വെള്ളം വെറുതെ ഒഴുകിപ്പോകാതെ നോക്കുക.
- ടെറസിൽ നിന്നുള്ള മഴവെള്ളം ടാങ്കുകളിൽ നിറച്ച് ശുദ്ധീകരിച്ചുപയോഗിക്കുക.
- ഉപയോഗ ശൂന്യമായ കിണറോ കുഴികളോ ഉണ്ടെങ്കിൽ വൃത്തിയാക്കി പുരയിടത്തിലൂടെ ഒഴുകി വരുന്ന വെള്ളം ശേഖരിക്കാം.
- പുരപ്പുറത്തുനിന്നും വരുന്ന മഴവെള്ളം ശുദ്ധീകരിച്ച് കിണറുകളിൽ സംഭരിക്കാം.
- മഴവെള്ളം വെറുതെ ഒഴുക്കി കളയാതെ മണ്ണിൽ താഴ്ത്തുകയോ സംഭരിക്കുകയോ ചെയ്യാം. ഇങ്ങനെ വേനൽക്കാലത്ത് കിണറുകൾ വറ്റി പോകുന്നത് തടയാം.

2.4 സുനാമി

2004 ഡിസംബർ 26ന് ഇന്തോനേഷ്യയിലെ സുമാത്രയുടെ പടിഞ്ഞാറൻ തീരത്തിനടുത്ത് കടലിനടിയിൽ വച്ചുണ്ടായ മെഗാത്രസ്റ്റ് ഭൂകമ്പമാണ് 2004 ലെ ഇന്ത്യൻ മഹാസമുദ്ര സുനാമി എന്ന പേരിൽ അറിയപ്പെടുന്നത്. ദക്ഷിണേഷ്യയിലെ 14 രാജ്യങ്ങളിലായി മൂന്നുലക്ഷത്തിലേറെ പേരുടെ ജീവൻ കവർന്നു. ഇന്ത്യയിൽ പതിനായിരത്തോളം പേർ മരിച്ചു. തീരദേശവാസികളാണ് പ്രധാനമായും ദുരന്തത്തിനിരയായത്. ഇന്തോനേഷ്യ, ഇന്ത്യ, തായിലാൻഡ്, ശ്രീലങ്ക തുടങ്ങിയ 14 രാജ്യങ്ങളിലാണ് സുനാമി വൻ നാശം വിതച്ചത്. കേരളത്തിൽ 168 പേർ മരിക്കുകയും 25 ലക്ഷത്തോളം തീരദേശ വാസികൾ സുനാമിക്കെടുതി അനുഭവിക്കുകയും ചെയ്തു. കേരളത്തിൽ കൊല്ലം ജില്ലയിലാണ് ഏറ്റവും കൂടുതൽ നാശം വിതച്ചത്. ഇവിടെ 131 പേരാണ് മരണപ്പെട്ടത്.

നിർവചനം

സമുദ്രാന്തർ ഭാഗത്തെ ഭൂമി കുലുക്കം ദ്വീപുകളിലെ അഗ്നിപർവ്വത സ്ഫോടനം എന്നിവയുടെ ഫലമായി സമുദ്രജലം വൻ തിരമാലകളായി കരയിലേക്കടിച്ചു കയറി വിനാശം വിതയ്ക്കുന്ന പ്രതിഭാസമാണ് സുനാമി.

സുനാമിയുടെ പരിണിത ഫലങ്ങൾ

- ജീവനഷ്ടം

- ഭൗതിക വസ്തുകളുടെ നാശം
- തീരശോഷണം

ദുരന്തനിവാരണം

മുൻകരുതൽ

- കടൽ തീരത്തു പോകുമ്പോൾ ലൈഫ് ജാക്കറ്റ്, വായു നിറച്ച ട്യൂബ് എന്നിവ കരുതുക.
- സുനാമിയുണ്ടായാൽ തീരത്തുനിന്നും പെട്ടെന്നു രക്ഷപ്പെടാനുള്ള വഴികൾ മനസ്സിലാക്കുക.
- കടലിൽ ഉൾവലിയുന്നതു പോലെയുള്ള മാറ്റങ്ങളുണ്ടെങ്കിൽ തീരത്തു നിന്നും പോകുക
- സുനാമി വാണിങ്ങ് മനസ്സിലാക്കുകയും പെട്ടെന്ന് തീരം വിടാൻ സന്നദ്ധരാവുകയും ചെയ്യുക.

സുനാമി വന്നാൽ

- സുനാമിയുണ്ടാകുന്നത് കാണാൻ ഒരിക്കലും തീരത്ത് നിൽക്കരുത്.
- നിയമപരമായ അറിയിപ്പുകൾ ശ്രദ്ധിക്കുകയും പാലിക്കുകയും ചെയ്യുക.
- സുനാമിയുണ്ടായ തീരത്തേക്ക് ഒരറിയിപ്പ് ഉണ്ടാകുന്നത് വരെ പോകരുത്.
- തീരപ്രദേശത്തുള്ള കെട്ടിടങ്ങളിലോ പാലങ്ങളിലോ നിൽക്കരുത്.
- വളരെ ഉയർന്ന കുന്നുകളിലോ മലകളിലോ അഭയം പ്രാപിക്കാൻ ബുദ്ധിമുട്ടുള്ളപ്പോൾ നന്നായി സുരക്ഷ നൽകുന്ന വെള്ളം കയറാൻ സാധ്യതയില്ലാത്ത കെട്ടിടങ്ങളിൽ അഭയം പ്രാപിക്കുക.
- വൈദ്യുതി ലൈനുകൾ പൊട്ടിക്കിടക്കാൻ സാധ്യതയുള്ളതിനാൽ സൂക്ഷിക്കുക.
- രക്ഷാപ്രവർത്തകരുടെ നിർദ്ദേശത്തിനനുസരിച്ച് പ്രവർത്തിക്കുക.

സുനാമിയ്ക്കു ശേഷം

- ശാന്തരായിരിക്കുക
- പരിക്കുപറ്റിയവരെ സഹായിക്കുക
- പരിക്കു പറ്റിയ പക്ഷി മൃഗാദികളെ സുരക്ഷിതരാക്കുക
- റേഡിയോയിലൂടെയും ടെലിവിഷനിലൂടെയും തരുന്ന നിർദ്ദേശങ്ങൾ ശ്രദ്ധിക്കുക
- തീരപ്രദേശങ്ങളിൽ കണ്ടൽക്കാടുകൾ വച്ച് പിടിപ്പിക്കുക.
- സുനാമി മുന്നറിയിപ്പ് സംവിധാനം തന്റെ തീരദേശത്തുമുണ്ടോ എന്ന് ഉറപ്പു വരുത്തുക.
- സുനാമി വെള്ളപ്പൊക്കത്തിൽ നിന്ന് രക്ഷപ്പെട്ടവർക്കും, ബന്ധുമിത്രാദികൾ നഷ്ടപ്പെട്ടവർക്കും കൗൺസലിങ്ങ് കൊടുക്കുക.
- പരിക്ക് പറ്റിയവർക്ക് പ്രഥമ ശുശ്രൂഷ നൽകുക.

(ഏറ്റവും കൂടുതൽ സുനാമി സാധ്യത കാണുന്നത് പസഫിക് സമുദ്രത്തിലാണ്)

(ലോക സുനാമി ബോധവൽക്കരണ ദിനം നവംബർ 5)

- വീടുകളിലേക്ക് തിരിച്ചു വന്നാൽ ചുവരിന്റെയും തറയുടെയും, സ്റ്റെയർകേസുകളുടെയും, ജനൽ, വാതിൽ എന്നിവയുടെയും ബലം പരിശോധിക്കുക. കേടുവന്ന കാര്യങ്ങൾ നേരെയാക്കുക.
- ഒഴുകി വന്ന വെള്ളത്തിലൂടെ വല്ല ഇഴജന്തുക്കളും വീട്ടിൽ കയറി കൂടിയിട്ടുണ്ടോയെന്നു പരിശോധിക്കുക.

2.5 ഉരുൾപൊട്ടൽ

അതിശക്തമായ മഴയിൽ ഭൂമിയിൽ സംഭരിക്കപ്പെടുന്ന ജലം അതിമർദ്ദത്താൽ പുറംതള്ളപ്പെടുന്നു. ഉയർന്ന പ്രദേശങ്ങളിലാണ് സാധാരണയായി ഉരുൾപൊട്ടൽ ഉണ്ടാകുന്നത്. കേരളത്തിൽ മലയോര പ്രദേശങ്ങളിലാണ് ഉരുൾപൊട്ടൽ കൂടുതൽ സംഭവിക്കുന്നത്. വയനാട്, കണ്ണൂർ, കോഴിക്കോട്, പാലക്കാട്, മലപ്പുറം എന്നിവിടങ്ങൾ ഉരുൾ പൊട്ടൽ ഭീഷണിയുള്ള ജില്ലകളാണ്, കൂടുതൽ ഉരുൾപൊട്ടൽ സാധ്യതയുള്ളത് ഇടുക്കിയിലാണ്.

റെയിൻ ഫോൾഡ് ത്രഷോൾഡ് അനലിറ്റിക്സ് എന്ന പരിശോധനയിലൂടെ ഉരുൾ പൊട്ടൽ മുൻകൂട്ടി കണ്ടെത്താം.

തുടർച്ചയായി മഴയുണ്ടായാൽ ഉരുൾപൊട്ടൽ സംഭവിക്കാം. ഇനി എത്ര മില്ലി മീറ്റർ കൂടി പെയ്താൽ മണ്ണിടിച്ചിൽ ഉണ്ടാകുമെന്ന കണക്ക് അടിസ്ഥാനമാക്കിയാണ് ഉരുൾ പൊട്ടൽ പ്രവചിക്കുന്നത്.

നിർവ്വചനം

അതിശക്തമായ മഴയുടെ ഫലമായി ധാരാളം ജലം മണ്ണിലേക്കാഴ്ന്നിറങ്ങി ചരിഞ്ഞ പ്രദേശങ്ങളിലെ മണ്ണ് ഭൂഗുരുത്വത്തിന്റെ ഫലമായി ഒന്നാകെ ഇടിഞ്ഞു വീഴുന്ന പ്രതിഭാസമാണ് ഉരുൾപ്പൊട്ടൽ.

മണ്ണിലേക്കാഴ്ന്നിറങ്ങിയ ജലം ശക്തമായി മണ്ണിനോടൊപ്പം ഒഴുകുന്നു. മഴയുടെ ശക്തി കുറയുന്നതുവരെ ഈ ഒഴുക്ക് തുടരും ചിലത് സ്ഥിരം നീർച്ചാലുകളായി മാറുകയും ചെയ്യുന്നു.

ഭൂഗുരുത്വാകർഷണമാണ് ഉരുൾപൊട്ടലുണ്ടാകാനുള്ള പ്രധാന കാരണം, ഭൂകമ്പം, അഗ്നിപർവ്വത സ്ഫോടനം, മഴയുടെ ഫലമായി ഭൂഗർഭ ജലത്തിലുണ്ടാകുന്ന മാറ്റം, കുന്നിൻ മുകളിലെ അശാസ്ത്രീയവും ക്രമരഹിതവുമായ കെട്ടിട നിർമ്മാണം, കുന്നും മലകളും ഇടിച്ചു നിരത്തി മണ്ണെടുക്കൽ, ചെരിവുള്ള പ്രദേശങ്ങളിലെ മണ്ണിന് ഇളക്കം തട്ടുന്ന തരത്തിലുള്ള കൃഷിരീതി, ചെരിവുള്ള പ്രദേശങ്ങളിലെ കെട്ടിട നിർമ്മാണം, വന നശീകരണം എന്നിവയെല്ലാമാണ് കാരണങ്ങൾ.

പരിണിത ഫലങ്ങൾ

- മനുഷ്യർ, കന്നുകാലികൾ, മറ്റു പക്ഷിമൃഗാദികൾ എന്നിവയുടെ മരണത്തിനിടയാക്കുന്നു. ഉരുൾപ്പൊട്ടലിൽ എല്ലാം ഒഴുകി വരുന്ന മണ്ണിനടിയിൽ അടക്കം ചെയ്യപ്പെടുന്നു.
- മണ്ണ്, ചെളി, മറ്റ് അവശിഷ്ടങ്ങളുടെ അതിശക്തമായ ഒഴുക്ക് വീടുകളും, കെട്ടിടങ്ങളും മറ്റ് വസ്തുവകകളും നശിക്കാൻ കാരണമാകുന്നു.
- മണ്ണും ചെളിയും, ചെടികളുടെയും മരങ്ങളുടെയും മറ്റവശിഷ്ടങ്ങളും, പാലം, റോഡ്, റെയിൽ ഗതാഗതം, ഇലക്ട്രിസിറ്റി, ടെലി കമ്മ്യൂണിക്കേഷൻ എന്നീ അടിസ്ഥാന സൗകര്യങ്ങൾ തകർക്കുന്നു.
- ഒഴുകി വരുന്ന അവശിഷ്ടങ്ങൾ ജലസ്രോതസ്സുകളെ നശിപ്പിക്കുന്നു. കുളങ്ങൾ, തടാകങ്ങൾ എന്നിവ മലിനമാക്കുകയും ശുദ്ധജലപൈപ്പ് ലൈനുകൾ തകരാൻ കാരണമാവുകയും ചെയ്യുന്നു.
- കൃഷി ഭൂമിക്ക് നാശം സംഭവിക്കുന്നു.

- നാടിന്റെ സാംസ്കാരിക പൈതൃകങ്ങൾ നശിക്കാൻ കാരണമാകുന്നു.
- നമ്മുടെ പ്രിയപ്പെട്ടവരുടെ ജീവനെടുക്കുന്നു.

ദുരന്ത നിവാരണം

ഉരുൾപൊട്ടൽ തടയാനുള്ള മുൻകരുതൽ

- പ്രകൃതിയുടെ സംരക്ഷണം സ്വന്തം ഉത്തരവാദിത്തമായി കരുതുക
- കുന്നിൻ മുകളിൽ മണ്ണിന് ഇളക്കം തട്ടുന്ന തരത്തിലുള്ള കൃഷിരീതി ഒഴിവാക്കുക
- കുന്നിൻ ചരിവുകളെ തട്ടുകളാക്കി കൃഷി ചെയ്യുക.
- സ്വാഭാവിക നീർച്ചാലുകൾക്ക് തടസ്സമുണ്ടാക്കാതിരിക്കുക
- കുന്നിൽ ചരിവിൽ കെട്ടിടങ്ങൾ പണിയാതിരിക്കുക.
- മലകൾ ഇടിച്ചു നിരത്തുന്നതും മണ്ണെടുക്കുന്നതും നിർത്തലാക്കുക.
- കുന്നിൻ മുകളിലെ അശാസ്ത്രീയമായ കെട്ടിട നിർമ്മാണം തടയുക.
- ഉരുൾപൊട്ടൽ ഉണ്ടാകാനിടയുള്ള മലയുടെ അടിവാരത്തിലോ കുന്നിൻ പ്രദേശങ്ങളിലോ വീടുള്ളവർ മഴപെയ്യുമ്പോൾ ജാഗ്രത പാലിക്കുക.

ഉരുൾപൊട്ടൽ ഉണ്ടാകാൻ സാധ്യതയുള്ള സമയത്ത്

- മരം വീഴുകയോ അസാധാരണ ശബ്ദമുണ്ടാകുകയോ ചെയ്യുമ്പോൾ ജാഗ്രത പാലിക്കുക.
- അപായ സൂചനയുണ്ടെങ്കിൽ സുരക്ഷിത സ്ഥാനത്തേയ്ക്ക് പെട്ടെന്ന് മാറുക
- ഉരുൾപൊട്ടൽ സാധ്യത ഉണ്ടെന്ന് തിരിച്ചറിഞ്ഞാൽ സാധനങ്ങളെല്ലാം എടുക്കാൻ നിൽക്കാതെ പെട്ടെന്ന് സ്ഥലം കാലിയാക്കുക.
- രക്ഷപ്പെടുമ്പോൾ ഒരിക്കലും കുന്നിൽ ചരിവിലേക്കോ താഴേക്കോ പോകാതെ സുരക്ഷിതമായ ഉയർന്ന സ്ഥലത്തേക്ക് മാറുക.
- സംഭവ സ്ഥലത്തു നിന്ന് രക്ഷപ്പെടാൻ കഴിയില്ലായെന്നു തോന്നിയാൽ തലക്ക് പരിക്കേൽക്കാത്ത രീതിയിൽ കഴിവതും ഒരു ബോൾ പോലെ ചുരുണ്ട് ഇരിക്കുക.

ഉരുൾപൊട്ടലിനു ശേഷം

- ഉരുൾ പൊട്ടലുണ്ടായ പ്രദേശത്ത് വീണ്ടും അതുണ്ടാകാൻ സാധ്യതയുള്ളതിനാൽ കരുതിയിരിക്കുക.
- തകർന്ന കെട്ടിടത്തിനകത്തേക്ക് പ്രവേശിക്കാതെയിരിക്കുക.
- ഉരുൾപ്പൊട്ടലിൽ ഒഴുകി വന്ന അവശിഷ്ടങ്ങൾക്കടുത്തേക്ക് പോകാതിരിക്കുക.
- രക്ഷാപ്രവർത്തകരുടെയും അധികൃതരുടെയും നിർദ്ദേശങ്ങൾക്കനുസരിച്ച് പ്രവർത്തിക്കുക.
- പ്രകൃതിയെ നശിപ്പിക്കാതിരിക്കുക.
- ദുരന്തത്തിൽ നിന്ന് രക്ഷപ്പെട്ടവരെ സഹായിക്കുക കൗൺസലിങ്ങ് കൊടുക്കുക.
- പ്രകൃതിദത്തമായ വെള്ളച്ചാലുകളിലൂടെ മഴവെള്ളം ഒഴുക്കി വിടുക.
- ഉരുൾപൊട്ടൽ സാധ്യതയുള്ള സ്ഥലങ്ങളിൽ വെള്ളം മണ്ണിൽ താഴുന്നത് തടയുക.
- ശാസ്ത്രീയവും സുരക്ഷിതവുമായി ഭൂമിയെ ഉപയോഗിക്കുക.
- ചെടികളും മരങ്ങളും വച്ചു പിടിപ്പിക്കുക.

2.6 ഇടിമിന്നൽ

ഇന്ത്യയിൽ ഇടിമിന്നലേറ്റ് ഏറ്റവും അധികം മരണവും വസ്തുവകകൾക്ക് നാശവും സംഭവിക്കുന്ന സംസ്ഥാനം കേരളമാണെന്ന് പഠനങ്ങൾ തെളിയിക്കുന്നു. കേരളത്തിൽ ഇടിമിന്നൽ ദുരന്തങ്ങൾ വർദ്ധിച്ചു വരുന്നു. കേരളത്തിൽ ഏറ്റവും കൂടുതൽ ഇടിമിന്നൽ അനുഭവപ്പെടുന്നത് കൊല്ലം ജില്ലയിലും കുറവ് തൃശ്ശൂർ ജില്ലയിലുമാണെന്ന് പഠന റിപ്പോർട്ടുകൾ പറയുന്നു. വേനൽക്കാലത്ത് ഉണ്ടാകുന്ന ഇടിമിന്നലുകളാണ് ഏറെ നാശം വിതയ്ക്കുന്നത്. കേരളത്തിൽ ഏറ്റവുവധികം അപകടങ്ങളുണ്ടാക്കുന്ന ഒരു പ്രകൃതി ക്ഷോഭം ഇടിമിന്നലാണ്. 1986 മുതലുള്ള കണക്കുകളുടെ അടിസ്ഥാനത്തിൽ തിരുവനന്തപുരത്തെ ഭൗമശാസ്ത്രപഠന കേന്ദ്രം നടത്തിയ പഠനത്തിൽ മനസ്സിലാകുന്നത് പ്രതിവർഷം 70 ലക്ഷം പേർ ഇടിമിന്നൽ മൂലം മരണപ്പെടുകയോ പരിക്കേൽക്കുകയോ ചെയ്യുന്നു എന്നാണ്.

നിർവ്വചനം

ഇടിമുഴക്കത്തിന്റെ അകമ്പടിയോടെ മേഘങ്ങളിൽ നിന്നും ഭൗമോപരിതലത്തിലേക്ക് പ്രവഹിക്കുന്ന അമിത ഊർജ്ജത്തോടെയുള്ള തിളങ്ങുന്ന വൈദ്യുത ഡിസ്ചാർജ്ജാണ് മിന്നൽ.

മിന്നൽ അപകടകരമാവുന്നതിന്റെ കാരണങ്ങൾ

- സെക്കന്റിന്റെ പത്തിലൊന്ന് അംശം സമയത്തിനുള്ളിൽ ദശലക്ഷക്കണക്കിന് വോൾട്ട് വൈദ്യുത ഡിസ്ചാർജ്ജും മുപ്പതിനായിരത്തോളം ഡിഗ്രി ചൂടും സൃഷ്ടിക്കപ്പെടുന്ന മിന്നൽ അപകടകാരികളാണ്.
- ഏറ്റവും വലുപ്പമേറിയ ക്യുമുലോനിംബസ് മേഘങ്ങൾ ആണ് മിന്നലുണ്ടാകാനുള്ള പ്രധാന കാരണം. സൂര്യ രശ്മികളുടെ കഠിന താപത്തിനാൽ പ്രഭാത സമയങ്ങളിലാണ് ഇവ രൂപപ്പെടുന്നത്. താപസംവാഹകരായ ഈ മേഘങ്ങളാണ് കേരളത്തിലുണ്ടാകുന്ന മിന്നലിനു കാരണം.

പരിണിത ഫലങ്ങൾ

- പെട്ടെന്നുള്ള മരണം
- വൈദ്യുതാഘാതം, പൊള്ളൽ എന്നിവ
- വീട്ടിലെ ഇലക്ട്രിക്കൽ വയറിംങ്ങ് നശിക്കാനിടയാകുന്നു.
- വൻ മരങ്ങൾ ഇടിമിന്നലിൽ നശിച്ചു പോകുന്നു.

ദുരന്തനിവാരണം

ഇടിമിന്നൽ - മുൻ കരുതൽ

- ലോഹനിർമ്മിതമായ വസ്തുക്കളിൽ നിന്ന് അകന്നു നിൽക്കുക.
- ജലാശയങ്ങളിലായിരിക്കുമ്പോൾ അപകട സാധ്യതയുള്ളതിനാൽ അവിടെ നിന്നും മാറുക.
- സ്വിച്ച് ഓണാക്കുമ്പോൾ സൂക്ഷിക്കുക. വൈദ്യുതാഘാത മേൽക്കാൻ സാധ്യതയുണ്ട്.
- വൈദ്യുത ലൈനുകൾ ഇടിമിന്നൽ സുരക്ഷാ കവചങ്ങളാൽ നിർമ്മിക്കുക.

മിന്നൽ സംരക്ഷണ മാർഗ്ഗങ്ങൾ

- മിന്നൽ രക്ഷാചാലകം (Lightning conductor) പൊട്ടിത്തെറിക്കാൻ സാധ്യതയുള്ള വസ്തുക്കൾ സൂക്ഷിക്കുന്ന കെട്ടിടങ്ങളിൽ മിന്നൽ ഏൽക്കാതിരിക്കാൻ ഉപയോഗിക്കുന്നു. (ഇവയ്ക്ക് മിന്നൽ ഉണ്ടാകുന്നത് തടയാൻ കഴിയുന്നു)

- എർത്തിങ്ങ് (Earthing) - വീടുകൾക്ക് വൈദ്യുതി ഏൽക്കാതെ സംരക്ഷണം നൽകുന്നു.
- റിംഗ് കണ്ടക്ടർ (Ring conductor) - മരങ്ങൾക്ക് മിന്നലേൽക്കാതെ സംരക്ഷിക്കുന്നു.
- മിന്നൽ അറെസ്റ്റർ (Lightning Arrester) - മിന്നൽ സമയത്ത് വൈദ്യുത ഉപകരണങ്ങളിൽ നിന്ന് വൈദ്യുതിയേൽക്കാതെ സംരക്ഷിക്കുന്നു.

മിന്നൽ ഉണ്ടാകുമ്പോൾ നിൽക്കേണ്ട സുരക്ഷിതമായ സ്ഥലങ്ങൾ

- മിന്നലിനെ ഉൾഭാഗത്തേക്ക് തുളച്ചു കയറാൻ അനുവദിക്കാത്തതും പൊട്ടാത്തതുമായ ലോഹപ്രതലങ്ങളാൽ ഭാഗികമായോ പൂർണ്ണമായോ ചുറ്റപ്പെട്ട സ്ഥലങ്ങളിൽ ഒരു വ്യക്തി സുരക്ഷിതനായിരിക്കും.

ഉദാ: സ്റ്റീൽ ഫ്രെയിമുള്ള കെട്ടിടങ്ങൾ, ലോഹപ്രതലമുള്ള വാഹനങ്ങൾക്കകത്ത് (കാറിനകത്ത്)

- മേൽക്കൂരയും ഭിത്തിയും ലോഹ ഷീറ്റുകൊണ്ട് മൂടിയതും ജോയിന്റുകൾ ചാലക പ്രതലം ഉറപ്പാക്കുന്ന തരത്തിൽ വൈദ്യുത ശൃംഖലയുമായി ബന്ധിപ്പിച്ച കെട്ടിടത്തിനകത്തും സുരക്ഷിതമായിരിക്കും.
- വലുതും ചെറുതുമായ കെട്ടിടങ്ങൾക്കകത്ത് ഇരിക്കുക.
- പർവ്വതങ്ങൾക്കകത്തുള്ള ഗുഹ പോലെയുള്ള പൊള്ളയായ ഭാഗങ്ങളിൽ ചുവരിനെ സ്പർശിക്കാതെയിരിക്കാം.

മിന്നലുള്ളപ്പോൾ ഒഴിവാക്കേണ്ട സ്ഥലങ്ങൾ

- ഏറ്റവും ഉയരം കൂടിയ വസ്തുക്കളിൽ മിന്നൽ വന്നുപതിക്കാൻ വളരെയധികം സാധ്യതയുള്ളതിനാൽ അവയുടെ സമീപത്തു നിന്നും മാറി നിൽക്കുക.
- ലോഹ നിർമ്മിതമായ വസ്തുക്കളിൽ മിന്നലേൽക്കാൻ സാധ്യതയുള്ളതിനാൽ അവയിൽ നിന്നും മാറി നിൽക്കുക.
- തുറസ്സായ സ്ഥലത്തും, കുന്നിൻ മുകളിലും, ഒറ്റപ്പെട്ട മരങ്ങളുടെ അടിയിലും നിൽക്കരുത്.
- വൻമരങ്ങളുടെ അടിയിൽ നിൽക്കരുത്.
- സുരക്ഷാ കവചമില്ലാത്ത കെട്ടിടങ്ങൾ, ടവറുകൾ, കുടിലുകൾ, തുറസ്സായ സ്ഥലങ്ങൾ എന്നിവിടങ്ങളിൽ നിൽക്കരുത്.

- സുരക്ഷാ കവചമില്ലാത്ത വൈദ്യുത ലൈനുകൾ, ലോഹ ഘടനകൾ എന്നിവയുടെ സമീപത്ത് നിൽക്കരുത്.
- കൊടിമരം, കുത്തനെയുള്ള ലോഹ പൈപ്പുകൾ എന്നിവയുടെ അടുത്ത് നിൽക്കരുത്.
- തടാകങ്ങളും നീന്തൽ കുളങ്ങളും, തുറസ്സായ ജലസ്രോതസ്സുകളിൽ കാണുന്ന വള്ളങ്ങളും മിന്നലേൽക്കാൻ സാധ്യതയുള്ള ഇടങ്ങളാണ്.
- ലോഹ നിർമ്മിതമായ വാഹനങ്ങളുടെ സമീപം, റെയിൽവേ ട്രാക്ക് എന്നിവിടങ്ങളിൽ നിൽക്കരുത്.

ഇടിമിന്നലുണ്ടാകുമ്പോൾ

- വൈദ്യുത ബന്ധം വിഛേദിക്കുക
- ഫോൺ, ഷവർ, വാഷ്ടാപ്പ് എന്നിവ ഉപയോഗിക്കരുത്.
- കാൽപാദങ്ങളും കാൽമുട്ടും ചേർത്ത് പിടിച്ച് കൈകൾ മുട്ടിൽ ചുറ്റി വരിഞ്ഞ് താടി മുട്ടിനു ഉറപ്പിച്ചു നിലത്തു കുത്തിയിരിക്കുക.
- രണ്ടു കൈകൊണ്ടും ചെവി പൊത്തി പിടിക്കുക. വലിയ മുഴക്കത്തോടെയുള്ള മിന്നലിൽ കേൾവി ശക്തി തന്നെ നഷ്ടപ്പെടാൻ സാധ്യതയുണ്ട്.

ഇടിമിന്നലിനു ശേഷം

- മിന്നലേറ്റ് അബോധാവസ്ഥയിൽ കിടക്കുന്ന ആളെ പെട്ടെന്ന് കൃത്രിമ ശ്വാസോച്ഛ്വാസം (CPR) നൽകുക.
- എത്രയും പെട്ടെന്ന് ആശുപത്രിയിലെത്തിക്കുക.
- പൊള്ളലേറ്റവരെ പരിക്കേറ്റ ഭാഗം വ്യത്തിയുള്ള കട്ടികുറഞ്ഞ ഉണങ്ങിയ തുണിയിൽ പൊതിഞ്ഞ് എത്രയും പെട്ടെന്ന് ആശുപത്രിയിലെത്തിക്കുക.
- പൊള്ളലേറ്റഭാഗത്തെ വസ്ത്രങ്ങൾ പെട്ടെന്ന് ഊരി മാറ്റരുത്.
- വീടുപണിയുമ്പോൾ ലൈറ്റുകൾ ഘടിപ്പിക്കുന്നതിന് ലോഹക്കമ്പി കൾ ഒഴിവാക്കുക.
- അയ കെട്ടാൻ ലോഹ ദണ്ഡുകളും ലോഹ വയറുകളും ഒഴിവാക്കുക.

2.7 ചുഴലിക്കാറ്റ്

2017 നവംബർ 30ന് കേരളത്തിൽ തിരുവനന്തപുരം, കൊല്ലം, ഇടുക്കി, പത്തനംതിട്ട എന്നീ ജില്ലകളിൽ ശക്തമായ ഓഖി ചുഴലിക്കാറ്റുണ്ടായി. ചുഴലിക്കാറ്റിന് ബംഗ്ലാദേശിൽ ഉപയോഗിക്കുന്ന പേരാണ് ഓഖി. കണ്ണ് എന്നാണ് ഈ പദത്തിന് അർത്ഥം. ഉഷ്ണമേഖലാ ചുഴലിക്കാറ്റുകളെ തിരിച്ചറിയുന്നതിന് കാലാവസ്ഥാ നിരീക്ഷകർ നൽകിയ പേരാണ് ഇത്. തെക്കൻ കേരളത്തിൽ മണിക്കൂറിൽ 120 കിലോമീറ്റർ വേഗത്തിലാണ് ഓഖി വ്യാപിച്ചത്.

കന്യാകുമാരിക്ക് തെക്കും ശ്രീലങ്കക്കു പടിഞ്ഞാറും രൂപപ്പെട്ട ന്യൂനമർദ്ദമാണ് ഓഖി ചുഴലിക്കാറ്റായി മാറിയത്. ഓഖി ചുഴലിക്കാറ്റിൽ കേരളത്തിൽ വൻ നഷ്ടങ്ങളാണ് ഉണ്ടായത്. ധാരാളം വീടുകൾ പൂർണ്ണമായും ഭാഗികമായും തകർന്നു. ഏകദേശം 529 കുടുംബങ്ങളെ ദുരിതാശ്വാസ ക്യാമ്പിൽ മാറ്റി പാർപ്പിച്ചു. കടലിൽ പോയ ഏകദേശം നൂറോളം മൽസ്യതൊഴിലാളികളെ ചുഴലിക്കാറ്റിൽ കാണാതായി.

മുപ്പതിലധികം ആളുകൾ മരിക്കാനിടയായി. തീരസംരക്ഷണ സേന, വ്യോമസേന, നാവികസേന, ദേശീയ ദുരന്ത പ്രതികരണ സേന, കേന്ദ്ര സംസ്ഥാന ഗവൺമെന്റ് ഏജൻസികൾ ദുരിതാശ്വാസ പ്രവർത്തനങ്ങളിൽ ഏർപ്പെട്ടു.

നിർവ്വചനം

ശക്തമായ കാറ്റും പേമാരിയും സൃഷ്ടിച്ചു കൊണ്ട് ഒരു ന്യൂനമർദ്ദ കേന്ദ്രത്തിനു ചുറ്റും ചുഴറ്റി നിൽക്കുന്ന കൊടുങ്കാറ്റുകളുടെ ഒരു കൂട്ടമാണ് ചുഴലിക്കാറ്റ്.

കൊടുങ്കാറ്റും പേമാരിയുമാണ് ചുഴലിക്കാറ്റിന് കാരണമാകുന്നത്.

ചുഴലിക്കാറ്റിന്റെ പരിണിത ഫലങ്ങൾ

- വീടുകളും കെട്ടിടങ്ങളും, വസ്തുവകകൾക്കും നാശം സംഭവിക്കുന്നു.
- ശക്തമായ മഴമൂലം തോടുകളും പുഴകളും നിറഞ്ഞൊഴുകി വെള്ളപ്പൊക്കത്തിന് കാരണമായി തീരുന്നു.
- ജലസ്രോതസ്സുകൾ അവശിഷ്ടങ്ങൾ കൊണ്ട് നിറഞ്ഞ് നാശമാവുന്നു.
- വൈദ്യുത ലൈൻ ടെലിഫോൺ ലൈൻ എന്നിവ തകരുന്നു.
- കൃഷിക്കും കന്നുകാലികൾക്കും നാശം സംഭവിക്കുന്നു.
- മനുഷ്യർക്ക് ജീവനഷ്ടം, പരിക്ക് എന്നിവയ്ക്ക് കാരണമാവുന്നു.
- ശക്തമായ കാറ്റ് ഉറപ്പില്ലാത്ത മേൽക്കൂരകളെ പറത്തിക്കൊണ്ടു പോകുന്നു. അതിലെ എല്ലാ വസ്തുക്കൾക്കും നാശം സംഭവിക്കുന്നു.
- പറന്നു പോകുന്ന വസ്തുക്കളാൽ ആളുകൾക്ക് പരിക്കേൽക്കാം, മരണം വരെ സംഭവിക്കാം.

ദുരന്തനിവാരണം

ചുഴലിക്കാറ്റിനുമുമ്പ്

- ഒരു എമർജൻസി കിറ്റ് തയ്യാറാക്കി വയ്ക്കുക.
- മരങ്ങളുടെ ഉണങ്ങിയ കൊമ്പും ചില്ലകളും മുറിച്ചു മാറ്റുക.

- പറന്നു പോകാൻ സാധ്യതയുള്ള വസ്തുക്കൾ മാറ്റി വയ്ക്കുക.
- ഇളകിപ്പോകാൻ സാധ്യതയുള്ള വസ്തുക്കൾ ഉറപ്പിക്കുക.
- ആവശ്യത്തിന് വെള്ളവും ഭക്ഷണവും കരുതുക.
- വലിയ പാത്രങ്ങളിൽ മൂന്ന് നാല് ദിവസത്തേക്കു വേണ്ട ശുദ്ധജലം കരുതുക.
- ചുഴലിക്കാറ്റിന് സാധ്യതയുള്ള സ്ഥലങ്ങൾ തിരിച്ചറിയുക.
- റേഡിയോയിലും ടിവിയിലും തരുന്ന മുന്നറിയിപ്പ് ശ്രദ്ധിക്കുക.
- മേൽക്കൂര കൊൺക്രീറ്റ് നിർമ്മിതമായിരിക്കാൻ ശ്രദ്ധിക്കുക.
- വീടിനോട് ചാഞ്ഞു നിൽക്കുന്ന മരങ്ങൾ മുറിക്കുക.

ചുഴലിക്കാറ്റുണ്ടാകുമ്പോൾ

- ചുഴലിക്കാറ്റുണ്ടാകുമ്പോൾ കോൺക്രീറ്റ് മേൽക്കൂരയുള്ള ഉറപ്പുള്ള ഒരു കെട്ടിടത്തിലേക്ക് മാറുക.
- വീടിനുള്ളിലെ ഏറ്റവും സുരക്ഷിതമായ ഭാഗത്തിരിക്കുക.
- ഏറ്റവും ഉറപ്പുള്ള മേശയുടെ അടിയിൽ ഇരിക്കുകയോ ഉറപ്പുള്ള

തൂണിലോ പൈപ്പിലോ മുറുകെ പിടിക്കുകയോ ചെയ്യുക.

- എല്ലാ ജനലുകളും അടയ്ക്കുക വീടിനകത്തെ മർദ്ദം കുറയ്ക്കാൻ അപകടമുണ്ടാകാൻ സാധ്യതയില്ലാത്ത ഒരു ജനൽ തുറന്നിടുകയോ ചെയ്യുക.
- വാതിലുകളിൽ നിന്നും ജനലരികിൽ നിന്നും മാറി നിൽക്കുക.
- വീടുമായുള്ള വൈദ്യുതി ബന്ധം വിഛേദിക്കുക.
- ഇലക്ട്രിക്കൽ, മെറ്റൽ ഉപകരണങ്ങളിൽ നിന്നും അകന്ന് നിൽക്കുക.

ചുഴലിക്കാറ്റിനു ശേഷം

- ചുഴലിക്കാറ്റ് ശമിച്ചു എന്ന് ഔദ്യോഗികമായി അറിയിപ്പ് കിട്ടും വരെ വീടിനകത്തു തന്നെയിരിക്കുക.
- അത്യാവശ്യമായി പുറത്തു പോകണമെങ്കിൽ സുരക്ഷിതമായ വഴി തിരഞ്ഞെടുക്കുക.
- ഒടിഞ്ഞുവീണ വൈദ്യുത ലൈനുകൾ, മരങ്ങൾ, കെട്ടിടങ്ങൾ എന്നിവയെ കുറിച്ച് ബോധമുണ്ടാകണം.
- ജാഗ്രതാ മുന്നറിയിപ്പ് അവഗണിച്ച് അപകട സ്ഥലം സന്ദർശിക്കാതിരിക്കുക.
- പൊട്ടി വീണ വൈദ്യുതി ലൈൻ, ടെലിഫോൺ ലൈൻ എന്നിവ പുനസ്ഥാപിക്കാൻ വിദഗ്ദരുടെ സഹായം തേടുക.
- അപകടത്തിൽപ്പെട്ട് എല്ലാം നഷ്ടപ്പെട്ടവരെ സഹായിക്കുക, ആവശ്യമുള്ളവരെ കൗൺസലിങ്ങിന് വിധേയമാക്കുക.

2.8 ആലിപ്പഴവർഷം

കേരളത്തിൽ പൊതുവെ വേനൽ മഴയോടൊപ്പമാണ് ആലിപ്പഴവർഷം കാണപ്പെടുന്നത്. ശക്തമായ മഴയോടു കൂടി മഞ്ഞു കട്ടകൾ വർഷിക്കപ്പെടുന്നു. ഇത് വീടുകളുടെ മേൽക്കൂരയും വാഹനങ്ങളും തകരാനിടയാക്കുന്നു.

നിർവ്വചനം

മഞ്ഞുകട്ടകൾ ഭൂമിയിൽ വർഷണരൂപത്തിൽ പതിക്കുന്ന പ്രതിഭാസമാണ് ആലിപ്പഴവർഷം.

കാരണങ്ങൾ

- ശക്തമായ ഇടിമിന്നലോട് കൂടിയ മഴയും ശക്തമായ കാറ്റും.
- ശക്തമായ കാറ്റിൽ മഴത്തുള്ളികൾ അന്തരീക്ഷത്തിലേക്കു തിരിച്ചു വഹിക്കപ്പെടുകയും തണുത്തുറഞ്ഞു മഞ്ഞുകട്ടകളായി ഭൂമിയിൽ പതിക്കുകയും ചെയ്യുന്നു.
- ക്യുമുലോനിംബസ് മേഘങ്ങൾ അടിഞ്ഞുകൂടി അവ സൂപ്പർ സെല്ലുകളാകുന്നു. ഈ സൂപ്പർ സെല്ലുകൾ വലിയ കൊടുങ്കാറ്റും മഴയും ഇടിമിന്നലും കൂടിച്ചേർന്ന് ആലിപ്പഴ വർഷമായി ഭൂമിയിൽ പതിയ്ക്കുന്നു.

പരിണിത ഫലങ്ങൾ

വാഹനങ്ങൾ, കന്നുകാലികൾ, ചില്ലുമേൽക്കൂരകൾ, ദീപങ്ങൾ, എയർക്രാഫ്റ്റ്, കൃഷി എന്നിവയ്ക്ക് വൻ നാശം വരുത്തുന്നു.

പരിഹാരം

- മേൽക്കൂരകൾ ഉറപ്പുള്ളതായി നിർമ്മിക്കുക.
- വാഹനങ്ങൾ ഉറപ്പുള്ള മേൽക്കൂരകൾക്കു താഴെ പാർക്ക് ചെയ്യുക.
- കന്നുകാലികളുടെ തൊഴുത്തുകൾ ഉറപ്പുള്ളതായി നിർമ്മിക്കുകയും ആലിപ്പഴ വർഷം ഉണ്ടാകുമ്പോൾ അവയെ അതിനുള്ളിൽ കെട്ടുകയും ചെയ്യുക.

2.9 ഉഷ്ണതരംഗവും ശൈത്യതരംഗവും

ഉഷ്ണതരംഗം

2016 ലാണ് ഉഷ്ണതരംഗമെന്ന അവസ്ഥ കേരളം നേരിട്ടറിഞ്ഞത്. കേരളത്തിൽ വിവിധ സ്ഥലങ്ങളിൽ നിന്നും ആ വർഷം സൂര്യാഘാതം റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിരുന്നു.

നിർവ്വചനം

അസ്വാഭാവികവും അസുഖകരവുമായ ചൂടും ആർദ്രത കൂടിയതുമായ കാലാവസ്ഥയാണ് ഇത്. ഒരു ദിവസം മുഴുവനുമോ ആഴ്ചകളോളമോ ഉണ്ടാവാം.

കാരണം

ഉന്നതമർദ്ദം ചൂടിനെ ഭൂമിയുടെ പ്രതലത്തോട് ചേർത്ത് നിർത്തുമ്പോഴാണ് ഉഷ്ണതരംഗം ഉണ്ടാവുന്നത്.

പരിണിത ഫലങ്ങൾ

- അമിതമായ ചൂട് ശാരീരിക പ്രശ്നങ്ങൾക്ക് കാരണമാവുന്നു.
- സൂര്യാഘാതം ഉണ്ടാകുന്നു.
- അധിക ചൂട് മാനസിക പിരിമുറുക്കത്തിന് കാരണമാവുന്നു.
- മാനസിക പിരിമുറുക്കം കൂടുന്നത് കാരണം വ്യക്തികൾ തമ്മിലുള്ള സംഘട്ടനം കൂടുന്നു, ചൂട് കൂടുന്നത് മാനസിക

സമ്മർദ്ദം കൂട്ടുന്നു. കുറ്റകൃത്യങ്ങൾ വർദ്ധിക്കുന്നു.

- അമിത ചൂട് കാർഷിക വിളകളെ നശിപ്പിക്കുന്നു.

എങ്ങനെ നേരിടാം

- ധാരാളം വെള്ളം കുടിക്കുക.
- അയഞ്ഞതും ഇളം നിറത്തിലുള്ളതുമായ കോട്ടൺ വസ്ത്രങ്ങൾ ധരിക്കുക.
- യാത്ര ചെയ്യുകയാണെങ്കിൽ ആവശ്യത്തിന് വെള്ളം കരുതുക.
- കന്നുകാലികളെയും മറ്റു വളർത്തു മൃഗങ്ങളെയും തണലിൽ നിർത്തുക. ധാരാളം വെള്ളം കുടിക്കാൻ കൊടുക്കുക.
- തണുത്ത വെള്ളത്തിൽ കുളിക്കുക.
- ശരീരത്തിൽ നിർജ്ജലീകരണം ഉണ്ടാകാതിരിക്കാൻ ശ്രദ്ധിക്കുക.
- ശരീരം തണുപ്പിക്കാൻ നനഞ്ഞ വസ്ത്രങ്ങൾ ധരിക്കുക.
- ഫാൻ ഉപയോഗിക്കുക രാത്രി ജനലുകൾ തുറന്നിടുക.
- ചൂട് കൂടുതലുള്ള സമയം ഒഴിവാക്കി ജോലി സമയം ക്രമീകരിക്കുക.

ഉഷ്ണതരംഗം ബാധിച്ചയാൾക്ക് ചെയ്യേണ്ട കാര്യങ്ങൾ

- തണുപ്പുള്ള നിലത്ത് കിടത്തുക
- നനഞ്ഞ തുണി കൊണ്ട് ശരീരം തുടയ്ക്കുക.
- ശരീരം ഇടയ്ക്കിടെ കുളിപ്പിക്കുക, ശരീരോഷ്മാവ് സാധാരണ നിലയിലാക്കുക.
- നിർജ്ജലീകരണം സംഭവിക്കുകയാണെങ്കിൽ ഒ.ആർ.എസ് ലായനി കലക്കി കൊടുക്കുക. കൂടാതെ കഞ്ഞിവെള്ളം, നാരങ്ങാവെള്ളം, കരിക്കിൻ വെള്ളം എന്നിവ കൊടുക്കുക.
- മരണം വരെ സംഭവിക്കാൻ സാധ്യതയുള്ളതിനാൽ പെട്ടെന്ന് തൊട്ടടുത്ത ആരോഗ്യ കേന്ദ്രത്തിലെത്തിക്കുക.

ശൈത്യതരംഗം

2012 ജനുവരി 18ൽ വന്ന ഒരു പത്ര വാർത്തയിൽ ഇങ്ങനെയാണ്

പറയുന്നത്. ദക്ഷിണേന്ത്യയിൽ അപൂർവ്വമായി അതിശൈത്യകാലാവസ്ഥ അനുഭവപ്പെടുന്നു. ആന്ധ്രപ്രദേശ്, തെലുങ്കാന എന്നിവിടങ്ങളിലെ തീരദേശ മേഖലകളിൽ നിന്നും ശൈത്യ തരംഗം റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിരുന്നു. ഇത്തരത്തിലുള്ള കൊടും തണുപ്പുള്ള കാലാവസ്ഥയിൽ പതിനഞ്ച് പേരോളം മരണപ്പെടുകയുണ്ടായി. കർണാടകയിൽ നൂറ് വർഷത്തിലേറെയായി കാണപ്പെടുന്ന കുറഞ്ഞ താപനിലയേക്കാൾ കുറഞ്ഞ താപനില ഈ അടുത്തകാലത്ത് അനുഭവപ്പെട്ടു.

നിർവ്വചനം

ശൈത്യതരംഗം എന്നാൽ 24 മണിക്കൂറിനുള്ളിൽ താപനിലയിലുണ്ടാകുന്ന ദ്രുതഗതിയിലുള്ളതാഴ്ചയാണ്. ഏത് കോണിൽ താപനിലയിൽ കുറവുണ്ടാകുന്നു എന്നതനുസരിച്ചാണ് ശൈത്യതരംഗം ഉറപ്പു വരുത്തുന്നത്.

കാരണങ്ങൾ

- താപനിലയിലുണ്ടാവുന്ന പെട്ടെന്നുള്ള താഴ്ചയാണ് ശൈത്യ തരംഗത്തിന് കാരണം.

പരിണിത ഫലങ്ങൾ

- കന്നുകാലികളുടെയും വന്യജീവികളുടെയും മരണത്തിന് കാരണമാവുന്നു.
- അതിശൈത്യം മനുഷ്യന്റെ സുഗമമായ നിലനിൽപിനെ ബാധിക്കുന്നു.

- സസ്യങ്ങൾ കൊടും തണുപ്പിൽ മരവിക്കുന്നു. അങ്ങനെ നശിക്കാനിടയാവുന്നു.

ശൈത്യ തരംഗം വന്നാൽ

- ശരീരം കമ്പിളികൊണ്ടു പുതയ്ക്കുകയോ കമ്പിളിക്കുപ്പായങ്ങൾ ധരിക്കുകയോ ചെയ്യുക.
- വീടിനകത്ത് ഇരിക്കുക.
- തീ കായുക.
- ചൂടുള്ള ഭക്ഷണ പദാർത്ഥങ്ങൾ കഴിക്കുക.
- ചൂടു വെള്ളത്തിൽ കുളിക്കുക.
- കാലുകൾ ചൂടു വെള്ളത്തിൽ താഴ്ത്തി വെയ്ക്കുക.
- ശൈത്യ തരംഗം ബാധിച്ച ആളെ വീടിനകത്ത് കൊണ്ടു പോയി കിടത്തുക. നടക്കാനനുദിക്കരുത്.

2.10 മേഘസ്ഫോടനം

2012 ഓഗസ്റ്റിൽ കോഴിക്കോട് പുല്ലൂരാംപാറയിലുണ്ടായത് മേഘസ്ഫോടനമാണെന്ന് ഭൗമശാസ്ത്ര വിദഗ്ധർ പറയുന്നു. പെട്ടെന്നുണ്ടായ മഴയിലും മണ്ണിടിച്ചിലിലും പുല്ലൂരാംപാറ, ആനക്കാംപൊയിൽ, മഞ്ഞു വയൽ, മാവിൻ ചുവട് തുടങ്ങിയ സ്ഥലങ്ങളിൽ വൻ നാശനഷ്ടങ്ങളുണ്ടായി. ഉരുണ്ടു കൂടിയ മേഘത്തിന് സ്വതന്ത്രമായി സഞ്ചരിക്കുന്നതിൽ വിഘാതം സൃഷ്ടിക്കപ്പെട്ടതാണ് മേഘ സ്ഫോടനത്തിനിടയാക്കിയതെന്ന് വിദ ഗ്ധർ പറയുന്നു. ഈ ദുരന്തത്തത്തിൽ 200 കോടിയോളം രൂപയുടെ നാശ നഷ്ടങ്ങളുണ്ടായതായി കണക്കാക്കുന്നു. പുല്ലൂരാം പാറയിൽ 8 പേരും ഇരിട്ടിയിൽ ഒരാളും മരിച്ചു.

നിർവ്വചനം

വളരെ ചുരുങ്ങിയ സമയത്തിനുള്ളിൽ ഒരു ചെറിയ പ്രദേശത്ത് പെയ്തിറങ്ങുന്ന അതിശക്തമായ മഴയെയാണ് മേഘസ്ഫോടനം (Cloud burst) എന്ന് വിളിക്കുന്നത്. - പലപ്പോഴും മിനിറ്റുകൾ മാത്രം നീളുന്ന ഈ പ്രതിഭാസം വലിയ വെള്ളപ്പൊക്കങ്ങൾക്കും നാശനഷ്ടങ്ങൾക്കും

ഇടയാക്കാറുണ്ട്.

കാറ്റിന്റെയും ഇടിമുഴക്കത്തിന്റെയും അകമ്പടിയോടെ ആരംഭിക്കുന്ന മഴ പെട്ടെന്നു ശക്തി പ്രാപിക്കുകയും ആ പ്രദേശത്തെയാകെ പ്രളയത്തിലാക്കുകയും ചെയ്യും.

മണിക്കൂറിൽ നൂറ് മില്ലിമീറ്ററിൽ കൂടുതൽ മഴ ഒരു സ്ഥലത്തു ലഭിച്ചാൽ അതിനെ മേഘസ്ഫോടനം എന്ന് കരുതാം.

പരിണിത ഫലങ്ങൾ

- പെട്ടെന്നുണ്ടാകുന്ന മഴയായതിനാൽ ഫ്ളാഷ് ഫ്ളഡുണ്ടാകും (പെട്ടെന്നുള്ള വെള്ളപ്പൊക്കം)
- മനുഷ്യർക്ക് പരിക്ക് ജീവനാശം എന്നിവയുണ്ടാകുന്നു.
- കൃഷിനാശം, കന്നുകാലികൾക്ക് ജീവനഷ്ടം എന്നിവയുണ്ടാക്കുന്നു.

2.11 ഹിമപാതം / ഹിമാനിപതനം

2016 ഫെബ്രുവരിയിൽ വന്ന ഒരു പത്ര വാർത്ത

ദില്ലി: സിയാച്ചിനിൽ മഞ്ഞിടിച്ചിലിൽ നിന്ന് രക്ഷപ്പെടുത്തിയ സൈനികൻ ലാൻസ് നായിക് ഹനുമന്തപ്പ കൊക്കാട് ഒടുവിൽ മരണത്തിന് കീഴടങ്ങി. ദില്ലിയിലെ ആർ ആർ സൈനിക ആശുപത്രിയിൽ വച്ചായിരുന്നു മരണം.

സിയാച്ചിനിൽ ഹിമപാതത്തിൽപ്പെട്ട പത്ത് സൈനികരിൽ ജീവനോടെ രക്ഷപ്പെട്ടത് ഹനുമന്തപ്പ മാത്രമായിരുന്നു. ആറു ദിവസം മഞ്ഞിനടിയിൽ ജീവനോടെ കഴിഞ്ഞ ഹനുമന്തപ്പ വൈദ്യശാസ്ത്രത്തിനു പോലും അത്ഭുതമായിരുന്നു. ദില്ലിയിലെ സൈനിക ആശുപത്രിയിൽ ഫെബ്രുവരി 11ന് ഉച്ചരക്ക് 11.45നായിരുന്നു ഹനുമന്തപ്പ മരണത്തിന് കീഴടങ്ങിയത്.

നിർവ്വചനം

ഒരു താഴ്വരയിൽ പ്രകൃതിദത്തമായ കാരണങ്ങളാലോ മാനുഷിക പ്രവൃത്തിയാലോ ഹിമപ്പരപ്പിന്റെ സന്തുലിതാവസ്ഥ നഷ്ടപ്പെടുന്നതിനാൽ പെട്ടെന്നുണ്ടാകുന്ന ഹിമ പ്രവാഹമാണ് ഹിമപാതം.

കാരണം

മഞ്ഞു കട്ടകൾ ഭാരം കൂടുമ്പോൾ പർവ്വതങ്ങളിൽ നിന്നും ഭൂഗുരുത്വത്തിന്റെ ഫലമായി താഴേക്കു പതിക്കുന്നതാണ് ഹിമപാതം.

മുൻകരുതൽ

- താഴ്വരയിൽ താമസിക്കുന്നവർക്ക് ജീവഹാനിയും ഭവന നഷ്ടവും ഉണ്ടാകാൻ സാധ്യതയുള്ളതിനാൽ അത്തരം പ്രദേശങ്ങളിൽ വീടുകൾ പണിയാതിരിക്കുക.
- ഹിമപാതം ഉണ്ടാകാൻ സാധ്യത തിരിച്ചറിഞ്ഞാൽ അവിടെ സ്കേറ്റിങ്ങ് നടത്താതിരിക്കുക.
- വീടുകൾ നിരപ്പുള്ള പ്രദേശങ്ങളിൽ ഉറപ്പുള്ളതായി പണിയുക.
- വളരെയേറെ അളവിൽ ഹിമത്തെ പെട്ടെന്ന് തന്നെ ദീർഘദൂരം കൊണ്ടെത്തിക്കാൻ കഴിവുള്ളതിനാൽ മഞ്ഞു മൂടിക്കിടക്കുന്ന മലമ്പ്രദേശങ്ങളിൽ ജീവനും സ്വത്തിനും നാശം വരുത്താൻ അതീവ വിനാശകാരികളായ ഹിമപാതങ്ങൾക്ക് സാധിച്ചേക്കാം.
- ഹിമപാതത്തിൽ അകപ്പെട്ടാൽ അപൂർവ്വമായേ രക്ഷപ്പെടുകയുള്ളൂ. കൊടും തണുപ്പിൽ മരണം സംഭവിക്കാൻ സാധ്യതയേറെയുണ്ട്.

2.12 അഗ്നിപർവ്വത സ്ഫോടനം

ഏകദേശം 500ൽ പരം അഗ്നി പർവ്വതങ്ങൾ സജീവമായി ഇപ്പോഴും ഭൂമുഖത്തുണ്ടെന്നാണ് കണക്കാക്കപ്പെട്ടിരിക്കുന്നത്. വടക്കേ അമേരിക്കയുടെ പടിഞ്ഞാറൻ തീരങ്ങളിൽ, ഹവായിയിലെ മാണാലോവാ, മെക്സിക്കോയിലെ പാരീ കൂട്ടിൻ, ഇകഡോറിലെ കോട്ടപക്സി, ഇറ്റലിയിലെ വെസൂവിയസ്, ജപ്പാനിലെ ഫ്യൂജിയാമാ ഫിലിപ്പീൻസിലെ മായാൺ എന്നിവയാണ് ഏറ്റവും അപകടകാരികളായ അഗ്നി പർവ്വതങ്ങൾ. ഇന്ത്യയിലെ ഒരേ ഒരു അഗ്നി പർവ്വതമാണ് ആൻഡമാൻ നിക്കോബാർ ദ്വീപ് സമൂഹത്തിലെ ബാരൻ ദ്വീപിലുള്ള അഗ്നി പർവ്വതം. 2017 ജനുവരി 26ന് ശാസത്രജ്ഞർ ഈ അഗ്നി പർവ്വതം കടലിൽ നിന്ന് വീക്ഷിച്ചു. കൽക്കരി പോലുള്ള വസ്തുക്കളും കടലിൽ നിന്ന് കണ്ടെത്തി. ഇവിടെ കടലിനടിയിൽ ഒരേ നിരയിൽ നിരവധി അഗ്നി പർവ്വതങ്ങളുണ്ടെന്ന് ശാസ്ത്രജ്ഞർ കണ്ടെത്തി.

നിർവ്വചനം

തിളച്ചുരുകിയ മാഗ്മ ദ്രവരൂപത്തിലോ, ബാഷ്പമായോ, രണ്ടും ചേർന്നോ വൻ തോതിൽ ഗ്രഹോപരിതലത്തിലേക്ക് ബഹിർഗമിക്കുന്ന ഭൂവൽക്കഛിദ്രമാണ് അഗ്നി പർവ്വത സ്ഫോടനം. അഗ്നി പർവ്വതം

മിക്കപ്പോഴും ഉയർന്ന കുന്നുകളുടെയോ പർവ്വതങ്ങളുടെയോ രൂപത്തിലായിരിക്കും.

കാരണം

ഭൂവൽക്കത്തിന് കീഴിലുള്ള ഭാഗങ്ങൾ ഉയർന്ന മർദ്ദവും താപനിലയും മൂലം ഉരുകിയ നിലയിലായിരിക്കും. ഈ ഉരുകിയ ശിലാഖനിജ ഭാഗങ്ങളെ മാഗ്മ എന്നറിയപ്പെടുന്നു. ഉയർന്ന മർദ്ദത്തിന്റെ ഫലമായി പ്രതലത്തിലെ വിള്ളലുകളിലൂടെ ബഹിർഗമിക്കുന്ന മാഗ്മ ദ്രവ്യങ്ങൾ ലാവാ പ്രവാഹമായി നാലുപാടും പരന്നൊഴുകുന്നു.

പരിണിത ഫലങ്ങൾ

- അഗ്നി പർവ്വത സ്ഫോടനത്തിലൂടെ ലാവ കൂടാതെ, വാതകങ്ങളും, ഖര വസ്തുക്കളും പുറത്തു വരുന്നു.
- ആദ്യമായി പുറത്തു വരുന്നത് നീരാവിയും പുകയും വാതകങ്ങളുമാണ്.
- പെട്ടെന്നുണ്ടാകുന്നതും വളരെക്കാലം നില നിൽക്കുന്നതുമായ രോഗബാധ.
- പുറം തള്ളുന്ന വാതകങ്ങൾ ശ്വസിക്കുന്നതു കാരണം ശ്വാസതടസ്സങ്ങളും മറ്റു പ്രശ്നങ്ങളുമുണ്ടാവും.
- മാരകമായ വാതകങ്ങൾ ശ്വസിക്കുന്നത് മനുഷ്യരുടെയും മൃഗങ്ങളുടെയും മരണത്തിനു കാരണമാകുന്നു.

തയ്യാറെടുക്കൽ

- വീടിനെയും കുടുംബാംഗങ്ങളെയും സുരക്ഷിതമാക്കുക.
- വളർത്തുമൃഗങ്ങളെയും മറ്റു പക്ഷിമൃഗാദികളെയും സുരക്ഷിത മാക്കുക.
- വീട് പണിയുമ്പോൾ അഗ്നിപർവ്വത സ്ഫോടന സാധ്യതയുള്ള പ്രദേശത്തു നിന്നും വളരെ അകലെ പണിയുക.

പ്രതികരണം

- പ്രാദേശിക റേഡിയോ നിലയത്തിൽ നിന്നും തരുന്ന അടിയന്തിര

വിവരങ്ങളും നിർദ്ദേശങ്ങളും ശ്രദ്ധിക്കുക.

- ബന്ധപ്പെട്ട അധികാരികൾ തരുന്ന നിർദ്ദേശങ്ങൾ അനുസരിക്കുക.
- വീട്ടിനുള്ളിലാണെങ്കിൽ അഗ്നിപർവ്വതചാരം വീട്ടിനുള്ളിൽ കേറാതിരിക്കാൻ ജനലും വാതിലുകളും അടച്ചിടുക.
- വാഹനങ്ങളും, മറ്റു മെഷീനുകളും ഗാരേജിൽ വച്ച് അടയ്ക്കുകയോ, ടാർപോളിൻ കൊണ്ട് മൂടിയിടുകയോ ചെയ്യുക.
- പരമാവധി വീടിനു പുറത്തു പോകാതെയിരിക്കുക.
- താഴ്ന്ന പ്രദേശങ്ങളിലേക്ക് അഗ്നിപർവ്വത ചാരം വരാൻ സാധ്യതയുണ്ട് അതുകൊണ്ട് അവിടെ നിന്ന് മാറി നിൽക്കുക.
- പുറത്തിറങ്ങുമ്പോൾ ചാരം ശ്വസിക്കാതിരിക്കാൻ ഡസ്റ്റ് മാസ്ക് ധരിക്കുക, ശരീരം മൂടുന്ന വസ്ത്രം ധരിക്കുക, കണ്ണട ധരിക്കുക.
- നിയന്ത്രിത മേഖലകളിൽ നിന്നും അകന്നു നിൽക്കുക. മൈലുകൾക്കകലെ വരെ ഇതിന്റെ അനന്തരഫലം അനുഭവപ്പെടാം.

അഗ്നിപർവ്വത സ്ഫോടനത്തിനു ശേഷം

- വീടൊഴിഞ്ഞു പോയവർ അധികാരികളുടെ അറിയിപ്പ് ലഭിച്ചതിനു ശേഷം മാത്രം തിരികെ വരിക.
- റേഡിയോയിലൂടെ വരുന്ന അടിയന്തിര നിർദ്ദേശങ്ങൾ കൃത്യമായി ശ്രദ്ധിക്കുക.
- എമർജൻസി പ്രവർത്തകർ വരുന്നതിന് മുൻപു തന്നെ നമ്മളാൽ കഴിയുന്ന പ്രാഥമിക ചികിൽസ ആവശ്യമുള്ളവർക്ക് കൊടുക്കുക.

3

മനുഷ്യ നിർമിത ദുരന്തങ്ങളും ദുരന്ത നിവാരണവും

3.1 മലിനീകരണം

മലിനീകരണം ഒരു ഹസാർഡ് ആയി കണക്കാക്കപ്പെടുന്നു. ദുരന്തത്തിലേക്ക് വഴി തെളിക്കുന്ന, ജീവനോ, സ്വത്തിനോ ഭീഷണി ഉയർത്തുന്ന അവസ്ഥയെയാണ് ഹസാർഡ് എന്ന് പറയുന്നത്. ഇന്ത്യയിൽ മലിനീകരണം ഏറ്റവും കൂടുതൽ കാണുന്ന നഗരമാണ് ഡൽഹി. ഈ നൂറ്റാണ്ടിലെ ഏറ്റവും വലിയ ഒരു പ്രശ്നമാണ് മലിനീകരണം. കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡിന്റെ നിരീക്ഷണ റിപ്പോർട്ടിൽ കേരളത്തിലെ നഗരങ്ങളായ കൊച്ചി, ഇടുക്കി, കണ്ണൂർ, കോഴിക്കോട്, തൃശ്ശൂർ പാലക്കാട് എന്നിവിടങ്ങൾ അപായ രേഖക്കരികിലാണെന്നാണ് സൂചന.

നിർവചനം

മലിനീകരണ വസ്തുക്കൾ (മലിനീകാരികൾ) പരിസ്ഥിതിയിൽ ഹാനികരമായി ബാധിക്കുന്നതാണ് മലിനീകരണം. മലിനീകരണത്തെ വീണ്ടും നാലായി തിരിച്ചിരിക്കുന്നു.

അന്തരീക്ഷ മലിനീകരണം /വായുമലിനീകരണം

ജലമലിനീകരണം

മണ്ണു മലിനീകരണം

ശബ്ദ മലിനീകരണം

വായു മലിനീകരണം

അന്തരീക്ഷ വായുവിൽ അസ്വാഭാവികമായ രീതിയിൽ ഉണ്ടാകുന്ന വിഷവാതകങ്ങൾ, വ്യവസായ ശാലകളിൽ നിന്നുമുള്ള പുക, പലതരം വാതകങ്ങൾ പുറം തള്ളുന്നത്, അടുക്കള മാലിന്യങ്ങൾ, ഹോട്ടൽ മാലിന്യങ്ങൾ, പുകപടലങ്ങൾ എന്നിവ അന്തരീക്ഷവായുവിനെ അസ്വാഭാവികമാക്കുന്നതിനെയാണ് വായുമലിനീകരണം എന്ന് പറയുന്നത്.

കാരണങ്ങൾ

- കാർബൺ ഡൈഓക്സൈഡ് (CO_2)
- മിഥേൻ (CH_4)
- ക്ലോറോഫ്ളൂറോ കാർബൺ (CFC)
- സൾഫർ ഡൈഓക്സൈഡ് (SO_2)
- നൈട്രജന്റെ ഓക്സൈഡുകൾ (NO_2)
- കാർബൺമോണോക്സൈഡ് (CO)
- വ്യാവസായിക വിഷവാതകങ്ങൾ, പലതരം പൊടിപടലങ്ങൾ, വ്യവസായ സ്ഥാപനങ്ങളിൽ നിന്നും വാഹനങ്ങളിൽ നിന്നുമുള്ള പുക
- വാഹനപ്പെരുപ്പം, നിർമ്മാണ പ്രവർത്തനങ്ങൾ, മാലിന്യം കത്തിക്കൽ, വ്യവസായ ശാലകളിലെ പുക

പരിണിത ഫലങ്ങൾ

ഹരിതഗൃഹപ്രഭാവം

കാർബൺഡൈഓക്സൈഡ്, മിഥേൻ തുടങ്ങിയ വാതകങ്ങൾ അന്തരീക്ഷത്തിലെ ചൂടിനെ പുറത്തുവിടാതെ നിലനിർത്തുന്ന ഹരിത ഗൃഹവാതകങ്ങളാണ്. അന്തരീക്ഷത്തിൽ ഈ വാതകങ്ങളുടെ സാന്ദ്രത കൂടിയാൽ ഭൂമിയിലെ ചൂട് വർദ്ധിക്കും.

ആഗോളതാപനം

അന്തരീക്ഷത്തിലെ കാർബൺഡൈഓക്സൈഡ് സാന്ദ്രത

ഇരട്ടിയായാൽ അന്തരീക്ഷതാപനില ശരാശരി 30 ഡിഗ്രി സെൽഷ്യസ് കൂടുമെന്നാണ് കണക്ക്. ഇത്രയും ചൂട് കൂടിയാൽ പോലും അന്റാർട്ടിക്കയിലെയും ആർട്ടിക് സമുദ്രത്തിലെയും മഞ്ഞു കട്ടകൾ ഉരുകി ആകെ സമുദ്ര നിരപ്പ് ശരാശരി 5 മീറ്ററോളം ഉയരാൻ സാധ്യതയുണ്ട്. സമുദ്ര തീരത്തുള്ള അനേകം നഗരങ്ങളുടെ നല്ല ഭാഗവും വെള്ളത്തിനടിയിലായി വമ്പിച്ച നാശനഷ്ടങ്ങളായിരിക്കും ഫലം.

ഓസോൺ ശോഷണം

ഭൂമിയുടെ അന്തരീക്ഷത്തിൽ വളരെ ചെറിയ സാന്ദ്രതയിൽ മാത്രം കാണുന്ന വാതകമാണ് ഓസോൺ. പൊതുവെ കുറഞ്ഞ അളവിൽ മാത്രമുള്ളതെങ്കിലും സൂര്യരശ്മിയിലെ അൾട്രാവയലറ്റ് കിരണങ്ങൾ ഭൂമിയിൽ പതിക്കുന്നത് തടയുന്നു. അൾട്രാവയലറ്റ് കിരണങ്ങൾ മാരകമായ കാൻസർ പോലെയുള്ള അസുഖങ്ങൾക്ക് കാരണമാവുന്നു.

അമ്ലമഴ

മലിനീകാരികളായ അന്തരീക്ഷവാതകങ്ങൾ പലതും അമ്ലസ്വഭാവമുള്ളവയാണ്. സൾഫർ ഡൈഓക്സൈഡ് നൈട്രജന്റെ ഓക്സൈഡുകൾ എന്നിവ മഴത്തുള്ളികളിൽ അലിയുമ്പോൾ

അമ്ലമഴയാവുന്നു. ഈ മഴയേൽക്കുന്ന സസ്യജന്തുജാലങ്ങൾക്ക് ഇത് ഹാനികരമാകുകയും ചെയ്യുന്നു.

ദുരന്തനിവാരണം

മുൻകരുതൽ

- മരങ്ങൾ വച്ചു പടിപ്പിക്കുക
- ഊർജ്ജത്തിനായി സോളാർ എനർജി, തിരമാലയിൽ നിന്നുള്ള എനർജി, കാറ്റിൽ നിന്നുള്ള എനർജി എന്നിവ ഉപയോഗിക്കുക.
- വ്യവസായ ശാലകൾക്കു ചുറ്റും മരങ്ങൾ വച്ചു പിടിപ്പിക്കുക.
- വ്യവസായ ശാലകൾ ജനവാസ മേഖലയിൽ നിന്നും അകലെ നിർമ്മിക്കാൻ ശ്രദ്ധിക്കുക.
- പ്ലാസ്റ്റിക് കത്തിക്കാതിരിക്കുക
- പഴയ വാഹനങ്ങളുടെ ഉപയോഗം നിരോധിക്കുക.
- ബാറ്ററി, ഇലക്ട്രിസിറ്റി എന്നിവ ഉപയോഗിച്ച് പ്രവർത്തിക്കുന്ന വാഹനങ്ങൾ ഉപയോഗിക്കുക.
- വ്യവസായ ശാലകളിൽ സ്മോക്ക് ഫിൽട്ടർ ഘടിപ്പിക്കുക.

വായുമലിനീകരണമുണ്ടായാൽ

- പുറത്തു യാത്ര പോകുന്നത് പരമാവധി ഒഴിവാക്കുക.
- ചപ്പുചവറുകൾ, പ്ലാസ്റ്റിക് എന്നിവ കൂട്ടിയിട്ട് കത്തിക്കുന്നത് ഒഴിവാക്കുക.
- പ്ലാസ്റ്റിക് ഉപയോഗം പൂർണ്ണമായി ഒഴിവാക്കുക.
- പുറത്തുപോകുമ്പോൾ മാസ്ക് ധരിക്കുക.
- എയർകണ്ടീഷണറുകളുടെ ഉപയോഗം കുറയ്ക്കുക.
- അന്തരീക്ഷത്തിൽ പുകയും പൊടി പടലങ്ങളും അമിതമാവാതെ ശ്രദ്ധിക്കുക.
- മോട്ടോർ വാഹനങ്ങളുടെ ഉപയോഗം പരമാവധി കുറയ്ക്കുക.
- ധാരാളം ചെടികളും മരങ്ങളും ഉള്ളയിടങ്ങളിൽ നിൽക്കുക.
- ഹോട്ടൽ, ഗാർഹിക ജൈവമാലിന്യങ്ങൾ സംസ്ക്കരിക്കാൻ ബയോ പ്ലാന്റുകൾ സ്ഥാപിക്കുക.

പരിഹാരമാർഗ്ഗങ്ങൾ

- വ്യവസായശാലകളിലും പുകയടുപ്പുകളുടെ ചിമ്മിനികളിലും മലിനീകരണ ഫിൽട്ടറുകൾ സ്ഥാപിക്കുക.
- സൂക്ഷ്മ ജീവികളായ ബാക്ടീരിയ, ഫംഗസുകൾ എന്നിവയുപയോഗിച്ച് മാലിന്യങ്ങളെ അലിയിപ്പിക്കുന്ന പ്രക്രിയ (ബയോഫിൽട്രേഷൻ)യ്ക്ക് വിധേയമാക്കുക.
- മോട്ടോർ വാഹനങ്ങളിലും മറ്റ് എഞ്ചിനുകളിലും വായുമലിനീകരണം കുറയ്ക്കുന്ന തരത്തിലുള്ള ഇന്ധനങ്ങൾ ഉപയോഗിക്കുക.
- പാചകത്തിന് ബയോഗ്യാസ് ഉപയോഗിക്കുക.

ജലമലിനീകരണം

ജലമലിനീകരണത്തിലൂടെ മാരകമായ വിഷാംശം കലർന്ന ജലം

ആളുകളുടെ ശരീരത്തിലെത്തുന്നു. ആർസനിക് എന്ന വിഷവസ്തു പശ്ചിമ ബംഗാളിലെ ഭൂഗർഭ ജലത്തിൽ നിന്നും റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിട്ടുണ്ട്. ഇതിനെ ഭൗമ പരിസ്ഥിതി ദുരന്തമായിട്ടാണ് കണക്കാക്കുന്നത്. ഇന്ത്യയുടെ വടക്ക് കിഴക്കൻ സംസ്ഥാനങ്ങളിലാണ് മലിനീകരണം കുറവുള്ളത്.

നിർവ്വചനം

രാസവസ്തുകളായ ആർസനിക്, ഫ്ളൂറൈഡ്, അയേൺ, നൈട്രേറ്റ്, മെർക്കുറി, കാഡ്മിയം, കീടനാശിനികൾ, രാസവളങ്ങൾ, എണ്ണശുദ്ധീകരണശാലയിൽ നിന്നും മറ്റ് വ്യവസായ ശാലകളിൽ നിന്നും പുറത്തേക്കൊഴുക്കുന്ന മലിനജലം എന്നിവ കലർന്ന് ജലത്തിന്റെ സ്വാഭാവികത നശിക്കുന്ന പ്രവർത്തനമാണ് ജലമലിനീകരണം. ജലമലിനീകരണം ജലത്തിന്റെ ഗുണത്തിൽ ഹാനികരങ്ങളായ മാറ്റമുണ്ടാക്കുന്നു.

കാരണങ്ങൾ

- വ്യവസായ ശാലകളിൽ നിന്നുള്ള മാലിന്യങ്ങൾ ജലാശയങ്ങളിലേയ്ക്ക് പുറന്തള്ളുന്നു.
- ജനപ്പെരുപ്പം
- കെട്ടിടം, റോഡ്, തുടങ്ങിയ നിർമ്മാണ പ്രവർത്തനങ്ങൾ.
- ജലാശയങ്ങളിൽ വാഹനങ്ങൾ, കഴുകുക, കന്നുകാലികളെ കുളിപ്പിക്കുക, തുണി അലക്കുക എന്നിവ ചെയ്യുന്നതിലൂടെ.
- വാഹനങ്ങിൽ നിന്നും പെട്രോൾ ഡീസൽ എന്നിവയുടെ ലീക്ക്.
- രാസവളം, കീടനാശിനി എന്നിവയുടെ അമിത ഉപയോഗം.
- ജലം കാർഷിക ആവശ്യങ്ങൾക്കും, ഗാർഹികം, വ്യവസായികം, വിനോദം, ഗതാഗതം, വ്യക്തിപരം എന്നീ ആവശ്യങ്ങൾക്ക് ഉപയോഗിക്കുമ്പോൾ മലിനമാകാൻ ഇടയാവുന്നു.
- മാലിന്യങ്ങൾ ജലാശയങ്ങളിൽ നിക്ഷേപിക്കുന്നത്.

പരിണിത ഫലങ്ങൾ

- ജല മലിനീകരണം ജല ജീവികളുടെ മരണത്തിനിടയാക്കുന്നു.
- ജലാശയങ്ങളിലെ ജൈവ വൈവിധ്യം നശിക്കാനിടയാക്കുന്നു.

- മീനുകളെയും മറ്റ് ജലജീവികളെയും ഭക്ഷിക്കുന്ന മനുഷ്യർക്ക് പലതരം രോഗങ്ങളുണ്ടാകാൻ കാരണമാവുന്നു.
- മലിന ജലത്തിലൂടെ ഹെപ്പറ്റൈറ്റിസ്, കോളറ, മലമ്പനി എന്നിവ പകരുന്നു.
- ജലജീവികളുടെ നാശം ആഹാര ശൃംഖലയുടെ നാശത്തിനു തന്നെ കാരണമാവുന്നു.

ദുരന്തനിവാരണം

മുൻകരുതലുകൾ

- ഖരമാലിന്യങ്ങൾ പുഴയിൽ തള്ളാതിരിക്കുക.
- ഗാർഹികമാലിന്യങ്ങൾ, വ്യവസായികമാലിന്യങ്ങൾ എന്നിവ പുഴയിലേക്ക് ഒഴുക്കി വിടാതിരിക്കുക.
- പുഴയിൽ തുണിയലക്കാതിരിക്കുക, കന്നുകാലികളെ കുളിപ്പിക്കാതിരിക്കുക.
- കാർഷികാവശ്യങ്ങൾക്കായി രാസവളങ്ങളും, രാസകീടനാശിനികളും ഉപയോഗിക്കുന്നത് പരമാവധി കുറയ്ക്കുക. ജൈവവളങ്ങളും ജൈവകീടനാശിനികളും പ്രോൽസാഹിപ്പിക്കുക.
- പ്ലാസ്റ്റിക് ഒഴിവാക്കി പരിസ്ഥിതി സൗഹാർദ്ദപരമായ വസ്തുക്കൾ വാങ്ങുക.
- വാഹനങ്ങളിലെ ഓയിലുകൾ ലീക്കാവാതെ നോക്കുക.
- പുനരുപയോഗിക്കാൻ സാധിക്കുന്ന വസ്തുക്കൾ വാങ്ങിക്കുക.
- മൃഗങ്ങളുടെയും മനുഷ്യരുടെയും വിസർജ്യങ്ങൾ ജലാശയങ്ങളിലേക്ക് ഒഴുക്കി വിടാതിരിക്കുക.
- ജലമലിനീകരണം ശ്രദ്ധയിൽപ്പെട്ടാൽ അധികൃതരെ വിവരമറിയിക്കുക.
- ജലാശയങ്ങളെ മലിനമാക്കാതിരിക്കുക.
- മലിനമായ ജലാശയങ്ങളെ മാലിന്യമുക്തമാക്കാൻ ഒരുമിച്ച് പ്രവർത്തിക്കുക.
- വ്യവസായശാലകളിൽ നിന്നും വീടുകളിൽ നിന്നും മാലിന്യം

നീക്കിയ ശേഷം ജലം പുറത്തു വിടുക.

ജലമലിനീകരണമുണ്ടായാൽ

- സന്നദ്ധ സംഘടനകളുടെ കൂടെ ചേർന്ന് ജലാശയങ്ങൾ മാലിന്യമുക്തമാക്കാൻ ശ്രമിക്കുക.
- ജലാശയങ്ങളിൽ മാലിന്യം തള്ളുന്നവർക്കെതിരെ കർശന നടപടിയെടുക്കുക.
- വാഹനങ്ങളിലെ കേടുപാടുകൾ തീർക്കുക. എണ്ണ ലീക്കാവാതെ നോക്കുക.
- വ്യവസായശാലകളിൽ നിന്നും പുറന്തള്ളുന്ന ജലം മാലിന്യ സംസ്കരണത്തിനു ശേഷമേ പുറന്തള്ളുന്നുള്ളുവെന്ന് ഉറപ്പു വരുത്തുക.
- ജലമലിനീകരണം ശ്രദ്ധയിൽപ്പെട്ടാൽ അധികൃതരെ വിവരമറിയിക്കുക.
- ജലാശയങ്ങളിലെ ജലം മാലിന്യ സംസ്കരണത്തിന് ശേഷം മാത്രം നിത്യജീവിതാവശ്യങ്ങൾക്ക് ഉപയോഗിക്കുക.
- പ്ലാസ്റ്റിക് കുപ്പികൾ, കവറുകൾ എന്നിവ പുഴകളിൽ നിന്നും നീക്കം ചെയ്യുക.

പരിഹാര മാർഗ്ഗങ്ങൾ

- ജല സംരക്ഷണ മാർഗ്ഗങ്ങളെക്കുറിച്ച് പൊതുജനങ്ങളെ ബോധവൽക്കരിക്കുക.
- മാലിന്യം ജലാശയങ്ങളിൽ നിന്നും നീക്കം ചെയ്തില്ലെങ്കിൽ ജല ജീവികൾക്കും മനുഷ്യർക്കും ദോഷമാകുമെന്ന് മനസ്സിലാക്കുക.
- ജലാശയങ്ങളിൽ മാലിന്യം നിക്ഷേപിക്കുന്നത് ശിക്ഷാർഹമാണെന്ന് മനസ്സിലാക്കുക.
- ശുദ്ധീകരിച്ച ജലം മാത്രമേ കുടിക്കാനും പാചകത്തിനും ഉപയോഗിക്കാവൂ.
- ജൈവ കൃഷിയെ പ്രോൽസാഹിപ്പിക്കുക.

മണ്ണ് മലിനീകരണം

ഐക്യരാഷ്ട്രസഭ ജനറൽ അസംബ്ലിയുടെ ആഹ്വാനപ്രകാരം 2015 മണ്ണിന്റെ അന്താരാഷ്ട്ര വർഷമായി ആചരിച്ചു. മണ്ണ് മലിനീകരണം മൂലം പല ജീവികളുടെയും ആവാസ വ്യവസ്ഥയും, കൃഷിയും, ശുദ്ധജലലഭ്യതയും ഇല്ലാതാവുന്നു. മനുഷ്യന്റെ നിലനിൽപ്പിന് മണ്ണിന്റെ ഗുണം നിലനിർത്തേണ്ടത് അത്യാവശ്യമാണ്. മണ്ണിന്റെ മേന്മ നിലനിർത്താനുള്ള പ്രവർത്തനങ്ങളാണ് 2015ൽ നടത്തിയത്.

നിർവ്വചനം

മലിനീകാരികൾ മണ്ണിൽ കലർന്ന് ഹാനികരമായി മാറുന്നതാണ് മണ്ണ് മലിനീകരണം.

കാരണങ്ങൾ

വ്യവസായിക വിപ്ലവത്തിനു ശേഷമാണ് മണ്ണിന് ദോഷം

സംഭവിക്കാൻ തുടങ്ങിയത്.

- രാസകീടനാശിനുകളുടെ അവശിഷ്ടങ്ങളാണ് മണ്ണ് മലിനമാകുന്നതിന്റെ പ്രധാന കാരണങ്ങൾ.
- ഡിഡിറ്റി, ബിഎച്ച്സി എന്നിവ മുഖ്യമലിനീകാരികളാണ്.
- രാസവളങ്ങളുടെ അമിത ഉപയോഗം മണ്ണ് മലിനമാക്കുന്നു.
- മലിനജലം ഒരു കാരണമാകുന്നു.
- പ്ലാസ്റ്റിക് വസ്തുക്കളാണ് മണ്ണ് മലിനീകരണത്തിന്റെ മറ്റൊരു കാരണം.

പരിണിത ഫലങ്ങൾ

- കാർഷിക വിളകളുടെ ഗുണനിലവാരം കുറയുന്നു.
- ജലസ്രോതസ്സുകൾ മലിനമാകുന്നു.
- ജൈവവൈവിധ്യത്തിന് പ്രത്യാഘാതമുണ്ടാവുന്നു.
- ജലമലിനീകരണത്തിന് കാരണമാകുന്നു.

ദുരന്ത നിവാരണം

മുൻകരുതൽ

- പ്ലാസ്റ്റിക് മാലിന്യങ്ങൾ അലക്ഷ്യമായി മണ്ണിൽ കളയാതിരിക്കുക.
- രാസവളങ്ങളും, രാസകീടനാശിനികളും ഉപയോഗിക്കാതിരിക്കുക.
- ജൈവ കൃഷിരീതി നടപ്പിലാക്കുക.
- പുന: ചംക്രമണം ചെയ്യാൻ കഴിയുന്ന വസ്തുക്കൾ ഉപയോഗിക്കുക.
- വ്യവസായിക മാലിന്യങ്ങൾ സംസ്കരിക്കുക
- ഗാർഹികമാലിന്യ സംസ്കരണ പ്ലാന്റ് നിർമ്മിക്കുക.
- ബോധവൽക്കരണ പരിപാടികൾ (സെമിനാർ, പോസ്റ്റർ പ്രദർശനം, ദിനാചരണം തുടങ്ങിയവ) നടത്തുക.

മണ്ണ് മലിനമായാൽ

- മണ്ണിൽ നിന്നും പ്ലാസ്റ്റിക് മാലിന്യങ്ങൾ നീക്കം ചെയ്യുക.

- മണ്ണിൽ മാലിന്യം നിക്ഷേപിക്കുന്നവരെ കർശനമായി ശിക്ഷിക്കുക
- രാസവളങ്ങളും രാസകീടനാശിനികളും ഉപയോഗിക്കാതിരിക്കുക.

പരിഹാരമാർഗ്ഗങ്ങൾ

- രാസവളങ്ങളുടെയും രാസകീടനാശിനികളുടെയും ഉപയോഗം പരമാവധി കുറയ്ക്കുകയോ അല്ലെങ്കിൽ പൂർണ്ണമായും ഒഴിവാക്കുകയോ ചെയ്യുക.
- പ്ലാസ്റ്റിക് കത്തിക്കാതിരിക്കുക.
- എല്ലാ പാഴ്വസ്തുക്കളും, പ്രത്യേകിച്ച് ജൈവപരമായ ജീർണ്ണനത്തിന് വിധേയമാകാത്തവ മണ്ണിന്റെ മലിനീകരണത്തിനിടയാക്കുന്നതിനാൽ അവ മണ്ണിൽ നീക്കം ചെയ്യുക .
- ജൈവ വിഘടനത്തിനു വിധേയമാകുന്ന വസ്തുക്കൾ മാത്രം വാങ്ങാൻ ശ്രദ്ധിക്കുക.
- പ്ലാസ്റ്റിക് കവറുപയോഗിച്ച് പാക്ക് ചെയ്ത പദാർത്ഥങ്ങളുടെ ഉപയോഗം പരമാവധി കുറയ്ക്കുക.
- പുനരുപയോഗിക്കാൻ കഴിയുന്ന വസ്തുക്കൾ വാങ്ങുക.

ശബ്ദമലിനീകരണം

ലോകാരോഗ്യ സംഘടനയുടെ നിർദ്ദേശമനുസരിച്ച് ശബ്ദപരിധി കൃത്യമായി നിശ്ചയിക്കപ്പെട്ടിട്ടുണ്ട്. 8 മണിക്കൂർ കൂടുതലായി 85 ഡെസിബലിൽ കൂടുതൽ ശബ്ദം ഉണ്ടാവുകയാണെങ്കിൽ അത് ശബ്ദ മലിനീകരണത്തിന് കാരണമാകും. തുടർച്ചയായി 85 ഡെസിബൽ ഒരു ദിവസം 8 മണിക്കൂറിൽ കൂടുതൽ ഉണ്ടായാൽ ശ്രവണ തരാറുകൾ ഉണ്ടാകാനിടയുണ്ട്. ശ്രവണതകരാറുകൾ ഓഡിയോഗ്രാം എന്ന ടെസ്റ്റിലൂടെ കണ്ടെത്താൻ സാധിക്കും. 140-180 ഡെസിബൽ വരെയുള്ള സൗണ്ട് എക്സ്പോഷർ പെട്ടെന്നുണ്ടായാൽ കർണപടം പൊട്ടിപ്പോകാനുള്ള സാധ്യതയുണ്ട്.

നിർവ്വചനം

മനുഷ്യന്റെയും മറ്റു ജീവജാലങ്ങളുടെയും സ്വസ്ഥതയെയും സൈര്യ ജീവിതത്തെയും ബാധിക്കുന്ന അമിതവും അസഹ്യവുമായ ശബ്ദത്തെയാണ് ശബ്ദമലിനീകരണം എന്ന് പറയുന്നത്.

കാരണങ്ങൾ

- ഫാക്ടറികളിൽ നിന്നും മറ്റു വ്യവസായശാലകളിൽ നിന്നുമുള്ള അസഹനീയ ശബ്ദങ്ങൾ
- വാഹനങ്ങളിൽ നിന്നുള്ള ശബ്ദം
- ലൗഡ് സ്പീക്കറുകളുടെയും മൈക്രോ ഫോണുകളുടെയും അമിത ഉപയോഗം
- വെടിമരുന്നു പ്രയോഗങ്ങൾ
- വീട്ടുപകരണങ്ങളിൽ നിന്നുള്ള അമിത ശബ്ദം.
- വാഹനങ്ങളുടെ ഹോണുകൾ

പരിണിത ഫലങ്ങൾ

- ശബ്ദം 150 ഡസിബലിൽ കൂടിയാൽ ഒരാളുടെ കേൾവി ശക്തി

തന്നെ തകരാറിലാവും.

- കുറഞ്ഞ ഡസിബൽ ശബ്ദമാവുമ്പോൾ ചിലർക്ക് മനം പുരട്ടലും ചർദ്ദിയുമൊക്കെ ഉണ്ടാകും.
- രാത്രിയിലാണ് ശബ്ദമെങ്കിൽ ഉറക്കമില്ലായ്മ പോലുള്ള അസുഖങ്ങൾ ഉണ്ടാകും.
- ഉയർന്ന ശബ്ദം കാരണം മാനസിക സമ്മർദ്ദം, രക്ത സമ്മർദ്ദം, ഉറക്കക്കുറവ്, തലവേദന, ദേഷ്യം, സംസാരിക്കാനുള്ള ബുദ്ധിമുട്ട്, മാനസിക നില തകരാറിലാവുക എന്നിവയ്ക്ക് കാരണമാവുന്നു.

ദുരന്ത നിവാരണം

മുൻകരുതൽ

- വലിയ ശബ്ദംപുറപ്പെടുവിക്കുന്ന വാഹനങ്ങളിൽ സൈലൻസർ ഉപയോഗിച്ച് ശബ്ദം നിയന്ത്രിയ്ക്കുക.
- വ്യവസായശാലകൾക്കു ചുറ്റും ധാരാളം മരങ്ങൾ വച്ചു പിടിപ്പിക്കുക.
- ഇലക്ട്രിക് ഉപകരണങ്ങൾ ശബ്ദരഹിതമാക്കി നിർമ്മിക്കുക (Noice Free)
- ഉയർന്ന ശബ്ദത്തിലെ സംഗീതം ആസ്വദിക്കാൻ ഹെഡ്ഫോൺ ഉപയോഗിക്കുക.
- വാഹനങ്ങളിൽ ബൾബ് ഹോണിനു പകരം ഇലക്ട്രിക് ഹോണുകൾ നിർബന്ധമാക്കുക.
- ഉയർന്ന ശബ്ദത്തിലുള്ള വെടിമരുന്നു പ്രയോഗം നിയമം മൂലം നിർത്തലാക്കുക.

ശബ്ദം അമിതമാകുമ്പോൾ

- ലൗഡ് സ്പീക്കറുകൾ ഉപയോഗിക്കുമ്പോൾ ശബ്ദപരിധി നിശ്ചയിക്കുക.
- ഏതെങ്കിലും പരിപാടിയിൽ അമിത ശബ്ദമുണ്ടായാൽ അധികൃതരെ വിവരമറിയിക്കുകയും നിയമം മൂലം തടയുകയും

ചെയ്യുക.

- ശബ്ദം കുറച്ച് കേൾക്കത്തക്ക വിധത്തിൽ മൂടുന്ന വസ്തുക്കൾ ഉപയോഗിച്ച് ചെവിയെ സംരക്ഷിക്കുക.
- വെടിമരുന്നു പ്രയോഗങ്ങൾ കാണാനും കേൾക്കാനും പിഞ്ചു കുഞ്ഞുങ്ങളും ഗർഭിണികളും പോകാതിരിക്കുക.
- അമിത ശബ്ദമുണ്ടായാൽ ഇയർ പ്ലഗുകൾ (**Ear Plug**) ഉപയോഗിക്കുക.
- അമിത ശബ്ദം അലോസരമായി തോന്നിയാൽ ആ സ്ഥലത്തു നിന്നും നിശബ്ദമായൊരിടത്തേക്കു പോകുക.
- അസ്വസ്ഥതകളും ആരോഗ്യ പ്രശ്നങ്ങളും തോന്നിയാൽ ഡോക്ടറെ സമീപിക്കുക.

പരിഹാരം

- അമിത ശബ്ദം പുറപ്പെടുവിക്കുന്ന മോട്ടോർ വാഹനങ്ങളുടെ ഉപയോഗം നിയന്ത്രിക്കുക.
- ഹോസ്പിറ്റൽ, സ്കൂൾ, ആൾപാർപ്പുള്ള ഇടങ്ങൾ എന്നിവിടങ്ങളിലെ മൈക്രോഫോണുകളുടെ ഉപയോഗം നിയമം മൂലം നിയന്ത്രിക്കുക.
- ആളുകൾക്ക് അലോസരമുണ്ടാക്കുന്ന ശബ്ദം പുറപ്പെടുവിക്കുന്നത് ശിക്ഷാ നടപടിക്ക് വിധേയമാക്കുക.
- ശാന്തതയും സമാധാനവും നിലനിർത്താൻ ശ്രമിക്കുക.
- സുപ്രീം കോടതി 2000ൽ പുറപ്പെടുവിച്ച ഉത്തരവിൽ പാരിസ്ഥിതിക നിയമത്തിൽ നിഷ്കർഷിച്ചിരിക്കുന്ന തോതിൽ ആയിരിക്കണം മതസ്ഥാപനങ്ങളും, പൊതുസ്ഥാപനങ്ങളും, വ്യക്തികളും ഉച്ചഭാഷിണികൾ ഉപയോഗിക്കേണ്ടത് എന്ന് വിധിച്ചിട്ടുണ്ട്.

3.2 വനനശീകരണം

2012 നവംബർ 28നു യുണൈറ്റഡ് നേഷൻസ് ജനറൽ അസംബ്ലിയുടെ 23-ാം കോൺഫറൻസിലാണ് വനങ്ങൾക്കായി ഒരു ദിവസം എന്ന നിയമം പാസാക്കുന്നത്. അങ്ങനെ മാർച്ച് 21 ലോക വനദിനമായി ആചരിക്കുന്നു. ഭൂമിയിലെ ജൈവ വൈവിധ്യങ്ങളുടെ കലവറയാണ് വനങ്ങൾ. എല്ലാ വർഷവും ഏതാണ്ട് 13 മില്ല്യൺ ഹെക്ടറോളം വനനശീകരണം ഉണ്ടാകുന്നുവെന്നാണ് യു എൻ കണക്കുകൾ വ്യക്തമാക്കുന്നത്.

നിർവ്വചനം

കാടോ, മരങ്ങൾ നിൽക്കുന്ന പ്രദേശങ്ങളിൽ നിന്ന് മരങ്ങളോ കാടു തന്നെയോ ഇല്ലാതാക്കി അവയെ കൃഷിയിടങ്ങളാക്കൽ, കന്നുകാലി മേയ്ക്കൽ, നഗരവൽക്കരണം തുടങ്ങി വനേതര ആവശ്യങ്ങൾക്കായി

ഉപയോഗിക്കുന്ന പ്രക്രിയയെ വനനശീകരണം (Deforestation) എന്നു വിളിക്കുന്നു.

കാരണങ്ങൾ

- മരങ്ങൾ വെട്ടി ഗൃഹനിർമ്മാണത്തിനും, വീട്ടുപകരണങ്ങൾ നിർമ്മിക്കാനും ഉപയോഗിക്കുന്നു.
- വനങ്ങൾ വെട്ടി തെളിച്ച് കൃഷിയിടങ്ങളാക്കുന്നു.
- വനങ്ങൾ വെട്ടി നശിപ്പിച്ച് നഗരവൽക്കരണം നടത്തുന്നു.
- വനങ്ങൾ വെട്ടി നികത്തി റോഡുകൾ, കച്ചവട സ്ഥാപനങ്ങൾ, വീടുകൾ, റിസോർട്ടുകൾ എന്നിവ പണിയുന്നു.

പരിണിത ഫലങ്ങൾ

- വനനശീകരണം മൂലം കാലാവസ്ഥാ വ്യതിയാനം ഉണ്ടാകുന്നു.
- ആഗോളതാപനം, അമ്ലമഴ, ഹരിത ഗൃഹപ്രഭാവം എന്നിവയുണ്ടാകുന്നു.
- വനനശീകരണം താപനില വർദ്ധിക്കാൻ കാരണമാകുന്നു.
- കാലാവസ്ഥാ വ്യതിയാനവും മഴയുടെ ലഭ്യതയിൽ കുറവുമുണ്ടാകുന്നു.
- മഴയുടെ ലഭ്യതക്കുറവ് കുടിവെള്ളക്ഷാമം ഉണ്ടാക്കുന്നു.
- വന നശീകരണം മഴക്കാലത്ത് ഉരുൾപ്പൊട്ടൽ, മണ്ണിടിച്ചിൽ എന്നിവയ്ക്ക് കാരണമാകുന്നു.

ദുരന്തനിവാരണം

മുൻകരുതൽ

- പ്രകൃതിയെ ചൂഷണം ചെയ്യാതിരിക്കുക
- മരം കൊണ്ടുള്ള ഉൽപന്നങ്ങളും, ഉപകരണങ്ങളും കേടു കൂടാതെ സൂക്ഷിക്കുക. പുതിയവ വാങ്ങിക്കൂട്ടാതിരിക്കുക.
- റീ സൈക്കിൾ ചെയ്യാൻ കഴിയുന്ന ഉൽപന്നങ്ങൾ ഉപയോഗിക്കുക.
- വന മേഖലയിലേക്കുള്ള കടന്നു കയറ്റം കുറയ്ക്കുക.

- വനസംരക്ഷണത്തിന് പ്രാധാന്യം കൊടുക്കാൻ ബോധ വൽക്കരണം നടത്തുക. ലോക വനദിനം ആചരിക്കുക.

വനനശീകരണമുണ്ടായാൽ

- വനങ്ങൾ വെട്ടി നശിപ്പിക്കുന്നവരെ നിയമത്തിനു വിധേയമാക്കുക.
- പ്രകൃതി വിഭവങ്ങളുടെ ചൂഷണം കുറയ്ക്കുക.
- പരിസ്ഥിതിയ്ക്ക് കോട്ടം വരുത്തുന്ന വികസന പ്രവർത്തനങ്ങൾക്ക് നിയന്ത്രണം ഏർപ്പെടുത്തുക.
- ഏറ്റവും കൂടുതൽ വനനശീകരണം നടക്കുന്നത് ഉഷ്ണമേഖലാ മഴക്കാടുകളിലാണ്. ഇത് അധികൃതർ ശ്രദ്ധിക്കുകയും തടയുകയും ചെയ്യുക.
- വർഷം തോറും ഹെക്ടർ കണക്കിന് വനമാണ് ഭൂമുഖത്തു നിന്നും അപ്രത്യക്ഷമായിക്കൊണ്ടിരിക്കുന്നത് പ്രകൃതിയുടെ ശ്വാസകോശങ്ങളായ മരങ്ങൾ നശിപ്പിക്കുന്നത് ആത്മഹത്യാപരമാണ്.

വീണ്ടെടുപ്പ്

- വനനശീകരണത്തെ തടയുകയും മരങ്ങൾ വച്ചു പിടിപ്പിക്കുന്നതിന് പ്രോൽസാഹനം നൽകുകയും വഴി മാത്രമേ ഈ ദു:സ്ഥിതി തടയാൻ കഴിയൂ.
- വൃക്ഷങ്ങൾ അന്തരീക്ഷത്തിൽ നിന്ന് കാർബൺ ഡൈഓക്സൈഡ് സ്വീകരിച്ച് താപനില നിയന്ത്രിക്കുന്നതിന് സഹായിക്കുന്നു.

പത്തു കിണറിനു സമം ഒരു കുളം
പത്തു കുളത്തിനു സമം ഒരു ജലാശയം
പത്തു ജലാശത്തിനു സമം ഒരു പുത്രൻ
പത്തു പുത്രൻമാർക്കും സമം ഒരു വൃക്ഷം
(വൃക്ഷായുർവ്വേദം)

3.3 അപകടങ്ങൾ

രാജ്യത്ത് ഏറ്റവുമധികം അപകടങ്ങളുണ്ടാകുന്ന 50 നഗരങ്ങളുടെ പട്ടികയിൽ കേളത്തിലെ ഏഴു നഗരങ്ങളായ കണ്ണൂർ, കോഴിക്കോട്, കൊച്ചി, കൊല്ലം, മലപ്പുറം, തിരുവനന്തപുരം എന്നീ നഗരങ്ങൾ ഉൾപ്പെടുന്നു. 2018-ൽ കേരളത്തിലെ റോഡപകടങ്ങൾ കുറയ്ക്കാൻ സേഫ് കേരള എന്ന പദ്ധതി കേരള സർക്കാർ ആവിഷ്ക്കരിച്ചു. ദേശീയ പാതകളിൽ മാത്രമല്ല നാട്ടിൻ പുറങ്ങളിലെ റോഡുകളിൽ വരെ 24 മണിക്കൂർ പട്രോളിങ്ങ് ഉറപ്പു വരുത്തുന്നതിന് വേണ്ടിയാണ് ഈ പദ്ധതി. അപകടത്തിൽപ്പെടുന്നയാളുകൾക്ക് ഗോൾഡൻ ഹവറിൽ ചികിൽസ യെത്തിക്കുന്നതിനായിരിക്കും മുൻഗണന. ട്രാഫിക് ബ്ലോക്ക് വരുന്ന പ്രദേശങ്ങളിൽ പെട്ടെന്ന് തടസ്സം നീക്കും, ജിപിഎസ് വെഹിക്കൾ പാർക്കിംഗ്, ക്യാമറ, വീഡിയോ സർവയലൻസ്, എന്നീ സംവിധാനങ്ങൾ ഉപയോഗിച്ച് പദ്ധതി നടപ്പിലാക്കും. നാഷണൽ ഹൈവേ അതോറിറ്റി തുടങ്ങിയ വിവിധ വകുപ്പുകളെ ഏകോപിപ്പിച്ച് കൊണ്ടായിരിക്കും പ്രവർത്തനം.

കാരണങ്ങൾ

- റോഡ് നിയമങ്ങൾ കൃത്യമായി പാലിക്കപ്പെടാത്തതാണ് ഇന്ന് റോഡപകടങ്ങൾ കൂടാനുള്ള പ്രധാന കാരണം.
- ഡ്രൈവർമാരുടെ അശ്രദ്ധമൂലമാണ് മിക്ക റോഡപകടങ്ങളും സംഭവിക്കുന്നത്.
- റോഡ് ഡിസൈനിംഗിലുള്ള പോരായ്മയാണ് ഒരു കാരണം.
- റോഡുകളുടെ മോശപ്പെട്ട അവസ്ഥ റോഡപകടങ്ങൾക്ക് കാരണമാവുന്നു.
- വാഹനങ്ങളുടെ കാലപ്പഴക്കം
- വഴിയാത്രക്കാരുടെ അശ്രദ്ധ.

പരിണിത ഫലങ്ങൾ

- അപകടങ്ങളിൽ ജീവൻ പൊലിയുന്നു.
- പരിക്കുകൾ ഉണ്ടാകുന്നു.
- വാഹനങ്ങൾ നശിക്കാനിടയാവുന്നു.

പരിഹാരം

- ഹെൽമറ്റ്, സീറ്റ്ബൽറ്റ് എന്നിവ ധരിക്കുക.
- റോഡ് ഡിസൈനിംഗിലുള്ള പോരായ്മകൾ പരിഹരിക്കൽ.
- ഡ്രൈവർമാർക്ക് റോഡുസുരക്ഷ പരിശീലനം കൊടുക്കുക.
- റോഡുകളുടെ മോശപ്പെട്ട അവസ്ഥ പരിഹരിക്കുക.
- റോഡ് ഉപയോഗിക്കുന്നവർക്കു സുരക്ഷാ പരിശീലനം.
- വാഹനങ്ങൾ ബ്ലോക്കാവാതെ നോക്കുക.
- വാഹനങ്ങളിൽ വേഗത നിയന്ത്രിക്കാൻ വേഗപൂട്ട് ഘടിപ്പിക്കുക.

വിമാന അപകടങ്ങൾ

2011 ഓഗസ്റ്റ് 29ന് ബഹ്റൈനിൽ നിന്ന് 137 യാത്രാക്കാരുമായി കൊച്ചിയിലെത്തിയ ഗൾഫ് എയറിന്റെ ജി എഫ് 270 വിമാനമായിരുന്നു അപകടത്തിൽപ്പെട്ടത്. റൺവേയിൽ നിന്നും വിമാനം തെന്നിമാറുകയായിരുന്നു. രക്ഷാപ്രവർത്തനത്തിനിടയിൽ യാത്രക്കാർക്കു പരിക്കേറ്റതൊഴിച്ചാൽ ആളപായമൊന്നും ഉണ്ടായില്ല.

കാരണങ്ങൾ

- കൊടുങ്കാറ്റിന്റെ സാന്നിധ്യം
- ഉപകരണങ്ങളുടെ തകരാറ്
- പൈലറ്റിന്റെ ശ്രദ്ധക്കുറവ്

അപകട നിയന്ത്രണ മാർഗ്ഗങ്ങൾ

- പൊട്ടിത്തെറിക്കാൻ സാധ്യതയുള്ള വസ്തുക്കൾ വിമാനയാത്രയിൽ ഒഴിവാക്കുക.
- വിമാനത്തിന്റെ അറ്റകുറ്റപ്പണികൾ യഥാസമയം നടത്തുക.
- വിമാനം പുറപ്പെടുന്നതിനു മുൻപ് തരുന്ന നിർദ്ദേങ്ങൾ അനുസരിക്കുക.

തീവണ്ടി അപകടങ്ങൾ

1988 ജൂലൈ 8ന് കൊല്ലം ജില്ലയിലെ പെരിനാടിനടുത്തുള്ള

പെരുമൺ പാലത്തിൽ നിന്ന് ബാംഗ്ലൂർ കന്യാകുമാരി ഐലന്റ് എക്സ്പ്രസ് പാളം തെറ്റി അഷ്ടമുടികായലിലേക്ക് മറിഞ്ഞുണ്ടായ വൻ അപകടമാണ് പെരുമൺ ദുരന്തം. കേരളത്തിൽ നടന്ന വലിയ അപകടങ്ങളിലൊന്നായ പെരുമൺ ദുരന്തത്തിൽ 105 പേർ മരണപ്പെടുകയും ഇരുനൂറിലധികം പേർക്ക് പരിക്കേൽക്കുകയും ചെയ്തു.

കേരളത്തിൽ കോഴിക്കോട് ജില്ലയിലെ കടലുണ്ടിയിൽ 2001 ജൂൺ 22ന് ഉണ്ടായ തീവണ്ടി അപകടമാണ് കടലുണ്ടി തീവണ്ടി അപകടം. മദ്രാസ് മെയിൽ (മംഗലാപുരം ചെന്നൈ എക്സ്പ്രസ്) കടലുണ്ടി പുഴയുടെ മീതെ കടന്നു പോകുമ്പോൾ പാലം പൊളിയുകയും 3 ബോഗികൾ പുഴയിലേക്ക് മറിയുകയും ചെയ്തു. ഈ അപകടത്തിൽ 52 പേർക്ക് ജീവഹാനി സംഭവിച്ചു. 222 പേർക്ക് പരിക്കേറ്റു.

കാരണങ്ങൾ

- റെയിൽപാളം തെറ്റുന്നത് കാരണമാകുന്നു.
- റെയിലിന്റെയും തീവണ്ടി എഞ്ചിന്റെയും അറ്റകുറ്റപ്പണികളുടെ അഭാവം.
- കാലാവസ്ഥാ വ്യതിയാനങ്ങൾ പാളത്തിൽ ഉണ്ടാക്കുന്ന തകരാറുകൾ.

പരിഹാരം

- സ്ഥിരമായി പാതകളിൽ അറ്റകുറ്റപ്പണികൾ നടത്തുക.
- പാളം പുതുക്കി പണിയുക.
- എഞ്ചിൻ യഥാസമയം ശരിയാക്കുക.
- റെയിൽ സിഗ്നലുകൾ തെറ്റാതെ നോക്കുക

ബോട്ടപകടങ്ങൾ

2009 സെപ്റ്റംബർ 30നാണ് തേക്കടിയിൽ കെടിഡിസിയുടെ ജലകന്യക ബോട്ട് മറിഞ്ഞ് 45 പേർ മരിച്ചത്. സർവ്വീസ് ആരംഭിച്ച് 45-ാം ദിവസമായിരുന്നു അപകടം. അമിതഭാരമാണ് അപകടത്തിനു കാരണം. 75 പേരെ കയറ്റേണ്ട ബോട്ടിൽ 97 പേരെ കയറ്റി കൂടുതൽ പേരും മുകളിലത്തെ ഡെക്കിലായിരുന്നു. ആർക്കും ലൈഫ് ജാക്കറ്റ് നൽകിയിരുന്നില്ല. ടൂറിസം വകുപ്പിലെയും കെടിഡിസിയിലെയും ഉന്നത ഉദ്യോഗസ്ഥരുടെ വീഴ്ചമൂലമാണ് ബോട്ട് ദുരന്തം ഉണ്ടായതെന്ന് ഇതേക്കുറിച്ച് അന്വേഷിച്ച കമ്മീഷൻ കണ്ടെത്തി.

കാരണങ്ങൾ

- ബന്ധപ്പെട്ട വ്യക്തികളുടെ നിരുത്തരവാദിത്തം.
- ബന്ധപ്പെട്ടവരുടെ പരിശീലനക്കുറവ്.
- ബോട്ടിന്റെ കാലപ്പഴക്കം

പരിഹാരം

- അത്യാവശ്യ സുരക്ഷാ സംവിധാനങ്ങൾ ബോട്ടിലുണ്ടെന്ന് ഉറപ്പു വരുത്തുക.
- യാത്രയ്ക്കു മുൻപ് കാലാവസ്ഥാ വ്യതിയാനങ്ങളെക്കുറിച്ച് മനസ്സിലാക്കുക.
- യാത്രയുടെ വേഗത നിയന്ത്രിക്കുക.
- നിയമങ്ങൾ അനുസരിക്കുക.

3.4 ജൈവദുരന്തങ്ങൾ/സാംക്രമിക രോഗങ്ങൾ

വിഷവസ്തുക്കളും രോഗാണുക്കളും ജീവജാലങ്ങളെ ബാധിക്കുന്നതു മൂലമുണ്ടാകുന്ന ദുരന്തങ്ങളെ ജൈവദുരന്തങ്ങൾ എന്ന് പറയുന്നു. ഉദാഹരണമായി വൈറസ് ബാധ, പകർച്ചവ്യാധി, വെട്ടുക്കിളി, പ്ലേഗ് എന്നിവ

സാംക്രമിക രോഗങ്ങൾ

ഒരു വലിയ പ്രദേശം മുഴുവൻ വ്യാപിക്കുകയും വീണ്ടും ഉണ്ടാകുകയും ചെയ്യുന്ന പകർച്ചവ്യാധികളാണ് സാംക്രമിക രോഗങ്ങൾ. ഉദാഹരണമായി വൈറസ് പരത്തുന്ന രോഗങ്ങൾ (എച്ച്. 1 എൻ. 1).

പകർച്ചവ്യാധികൾ

ഒരു പ്രദേശത്തിലെ ആകെ ജനങ്ങളെയോ, കുറച്ച് പേരെയോ സമാനമായ രീതിയിൽ ഒരേ സമയം ബാധിക്കുന്ന രോഗങ്ങളാണ് പകർച്ചവ്യാധികൾ. ഉദാഹരണമായി മലമ്പനി, ടൈഫോയ്ഡ്, കോളറ.

മൃഗങ്ങളിലെ പകർച്ചവ്യാധികൾ

- എബോള
- ആന്ത്രാക്സ്
- വെസ്റ്റ് നൈൽ രോഗം
- ഭ്രാന്തിപ്പശു രോഗം
- കുളമ്പുരോഗം

വെള്ളപ്പൊക്കം, ഭൂകമ്പം മുതലായ പ്രകൃതി ദുരന്തങ്ങൾ പരിസ്ഥിതി യിൽ ഉണ്ടാക്കുന്ന മാറ്റങ്ങളാണ് സാംക്രമിക രോഗങ്ങൾ പടർന്നു പിടിക്കാനും കൂടുതൽ പേരുടെ മരണത്തിനും കാരണമാവുന്നത്. കേരളത്തിൽ പൊതുവെ മഴക്കാലങ്ങളിലാണ് സാംക്രമിക രോഗങ്ങൾ

പടർന്നു പിടിക്കുന്നത്. പകർച്ചപ്പനികളായ ഡെങ്കിപ്പനിയും ചിക്കുൻ ഗുനിയയുമാണ് കൂടുതലും റിപ്പോർട്ട് ചെയ്യപ്പെടുന്നത്. 2004 ലെ സുനാമിയ്ക്കു ശേഷമാണ് കേരളത്തിൽ ചിക്കുൻ ഗുനിയ റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിട്ടുള്ളത് ധാരാളം പേർ മരണപ്പെടുകയും ചെയ്തു. 2018 ലെ വെള്ളപ്പൊക്കത്തിനു ശേഷം എലിപ്പനി പടർന്നു പിടിക്കാതിരിക്കാൻ സർക്കാർ ജനങ്ങൾക്ക് ജാഗ്രതാ നിർദ്ദേശം കൊടുത്തു. മലിനീകരണമാണ് പകർച്ചവ്യാധികൾ പകരാൻ പ്രധാന കാരണം. മാലിന്യമുക്തമായ ഒരു പ്രദേശത്ത് രോഗങ്ങൾ പെരുകുന്നില്ല. മാലിന്യ നിർമ്മാർജ്ജനമാണ് സാംക്രമിക രോഗങ്ങൾ തടയാനുള്ള പ്രധാന മാർഗ്ഗം.

- ഡെങ്കിപ്പനി
- മലമ്പനി
- വയറിളക്കം / അതിസാരം
- കോളറ
- മന്ത്
- ടൈഫോയ്ഡ്
- എലിപ്പനി
- മഞ്ഞപ്പിത്തം
- ചിക്കൻഗുനിയ
- ജപ്പാൻ ജ്വരം
- എച്ച് 1 എൻ 1 പനി
- നിപ പനി

തുടങ്ങിയവയാണ് കേരളത്തിൽ റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിട്ടുള്ള സാംക്രമിക രോഗങ്ങളിൽ പെടുന്നത്.

ഡെങ്കിപ്പനി

ഈഡിസ് വർഗ്ഗത്തിൽപ്പെട്ട കൊതുകുകൾ പരത്തുന്ന രോഗം.

പകരുന്ന രീതി

കൊതുക് കടിയിൽ കൂടി പകരുന്നു. പകൽ നേരത്ത് കടിക്കുന്ന ശുദ്ധജലത്തിൽ മുട്ടിയിട്ടു പെരുകുന്ന കൊതുകുകളാണ് ഈ രോഗം

ഒരാളിൽ നിന്നും മറ്റൊരാളിലേക്ക് പകർത്തുന്നത്.

ലക്ഷണങ്ങൾ

- പെട്ടെന്നുള്ള കഠിനമായ പനി
- കണ്ണുകൾക്ക് പിന്നിൽ വേദന
- അസഹ്യമായ തലവേദന
- വിശപ്പില്ലായ്മയും രുചിയില്ലായ്മയും
- ശരീരത്തിൽ ചുവന്ന പാടുകൾ, അഞ്ചാം പനി പോലുള്ള പൊള്ളൽ നെഞ്ചിലും കൈയ്യിലും
- മനം പുരട്ടലും ഛർദ്ദിയും
- മൂക്കിൽ നിന്നും വായിൽ നിന്നും രക്തസ്രാവം, രക്തസമ്മർദ്ദം കുറയുക എന്നിവ.

രോഗ പ്രതിരോധം

- രക്ത പരിശോധനയിലൂടെ ഈ രോഗം സ്ഥിരീകരിക്കുക
- നിങ്ങളുടെ പരിസരത്തോ, ബന്ധുക്കൾക്കോ ഡെങ്കിപ്പനി സ്ഥിരീകരിച്ചാൽ ആരോഗ്യ വകുപ്പിലെ ഉദ്യോഗസ്ഥരെ അറിയിക്കുക.

- സ്വയം ചികിൽസ ഒഴിവാക്കുക, ഡോക്ടറുടെ നിർദ്ദേശപ്രകാരം പ്രതിരോധ ഗുളിക കഴിക്കുക.

മലമ്പനി

പ്ലാസ്മോഡിയം വർഗ്ഗത്തിൽപ്പെട്ട ഏകകോശ ജീവികളാണ് ഈ രോഗമുണ്ടാക്കുന്നത്.

പകരുന്ന രീതി

അനോഫിലസ് വർഗത്തിൽപ്പെട്ട കൊതുക് കടിക്കുന്നതിലൂടെയാണ് ഈ രോഗം പകരുന്നത്.

ലക്ഷണങ്ങൾ

- അസഹനീയമായ തണുപ്പോടുകൂടി പനി തുടങ്ങുന്നു. വിറയൽ ബാധിക്കുന്നു, പനി പെട്ടെന്ന് ഉയരുന്നു, വിയർത്ത് പനി കുറയുന്നു, ഒന്നോ രണ്ടോ ദിവസത്തിനുള്ളിൽ പനി ആവർത്തിക്കുന്നു.
- തലവേദന, ക്ഷീണം, ചിലപ്പോൾ കണ്ണിൽ മഞ്ഞ നിറം കാണുന്നു.
- തലച്ചോറിനെ ബാധിക്കുന്ന മലമ്പനി മരണകാരണമായേക്കാം.

എങ്ങനെ കണ്ടു പിടിക്കാം

- കൈവിരലിന്റെ തുമ്പിൽ നിന്നും എടുക്കുന്ന ഒരു തുള്ളി രക്തം മൈക്രോസ്കോപ്പിലൂടെ പരിശോധിച്ചു ഈ അസുഖം കണ്ടെത്താനാകും.
- എല്ലാ ഗവൺമെന്റ് ആശുപത്രികളിലും മെഡിക്കൽ കോളേജുകളിലും ഈ പരിശോധന സൗജന്യമായി ലഭ്യമാണ്.

രോഗ പ്രതിരോധം

- കൊതുകു നിവാരണം
- മലമ്പനി പകർച്ച വ്യാധിയായിട്ടുള്ള സംസ്ഥാനങ്ങളിലേക്കും പ്രദേശങ്ങളിലേക്കും പോകാതിരിക്കുക. അഥവാ പോകുകയാണെങ്കിൽ കീടനാശിനി മുക്കിയ കൊതുകു വലയ്ക്കുള്ളിൽ ഉറങ്ങാൻ ശ്രദ്ധിക്കുക.

വയറിളക്കം / അതിസാരം

പലതവണ, സ്വാഭാവികമല്ലാത്ത രീതിയിൽ മലം പോകുന്ന രോഗമാണ് അതിസാരം. റോട്ടാ വൈറസുകൾ, കോളിഫോം, ബാക്ടീരിയ, സാൽമോണല്ല, യെർസിനിയ, ഷിഗല്ല, കാസെലോ ബാക്ടർ തുടങ്ങിയ ബാക്ടീരിയകൾ, അമീബ, ജിയാർഡിയ എന്നീ ഏക കോശ ജീവികൾ എല്ലാം വയറിളക്കത്തിനു കാരണമാകുന്നു.

പകരുന്ന രീതി

- രോഗിയുടെ മലത്തിൽ കൂടിയാണ് ഇതിന്റെ രോഗാണുക്കൾ മറ്റുള്ളവരിലേക്കു പകരുന്നത്.
- വിഷബാധയുള്ള ഭക്ഷ്യ സാധനങ്ങൾ പാകമാകാത്ത പഴവർഗ്ഗങ്ങൾ, കുടലിലെ ചലനം വർദ്ധിപ്പിക്കുന്ന ബാക്ടീരിയകൾ, പ്രോട്ടോസോവകൾ, വിരകൾ മുതലായവ അതിസാരമുണ്ടാക്കുന്നു.

- അന്ന പഥത്തിലെ ക്ഷയം, അർബുദം, റ്റൈഫോയ്ഡ് എന്നീ രോഗങ്ങളുടെ ലക്ഷണമായും അതിസാരമുണ്ടാകാം.
- കാലാവസ്ഥ, സ്ഥലം, ഭക്ഷണം എന്നിവയുടെ മാറ്റം കൊണ്ടും അതിസാരം ഉണ്ടാകാം
- രോഗമുള്ളപ്പോൾ മുട്ട, ഇറച്ചി, ചോറ് ഇവ വർജ്ജിക്കണം.
- രോഗിയുടെ മലത്തിലൂടെ വിസർജ്ജിക്കപ്പെടുന്ന രോഗാണുക്കൾമറ്റുള്ളവരിലേക്ക് പകരും,അത് ജലത്തിലൂടെയോ ഭക്ഷണ പദാർത്ഥങ്ങളിലൂടെയോ ആവാം

ലക്ഷണങ്ങൾ

- ചെറിയ പനിയും ഛർദ്ദിയും ആയിരിക്കും ആദ്യലക്ഷണം.
- തുടർന്ന് 4-5 മുതൽ 10-20 തവണ അയഞ്ഞ മലശോധനയും ഉണ്ടാവാം
- അമിതമായ ക്ഷീണം
- വിളിച്ചാൽ അറിയാതിരിക്കുക, മയങ്ങിക്കിടക്കുക
- വെള്ളം കുടിക്കാതിരിക്കുകയോ അൽപം മാത്രം കുടിക്കുകയോ ചെയ്യുക
- ഭക്ഷണം കഴിക്കാതിരിക്കുക, കണ്ണുകൾ കുഴിഞ്ഞിരിക്കുക
- തൊലി വലിച്ചു വിട്ടാൽ സാവധാനം പൂർവ്വ സ്ഥിതിയിലാവുക
- അണുക്കൾ മൂലമുണ്ടാകുന്ന വയറിളക്കത്തിന് പ്രത്യേകം മരുന്നു ആവശ്യമാണ്.
- ഈ അവസ്ഥയിൽ മലത്തിന്റെ കൂടെ രക്തത്തിന്റെ അംശമോ ധാരാളം കഫമോ ഉണ്ടാകും.
- നിർജ്ജലീകരണമാണ് രോഗിയെ അപകട നിലയിലെത്തിക്കുന്നത്.
- ഒരു വയസ്സിനു താഴെയുള്ള കുട്ടികൾക്ക് പച്ച നിറത്തിൽ മലം പോകുന്നത് അതിസാരത്തിന്റെ ലക്ഷണമാണ്.
- ഇത് തടയാത്ത പക്ഷം ശക്തിയായി പനി വരുകയും ശരീരത്തിൽ നിന്ന് ജലാംശവും സോഡിയവും മാരകമായവിധം നഷ്ടപ്പെടുകയും ചെയ്യും.

രോഗപ്രതിരോധം

- ഉപ്പിട്ട കഞ്ഞിവെള്ളം, കരിക്കിൻ വെള്ളം, ഉപ്പിട്ട നാരങ്ങവെള്ളം, ഒ.ആർ.എസ് ലായനി എന്നിവ നൽകുക.
- കുട്ടികൾക്ക് ആവശ്യത്തിനു മുലപ്പാലും ദ്രവരൂപത്തിലുള്ള ഭക്ഷണവും കൊടുക്കണം.
- പുനർജ്ജലീകരണ പാനീയ ചികിൽസയാണ് പ്രധാനം (Oral Rehydration Therapy)
- തിളപ്പിച്ചാറിയ വെള്ളം ഉപയോഗിക്കുക.
- വ്യക്തി ശുചിത്വം പാലിക്കുക.
- തുറസ്സായ സ്ഥലത്തെ മലമൂത്രവിസർജ്ജനം തടയുക
- ഭക്ഷണത്തിനു മുൻപും ശൗചം ചെയ്തതിനു ശേഷവും കൈകൾ സോപ്പ് ഉപയോഗിച്ച് കഴുകുക.
- ഒ.ആർ.എസ് ലായനിയും സിങ്ക് ഗുളികകളും കഴിക്കുക.
- ഭക്ഷണം അടച്ചു വയ്ക്കുക.
- കിണറുകളിൽ ബ്ലീച്ചിംഗ് പൗഡർ തളിക്കുക.

ഒ.ആർഎസ് ലായനി തയ്യാറാക്കുന്ന വിധം

5 ഗ്ലാസ്സ് ശുദ്ധമായ വെള്ളത്തിൽ (1 ലിറ്റർ) ഒരു പാക്കറ്റ് ഒ.ആർ.എസ്. പൊടി മുഴുവനായും ചേർത്ത് വൃത്തിയുള്ള സ്പൂൺ കൊണ്ട് ഇളക്കുക. ആവശ്യാനുസരണം വേറെ പാത്രത്തിലേക്ക് എടുത്ത് ഉപയോഗിക്കുക. ഈ ലായനി 24 മണിക്കൂറിൽ കൂടുതൽ ഉപയോഗിക്കരുത്.

കോളറ

ഒരു ജലജന്യരോഗമാണ് കോളറ. വിബ്രിയോ കോളറെ എന്ന ബാക്ടീരിയയാണ് ഈ രോഗം ഉണ്ടാക്കുന്നത്. ജലവും ലവണങ്ങളും ശരീരത്തിൽ നിന്നും വളരെയധികം നഷ്ടമാവുകയും മരണ കാരണമാവുകയും ചെയ്യുന്നു.

പകരുന്ന രീതി

- മനുഷ്യ വിസർജ്യത്തിലൂടെയാണ് ഈ ബാക്ടീരിയ ഒരാളിൽ നിന്നും മറ്റൊരാളിലേയ്ക്ക് പകരുന്നത്.
- വൃത്തിഹീനമായ സാഹചര്യത്തിൽ തയ്യാറാക്കുന്ന ഭക്ഷണം മുഖേനെയോ, തുറന്നു വെച്ച ഭക്ഷണത്തിലൂടെയോ ഈ ബാക്ടീരിയ പകരാം.
- മലിനമായ ജലത്തിലൂടെ പകരാം.
- ജനങ്ങൾ തിങ്ങിപ്പാർക്കുന്നതും വൃത്തിയില്ലാത്തതുമായ സാഹചര്യത്തിൽ നിന്നുമാണ് കോളറ കൂടുതൽ റിപ്പോർട്ട് ചെയ്യപ്പെട്ടിട്ടുള്ളത്.
- രോഗം ബാധിച്ചവർ ഒരാഴ്ച മുതൽ 10 ദിവസം വരെ അണുക്കൾ വിസർജിക്കും. ചിലരിൽ 3 ആഴ്ച വരെ ഉണ്ടാവാം.

രോഗ നിർണ്ണയം

കഠിനമായ വയറു വേദനയും വയറിളക്കവും ഛർദ്ദിയും ഉണ്ടായാൽ ലബോറട്ടറിയിൽ മലം പരിശോധിക്കുന്നതിലൂടെ രോഗം നിർണ്ണയിക്കാം.

രോഗ ലക്ഷണങ്ങൾ

- ഛർദ്ദിയും വയറിളക്കവും
- കടുത്ത ക്ഷീണവും തളർച്ചയും
- ചുണ്ടുകൾ വരളുന്നു.
- വിയർപ്പില്ലാതാവുന്നു
- ഹൃദയമിടിപ്പ് കൂടുന്നു
- രക്തസമ്മർദ്ദം കുറയുന്നു
- തല ചുറ്റുന്നു, ശരീരഭാരം കുറയുന്നു
- കണ്ണുകൾ കുഴിഞ്ഞിരിക്കുന്നു, പനി അപൂർവമായേ കാണൂ.

രോഗ പ്രതിരോധ മാർഗ്ഗങ്ങൾ

- നന്നായി വേവിച്ചതും ചൂടുള്ളതുമായ ഭക്ഷണം കഴിക്കുക.
- തിളപ്പിച്ചാറിയ വെള്ളം നന്നായി കുടിക്കുക
- പച്ചക്കറികളും പഴങ്ങളും കഴുകി വൃത്തിയായി ഉപയോഗിക്കുക

- ഭക്ഷണത്തിനു മുൻപും ശൗചത്തിനു ശേഷവും കൈ സോപ്പുപയോഗിച്ച് കഴുകി വൃത്തിയാക്കുക.
- ഒ.ആർ.എസ് ലായനി കുടിക്കുക.
- ആവശ്യമെങ്കിൽ ഡോക്ടറുടെ നിർദ്ദേശപ്രകാരം വാക്സിൻ എടുക്കുക

മന്ത് (Filariasis)

ഫൈലേറിയ വർഗ്ഗത്തിൽപ്പെട്ട വിരകളാണ് ഈ രോഗമുണ്ടാക്കുന്നത്.

പകരുന്ന രീതി

കൊതുകു കടിയിൽ കൂടിയാണ് ഈ രോഗം പകരുന്നത്

ലക്ഷണങ്ങൾ

പനി, കൈകാലുകളിലെ നീർവീക്കം

രോഗ പ്രതിരോധം

- കൊതുകു നിവാരണം
- രോഗ പ്രതിരോധ മരുന്ന് കഴിക്കുക

ടൈഫോയ്ഡ്

ഒരു ജലജന്യ രോഗമാണ് ടൈഫോയ്ഡ്. സാൽമോണല്ല ടൈഫി എന്ന ബാക്ടീരിയയാണ് ഈ രോഗമുണ്ടാക്കുന്നത്. മനുഷ്യന്റെ കുടലിലും രക്തപര്യയന വ്യവസ്ഥയിലും ആണ് ഇവ കാണപ്പെടുന്നത്.

പകരുന്ന രീതി

- മനുഷ്യന്റെ മലമൂത്ര വിസർജനത്തിലൂടെയാണ് ഒരാളിൽ നിന്നും മറ്റൊരാളിലേക്ക് ഈ രോഗം പകരുന്നത്.
- രോഗാണു വാഹകരുടെ വിസർജ്യത്തിലൂടെ പുറത്തു വരുന്ന രോഗാണുക്കൾ ഏഴു ദിവസം വെള്ളത്തിലും ഏഴു ദിവസം അഴുക്കു ജലം കലർന്ന മണ്ണിലും ജീവനോടെയിരിക്കും.
- മലിനജലത്തിലൂടെയും ഈച്ചകളിലൂടെയും ഈ രോഗം

പകരുന്നു.

- ഭക്ഷണത്തിലൂടെയും മലിന ജലത്തിലൂടെയും ഇത് മനുഷ്യന്റെ കുടലിലെത്തുന്നു ഒന്നോ രണ്ടോ ആഴ്ച അവിടെ കാണുന്നു. അതിനു ശേഷം കുടൽ ഭിത്തിലൂടെ രക്തപര്യയനത്തിലെത്തുന്നു.
- രക്തത്തിൽ നിന്നും അവ ഓരോ അവയവങ്ങളിലേക്കും കലകളിലേക്കും വ്യാപിക്കുന്നു. അങ്ങനെ രോഗിയുടെ രോഗ പ്രതിരോധ ശേഷി കുറയ്ക്കുന്നു.

രോഗ നിർണ്ണയം

രക്തം, മലം, മൂത്രം, അസ്ഥിമജ്ജ എന്നിവ പരിശോധിച്ചാൽ രോഗം നിർണ്ണിയിക്കാം.

ലക്ഷണങ്ങൾ

- 6 മുതൽ 30 ദിവസത്തിനുള്ളിൽ ലക്ഷണങ്ങൾ തിരിച്ചറിയാം 3, 4 ആഴ്ച നീണ്ടു നിൽക്കും.
- കഴുത്തിലും, വയറിലും ചുവന്ന തടിപ്പുകൾ, പനി എന്നിവ കാണുന്നു. പനി പതുക്കെ കൂടി കൂടി വന്നു 104 ഡിഗ്രി ഫാരെൻ ഹീറ്റിൽ കൂടുതൽ വരെയാകും.
- ഇടവിട്ടുള്ള തലവേദന, പനി, തലകറക്കം, തളർച്ച. വയറു വേദന, വയറിളക്കം, ഛർദ്ദി എന്നിവയുണ്ടാകും.
- ചികിൽസിക്കാതിരുന്നാൽ കുടൽ ഭിത്തിയിൽ ദ്വാരമുണ്ടാകുകയും അത് അണുബാധയ്ക്കു കാരണമാകുകയും അതീവ ഗുരുതരമാവുകയും ചെയ്യും.

രോഗ പ്രതിരോധ മാർഗ്ഗങ്ങൾ

- തിളപ്പിച്ചാറിയ വെള്ളം കുടിക്കുക
- ഭക്ഷണ പദാർത്ഥങ്ങൾ അടച്ചു വയ്ക്കുക.
- തണുത്തതും ഐസ് ഇട്ടതുമായ ഭക്ഷണം പരമാവധി ഒഴിവാക്കുക.
- പരിസര ശുചിത്വം, മാലിന്യ നിർമ്മാർജ്ജനം, ശുദ്ധ ജലം

മാത്രം ഉപയോഗിക്കൽ, ഭക്ഷണ പദാർത്ഥങ്ങൾ ശ്രദ്ധയോടെ സൂക്ഷിക്കുന്നത് വഴി ഈ രോഗം തടയാം.

- നേരത്തേ രോഗ നിർണ്ണയം നടത്തി ഡോക്ടറുടെ നിർദ്ദേശപ്രകാരം മരുന്നു കഴിക്കുക.

എലിപ്പനി

ലെപ്റ്റോസ്പൈറ എന്ന ബാക്കിടീരിയ ഉണ്ടാക്കുന്ന രോഗമാണ്.

പകരുന്ന രീതി

- എലി, അണ്ണാൻ, തുടങ്ങിയ ജീവികളുടെ മൂത്രം വീണ മലിനമായ ജലത്തിൽ കൂടി പകരുന്നു.
- മൃഗങ്ങളിൽ നിന്ന് മനുഷ്യരിലേക്ക് പകരുന്ന രീതി.
- കാർന്നു തിന്നുന്ന ജീവികളായ എലി, അണ്ണാൻ, മരപ്പട്ടി എന്നിവയിലും വളർത്തു മൃഗങ്ങളായ പശു, പട്ടി, പൂച്ച എന്നിവയിലും രോഗാണുക്കളെ കണ്ടെത്തിയിട്ടുണ്ട്.
- രോഗാണു വാഹകരായ ജന്തുക്കളുടെ മൂത്രം കലർന്ന മണ്ണ്, ജലം, ഭക്ഷണഫലവർഗ്ഗങ്ങളിലൂടെ രോഗാണുക്കൾ മനുഷ്യ ശരീരത്തിൽ എത്തുന്നു.
- കൈകളിൽ ഉണ്ടാകുന്ന മുറിവുകൾ കണ്ണ്, മൂക്ക്, വായ എന്നിവയിലൂടെ രോഗാണുക്കൾ ശരീരത്തിൽ പ്രവേശിക്കുന്നു.
- രോഗബാധക്കു സാധ്യത കൂടിയവർ
- കൃഷിയിടങ്ങളിൽ ജോലി ചെയ്യുന്നവർ
- ഓടകൾ, കുളങ്ങൾ എന്നിവ വൃത്തിയാക്കുന്നവർ
- ശുചീകരണ തൊഴിലാളികൾ
- മാർക്കറ്റിൽ ജോലി ചെയ്യുന്നവർ
- പാചകതൊഴിലാളികൾ, മത്സ്യം പിടിക്കുന്നവർ, മണൽ തൊഴിലാളികൾ, ചുമട്ടു തൊഴിലാളികൾ, ക്ഷീര കർഷകർ, ചെരുപ്പ് ഉപയോഗിക്കാത്തവർ.

രോഗ പ്രതിരോധം

- എലി നശീകരണം

- മലിനമായ സ്ഥലങ്ങളിൽ ജോലി ചെയ്യുമ്പോൾ ചെരുപ്പ് ധരിക്കുന്നത് ശീലമാക്കുക.
- എലിപ്പനിക്കുള്ള പ്രതിരോധ ഗുളികകൾ കഴിക്കുക.

മഞ്ഞപിത്തം

കരളിൽ പിത്താശയ നിർമ്മാണത്തിന്റെയും സംഭരണത്തിന്റെയും അപാകത കാരണം തൊലിക്കും കണ്ണിനും മൂത്രത്തിനുമെല്ലാം മഞ്ഞ നിറമാക്കുന്ന രോഗാവസ്ഥയാണ് മഞ്ഞപ്പിത്തം. മഞ്ഞപ്പിത്തം അഥവാ ഹെപ്പെറ്റൈറ്റിസ് പല തരത്തിലുണ്ട്. ഹെപ്പറ്റൈറ്റിസ് എ, ബി, സി, ഡി, ഇ എന്നിങ്ങനെ.

- ഇവയിൽ ഹെപ്പറ്റൈറ്റിസ് ബി മാരകമാണ്.
- സാധാരണ ഹെപ്പറ്റൈറ്റിസ് എ വിഭാഗത്തിൽപ്പെട്ട മഞ്ഞപ്പിത്തമാണ് കാണാറുള്ളത്.

പകരുന്ന രീതി

മലിനമായ ജലം ആഹാരം എന്നിവ കഴിക്കുന്നതിലൂടെ.

ലക്ഷണങ്ങൾ

- വിശപ്പില്ലായ്മ, ഓക്കാനം, ഛർദ്ദി

- മൂത്രത്തിന് മഞ്ഞ നിറം
- കണ്ണിലെ വെള്ള മുഴുവൻ മഞ്ഞ നിറത്തിലാവുന്നു.
- വായയുടെ ഉൾഭാഗത്ത് ശ്ലേഷ്മ കലകൾ മഞ്ഞ നിറത്തിലാവുക.
- രോഗത്തിന്റെ കാഠിന്യം അനുസരിച്ച് ചർമ്മം മഞ്ഞ നിറത്തിലാവുന്നു.
- നിരവധി രോഗങ്ങളുടെ ലക്ഷണമായും മഞ്ഞപ്പിത്തം വരാം.

രോഗനിർണ്ണയം

- രക്തപരിശോധനയിലൂടെ മാത്രമേ മഞ്ഞപ്പിത്തം തിരിച്ചറിയാൻ കഴിയൂ
- പുറമേക്കുള്ള ലക്ഷണങ്ങൾ ഇല്ലെങ്കിലും രക്തപരിശോധന വഴി രോഗാവസ്ഥ അറിയാം

രോഗപ്രതിരോധ മാർഗ്ഗങ്ങൾ

- തിളപ്പിച്ചാറിയ വെള്ളം ഉപയോഗിക്കുക
- തുറസ്സായ സ്ഥലത്തെ മലമൂത്ര വിസർജനം തടയുക.
- മഞ്ഞപ്പിത്തം തുടക്കത്തിൽ തന്നെ ചികിൽസിച്ചില്ലെങ്കിൽ ഗുരുതരമാവും

ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ

- ലിവർ സിറോസിസ്, കാൻസർ, മഹോദരം എന്നീ അസുഖങ്ങൾ മഞ്ഞപ്പിത്തം മൂലം ഉണ്ടാകാം.
- ശ്വാസകോശാർബുദം, ലിംഫോമ തുടങ്ങിയ രോഗങ്ങളുടെ ഫലമായും മഞ്ഞപ്പിത്തം വരാം
- ശരിയായ രോഗ നിർണ്ണയത്തിലൂടെയും ഔഷധ പരിചരണത്തിലൂടെയും മഞ്ഞപിത്തത്തിന്റെ ഗുരുതരാവസ്ഥ ഒരു പരിധി വരെ തരണം ചെയ്യാൻ സാധിക്കും.
- വിദഗ്ധ ചികിൽസ തേടുക.

ചിക്കുൻ ഗുനിയ

ചിക്കുൻ ഗുനിയ വൈറസ് (CHIKV) എന്ന രോഗാണു പരത്തുന്ന

രോഗമാണിത്.

പകരുന്ന രീതി

ഈഡിസ് വർഗത്തിൽപ്പെട്ട കൊതുക് കടിക്കുന്നതിലൂടെ രോഗം പരക്കുന്നു.

രോഗ ലക്ഷണം

കഠിനമായ പനി, സന്ധികളിൽ വേദന, ചുവന്ന തടിപ്പുകൾ ശരീരത്തിൽ ഉണ്ടാകുന്നു. തലവേദന, തളർച്ച, ക്ഷീണം ദഹനക്കേട്, നീർവീക്കം, കണ്ണുകളിൽ ചുവപ്പ് എന്നിവ.

രോഗ പ്രതിരോധം

- കൊതുക് നിവാരണത്തിലൂടെ ഈ രോഗം പകരുന്നത് തടയാം.
- ഡോക്ടറുടെ നിർദേശപ്രകാരമുള്ള ചികിൽസ തേടുക.

ജപ്പാൻ ജ്വരം

ജപ്പാനീസ് എൻസഫാലെറ്റിസ് വൈറസ് (JEV) എന്ന രോഗാണുവാണ് ഈ രോഗമുണ്ടാക്കുന്നത്.

പകരുന്ന രീതി

ക്യൂലെക്സ് കൊതുക് വർഗത്തിൽപ്പെട്ട കൊതുകുകൾ കടിക്കുന്നതിലൂടെ പകരുന്നു.

ലക്ഷണങ്ങൾ

പനി, ശരീരവേദന, തലവേദന, കഴുത്ത് തിരിക്കാൻ പ്രയാസം, മാനസിക വിഭ്രാന്തി, ബോധക്ഷയം

രോഗ പ്രതിരോധം

- കൊതുക് നിവാരണം
- പ്രത്യേക ചികിൽസ ഇല്ലാത്തതുകാരണം ഡോക്ടറുറെ നിർദ്ദേശ പ്രകാരമുള്ള മരുന്നുകൾ മാത്രം കഴിക്കുക.

വൈറൽ പനി / ഫ്ളൂ

(H1N1)

വൈറസ് പരത്തുന്ന ഒരു രോഗമാണിത്

ശ്വസന വ്യവസ്ഥയെ ബാധിക്കുന്ന രോഗമാണ്.

പകരുന്ന രീതി

- വായുവിൽകൂടി പകരുന്നു.
- രോഗി സംസാരിക്കുമ്പോഴും, തുമ്മുമ്പോഴും, ചുമയ്ക്കുമ്പോഴും രോഗാണുക്കൾ വിസർജ്ജിക്കപ്പെടുന്നു.
- രോഗാണുവാഹകരായ ദ്രാവക കണികകൾ ശ്വസിക്കപ്പെടുന്നത് കൊണ്ടാണ് രോഗം പകരുന്നത്.

ലക്ഷണങ്ങൾ

- ഒന്ന് മുതൽ അഞ്ച് ദിവസം വരെ പനിയുണ്ടാകും.
- ശക്തമായ പനി, ശരീരവേദന, ചുമ, തൊണ്ട വേദന, മൂക്കൊലിപ്പ്, ശ്വാസ തടസ്സം
- പനിയും ചുമയും നീണ്ടുപോയാൽ ബ്രോൺങ്കൈറ്റിസ്, ന്യൂമോണിയ മുതലായ സങ്കീർണ്ണ രോഗാവസ്ഥകൾക്കു ഇടവരുന്നു.
- ഫ്ളുവിന് സാധാരണ നിലയിൽ ആന്റി ബയോട്ടിക് ഔഷധങ്ങളുടെ ആവശ്യമില്ല എന്നാൽ അനാരോഗ്യകരമായ സാഹചര്യങ്ങളിൽ സ്വാഭാവിക രോഗപ്രതിരോധ ശേഷി കുറഞ്ഞവർ മറ്റു ബാക്ടീരിയകളുടെ ആക്രമണത്തിന് വിധേയമാകുന്നു.

രോഗപ്രതിരോധം

- തുമ്മുമ്പോഴും ചുമയ്ക്കുമ്പോഴും മൂക്ക് ചീറ്റുമ്പോഴും തൂവാല ഉപയോഗിച്ച് വായും മൂക്കും പൊത്തുക. ഇടയ്ക്കിടക്ക് മുഖവും കൈകളും സോപ്പും വെള്ളവും ഉപയോഗിച്ച് കഴുകുക.
- ഒരിക്കൽ രോഗം പിടിപെട്ടയാളിനു രോഗം ആവർത്തിക്കാം

- അതിനാൽ പ്രതിരോധ കുത്തിവെപ്പ് അത്ര പ്രായോഗികവും ഫലപ്രദവുമല്ല.
- രോഗകാരണ വൈറസ് തിരിച്ചറിഞ്ഞു പ്രത്യേകം വാക്സിൻ നൽകി പ്രതിരോധിക്കാം.

നിപ്പ പനി

നിപ്പ വൈറസ് (NIV) എന്ന രോഗാണുവാണ് ഈ അസുഖത്തിന് കാരണം. ഹെനിപാ വൈറസ് ജീനസിലെ ഒരു ആർ.എൻ.എ വൈറസ് ആണ്.

- മൃഗങ്ങളേയും മനുഷ്യരേയും ബാധിക്കുന്ന മാരകമായ വൈറസ് മൂലമുണ്ടാകുന്ന ഈ രോഗം രോഗികളുടെ മരണത്തിന് വരെ കാരണമാകുന്നു.
- മലേഷ്യയിലെ കമ്പുങ്ങ് സുങ്ങായ് നിപ്പാ എന്ന സ്ഥലത്ത് 1998ലാണ് ഈ വൈറസ് ബാധമൂലമുള്ള രോഗം ആദ്യം റിപ്പോർട്ട് ചെയ്തത്. അങ്ങനെയാണ് ആ പേര് വന്നത്. 1999ൽ ഈ വൈറസിനെ വേർതിരിച്ചെടുത്തു.
- ഈ രോഗം മൃഗങ്ങളിൽ നിന്ന് മൃഗങ്ങളിലേക്കും, മനുഷ്യരിലേക്കും പകരുന്നു.
- പന്നികളെ വളർത്തുന്ന കർഷകരിലാണ് ആദ്യം ഈ രോഗം

കാണപ്പെട്ടത്.

പകരുന്ന രീതി

- വൈറസ് ബാധയുള്ള വവ്വാലുകളിൽ നിന്നും, പന്നികളിൽ നിന്നും, മനുഷ്യരിൽ നിന്നും ഈ രോഗം പകരുന്നതായ് കരുതുന്നു.
- വൈറസ് ബാധിച്ച വവ്വാലുകൾ കടിച്ച പഴം കഴിക്കുന്നതിലൂടെ ഈ രോഗം പകരാം.

ലക്ഷണങ്ങൾ

- അഞ്ച് മുതൽ 14 ദിവസം വരെയാണ് ഇൻക്യുബേഷൻ പിരീഡ്.
- വൈറസ് അകത്ത് പ്രവേശിച്ച് രോഗലക്ഷണങ്ങൾ കാണിക്കാൻ 14 ദിവസം വരെയെങ്കിലും പിടിക്കും.
- തലവേദന, പനി, തലകറക്കം, ഛർദ്ദി, കാഴ്ച മങ്ങൽ എന്നിവയാണ് ലക്ഷണങ്ങൾ
- പത്ത് ദിവസം വരെ ലക്ഷണങ്ങൾ കാണാം
- രോഗം ബാധിച്ചതിനു ശേഷം രണ്ട് ദിവസങ്ങൾക്കുള്ളിൽ തന്നെ തലച്ചോറിനെ ബാധിക്കുന്ന എൻസെഫാലിറ്റിസ് ഉണ്ടാവുകയും രോഗി കോമ അവസ്ഥയിലെത്താനും സാധ്യതയുണ്ട്.

പ്രതിരോധം

- നിപാ വൈറസിനെ ചെറുക്കാൻ പ്രതിരോധ കുത്തി വെപ്പ് ഇതുവരെയും കണ്ടുപിടിച്ചിട്ടില്ല.
- അസുഖംവന്നതിനുശേഷമുള്ള ചികിൽസ ഫലപ്രദമാകാത്തതു കൊണ്ടു തന്നെ പ്രതിരോധിക്കുകയാണ് ഫലപ്രദമായ വഴി.
- വവ്വാലുകൾ കടിച്ച കായ്ഫലങ്ങൾ ഒഴിവാക്കുക.
- വൈറസ് ബാധിച്ച രോഗിയെ പരിചരിക്കുന്നവർ കൈയുറയും, മാസ്കും ധരിക്കുക.
- കൈ സോപ്പുപയോഗിച്ച് ഇടവിട്ട് 20 സെക്കന്റ് കഴുകുക.
- വൈറസ് ബാധിച്ച ആളുടെ വസ്ത്രങ്ങൾ, ഉപയോഗിക്കുന്ന വസ്തുക്കൾ പ്രത്യേകം സൂക്ഷിക്കുക.

- നിപാ ബാധിതരെ പരിചരിക്കുന്ന ആശുപത്രി ജീവനക്കാരും രോഗം പകരാതെയിരിക്കാൻ മുൻകരുതലെടുക്കുക.
- മാസ്ക്, കൈയുറ, ഗൗൺ എന്നിവ ധരിക്കുക
- ചികിൽസിക്കാൻ ഡിസ്പോസബിൾ ഉപകരണങ്ങൾ ഉപയോഗിക്കുക

രോഗ നിർണ്ണയം

- തൊണ്ടയിൽ നിന്നും മൂക്കിൽ നിന്നുമുള്ള സ്രവം, രക്തം, മൂത്രം, തലച്ചോറിലെ നീരായ സെറിബ്രോ സ്പൈനൽ ഫ്ളൂയിഡ് എന്നിവയിൽ നിന്നും റിയൽ ടൈം പോളിമറേസ് ചെയിൻ റിയാക്ഷൻ ഉപയോഗിച്ചും എലൈസ പരിശോധനയിലൂടെയും തിരിച്ചറിയാൻ സാധിക്കും.
- മരണപ്പെട്ടവരുടെ പോസ്റ്റ്മാർട്ടം പരിശോധനയിൽ കലകളിൽ നിന്നെടുക്കുന്ന സാമ്പിളുകളിൽ ഇമ്മ്യൂണോ ഹിസ്റ്റോ കെമിസ്ട്രി പരിശോധന നടത്തിയും അസുഖം സ്ഥിരീകരിക്കാൻ സാധിക്കും.
- ആരോഗ്യ വകുപ്പ് നൽകുന്ന നിർദ്ദേശങ്ങൾ പാലിക്കുക.

പകർച്ചവ്യാധി നിവാരണ മാർഗ്ഗങ്ങൾ

വീടിനു ചുറ്റും

- ചിരട്ട, ടിന്ന്, കുപ്പി, കപ്പ്, ചെടിച്ചട്ടി മുതലായ വസ്തുക്കളിൽ വെള്ളം കെട്ടി നിൽക്കുന്നത് ഒഴിവാക്കുക.
- ടെറസ്, സൺഷേഡ് എന്നിവയിൽ കെട്ടി നിൽക്കുന്ന വെള്ളം ഒഴുക്കിക്കളയുക
- വെള്ളം ശേഖരിക്കുന്ന ടാങ്കുകൾ, ബയോഗ്യാസ് പ്ലാന്റ് എന്നിവ കൊതുക് വല കൊണ്ട് മൂടുക.

വീടിനു പുറത്ത്

- റബ്ബർ പാൽ ശേഖരിക്കുവാൻ വച്ചിട്ടുള്ള ചിരട്ട, കപ്പ്, എന്നിവ ഉപയോഗം കഴിഞ്ഞ് കമിഴ്ത്തി വെയ്ക്കുക.
- ഉപയോഗിക്കാത്ത കിണറുകളിലും, വെള്ളക്കെട്ടുകളിലും ഗപ്പി, ഗംബൂസി പോലുള്ള കൂത്താടി ഭോജി മൽസ്യങ്ങളെ വളർത്തുക.
- വെള്ളം ശേഖരിച്ചു വയ്ക്കുന്ന പാത്രങ്ങൾ, ഡ്രമ്മുകൾ, ടാങ്കുകൾ എന്നിവ മൂടി വച്ചു കൊതുകുകൾ മുട്ടയിടുന്നത് തടയുക.
- കുളങ്ങളിലും തോടുകളിലും കാണുന്ന ജലസസ്യങ്ങൾ യഥാസമയം നീക്കം ചെയ്യുക.
- കാടു വെട്ടി വൃത്തിയാക്കുക.
- (വെള്ളി) വിദ്യാലയങ്ങൾ (ശനി) ഓഫീസുകൾ (ഞായർ) വീടുകൾ എന്നിവിടങ്ങളിൽ ഡ്രൈഡേ ആചരിക്കണം (കൊതുക്, കൂത്താടി എന്നിവയെ നശിപ്പിക്കൽ)
- പ്രഭാതങ്ങളിലും, വൈകുന്നേരങ്ങളിലും ചെടികൾക്കിടയിൽ നിൽക്കാതിരിക്കുക (അവിടെയാണ് കൊതുകുകൾ കാണപ്പെടുന്നത്)
- ഇളം നിറത്തിലുള്ളതും, ശരീരം മൂടുന്നതുമായ വസ്ത്രങ്ങൾ ധരിക്കുക (കൊതുകു കടി കുറയുന്നതിന് സഹായിക്കും).

- കുടിവെള്ള സ്രോതസ്സുകൾ ബ്ലീച്ചിംഗ് പൗഡർ ഉപയോഗിച്ച് അണുവിമുക്തമാക്കുക.

വീട്ടിനുള്ളിൽ

- ഭക്ഷണത്തിന് ഉപയോഗിക്കുന്ന പാത്രങ്ങൾ ചൂടുവെള്ളത്തിൽ കഴുകി ഉപയോഗിക്കുക.
- വെള്ളം ശേഖരിക്കുന്ന പാത്രങ്ങൾ ആഴ്ചയിലൊരിക്കൽ കഴുകി ഉണക്കുക, ഫ്രിഡ്ജ്, കൂളർ, എന്നിവയുടെ അടിഭാഗത്ത് ശേഖരിക്കപ്പെടുന്ന വെള്ളം ആഴ്ചയിലൊരിക്കൽ നീക്കം ചെയ്യുക.
- ഒരു ടീസ്പൂൺ വെള്ളം തങ്ങി നിൽക്കുന്ന ഇടങ്ങളിൽ പൊലും കൊതുകുകൾ മുട്ടയിടുന്നു. ഇത്തരം ഉറവിടങ്ങൾ കണ്ടെത്തി നശിപ്പിക്കുക.
- തിളപ്പിച്ചാറിയ വെള്ളം മാത്രം കുടിക്കുക.
- വ്യക്തി ശുചിത്വം, പരിസര ശുചിത്വം എന്നിവ പാലിക്കുക.
- കൊതുക് കടി ഏൽക്കാതിരിക്കാനുള്ള ലേപനങ്ങൾ, റിപ്പല്ലന്റുകൾ, കൊതുകു തിരികൾ എന്നിവ ഉപയോഗിക്കുക.
- കഴിയുന്നതും വീടിനു പുറത്ത് രാത്രി കാലങ്ങളിൽ കിടന്നുറങ്ങാതിരിക്കുക.

പകർച്ചവ്യാധി - എമർജൻസി കിറ്റ്

ഒ.ആർ.എസ്. പാനീയം.

പാരസെറ്റമോൾ ഗുളികകൾ

വയറിളക്കം കുറക്കാനുള്ള ഗുളികകൾ

വേദനസംഹാരികൾ

3.5 തീപിടുത്തം / അഗ്നിബാധ

2016 ഏപ്രിൽ 10ന് ഇന്ത്യൻ സ്റ്റാൻഡാർഡ് സമയം 3.30ന് കൊല്ലം പരവൂർ പുറ്റിങ്ങലിൽ ക്ഷേത്രത്തിൽ ഏറ്റവും ഭീകരമായ വെടിക്കെട്ടപകടം നടന്നു. ഏകദേശം 107 പേർ മരണപ്പെട്ടു. കുറേയാളുകൾക്ക് പരിക്കേറ്റു. ഏപ്രിൽ 13ന്, സൂര്യാസ്തമനത്തിനു ശേഷം ശബ്ദമുഖരിതമായ വെടിക്കെട്ട് നിരോധിച്ചുകൊണ്ട് കേരള ഹൈക്കോടതി ഉത്തരവിറക്കി.

നിർവ്വചനം

അനിയന്ത്രിതമായി തീ പടർന്ന് മനുഷ്യനോ, ജീവികൾക്കോ ആരോഗ്യഹാനിയോ, ജീവഹാനിയോ, വസ്തു നഷ്ടമോ, പ്രകൃതി നാശമോ സംഭവിക്കുന്ന സ്ഥിതി വിശേഷത്തെയാണ് അഗ്നിബാധ എന്ന് പറയുന്നത്.

കാരണങ്ങൾ

മനപൂർവ്വമല്ലാത്ത അപകടങ്ങൾ കൊണ്ടോ (Accidental) കൊള്ളിവപ്പ് കൊണ്ടോ (Arson) പ്രകൃതിക്ഷോഭം (Natural Disaster) കൊണ്ടോ സംഭവിക്കാം.

അഗ്നി സുരക്ഷ

അഗ്നി ബാധയിൽ നിന്നും സുരക്ഷ നേടുകയോ, അഗ്നി ബാധയെ ഇല്ലാതാക്കുകയോ ചെയ്യുന്നതാണ് അഗ്നി സുരക്ഷ.

അഗ്നി പ്രതിരോധം

തീ പിടുത്തം ഒഴിവാക്കുന്നതിനും, കെടുത്തുന്നതിനും നാശ നഷ്ടങ്ങൾ ലഘൂകരിക്കുന്നതിനും ആവശ്യമായ പ്രവർത്തനത്തെയാണ് അഗ്നി പ്രതിരോധം എന്ന് പറയുന്നത്.

പൊതുവായി ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ

- ബഹുനില കെട്ടിടങ്ങളിൽ തീപിടുത്തമുണ്ടായാൽ രക്ഷപ്പെടുന്നതിനായി ഗോവണിപ്പടി (സ്റ്റെയർ കേസ്) ഉപയോഗിക്കുക.
- ഫയർ അലാറം ഉള്ള കെട്ടിടങ്ങളിൽ അലാറത്തിന്റെ ഗ്ലാസ്സ് ബ്രേക്ക് ചെയ്തു പ്രവർത്തിപ്പിക്കുക.
- വസ്ത്രങ്ങളിൽ തീ പിടിച്ചാൽ ഓടാതെ നിലത്തു കിടന്നുരുളുകയോ നനഞ്ഞ ചാക്കോ കട്ടിയുള്ള തുണികളോ ഉപയോഗിച്ച് പുതയ്ക്കുകയോ ചെയ്യുക.

ദുരന്തനിവാരണം

മുൻകരുതൽ

- മുതിർന്നവരുടെ മേൽനോട്ടത്തോടു കൂടെ മാത്രമേ കുട്ടികൾ പടക്കങ്ങളും മറ്റും ഉപയോഗിക്കാൻ പാടുള്ളൂ.
- പെട്രോൾ, ഡീസൽ എന്നിവ അടുക്കളയിൽ സ്റ്റൗവ് കത്തിക്കാൻ ഉപയോഗിക്കരുത്.
- അടുക്കളയിൽ അയഞ്ഞതും പെട്ടെന്ന് തീ പിടിക്കുന്നതുമായ വസ്ത്രങ്ങൾ ധരിക്കുന്നത് ഒഴിവാക്കുക.
- സിഗറ്റു കുറ്റികൾ, തീപ്പെട്ടിക്കൊള്ളികൾ എന്നിവ അലക്ഷ്യമായി തുറസ്സായ സ്ഥലങ്ങളിലോ വേസ്റ്റ് ബോക്സിലോ വലിച്ചെറിയാതെ കെടുത്തിക്കളയുക.

പൊതുവായി ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ

- എല്ലാ കെട്ടിടങ്ങളിലും ഫയർ എക്സ്റ്റിംഗ്യുഷർ സ്ഥാപിക്കുക.
- സ്ക്കൂളുകൾ, ഓഫീസുകൾ, ഫാക്ടറികൾ, ഹോട്ടലുകൾ, മറ്റു ബഹുനില കെട്ടിടങ്ങൾ എന്നിവിടങ്ങളിൽ ഫയർ അലാറം സ്ഥാപിക്കുക.
- ഗ്യാസ് സിലിണ്ടർ കൃത്യമായി ഓഫാക്കാൻ ശ്രദ്ധിക്കുക.
- ഗ്യാസ് സിലിണ്ടർ എപ്പോഴും അടുപ്പിനു വളരെ താഴെയായി മാത്രം വെയ്ക്കുക.
- വിറകടുപ്പിനു സമീപം ഗ്യാസ് സിലിണ്ടർ വെയ്ക്കരുത്.

കാട്ടു തീ

കാട് അനിയന്ത്രിതമായി അഗ്നിക്കിരയാകുന്ന പ്രതിഭാസമാണ് കാട്ടുതീ. മനുഷ്യന്റെ നേരിട്ടോ അല്ലാതെയോ ഉള്ള ഇടപെടലുകളാണ് കാട്ടുതീയുണ്ടാകാൻ കാരണം.

കാട്ടു തീയുണ്ടാകാനുള്ള കാരണങ്ങൾ

- ചപ്പു ചവറുകൾ കൂട്ടിയിട്ടു കത്തിക്കുന്നത്.
- വനയാത്രയിലെ പുകവലി
- വെടിക്കെട്ട്, പടക്കങ്ങൾ പോലുള്ള സ്ഫോടക വസ്തുക്കളുടെ ഉപയോഗം

- കരിയിലകൾക്ക് തീപിടിക്കുന്നത്

പരിണിത ഫലം

- പരിസ്ഥിതിയെ ദോഷകരമായി ബാധിക്കുന്നു.
- വനനശീകരണമുണ്ടാക്കുന്നു.
- ജന്തുജാലങ്ങൾ നശിക്കാൻ കാരണമാകുന്നു.
- പുകയും വാതകങ്ങളും അന്തരീക്ഷത്തിലേക്ക് പടരാൻ കാരണമാകുന്നു.
- മനുഷ്യന്റെ നിലനിൽപിന് തന്നെ ദോഷകരമായി തീരുന്നു.

പരിഹാരം

- തീ അനിയന്ത്രിതം ആണെങ്കിൽ അഗ്നിശമന സേനയെ വിവരമറിയിക്കുക.
- വനയാത്രയിൽ പുകവലിക്കാതിരിക്കുക, വനയാത്രയിൽ തീയുണ്ടാകാൻ സാധ്യതയുള്ള വസ്തുക്കൾ കൊണ്ടു പോകാതെയിരിക്കുക.
- വനമേഖലയിൽ പാഴ്വസ്തുക്കൾ കത്തിക്കുകയാണെങ്കിൽ ബന്ധപ്പെട്ടവരുടെ അനുവാദം വാങ്ങുക.
- വനമേഖലയുടെ സമീപം തീപിടിക്കാൻ സാധ്യതയുള്ള എന്തെങ്കിലുംജോലിചെയ്യേണ്ടതുണ്ടെങ്കിൽതീകെടുത്താനുള്ള സംവിധാനം ഏർപ്പെടുത്തുക.

3.6 മുങ്ങി മരണങ്ങൾ

നാഷണൽ ക്രൈം റെക്കോർഡ്സ് ബ്യൂറോ സൂചിപ്പിക്കുന്നത് ഇന്ത്യയിൽ പ്രതിദിനം 80 മുങ്ങിമരണങ്ങളെങ്കിലും സംഭവിക്കുന്നു എന്നാണ്. കേരളത്തിൽ പ്രതിവർഷം ആയിരത്തോളം പേർ മുങ്ങി മരിക്കുന്നതായാണ് കണക്കുകൾ സൂചിപ്പിക്കുന്നത്. ഇത് കേരള സമൂഹത്തിന് ഒരു വെല്ലുവിളിയാണ്.

മുൻകരുതൽ

- ഒഴുക്കുള്ള വെള്ളം, വെള്ളക്കെട്ട് എന്നിവിടങ്ങളിൽ ഇറങ്ങരുത്
- ആഴമുള്ള കുളങ്ങളിലോ, പുഴയിലോ കുളിക്കുമ്പോഴും നീന്തുമ്പോഴും സാഹസം ഒഴിവാക്കുക.
- ആറ് ഇഞ്ച് ഉയരത്തിലുള്ള വെള്ളത്തിനു പോലും നമ്മളെ വീഴ്ത്താൻ സാധിക്കും. അതുകൊണ്ട് വെള്ളത്തിലൂടെ നടക്കേണ്ടി വന്നാൽ ഒഴുക്കില്ലാത്ത ഭാഗം തിരഞ്ഞെടുക്കുക.
- നീന്തൽ പഠിക്കുക
- നീന്തൽ അറിയാത്തവർ ഒഴുക്കുള്ളതോ ആഴമുള്ളതോ ആയ ജലാശയങ്ങളിൽ ഇറങ്ങരുത്.
- നീന്തൽ അറിയാവുന്ന കുട്ടികളാണെങ്കിൽക്കൂടി മുതിർന്നവരോടൊപ്പം മാത്രമേ ആഴമുള്ള വെള്ളത്തിൽ ഇറങ്ങാവൂ.
- തദ്ദേശ സ്വയം ഭരണ സ്ഥാപനങ്ങളും ബന്ധപ്പെട്ട സർക്കാർ വകുപ്പുകളും അപകട സാധ്യതയുള്ള സ്ഥലങ്ങളിൽ ജാഗ്രത നിർദ്ദേശ ബോർഡ് സ്ഥാപിക്കുക.
- ജാഗ്രതാ നിർദ്ദേശം അവഗണിച്ചു കൊണ്ട് വെള്ളത്തിൽ ഇറങ്ങരുത്.
- അമിതമായ നീരൊഴുക്കുണ്ടെങ്കിൽ വെള്ളത്തിൽ ഇറങ്ങരുത്.
- പുഴയുടെയോ കടലിന്റെയോ പരിസരങ്ങളിലേക്കു പോകുന്നവർ അതീവ ശ്രദ്ധ പാലിക്കുക.
- വെള്ളത്തിൽ മുങ്ങിയ ഒരാൾക്ക് ആദ്യത്തെ അഞ്ച് മിനിട്ട് വളരെ നിർണ്ണായകമാണ്. ഫയർ ഫോഴ്സും മറ്റ് രക്ഷാ പ്രവർത്തകരും എത്തുമ്പോഴേക്കും മരണം സംഭവിക്കാം. അതുകൊണ്ട് ഇത്തരത്തിലുള്ള പ്രഥമ ശുശ്രൂഷാ പരിശീലനം അത്യന്താപേക്ഷിമാണ്.

- രക്ഷിക്കാനായി എടുത്തു ചാടുന്നത് നിങ്ങളുടെ ജീവനും അപകടത്തിലാക്കും.

വെള്ളത്തിൽ മുങ്ങിപ്പോയ ഒരാളെ രക്ഷിക്കാനുള്ള രീതികൾ

1. റീച്ച് (Reach) - കൈ കൊടുത്തു കൊണ്ട്.
2. ത്രോ (Throw) - രക്ഷപ്പെടുത്താൻ കഴിയുന്ന നല്ല കയർ പോലെയുള്ള സാധനങ്ങൾ എറിഞ്ഞു കൊടുത്തു കൊണ്ട്.
3. റോ (Raw) - വള്ളമോ തോണിയോ തുഴഞ്ഞു കൊണ്ട്
4. ഗോ (Go) - നീന്തി ചെന്നു കൊണ്ട്

ഈ ശ്രമം അവസരോചിതമായി പാലിക്കാൻ ശ്രമിക്കുക. ആദ്യത്തെ മൂന്ന് രീതികളും അസാധ്യമെങ്കിൽ മാത്രമേ വെള്ളത്തിൽ ഇറങ്ങാവൂ.

പ്രഥമ ശുശ്രൂഷ

- അപകടത്തിൽപ്പെട്ട വ്യക്തിയെ വെള്ളത്തിൽ നിന്നെടുത്ത ശേഷം സുരക്ഷിമായ ഒരു സ്ഥലത്ത് കിടത്തുക.
- തല ചെരിച്ച് കിടത്തിയ ശേഷം വായിലോ, മൂക്കിലോ തടസ്സം ഉണ്ടെങ്കിൽ അത് ആദ്യം മാറ്റുക.
- വയറ്റിൽ വെള്ളമുണ്ടാകാം അത് ബലം പ്രയോഗിച്ച് പുറത്തെടുക്കാൻ ശ്രമിക്കാതിരിക്കുക.
- വ്യക്തി അബോധാവസ്ഥയിൽ ആണെങ്കിൽ ഹൃദയസ്പന്ദനം ശ്വസന പുനരുജീവന പ്രക്രിയയ്ക്കു വിധേയമാക്കുക.
- വ്യക്തിയെ എത്രയും പെട്ടെന്നു തന്നെ അടുത്തുള്ള ആശുപത്രിയിൽ എത്തിക്കുക.

3.7 കൂട്ടമരണങ്ങൾ

മതപരമായ തീർത്ഥാടനങ്ങൾ നടക്കുന്ന സ്ഥലങ്ങളിലും വലിയ വിനോദ പരിപാടികൾ അരങ്ങേറുന്നയിടങ്ങളിലും പരിഭ്രാന്തിയോ, തീ പിടുത്തമോ സ്ഫോടനമോ ഉണ്ടാകുന്നതിന്റെ ഫലമായി തിക്കിലും തിരക്കിലും പെട്ട് ആളുകൾ കൂട്ടത്തോടെ മരണമടയുന്നു. ഉദാ: ശബരിമല പുല്ലുമേട് ദുരന്തം, മക്കയിലെ മിനാദുരന്തം

കാരണങ്ങൾ

- ഒരു ചതുരശ്ര മീറ്ററിൽ ആറ് അല്ലെങ്കിൽ ഏഴ് ആൾക്കാരിൽ കൂടുതൽ നിൽക്കുന്നത് ജനസാന്ദ്രത കൂടുതലുള്ള സ്ഥലത്താണെന്നു പറയാം.
- ഇത്തരം ജനസാന്ദ്രതയുള്ളയിടത്ത് ആൾക്കാരുടെ കൂട്ടത്തോടെയുള്ള ചലനം ഒരു ദ്രാവകം ഒഴുകുന്നതിന് സമമാവും.
- ഇത്തരം സാഹചര്യങ്ങളിൽ ഒരു വ്യക്തി വീഴുകയാണെങ്കിൽ മറ്റുള്ളവർ സഹായിക്കാനെത്തുമ്പോൾ എല്ലാവരും വീഴാനുള്ള സാഹചര്യം ഉണ്ടാകുന്നു. അതുവഴി തിക്കിലും തിരക്കിലും പെട്ട് ശ്വാസം മുട്ടി മരിക്കുന്നു.
- വീഴുന്ന ആളുകൾക്ക് എതിരെ വരുന്ന ആളുകളെ നേരിടാൻ പ്രയാസമാവുന്നു.

പരിഹാരം

- മതപരമായ ചടങ്ങുകൾ നടക്കുന്നയിടങ്ങളിലും. വലിയ തീർത്ഥാടന സ്ഥലങ്ങളിലും തിരക്കു നിയന്ത്രിക്കുക, ക്യൂ പാലിക്കുക, ട്രാഫിക് നിയന്ത്രണം ഏർപ്പെടുത്തുക, പരിപാടിയുടെ ഓർഗനൈസർമാർ, വളണ്ടിയർമാർ, സുരക്ഷാ ഉദ്യോഗസ്ഥർ എന്നിവർ ജനസാന്ദ്രത നിയന്ത്രിക്കാൻ കൃത്യമായി മാനേജ്മെന്റ് പ്ലാൻ തയ്യാറാക്കുക.
- അപകട സാധ്യയുള്ള സ്ഥലങ്ങളിൽ മുന്നറിയിപ്പ് നൽകുക.
- ജനസാന്ദ്രത കൂടിയാൽ ഓരോരുത്തരും സ്വയം നിയന്ത്രിക്കുക തിരക്കിലേക്ക് കൂടുതൽ പോകാതെ നോക്കുക.

3.8 ഭക്ഷ്യ വിഷബാധ

നിർവ്വചനം

വിഷപദാർത്ഥങ്ങൾ കലർന്ന ഭക്ഷണം വിഷമയമാകുന്നതാണ് ഭക്ഷ്യ വിഷബാധയ്ക്കു കാരണം.

പഴകിയ ഭക്ഷണമോ, പാനീയങ്ങളോ ഉപയോഗിക്കുന്നതുമൂലം ഉണ്ടാകുന്ന മാരകമായ ഒരു രോഗാവസ്ഥയാണിത്. ചിലരിൽ ഇത് ഛർദ്ദിയായോ അല്ലെങ്കിൽ വയറിളക്കമായോ പ്രത്യക്ഷപ്പെടുന്നു. പഴകിയ ഭക്ഷണത്തിൽ ഉണ്ടാകുന്ന ചിലതരം ബാക്ടീരിയകൾ, വൈറസുകൾ, പാരസൈറ്റുകൾ എല്ലാമാണ് ഭക്ഷ്യ വിഷബാധയ്ക്ക് കാരണമാകുന്നത്. ചിലപ്പോൾ ഭക്ഷണത്തിൽ അടങ്ങിയ രാസപദാർത്ഥങ്ങളും ഭക്ഷ്യ വിഷ ബാധയുണ്ടാക്കുന്നു.

ഭക്ഷ്യ വിഷബാധ പ്രധാനമായും മൂന്നു തരത്തിൽ ഉണ്ടാകുന്നു.

- ഭക്ഷണത്തിൽ അണുബാധയുണ്ടാകുമ്പോൾ - ബാക്ടീരിയ, വൈറസ് എന്നിവ.
- ഭക്ഷണത്തിൽ ഉണ്ടാകുന്ന പൂപ്പലുകൾ വിഷ വസ്തുക്കൾ ഉണ്ടാക്കുന്നു.
- ഭക്ഷണത്തിൽ വിഷമയമായ വസ്തുക്കൾ കലരുന്നതു വഴി.
- കീടനാശിനികൾ, മറ്റു രാസ വസ്തുക്കൾ എന്നിവ അബദ്ധത്തിൽ കലരുന്നതു വഴി.

ഭക്ഷ്യ വിഷബാധയുണ്ടാക്കുന്ന സൂക്ഷ്മ ജീവികൾ

- കാം പൈലോ ബാക്ടർ - പഴകിയ പാലിൽ കാണുന്നു.
- സാൽമോണല്ല - പഴകിയ ഇറച്ചി, മുട്ട എന്നിവയിൽ കാണുന്നു.
- സ്റ്റെഫേലോ കോക്കസ്, ഓറിയസ്, ക്ലോസ്റ്റിറിഡിയം, ബാസിലസ് ഇവയെല്ലാം പഴകിയ ഭക്ഷണ പദാർത്ഥത്തെ മാരകമായ വിഷമയമാക്കുന്നു.

രോഗലക്ഷണങ്ങൾ

പനി, വയറു വേദന, രക്തം കലർന്ന മലം, ഛർദ്ദി, ക്ഷീണം, തളർച്ച, വയറിളക്കം എന്നിവ.

ഭക്ഷ്യവിഷബാധയുണ്ടായാൽ

- ഛർദ്ദിക്കുന്നതിലൂടെയും വയറിളക്കത്തിലൂടെയും നിർജ്ജലീകരണം സംഭവിക്കുന്നതിനാൽ തിളപ്പിച്ചാറ്റിയ വെള്ളം നന്നായി കുടിക്കുക.
- ഒ.ആർ.എസ്. ലായനി കുടിക്കുക.
- ധാരാളം ജലാംശമുള്ള പഴവർഗ്ഗങ്ങൾ കഴിക്കുക.
- ഉപ്പിട്ട കഞ്ഞി വെള്ളവും, കരിക്കിൻ വെള്ളവും കുടിക്കുക.
- ഇഞ്ചിനീര്, തേൻ എന്നിവ കഴിക്കുക
- വിദഗ്ധ ഡോക്ടറുടെ ചികിൽസ തേടുക

രോഗ പ്രതിരോധമാർഗ്ഗങ്ങൾ

- ഭക്ഷണത്തിന് മുൻപും ശൗചത്തിന് ശേഷവും കൈകൾ സോപ്പിട്ട് കഴുകുക.
- പാത്രങ്ങൾ വൃത്തിയായി കഴുകുക
- മൽസ്യമാംസാഹാരങ്ങൾ നന്നായി വേവിച്ച് കഴിക്കുക.
- കേടാവാൻ സാധ്യതയുള്ള ഭക്ഷണങ്ങൾ റഫ്രിജറേറ്റിൽ വെയ്ക്കുക.
- പഴകിയ സാധനങ്ങൾ കഴിക്കാതിരിക്കാൻ ശ്രദ്ധിക്കുക.
- റഫ്രിജറേറ്റിൽ വച്ച് തണുത്ത ഭക്ഷണം ആവശ്യമുള്ളതുമാത്രം ചൂടാക്കി ഉപയോഗിക്കുക

- ഭക്ഷണ പദാർത്ഥങ്ങൾ വാങ്ങുമ്പോൾ അതിന്റെ കാലാവധി കഴിഞ്ഞതാണോ എന്ന് പരിശോധിക്കുക.
- അടുക്കള എന്നും വൃത്തിയായി സൂക്ഷിക്കുക
- ഭക്ഷണ പദാർത്ഥങ്ങൾ കേടുവരാതെ സൂക്ഷിക്കുക,
- കേടു വന്നത് ഒഴിവാക്കുക.

3.9 രാസദുരന്തങ്ങൾ / വ്യാവസായിക ദുരന്തങ്ങൾ

ലോകം കണ്ട ഏറ്റവും നാശകരമായ ഒരു രാസ ദുരന്തമായിരുന്നു 1984 ൽ നടന്ന ഭോപ്പാൽ ഗ്യാസ് ദുരന്തം. ഭോപ്പാലിലെ യൂണിയൻ കാർബൈഡ് ഫാക്ടറിയിൽ നിന്നും അപകടകരമായ രീതിയിൽ മീഥൈൽ ഐസോസയനേറ്റ് എന്ന വിഷവാതകം ചോർന്നതാണ് ഈ ദുരന്തത്തിനിടയാക്കിയത്. 2500 പേരുടെ മരണത്തിനിടയാക്കി ഈ വൻ ദുരന്തം.

രാസദുരന്തങ്ങൾ നിയന്ത്രിക്കാൻ സമഗ്രമായ ഒരു നിയമ ചട്ടക്കൂട് നമ്മുടെ രാജ്യത്ത് നില നിൽക്കുന്നു.

രാസ ദുരന്ത നിവാരണത്തിന് വേണ്ടി രൂപീകരിച്ച നിയമങ്ങൾ

- സ്ഫോടക വസ്തു നിയമം 1884
- പെട്രോളിയം നിയമം 1934
- ഫാക്ടറിസ് ആക്റ്റ് 1948
- കീടനാശിനി നിയമം 1968
- പരിസ്ഥിതി സംരക്ഷണ നിയമം 1986
- മോട്ടോർ വാഹന ആക്ട് 1988
- പബ്ളിക് ലയബിലിറ്റി ഇൻഷ്വറൻസ് ആക്റ്റ് 1991
- ഡിസാസ്റ്റർ മാനേജ്മെന്റ് ആക്ട് 2005

മുൻകരുതലുകൾ

- വ്യവസായ യൂണിറ്റുകളുടെ സമീപത്ത് താമസിക്കുന്നവർ അതുമായി ബന്ധപ്പെട്ട് ഉണ്ടാകാനിടയുള്ള ബുദ്ധിമുട്ടുകൾ മനസ്സിലാക്കുകയും ശ്രദ്ധാലുക്കളാവുകയും ചെയ്യുക.
- പുകവലിക്കരുത്, തീ കൂട്ടരുത്
- അടിയന്തിര സാഹചര്യങ്ങളിൽ ബന്ധപ്പെടേണ്ട സർവ്വീസുകളായ ഫയർ സ്റ്റേഷൻ, പോലീസ് സ്റ്റേഷൻ, കൺട്രോൾ റൂം, ഹെൽത്ത് സർവ്വീസ് എന്നിവയുടെ ഫോൺ നമ്പർ സൂക്ഷിക്കുക.
- അപകട സാധ്യതയുള്ള രാസവസ്തുക്കൾ നിർമ്മിക്കുന്ന വ്യവസായ ശാലകളുടെ സമീപത്തുനിന്നും വീടുകൾ ഒഴിവാക്കുക.

- അപകടകരമായ രാസവസ്തുക്കളുടെ അടിസ്ഥാന സ്വഭാവവും, അപകടത്തിൽപ്പെട്ടവർക്കു കൊടുക്കേണ്ട പ്രഥമശുശ്രൂഷയെ കുറിച്ചും കുടുംബാംഗങ്ങളും നാട്ടുകാരും ബോധവാൻമാരാവുക.

രാസ ദുരന്തമുണ്ടായാൽ - പരിഹാരം

- പരിഭ്രാന്തരാകരുത്
- ദുരന്ത സ്ഥലത്തു നിന്നും സംയമനം പാലിച്ച് കാറ്റിന്റെ ദിശയിലേക്ക് വേഗത്തിൽ ഒഴിഞ്ഞു മാറുക.
- ഒരു കൈലേസോ, തുണി കഷണമോ, സാരിയോ കൊണ്ട് മൂക്കും മുഖവും മറച്ചു പിടിക്കുക.
- രോഗികൾ, വൃദ്ധർ, വിഗലാംഗർ, എന്നിങ്ങനെ ഒഴിഞ്ഞു പോകാൻ കഴിയാത്തവരെ അകത്താക്കി ജനലും വാതിലുകളും നന്നായി അടയ്ക്കുക.
- തുറന്നു വച്ച ഭക്ഷണം, വെള്ളം എന്നിവ കഴിക്കരുത്.
- കഴിയുന്നതും ആ പ്രദേശത്തു നിന്നും ഒഴിഞ്ഞു പോകുക. പുതിയ സ്ഥലത്തെത്തിയാൽ വസ്ത്രം മാറുക.
- എന്തെങ്കിലും ബുദ്ധിമുട്ടനുഭവപ്പെടുകയാണെങ്കിൽ കൺട്രോൾ റൂമിലേക്ക് വിളിച്ച് കാര്യങ്ങൾ പറയുക.
- റേഡിയോ, ടിവി ചാനലുകളിൽ കൂടി ബന്ധപ്പെട്ട അധികാരികൾ തരുന്ന നിർദ്ദേശം ശ്രദ്ധിക്കുകയും അനുസരിക്കുകയും ചെയ്യുക.
- കിംവദന്തികൾ ശ്രദ്ധിക്കാതിരിക്കുകയും പ്രചരിപ്പിക്കാതിരിക്കുകയും ചെയ്യുക.

3.10 ന്യൂക്ലിയർ ദുരന്തങ്ങൾ

ആണവ ദുരന്തങ്ങൾ വളരെ നാശകരമായി പ്രകൃതിയെയും ജീവജാലങ്ങളെയും ബാധിക്കുന്നു. ആണവ ദുരന്തവുമായി ബന്ധപ്പെട്ട വികിരണം പരിസ്ഥിതിയിൽ ഗണ്യമായ അപകടങ്ങൾ സൃഷ്ടിക്കുന്നു.

അന്താരാഷ്ട്ര ആണവോർജ്ജ ഏജൻസി (IAEA - International Atomic Energy Agency) യുടെ നിർവ്വചനപ്രകാരം പ്രകൃതിയ്ക്കും, ജനങ്ങൾക്കും പ്രത്യാഘാതങ്ങൾ ഉണ്ടാകുന്ന തരത്തിലുള്ള ആണവ വികരണത്തിന്റെ പ്രഭാവത്തെയാണ് ന്യൂക്ലിയർ ദുരന്തങ്ങൾ എന്ന് പറയുന്നത്.

1986 ൽ ഉക്രെയ്നിൽ നടന്ന ചെർണോബിൽ ദുരന്തമായിരുന്നു ഇന്നത്തെ ഏറ്റവും ഭീകരമായ ആണവ അപകടങ്ങളിൽ ഒന്ന്. ആ ദുരന്തത്തിൽ 31 പേരാണ് കൊല്ലപ്പെട്ടത്. 7 ബില്ല്യൻ ഡോളർ നാശ നഷ്ടങ്ങൾ ഉണ്ടായതായി കണക്കാക്കുന്നു. ഈ ദുരന്തത്തിന്റെ പരിണിത ഫലമായി 4000 ത്തോളം കാൻസർ മരണങ്ങളുണ്ടായതായി 2005 ൽ പ്രസിദ്ധീകരിച്ച ഒരു പഠനത്തിൽ കണ്ടെത്തിയിട്ടുണ്ട്.

പരിണിത ഫലങ്ങൾ

- റേഡിയേഷൻ മൂലമുള്ള വിഷബാധ, 'റേഡിയേഷൻ അസുഖം' (Radiation Sickness) ഉണ്ടാക്കുന്നു. ഈ അസുഖത്തിൽ ശരീര കലകൾക്ക് ഗുരുതരമായ പ്രശ്നങ്ങൾ ഉണ്ടാകുന്നു.
- ആണവ വികിരണത്തിന് വിധേയമായ ഒരാൾക്ക് ഛർദ്ദി, വയറിളക്കം എന്നിവയുണ്ടാകുന്നു. മൂന്നോ നാലോ ആഴ്ച അസുഖബാധയുണ്ടായേക്കാം.
- ഛർദ്ദിയും അതിസാരവും മൂലം ജലവും ലവണങ്ങളും ശരീരത്തിൽ നിന്ന് നഷ്ടമാകുന്നത് മരണകാരണമാവുന്നു.
- റേഡിയേഷൻ കേന്ദ്ര നാഡീവ്യവസ്ഥയെ ബാധിച്ച് മരണം സംഭവിക്കുന്നു.
- ശ്വാസകോശ സംബന്ധമായ പ്രശ്നങ്ങൾ ഉണ്ടാകുന്നു.
- മനുഷ്യ ശരീരത്തിൽ തൊലിയിൽ ഉണ്ടാകുന്ന കാൻസറിന് കാരണമാകുന്നു.

- ജനിതക തകരാറുകൾ ഉണ്ടാകുന്നു.
- ഗർഭസ്ഥ ശിശുവിനെ ബാധിക്കുന്നു, മരണ കാരണമാകുന്നു.
- രക്താർബുദം ഉണ്ടാകാൻ കാരണമാവുന്നു.
- കണ്ണുകളിൽ തിമിരം ഉണ്ടാവാൻ സാധ്യതയുണ്ട്.
- ആണവ അക്രമണങ്ങൾ മൂലം ഉണ്ടാകാൻ സാധ്യതയുള്ള സാംക്രമിക രോഗങ്ങളാണ്
    - അതിസാരം
    - ടൈഫോയ്ഡ്
    - ഹെപ്പറ്റൈറ്റിസ്
    - കോളറ
    - ക്ഷയം
    - ഡിഫ്തീരിയ
    - പോളിയോ
    - ന്യുമോണിയ

പരിഹാര മാർഗ്ഗങ്ങൾ

- ആണവ നിലയങ്ങളിൽ കർശനമായ സുരക്ഷാ മാനദണ്ഡങ്ങൾ പാലിക്കുക
- ആണവ സുരക്ഷയ്ക്കായി രൂപം കൊണ്ട അന്താരാഷ്ട്ര ആണവോർജ്ജ ഏജൻസിയുടെ സുരക്ഷാ നിർദേശം പാലിക്കുക.
- ആണവോർജ്ജം ഉപയോഗിക്കുന്ന രാജ്യങ്ങളിൽ അതിന്റെ സുരക്ഷയും മേൽ നോട്ടവും കർശനമാക്കുക.
- ന്യൂക്ലിയർ പവർ പ്ലാന്റുകൾ എപ്പോഴും കടലിനു സമീപമായിരിക്കും സ്ഥിതി ചെയ്യുന്നത്. പക്ഷേ വെള്ളപ്പൊക്കവും സുനാമിയും പോലുള്ള ദുരന്തങ്ങളുടെ റിസ്കിനെ അതിജീവിക്കുന്ന തരത്തിലായിരിക്കണം അതിന്റെ നിർമ്മാണം. (ജപ്പാൻ, ഇന്ത്യ, ചൈന, യു.എസ്.എ എന്നിവിടങ്ങളിലാണ് ഭൂകമ്പ സാധ്യതയുള്ള പ്രദേശങ്ങളിലുള്ള പ്ലാന്റുകൾ.
- ന്യൂക്ലിയർ റെഗുലേറ്ററി കമ്മീഷൻ നിർദ്ദേശിച്ചിട്ടുള്ള ആണവ

സുരക്ഷാ സംവിധാനങ്ങളുടെ മൂന്ന് പ്രധാന ലക്ഷ്യങ്ങളാണ്,

- റിയാക്ടർ അടച്ചു പൂട്ടുക
- ഷട്ട്ഡൗൺ അവസ്ഥയിൽ സൂക്ഷിക്കുക.
- അപകടങ്ങളുടെ സമയത്ത് റേഡിയോ ആക്ടീവ് വസ്തുക്കളുടെ വികിരണം തടയുക.

3.11 അണക്കെട്ട് തകർച്ച

ഒഴുകിക്കൊണ്ടിരിക്കുന്ന നദിക്കു കുറുകെ അണകെട്ടി ജലവൈദ്യുത പദ്ധതികൾ നടപ്പിലാക്കാനാണ് അണക്കെട്ട് നിർമ്മിക്കുന്നത്.

അണക്കെട്ട് തകർച്ച വളരെ അപൂർവ്വമായേ ഉണ്ടാകൂ. പക്ഷേ ഉണ്ടാകുമ്പോൾ അമിതമായ നാശനഷ്ടങ്ങളും ജീവഹാനിയുമുണ്ടാക്കി ഒരു ദുരന്തമായി അത് മാറുന്നു.

പ്രധാന കാരണങ്ങൾ

- ഡാമുകളുടെ കാലപ്പഴക്കം

- നിലവാരം കുറഞ്ഞ സാങ്കതിക വിദ്യയും, നിർമ്മാണ വസ്തുക്കളും ഉപയോഗിച്ച് ഡാം പണിയുമ്പോൾ.
- സ്പിൽവേ ഡിസൈനിങ്ങിലുള്ള പിഴവ്.
- അറ്റകുറ്റപ്പണികളുടെ അഭാവം പ്രത്യേകിച്ച് ഔട്ട്ലെറ്റ് പൈപ്പുകളുടെ
- റിസർവോയറിലേക്ക് മലയിടിയുന്നത് ഡാം തകരാൻ കാരണമാവുന്നു.
- ഭൂകമ്പം മൂലവും അണകെട്ടുകൾ തകരാം.

പരിഹാരം

- ഡാം മാനേജർമാർ യഥാസമയം ഡാമിന്റെ അവസ്ഥ നിരീക്ഷിക്കുകയും അപകട സാധ്യതയുള്ള ഏത് സാഹചര്യവും അധികൃതരെ അറിയിക്കുകയും വേണ്ട തയ്യാറെടുപ്പുകൾ നടത്തുകയും ചെയ്യുക.
- കനത്ത മഴയും വെള്ളപ്പൊക്ക സാധ്യതയും ഉണ്ടാകുമ്പോൾ ഡാം തുറക്കേണ്ട സാഹചര്യമുണ്ടെങ്കിൽ മുന്നറിയിപ്പ് കൊടുക്കുക. അതുവഴി വൻദുരന്തം ഒഴിവാക്കാം.
- മാക്സിമം വാട്ടർ ലെവലിൽ അധികമായാൽ സശ്രദ്ധം നിരീക്ഷിക്കുകയും വേണ്ട തയ്യാറെടുപ്പുകൾ നടത്തുകയും ചെയ്യുക.
- ഡാമിന്റെ അറ്റകുറ്റപ്പണി യഥാസമയം നടത്തുക.

3.12 ഖനികളിലെ വെള്ളപ്പൊക്കം

ഖനന പ്രവർത്തനങ്ങൾ വളരെ നീണ്ട കാലയളവ് ആവശ്യമായ പ്രവർത്തിയാണ്. ഖനനപ്രവർത്തനങ്ങൾ തുടരണമെങ്കിൽ ഖനികളിലെ വെള്ളം ഇടയ്ക്കിടെ നീക്കിക്കൊണ്ടിരിക്കണം. ഖനികളിൽ ഡ്രെയിനേജ് സംവിധാനം ഇല്ലാതിരിക്കുമ്പോഴാണ് ഖനികളിൽ വെള്ളപ്പൊക്കമുണ്ടാകാൻ സാധ്യത കൂടുന്നത്.

കാരണങ്ങൾ

- ഖനികൾക്ക് സാമ്പത്തികമായി പ്രാധാന്യം കുറയുമ്പോൾ
- അസംസ്കൃത വസ്തുക്കൾ നശിക്കുമ്പോൾ
- യുദ്ധം, അപകടം, മറ്റു രാഷ്ട്രീയ കാരണങ്ങളാൽ
- ഖനികളുടെ പ്രവർത്തകരുടെ അസ്ഥിരത
- ചില സുരക്ഷാ കാരണങ്ങൾ, എന്നിവ ഖനികളുടെ നാശത്തിനും വെള്ളപ്പൊക്കത്തിനും കാരണമാവുന്നു.

3.13 ഓയിൽ സ്പിൽ (ഇന്ധന ചോർച്ച)

മനുഷ്യന്റെ അശ്രദ്ധയുടെ ഫലമായി ദ്രാവക പെട്രോളിയം ഹൈഡ്രോകാർബൺ പരിസ്ഥിതിയിലേക്ക് പ്രത്യേകിച്ചും സമുദ്ര ആവാസ വ്യവസ്ഥയിലേക്ക് വ്യാപിക്കുന്നതിനെയാണ് ഓയിൽ സ്പിൽ എന്ന് പറയുന്നത്.

ടാങ്കറിൽ നിന്നും ക്രൂഡ് ഓയിൽ ശുദ്ധമാക്കിയ പെട്രോളിയും ഉൽപന്നങ്ങൾ (പെട്രോൾ, ഡീസൽ) എന്നിവ കടലിൽ വ്യാപിക്കുമ്പോഴാണ് പൊതുവെ ഓയിൽ സ്പിൽ ദുരന്തമായി കടൽ ജീവികളെ ബാധിക്കുന്നത്.

ഇത്തരത്തിലുള്ള ഇന്ധന ചോർച്ച കരയിലും ഉണ്ടാകാനിടയുണ്ട്. അവ മഴവെള്ളത്തിലൂടെ ജലാശയങ്ങളിലെത്തുമ്പോഴും ജലജീവികൾക്ക് നാശം സംഭവിക്കുന്നു.

പരിണിത ഫലങ്ങൾ

- ജല ജീവികളുടെ തൂവലുകളിലും രോമങ്ങളിലും എണ്ണ പിടിക്കുകയും അവയ്ക്ക് വെള്ളത്തിൽ പൊങ്ങി നിൽക്കാൻ കഴിയാതെയാവുകയും ചെയ്യുന്നു.
- അത് വഴി ശരീരത്തിന്റെ താപനില നിയന്ത്രിക്കാൻ ബുദ്ധിമുട്ടുണ്ടാവുന്നു. അങ്ങനെ അവ ചത്തൊടുങ്ങാൻ കാരണമാവുന്നു.
- ജല സസ്യങ്ങൾ നശിക്കുന്നു.
- മൽസ്യങ്ങളും ചത്തൊടുങ്ങാൻ കാരണമാവുന്നു.
- ജലത്തിന്റെ ബാഷ്പീകരണത്തെ ബാധിക്കുന്നു.
- സാമ്പത്തികമായും, പരിസ്ഥിതിപരമായും, സാമൂഹ്യമായും നാശനഷ്ടങ്ങൾക്കിടയാകുന്നത് കൊണ്ട് ഇവ വലിയൊരു ദുരന്തമായി മാറുന്നു.

പരിഹാരം

വെള്ളത്തിൽ കലർന്ന എണ്ണ മാറ്റി ശുദ്ധീകരിക്കാൻ കഴിയും പക്ഷെ അതിന് ആഴ്ചകൾ, മാസങ്ങൾ വർഷങ്ങൾ വരെ എടുത്തേക്കാം.

3.14 തീരശോഷണം

കടൽ തീരത്തു നിന്നും തിരമാലയുടെ ഫലമായോ, വേലിയേറ്റത്തിന്റെ ഫലമായോ, കാറ്റിന്റെയോ കൊടുങ്കാറ്റിന്റെയോ മണലെടുപ്പിന്റെയോ ഫലമായി തീരം നഷ്ടപ്പെടുന്നതാണ് തീരശോഷണം.

- തീരശോഷണത്തിന്റെ ഫലമായി കടൽ കരയിലേക്ക് കേറി വരുന്നു.
- ഇതിന്റെ ഫലമായി തീരദേശമാലിന്യങ്ങളും പാറകളും മറ്റവശിഷ്ടങ്ങളും കടൽ തീരത്ത് നിക്ഷേപിക്കപ്പെടുന്നു.

പരിഹാരം

- തീരത്ത് പാറക്കല്ലുകൾ ഉപയോഗിച്ച പുലിമുട്ട് നിർമ്മിക്കുക.
- കടൽഭിത്തി കെട്ടുക.
- മണൽ നിറച്ച ചാക്കുപയോഗിച്ച് കടൽഭിത്തിയുണ്ടാക്കുക.
- കടൽ തീരത്തു നിന്നും താമസം ഒഴിയുക.

3.15 ഭീകരാക്രമണം / യുദ്ധങ്ങൾ

2012 മാർച്ച് 18 ലെ ഒരു പത്രവാർത്ത

ന്യൂഡൽഹി: കഴിഞ്ഞ വർഷം സൈന്യത്തിനു നേരെ 15 ഭീകരാക്രമണങ്ങൾ നടന്നു. 68 സൈനികൾ വീരമൃത്യു വരിച്ചു. ജമ്മുകാശ്മീർ അതിർത്തിയിൽ 2018ൽ പാക്കിസ്ഥാൻ 449 തവണ വെടി നിർത്തൽ കരാർ ലംഘിച്ചു. 2014 ൽ പത്തും 2015ൽ പതിനൊന്നും ഭീകരാക്രമണമുണ്ടായി.

ഇന്ത്യയിൽ നടന്ന ഭീകരാക്രമണങ്ങൾ

1998 ലെ കൊയമ്പത്തൂർ ബോംബ് സ്ഫോടനം
2001 ലെ ഇന്ത്യൻ പാർലമെന്റ് ആക്രമണം
2005 ഡൽഹി ബോംബ് സ്ഫോടന പരമ്പര
2006 ലെ കോഴിക്കോട് ഇരട്ട സ്ഫോടനങ്ങൾ
2007 അജ്മീർ ദർഗാ സ്ഫോടനം
2008 നവംബറിലെ മുംബൈ ഭീകരാക്രമണ പരമ്പര
2009 മഡ്ഗാവ് സ്ഫോടനം
2010 പൂനെ ബോംബ് സ്ഫോടനം
2013 ഹൈദരാബാദ് ബോംബ് സ്ഫോടനം
2013 മുംബൈ ബോംബ് സ്ഫോടനം

പരിഹാരം

- രാജ്യങ്ങൾ തമ്മിൽ ശക്തമായ നയതന്ത്ര ഇടപെടൽ രൂപീകരിക്കുക.
- വിദ്യാഭ്യാസത്തിലൂടെ സ്വഭാവ രൂപീകരണം സാധ്യമാക്കുക.

ഉപസംഹാരം

ദുരന്തങ്ങളെക്കുറിച്ചും അവ എങ്ങനെ നേരിടാമെന്നുമുള്ള ഒരു പൊതുബോധമാണ് ഇതുവരെ നൽകിയത്. ദുരന്തങ്ങൾ കൂടിവരുന്ന ഈ കാലഘട്ടത്തിൽ അവയെക്കുറിച്ചുള്ള അറിവ് വളരെ പ്രധാനമാണ്. ഈയവസരത്തിൽ ദുരന്തം സംഭവിച്ചവർക്ക് അവരുടെ പൂർവ്വ അവസ്ഥയിലേക്ക് തിരിച്ചു വരാൻ സഹായം നൽകുക എന്നുള്ളത് ഒരു സാമൂഹിക പ്രതിബദ്ധതയാണ്. സമൂഹത്തിന്റെ വിവിധ തലങ്ങളിലുള്ള വ്യക്തികൾ ഇതിനു മുൻകൈ എടുക്കേണ്ടതുണ്ട്. ഭാവിതലമുറ എന്ന നിലയ്ക്ക് വിദ്യാർത്ഥികളെക്കൂടി ഇതിന് സജ്ജമാക്കുക എന്നുള്ളത് ഇന്ന് വളരെ അത്യാവശ്യമാണ്.

ദുരന്തം ബാധിച്ചവർക്ക് പ്രാഥമികമായി വീട്, വസ്ത്രം, ഭക്ഷണം, വൈദ്യസഹായം എന്നിവ നൽകുക, മാനസികമായി ശക്തരാകുവാൻ കൗൺസിലിംഗ് നൽകുക, ഗവൺമെന്റ് ധനസഹായം നൽകുക, അത് കിട്ടേണ്ടവർക്ക് എത്തിച്ചു കൊടുക്കുക, എന്നിവയെല്ലാം ദുരന്തബാധിതർക്ക് അവരുടെ സാധാരണ ജീവിതത്തിലേക്കുള്ള തിരിച്ചു പോക്കിന് സഹായിക്കും.

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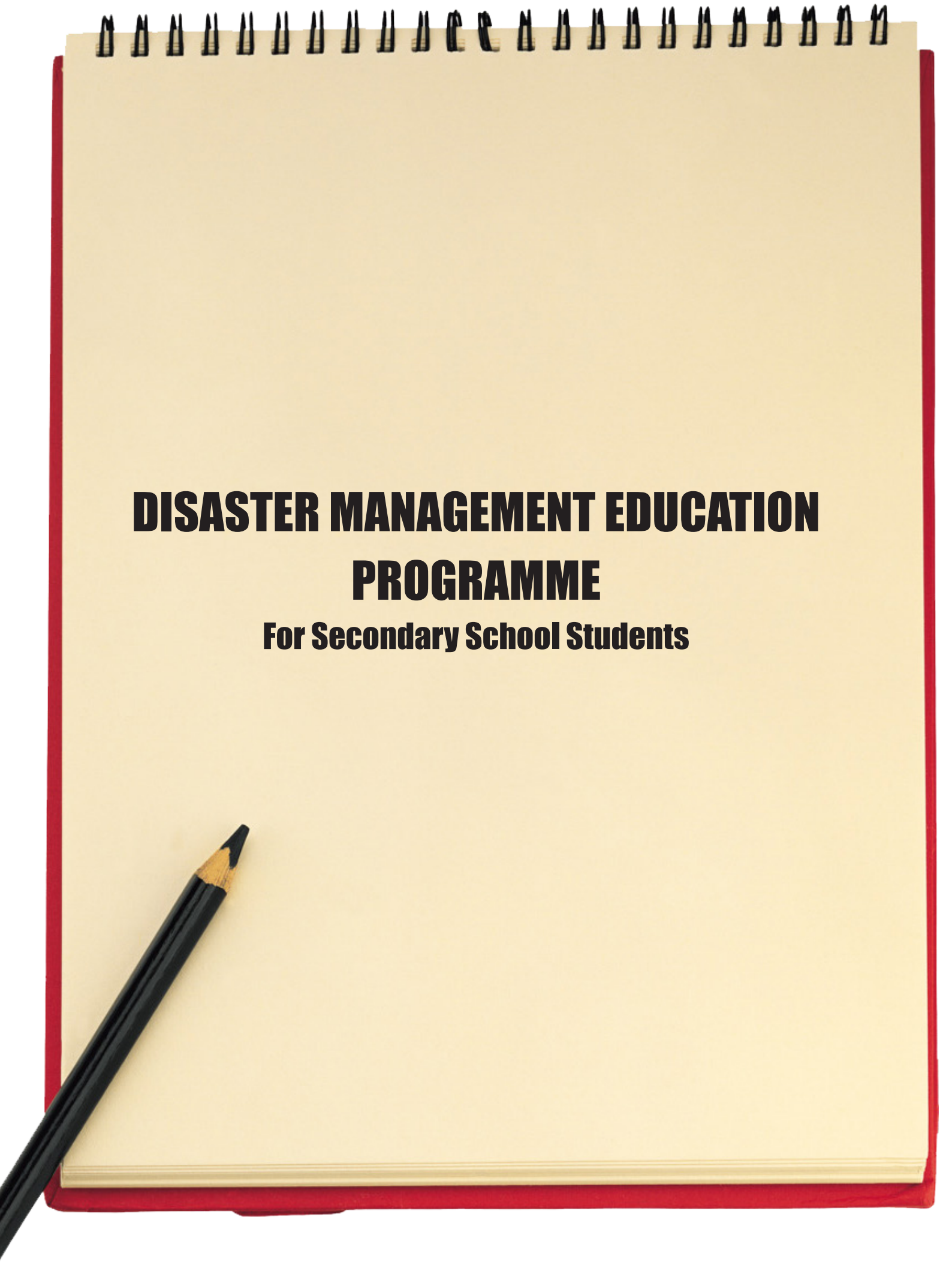
Nipah viru

DISASTER MANAGEMENT EDUCATION PROGRAMME

For Secondary School Students



DISASTER MANAGEMENT EDUCATION PROGRAMME

For Secondary School Students

INTRODUCTION

This is a programme to enhance awareness on disasters and its management among secondary school students. You may know that knowledge in disaster management is an urgent need of the hour. This programme gives awareness on a general understanding of disasters, different types of natural and man made disasters and the management of each disaster. Thus, this programme is divided into three units, in which the first unit is with a general understanding of disasters, the second unit is with natural disasters and its management. And the third unit includes man made disasters and its management. The programme ends with a conclusion. The complete progamme is made simple for students of secondary level to understand it very easily.

OBJECTIVES

The secondary school students will be able to:

- Become aware of basic concepts of disaster management.
- Have knowledge about types of disasters.
- Familiarize the cycle of of disaster management.
- Become aware of disasters and its management.

CONTENTS

1

DISASTER MANAGEMENT BASIC CONCEPTS

There is an interrelationship between nature and its living organisms. Nature always keeps balancing to maintain this relationship. When there is a change or lose in the natural equilibrium, the survival of living things can be a threat.

The excessive exploitation of natural resources by human beings causes losing of the natural equilibrium. In the era of urbanization, industrialization and population explosion, man's excessive overriding in nature led to various disasters.

1.1. DISASTERS - CHARACTERISTICS

Disasters are the most unexpected and difficult events.

Any condition that happens faster of any natural or non-natural condition that results in the destruction of life and damage to the property can be called a disaster.

Eg: Earthquake, Flood, Fire, Tsunami, Food poisoning etc.

The Nature of Disasters

- Unpredictable
- Non -comparable
- Speed
- It's fast
- Uncertainty
- Threat

1.2. CLASSIFICATION OF DISASTERS

Disasters can be classified mainly into two

1. Natural disasters

2. Man-made disasters

Natural Disasters

Unexpectedly caused imbalances in nature are called Natural disasters. E.g. Earthquake

Manmade Disasters

Manmade disasters are caused by man's negligence and exploitation of natural resources unnecessarily.

E.g. Fire

Disasters can be classified based on origin

1. Occurring for geographical reasons. (Geographical related)
    - Earthquake
    - Tsunami
    - Volcanic eruption
    - Landslide / Mud flow
2. Occurrences for Climate Change (Climate related)
    - Torrential rain
    - Cyclones
    - Drought
    - Lightning
    - Heat wave

- Cold wave

3. Water-based causes (water born)
   - Land slides
   - Flooding
   - Dams failure
4. Chemical disasters / Industrial disasters
   - Poisonous gas leak
   - Chemical waste contaminates freshwater sources
   - Nuclear leak
   - Application of Chemical weapons
5. Organic disasters
   - Infectious diseases
   - Biomaterials are applied
6. Caused by Technological reasons (Technical related)
   - Accidents (Road, Rail, Water & Air)
   - Collapses of buildings and bridges
   - Fire
7. Because of man's interventions (Manmade)
   - Chemical disasters
   - Biological disasters
   - Vehicle disasters
   - Food poisoning
   - Fire
   - Stampede (war, riots) etc.

1.3. DISASTER MANAGEMENT – PHASES

We exploit natural resources for industrial purposes and for agriculture and other development needs. Outcomes sometimes lead to natural disasters and man-made disasters. We have to take steps to prevent and face such situations through Disaster Management.

Disaster Management

Disaster Management is a group of activities designed to simplify the effects of a natural or man-made disaster. The purpose of Disaster Management is to avoid the occurrence of disaster, take measures to deal with the tragedy, rehabilitation after the disaster and rehabilitate the survivors etc.

Disaster Management Phases

Disasters - natural or man made - may sometimes be impossible to prevent it may be natural or human made. But it can be minimized by disaster mitigation activities. We can thus reduce the effects of disasters and protect the victims and rehabilitate them.

The Disaster Management Phases can be classified into three Phases

1. Phase before the disaster (Pre-Disaster)
2. Phase during the disaster (During Disaster)
3. Phase after disaster (Post-Disaster)

Phase before the Disaster

- Understanding the possibility of risk - Evaluating
- Reduces Vulnerabilities and Prepares
- Taking Legislative approach

- Provide Awareness
- Budgeting
- Mock Drill

Phase during Disaster

- A quick rescue work
- Listen to warning
- Resettle people away
- Provide medical assistance
- Prepare Relief Camps

Phase after Disaster

- Rehabilitation
- Renovation
- Medical help
- Counselling

Terms related to Disaster Management

Hazard: Hazard is the way to the Disaster. The threat of life or property
Eg: pollution and deforestation

Vulnerability: The purpose of this is to indicate just how close an area or people towards a hazard of any kind.
E.g. coastal residing people

Risk (possibility of accident):

The Risk means expected loss due to a hazard within the stipulated time. Pollution, deforestation, and accidents may be a threat to human life. These are the factors that influence the risk.

- The nature of hazard
- Vulnerability
- The financial value of the item involved

Accidents:

Accidents are the dislike events happen accidentally. Accidental damage may or may not occur.

1.4. DISASTER MANAGEMENT CYCLE

Disaster Management cycle is a model that present cyclically the processes of disaster management in various phases. This includes three steps of the disaster Management Cycle.

The first stage includes mitigation and preparation. Response in the second stage, recovery is the third stage.

1.Mitigation

This phase analyses the Accidental possibilities with the aim of reducing the consequences of the disaster. For example, undertakes construction codes, zoning and awareness activities.

2. Preparedness

In this phase, planning on how to respond if a disaster occurs. For

example, the plans are being prepared, Training in emergency activities, establishment of warning systems. Preparation of Emergency Kit.

3. Response

Response means attempts to reduce the risk of a tragedy in this phase. For example, search, rescue activities, and emergency assistance.

4. Recovery

At this stage brings back the victims of disaster to their normal lives. E.g. Preparing temporary housing, financial support, counselling, and medical assistance.

Goals of Disaster Management

1. Reduce or eliminate loss caused by a disaster
2. Ensure assistance to the disaster victims
3. Receive a sound and effective recovery

1.5. DISASTER MANAGEMENT ACT 2005

This law came into force on December 23, 2005. The RajyaSabha passed the Act on 28 November 2005 and the LokSabha on 12 December 2005. On January 9, 2006, the President signed this law. It has 11 chapters and 79 categories. This law is applicable all over India. This Act prescribes disasters and all related issues and their effective reluctance.

1.6.DISASTER MANAGEMENT SYSTEMS AT GOVERNMENT LEVEL

1. National Disaster Management Authority-NDMA

National Disaster Management Authority was established in 2005. The **Prime Minister** is the Chairman of the National Disaster Management Authority.

The State Disaster Management Authority functions in each Indian States under the National Disaster Management Authority.

2. State Emergency Operation Centre- SEOC

The **Chief Minister** is the Chairman of the State Disaster Management Authority.

Disaster relief guidelines for each of the districts are provided by the State Emergency Operation Center.

The District Emergency Operation Center operates in all the districts under the State Disaster Management Authority.

3. District Emergency Operation Centre / District Disaster Management Authority (DDMA)

District Emergency Operation Centre is to provide guidelines for disaster management activities in each region.

At district level, disaster relief measures are collected and regulated by **District Collector**.

Village officer is the initiator of further action related to disaster relief in each area.

4. Central Government

All departments of the Ministry of Central Government are involved in disaster management activities (Eg Ministries such as Agriculture, Atomic Energy, Civil Aviation, Earth Science, Environment, Forests, Home, Health,

Mining, Railways, Space, Water Resources, etc.)

The management of disasters deals with each category. The central government allocates funds for all kinds of disasters and adequate preparations and ensures that they respond effectively to all disasters.

5. State Governments

The primary responsibility for disaster prevention is vested in the state government. Disaster Management Establishments at Central, State and District level will be effective. Disaster management law asks the Central Government to allocate funds for preventing disasters, implementation of development projects and setting up warning systems.

OTHER IMPORTANT INSTITUTIONS

6. Armed Forces

When it is difficult to respond to the disaster situation, the government will ask for the help of the Armed Forces. In the immediate context, the armed forces played a historic role in many adverse conditions. These include communication, search, rescue, health promotion, transportation and air lifting (Heli - lifting).

When the neighbouring country faces such a crisis, the country will get their help. Armed personnel training is provided to the victims of helpline, rescue from high places and Para troop training. The NEC also includes the chief of Integrated Defence Staff Chairman. Chief of Staff Committee. Similarly, local representatives of the state and district level armed forces play a major role in the executive committees.

7. Central Para Military Forces

Armed Forces, Central paramilitary forces play an important role in triggering immediate response to disasters. In addition to the NDRF's contribution, they develop enough residual capacity in their own armed forces

and respond to the tragedies in areas where they are posted. The CPMF's representatives are invited by the State Executive Committee.

8. State Police Forces and Fire and Rescue Services

The State Police Force and the Fire and rescue personals provide immediate response to disasters. Provide training to police force and Fire and rescue personals and improve multi hazard rescue capabilities.

9. Civil Defence and Home Guards

Civil Defence and Home Guards play a major role in disaster management activities. They are deployed for community gathering and general awareness. They also promote voluntary reporting systems in any disaster situation.

10. State Disaster Response Forces-SDRF

The States encourage to develop their ability to respond from their existing resources. The goal of each process is to try to ensure a battalion equivalent army. They include female members to consider the demands of women and children. NDRF battalions and their training institutions will help the state battalion in this initiative. Regional Police Training Colleges and Basic Training Courses are also conducted for Gazetted, Non Gazetted Officers.

11. Role of National Cadet Corps (NCC), National Service Scheme (NSS) and Nehru Yuva Kendra Sangatan (NYKS)

Supports all youth organizations and social enterprises.Includes social programs for disaster relief.

After the 2004 tsunami, world countries have brought together a coordinated logistical solution to the disaster reduction in Kobe of Japan, which is to say that the Hyogo Frame Work for Action 2005 (HFA) trigger intervention

and disaster.

October 13

International Day for Disaster Reduction

Controll Room Numbers - District Wise

District	Phone Number
Thiruvananthapuram	0471-2730045
Kollam	0474-2794002
Pathanamthitta	0468-2222515
Alappuzha	0477-2238630
Kottayam	0481-2304800
Idukki	0486-2233111
Ernakulam	0484-2423513
Thrissur	0487-2362424
Palakkad	0491-2505309
Malappuram	0483-2736320
Kozhikode	0495-2371002
Wayanad	0493-6204151
Kannur	0497-2713266
Kasaragode	0499-4257700

2

NATURAL DISASTERS DISASTER MANAGEMENT

Changes in nature, which causing significant damage to humans, other living things and their surroundings are known as natural disasters.

2.1. EARTHQUAKE

On January 26, 2001, during the Republic Day celebrations of our country, the eastern state of India, the Gujarat, collapsed by earthquake. In this tragedy, about 20,000 lives were lost. Kutch district has witnessed an earthquake of 7.7 on the Richter scale in Gujarat.

Definition

An earthquake is a shaking of the ground caused by movement of the earth's crust.

Study on earthquakes is called Seismology.

A Richter scale is used to measure earthquake intensity (The Moment Magnitude Scale-MMS). Earthquake possibilities can be identified by geological studies and satellite studies.

Consequences of the earthquake

- Buildings and bridges collapse in earthquake.
- Dams Failure
- Cracks in the floor
- The liquidation of the soil occurs
- Leakage of chemicals from factories
- Nuclear radiation from nuclear plants
- Fire is caused by electric short circuit
- Cause Tsunamis and Land slides

Disaster Management

Precautions

- Train and prepare the Disaster Relief Committees
- Repair the damaged electric tools and pipes
- Understand the security positions in the home and office and make a plan on what to do.
- Train your family, including your children, how to switches off electricity and cooking gas.
- Remember or write down and save essential phone numbers
- Maintain essentials to keep life in an emergency, medicines, food and water in an Emergency kit
- Keep the phone numbers of emergency services like Police, Fire Services, Doctors, Electricity Offices and Voluntary Organizations

We have to do it during the earthquake

- Do not panic, keep up the rest

- Run out of the home only if it is safe out side
- Bent under a strong table or desk cover head with one hand and hold the table with the other hand. So, you can get rid of an extent from a direct impact.
- If there is no strong table or a desk, bent under the corner of the room to hide it with your hand
- Get away from the falling objects, from the bottom of the window
- If you sit on the bed, keep a thick pillow over the head
- If you are outside, stay away from the possibility of falling objects
- Do not use staircase or lift during earthquakes if you are in a multi-storey building
- Think about it when making a decision and do not run away
- If within the running car, stop the car and get out
- If you are trapped inside the ruins of the building, turn on electric switch only when you are sure that there is no gas or electric leakage.
- Use lantern and torch light using battery
- Use the Land phone after making sure that there is no electricity leakage

When we are in the earthquake rescue, we have to do

- Change the serious injured persons to the hospital
- Turn off the power outlet if you have an electrical leak
- If necessary, provide CPR

The other reasons for causing the death in an earthquake

- Building collapse
- Epidemic
- Landslide

After the earthquake

- Be careful as there are subsequent movements after the earthquake
- Change the serious injured persons to the hospital
- Change the persons who have lost consciousness to the hospital by protecting their neck and backbone
- Hide the mouth and nose with the cloth
- Wear thick shoes during exit
- Immediately remove fire- burning material
- Turn off main switch if suspected of electric leakage
- Look at whether the drainage pipe has been damaged and then use only the flush
- Use the land phone only after making sure you do not have electricity leak
- Stay away from the broken electric cords
- Remember that bridges and roads are likely to be damaged
- Notice the possibility of tsunami waves in the coastal areas

2.2. FLOOD

In July and August, 2018, most of the districts in Kerala flooded and landslides occurred in mountainous areas with heavy rains. *Atheeva Jagrata* (Red Alert) has also been announced in fourteen districts. During the south west monsoon, heavy rains were reported and the water level in the dam was exacerbated due to increase in floods. 35 shutters have been opened in 54 dams. The rivers overflowed. Road, rail, and air traffic networks were adversely affected. In 2018, is the largest flooding since the flood of 1924. 483 people were killed and 14 others missing in torrential rain and landslides. 140 people have been hospitalized. On August 21st, 2018, from 3, 91,494 lakh households, 14, 50,707 people reached relief camps.

Definition

The flood is the condition of an entire area being in water. Rain, cyclones, tsunami, and clouds burst can be the cause of flood. The main reason is the rapid urbanization and the actions of the man to disrupt the natural flow of rivers. Flood is one of the worst natural disasters in Kerala.

Consequences of Flood

- It is a threat to life and the existence of humans and other creatures.
- The house and property are destroyed
- Damage to farms, crops and cattle
- Hospitals, school, roads, telephone, electricity, and railways will be destroyed
- Water sources are polluted
- Causing communicable diseases
- Causing water borne diseases
- Those that lose everything in the flood have mental stress

Disaster Management

Before the Flood

- Family members need to know the different ways to go to a safe place
- Residents of flood prone areas can build strong walls using cement and brick
- Raise oven and water heater
- Prepare an Emergency Kit to use in emergency situations
- Whenever a flood is set, decide what items are needed to be taken away from home

During the flood

- Do not panic; be aware of the warning in radio and TV
- change pet animal in to a safe location
- Woollen clothes, essential medications, expensive items, and valuable documents wrapped them in plastic cover
- Act according to the instructions of the rescue workers
- Drink only boiled and cooled water
- Use black tea, 'Rice Soup' water and tender coconut water
- Cover food and avoid excessive food
- If you have diarrhoea, buy O R S powder from a nearby health center
- Report to local volunteers when you are going to a safe place
- Raise up expensive house hold appliances and other items to a higher place
- Cut off the power supply to the house
- Put a sandy sack on the toilet, bathroom and drainage. This is because to avoid the outward dirt is entering inside
- If you were get hints of flood will become dangerous conditions, quickly

takes a safe shelter and locked door

- Do not get in to water logged and water shed areas. You can screw up about six inches of water
- Select the unplugged area when walking through the water. Take a rod in hand to rescue from creeping animals in water
- Avoid driving in floods
- If you have a quick flood, stop the vehicle and move to a safe place
- Follow the instructions given by radio and TV
- Do not allow children to play within flooded water
- Move from buildings surrounded by water
- Collect rain water and use it
- Do not use the tap water directly

Items in an Emergency Kit

- Radio
- Torch and batteries
- Fresh water
- Food items like biscuits and bread.
- Sugar and salt
- Kerosene
- Candle
- Expensive items
- Valid records
- Plastic bags to store essential clothing and umbrella.
- Bamboo sticks, for saving from snakes (first aid tools, drugs)
- Keep the required water, food and clothes.

After the flood

- Clean the house and surroundings using the bleaching powder
- Use electrical equipment only after their risk is avoided
- Avoid wet cereals and other dietary supplements
- Do not play in flooded water
- Make sure that the reptiles does not enter in to home when cleaning the house
- Apply the bleaching powder after cleaning the well
- Follow the instructions given through TV and radio
- Successfully clean the houses according to the recommendations of health workers
- Carefull about the occurrence of epidemics

2.3. DROUGHT

Kerala, which has the largest and most water-rich south Indian state, also suffers from drought, reduced soil moisture content. This causes the water in the wells to fall. Kerala is home to the dreadful drought of its own, with 44 rivers, 29 lakes, spacious fields and an average of 3,000 millimetre rain falls. The rivers and the lakes dried. Many water sources are contaminated. Loss of Agricultural land.

According to the Indian Meteorological Department, drought declining to 26% less than the long-term average rainfall and 20% to 30%, moderate drought and 50% more drought.

The drought in Kerala is due to the loss of south west monsoon. About 17,128 hectares are facing drought in Kerala. Paddy cultivation, vegetable crops and plantation crops are also under threat.

Definition

Significant decrease in rainfall reduces the surface water availability. This phenomenon is called drought.

Consequences of Drought

- Causing trees and other plants to perish
- Large scale agriculture becomes vulnerable
- Cattle and other biomass destroy without getting water. Fish rearing is also face the problem
- Water sources dried up
- Deterioration of forest and wildlife
- Drought hurts farmers. Without water the crops are destroyed
- Drought prone to low yield
- Water quality due to drought results in relatively low quality and can cause water borne diseases and infectious diseases.
- Fresh water (drinking water) availability is reduced

Disaster Management

Precautions for Defending the Drought

- Block the soil and sand mining in the river
- Ensure proper irrigation of crops without losing water
- Purify water sources by removing pollutants from it.
- Reduce availability of water sources
- Protect water pools
- Establish a rainwater harvesting reservoir. Purify rain water and use it
- Take rain water pits around the house and turn the flowing rain water in to it.
- Visit the nearest health centre to understand the drought borne diseases
- Plant drought resistant plants, and adopt farming practices

When facing Drought

- Ensure that the pipe in the house, valve and joints are not leaking
- Use the required water in the bathroom instead of using shower
- collect water in the cup without opening the pipes directly in the wash basin

- Use water management only in flush tanks
- Do not lose water when using soap and shampoo
- Large bottles of water are kept in flush tanks and prevent the flow of excess water
- Use only limited amount of water for washing in machines
- When washing the utensils and clothing, do not open tap and leave
- Reduce the use of soap powder. This will reduce the excessive amount of water
- Wash fruits and vegetables in water taken in a utensil
- Establish system of automatic pipe closing after use
- Clean the house and the vehicle by using wet cloth and wipe it off.
- Do not carry out fertilizers and pesticides during summer season. This leads to more spraying of water. Water the plants in the early morning or late evening. This reduces water loss

After Drought

- Check out the leak of water when fill the tank with the motor
- Rain water from the terraces collected in the tank, used after purification
- Water can be collected in the use less wells by clearing the waste water
- The rainwater from the terrace can be collected, purified and stored in wells
- It may be reduced by keeping the water in the soil without irrigation. This will prevent the wells being drained during the summer

2.4 TSUNAMI

The Magnificent Indian Ocean Tsunami in 2004 was the Mega thrust earthquake in the ocean near the western coast of Sumatra, Indonesia. On December 26, 2004, more than three lakh people were killed in 14 countries in South Asia. About 10,000 people have died in India. The residents of the coastal area mainly suffered the disasters. Indonesia, India, Thailand and Sri Lanka have been damaged by the tsunami. In Kerala, 168 people lost their lives and about 25 lakh coastal residents were affected by the tsunami. Kollam district recorded the highest loss in the Kerala state. There were 131 deaths.

Definition

The tsunami is a phenomenon where ocean waves can be wiped out from the ocean as a result of earthquake and volcanic eruptions under the ocean.

The consequences of the tsunami

- Loss of Life
- The destruction of material objects
- Coastal erosion

Disaster Management

Precaution

- Take life jacket, air-tight tube as you go to beach
- Find ways to escape suddenly from the coast if there is a tsunami
- Go away from the coast if there are any changes in the ocean currents
- Understand Tsunami Warning and get ready to leave the shore soon

When the tsunami arrives

- Do not stay on the shore to see the tsunami
- Listen and follow legal information
- Do not go to the tsunami affected coast until there is an announcement
- Do not stand in buildings or bridges on coastal areas
- In times of difficulty to find shelter in high hills or mountains, take a shelter in safe buildings that are well protected from
- Be careful as the electrical line are likely to break
- Act according to the recommendations of the rescue workers

After the tsunami

- Be calm
- Help the victims
- make the injured animals safe
- Listen to the instructions given on radio and television
- Plant mangrove Plants in the coastal areas
- Ensure that the tsunami warning system is on our coast
- Counselling for the survivors of tsunami floods and those who lost relatives.
- Give first aid to the victims

The tsunami is likely to be the highest in the Pacific
The World Tsunami Awareness Day is November 5

- Check the strength of the wall, staircase, windows, and door when returning home. The damaged things to be repair.
- Check whether any reptile animals have enter in to home through the flowed water

2.5. LAND SLIDES

The water that is stored on the ground in heavy rain is extinguished by pressure. Usually it happened in the hilly regions of Kerala. Wayanad, Kannur, Kozhikode, Palakkad and Malappuram these are the areas where the threat of land slide is existed and the major threat is in the Idukki district.

Landslides may be predetermined with the help of Rain Fold Threshold Analytics.

If there is a continuous rainfall, the outbreak of land slide can occur. Landslides is predicted based on the estimates of millimetres of rain fall is caused the land slide.

Definition

Land slide is the phenomenon where the soil in the inclined regions is diluted as a result of intense rainfall and pulling down due to gravity.

Water catch up with the soil strongly flows with the soil. With the decrease in rainfall, this flow will continue and some turn into a permanent water ways.

The main reason of land slide is the gravity, earthquake, volcanic eruption, as a result of a change in the groundwater, unscientific and irregular building construction on the top of the hill, the soils removed by destroying the hill and mountains, agriculture cause penetration of the soil in the inclined areas, waiting for the soil penetrating, construction of building in the slops and deforestation etc are the main reasons.

Consequences

- It causes death of humans, cattle, and other animals. All are buried in the soil that flows due to land slide
- Strong flow of soil, mud, and other debris can cause houses, buildings, and other property to collapse.
- Soil, mud, plants and other trees. Infrastructure, bridge, road, rail transport, electricity and telecommunication infrastructure are destroyed

- Flooding waste destroys water sources. Pollution of ponds and lakes causes freshwater pipelines to disrupt
- Damage to farmland occurs
- Causing the cultural heritage of the country to perish
- Take the lives of our loved ones

Disaster Management

Precautions of land slides

- See nature's protection as your own responsibility
- Avoid breeding practices that make the soil moist and flows down from the hills.
- Planting on the hill slopes as on the ridges
- Do not interrupt the natural water ways
- Prevent the building construction on hill slopes
- Cut down the mountains and throw down the soil
- Prevent the construction of the building on the hill above the abstract
- Take care when the rain fall on the mountain or the occurrence of the land slide

At the time of Land slide

- Be careful when wooden or unusual sounds are played
- Switch back to a safe location if there is a danger
- Identify the possibility of land slide of the spot without having to take things out
- When saving, always move to a higher elevation, not uphill or downhill
- If you feel that you are not able to escape from the scene, be as cool as a ball that does not get injured in the head.

After the Land slide

- Be careful as it is likely to be in the area of Land slide again
- Do not get into a broken building
- Do not go towards the flush that flowed through the water
- Work according to rescue workers and authorities
- do no destroy nature
- Help those who have survived the disaster and give counseling
- Pull water through natural water ways
- Prevent the water from penetrating in to the ground in potentially destructive areas
- Use the Earth to be scientifically and safely
- Plant and growtrees

2.6 LIGHTNING

Study shows that the massive loss of life and property occurred due to lightning are in a state in India is Kerala. Lightning disaster in Kerala are on the rise. According to the study, Kollam district has the highest in lightning and the lowest is in Trissur district. A natural disaster that creates the most injuries in Kerala is lightning. A study conducted by the Department of Earth Sciences in Thiruvananthapuram on the basis of estimates from 1986 shows that about seven lakh people die annually or injured because of the lightning.

Definition

Lightning is a bright power discharged or electric discharge from the clouds to the Earth's surface along with thunder and thunderstorm

The reasons why the lightning is dangerous

- Lightning discharges generate millions of voltage electrical discharges and 30,000 degrees hotter in one tenth of the second
- The main reason for the lightning is the largest Cumulo Nimbus clouds. They develop in the morning, with the hard rays of the sun's rays. Because of these clouds as thermal conductors the lightning occur in Kerala

Consequences

- A sudden death
- Electric shock and burning
- The electrical wiring of the home is destroyed
- Large trees fall under the thunderstorm.

Disaster Management

Lightning - precaution

- Stay away from metal objects
- Being away from the water due to risks in water bodies
- Pay attention while switched on the electricity. There is a possibility of

electric shock

- Generate electricity lines by lightning protection guards

Lightning protection methods

Lightning conductor is used to avoid lightning in buildings that store potential objects. (This can prevent lightning from occurring)

Earthing houses provide protection against electricity

Ring conductor protects trees from lightning

Lightning arrester protects electric objects from electric power at the time of lightning.

Safe places to stay when lightning occurs

- A person is safe in parts of partially or fully metal spheres that do not allow the lightning to penetrate in to inside

  For example, buildings with steel frames (within the car)
- The roof and the wall are covered with metal sheets and the joints are safe in the building connected to the cable network to ensure the floor space.
- Sit inside buildings that are large and small
- The wall may not have touched the hollow parts of the hills, which are inside the caves

Places to be avoided when Lightning occurs

- Stand out from the vicinity, as the tallest objects are very intense in lightning
- Stay away from metal products as it is possible to lightning
- Do not stand in the open field, on the hill top, and near the isolated trees
- Do not stand under the big trees
- Do not stay in safe shielded buildings, towers, huts and open spaces
- Do not stay behind the power lines and metal structures
- Do not stand near the hoist and stable metal pipes
- Lakes, swimming ponds, and open water bodies are likely to be affected by lightning
- Do not stand near the metallic vehicles and drive tracks

When the lightning falls

- Disconnect electricity connection
- Do not use phone, shower, or wash tap
- Wrap your hands and hands around the knees, kneel pads and stab them to the ground
- Hold both hands on ears, there is a possibility of losing power in hearing due to lightning

After Lightning

- Give the person who is lying in an unconscious state immediately afterwards and give him the Artificial Respiration (CPR)
- bring him in to the hospital as soon as possible
- wrap the burning part with a dry piece of cloth and immediately get in to the hospital as quickly as possible
- Do not take off the clothes on the burnout part
- Avoid metal compounds to light the lights
- Avoid metal rod and metal wires for hanging dresses

2.7 CYCLONE

On November 30, 2017, a severe cyclonic storm hit Thiruvananthapuram, Kollam, Idukki and Pathanamthitta districts. Okhi is the name used in the cyclone Bangladesh. This means the eye. This is the name given by weather forcasting experts to identify tropical cyclones. Ohkhi spread in southern Kerala at a speed of 120 kmph.

Okhhi is the Cyclone of the Kanyakumari south and Sri Lanka in the west. Many houses were completely destroyed. About 529 families were transferred to relief camps.

More than 100 fishermen who went to sea have gone missing in cyclone. More than 30 people died. The Coast guard, Air Force, Navy, National Disaster Response Force, Central Government, Government agencies engaged in relief works.

Definition

A Cyclone is a horde of harsh windstorm surrounding a low pressure center causing strong winds and torrential rains. Terrential rain and Storm are the cause of the cyclone.

Consequences of cyclone

- Damage to homes, buildings and property.
- Strong rains cause flooding of streams and rivers.
- Water sources are damaged with debris.
- Electric line and telephone line break down.
- Damage to agriculture and livestock occur.
- Loss of personnel injury.
- Strong winds are going to flee weak roofs. It destroys all of its things.
- People can fall through the flies, and may even death occur

Disaster Management

Before Cyclone

- Prepare an emergency kit
- Cut off the dry branches of trees
- Drop off the possibility of flying away
- Determine the material that is likely to move
- Keep sufficient water and food
- Supply fresh water for three to four days in large containers
- Identify cyclone-prone areas
- Notice the warning on radio and TV
- Note that the construct roof with concrete
- Cut off trees that fall on house

When a Cyclone occurs

- Switch back to a sturdy building with a concrete roof when the cyclone comes

- Be the safest part of the house
- Stay on the bottom of the sturdy table or hold firm on a solid pipe or pillar
- Close all the windows and open a window that is not likely to be at risk to reduce pressure inside the home
- Stay away from the doors and windows
- Cut off home-based electricity connection
- Stay away from electrical and metal equipment

After Cyclone

- Stay within the house until a Cyclone has been officially announced
- Choose the safest way to get out of the room
- Be aware of the falling electricity line, trees and buildings
- Do not visit danger zone by avoiding the warning.
- Seek out the help of experts to restore the electric lines and telephone lines
- Help the losers to get lost in the accident and subject the needy to the council

2.8 HAIL STORM

In India, the Hail will appear with summer rain. Heavy snow drifts are poured out. This may cause homes and vehicles to crash.

Definition

Hailstorm is a phenomenon that blows snow patterns on Earth

The Reasons

- Strong thunderstorm rain and strong winds
- Rain drops into the atmosphere at strong winds and lays frost on the ground as frosts
- The Cumulo Nimbus clouds collide and become super cells. These super cells merge with storms, heavy rains and lightning and fallen as hails

Consequences

Huge damage to vehicles, cattle, crimson, lamps, air craft, and crops

Solution

- Build roofs firmly
- Park the vehicles below the sure roof
- Cattle sheds are made up of strong materials and tied the animals inside during the Hail storm

2.9 HEAT WAVE AND COLD WAVE

The Heat Wave

Kerala faced with Heat wave in 2016. Sun burns were reported from the different parts across Kerala

Definition

The weather is unpleasant with warm and humid climate. It may last a whole day or weeks.

The reason

The hot weather occurs when the high pressure fuels the heat on the earth's surface

Consequences

- Excessive heat causing physical problems
- Cause sunburn
- High heat cause mental stress
- Due to the mental stress, the clash of individuals increases because the heat intensity increases mental stress there by increases Crimes
- Excess heat affects the crops

Let's face How

- Drink lots of water

- Wear lighter and light coloured cotton clothes
- Sufficient water carries out if you are traveling
- Kept the cattle and the other animals in the shade. Give plenty of water to drink
- Bath in cold water
- Take care to avoid dehydration
- Wear damp clothes to cool body
- Use the fan and open the doors at night
- Set work hours by eliminating the hottest time

Things to do to the heat wave affected person

- Lie on the cold ground
- Wipe your body with moisture
- Wash your body regularly and keep your body normal
- If the dehydration occurs, give O.R.S solution. Provide Rice water, lemon water, and tender coconut water
- Be suspicious of death take him immediately in to the next health centre

Cold Wave

In a news report on January 18, 2012, South India rarely experiences extreme cold weather. The coastal districts of Andhra Pradesh and Telangana have been reported by the wettest. Fifteen people died in this cold and cold climate.

In recent times, it has experienced a lower temperature than lowest temperature ever in 100 years in Karnataka.

Definition

Winters are a rapid fall in temperature within 24 hours. Winter level

ensures that the temperature in which the temperature is reduced

The reasons

- The worsening of temperatures is a quick fall in temperature

Consequences

- Causing death of livestock and wildlife
- Extreme cold affects the smooth existence of man
- Plants are frozen in bad cold. That may be ruined

When cold wave comes

- Wrap your body with wool or wear blankets
- Stay in the house
- Warm the fire
- Eat hot foods
- Wash in warm water
- Lower legs in hot water
- Take the affected person inside of the house and lie down. Do not let him walk

2.10 CLOUD BURST

Experts report that what has happened in Pullurampara, Kozhikode

in August 2012, was a cloud burst. Sudden rains and landslides resulted in huge losses in places like Pullurampara, Anakkaampoyil, Manjuvayl and Mavinchuvadu. Experts say that the clouds have been struck by the free movement of the clouds. This tragedy makes the loss of 200 Crores. Eight people died in Pulluramara and one in Iritty.

Definition

The cloudburst is the strongest rainfall in a short area within a very short time. This phenomenon, which often lasts minutes, leads to large floods and loss of property.

The rain, which starts with winds and thunder, quickly gripes the water and makes that area into the flood. If you get more than one hundred millimetres of rain per hour, you may think that it's a cloud burst

Consequences

- Flash Flood due to sudden rain
- Death and loss of human suffering
- Loss of agriculture and livestock

Disaster Management

Take all Disaster Management actions that we take for the catastrophe of flood.

2.11 SNOW AVALANCHES

News of February 2016

Lance Naik Hanumanthappa Kokattu, who was rescued from Siachen on Saturday, has finally succumbed to his death. He was died at the Army Hospital in New Delhi.

Hanumanthappa was the only survivor in the Siachen among the 10 commandands. During the six days of the winter, the Hanumanathappa was miraculously surprised by lying under the snow. Hanumanthappa died in Delhi at 11.45 pm on February 11 at the Army Hospital in New Delhi.

Definition

Snowfall is a rapidly flowing ice because of the natural causes or human activity in a valley losing the balance of the glacier.

The reason

Ice loads are heavier as a result of gravitational pull down the mountains.

Precaution

- Residents of the valley cannot afford to lose their homes in such places as they are likely to lose life.
- Do not skate there if you notice the possibility of a snowfall
- Build stable in house-to-house areas
- A large amount of snow may have a long distance, and ice hazards may cause damage to life and property in hilly areas.
- Fall in the glacier rarely gets saved. In extreme cold, death is likely to happen

2.12 VOLCANIC ERUPTIONS

It is estimated that approximately 500 volcanoes are still alive on earth. The most dangerous volcanoes are in North America, Manalavo in Hawaii, Parikoottin in Mexico, Cotapaxi in Ecuador, Vesuvius in Italy, Fujiyama in Japan and Mayan of the Philippines.

The volcano in the Andaman and Nicobar Islands is the only volcano in India. On 26 January 2017, scientists viewed this volcano from the sea. Scientists have discovered that there are several volcanoes in the same line.

Definition

The volcanic eruption is an earthquake in which the magnificent Magma is flowing into the Big Bang, either into the liquid, or vapour, or both. Volcano can often be in the shape of high hills and mountains.

The reason

The areas under the turbulent are melt due to high pressure and temperature. Parts of this molten rock are known as magma. Exclamation of magic from the cracks in the surface as a result of high pressure leads to flowing stream

Consequences

- In addition to the volcanic eruptions, gas and solid material are released.
- First comes out of steam, smoke, and gas
- A sudden and long-term disease
- Respiration gases can cause breathing problems and other problems
- Blowing of dead gases causes the death of humans and animals

Preparing

- Secure house and family
- Secure pet and other animals
- Work on the construction of a home, away from a potentially volcanic earthquake

Response

- Consider the immediate information and instructions from a local radio

station

- Follow the instructions given by the relevant authorities
- Close the doors to avoid the volcanic ash get inside the house
- Close the vehicles and other machines in the garage or cover them with a tarpaulin
- do not get out of the house for maximum
- It is possible that volcanic ash must come to the low plain, so get out of there
- Wear the dirt mask to keep your ash at the time of exhaustion, put on the covering of the body, and wear the glass
- Stay away from the restricted areas. In miles you can feel the consequences of this

After the volcanic eruption

- Return the resignation only after the notice of the authorities comes back
- Precise urgent instructions from the radio
- Emergency care should be given to those who are in need primary care before they can arrive.

3.1 POLLUTION

3

MAN-MADE DISASTERS
DISASTER MANAGEMENT

Pollution is considered to be a hazard. The hazard is disastrous condition that leads to the loss of life or property. Delhi has the highest polluted city in the country. This

Pollution is one of the biggest problems of this century. The Kerala State Pollution Control Board's observations report indicates that cities in Kerala, Kochi, Idukki, Kannur, Kozhikode, Thrissur and Palakkad are in danger.

Definition

Pollution is the introduction of contaminants in to the natural environment that cause adverse change. The pollution is of four types.

- Air pollution
- Water pollution
- Soil pollution
- Noise pollution

Air Pollution

Air pollution is caused by the introduction of pollutants in to the atmosphere, smoke from industries, exhaust gases, kitchen waste, smoke, cause air pollution.

The reasons

- Carbon dioxide (CO2)
- Methane (CH4)
- Chlorofluorocarbon (CFC)
- Sulfur Dioxide (SO2)
- Nitrogen's oxides (NO2)
- Carbon monoxide (CO)
- Industrial poisons various kinds of dust, industrial and smoke from vehicles
- Vehicle, construction, waste burning, smoke in industrial plants etc cause pollution.

Consequences

Carbon dioxide and methane are the greenhouse gases that keep them out of the atmosphere. The density of gas in the atmosphere will warm the earth's heat.

Global warming

If the atmospheric carbon dioxide density doubled, the atmospheric temperature rises 3 degrees celsius. Even if it is warmer, it is likely that the total sea level rise in Antarctica and the Arctic Ocean will rise to an average of 5 meters due to melting of ice. A good portion of many cities on the sea shore underwent water cost is heavy loss

Ozone depletion

Ozone is the gas found in very small densities of Earth's atmosphere. In general, low voltage radiation prevents the terrestrial radiation in the sun. Ultraviolet rays can cause diseases such as deadly cancer.

Acid rain

Many of the atmospheric gaseous are acidic. Sulphur dioxide and nitrogen oxides are often mildly acidic. It can also harm the flora and fauna due to this rainstorm

Disaster Management

Precaution

- Plant trees
- Use solar energy, wave energy, wind energy
- Plant trees around industries
- Pay attention to building industrial units away from the area of residence
- Do not burn the plastic
- Banning the use of old vehicles

- Use vehicles running with the help of Battery and Electricity
- Attach Smoke filter in industrial industries

If Air Pollution Occurs

- Avoid traveling out
- Avoid burning waste and plastic
- Completely avoid plastic use
- Wear the mask when exiting
- Reduce use of air conditioners
- Be careful in releasing smoke and dust in to atmosphere
- Reduce the use of motor vehicles
- Stay close to plenty of plants and trees
- Establishment of Bio gas plants to meet domestic hotel purposes

Remedies

- Establish pollution filters in industries houses and smoke chimneys.
- Establish waste generation process (bio filtration) with microscopic bacteria and fungi
- Use types of fuel to reduce air pollution in motor vehicles and other engines
- Use biogas for cooking

Water pollution

It is reported that water poisoning comes into the body as deadly toxins. The suspicion of Arsenic is reported from underground water in West Bengal. This is considered a terrestrial environmental disaster. In North East India, there is a decline in pollution.

Definition

Water pollution is the process of dissolving chemicals such as arsenic, fluoride, nitrate, mercury, cadmium, pesticides, fertilizers, extinguishing water from the oil refineries and other industries. Water pollution causes changes in the quality of water.

The Reasons

- Waste discharges from industries to water bodies
- Population explosion
- Building and construction activities
- Washing vehicles in water bodies, bathing livestock, washing cloths etc.
- Leak of petrol and diesel from vehicles
- Excessive use of fertilizer and pesticide
- Water utilizes for agricultural purposes, household, industrial, recreational, transportation, and personal use.
- Dump waste in to water bodies

Consequences

- Water pollution threatens life of aquatic animals

- The biodiversity aquatic ecosystem ruined
- People who eat fish and other aquatic organism can have a variety of illnesses.
- Hepatitis, cholera and malaria are spread through the waste water
- The destruction of aquatic organism results in the destruction of the food chain

Disaster Management

Precautions

- Do not contaminate water bodies
- Do not throw solid waste into the river
- Do not dumb domestic waste and industrial waste into the river
- Do not wash your cloth in the river and never bath your cattle in the liver
- Reduce the use of chemical fertilizers and chemicals pesticides. Promote organic fertilizers and organic pesticides
- Get away with plastic and buy environment friendly materials
- Carefully avoid oil leakage from vehicles
- Buy reusable goods
- Avoiding the wastes of animals and humans in water bodies
- If you notice any water pollution, inform the authorities
- Do not contaminate water bodies
- Work together to eradicate pollution from water bodies
- Industries and residences must remove waste from water before release it in to water bodies

If water pollution occurs

- Try to remove waste from water bodies along with NGOs

- Take strict action against those who are dumbing waste in to the water bodies
- Repair vehicles and careful about oil leakage
- Ensure that the water emitted from industrial outflows only after treatment for waste management
- Tell the authorities if the water is getting polluted
- Use water in the water bodies only after the waste treatment
- Remove plastic bottles and covers from the rivers

Remedies

- Enhance the awareness of public on water conservation methods
- Know that if waste matter not removed from water bodies and humans and other organisms will be harmed.
- Understand that dumping waste in to water bodies is punishable
- Only purified water should be used for drinking and cooking
- Encourage organic farming

Soil Pollution

The International Year of soil 2015 was observed as the UN General Assembly's call. Soil pollution cannot be eradicated by subsistence and ecosystem, agriculture and fresh water supply. It is important to maintain the soil's quality for man's survival. The work was done in 2015 to maintain the goodness of the soil

Definition

Soil pollution is the inclusion of harmful substance in the soil

The Reasons

Soon after the industrial revolution, the soil began to degrade

- Remnants of chemical pesticides are the main reasons for soil pollution
- The contents of D. D. T and B. H. C are another major soil pollutant
- Excessive use of fertilizers contaminates the soil
- Polluted water is a cause
- Another type of soil pollution is plastic substance contamination

Consequences

- Quality of agricultural crops decreases
- Water sources are polluted
- Adverse effects on biological diversity
- Cause Water pollution

Disaster Management

Precaution

- Do not leave plastic waste in the soil
- Do not use chemical fertilizers and chemical pesticides
- Preform organic farming practices

- Use reusable materials
- Processing industrial waste
- Build a domestic waste processing plant
- Organizing programs, seminars, poster displays, etc for providing awareness

If the soil is contaminated

- Remove plastic waste from the soil
- Strictly punish those who dump waste in the soil
- Do not use chemical fertilizers and chemical pesticides

Remedies

- To minimise or completely avoid the use of chemical fertilizers, chemical pesticides
- Do not burn the plastic
- Remove all of the things that are not subject to organic decay, especially soil degradation.
- Pay attention to purchase of only bio degradable materials
- Reduce the use of packaged materials using plastic cover
- Buy reusable goods

Noise Pollution

According to the World Health Organization's recommendation, sound limits have been fixed. If there is more than 8 hours with more than 85 decibels, it can cause noise pollution. If 85 decibel more than eight hours a day continuously, there may be hearing impairment.

The test can be used to detect hearing impairedness by the audio tests. If the sound exposure up to 140 - 180 degrees lose hearing.

Definition

Sound pollution is an excessive and uncomfortable sound that affects the human and other living things.

The Reasons

- Excessive voices from factories and other industries
- Sounds from vehicles
- Overuse of loud speakers and micro phones
- Use of fire crackers
- Excessive sound from household appliances
- Vehicle hones

Consequences

- If the sound exceeds 150 decibel, ones hearing is damaged
- When there is a low decibel sound, some people may get nausea and vomiting tendencies
- If loud noise at night, you will have illnesses like sleeplessness
- High emotional stress, high blood pressure, insomnia, headache, anger, difficulty talking, and mental retardation

Disaster Management

Precaution

- Control the sound with the silencer in the vehicles that produce loud noise
- Planting many trees around the industrial area
- Make electrical equipment noise free
- Use the headphones to enjoy high-quality music
- Enforce electric hones instead of bulb hones in vehicles
- Fireworks are terminated by law

When the sound is excessive

- Determine the sound limit when using loudspeakers
- Inform the authorities if any program produces excessive noise
- Protect your ears by covering the ear with ear covering materials
- Do not go with babies and pregnant women to see or hear fire crackers or fire works
- Use ear plugs for high sound
- Excessive sounds seems harsh go to a quiet place
- Contact your doctor if you feel uncomfortable and health problems

Remedies

- Control the use of motor vehicles that produce excessive noise
- terminate the use of microphones near by the hospital, school and residential areas according to the law
- Disturbing will be terminated by the law
- Try to keep calm and peace
- In the order issued by the Supreme Court in 2000, it has been decided that religious institutions, public institutions, and individuals should use the loudspeaker as defined in the ecological legislation.

3.2 DEFORESTATION

On the 28th of November 2012, 23rd Conference of the General Assembly of the United Nations passed a day for forest. So it celebrates March 21 as World Forest Day. In 2013, the World Forest Day was first observed in the world. Forests are rich in organic diversities.

UN estimates that about 13 million hectares of deforestation are occurring every year.

Definition

Deforestation is when forests are destroyed by cutting trees and not replanting them. Sometimes deforestation occures when people change land in to farms, cattle rearing, urbanisation.

The reasons

- Trees are used for cutting and building houses
- Cutting of forest for agriculture
- Destruction of forests and urbanization
- Cut down the forests and build roads, vending institutions, homes and resorts

Consequences

- Due to deforestation, climate change occurs
- Global warming, acid rain, and greenhouse effect happens
- Deforestation increase hot weather
- Climate change and decrease in rainfall availability
- Due to rainfall shortages there is a shortage of drinking water
- Deforestation can result in rainfall and landslides in the rainy season

Disaster Management

Precaution

- Do not exploit nature
- Keep wooden equipment without harm. Do not buy new ones
- Use recyclable products
- Reduce the passengers in to forest area
- Making awareness to promote forest protection. Celebrate the World Forest Day

When the forest becomes vandalized

- Those who destroy the forest will be punished
- Reduce the exploitation of natural resources
- Restrict the development which cause environmental degradation

- Most deforestation occurs in tropical rainforests. Authorities pay the attention and block that process.
- Annually the hectare of forest land has disappeared from the earth. It is suicidal to destroy the lungs of the nature

Recovery

- It is only by blocking deforestation and encouraging plantation of trees.
- Trees receiving carbon dioxide from the atmosphere to help control the heat balance.

Pathu kinarinu samam oru kulam

Pathu kulathinu samam oru jalashayam

Pathu jalashayathinu samam oru puthran

Pathu puthranmarkkum samam oru vruksham

(Vrukshayurvedam)

3.3 ACCIDENTS

There are seven cities in Kerala Kannur, Kozhikode, Kochi, Kollam,

Malappuram and Thiruvananthapuram are included in the list of 50 cities with more accidents in the country. The Kerala government has introduced 'Safe Kerala' in 2018 to reduce road accidents in Kerala. The project is meant to ensure 24 hours of patrolling up to roads not only on national roads but also in rural roads. Priority will be given to those in need of treatment in the Golden hour. Immediate disruption will be in areas where traffic blocks are occurs, with GPS Vehicle Parking, Camera and Video Survival facility. National Highway Authority and other departments, work together to achieve the aims.

The Reasons

- Disobedience of traffic rules are a major reason for road accidents
- Most road accidents occur due to negligence of drivers
- One reason is the drawback of road designing
- The worst of roads causes road accidents
- Use of old vehicles
- The negligence of passengers through

The Consequences

- Life injured in accidents
- Injuries occur
- The vehicles may be destroyed

Solution

- Wear a helmet and seatbelt
- Resolving faulty road designing
- Provide road safety training to drivers
- Resolve the worst conditions of roads
- provide safety training to drivers

- be careful not to block the vehicle
- attach speed limiter in vehicle to control speed

Aviation Accidents

On August 29, 2011, G F Gulf Air flight arrived at Kochi with 137 passengers from Bahrain. The plane was flying away from the runway. There were no causalities happened, but passengers injured during the rescue operation

The Reasons

- Storm presence
- Disruption of devices
- Negligence of pilot

Risk Control Measures

- Avoid exploding material on airplane
- Handling of flight operations regularly
- Follow the instructions given prior to departure

Rail Accidents

Peruman rail accident is a huge accident on July 8, 1988, when the Kanyakumari Island Express derailed at Ashtamudikayal from Peruman Bridge near Perinadu in Kollam district. In Peruman disaster, which took place in Kerala with serious casualities, 105 people were killed and more than 200 were injured.

Kadalundi train accident took place on June 22, 2001 at Kadalandi, Kozhikode district of Kerala. Madras Mail (Mangalapuram Chennai Express) passes over Kadalundi River Bridge and the bridge has been thrown out and the three bogs

were derailed to the river. In this accident, 52 people were killed. A total of 222 people were injured.

The Reasons

- The cause of the misplacement of rail tracks

- Lack of repair of train engines
- Damage due to the climate change

Solution

- Regular maintenance of rail
- Restore and rebuild the rail
- Repair train engine regularly
- Check the signal of the rail

Boat Accidents

At Thekkady on September 30, 2009 capsized KTDC's Jalakanyaka boat. About 45persons were killed in the accident. The accident occurred on the 45th day of the boat's launch. The cause of the accident is the heavy burden. About 75 people boarded at boat that made 97 people, most of them in the upper deck. No one has ever given life jacket. The inquiry commission was

investigated the boat tragedy is due to the negligence of the officials of the tourism department and KTDC.

The Reasons

- Irresponsibilities of the concerned individuals
- Absence of training
- Aging of Boat

Remedies

- Ensure that the essential safety measures are on the boat
- Learn about climate change before traveling
- Manage the speed of travel
- Follow the rules

3.4 BIOLOGICAL DISASTERS

Biological disaster refers to calamity caused by the exposure of living organisms to germs and toxic substances. For instance, spread of a disease, a virus, an epidemic, and a locust plague

Epidemic affecting a disproportionately large number of individuals within a population, community, or region at the same time, examples being Cholera, Plague, malaria, typhoid etc.

Pandemic is an epidemic that spreads across a large region, that is, a continent, or even worldwide of existing, emerging or re-emerging diseases and illness, example being Influenza H1N1 (Swine Flu).

Epidemics in animals

Ebola – virus

Anthrax – virus

West Nile encephalitis – virus

Mad cow disease – prion (an abnormal version of protein)

Foot and Mouth disease - virus

Epidemics

Changes in natural disasters such as floods, earthquakes, and environmental impacts result in infectious diseases spreading and results more deaths. Infectious Diseases are common in rainy seasons. Infectious dengue fever and Chickungunia are reported mostly.

After the 2004 tsunami, Chikungunia reported that many people died. After the flooding in 2018, the government gave alert to the people not to get away from the leap.

Pollution is the main cause of infectious diseases. Disease does not develop in a waste-free area. Waste management is the main way to prevent contagious diseases.

- Dengue fever
- Leptospirosis
- Chikungunya
- Japan fever
- Malaria
- Filariasis
- Jaundice
- Typhoid
- Cholera
- H1N1
- Diarrhea / dysentery
- Fever etc. is the communicable diseases reported in Kerala.

Dengue Fever

The disease spreads by mosquito breed

Method of spreading

The mosquito pours through the bite. The disease is transmitted from one to another into the mosquito breeding grounds in fresh water that bites during the day.

Symptoms

- Sudden severe fever
- Pain behind the eyes
- A major headache

- Hunger and lack of appetite
- Bulging red cheeks in the body and a burning chest
- Nausea and vomiting
- Bleeding from the nose and mouth, blood pressure

Disease Resistance

- This diagnosis can be confirmed by blood tests
- Inform the health department officials if your premises or relatives confirm your dengue fever
- Avoid self-medication, and eat curative pills according to the doctor's instructions

Leptospirosis

Leptospyra bacteria are caused this disease.

Method of spreading

- Spread through the polluted water with urine of the rats and squirrel.

- Spreads from animals to humans
- The bacteria found in rodents like rats, squirrel, and civet cat and also found in animals, cow, dogs and cats.
- Disease causing organism enters in the human body through the soil, water, food and fruits contaminated with the urine of the causative organism.
- The bacteria enter in to our body through the wounds in the hands, eye, nose and mouth.

Possibility for infection

- Workers of farms
- The persons who clean the drainages and pools
- Cleaning Workers
- Workers in the market
- Food caterers, fisher men, sand workers, loading workers, dairy farmers, who do not use footwear

Disease resistance

- Killing of rat
- Get used to wear the shoe when working in polluted places
- Take preventive vaccines

Chikungunya

It is a disease caused by Chikungunia virus (CHIKV)

Method of spreading

- The disease spreads by crossing the mosquito breed of edibles

The symptom of the disease

- A severe fever, pain in the joints, and red patches on the body. Headache,

fatigue, indigestion, swelling and eyes are red

Disease resistance

- Prevention of this disease through mosquito repellent
- Seek medical treatment under doctor's instructions

Japan Fever

The disease is caused by the Japanese Encephalitis Virus (JEV).

Method of spreading

- Culex mosquitoes spreads this disease

Symptoms

- Fever , body pain, headaches, neck pain, mental disorders, and un consciousness

Disease resistance

- mosquito control measures
- should not be a special treatment for this disease, take the medicines only by doctor's prescriptions

Malaria

This disease is spread by single-celled organism in plasmodium category.

Method of spreading

- The disease spreads through the bite of Anopheles mosquito

Symptoms

- The fever begins with an intense cooling. Trauma affects, fever increases and rapidly, decreases the fever and repeats the fever within one or two days
- Headache, fatigue, and sometimes yellowing of eyes appear
- Malaria affects the brain can cause death

How to find out

- A drop of blood from the tip of the finger can be used to diagnose with a microscope and can be detected.
- This test is available free of cost in all government hospitals and medical colleges.

Disease resistance

- The mosquito control measures
- Do not go to states and territories which are affected by malaria. If you are going, try to sleep in the mosquito net

Filariasis

It causes worms of the Filarial species

Method of spreading

The disease is spread through the mosquito bite

Symptoms

Fever and swelling in the limb

Disease resistance

- The mosquito repellent
- Take immunotherapy medicine

Jaundice

Jaundice is a condition that caused by the defects in the formation of bile in the liver and gall bladder results in the yellowing of skin, eye and urine Called jaundice or hepatitis. Hepatitis may be of A, B, C, D and E.

- Hepatitis B is deadly
- Hepatitis A group of jaundice is commonly seen in animals.

Method of spreading

- By consuming contaminated water

Symptoms

- Absence of appetite, nausea, and vomiting
- Urine gets yellow in colour
- Eyes become yellowing
- Epithelial cells of Mouth become yellowish.
- Depending on the severity of the disease , the skin becomes yellow
- It may also be a symptom of many diseases

Diagnosis

- Jaundice can be diagnosed by blood tests
- There is no external symptom but the disease is detected by blood test

Disease resistance methods

- Use boiled and cooled water
- Preventing open air toileting
- If jaundice is not diagnosed at the initial stage, it is become critical

Things to note

- Liver cirrhosis, cancer, and Mahodaram diseases can be caused due to jaundice
- Jaundice occur due to Lung cancer , lymphoma etc
- With the right diagnosis and medication, the critical condition of jaundice can be overcome in some degree

Typhoid

Typhoid is water borne disease. It is caused by bacteria called salmonella typhi. It occurs in human bowels and in the bloodstream.

Method of spreading

- This disease is transmitted from one person to another through human excretion
- The causative organism come with the excreata of affected person can live seven day in water and then in contaminated soil.
- It is transmitted through contaminated water and flies
- It enters in to human intestines through food and contaminated water for a week or two. Thereafter, enter in to the intestine then moves to bloodstream
- It spreads from blood to each of the organs and tissues. This reduces the immunity of the individual

Disease determination

- If you check blood, stool, urine and bone marrow you can determine the disease

Symptoms

- Identification of symptoms within 6 to 30 days can last for 3 to 4 weeks

- Scarves on the neck and stomach and fever are seen. The fever will gradually increase to 104 degrees Fahrenheit
- Intermittent headache, fever, fainting , fatigue, stomach pain, diarrhoea and vomiting are seen
- If you hesitate to take medicine, results in the formation of a hole in the bowl of the intestine, it causes the condition becomes very serious.

Disease preventive measures

- Drink boiled and cooled water
- Keep food items Closed
- Avoid cool and ice food
- Prevention is by sanitation, waste management, use of safe drinking water, and preventing the disease from keeping the food items in hygienic condition
- Take medicines as per your doctor's instructions

Cholera

Cholera is water borne disease. This disease is caused by bacteria Vibrio cholera. Water and minerals lost a lot of body and it will leads to death.

Method of spreading

- Bacteria transmit from one person to another through human defecation
- This bacteria can enter in to your body through food or food prepared in the worst situation
- Let us spreads through contaminated water
- Cholera has been reported from the densely populated and dirty conditions
- The disease will be exposed to germs for a period of one week to 10

days. Some people it may stay up to 3 weeks

Disease diagnosis

If you have severe stomach pain, diarrhoea and vomiting, you can determine the disease by checking the stool in laboratory.

Symptoms of the disease

- Vomiting and diarrhoea
- Strong fatigue and fatigue
- The lips be dry
- Absence of Sweat
- Increases heart rate
- Reduces blood pressure
- Fainting , weight loss
- Eyes are circled , fever seen rarely

Disease resistance methods

- Enjoy a well-cooked and hot meal
- Drink well boiled and cooled water
- Wash and use vegetables and fruits
- Wash your hands after and before toileting
- Drink O.R.S solution
- If necessary, take the vaccine under doctor's instructions

Viral Fever / flu (H1N1)

Virus spreads this disease. Disease affects the breathing system.

Method of spreading

- Spread by air
- Virus are spreads out when the patient speaks, sneezes, and coughs

- The disease is transmitted by the inhalation of airborne fluid particles.

Symptoms

- Between 1 to 5 days it will have a fever
- Strong fever, body aches, cough, throat pain, nasal seizures, breathing problems
- Fever and cough lengthen to a complex condition like bronchitis, pneumonia etc.
- Flu is not usually required by the anti-biotic drugs, but in unhealthy situations, those who have a natural immune system are under the influence of other bacteria

Disease resistance

- Swipe the nose and mouth with the napkin while sneezing and coughing
- Occasionally wash your face and hands with soap and water
- Repeat the disease once again in the affected person
- Therefore immunodeficiency vaccination is not practical and effective
- Recognize the virus caused by the disease and provide vaccination

Diarrhoea / Dysentery

Diarrhoea is a disease due to the abnormal defecation. Bacteria, rota viruses, coliform, bacteria, salmonella, Yersinia, shigalla, casselo bacteria, amoeba and giardia are the cause of diarrhea.

Method of spreading

- Disease transmitted to the patient through excreta
- Fruits that are poisoned, poisonous food items, bacteria that increase intestinal mobility, protozoans, and worms can cause dizziness.
- Due to cancer, and typhoid diseases can cause diarrhoea

- Changes in weather, place and food may cause diarrhoea
- Avoid eggs, meat and rice when we have ill
- Disease spreads through patient's excreta will be transferred to others, which can be either through water or food

Symptoms

- The first symptom will be small fever and vomiting
- There can also be a 4-5 to 10-20 times loose motion
- Excessive fatigue
- Stay asleep if called
- Do not drink water or drink a little
- Do not eat food, eyes look deeper
- If the skin is pulled down it slowly returns in normal condition
- Diarrhoea, which is the caused by bacteria required special medicines

- In this situation there will be a portion of the blood or a mucous membrane excreted by the patient.
- dehydration makes the patient at risk
- Children below the one year old eliminate green colour stool is a symptom of diarrhoea
- If it does not stop you will have a fever in the body and lose your hydration and sodium from the body

Disease resistance

- Provide salted water, tender coconut water, salted lime water, O.R.S solution
- Children need breast milk and feed in liquid form
- Rehydration drinking is the primary (oral rehydration therapy)
- Use boiled and cooled water
- Keep your personal hygiene
- Prevent the excretion in the open field
- Wash hands with soap before and after toileting
- Ensure the ORS solution and zinc pills
- Keep food materials closed
- Sprinkle bleaching powder in wells

How to prepare O.R.S solution

Mix 5 glasses of water (1 litre) with a packet of O.R.S powder thoroughly with a clean teaspoon. Use it to any other vessel. Do not use more than 24 hours after the preparation of the solution.

Nipah Fever

This disease is caused by a virus called Nipah virus (NIV). The Henipa

virus is an RNA virus in the genus. This disease, which is mainly affected to animals and humans, causes the death of patients

- The virus was first reported in 1998 in Kampung Sungai Nippah, Malaysia. That's how that name came. The virus was distinguished in 1999.
- This disease is transmitted from animals to animals and to humans.
- The disease was first identified by farmers who grow pigs.

Method of Spreading

- It is thought to infect from the infected bats, pigs, and humans.
- Beware of infected bats can be made by eating fruits that are bite

Symptoms

- Incubation Period for 4-5 days
- Virus will enter and take at least 14 days to show symptoms
- Include headache, fever, dizziness, vomiting and blurred vision
- You can see symptoms for up to 10 days
- Two days after the infection is possible, the encephalitis affects the brain and the patient may be in a coma.

Resistance

- No preventive vaccine has yet been detected to prevent Nipah virus
- Treatment is effective against preventing illness
- Avoid fruits bitten by bats
- Those that treating a virus infected patient will wear hand glows and mask
- Wash your hands 20 seconds with soaps
- Keep your personal belongings clean
- The hospital staff who are serving patients should be careful not to get sick
- Wear the mask, hand glows

Disease Determination

- Mucous from throat and nose, blood, urine and the cerebro spinal fluid in the brain can be used to detected by the real time polymerase chain reaction and through the ELISA test
- Immunohistochemistry inspection can be diagnosed in samples of post mortem examination of the dead patients.
- Follow the directions provided by the Department of Health

Measures to control epidemics

- Avoid stagnant water from materials like coconut shell, earthenware, bottle, cups, around the house
- Drain the water standing on the terrace and sunshade
- Cover water tanks and biogas plants with mosquito nets

Outside the house

- Remove stagnant water from Rubber milk Collecting cups, bottles etc.
- Gappi, Gamboosi fishes are grown in well and other stagnant water bodies.

- Cover water utensils, drums and tanks covering mosquito nets
- Remove water plants from ponds and streams at any time
- Clean up the forest
- Drying should be done at schools (Friday), offices (Saturdays) and homes (Sundays) (destroying mosquito and hoardings)
- Do not stay among the plants in the morning and in the evenings (where mosquitoes are found)
- Wear clothes that are light tinted and dressed in body covering (reduce mosquito biting)
- Sprinkle drinking sources with bleaching powder

Inside the House

- Wash and use the utensils in hot water
- Wash water drains once a week and remove once a week to collect water at the bottom of the fridge and cooler.
- Mosquitoes also lay eggs in places where one teaspoon of water found. Find and destroy these sources
- Drink only boiled and cooled water
- Follow the personal hygiene and environmental hygiene of the person
- Use mosquito repellents to prevent mosquito bite
- Do not sleep outside the home in the night

Emergency Kit for Epidemics

- Oral Rehydration Solution (ORS) sachets.
- Paracetamol. Tablet
- Anti-diarrhoea Tablet.
- Anti-spasmodic Tablet

3.5. FIRE

On April 10, 2016, the Indian Standard Time 3.30pm a fire accident happened was at the Kollam Paravoor Puttingal Temple. About 107 people died. Many injured. On 13th April, the Kerala High Court ordered that the fire works with high noise after sunset be banned

Definition

Uncontrolled fire may cause loss of life of humans or living things, harm to life, and loss of property called fire.

The Reasons

It can happen with unconscious hazards, cause of arson or may be a natural disaster.

Fire Safety

Fire safety is the means to protect one from the fire or control the fire.

Fire Resistant

Fire resistance is the necessary action for eliminating fire and getting safe from fire damage.

Things to keep in mind

- Use staircase, for multi-storey buildings to escape
- Break the alarm's glass in buildings with fire alarm and run it
- Do not run if fire burned in the garments. suddenly lying on the ground, using a wet sack or thick cloth to stop burning

Disaster Management

Precaution

- Children can use firecrackers only under the super vision of the elders
- Do not use petrol or diesel in burn stove in kitchen
- Avoid wearing loose clothes that are easily get burned in the kitchen
- Do not throw Smudge cigarettes, fired match sticks in the open spaces or in the waste box

Things to keep in mind

- Set fire extinguisher in all buildings
- Set fire alarms in all schools, offices, factories, hotels and other multinational buildings
- Notice that the gas cylinder will be turned off correctly
- Keep gas cylinders on the bottom of the oven
- Do not keep gas cylinder near firewood

Wild Fire

The wildfire is an uncontrolled forest fire, because of man's direct or indirect interventions

The reasons for wild fire

- Combine the remains of garbage and burn them

- Smoking during forest trip
- Use of explosives, such as fireworks and fire crackers
- Burning of dried leaves

Consequences

- Harmful to the environment
- Making deforestation
- Destruction of living things
- Release smoke and harmful gas in to atmosphere
- It cause difficult in human existence

Remedies

- Report Fire Service if fire is un controllable
- Do not smoke on your way to the forest, avoid bringing firewood items
- In case we want to fire burned in forests, buy the permission of the concerned person
- If you Set fire near by the forest area, set the fire extinguishing systems there.

3.6. DROWNING

The National Crime Records Bureau has indicated that there are at least 80 deaths per day in India because of drowning. Figures indicate that over 1,000 people die each year in Kerala. This is a challenge to the Kerala society

Precaution

- Do not get in to flowing water and water places
- Avoid adventure performances when swimming in deep pools, or in the river
- Even six inches of water can fall us. So if you want to walk through the water, select the unplugged area
- Learn swimming
- Do not go for swimming in water bodies if one who do not know swimming
- Even if you have children who know swimming, you can go down to deep water along with adults
- Local Self Government Institutions and related departments to place vigilance board in dangerous areas.
- Do not get into water by ignoring the warning systems
- Do not get in to water if there have too much flow of water
- Pay special attention to those who go to the beach or surroundings of the river
- The first five minutes of one person drown in the water is very crucial. Death occurs within fire force and other rescue workers arrive. Therefore, first aid training is essential for the common people.
- Getting in to water for rescue will also put your life at risk

Methods to save someone drowned in water

1. **Reach**-by-hand

2. **Throw** - throwing things like a good rope that can be used to rescue

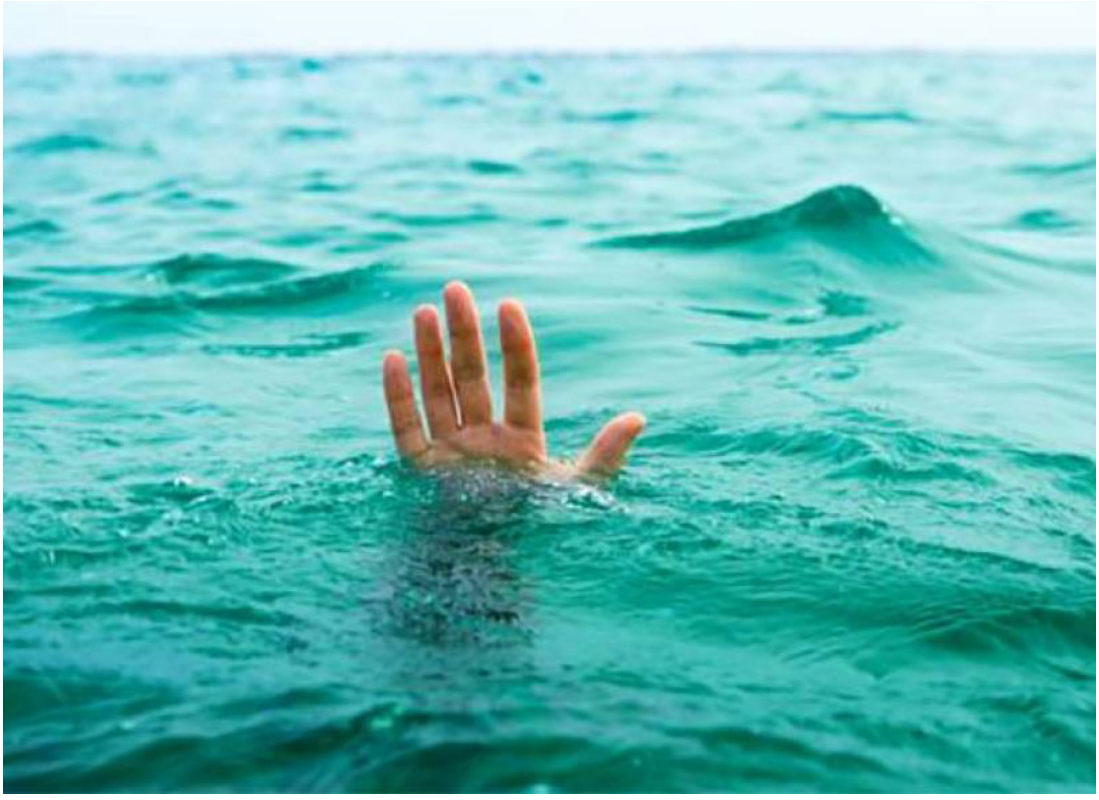
3. **Row** – use boat or shaft

4. **Go** and swim

Try to keep this effort opportunistic. Can go down to water only if the first three methods is impossible.

First Aid

- After getting out from the water lie down the victim in a safe place
- After laying down the head, remove any objects in nose or mouth
- Being in the stomach filled with water and do not try to force it out
- If the person is in an unconscious state, provide C P R for respiratory regeneration
- Change the person to the hospital as soon as possible



3.7. STAMPEDE

People in large numbers in the pilgrimage places died due to crowed, massive entertainment events, as a result of panic, fire or bomb explosions. Ex: Sabarimala Pullumedu disaster, Mina Stampede in Mecca

The reasons

- At one square meter, standing above six or seven people is said to be a place where population density is high
- It is equivalent to the flow of fluid in a population where such a high population density
- In situations such as when a person falls, others fall by through this, the suffocation leads to death and stroke
- It is difficult to cope with the people coming against the fallen people

Remedies

- In the areas where religious ceremonies are held, large pilgrimage atolls will be controlled by traffic, queue, and traffic control, organizers of the event, volunteers and security personnel to properly manage population density.
- Warn at dangerous places
- If people are densely populated, try to control yourself and do not go further

3.8. FOOD POISONING

Food poisoning is caused by contamination of harmful substances in the food It is a deadly disease caused by using stale foods or drinks. In some cases it may appear as vomiting or diarrhoea. Some bacteria, viruses and parasites that are found in stale food are the cause of food poisoning. Sometimes, dietary chemicals cause food poisoning.

Food poisoning mainly consists of three ways.

- When a diet is suspected - bacteria and viruses
- Fungus in the diet produce poisons
- By mixing poisonous substances in the diet
- By accidentally pesticides and other chemical substances mixes with food

Microorganisms responsible for food poisoning

- Campellobacter - is found in stale milk
- Salmonella - found in antiquated meat and eggs
- Staphylococcus, orius, clostiridium, bacillus, and all these contaminate

foods that make the food poisonous

Symptoms of the Disease

- Fever, abdominal pain, blood-stool, vomiting, fatigue, and diarrhea

If Food Poisoning Occurs

- Drink boiled and cooled water well because the vigor is caused by vomiting and diarrhea.
- Drink the O.R.S solution
- Eat plenty of watery fruits
- Drink salted rice water and tender coconut water
- Eat ginger and honey
- Seek medical treatment from an expert doctor

Disease preventive measures

- Wash hands before eating and after toileting
- Wash the utensils cleanly
- Eat only fully cooked fish and meat
- Keep the food that are tend to stale in refrigerator
- Keep refusing to eat old food
- Use only required food from refrigerator
- Check whether the purchase of food items is expired or not
- Keep the kitchen clean evenly
- Keep your food from damage

- Avoid damaged food

3.9. CHEMICAL DISASTERS

The worst chemical tragedy of the world was the 1984 Bhopal gas tragedy. The tragedy was caused by a lethal gas methyl isocyanides from the Union Carbide Factory in Bhopal. This huge tragedy has led to the deaths of 2500 people.

There is a comprehensive law framework in our country to control chemical disasters.

Rules set up for the disaster relief

- Explosives Act, 1884
- Petroleum Act 1934
- Factories Act 1948
- Pesticides Act 1968
- Environment Protection Act, 1986
- Motor Vehicle Act, 1988

- Public Liability Insurance Act of 1991
- Disaster Management Act, 2005

Precautions

- Those living near industrial units understand the difficulties associated with it.
- Do not smoke, do not burn waste near by the industries
- Keep the phone numbers of emergency services like Fire Station, police Control Room and Health Service
- Avoid homes from nearby industrial plants that produce potential chemical products
- Families and local people aware of the basic nature of dangerous chemicals and the first aid to be given to the victims

Remedies

- Do not panic
- Get away from the tragic location and quickly escape the wind direction
- Hide the face with a piece, cloth or sari
- Patients, Elders, Persons with Disabilities, those who cannot get out from the home, stay in the house, close the doors and windows well
- Do not eat opened food or drink opened water
- Get away from that area as well. When you get to the new place, change your clothes
- Call to the control room if you have any difficulties
- Listen or follow the instructions given by the relevant authorities in radio or TV channels

- Do not listen to the rumors and do not spread the rumors

3.10. NUCLEAR DISASTERS

Nuclear disasters affect the nature and organisms that are very destructive. The radiation related to the nuclear disaster creates significant accidents in the environment.

According to the definition of International Atomic Energy Agency (IAEA) nuclear disasters are the effect of nuclear radiations that can have the effect on nature and people.

The Chernobyl nuclear disaster that had happened in 1986 is considered as the worst disaster of this kind. 31 were lost life.

It is estimated that almost $ 7 billion have been lost. The studies published in 2005 say that consequence of this disaster is estimated to have resulted in more than 4,000 deaths due to cancers.

Consequences

- Errors from infrared thermal radiation, causing radiation-based poisoning (radiation sickness). This disease produces serious problems for body tissues.
- A person suffering from a nuclear radiation has vomiting and diarrhea. Three to four weeks may be ill
- Loss of water and minerals from the body resulting from fatigue and dizziness cause death
- Death occurs when the radiation affects the central nervous system
- Lung can cause serious problems
- Can cause cancer in the human body and skin cancer
- Can cause Genetic disorders

- Infecting the foetus causes death
- Causing leukaemia
- eyes can have cataracts
- Infectious diseases that are likely to be caused by nuclear radiation are:
    - Diarrhoea
    - Typhoid
    - Hepatitis
    - Cholera
    - Tuberculosis
    - Diphtheria
    - Polio
    - Pneumonia

Remedies

- Follow strict security measures in nuclear power stations
- Follow the security mechanism of the International Atomic Energy Agency, which forms the basis for nuclear safety
- Ensure safety and supervision in countries that use nuclear energy
- Nuclear power plants are always located near the sea. But the construction of what should be done to overcome the risk of floods and tsunami. (Japan, India, China and USA- the nuclear power plants are vulnerable).
- The three main goals of the Nuclear Safety Mechanism recommended by the Nuclear Regulatory Commission are:
- Shut down the reactor
- Keep the shutdown state

- Prevent the radiation of radioactive material during accidents

3.11. DAM FAILURE

The dam is being constructed across the flowing river for hydroelectric projects.

Dam failure may be very rare. But when it comes it cause excessive damage and loss, it becomes a disaster.

The main reasons

- The timeliness of the dams
- Construction of dam using low quality technology and low construction materials

- Error in spillway designing
- Lack of maintenance work especially for outlet pipes
- Collapse of the mountain in to the reservoir causes the dam to be damaged
- Damage can also be caused by earthquakes

Remedies

- Dam Managers should be able to monitor the situation of the dam timely and inform the authorities about any potentially dangerous situation.
- Warn if the dams should open when heavy rains and floods are likely. Thus it is possible to avoid huge disaster
- Be careful and take care of the maximal water level of the dam

- Ensure maintenance of the dam timely

3.12. MINES FLOODING

Mining activity is a long-term activity. The water in the mines must be periodically removed if mining operations continue. The mines are likely to cause floods when there is no drainage system in mines

The reasons

- When mining is less economically important
- When raw material are destroyed
- War, danger and other political reasons
- Instability of mines workers

- For some security reasons, may be the cause of the mine floods

3.13. OIL SPILL (FUEL LEAK)

Oil spill is the result of human negligence of releasing liquid petroleum hydrocarbon, especially to the ocean ecosystem of the environment.

Oil spills are often affected by the disruption of petroleum products (petrol and diesel) that are crushed by the crude oil from the tanker. Such a fuel leak may be on the land and the water becomes subject to rainfall when the rains water flow into the water bodies.

Consequences

- Oils are caught in the fur and feathers of aquatic organism and oil so they are unable to keep buoyancy in water
- It is therefore difficult to control body temperature. So they become dead
- Water plants are destroyed
- Fishes also become dead
- It effect on Evaporation of water
- These become a major disaster, both economically, environmentally and socially

Remedies

- Oil spill can be purified but it can take weeks, months, and years

3.14. COASTAL EROSION

The vastness of the sea is caused by the waves, the result of the tide, the wind, storm, and sandstones.

- The sea is getting in to the shore because of coastal erosion
- As a result, coastal waste, rocks and other debris are deposited on the beach

Remedies

- Build the sea wall using the rocks on the shore
- Build the sea wall with sack filled with sand

- Stay away from sea shore

3.15. TERRORIST ATTACKS / WARS

A news article on March 18, 2012

Last year, there were 15 terrorist attacks in the country. A total of 68 soldiers were killed. Pakistan has breached the 449-point ceasefire agreement by 2018 on the border with Jammu and Kashmir. In 2014, there were 10 and in 2015 were 10 terrorist attacks are happened.

THE TERRORIST ATTACKS IN INDIA

- 1998 Coimbatore bomb blast
- 2001 Parliament attack
- 2005 Delhi bomb blast series
- 2006 Kozhikode double blasts
- 2007 Ajmer Dargah blast
- 2008 November Mumbai attacks case
- 2009 Goa Madgaon blasts
- 2010 Pune bomb explosion
- 2013 Hyderabad bomb blast
- 2013 Mumbai bomb blast

Remedies

- Set up diplomatic interactions between countries
- Facilitate character formation through education

CONCLUSION

This programme gives a general awareness on disasters and its management. The knowledge in this regard is very important as the disasters are increasing every where. It is a social commitment to help those who are the victims of disasters, to return to their former state of affairs. Individuals at various levels of society need to take the initiative. Today, it is important for us to prepare the students to bring back the affected, as future generations.

Provision of home, clothing, food and medical assistance to victims of the disaster, counselling to the mentally distressed, provide government grants, and the delivery of these to the affected will help the victims to go back to their normal lives.

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APPENDIX IV

EVALUATION PROFORMA

This is an evaluation proforma to evaluate the Disaster Management Education Programme for Secondary School Students. Read the following and put a √ mark in the appropriate column. Give your valuable suggestions in the last column.

Name: **Designation:**

Evaluation Criteria	Good	Satisfactory	Not Satisfactory
Selection of the Content			
Organisation of the Content			
Presentation of the Content			
Appropriateness of the Content			
Language Used			
Suggestions			

DISASTER MANAGEMENT AWARENESS TEST

Udayasree K
Senior Research Fellow
Farook Training College

Dr. P. Rekha
Assistant Professor
Farook Training College

PART - A

നിർദ്ദേശങ്ങൾ:

നാം ഇപ്പോൾ അനവധി ദുരന്തങ്ങളെ അഭിമുഖീകരിക്കുന്നുണ്ടല്ലോ, ഈ ദുരന്തങ്ങൾ പലതും പ്രകൃത്യാലും മനുഷ്യനാലും സംഭവിക്കാറുണ്ട്. ഇവയെക്കുറിച്ചുള്ള നിങ്ങളുടെ അറിവ് പരിശോധിക്കാനുള്ള ഒരു ചോദ്യാവലിയാണിത്. താഴെ തന്നിരിക്കുന്ന ഓരോ ചോദ്യവും വായിച്ച് ഏറ്റവും അനുയോജ്യമായ ഉത്തരത്തിന് നേരെ ഉത്തരക്കടലാസിൽ (✓) ഇടുക.

1. 'പ്രകൃതി സംരക്ഷണം' എന്നതുകൊണ്ട് അർത്ഥമാക്കുന്നതെന്ത്?
   a) പ്രകൃതിവിഭവങ്ങളെ അല്പവും ഉപയോഗിക്കാതെ സൂക്ഷിക്കണം
   b) പ്രകൃതി വിഭവങ്ങൾ ആവശ്യാനുസരണം ഉപയോഗിക്കണം
   c) പ്രകൃതിവിഭവങ്ങൾ ഉപയോഗിക്കരുത്
   d) പ്രകൃതിവിഭവങ്ങൾ ബുദ്ധിപൂർവ്വം ഉപയോഗിക്കണം.
2. നിങ്ങളുടെ പ്രദേശത്ത് ഒരു ദുരന്തമുണ്ടായാൽ തുടർനടപടികൾക്ക് മുൻകൈ എടുക്കുന്നതാര്?
   a) ജില്ലാ കലക്ടർ
   b) പഞ്ചായത്ത്
   c) സംസ്ഥാന ഗവൺമെന്റ്
   d) വില്ലേജ് ഓഫീസർ
3. ഭൂകമ്പം ഉണ്ടാകുന്നതെങ്ങനെ?
   a) ഭൂമിയിലെ വസ്തുക്കളുടെ ഭാരം കാരണം ഭൂമി സൃഷ്ടിക്കുന്ന പ്രതിരോധമാണ് ഭൂകമ്പം
   b) ഭൂമിക്കടിയിലുള്ള പാറകൾ പൊട്ടുമ്പോഴും തെന്നിമാറുമ്പോഴും ഉണ്ടാകുന്ന കമ്പനമാണ് ഭൂകമ്പം
   c) കുഴൽക്കിണറുകളുടെ നിർമ്മാണ സമയത്ത് ഉണ്ടാകുന്ന ഭൂമിയുടെ കുലുക്കമാണ് ഭൂകമ്പം.
   d) വലിയ കെട്ടിടങ്ങൾ പണിയുമ്പോൾ സന്തുലനം പാലിക്കാൻ കഴിയാതെ വരുമ്പോൾ ഭൂമിയിലുണ്ടാകുന്ന കുലുക്കമാണ് ഭൂകമ്പം.
4. താഴെ തന്നിട്ടുള്ളവയിൽ വെള്ളപ്പൊക്ക ഭീഷണിയെ നേരിടാൻ നാം സ്വീകരിക്കേണ്ട മുൻകരുതലിൽപ്പെടാത്തത് ഏത്?
   a) വെള്ളപ്പൊക്ക ഭീഷണിയുള്ള പ്രദേശങ്ങളിൽ താമസിക്കുവർ സിമന്റും ഇഷ്ടികയും കൊണ്ടുള്ള ഉറപ്പേറിയ ഭിത്തികൾ

നിർമ്മിക്കണം.

b) അത്യാവശ്യ ഘട്ടങ്ങളിൽ ഉപയോഗിക്കാൻ എമർജൻസി കിറ്റ് കരുതണം.

c) ടെറസിന്റെ മുകളിൽ അഭയം പ്രാപിക്കണം.

d) അടുപ്പുകൾ, വാട്ടർഹീറ്റർ, വൈദ്യുത പാനലുകൾ എന്നിവ ഉയർത്തി സ്ഥാപിക്കണം.

5. താഴെ തന്നിട്ടുള്ളവയിൽ വരൾച്ചക്ക് കാരണമായി ചൂണ്ടിക്കാണിക്കാവുന്ന നിർവചനം ഏത്?

a) വയലുകൾ നികത്തുന്നത് കാരണമാണ് വരൾച്ച ഉണ്ടാകുന്നത്.

b) ജല സ്രോതസ്സുകളിൽ ജലത്തിന്റെ ലഭ്യത കുറയുന്നത് വരൾച്ചയുണ്ടാക്കുന്നു.

c) വർഷപാതത്തിലുണ്ടാകുന്ന ഗണ്യമായ കുറവ് ഭൗമോപരിതലത്തിലെ ജല ലഭ്യത കുറയ്ക്കുന്നു.

d) കാലാവസ്ഥാ വ്യതിയാനം വരൾച്ചയുണ്ടാക്കുന്നു.

6. ജില്ലാതലത്തിൽ ദുരിതാശ്വാസ പദ്ധതികൾ തയ്യാറാക്കുകയും നിയന്ത്രിക്കുകയും ചെയ്യുന്നത് ആര്?

a) ഗവർണ്ണർ

b) സ്പീക്കർ

c) കലക്ടർ

d) മുഖ്യമന്ത്രി

7. താഴെ കൊടുത്തിരിക്കുന്നവയിൽ ഭൂകമ്പ സാധ്യതാ മുൻകരുതലുകളല്ലാത്തത് ഏത്?

a) ദുരന്തനിവാരണ സംഘങ്ങളെ പരിശീലിപ്പിച്ച് തയ്യാറാക്കി നിർത്തുക.

b) ബഹുനിലക്കെട്ടിടങ്ങൾ പണിയാതിരിക്കുക

c) കേടായ ഇലക്ട്രിക് ഉപകരണങ്ങൾ, പൈപ്പുകൾ എന്നിവ നന്നാക്കുക.

d) വീട്ടിലേയും ഓഫീസിലേയും സുരക്ഷാ സ്ഥാനങ്ങൾ ഏതൊക്കെയെന്നു മനസ്സിലാക്കുകയും ചെയ്യേണ്ട കാര്യങ്ങളെപ്പറ്റി ഒരു പ്ലാൻ തയ്യാറാക്കുകയും ചെയ്യുക.

8. തന്നിട്ടുള്ളവയിൽ വരൾച്ചയെ പ്രതിരോധിക്കാനുള്ള മാർഗ്ഗമല്ലാത്തത് ഏത്?

a) മഴവെള്ള സംഭരണ മാർഗ്ഗങ്ങൾ അവലംബിക്കുക

b) ജലസ്രോതസ്സുകൾ മലിനമാക്കാതിരിക്കുക

c) വരൾച്ചാകാല രോഗങ്ങളെക്കുറിച്ച് ബോധവാനാകുക

d) പുഴയോരങ്ങളിലെ മണ്ണെടുപ്പും മണ്ണിടിച്ചിലും തടയുക.

9. സുനാമിയുണ്ടാകുതിന് പ്രധാന കാരണം ഏത്?

a) ഭൂമികുലുക്കം

b) വെള്ളപ്പൊക്കം

c) വേലിയേറ്റം

d) ചുഴലിക്കാറ്റ്

10. താഴെ തന്നിട്ടുള്ളവയിൽ മനുഷ്യനിർമ്മിത ദുരന്തത്തിൽ പെടാത്തത്

ഏത്?

a) കാട്ടുതീ

b) മേഘസ്ഫോടനം

c) ബോംബ് സ്ഫോടനം

d) തീവണ്ടി ദുരന്തം

11. തന്നിട്ടുള്ളവയിൽ ഉഷ്ണമേഖലാ ചുഴലിക്കാറ്റിന്റെ ശരിയായ പരിണിത ഫലം ഏത്?

a) പരിക്കേറ്റവരുടെ വർദ്ധനവ്

b) വേലിയേറ്റവും വേലിയിറക്കവും

c) പേമാരി

d) കൃഷിയെ ബാധിക്കുന്ന മണ്ണൊലിപ്പ്

12. സംസ്ഥാന ദുരന്തനിവാരണ അതോറിറ്റിയുടെ നേതൃത്വം വഹിക്കുന്ന താര്?

a) സ്പീക്കർ

b) മുഖ്യമന്ത്രി

c) ഗവർണർ

d) പ്രധാനമന്ത്രി

13. ഏറ്റവും കൂടുതൽ സുനാമി സാധ്യത കാണുന്നത് എവിടെ?

a) അറ്റ്ലാന്റിക് സമുദ്രം

b) പസഫിക് സമുദ്രം

c) ഇന്ത്യൻ മഹാസമുദ്രം

d) ഇന്തോനേഷ്യൻ തീരങ്ങളിൽ

14. ഭൂകമ്പതീവ്രത അളക്കാൻ ഉപയോഗിക്കുന്ന ഉപകരണമേത്?

a) മെട്രിക് സ്കെയിൽ

b) റിക്ടർ സ്കെയിൽ

c) ബാരോമീറ്റർ

d) ഫാത്തോമീറ്റർ

15. വെള്ളപ്പൊക്കസാധ്യതയുള്ള പ്രദേശങ്ങളിൽ താമസിക്കുവർ വെള്ളപ്പൊക്ക സമയത്ത് ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങളിൽ പെടാത്തത് ഏത്?

a) റേഡിയോ, ടി.വി എന്നിവയിൽ വരുന്ന മുന്നറിയിപ്പ് ശ്രദ്ധിക്കുക

b) വീട്ടിൽ നിന്നും പുറത്തുപോകാതെയിരിക്കുക.

c) ആവശ്യമായ ഭക്ഷണം, വെള്ളം, വസ്ത്രങ്ങൾ എന്നിവ തയ്യാറാക്കി വെക്കുക.

d) വെള്ളപ്പൊക്കമുണ്ടായാൽ വീട്ടിൽ നിന്നും മാറ്റേണ്ട സാധനങ്ങൾ ഏതൊക്കെയെന്ന് തീരുമാനിക്കുക.

16. തന്നിട്ടുള്ളവയിൽ ജലസംരക്ഷണ മാർഗ്ഗമല്ലാത്തത് ഏത്?

a) വീടുകളിലെ പൈപ്പുകൾ, വാൽവുകൾ എന്നിവ ചോർച്ചരഹിതമെന്ന് ഉറപ്പുവരുത്തുക.

b) ബാത്ത്റൂമിൽ ഷവർ, ഫ്ളഷ് ടാങ്ക് എന്നിവ ഉപയോഗിക്കുക.

c) സോപ്പ്, ഷാമ്പൂ എന്നിവ ഉപയോഗിക്കുമ്പോൾ വെള്ളം തുറന്നു

വിടാതിരിക്കുക.

d) പാത്രങ്ങൾ കഴുകുമ്പോൾ പൈപ്പുതുറന്നു വിടാതിരിക്കുക.

17. തന്നിട്ടുള്ളവയിൽ സുനാമിയുടെ പരിണിത ഫലമല്ലാത്തത് ഏത്?

a) ജീവനഷ്ടം

b) ഭൗതിക വസ്തുക്കളുടെ നാശം

c) തീരശോഷണം

d) മേഘസ്ഫോടനം

18. ഉരുൾപൊട്ടലുണ്ടാകാനുള്ള കാരണങ്ങളിൽ പെടാത്തത് ഏത്?

a) വന നശീകരണം

b) റോഡ് നിർമ്മാണം

c) മഴയുടെ ലഭ്യതക്കുറവ്

d) കാലവർഷം

19. ഇടിമിന്നൽ അപകടകാരിയാകുന്നത് എപ്പോൾ?

a) മഴപെയ്യാൻ സാധ്യതയുള്ളപ്പോൾ

b) സെക്കന്റിന്റെ പത്തിലൊന്ന് അംശം സമയത്തിനുള്ളിൽ സംഭവിക്കുമ്പോൾ

c) ആകാശത്തിൽ ക്യുമുലോ നിംബസ് മേഘങ്ങൾ രൂപപ്പെടുമ്പോൾ.

d) കാർമേഘങ്ങൾക്ക് ചൂടേൽക്കുമ്പോൾ

20. തന്നിട്ടുള്ളവയിൽ ചുഴലിക്കാറ്റിന് കാരണമാകുന്നത് എന്ത്?

a) കൊടുങ്കാറ്റും പേമാരിയും

b) ഭൂകമ്പവും സുനാമിയും

c) മഴയും വെള്ളപ്പൊക്കവും

d) വരൾച്ചയും ഭൂചലനവും

21. മഞ്ഞുകട്ടകൾ ഭാരം കൂടുമ്പോൾ പർവ്വതങ്ങളിൽ നിന്നും ഭൂഗുരുത്വത്തിന്റെ ഫലമായി താഴേക്കുപതിക്കുന്നത് അറിയപ്പെടുന്നത് താഴെ പറയുന്നവയിൽ ഏതാണ്?

a) വർഷപാതം

b) ഹിമാനി

c) ആലിപ്പഴം

d) ഹിമപാതം

22. ദേശീയ ദുരന്തനിവാരണ അതോറിറ്റിയുടെ ചെയർമാൻ ആര്?

a) പ്രധാന മന്ത്രി

b) പ്രസിഡന്റ്

c) സ്പീക്കർ

d) ഉപപ്രധാനമന്ത്രി

23. ദുരന്തനിവാരണ പ്രവർത്തനചക്രത്തിലെ ആദ്യപടിയേത്?

a) തയ്യാറെടുക്കൽ ഘട്ടം (Preparedness)

b) ലഘൂകരണ ഘട്ടം (mitigation)

c) പ്രതികരണ ഘട്ടം (response)

d) വീണ്ടെടുപ്പ് ഘട്ടം (recovery)

24. ഭൂകമ്പ സമയത്ത് നമ്മൾ ചെയ്യാൻ പാടില്ലാത്തത് ഏത്?
a) ബലമുള്ള മേശയുടെയോ, ഡസ്കിന്റെയോ ചുവട്ടിൽ കുനിഞ്ഞിരിക്കുക.
b) ജനലുകളുടെ അരികിൽ നിന്നും മാറി നിൽക്കുക
c) പരിഭ്രാന്തരാകാതെ സംയമനം പാലിക്കുക
d) കെട്ടിടത്തിനകത്താണെങ്കിൽ ലിഫ്റ്റ് ഉപയോഗിക്കുക

25. വെള്ളപ്പൊക്കത്തിനു ശേഷം നമ്മൾ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങളിൽ പെടാത്തത് ഏത്?
a) നിറഞ്ഞുനിൽക്കുന്ന വെള്ളം പരമാവധി ഉപയോഗപ്പെടുത്തുക
b) ടി.വി, റേഡിയോ എന്നിവയിലൂടെ തരുന്ന നിർദ്ദേശങ്ങൾ ശ്രദ്ധിക്കുക.
c) വൈദ്യുത ഉപകരണങ്ങൾ അവയുടെ അപകടസാധ്യത ഒഴിവാക്കിയ ശേഷം മാത്രം ഉപയോഗിക്കുക
d) വെള്ളത്താൽ ചുറ്റപ്പെട്ട സ്ഥലത്തു നിന്നും അകന്നു നിൽക്കുക

26. ഭൂകമ്പരക്ഷാപ്രവർത്തനത്തിൽ ആയിരിക്കുമ്പോൾ നമ്മൾ ചെയ്യാൻ പാടില്ലാത്തത് ഏത്?
a) ഗുരുതരമായി പരിക്കുപറ്റിയ ആളുകളെ ആശുപത്രിയിലേക്ക് മാറ്റുക.
b) വൈദ്യുതി ചോർച്ച സംശയിക്കുന്നുണ്ടെങ്കിൽ മെയിൻ സ്വിച്ച് ഓഫാക്കുക.
c) ആവശ്യമെങ്കിൽ ദുരന്തബാധിതർക്ക് കൃത്രിമശ്വാസോച്ഛ്വാസം കൊടുക്കുക.
d) ബോധം നഷ്ടപ്പെട്ട് കിടക്കുന്ന ആളുകളെ ഉണർത്തി വെള്ളം കൊടുക്കുക

27. സുനാമി വരുമ്പോൾ താഴെ പറയുന്നവയിൽ നാം സ്വീകരിക്കേണ്ട മാർഗമേത്?
a) സുനാമിയോടനുബന്ധിച്ച് കടലിൽ വരുന്ന മാറ്റങ്ങൾ തിരിച്ചറിയാനുള്ള ബോധവൽക്കരണം നേടുക.
b) സംഭവസ്ഥലത്ത് നിന്നും പെട്ടന്നൊഴിഞ്ഞ് പോകാനുള്ള മാർഗം മുൻപേ മനസ്സിലാക്കുക
c) സുനാമി മുന്നറിയിപ്പ് തിരിച്ചറിയാനുള്ള ബോധവൽക്കരണം നേടുക.
d) ഇവയെല്ലാം

28. ദുരന്തനിവാരണ പ്രവർത്തനങ്ങൾ എത്ര ഘട്ടങ്ങളിലായാണ് നടക്കുന്നത്?
a) 1
b) 2
c) 3
d) 4

29. ഭൂമികുലുക്കത്തിൽ ജീവൻ പൊലിയാനുള്ള കാരണമല്ലാത്തത് എന്ത്?
a) വെള്ളപ്പൊക്കം
b) പകർച്ചവ്യാധി

c) കെട്ടിടങ്ങളുടെ തകർച്ച

d) മണ്ണിടിച്ചിൽ

30. ഇന്ത്യൻ പാർലമെന്റ് ദേശീയ ദുരന്തനിവാരണ നിയമം പാസാക്കിയ വർഷം?

a) 2000

b) 2001

c) 2002

d) 2005

31. തന്നിട്ടുള്ളവയിൽ അണക്കെട്ട് തകർച്ചയുടെ കാരണമല്ലാത്തത് എന്ത്?

a) ജലനിരപ്പ് ഉയരുന്നു

b) അതിശക്തമായ മഴ

c) തീരശോഷണം

d) മലവെള്ളപ്പാച്ചിൽ

32. ഉഷ്ണതരംഗം (Heat wave) ബാധിക്കാതിരിക്കാൻ സ്വീകരിക്കേണ്ട മുൻകരുതൽ എന്ത്?

a) അയഞ്ഞ കോട്ടൺ വസ്ത്രങ്ങൾ ഉപയോഗിക്കുക

b) നന്നായി വെള്ളം കുടിക്കുക

c) മരങ്ങളും ചെടികളും ഉള്ള സ്ഥലങ്ങളിൽ ഇരിക്കുക

d) ഇവയെല്ലാം

33. കിണർ വറ്റാതിരിക്കാൻ നാം സ്വീകരിക്കേണ്ട മാർഗമേത് ?

a) മഴവെള്ളം ശേഖരിച്ച് ശുദ്ധീകരിച്ചുപയോഗിക്കുക.

b) മഴനീർക്കുഴികൾ കാലവർഷത്തിനു മുമ്പുതന്നെ പുതുക്കാം

c) പുരയിടത്തിലൂടെ ഒഴുകി വരുന്ന വെള്ളം മണ്ണിൽ താഴ്ത്താം.

d) ഇവയെല്ലാം

34. 2013 ജൂൺ 15 ന് കേദാർനാഥിലുണ്ടായ വെള്ളപ്പൊക്കത്തിന് കാരണമായത് എന്ത്?

a) ഭൂകമ്പം

b) ഉരുൾപ്പൊട്ടൽ

c) സുനാമി

d) മേഘസ്ഫോടനം

35. താഴെ തന്നിട്ടുള്ളവയിൽ മണ്ണൊലിപ്പു തടയാൻ നാം സ്വീകരിക്കേണ്ട ശരിയായ മാർഗ്ഗമേത്?

a) ഇടവിളകൃഷി ഒഴിവാക്കുക

b) മരം നടുക

c) മണ്ണിര കമ്പോസ്റ്റ് നിർമ്മിക്കുക

d) മിശ്രകൃഷി ഒഴിവാക്കുക

36. തന്നിട്ടുള്ളവയിൽ തീരശോഷണം തടയാൻ ചെയ്യുന്ന ഏറ്റവും മികച്ച മാർഗ്ഗമേത്?

a) കടൽഭിത്തി നിർമ്മിക്കുക

b) മണൽ നിറച്ച ചാക്കുകൾ ഉപയോഗിച്ച് തീരത്ത് മതിൽ തീർക്കുക

c) നഷ്ടപ്പെട്ട മണൽ പുനക്രമീകരിക്കുക

d) ഇവയെല്ലാം

37. ദുരിത ബാധിതരെ സുരക്ഷിതരാക്കുക, പരിക്കേറ്റവരെ ചികിത്സിക്കുക, ജീവൻ രക്ഷിക്കുക എന്നിവ ആരുടെ ഉത്തരവാദിത്തമാണ്?

a) ദുരന്തം ആദ്യം ശ്രദ്ധയിൽപ്പെടുന്നവരുടെ

b) മാനസികാരോഗ്യ പ്രവർത്തകരുടെ

c) ദുരന്തനിവാരണ പ്രവർത്തന വളണ്ടിയർമാരുടെ

d) മുകളിൽ പറഞ്ഞവരുടെയെല്ലാം.

38. ഉരുൾപൊട്ടൽ തടയുന്നതെങ്ങനെയാണ്?

a) സസ്യജാലങ്ങളെ നിലനിർത്തിക്കൊണ്ട്

b) പ്രകൃതിദത്തമായ വെള്ളച്ചാലുകളിലൂടെ മഴവെള്ളം ഒഴുക്കിവിട്ടുകൊണ്ട്

c) ഉരുൾപൊട്ടൽ സാധ്യതയുള്ള സ്ഥലങ്ങളിൽ വെള്ളം മണ്ണിലേക്ക് താഴുന്നത് തടഞ്ഞുകൊണ്ട്

d) ഇവയെല്ലാം

39. ദേശീയ ദുരന്ത നിവാരണ അതോറിറ്റി നിലവിൽ വന്ന വർഷം?

a) 2001

b) 2003

c) 2005

d) 2006

40. തന്നിട്ടുള്ളവയിൽ മനുഷ്യന്റെ ഏത് പ്രവൃത്തിയാണ് തീരശോഷണം ഉണ്ടാക്കുന്നത്?

a) മീൻപിടുത്തം

b) തീരത്തെ മരങ്ങൾ മുറിക്കുന്നത്

c) തുറമുഖ നിർമ്മാണം

d) ഇവയെല്ലാം

41. ശൈത്യതരംഗത്തിന് (cold wave) ഇരയായ ഒരാൾക്ക് കൊടുക്കേണ്ട പ്രഥമ ശുശ്രൂഷയിൽപ്പെടാത്തത് ഏത്?

a) കമ്പിളിപ്പുതപ്പുകൊണ്ട് അയാളെ പുതപ്പിക്കുക

b) വീടിനകത്തുകൊണ്ടുപോയി കിടത്തുക

c) തിളപ്പിച്ചാറിയ വെള്ളം കുടിക്കാൻ കൊടുക്കുക

d) അദ്ദേഹത്തെ നടക്കാനനുവദിക്കുക

42. സുനാമിയുടെ വൻതിരമാലകളിൽ നിന്നും നമ്മുടെ തീരദേശത്തെ കുറച്ചെങ്കിലും സംരക്ഷിച്ചത് ഇവയിൽ ഏതാണ്?

a) വനങ്ങൾ

b) കണ്ടൽക്കാടുകൾ

c) പുൽമേടുകൾ

d) അഴിമുഖങ്ങൾ

43. മിന്നൽ സംരക്ഷണ മാർഗ്ഗങ്ങളിൽപ്പെടാത്തത് ഏത്?

a) എർത്തിംഗ് (earthling)

b) റിങ്ങ് കണ്ടക്ടർ (ring conductor)
c) ട്രാൻസ്ഫോർമർ (Transformer)
d) മിന്നൽ രക്ഷാചാലകം (Lighting conductor)

44. 2013 ജൂൺ 15 ന് കേദാർനാഥിലുണ്ടായ മേഘസ്ഫോടനത്തിന് കാരണമായ മേഘമേത്?
a) ക്യുമുലോ നിംബസ്
b) സിറസ്
c) നിംബോസ് സ്ട്രാറ്റസ്
d) സിറോ ക്യുമുലസ്

45. തന്നിട്ടുള്ളവയിൽ ചുഴലിക്കാറ്റിനെ പ്രതിരോധിക്കാൻ നാം സ്വീകരിക്കേണ്ട മുൻകരുതലുകൾ എന്ത്?
a) വീടുകൾ ശക്തമായ കാറ്റിനെ അതിജീവിക്കാൻ തക്കതാക്കി നിർമ്മിക്കുക.
b) വീടിനുമുകളിലേക്ക് ചാഞ്ഞുനിൽക്കുന്ന മരങ്ങൾ മുറിച്ചുമാറ്റുക.
c) അപകടങ്ങൾ ഉണ്ടാക്കാൻ സാധ്യതയുള്ള വീട്ടുപകരണങ്ങൾ ഒഴിവാക്കുക.
d) ഇവയെല്ലാം

46. ഒരു അഗ്നിപർവ്വത സ്ഫോടനത്തിന്റെ പരിണിതഫലമാകുന്നത് എന്ത്?
a) പെട്ടെന്നുണ്ടാകുന്നതും വളരെക്കാലം നിലനിൽക്കുന്നതുമായ രോഗബാധ
b) വിളകളുടെ നാശം
c) അത്യാഹിതങ്ങളും മരണവും
d) ഭവന നഷ്ടവും ശ്വാസകോശരോഗങ്ങളും

47. മഞ്ഞുകട്ടകൾ ഭൂമിയിൽ വർഷണരൂപത്തിൽ പതിക്കുന്ന പ്രതിഭാസം ഏത്?
a) മഞ്ഞുവീഴ്ച
b) ആലിപ്പഴത്തോടുകൂടിയ കൊടുങ്കാറ്റ്
c) ആസിഡ് മഴ
d) വർഷപാതം

48. ലാവാപ്രവാഹത്തിന് കാരണമാകുന്നത് എന്ത്?
a) ഭൂവൽക്കത്തിൽ നിന്നും വാതകങ്ങൾ പുറംതള്ളപ്പെടുന്നത്
b) അഗ്നിപർവ്വത സ്ഫോടനം
c) അന്തരീക്ഷമർദ്ദം കൂടുന്നതുകാരണം
d) ഇവയെല്ലാം

49. ഒരു ദുരന്തബാധിത മേഖലയിലേക്ക് നൽകാൻ കഴിയുന്ന ദുരിതാശ്വാസം ഏത്?
a) വസ്ത്രം, ഭക്ഷണം
b) വൈദ്യസഹായം
c) വളണ്ടിയർമാരുടെ സഹായം
d) ഇവയെല്ലാം

50. 2016 സെപ്തംബർ 8 ന് ദുരന്തനിവാരണ പ്രവർത്തനങ്ങളെ നിയന്ത്രിക്കാൻ ഇന്ത്യ വിക്ഷേപിച്ച ഉപഗ്രഹമേത്?

a) ഇൻസാറ്റ് 3DR
b) എഡ്യൂസാറ്റ്
c) ഇൻസാറ്റ് 3D
d) കാർട്ടോസാറ്റ്

DISASTER MANAGEMENT AWARENESS TEST

Udayasree K
Senior Research Fellow
Farook Training College

Dr. P. Rekha
Assistant Professor
Farook Training College

PART - B

നിർദ്ദേശങ്ങൾ:

നാം ഇപ്പോൾ അനവധി ദുരന്തങ്ങളെ അഭിമുഖീകരിക്കുന്നുണ്ടല്ലോ, ഈ ദുരന്തങ്ങൾ പലതും പ്രകൃത്യാലും മനുഷ്യനാലും സംഭവിക്കാറുണ്ട്. ഇവയെക്കുറിച്ചുള്ള നിങ്ങളുടെ അറിവ് പരിശോധിക്കാനുള്ള ഒരു ചോദ്യാവലിയാണിത്. താഴെ തന്നിരിക്കുന്ന ഓരോ ചോദ്യവും വായിച്ച് ഏറ്റവും അനുയോജ്യമായ ഉത്തരത്തിന് നേരെ ഉത്തരക്കടലാസിൽ (✓) ഇടുക.

1. താഴെ കൊടുത്തിരിക്കുന്നവയിൽ മനുഷ്യന്റെ ഏത് പ്രവൃത്തിയാണ് കാട്ടുതീക്ക് കാരണമാകുന്നത്?
   a) വാഹനങ്ങളിൽ നിന്നും പുറത്തേക്കുവിടുന്ന പുക
   b) ഫാക്ടറികളിൽ നിന്നും പുറംതള്ളുന്ന പുക
   c) വനയാത്രയിലെ പുകവലി
   d) ഗ്യാസ് സിലിണ്ടർ ലീക്കായാലുണ്ടാകുന്ന തീ
2. താഴെ പറയുന്നവയിൽ വനനശീകരണം തടയുന്നതിന് സ്വീകരിക്കുന്ന മാർഗമേത്?
   a) മണ്ണൊലിപ്പു തടയുന്നതുവഴി
   b) കന്നുകാലികൾ മേയുന്നതിലൂടെ
   c) ബോധവൽക്കരണം നടത്തുന്നതിലൂടെ
   d) കൃഷി ചെയ്യുന്നതിലൂടെ
3. തന്നിട്ടുള്ളവയിൽ റോഡപകടങ്ങളുണ്ടാകാനുള്ള പ്രധാന കാരണമെന്ത്?
   a) വാഹനങ്ങളുടെ എണ്ണം കൂടുന്നത്
   b) ട്രാഫിക് നിയമങ്ങൾ പാലിക്കാത്തത്
   c) പഴയ വാഹനങ്ങളുടെ ഉപയോഗം
   d) ഇവയൊന്നുമല്ല
4. തീപിടുത്തം ഉണ്ടാകാതിരിക്കാൻ നാം സ്വീകരിക്കേണ്ട സുപ്രധാന മുൻകരുതൽ ഏത്?
   a) വെള്ളം കോരിയൊഴിക്കുക
   b) ഫയർഫോഴ്സിനെ വിവരമറിയിക്കുക
   c) തീപിടുത്തമുള്ള സ്ഥലത്തു നിന്നും ആളുകളെ ഒഴിപ്പിക്കുക
   d) തീ കെടുത്താനുള്ള സംവിധാനം സ്ഥാപിക്കുക
5. താഴെ കൊടുത്തിരിക്കുന്നവയിൽ വ്യക്തിശുചിത്വം പാലിക്കുന്നവർക്ക്

ഉണ്ടാകാൻ സാധ്യതയില്ലാത്ത് ഏത്?

a) കോളറ

b) സന്ധിവാതം

c) വിഷബാധ

d) കാൻസർ

6. താഴെ തന്നിട്ടുള്ളവയിൽ വനനശീകരണത്തിന്റെ പ്രധാന കാരണം എന്ത്?

a) കൃഷിയും കന്നുകാലി വളർത്തലും

b) വയൽ നികത്തൽ

c) വായുമലിനീകരണം

d) ഇവയൊന്നുമല്ല

7. ബോട്ടുലിസം എന്ന മാരകമായ ഭക്ഷ്യവിഷബാധയ്ക്ക് പ്രധാന കാരണമാകുന്നത് ഏത്?

a) ബാക്ടീരിയ

b) കൊതുകുകൾ, കൂത്താടി

c) പൂപ്പലുകൾ

d) കുമിളുകൾ

8. ബഹുനില കെട്ടിടങ്ങളിൽ തീപിടുത്തമോ മറ്റു അപകടങ്ങളോ ഉണ്ടായാൽ രക്ഷപ്പെടുന്നത് എങ്ങനെ?

a) സ്റ്റെയർകെയ്സ് ഉപയോഗിക്കുക

b) ലിഫ്റ്റ് ഉപയോഗിക്കുക

c) സ്റ്റെയർകെയ്സിന് അടിയിൽ ഇരിക്കുക.

d) ഫർണിച്ചറിന് അടിയിലിരിക്കുക.

9. തന്നിട്ടുള്ളവയിൽ ജൈവദുരന്തങ്ങൾക്ക് (Bilological Disaster) മൂലകാരണമാകുന്നത് ആര്?

a) പക്ഷിമൃഗാദികൾ

b) സൂക്ഷ്മജീവികൾ

c) മനുഷ്യർ

d) കന്നുകാലികൾ

10. തന്നിട്ടുള്ളവയിൽ മനുഷ്യന്റെ ഏതു പ്രവൃത്തിയാണ് വനനശീകരണത്തിന് കാരണമാകുന്നത്?

a) മരം ഇന്ധനമാക്കുന്നു

b) മരം പേപ്പർ നിർമ്മാണത്തിനുപയോഗിക്കുന്നു

c) ഫർണിച്ചർ നിർമ്മാണത്തിന് മരം ഉപയോഗിക്കുന്നു.

d) ഇവയെല്ലാം

11. ജലമലിനീകരണത്തിന് ഒരു പ്രധാന കാരണം ഏത്?

a) വാഹനങ്ങളുടെ ഉപയോഗം കൂടുന്നത്.

b) ഉപയോഗശൂന്യമായ പ്ലാസ്റ്റിക്ക് കത്തിക്കുന്നത്.

c) വ്യാവസായിക മാലിന്യങ്ങൾ ജലസ്രോതസ്സുകളിലേക്ക് പുറംതള്ളുന്നത്.

d) വയൽ വറ്റിക്കൽ കൃഷിരീതി

12. നിങ്ങളുടെ വസ്ത്രത്തിന് തീപിടിച്ചാൽ പെട്ടെന്ന് ചെയ്യേണ്ട പ്രധാന കാര്യം എന്ത്?

a) ഓടുക

b) നിലത്ത് കിടന്നുരുളുക

c) വെള്ളമൊഴിക്കുക

d) വസ്ത്രം ഊരിമാറ്റുക

13. തന്നിട്ടുള്ളവയിൽ വനനശീകരണം മൂലം ഉണ്ടാകുന്ന പ്രധാന പ്രശ്നം എന്ത്?

a) ജലം മലിനമാകുന്നു

b) ഹരിതഗൃഹപ്രഭാവം ഉണ്ടാകുന്നു

c) അന്തരീക്ഷ താപനില കുറയുന്നു

d) മഴ ലഭ്യത കൂടുന്നു.

14. വായു മലിനീകരണം നിയന്ത്രിക്കാൻ ഫലപ്രദമായ മാർഗ്ഗം കണ്ടെത്തുക.

a) ഫാക്ടറികളിൽ നിന്നുള്ള മാലിന്യങ്ങൾ നിയന്ത്രിക്കുക

b) ചെടികൾ നടുക

c) വാഹനങ്ങളുടെ ശബ്ദം നിയന്ത്രിക്കുക

d) വാഹനങ്ങളിൽ വേഗപ്പൂട്ട് ഘടിപ്പിക്കുക

15. സംശയകരമായ സാഹചര്യത്തിൽ പ്രത്യേക വസ്തുക്കളോ വ്യക്തികളെയോ യാത്രയിൽ കാണാനിടയായാൽ നിങ്ങൾ എന്തു ചെയ്യും?

a) വസ്തുക്കൾ കൈമാറുകയും വ്യക്തികളെ സ്വീകരിക്കുകയും ചെയ്യും

b) വസ്തുക്കൾ പരിശോധിക്കുകയും ആ വ്യക്തികളെ ഉപദ്രവിക്കുകയും ചെയ്യും

c) യഥാർത്ഥ ഉടമസ്ഥനെ കണ്ടെത്തി സാധനങ്ങൾ തിരിച്ചുകൊടുക്കും

d) പോലീസിൽ വിവരമറിയിക്കും

16. മണ്ണ് മലിനീകരണം തടയുന്നതെങ്ങനെ?

a) വിളപര്യയം എന്ന കൃഷിരീതി ഉപയോഗിക്കുക

b) കളനാശിനികളും കീടനാശിനികളും മണ്ണിൽ നിന്നും നീക്കം ചെയ്യുക

c) മണ്ണിൽ നിന്നും നീക്കിയ പ്ലാസ്റ്റിക് കത്തിക്കുക.

d) മരങ്ങൾ വച്ചു പിടിപ്പിക്കുക

17. ഉത്സവാഘോഷങ്ങൾക്ക് പടക്കങ്ങൾ ഉപയോഗിക്കുമ്പോഴുണ്ടാകുന്ന അപകടങ്ങൾ ഒഴിവാക്കാൻ പ്രധാനമായും നാം ശ്രദ്ധിക്കേണ്ടതെന്ത്?

a) നിയമങ്ങൾ പാലിക്കുക

b) അപകടകാരികളായ സ്ഫോടക വസ്തുക്കൾ ഒഴിവാക്കുക

c) സുരക്ഷാമാർഗ്ഗങ്ങൾ ഉറപ്പുവരുത്തുക

d) ഇവയെല്ലാം

18. തന്നിട്ടുള്ളവയിൽ നിന്നും വായുമലിനീകരണത്തിന്റെ പ്രധാന കാരണം കണ്ടുപിടിക്കുക?

a) വിഷവാതകങ്ങളുടെ പുറം തള്ളൽ

b) ഗാർഹിക മാലിന്യങ്ങളുടെ പുറംതള്ളൽ

c) ഇലക്ട്രോണിക് മാലിന്യങ്ങളുടെ പുറംതള്ളൽ
d) വ്യാവസായിക മാലിന്യങ്ങളുടെ പുറംതള്ളൽ

19. രാസദുരന്തങ്ങൾക്ക് (chemical disasters) പ്രധാന കാരണം താഴെ തന്നിട്ടുള്ളവയിൽ നിന്നും തിരഞ്ഞെടുക്കുക?
a) പ്ലാസ്റ്റിക്കിന്റെ അമിത ഉപയോഗം
b) രാസവസ്തുക്കളുടെ അമിത ഉപയോഗം
c) ജലമലിനീകരണം
d) അഴുകിയ പച്ചക്കറികൾ

20. ലോകവ്യാപകമായി നിരോധിച്ച ഒരു കീടനാശിനി ഏത്?
a) ക്ലോറിൻ
b) ഡി ഡി റ്റി
c) ബി.എച്ച്.സി
d) ടെട്രാസൈക്ലിൻ

21. തന്നിട്ടുള്ളവയിൽ വളർത്തുമൃഗങ്ങളിൽ നിന്നും മനുഷ്യരിലേക്ക് പകരാൻ സാധ്യതയില്ലാത്ത രോഗം?
a) മാൾട്ടാപനി
b) കുളമ്പുരോഗം
c) ഭ്രാന്തിപ്പശു രോഗം
d) ആന്ത്രാക്സ്

22. 2001 സെപ്തംബർ 11ന് അമേരിക്കയിലെ വേൾഡ് ട്രേഡ് സെന്റർ തകർന്നതെങ്ങനെ?
a) ഭൂകമ്പം മൂലം
b) മേഘസ്ഫോടനം മൂലം
c) ഉരുൾപൊട്ടൽ മൂലം
d) ഭീകരാക്രമണം മൂലം

23. മോട്ടോർ വാഹനങ്ങൾ പുറത്തുവിടുന്ന ഏറ്റവും അപകടകാരിയായ ലോഹീയ വിഷവസ്തു ഏത്?
a) മെർക്കുറി
b) കാഡ്മിയം
c) കോപ്പർ
d) ലെഡ്

24. ആന്ത്രാക്സ് പകരുന്നതെങ്ങനെ?
a) മുറിവിലൂടെ
b) ശ്വസനത്തിലൂടെ
c) തുമ്മലിലൂടെയോ ചുമയിലൂടെയോ
d) ഇവയെല്ലാം

25. ഗ്രീൻഹൗസ് ഇഫക്ട് എന്ന പ്രതിഭാസമുണ്ടാക്കുന്ന വികിരണങ്ങൾ ഏത്?
a) U V കിരണങ്ങൾ
b) X- ray കിരണങ്ങൾ

c) ഗ്രീൻ കിരണങ്ങൾ
d) ഇൻഫ്രാറെഡ് കിരണങ്ങൾ

26. ആഗോള താപനത്തിന് കാരണമാകുന്ന പ്രധാന വാതകം ഏത്?
a) കാർബൺ ഡൈഓക്സൈഡ്
b) കാർബൺ മോണോക്സൈഡ്
c) സൾഫർ ഡൈഓക്സൈഡ്
d) നൈട്രജൻ ഡൈഓക്സൈഡ്

27. വനനശീകരണവും കാട്ടുതീയും അന്തരീക്ഷത്തിലെ ഏത് വാതകത്തിന്റെ അളവാണ് കൂട്ടുന്നത്?
a) ഓക്സിജൻ
b) ഹൈഡ്രജൻ
c) നൈട്രജൻ
d) കാർബൺ ഡൈ ഓക്സൈഡ്

28. ജലാശയങ്ങളിൽ മാലിന്യങ്ങൾ അടിഞ്ഞുകൂടി ഓക്സിജന്റെ അളവ് സാരമായി കുറയുന്ന പ്രതിഭാസമേത്?
a) ഓക്സിഡേഷൻ
b) നൈട്രിഫിക്കേഷൻ
c) ട്രാൻസ്പിറേഷൻ
d) യൂട്രോഫിക്കേഷൻ

29. ബോട്ടപകടങ്ങൾ തടയാനുള്ള മാർഗമേത്?
a) അത്യാവശ്യ സുരക്ഷാ സംവിധാനങ്ങൾ ബോട്ടിലുണ്ടെന്ന് ഉറപ്പ് വരുത്തുക.
b) യാത്രക്ക് മുമ്പ് കാലാവസ്ഥ വ്യതിയാനങ്ങളെക്കുറിച്ച് മനസ്സിലാക്കുക.
c) യാത്രയുടെ വേഗത നിയന്ത്രിക്കുക, നിയമങ്ങൾ അനുസരിക്കുക
d) ഇവയെല്ലാം

30. ഏതെങ്കിലും ഭക്ഷണ പദാർത്ഥം മായം കലർന്നതാണെന്നറിഞ്ഞാൽ ആർക്കാണ് പരാതി നൽകേണ്ടത്?
a) എക്സൈസ് കമ്മീഷണർ
b) ചെക്കിംഗ് ഇൻസ്പെക്ടർ
c) സബ്ബ്ഇൻസ്പെകടർ
d) ഫുഡ് ഇൻസ്പെക്ടർ

31. അഗ്നിബാധ അണയ്ക്കാൻ ഉപയോഗിക്കുന്ന സിലിണ്ടറുകളിൽ നിറക്കുന്ന വാതകം ഏത്?
a) കാർബൺഡൈ ഓക്സൈഡ്
b) ഓക്സിജൻ
c) ഹൈഡ്രജൻ
d) നൈട്രജൻ

32. പെട്രോൾ പമ്പുകളിൽ തീ അണയ്ക്കാനായി സജ്ജീകരിച്ചിരിക്കുന്ന ചുവന്ന ബക്കറ്റുകളിൽ നിറച്ചിരിക്കുതെന്താണ്?

a) വെള്ളം
b) മണ്ണ്
c) കരിക്കട്ട
d) മണൽ

33. ജലത്തിൽ ഓക്സിജൻ ലയിച്ചു ചേരുന്നതിന് പ്രധാന തടസ്സമാകുന്നത്?
a) എണ്ണകൾ
b) കീടനാശിനി
c) ഡിറ്റർജന്റുകൾ
d) കളനാശിനികൾ

34. ശബ്ദതീവ്രത അളക്കുന്ന ഏകകം ഏത്?
a) ഫാതംസ്
b) ഡെസിബൽ
c) ടൺ
d) കിലോഗ്രാം

35. അന്തരീക്ഷത്തിൽ ഓസോൺ പാളി കാണപ്പെടുന്നതെവിടെ?
a) ട്രോപ്പോസ്ഫിയർ
b) സ്ട്രാറ്റോസ്ഫിയർ
c) മീസോസ്ഫിയർ
d) തെർമോസ്ഫിയർ

36. റോഡപകടങ്ങൾ ഒഴിവാക്കാനുള്ള മാർഗമേത്?
a) വാഹനങ്ങൾ ഓടിക്കുമ്പോൾ മൊബൈൽ ഫോൺ ഉപയോഗിക്കരുത്
b) മദ്യപിച്ച് വാഹനമോടിക്കരുത്
c) നിയമപ്രകാരം നിർണ്ണയിക്കപ്പെട്ട വേഗതയിൽ കൂടരുത്.
d) ഇവയെല്ലാം

37. മിനമാതാ രോഗമുണ്ടാക്കുന്ന രാസവസ്തു ഏത്?
a) ഓയിൽസ്പിൽ
b) ആർസനിക്
c) ജൈവാവശിഷ്ടങ്ങൾ
d) മെർക്കുറി

38. ജലമലിനീകരണത്തിന് കാരണമാകുന്ന ഡിറ്റർജെന്റുകളിലടങ്ങിയിരിക്കുന്ന മലിനീകാരി ഏത്?
a) സൾഫേറ്റ്
b) കാർബണേറ്റ്
c) നൈട്രേറ്റ്
d)ഫോസ്ഫേറ്റ്

39. വിമാന അപകടങ്ങൾ നിയന്ത്രിക്കാനുള്ള മാർഗമേത്?
a) പൊട്ടിത്തെറിക്കാൻ സാധ്യതയുള്ള വസ്തുക്കൾ വിമാനയാത്രയിൽ ഒഴിവാക്കുക
b) വിമാനത്തിന്റെ അറ്റകുറ്റപ്പണികൾ യഥാസമയം നടത്തുക.
c) വിമാനം പുറപ്പെടുന്നതിന് മുൻപ് തരുന്ന നിർദ്ദേശങ്ങൾ ശ്രദ്ധിക്കുക.

d) ഇവയെല്ലാം

40. വനപരിപാലനം താഴെ പറയുന്നവയിൽ ഏതുമായി ബന്ധപ്പെട്ടിരിക്കുന്നു?
a) സെറികൾച്ചർ
b) ഒലെറികൾച്ചർ
c) സിൽവികൾച്ചർ
d) എപ്പികൾച്ചർ

41. ഭക്ഷ്യവിഷബാധയേറ്റാൽ ചെയ്യേണ്ട പ്രഥമശുശ്രൂഷയേത്?
a) ഛർദ്ദിക്കാൻ അനുവദിക്കരുത്
b) മയക്കമുണ്ടെങ്കിൽ വെള്ളമോ ആഹാരമോ നൽകുക
c) കസേരയിൽ ചാരിയിരുത്തുക
d) കമിഴ്ത്തി കിടത്തി തലചെരിച്ച് വെക്കുക.

42. ഏറ്റവും കൂടുതൽ മലീനീകരിക്കപ്പെട്ട പട്ടണം ഏത്?
a) ന്യൂയോർക്ക്
b) മെക്സിക്കോ
c) ഡൽഹി
d) കൊൽക്കത്ത

43. റെയിൽ ദുരന്തങ്ങൾക്ക് കാരണമാകുന്നതെന്ത്?
a) പാളം തെറ്റുന്നത് കാരണമാകുന്നു.
b) അറ്റകുറ്റപ്പണിയുടെ അഭാവം
c) കാലാവസ്ഥാ വ്യതിയാനങ്ങൾ പാളത്തിൽ മാറ്റമുണ്ടാക്കുന്നത്.
d) ഇവയെല്ലാം

44. അമ്ലമഴയ്ക്ക് കാരണമായ പ്രധാന വാതകം ഏത്?
a) ഓസോൺ
b) സൾഫർ ഡൈ ഓക്സൈഡ്
c) ഓക്സിജൻ
d) ക്ലോറിൻ

45. തന്നിട്ടുള്ളവയിൽ ശബ്ദമലിനീകരണം മൂലം ഉണ്ടാകാൻ സാധ്യതയുള്ള ആരോഗ്യപ്രശ്നം ഏത്?
a) ഉയർന്ന രക്തസമ്മർദ്ദം
b) കേൾവിക്കുറവ്
c) ഉറക്കമില്ലായ്മ
d) ഇവയെല്ലാം

46. ഏറ്റവും കൂടുതൽ ഗ്രീൻഹൗസ് വാതകങ്ങൾ പുറത്തേക്ക് വിടുന്ന രാജ്യം ഏത്?
a) ഇന്ത്യ
b) യു.എസ്.എ
c) ബ്രിട്ടൺ
d) ഫ്രാൻസ്

47. ബോട്ടപകടങ്ങൾ ഉണ്ടാവാനുള്ള പ്രധാന കാരണമെന്ത്?

a) ബന്ധപ്പെട്ട വ്യക്തികളുടെ നിരുത്തരവാദിത്തം
b) ബന്ധപ്പെട്ടവരുടെ പരിശീലനക്കുറവ്
c) ബോട്ടിന്റെ കാലപ്പഴക്കം
d) ഇവയെല്ലാം

48. ചുവടെ ചേർത്തിട്ടുള്ളവയിൽ ജൈവവിഘടനത്തിന് വിധേയമാകാത്ത മാലിന്യം ഏതാണ്?
a) ബാന്റേജ് മാലിന്യങ്ങൾ
b) വിളകളുടെ അവശിഷ്ടങ്ങൾ
c) പച്ചക്കറികളുടെ മാലിന്യങ്ങൾ
d) പ്ലാസ്റ്റിക് മാലിന്യങ്ങൾ

49. തീവണ്ടി അപകടങ്ങൾ ഒഴിവാക്കാനുള്ള ഒരു മാർഗ്ഗമേത്?
a) സ്ഥിരമായ പാതകളിൽ അറ്റകുറ്റപ്പണി നടത്തുക
b) പാളം പുതുക്കി പണിയുക
c) റെയിൽവേ സിഗ്നലുകൾ തെറ്റാതെ നോക്കുക
d) ഇവയെല്ലാം

50. തീർത്ഥാടന സ്ഥലങ്ങളിൽ ഉണ്ടാകുന്ന കൂട്ടമരണങ്ങൾക്ക് കാരണമെന്ത്?
a) സ്ഥലത്തെ നിയന്ത്രണാധീതമായി കാണുന്ന ജനക്കൂട്ടം
b) അപ്രതീക്ഷിതമായ തീപിടുത്തം
c) ഗവൺമെന്റിന്റെ സുരക്ഷാസംവിധാനം അവഗണിക്കുന്ന പ്രവൃത്തി
d) ഇവയെല്ലാം

51. വിമാന അപകടങ്ങളുടെ പ്രധാന കാരണമെന്ത്?
a) കൊടുങ്കാറ്റിന്റെ സാന്നിധ്യം
b) ഉപകരണങ്ങളുടെ തകരാറ്
c) പൈലറ്റിന്റെ ശ്രദ്ധക്കുറവ്
d) ഇവയെല്ലാം

52. ഏറ്റവും കൂടുതൽ വായു മലിനീകരണം നടക്കുന്ന ഇന്ത്യൻ പട്ടണം?
a) ഡെൽഹി
b) കൊൽക്കത്ത
c) ഭോപ്പാൽ
d) ബാംഗ്ലൂർ

53. തന്നിട്ടുള്ളവയിൽ സാംക്രമികരോഗങ്ങൾ തടയാനുള്ള മാർഗമെന്ത്?
a) ഭക്ഷണത്തിന് മുൻപ് കൈ സോപ്പുപയോഗിച്ച് നന്നായി കഴുകുക
b) വാക്സിനേഷൻ എടുക്കുക
c) ഏതെങ്കിലും സാംക്രമികരോഗ ലക്ഷണങ്ങൾ ഉണ്ടെങ്കിൽ വീടിനുള്ളിൽ തന്നെ ഇരിക്കുക
d) ഇവയെല്ലാം

54. മുങ്ങിമരണങ്ങൾക്ക് കാരണമാവുതെന്ത്?
a) നീന്താനറിയാത്തത്
b) വെള്ളത്തിലുള്ള സാഹസികത

c) മദ്യപിച്ചുകൊണ്ട് വെള്ളത്തിലറങ്ങുന്നത്

d) ഇവയെല്ലാം

55. എണ്ണതുളുമ്പൽ (oil spill)/ഇന്ധന ചേർച്ച എന്ന ദുരന്തം വളരെയധികം ബാധിക്കുന്നത് ആരെ?

a) ജലജീവികളെ

b) മനുഷ്യരെ

c) കാട്ടുമൃഗങ്ങളെ

d) സൂക്ഷ്മജീവികളെ

56. കീടനാശിനി പാക്കറ്റുകളിൽ ചുവന്ന ത്രികോണം സൂചിപ്പിക്കുന്നത് എന്തിനെ?

a) നേരിയ വിഷം

b) സാധാരണ വിഷാംശം

c) മാരക വിഷാംശം

d) വിഷാംശമില്ല

57. വെള്ളത്തിൽ വീണ ഒരാൾക്ക് ചെയ്യേണ്ട പ്രഥമശുശ്രൂഷയേത്?

a) അപകടം സംഭവിച്ച വ്യക്തിയെ വെള്ളത്തിൽ നിന്നും മാറ്റിക്കിടത്തുക.

b) നനഞ്ഞവസ്ത്രങ്ങൾ മാറ്റി ഉണങ്ങിയ വസ്ത്രം ധരിപ്പിക്കുക

c) ഒരു വശം ചെരിച്ചുകിടത്തിയ ശേഷം വേഗം ആശുപത്രിയിൽ എത്തിക്കുക.

d) ഇവയെല്ലാം

58. ആണവ വികിരണത്തിന്റെ പ്രത്യാഘാതമെന്ത്?

a) പകർച്ചവ്യാധികൾ ഉണ്ടാകുന്നു

b) എയ്ഡ്സ് ഉണ്ടാകുന്നു

c) ഡെങ്കിപ്പനിയുണ്ടാകുന്നു

d) കാൻസർ ഉണ്ടാകുന്നു

Appendix VI

DISASTER MANAGEMENT AWARENESS TEST

Udayasree K
Senior Research Fellow
Farook Training College

Dr. P. Rekha
Assistant Professor
Farook Training College

PART- A

Instructions

Nowadays we are facing so many disasters in today life. Many of these disasters have occurred naturally and from humans. This is a test to check your knowledge of them. Read each of the following questions and put a '✓' mark on the appropriate answers in the answer sheet.

1. What do you mean by 'Nature Conservation'?

a. Keep the natural resources without using it
b. Use natural resources as you need them
c. Don't use natural resources
d. Use natural resource intellectually

2. Who prepare the action plans after a disaster happened in your area?

a. District collector
b. Panchayath
c. State government
d. Village officer

3. How does earthquake happen?

a. It is the resistance produced by the earth because of the weight of the objects in the earth
b. When the underground rocks are crushing and moving, that produces a shaking effect that is earthquake
c. Shaking of earth during tube well manufacturing

d. When we build large buildings, earth becomes unable to keep balance which will result in earthquake

4. Which among the following doesn't come under the precautions of flood?

a. Those living in flood prone areas should build strong walls with cement and brick
b. Keep an emergency kit for an emergency situation
c. Take refuge on the terrace during an emergency
d. Place ovens, water heater and electric panels at the height

5. Find out the definition of drought from below

a. It is because of filling of the fields
b. Because of decrease in water availability from water sources
c. Significant decrease in rain fall, decrease the availability of water
d. Climate change cause drought.

6. Who prepares and control disaster management in district level?

a. Governor
b. Speaker
c. Collector
d. Chief minister

7. Which among the given below is not a precaution for earthquake?

a. Train up disaster management volunteer groups
b. Do not build multi-storied buildings
c. Repair of damaged electrical objects, taps etc.
d. Learn safety locations within the office and house and create an outline of the things to do

8. Which one of the given below is not the way to combat drought?

a. Apply rain water harvesting methods
b. Do not contaminate water sources
c. Be aware of drought diseases
d. Block the soil mining and soil erosion in waterside?

9. What is the reason for a tsunami?

a. Earthquake
b. Flood

c. High tide
d. Cyclone

10. Which among the following is not a manmade disaster?

a. Forest fire
b. Cloud burst
c. Bomb blast
d. Train accident

11. Which of the following is the correct after effect of tropical cyclone?

a. Increase in injuries
b. High tide and low tide
c. Torrential rain
d. Soil erosion affecting agriculture

12. Who is the chairman of the State Disaster Management Authority?

a. Speaker
b. Chief Minister
c. Governor
d. Prime minister

13. Which is the most tsunami possible region?

a. Atlantic Ocean
b. Pacific Ocean
c. Indian Ocean
d. Indonesian Shores

14. 14. Which is the instrument used to measure earthquake intensity?

a. Metric scale
b. Richter scale
c. Delhi
d. Kolkkatta

15. The people living in a flood- prone area, do things like the following except?

a. Notice the warning given through Radio and T V
b. Do not get out of the house
c. Keep necessary things like water, food, dress etc. ready

d. Decide on the things to be taken away if there is a flood?

16. Which among the following is not a water conservation method?

a. Make sure that there is no leak in taps and valves at home
b. Use shower, flesh tank etc. in the bathroom
c. Do not keep tap open when we use soaps and shampoo during bathing
d. While cleaning the utensils, do not leave the pipes open

17. Which of the following is not an after effect of tsunami?

a. Loss of life
b. The destruction of material goods
c. Coastal erosion
d. Cloud burst

18. Which of the following does not become a reason for land slide?

a. Deforestation
b. Road construction
c. Less rain fall
d. Monsoon

19. When lightning becomes dangerous?

a. When it is likely to rain
b. It happen when the inter mission of lightning occurs within one tenth of a second.
c. When the cumulo- nimbus clouds are formed in the sky
d. When the clouds get heat

20. Which among the following becomes a reason for cyclone?

a. Storm and heavy rain fall
b. Earthquake and tsunami
c. Rain and flooding
d. Drought and earthquake

21. The phenomenon of ice sheets shedding down heavily from the mountains due to gravity is known as

a. Monsoon
b. Glacier

c. Hail storm

d. Avalanche

22. Who is the chairman of the National Disaster Management Authority?

a. Prime minister

b. President

c. Speaker

d. Deputy prime minister

23. What is the first step in Disaster Management cycle?

a. Preparedness

b. Mitigation

c. Response

d. Recovery

24. Which one of the following we shouldn't do during an earth quake?

a. Stooping at the base of a strong table or dusk

b. Stay away from the window side

c. Keep calm without being panic

d. If you are within a building use the lift to come out

25. After flood, we have to keep certain things in mind except?

a. Utmost use of flooded water

b. Notice the instructions given through Radio and T V

c. Electrical equipment should be used only after avoiding their risk

d. Stay away from the place surrounded by water

26. What should not we do while in earthquake rescue operations?

a. Move people who were seriously injured to the hospital

b. If the electrical leak is suspected, turn off the main switch

c. If necessary, allow artificial respiration to the victims

d. Wake up people who have lost their consciousness and give them water

27. What is the way we should accept when tsunami comes?

a. Get awareness about changes in the sea as part of tsunami

b. Find out how to get out of the accidental area early

c. Get awareness of tsunami warning detection

d. All the above

28. How many steps are involved in disaster management activities?

a. 1

b. 2

c. 3

d. 4

29. Which is not the cause of life loss during an earthquake?

a. Flooding

b. Epidemics

c. Collapse of building

d. Land slides

30. Which was the year in which the parliament of India passed by the National Disaster Management Act?

a. 2000

b. 2001

c. 2002

d. 2005

31. Which of the given below is not a cause of dam failure?

a. The rise in water level

b. Heavy rain

c. Coastal erosion

d. Heavy water flows from hills

32. What is the precaution we should take to avoid the heat wave?

a. Use loose cotton dress

b. Drink more water

c. Stay in places having more trees and herbs

d. All the above

33. What should we do to protect well from drying?

a. Use collected rain water after purification

b. Rain water harvesting can be renewed even before the monsoon

c. The rain water flowing through the floor can trap in the soil

d. All the above

34. What was the reason for the floods in Kedarnath on June 15, 2013?

a. Earthquake
b. Land slides
c. Tsunami
d. Cloud burst

35. What is the right way to prevent soil erosion?

a. Avoid inter cropping
b. Plant trees
c. Prepare compost
d. Avoid mixed cropping

36. Find out which is the best way to prevent coastal erosion?

a. Build the sea wall
b. Build a wall on the shore with sand filled sacks
c. Restore lost sand
d. All of the above

37. Make the victims safe, treat the injured, save the lives etc., are the responsibility of whom?

a. The first witness of the disaster
b. Mental health activist
c. Disaster relief volunteers
d. All those of the above

38. How to prevent landslides?

a. By Keeping the flora
b. By Flooding the rain water through natural water ways
c. By preventing the flow of water in to soil in land slide prone areas
d. All of the above

39. Which year in which National Disaster Management Authority came into existence?

a. 2001
b. 2003

c. 2005

d. 2006

40. Which among the following action of man cause coastal erosion?

a. Fishing

b. Cutting of trees on the shore

c. Harbour constructions

d. All the above

41. Which is not a First Aid service to be given to a victim of cold wave?

a. Wrap him well with wool blanket

b. Take him into the house and make him lie down

c. Give him boiled water to drink

d. Let him to walk

42. Which one of the following saved our coastal area a few from the big waves of tsunami?

a. Forest

b. Mangroves

c. Grass lands

d. Estuaries

43. Which one of these is not a lightning protection method?

a. Earthning

b. Ring conductor

c. Transformers

d. Lightning conductor

44. Which form of cloud caused the cloud burst in Kedarnath on June 15 2013?

a. Cumulus nimbus

b. Cirrus

c. Nimbus stratus

d. Cirrus cumulus

45. What are the precautions we should take to prevent cyclone?

a. Houses should be build up strongly to withstand wild storms

b. Cut down trees that lean to the top of house

c. Move risky appliances from home

d. All of the above

46. Which one of the following is a consequence of a volcanic eruption?

a. Sudden and long lasting disease

b. The destruction of crops

c. Difficulties and death

d. Housing loss and lung diseases

47. What is the phenomenon of snowball showering on the earth?

a. Snowfall

b. Hail storm

c. Acid rain

d. Monsoon

48. What is the cause of lava flow?

a. Release of gases from the earth crust

b. Volcanic eruption

c. Increase in atmosphere pressure

d. All of the above

49. Which is the best relief that can be given to a disaster affected area?

a. Dress and food

b. Medical assistance

c. Volunteer assistance

d. All the above

50. Which is an Indian satellite launched on September 8, 2016 to control disaster management operations?

a. INSAT 3DR

b. EDUSAT

c. INSAT 3D

d. KARTOSAT

DISASTER MANAGEMENT AWARENESS TEST

Udayasree K
Senior Research Fellow
Farook Training College

Dr. P. Rekha
Assistant Professor
Farook Training College

PART- B

Instructions

Nowadays we are facing so many disasters in today life. Many of these disasters have occurred naturally and from humans. This is a test to check your knowledge of them. Read each of the following questions and put a '✓' mark on the appropriate answers in the answer sheet.

1. Which one the following actions of man's actions cause wild fire?
    a. Smoke released from the vehicles
    b. Smoke emitted from the factories
    c. Smoking during forest tour
    d. Fire due to gas cylinder leak
2. Which of the following is the way followed by us to prevent deforestation?
    a. By preventing soil erosion
    b. By feeding the cattle
    c. By conducting awareness
    d. By cultivating
3. What is the main reason for road accidents?
    a. Drivers visual problem
    b. Increase in the number of vehicles
    c. Disobeying the traffic rules
    d. The use of damaged vehicles
4. What is the important precaution that we should take to avoid fire?
    a. Drain the water
    b. Inform the fire force
    c. Get people away from the fire

d. Establishment of fire extinguisher system

5. Which of the following will not affect individuals with cleanliness?
   a. Cholera
   b. Arthritis
   c. Poisoning
   d. Cancer
6. Find out the main cause of deforestation from the following?
   a. Agriculture and cattle rearing
   b. Agricultural field filling
   c. Air pollution
   d. None of the above
7. Which one of the following is the main reason for a food poisoning 'Botulism'?
   a. Bacteria
   b. Mosquitoes and its larva
   c. Fungus
   d. Mosses
8. How can we escape from huge buildings when a fire or other accidents occur?
   a. Use stair case
   b. Use lift
   c. Sit down at the bottom of stair case
   d. Sit down at the bottom of furniture
9. Who is the root cause of a biological disaster?
   a. The birds and animals
   b. Micro organisms
   c. Human beings
   d. Cattles
10. Find out from the following, the activity of man which causes deforestation?
    a. The wood used as fuel

b. Wood used for paper manufacture
c. Wood used for furniture making
d. All the above

11. What is the main cause of water pollution?
    a. The increased use of vehicles
    b. Burning of useless plastics
    c. Industrial waste being discharged into water sources
    d. Field drying agricultural practices
12. What is the main thing to do soon when you get fire on your clothes?
    a. Run
    b. Lie down on the floor and roll
    c. Pour water
    d. Change the clothes
13. Find out what is the main issue caused by deforestation from the following
    a. Water pollution
    b. Greenhouse effect
    c. Decrease in atmospheric temperature
    d. Increase in the rain fall availability
14. Find out the best way to control air pollution
    a. Manage waste from factories
    b. Plant trees
    c. Control the sound of vehicles
    d. Attach speed control instrument in vehicles
15. What will you do if you find specific objects or individuals under suspicious situation on the way?
    a. Objects will be transferred and will be welcomed individuals
    b. The materials will be checked and will be hurt individuals
    c. Will be returned to real owners after finding out them
    d. Will inform the police
16. How to prevent soil pollution?
    a. Use the ‘vilapariayam’ farming technique

b. Remove herbicides and pesticides from the soil
c. Burn the plastic spills removed from the soil
d. Plant trees.

17. What should we take care of to avoid the dangers of using firecrackers for festive occasions?
    a. Follow the laws
    b. Avoid dangerous explosives
    c. Make sure of safety measures
    d. All the above
18. Find out the main reason of air pollution from the following
    a. Out flow of poisonous gas
    b. Out flow of house hold wastes
    c. Out flow of electronic wastes
    d. Out flow of industrial wastes
19. Choose the main reason for chemical disasters is to select from the following
    a. Excessive use of plastics
    b. Excessive use of chemicals
    c. Water pollution
    d. Rotten vegetables
20. Which of these pesticides is banned worldwide?
    a. Chlorine
    b. D.D.T
    c. B. H. C
    d. Tetracycline
21. Which of the following disease is not likely to be transmitted to humans from pets?
    a. Malta fever
    b. Foot and mouthpiece disease of cattle
    c. Mad cow disease
    d. Anthrax

22. How did the World Trade Centre collapse in the US on September 11, 2001?
    a. Due to earthquake
    b. Due to cloud burst
    c. Due to land slide
    d. Due to terrorist attack
23. Which of these are the most dangerous toxic chemicals released by motor vehicles?
    a. Mercury
    b. Cadmium
    c. Copper
    d. Lead
24. How does anthrax spread?
    a. Through wounds
    b. Through breathing
    c. Through sneezing and coughing
    d. All the above
25. Which of the following radiations produce the phenomenon called greenhouse effect?
    a. U V rays
    b. X- rays
    c. Greenhouse rays
    d. Infrared rays
26. Which gas is the main reason of global warming?
    a. Carbon dioxide
    b. Carbon monoxide
    c. Sulphur dioxide
    d. Nitrogen dioxide
27. Deforestation and forest fire increases the amount of which gas in the atmosphere?
    a. Oxygen

b. Hydrogen
c. Nitrogen
d. Carbon dioxide

28. Which are the phenomena that reduce oxygen level at water bodies because of waste dumping in it?
    a. Oxidation
    b. Nitrification
    c. Transpiration
    d. Eutrophication
29. What is the way to prevent boat crashes?
    a. Ensure that there are essential safety measures on the boat
    b. Learn about climate change before travelling
    c. Control the speed of the journey and obey the rules
    d. All the above
30. To whom should we complain if a food item is found to be poisoned?
    a. Exercise commissioner
    b. Checking inspector
    c. Sub inspector
    d. Food inspector
31. Which gas is used to fill in the fire extinguisher?
    a. Carbon dioxide
    b. Oxygen
    c. Hydrogen
    d. Nitrogen
32. What is filled in the red buckets set on for fire extinguishing at petrol pumps?
    a. Water
    b. Soil
    c. Charcoal
    d. Sand

33. What prevents oxygen dissolving in water?
    a. Oil
    b. Pesticides
    c. Detergents
    d. Weedicides
34. Which unit is used to measure the sound intensity?
    a. Fathoms
    b. Decibel
    c. Tons
    d. Kilogram
35. Where is the ozone layer found in the atmosphere?
    a. Troposphere
    b. Stratosphere
    c. Mesosphere
    d. Thermosphere
36. What is the way to avoid road accidents?
    a. Do not use mobile phones while driving
    b. Do not get drunk while driving
    c. Do not overcome the speed level prescribed by law
    d. All the above
37. Which is the chemical that cause the Minematha disease?
    a. Oil spill
    b. Arsenic
    c. Organic wastes
    d. Mercury
38. Which of the following is a pollutant in detergents which causes water pollution?
    a. Sulphate
    b. Carbonate
    c. Nitrate
    d. Phosphate

39. What is the way to manage air accidents?
    a. Avoided exploding objects on air plane
    b. Proper maintenance of the air craft at proper time
    c. Listen to the instructions before the flight
    d. All the above
40. Forestry is related to which among the following?
    a. Seri culture
    b. Olery culture
    c. Silvi culture
    d. Epi culture
41. What is the first aid to be given for the victim of food poisoning?
    a. Do not allow to vomit
    b. Provide food or water if he feels fainting
    c. Relax on the chair
    d. Lay him on the floor with head to one side
42. Which is the most polluted city in the world?
    a. New York
    b. Mexico
    c. Delhi
    d. Kolkata
43. What causes rail disasters?
    a. Damaged rail tracks
    b. Lack of maintenance
    c. Climate change affects the rail
    d. All the above
44. Which gas is most responsible for an acid rain?
    a. Ozone
    b. Sulphur dioxide
    c. Oxygen
    d. Chlorine

45. Which of the following is a potential health problem caused by noise pollution?
    a. High blood pressure
    b. Deafness
    c. Sleeplessness
    d. All the above
46. Which country releases the most portions of greenhouse gases outside?
    a. India
    b. U S A
    c. Briton
    d. France
47. Which is the main reason for boat capsizing?
    a. irresponsibility of the concerned individuals
    b. Inadequate training of concerned individuals
    c. Boats error
    d. All the above
48. Which of the following waste is not subject to the biodegradation?
    a. Bandage waste
    b. The remnants of crops
    c. Vegetable wastes
    d. Plastic wastes
49. What is the way to avoid rail accidents?
    a. Repairs on regular ways
    b. Rebuild the rail regularly
    c. Try not to miss railway signals
    d. All the above
50. What causes the stampede in pilgrimage places?
    a. The uncontrolled mass found in such places
    b. Unexpected fire
    c. The act of ignoring the governments security systems
    d. All of the above

51. What is the main reason for aviation accidents?
    a. Presence of storm
    b. Device failure
    c. Attention failure of pilot
    d. All the above
52. Which is the most air polluted city in India?
    a. Delhi
    b. Kolkata
    c. Bhopal
    d. Bangalore
53. Which of the following is a way to prevent contagious diseases?
    a. Wash hands properly with soap before meal
    b. Take vaccination
    c. If you have any contagious disease symptoms, stay within the home
    d. All the above
54. What are the reasons for drowning?
    a. Does not know swimming
    b. Adventures in water
    c. Swim with drunkenness
    d. All the above
55. Who is most affected by the disaster of oil spill?
    a. Aquatic organisms
    b. Human beings
    c. Wild life’s
    d. Micro organisms
56. What does the red triangle indicate in pesticides packets indicate?
    a. A little toxic
    b. Common toxicity
    c. Lethal toxin
    d. No toxic

57. What is the first aid to be given to someone who has fallen into water?

a. Remove the victim from the water
b. Remove wet cloth and put on dry clothes
c. Lay down on one side and bring him to the hospital immediately
d. All the above

58. What is the effect of nuclear radiation?

a. Spread of epidemics
b. AIDS
c. Dengue fever
d. Cause cancer

APPENDIX- VII

DISASTER MANAGEMENT AWARENESS TEST- RESPONSE SHEET

Part A

Name: Class: Gender: Boy/Girl

No	**A**	**B**	**C**	**D**
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No	**A**	**B**	**C**	**D**
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APPENDIX- VIII

DISASTER MANAGEMENT AWARENESS TEST- RESPONSE SHEET

Part B

Name: Class: Gender: Boy/Girl

No	**A**	**B**	**C**	**D**
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No	**A**	**B**	**C**	**D**
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APPENDIX-IX

DISASTER MANAGEMENT AWARENESS TEST- SCORING KEY

PART-A

No:	Answer	No:	Answer
1	D	26	D
2	D	27	D
3	B	28	D
4	C	29	A
5	C	30	D
6	C	31	C
7	B	32	D
8	C	33	D
9	A	34	D
10	B	35	B
11	C	36	D
12	B	37	D
13	B	38	D
14	B	39	C
15	B	40	D
16	B	41	D
17	D	42	B
18	C	43	C
19	B	44	A
20	A	45	D
21	D	46	A
22	A	47	B
23	B	48	B
24	D	49	D
25	A	50	A

APPENDIX-X

DISASTER MANAGEMENT AWARENESS TEST- SCORING KEY

PART-B -

No:	Answer	No:	Answer
1	C	30	D
2	C	31	A
3	B	32	D
4	D	33	A
5	A	34	B
6	A	35	B
7	A	36	D
8	A	37	D
9	B	38	A
10	D	39	D
11	C	40	C
12	B	41	D
13	B	42	C
14	B	43	D
15	D	44	B
16	B	45	D
17	D	46	B
18	A	47	D
19	B	48	D
20	B	49	D
21	B	50	D
22	D	51	D
23	D	52	A
24	D	53	D
25	D	54	D
26	A	55	A
27	D	56	C
28	D	57	D
29	D	58	D

APPENDIX XI

LESSON TRANSCRIPTS

LESSON TRANSCRIPT 2

Topic: Disaster Management- Agencies and Disaster Management Act

Objectives:

To discuss different types of agencies of Disaster Management

To understand disaster management Act

To understand the functions of Disaster Management agencies

Main concept: Disaster, disaster management Act and Disaster Management Agencies

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Disaster Management	Group discussion followed by presentation	15 mts
2	Agencies related with disaster management	Group discussion followed by presentation	15 mts
3	Disaster management Act	Group discussion followed by presentation	15 mts

Activity I:

Teacher introduces the lesson by asking about the questions related to the types of disasters. Then the teacher asked to form four groups. The groups are provided with discussion points related to the management of natural disasters and manmade disasters. Teacher encouraged the group discussion. The leader of the group reflects

their views after discussion. Teacher summarized the discussion by showing the video related to the disaster management aspects of natural and manmade disasters using power point presentation.

Activity II:

Teacher provides some hints related to the agencies involved in disaster management. Teacher motivated the discussion. One of the member asked to some up their discussion findings. The wrong points are corrected by the teacher with the explanation.

Activity III:

The entire four groups asked to discuss laws and orders related with disaster management. Sum up their views by presentation. Teacher provide a clear explanation of disaster management law by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for the management certain natural disasters like landslides. All of them very interest in seeing the visuals of disasters.

Follow up activities

Write a short note about the activities of the agencies involved in disasters risk reduction.

LESSON TRANSCRIPT 3

Topic: Earthquake

Objectives:

To discuss the causes of Earthquake

To understand the disaster management phases of Earthquake

Main concept: Earthquake

Causes, impact, disaster management cycle of Earthquake

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Earthquake	Group discussion followed by presentation	15 mts
2	Earthquake - Disaster management steps	Group discussion followed by presentation	15 mts
3	Earthquake after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Earthquake then the teacher asked to form four groups. The groups are provided with discussion points like some reasons for the Earthquake. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Earthquake.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Earthquake. After the discussion the groups are asked to present their

findings. Then the teacher correct it with point related to disaster management phases of Earthquake by using videos of Earthquake.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Earthquake. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Earthquake.

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Earthquake. All of them are very interest in seeing the videos of Earthquake.

Follow up activities

Collect the pictures of Earthquake

LESSON TRANSCRIPT 4

Topic: Flood

Objectives:

To discuss the causes of Flood

To understand the Flood as a natural disaster

To understand the disaster management phases of Flood

Main concept: Flood causes, impact, disaster management cycle of Flood

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Flood	Group discussion followed by presentation	15 mts
2	Flood - Disaster management steps	Group discussion followed by presentation	15 mts
3	Flood after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Flood then the teacher asked to form four groups. The groups are provided with discussion points related to Flood (what are the causes of flood?). Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Flood.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Flood like precautions for flood, during flood and after flood. After the

discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Flood by using videos of flood.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Flood. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Flood.

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Flood. All of them very interest in seeing the videos of Flood.

Follow up activities

Collect the pictures of Flood in Kerala

LESSON TRANSCRIPT NO: 5

Topic: Draught

Objectives:

To discuss the causes of Draught

To understand Draught as a natural disaster

To understand the disaster management of Draught

Main concept: Draught causes, impact, disaster management cycle of Draught

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Draught	Group discussion followed by presentation	15 mts
2	Draught - Disaster management steps	Group discussion followed by presentation	15 mts
3	Draught after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Draught then the teacher asked to form four groups. The groups are provided with discussion points like causes and of Drought. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Draught.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Draught. After the discussion the groups are asked to present their

findings. Then the teacher correct it with point related to disaster management phases of Draught by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic consequences of Draught. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Draught.

Responses

All the students are participated very well in group discussions. Some students give problem in their area. The students are very interested in seeing the videos of Draught.

Follow up activities

Collect the pictures of Draught

LESSON TRANSCRIPT 6

Topic: Tsunami

Objectives:

To discuss the causes of Tsunami

To understand Tsunami as a natural disaster

To understand the disaster management of Tsunami

Main concept: Tsunami causes, impact, disaster management cycle of Tsunami

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Tsunami	Group discussion followed by presentation	15 mts
2	Tsunami - Disaster management steps	Group discussion followed by presentation	15 mts
3	Tsunami after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the video of Tsunami then the teacher asked to form four groups. The groups are provided with some hints related to Tsunami. Teacher encouraged the group discussion. The group leader presents their views after discussion. They present the causes of Tsunami; according to their knowledge. Teacher summarized the discussion by showing the video of Tsunami.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Tsunami. After the discussion the groups are asked to present their

findings. Then the teacher correct it with point related to disaster management phases of Tsunami by using power point.

Activity 3.

The students requested to make a discussion on the topic consequences of Tsunami. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Tsunami.

Responses

All the students are participated very well in group discussions. Some students give suggestion for evacuation during Tsunami. All of them very interest in seeing the videos of Tsunami.

Follow up activities

Collect the pictures of Tsunami

LESSON TRANSCRIPT 7

Topic: Landslides / mud flow

Objectives:

To discuss the causes of Landslides / mud flow

To understand Landslides / mud flow as a natural disaster

To understand the disaster management phases of Landslides / mud flow

Main concept: Landslides / mud flow causes, impact, disaster management cycle of Landslides / mud flow

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Landslides / mud flow	Group discussion followed by presentation	15 mts
2	Landslides / mud flow - Disaster management steps	Group discussion followed by presentation	15 mts
3	Landslides / mud flow after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Landslides / mud flow then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Landslides / mud flow. Teacher encouraged the group discussion. After discussion, teacher summarized the discussion by showing the video of Landslides / mud flow.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Landslides / mud flow. After the discussion the groups are asked to present their findings. Then the teacher corrects it by explaining disaster management phases of Landslides / mud flow by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Landslides / mud flow. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Landslides / mud flow.

Responses

The students are actively participated in group discussions. All of them very interest in seeing the videos of Landslides / mud flow.

Follow up activities:

Collect the pictures of Landslides / mud flow

LESSON TRANSCRIPT 8

Topic: Lightning

Objectives:

To discuss the causes of Lightning

To understand Lightning as a natural disaster

To understand the management of Lightning disaster

Main concept: Lightning causes, impact, disaster management cycle of Lightning

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Lightning	Group discussion followed by presentation	15 mts
2	Lightning - Disaster management steps	Group discussion followed by presentation	15 mts
3	Lightning after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the Topic by showing the video of Lightning then divided the students in to four groups. The groups are provided with discussion points related to Lightning, what are the reasons for lightning disaster? Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Lightning.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Lightning. After the discussion the groups are asked to present their

findings. Then the teacher correct it with point related to disaster management phases of Lightning by using videos of Lightning.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Lightning. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Lightning.

Responses

All the students are participated very well in group discussions. The students express their experiences in Lightning. All of them very interest in seeing the videos of Lightning.

Follow up activities:

Collect the news of lightning disaster happened in your area.

LESSON TRANSCRIPT 9

Topic: Cyclone

Objectives:

To discuss the causes of Cyclone

To understand Cyclone as a natural disaster

To understand the disaster management phases of Cyclone

Main concept: Cyclone causes, impact, disaster management cycle of Cyclone

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Cyclone	Group discussion followed by presentation	15 mts
2	Cyclone - Disaster management steps	Group discussion followed by presentation	15 mts
3	Cyclone after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the video of Cyclone. The teacher asked to form four groups. The groups are provided with discussion points related to Cyclone. Teacher encouraged the group discussion. The group leader presents the result of their discussion. Teacher summarized the discussion by showing the video of Cyclone.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Cyclone. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Cyclone by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Cyclone. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Cyclone using chart.

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Cyclone. All of them very interest in seeing the videos of Cyclone.

Follow up activities:

Write a short note on Cyclone.

LESSON TRANSCRIPT 10

Topic: Hail storm and Cloud burst

Objectives:

To discuss the causes of Hail storm and Cloud burst

To understand Hail storm and Cloud burst as a natural disaster

To understand the disaster management phases of Hail storm and Cloud burst

Main concept: hail storm and cloud burst causes, impact, disaster management cycle of hail storm and cloud burst

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Hail storm	Group discussion followed by presentation	15mts
2	Hail storm – disaster management	Group discussion followed by presentation	10mts
3	Cloud burst	Group discussion followed by presentation	10mts
4	Cloud burst - disaster management	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson. Then the teacher asked to form four groups. The groups are provided with discussion points related to Hail storm. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Hail storm

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases Hail storm. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Hail storm by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Cloud burst. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Cloud burst.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management phase Cloud burst. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Cloud burst by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control hail storm and cloud burst. All of them very interest in seeing the videos of hail storm and cloud burst

Follow up activities

Write a short note on Hail storm and Cloud burst in your diary.

LESSON TRANSCRIPT 11

Topic: Heat wave and Cold wave

Objectives:

To discuss the causes of Heat wave and cold wave

To understand Heat wave and cold wave as a natural disaster

To understand the disaster management of Heat wave and cold wave

Main concept: Heat wave and cold wave causes, impact, disaster management cycle of Heat wave and cold wave

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Heat wave	Group discussion	15mts
2	Heat wave – disaster management	Group discussion followed by presentation	10mts
3	Cold wave	Brain storming	10mts
4	Cold wave - disaster management	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news from the newspaper, and then the teacher divided the students in to four groups. The groups are provided with some hints related to Heat wave. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Heat wave

Activity 2.

Teacher encouraged the group discussion of the topic disaster management of Heat wave. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Heat wave by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Cold wave. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Cold wave.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management phase Cold wave. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Cold wave by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Heat wave and cold wave. All of them very interest in seeing the videos of Heat wave and cold wave

Follow up activities

Collect the news of Heat wave and cold wave

LESSON TRANSCRIPT 12

Topic: Avalanche and Volcanic eruption

Objectives:

To discuss the causes of Avalanche and Volcanic eruption

To understand Avalanche and Volcanic eruption as a natural disaster

To understand the disaster management of Avalanche and Volcanic eruption

Main concept: Avalanche and Volcanic eruption causes, impact, disaster management cycle of Avalanche and Volcanic eruption

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Avalanche	Group discussion followed by presentation	15mts
2	Avalanche – disaster management	Group discussion followed by presentation	10mts
3	Volcanic eruption	Group discussion followed by presentation	10mts
4	Volcanic eruption - disaster management	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing video of Avalanche, and then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Avalanche. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Avalanche

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases Avalanche. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Avalanche by using power point.

Activity 3.

Each group of the students requested to make a group discussion on the topic volcanic eruption. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of volcanic eruption.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management phase volcanic eruption. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of volcanic eruption by using power point

Responses

All the students are participated very well in group discussions. Some students give idea for control the after effects of Avalanche and Volcanic eruption. All of them shows interest in seeing the videos of Avalanche and Volcanic eruption

Follow up activities

Collect the pictures of Avalanche and Volcanic eruption

LESSON TRANSCRIPT 13

Topic: Air pollution

Objectives:

To discuss the causes of air pollution

To understand air pollution as a manmade disaster

To understand the management of air pollution

Main concept: Air pollution, causes, impact, disaster management cycle of air pollution

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Air pollution	Group discussion followed by presentation	15 mts
2	Air pollution- Disaster management steps	Group discussion followed by presentation	15 mts
3	Air pollution after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of air pollution then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to air pollution. Teacher encouraged the group discussion. One of the members reflects their views after discussion. Teacher summarized the discussion by showing the related aspects of pollution using power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of air pollution. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of air pollution by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of air pollution. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of air pollution

Responses

All the students are participated very well in group discussions. Some students give suggestion for air pollution management. All of them very interest in seeing the videos of air pollution

Follow up activities

Collect the pictures of air pollution hazards.

LESSON TRANSCRIPT 14

Topic: Water pollution

Objectives:

To discuss the causes of water pollution

To understand water pollution as a manmade disaster

To understand the management of water pollution

Main concept: water pollution, causes, impact, disaster management cycle of air pollution

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Water pollution	Group discussion followed by presentation	15 mts
2	Water pollution- Disaster management steps	Group discussion followed by presentation	15 mts
3	Water pollution after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of water pollution then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to water pollution. Teacher encouraged the group discussion. One of the members reflects their views after discussion. Teacher summarized the discussion by showing the related aspects of pollution using power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of water pollution. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of water pollution by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of water pollution. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of water pollution

Responses

All the students are participated very well in group discussions. Some students give suggestion for water pollution management. All of them very interest in seeing the videos of water pollution

Follow up activities

Collect the pictures of water pollution hazards.

LESSON TRANSCRIPT 15

Topic: Soil pollution

Objectives:

To discuss the causes of soil pollution

To understand soil pollution as a manmade disaster

To understand the management of soil pollution

Main concept: soil pollution, causes, impact, disaster management cycle of soil pollution

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Soil pollution	Group discussion followed by presentation	15 mts
2	Soil pollution- Disaster management steps	Group discussion followed by presentation	15 mts
3	Soil pollution after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of soil pollution then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to soil pollution. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the related aspects of pollution using power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of soil pollution. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of soil pollution by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of soil pollution. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of soil pollution

Responses

All the students are participated very well in group discussions. Some students give suggestion for soil pollution management. All of them very interest in seeing the videos of soil pollution

Follow up activities

Collect the pictures of soil pollution hazards.

LESSON TRANSCRIPT 16

Topic: Noise pollution

Objectives:

To discuss the causes of noise pollution

To understand noise pollution as a manmade disaster

To understand the management of noise pollution

Main concept: Noise pollution, causes, impact, disaster management cycle of noise pollution

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Noise pollution	Group discussion followed by presentation	15 mts
2	Noise pollution- Disaster management steps	Group discussion followed by presentation	15 mts
3	Noise pollution after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by telling a story about noise pollution then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to noise pollution. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the related aspects of noise pollution using power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of noise pollution. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of noise pollution by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of noise pollution. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of noise pollution

Responses

All the students are participated very well in group discussions. Some students give suggestion for noise pollution management. All of them very interest in seeing the videos of noise pollution

Follow up activities

Collect the pictures of noise pollution hazards.

LESSON TRANSCRIPT 17

Topic: Deforestation

Objectives:

To discuss the causes of deforestation

To understand deforestation as a manmade disaster

To understand the disaster management phases of deforestation

Main concept: Deforestation, causes, impact, disaster management cycle of Deforestation

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Deforestation	Group discussion followed by presentation	15 mts
2	Deforestation -Disaster management steps	Group discussion followed by presentation	15 mts
3	Deforestation after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by telling a story about Deforestation then the teacher divided the students in to four groups. The groups are provided with discussion points like some hints related to Deforestation. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the related aspects of Deforestation using power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Deforestation. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Deforestation by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Deforestation. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Deforestation

Responses

All the students are participated very well in group discussions. Some students give suggestion to control Deforestation management. All of them very interest in seeing the videos of Deforestation

Follow up activities

Collect the pictures of noise pollution hazards.

LESSON TRANSCRIPT 18

Topic: Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents

Objectives:

To discuss the causes of Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents

To understand Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents as a manmade disaster

To understand the control measures of Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents

Main concept: Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents causes, impact, control measures of Accidents

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Road Accidents	Group discussion followed by presentation	15mts
2	Train Accidents	Group discussion followed by presentation	10mts
3	Air Accidents	Group discussion followed by presentation	10mts
4	Boat Accidents	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news from the newspaper, and then the teacher asked to form four groups. The groups are provided with discussion

points like some hints related to road accidents and its management. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of road accidents

Activity 2.

Teacher encouraged the role play of train accidents. Then they asked to discuss about the topic control measures of train accidents. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of train accident by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic air accidents with the hints of its management. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Air crashes.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Boat accidents. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of boat accidents by using power point

Responses

All the students are participated very well in group discussion, brain storming and role play. Some students give suggestion for control accidents. All of them very interest in seeing the videos of Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents.

Follow up activities

Collect the news of Accidents- Road Accidents, Train Accidents, Air Accidents and Boat Accidents

LESSON TRANSCRIPT 19

Topic: Biological Disaster / Epidemic

Objectives:

To discuss the causes of Biological Disaster / Epidemic

To understand Biological Disaster / Epidemic as a disaster

To understand the control measures of Biological Disaster / Epidemic

Main concept: Biological Disaster / Epidemic, causes, impact, control measures of Biological Disaster / Epidemic

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Biological Disaster / Epidemic	Group discussion followed by presentation	15 mts
2	Biological Disaster / Epidemic - control measures	Group discussion followed by presentation	15 mts
3	Biological Disaster / Epidemic after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Biological Disaster / Epidemic. The students are divided in to four groups and provided with discussion points related to Biological Disaster / Epidemic. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Biological Disaster / Epidemic.

Activity 2.

Teacher encouraged the group discussion of the topic control measures of Biological Disaster / Epidemic. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Biological Disaster / Epidemic by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Biological Disaster / Epidemic. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Biological Disaster / Epidemic.

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Biological Disaster / Epidemic. All of them very interest in seeing the videos of Biological Disaster / Epidemic.

Follow up activities

Collect the pictures of Biological Disaster / Epidemic.

LESSON TRANSCRIPT 20

Topic: Dengue fever and Malaria

Objectives:

To discuss the causes of Dengue fever and Malaria

To understand Dengue fever and Malariaas a disaster

To understand the control measures of Dengue fever and Malaria

Main concept: Dengue fever and Malaria, causes, impact, control measures of Dengue fever and Malaria

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Dengue fever	Group discussion	15mts
2	Dengue fever – control measures	Group discussion followed by presentation	10mts
3	Malaria	Brain storming	10mts
4	Malaria- control measures	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news epidemic infection. The teacher divided the students in to four groups. The groups are provided with discussion points related to Dengue fever. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Dengue fever

Activity 2.

Teacher encouraged the group discussion of the topic control measures of Dengue fever. After the discussion the groups are asked to present their findings.

Then the teacher correct it with point related to control measures of Dengue fever by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Malaria. The findings were formed by the group. Then the teacher summarized the topic by explaining the causes and consequences of Malaria.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Malaria. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Malaria by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control epidemics. All of them very interest in seeing the videos of Dengue fever and Malaria

Follow up activities

Collect the news of Dengue fever and Malaria

LESSON TRANSCRIPT 21

Topic: Diarrhea and Cholera

Objectives:

To discuss the causes of Diarrhea and Cholera

To understand Diarrhea and Cholera as a disaster

To understand the control measures of Diarrhea and Cholera

Main concept: Diarrhea and Cholera, causes, impact, control measures Diarrhea and Cholera

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Diarrhea	Group discussion	15mts
2	Diarrhea – control measures	Group discussion followed by presentation	10mts
3	Cholera	Brain storming	10mts
4	Cholera - control measures	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news from the newspaper, and then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Diarrhea. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Diarrhea

Activity 2.

Teacher encouraged the group discussion of the topic control measures of Diarrhea. After the discussion the groups are asked to present their findings. Then

the teacher correct it with point related to control measures of Diarrhea by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Cholera. The findings were formed by the group. Then the teacher summarized the topic by explaining the causes and consequences of Cholera.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Cholera. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Cholera by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control epidemics like Diarrhea and Cholera. All of them very interest in seeing the videos of Diarrhea and Cholera

Follow up activities

Collect the news of Diarrhea and Cholera

LESSON TRANSCRIPT 22

Topic: Filariasis and Typhoid

Objectives:

To discuss the causes of Filariasis and Typhoid

To understand Filariasis and Typhoid as a disaster

To understand the control measures of Filariasis and Typhoid

Main concept: Filariasis and Typhoid, causes, impact, control measures of Filariasis and Typhoid

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Filariasis	Group discussion	15mts
2	Filariasis – control measures	Group discussion followed by presentation	10mts
3	Typhoid	Brain storming	10mts
4	Typhoid - control measures	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news from the newspaper, and then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Filariasis. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Filariasis

Activity 2.

Teacher encouraged the group discussion of the topic control measures of Filariasis. After the discussion the groups are asked to present their findings. Then

the teacher correct it with point related to control measures of Filariasis by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Typhoid. The findings were formed by the group. Then the teacher summarized the topic by explaining the causes and consequences of Typhoid.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Typhoid. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Typhoid by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control measures. All of them very interest in seeing the videos of Typhoid and filariasis

Follow up activities

Collect the news of Filariasis and Typhoid

LESSON TRANSCRIPT 23

Topic: Plague and Jaundice

Objectives:

To discuss the causes of Plague and Jaundice

To understand Plague and Jaundice as a disaster

To understand the disaster control measures of Plague and Jaundice

Main concept: Plague and Jaundice, causes, impact.

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Plague	Group discussion	15mts
2	Plague – control measures	Group discussion followed by presentation	10mts
3	Jaundice	Brain storming	10mts
4	Jaundice- control measures	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing picture of some epidemics and asked them to identify what are the infectious diseases in them. The teacher divides the students in to four groups. The groups are provided with discussion points like some hints related to Plague. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by power point with causes and consequences of Plague

Activity 2.

Teacher encouraged the group discussion of the topic control measures of Plague. After the discussion the groups are asked to present their findings. Then the

teacher correct it with point related to control measures of Plague by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Jaundice. The findings were formed by the group. Then the teacher summarized the topic by explaining the causes and consequences of Jaundice.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Jaundice. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Jaundice by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control infectious disease. All of them very interest in seeing the videos of Plague and Jaundice

Follow up activities

Collect the news of Plague and Jaundice

LESSON TRANSCRIPT 24

Topic: Flu (H1N1) and Nipah

Objectives:

To discuss the causes of Flu (H1N1) and Nipah

To understand Flu (H1N1) and Nipah as a disaster

To understand the control measures of Flu (H1N1) and Nipah

Main concept: Flu (H1N1) and Nipah, causes, impact.

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	H1N1	Group discussion	15mts
2	H1N1– control measures	Group discussion followed by presentation	10mts
3	Nipah	Brain storming	10mts
4	Nipah- control measures	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing news from the newspaper. The students are divided in to four groups. The groups are provided with discussion points related to flu. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic control measures of H1N1. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of H1N1by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Nipah. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Nipah.

Activity 4.

Teacher encouraged the group discussion of the topic control measures of Nipah. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to control measures of Nipah by using power point

Responses

All the students are participated very well in group discussions. All students have some suggestion for control epidemics.

Follow up activities

Collect the news of Flu (H1N1) and Nipah

LESSON TRANSCRIPT 25

Topic: Setting of fires/ Forest fire

Objectives:

To discuss the causes of Setting of fires/ Forest fire

To understand Setting of fires/ Forest fire as a manmade disaster

To understand the disaster management phases of Setting of fires/ Forest fire

Main concept: Setting of fires/ Forest fire, causes, impact, disaster management cycle of Setting of fires/ Forest fire

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Setting of fires/ Forest fire	Group discussion followed by presentation	15 mts
2	Setting of fires/ Forest fire - Disaster management steps	Group discussion followed by presentation	15 mts
3	Setting of fires/ Forest fire after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by showing the pictures of Setting of fires/ Forest fire then the teacher asked to form four groups. The groups are provided with discussion points related to Setting of fires/ Forest fire. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of Setting of fires/ Forest fire.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Setting of fires/ Forest fire. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Setting of fires/ Forest fire by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Setting of fires/ Forest fire. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Setting of fires/ Forest fire.

Responses

All the students are participated very well in group discussions. Some students give suggestion for control setting of fires/ Forest fire. All of them very interest in seeing the videos of Setting of fires/ Forest fire.

Follow up activities

Collect the pictures of Setting of fires/ Forest fire.

LESSON TRANSCRIPT 26

Topic: Drowning

Objectives:

To discuss the causes of Drowning

To understand Drowning as a manmade disaster

To understand the disaster management phases of Drowning

Main concept: Drowning causes, impact, disaster management cycle

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Drowning	Group discussion followed by presentation	15 mts
2	Drowning - Disaster management steps	Group discussion followed by presentation	15 mts
3	Drowning after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by telling news of Drowning. The students are divided in to four groups. The groups are provided with discussion points like causes of Drowning. Teacher encouraged the group discussion. The group leader presents their result of discussion. Teacher summarized the discussion by showing the video of swimming training.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Drowning. After the discussion the groups are asked to present their

findings. Then the teacher correct it with point related to disaster management phases of Drowning by using power point.

Activity 3.

Each group of the students requested to make a discussion on the topic how to control Drowning. The groups presented their views. Then the teacher summarized the topic by showing power point.

Responses

All the students are participated very well in group discussions. Some students explain their experience in swimming. All of them very interest in seeing the videos swimming training.

Follow up activities

Collect the pictures of swimming

LESSON TRANSCRIPT 27

Topic: Food poisoning and Stampede

Objectives:

To discuss the causes of Food poisoning and Stampede

To understand Food poisoning and Stampede as a manmade disaster

To understand the control measures of Food poisoning and Stampede

Main concept: Food poisoning and Stampede, causes, impact, disaster management

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Food poisoning	Group discussion	15mts
2	Food poisoning - Disaster management steps	Group discussion followed by presentation	10mts
3	Stampede	Group discussion	10mts
4	Stampede Disaster management steps	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing the pictures, and then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Food poisoning. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of Food poisoning

Activity 2.

Teacher encouraged the group discussion of the topic disaster management of Food poisoning. After the discussion the groups are asked to present their findings.

Then the teacher correct it with point related to control measures of Food poisoning by using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Stampede. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Stampede.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management of Stampede. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Stampede by using power point

Responses

All the students are participated very well in group discussions. Some students give suggestion for control Food poisoning and Stampede.

Follow up activities

Collect the news of Food poisoning and Stampede

LESSON TRANSCRIPT NO: 28

Topic: Chemical disasters / industrial disasters

Objectives:

To discuss the causes of Chemical disasters / industrial disasters

To understand Chemical disasters/industrial disasters as a manmade disaster

To understand the disaster management phases of Chemical disasters/ industrial disasters

Main concept: Chemical disasters / industrial disasters, causes, impact, disaster management cycle of Chemical disasters / industrial disasters

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Chemical disasters / industrial disasters	Group discussion followed by presentation	15 mts
2	Chemical disasters / industrial disasters - Disaster management steps	Group discussion followed by presentation	15 mts
3	Chemical disasters / industrial disasters after effects	Group discussion followed by presentation	15 mts

Activity 1.

Teacher introduces the lesson by telling the story of Chemical disasters / industrial disasters then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Chemical disasters / industrial disasters. Teacher encouraged the group discussion. The group leader

presents their views after discussion. Teacher summarized the discussion by showing the video of Chemical disasters / industrial disasters.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases of Chemical disasters / industrial disasters. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of Chemical disasters / industrial disasters by using videos of Chemical disasters / industrial disasters

Activity 3.

Each group of the students requested to make a discussion on the topic after effects of Chemical disasters / industrial disasters. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of Chemical disasters / industrial disasters.

Responses

All the students are participated very well in group discussions. All of them very interest in seeing the videos of Chemical disasters / industrial disasters.

Follow up activities:

Collect the pictures of Chemical disasters / industrial disasters.

LESSON TRANSCRIPT 29

Topic: Nuclear disasters

Objectives:

To discuss the causes of Nuclear disasters

To understand nuclear disasters as a manmade disaster

To understand the disaster management phases of nuclear disasters

Main concept: Nuclear disasters, causes, impact, disaster management cycle of nuclear disasters

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Nuclear disasters	Group discussion	15 mts
2	Nuclear disasters - Disaster management steps	Group discussion followed by presentation	15 mts
3	Nuclear disasters after effects	Group discussion	15 mts

Activity 1.

Teacher introduces the lesson by telling the story of nuclear disasters then the teacher divided the students in to four groups. The groups are provided with discussion points like some hints related to nuclear disasters. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by showing the video of nuclear disasters.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management of nuclear disasters. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management phases of nuclear disasters by using videos of nuclear disasters

Activity 3.

Each group of the students requested to make a discussion on the topic consequences of nuclear disaster. The discussion points were given by the teacher. Then the teacher summarized the topic by explaining the after effect of nuclear disasters.

Responses

All the students are participated very well in group discussions. All of them actively discuss the consequences of nuclear disasters .

Follow up activities: write a short note on nuclear disaster.

LESSON TRANSCRIPT 30

Topic: coastal erosion and oil spill

Objectives:

To discuss the causes of coastal erosion and oil spill

To understand coastal erosion and oil spill as a manmade disaster

To understand the disaster management phases of coastal erosion and oil spill

Main concept: coastal erosion and oil spill, causes, impact, disaster management cycle of coastal erosion and oil spill

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Coastal erosion	Group discussion	15mts
2	Coastal erosion – disaster management	Group discussion followed by presentation	10mts
3	Oil spill	Brain storming	10mts
4	Oil spill - disaster management	Group discussion followed by presentation	10mts

Activity 1.

Teacher introduces the lesson by showing pictures of coastal erosion. Then teacher divided the students in to four groups. The groups are provided with discussion points like causes and consequences of coastal erosion. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point of coastal erosion.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management of coastal erosion. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management of oil spill using power point.

Activity 3.

Each group of the students requested to make a brain storming on the topic Oil spill. The findings were formed by the group. Then the teacher summarized the topic by explaining the after effect of Oil spill.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management phase Oil spill. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management of Oil spill by using power point

Responses

All the students are participated very well in group discussions. All of them very interest in seeing the videos of coastal erosion and oil spill

Follow up activities

Write a short note on coastal erosion and oil spill

LESSON TRANSCRIPT 31

Topic: Terrorism

Objectives:

To discuss the causes of Terrorism

To understand Terrorism as a manmade disaster

To understand the causes and consequences of terrorism

Main concept: Terrorism, causes, impact

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Terrorism	Group discussion followed by power point presentation	15 mts
2	Terrorism- after effects	video	20 mts
3	Terrorist attacks in India	Chart presentation	10 mts

Activity 1.

Teacher introduces the lesson by showing the video of Terrorism then the teacher asked to form four groups. Then members of the group discuss the after effects of terrorism. The group leader presents their views after discussion. Teacher summarized the discussion by explaining it.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management phases Terrorism. After the discussion the groups are present their findings. Then the teacher correct it with point related to Terrorism by using power point.

Activity 3.

All the students are keenly observed the chart showing terrorist attacks in India. Then the teacher summarized the topic.

Responses

All the students are participated very well in group discussion. The reason for terrorism, they explained very well. All of them very interest in seeing the videos of Terrorism.

Follow up activities

Collect the news and pictures related to Terrorist attacks in India

LESSON TRANSCRIPT 32

Topic: Dam burst and Mine flooding

Objectives:

To discuss the causes of Dam burst and Mine flooding

To understand Dam burst and Mine flooding

To understand the disaster management of Dam burst and Mine flooding

Main concept: Dam burst and Mine flooding, causes, impact, disaster management cycle of Dam burst and Mine flooding

Instructional materials: video, chart, pictures and power point

Activities	Topic	Methodology	Duration
1	Dam burst	Group discussion	15mts
2	Dam burst – disaster management	Group discussion	10mts
3	Mine flooding	Brain storming	10mts
4	Mine flooding - disaster management	Group discussion	10mts

Activity 1.

Teacher introduces the lesson by showing picture of dam burst, and then the teacher asked to form four groups. The groups are provided with discussion points like some hints related to Dam burst. Teacher encouraged the group discussion. The group leader presents their views after discussion. Teacher summarized the discussion by a power point presentation.

Activity 2.

Teacher encouraged the group discussion of the topic disaster management of dam burst. After the discussion the groups are asked to present their findings. Then the teacher correct it with point related to disaster management of dam burst.

Activity 3.

Each group of the students requested to make a brain storming on the topic Mine flooding. The findings were formed by the group. Then the teacher summarized the topic by explaining the causes and consequences of Mine flooding.

Activity 4.

Teacher encouraged the group discussion of the topic disaster management of Mine flooding. After the discussion the groups are asked to present their findings. Then the teacher corrects it using power point.

Responses

All the students are participated very well in group discussions. Some students give suggestion to Dam burst and Mine flooding. All of them very interest in seeing the videos of Dam burst and Mine flooding

Follow up activities

Collect the news of Dam burst and Mine flooding