

MINOR RESEARCH PROJECT

*A Study into the Health Problems faced by Adolescent Girls of
Thoothukudi District*

MRP NO 276

(F.No: 4-4/2015-16 (MRP / UGC-SERO) – Proposal No: 276)

Final report

Submitted to

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University Grants Commission
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DECLARATION AND CERTIFICATE

I hereby declare and certify that, the Minor Research Project entitled “*A Study into the Health Problems faced by Adolescent Girls of Thoothukudi District*” MRP(S)-276, F.No: 4-4/2015-16 (MRP / UGC-SERO) – Proposal No: 276 is a bonafide record of research work carried out by me during the year 2017-2019. Further I certify that the work presented in the report is original and carried out according to the plan in the proposal and guidelines of the University Grants Commission.

Principal Investigator

Principal

ACKNOWLEDGMENT

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LIST OF ABBREVIATIONS

BMI	–	Body Mass Index
Hb	–	Haemoglobin
ICRW	–	International Center for Research on Women
NFHS	–	National Family Health Survey
NHP	–	National Health Policy
NPP	–	National Population Policy
NPEW	–	National Policy for the Empowerment of Women
NYP	–	National Youth Policy
UNDP	–	United Nations Development Programme
UNFPA	–	United Nations Fund for Population Activities
UNICEF	–	United Nations Children's Fund
WHO	–	World Health Organization

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**A STUDY INTO THE STEPS TAKEN IN THE HIGHER
SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL
AWARENESS AND THE ENVIRONMENTAL AWARENESS
AMONG HIGHER SECONDARY STUDENTS**

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Project Report Submitted to

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Through



**V.O. C. COLLEGE OF EDUCATION
(Re-Accredited with 'B' Grade by NAAC)**

THOOTHUKUDI – 628008.

TAMIL NADU.

JUNE- 2019

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CERTIFICATE

This is to certify that the project reportentitled “**A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS**” is a bonafide work done by **Dr. S.USHA PARVATHI**, Project Director, Assistant Professor of Mathematics, of our V.O.C. College of Education, Thoothukudi for **University Grants Commission (UGC), New Delhi** and it has not been submitted for the award of any degree, diploma, associateship, fellowship of any University or Institution.

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DECLARATION

I hereby declare that the project report entitled “**A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS**” is an original work done by me for **University Grants Commission (UGC), New Delhi** and it has not been submitted for the award of any degree, diploma, associateship, fellowship of any University or Institution.

Place : Thoothukudi, Tamilnadu

Date :

Signature of the Candidate

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LIST OF ABBREVIATIONS

B.Ed.	-	Bachelor of Education
C.R.Value	-	Critical Ratio Value
df	-	Degrees of Freedom
Govt.Aided	-	Government Aided
P.G.	-	Post Graduate
S.D	-	Standard Deviation
U.G.	-	Under Graduate

CHAPTER I

CONCEPTUAL FRAMEWORK OF THE STUDY

I.1. INTRODUCTION

The right to live in a healthy environment is part of Article 21 of the Constitution which is considered as a fundamental right. Global Warming is serious issue standing before the world. Global warming and climate change result in an increase of average global temperature. Natural events and human activities are believed to be contributing to increase average global temperatures. All can curb this issue by taking help from all three organs of the government namely Legislature, Executive and Judiciary. Indian Constitution provides specific provision for the protection and improvement of the Environment. There are more than 200 Central and State Legislation on environmental protection. The constitutional provisions are backed by a number of laws, acts, rules and notifications.

I.2. EDUCATION

In English the term “Education” has been derived from two Latin words Educare (Educere) and Educatum. “Educare” means draw to train or mould. It again means to bring up or to lead out. The term “Educatum” denotes the act of teaching. It throws light on the principles and practice of teaching. The term Educare or Educere mainly indicates development of the latent faculties of the child. But child does not know these possibilities. It is the educator or the teacher who can know these and take appropriate methods to develop those powers.

I.3. HUMAN BEINGS AND NATURE

Human beings have given themselves name “Homosapien”. This Latin word means – “Wise Men”. Other species of animals might not agree with this name. To the wild animals, which can live through the bush without cracking a twig, a human being stumbling and crashing through a forest probably doesn’t seem very wise. Yet, as a species humane are wise in many ways. Humans are using the resources of the world to make their lives easier and more comfortable. But at the same time, they cause a lot of damage and destruction to their environment. No other living creature is more capable of influencing and changing the environment as human can. That means humans have a greater responsibility in the world. Humans are indeed wise. But now-a-days they are not preserving nature.

In recent times, human beings are treating the earth, its air, its water, its land its life without caring for it. They must treat it better and must treat “Mother Earth” with love and care. They are competing with nature and racing against nature. Nature, it is said, is the best teacher. But human beings are not learning any lessons from nature and environment.

I.4. ENVIRONMENT

“Environment” is defined as sum total of all the conditions and influences that affect the life and development of organisms. Environment has two basic components: bio-physical and socio-cultural. The bio-physical components include all living organisms, like plants, animals, bacteria, viruses, etc. and the biosphere comprising lithosphere, hydrosphere and atmosphere. It also includes climatic factors like light, temperature, precipitation and wind factors like altitude, steepness, weathering and erosive agents like sea, wind, rain, ice, and soil factors like nature of parent rock and

humus. The interaction between these biological and physical factors decides the type of habitat and organisms in an area. The socio-cultural factors consist of man's economic, social, political and intellectual activities and their products such as modes of production, industry, education, technology, means of transport and commerce, culture, housing, bridges and highways, etc.

The total environment is dynamic and is always in a state of flux. Its ecosystem, comprising the complex web of interaction between its biotic and abiotic components, makes it self-balancing, self-adjusting and self-purifying. Ideally, there is no waste in a stable ecosystem. Its substances cycle naturally through many biogeochemical cycles like water, carbon, oxygen, nitrogen, phosphorus, cycles, etc. In the environment, plants, animals and microorganisms thrive with only minor change in number. In recent years, there has been a growing concern in India regarding the steady deterioration with country's environment. The unplanned development, rapid industrialization and unprecedented growth in population, (with its accompanying poverty and deprivation) are recognized as the main causes of environmental degradation. The governments, both at the center and in the states, are seized of the problem and have passed legislation to preserve ecology and prevent pollution.

Proper environment management and control of pollution are no longer local problems. These have to be tackled at global level. People who are ignorant and indifferent to their environment must be educated. In this context, environmental education assumes great significance. The need for teaching the subject is keenly felt in schools and colleges. The National Policy on Education (1986) stressed the importance of this subject in school curriculum. Consequently, the entire science

curriculum has been reoriented with activities pertaining to environmental problems from elementary school onwards and from local to global.

I.5. GLOBAL AND REGIONAL ENVIRONMENTAL ISSUES

The beginning of the twentieth century was marked by a sharp deterioration in man's natural environment, air and water pollution; increased level of noise loads especially in cities; accumulation of all kinds of waste products and discards over wide areas; extensive use of many natural components and extinction of some wild life and plant varieties; degradation of soil and other forms of disruption of natural balance. The technology and its waste could make the land; the seas and the atmosphere sicken and die. Already they are weak. The process is essentially universal involving most of the countries. The hazard effects of human activities are manifested in all major ecological spheres – the biosphere, atmosphere, hydrosphere and a certain part of the lithosphere.

Environmentalists have, for many years, had a love/hate relationship with industrialist until the middle of this century. London, (England) took pride in its nickname, "The Big Smoke" for two centuries. This had implied the concentration of industry, wealth and power. But with the 1950's, came London's killer smog and an epidemic pollution triggered the deaths from respiratory failure. Industry, of course, was not the only villain. The awareness of pollution costs grew with the Los Angelssmog, the death of Lake Erie and the profound degradation of major European rivers including the Elbe, the Meuse and the Rhine. The late 1950 brought the epidemic of mercury poisoning in Minamata, Japan and in the most – West Ontario, Canada.

In many cities in the developing world, air pollution is already worse than any experienced industrial nations in the 1950's or 1960's. One thousand people died when liquid gas storage tanks were exploded in Mexico City. More than two thousand people died at Bhopal in India in 1984 when methyl isocyanate gushed out of the Union Carbide factory. Then there was accidental release, in 1976, of dioxin in Seveso, Italy, resulting in scores of miscarried pregnancies and infants born malformed. The chemical plant fire at Basal in Switzerland in November 1986 caused massive fish-kills in water ways at far down-stream as the Netherlands.

Winston Churchill summed up the need rather well, in a speech to Britain's Parliament in February 1944. "It is better to be frightened now than killed here after" and in 1946, speaking at a university in Fulton Missouri, he made direct reference to the ungoverned dominance of technology and the possible consequences for mankind. "The dark ages may return; the Stone Age may return on the gleaming wings of science. Time may be short". United States Supreme Court justice Oliver Wendell Holmes said, "Every man has a right to swing his arms but that right is circumscribed by the proximity of his neighbor's nose". Many noses have already been blooded, in the rush to have bigger industries, bigger automobiles, more comfort and higher incomes. They are living on the surface of this time machine called earth. Human beings now risk 'breaking noses' well into the next century.

Pollution of the environment can be defined as "the interference with or the interruption of biological cycles". It may be that the biological breakdown of an excess of organic material washed into surface water depletes the oxygen content and kills fish and other animals. It may be that toxic materials contaminate soil or water. It is again the biological functions which are impaired. When these substances get into the food-chains routes the toxic substances may follow a direct poisoning of

human beings or through more complicated route of toxic substances (UNESCO, 1986). In most developing countries, malnutrition, parasitic and infectious diseases, contamination of food and water, inadequate health services and poor housing facilities are the major environmental concerns for national governments. In such cases other long-term environmental problems (e.g. green house effect or the detection of ozone layer) become less urgent. The last 200 years have been a destructive period. There is no paradox between ecology and development in the developed countries, but there is a paradox in the under developed countries.

The international effort for the protection and preservation of environment became vigorous in the late 1970s and 1980s. The United Nations conference of Human Environment was held in Stockholm, Sweden 1972. This was the first international conference, especially dealing with the global environmental concerns. The U. N. convened a United Nations Conference on Environment and Development at Riode Janeiro in 1992. It is called the Earth Summit. A comprehensive document called Agenda-21 was issued at the conference. The world summit on sustainable development was held at Johannes burg (South Africa's) in August, September 2002. It has generally reviewed the progress.

I.6. THE ENVIRONMENTAL CRISIS

The evidence of environmental crisis is present everywhere in biosphere. A global confession about this came in the report of the United Nations conference on Human Environment, Stockholm, 1972. There is evidence of man-made harm in many regions of the earth, dangerous levels of pollution of air, water, earth and living beings; and undesirable disturbance to the ecological balance of the biosphere. Deficiencies are harmful to the physical and social health of man, in the man-made

environment particularly in the living and the working environment (UNESCO, 1977).

Even nearly four decades after the Stockholm conference, the crisis far from being blown over, is threatening mankind with menacing proportions. There is also evidence from the report of UNEP(United Nations Environment Programme) sponsored International congress on environmental education and training held in Moscow USSR(Union of Soviet Socialist Republics) during August 1987. The major pressing environmental problems of the globe as identified in this conference are urbanization, population explosion (in developing countries) energy crisis, depletion of tropical forests, deforestation, present and future climatic changes, mismanagement, pollution and shortage of water, loss of productivity of land, greenhouse effect and global warming. Marine pollution is the threat to human health and environment by the hazards of 70,000 chemicals erosion. Floods and famines, especially in developing countries result in depletion of natural resources and ozone layer, etc.

While the industrialized or developed countries face environmental problems due to intensive application of science and technology and affluent life-styles, the developing or third world countries are confronted with environmental problems which arise in course of development. Poor conditions of human settlement, loss of productivity through disease, insanitation and malnutrition, high rate of population growth, poverty, deforestation, natural disasters and in general the poor quality of life in terms of standards of living plague these countries. “Environmental problems of rich countries arise out of affluence and lavish consumption styles while in the developing world they arise mostly of ignorance and poverty” (Indira Gandhi, 1972).

However, the problems of environment are matters of common concern for the entire humanity as, in their solution, lays the future survival of man. The all-inclusive aspects of environment make it necessary that these problems be conceived in terms of their totality and should not be limited by national geographical or regional considerations, since, they are concerned with the entire humanity. A concentrated effort is absolutely essential for their control, prevention and solution.

I.7. ENVIRONMENTAL DEGRADATION IN INDIA

In India, the greatest pollution centers are seen in industrial townships. As per the report, Delhi, Kolkata and Mumbai have occupied 4th, 8th, 13th ranks respectively among the highly polluted towns of the world (The Samaj. 2nd June, 1995). Residents of Delhi are today exposed to the highest level of air pollution in the country and perhaps in the world. The emission of gases like sulfur dioxide and oxides of nitrogen from Mathura based petroleum refinery is poisoning threat to the Taj mahal at Agra and other monuments at Fatepursikri. Thermal power station at Singhal in Uttar Pradesh, Kora in Madhya Pradesh, Farkas in West Bengal and Talcher in Orissa are releasing fly ash, sulfur dioxide and various hydrocarbons are polluting the air and also spreading the serious respiratory diseases like asthma, bronchitis, lung cancer etc. Plants are also suffering a lot by these pollutants. Similarly, by receiving the effluents of the major industries, the banks of the river Ganga, Cauvery, Jamuna, Mahanadi and Rushikulya are being polluted. The vehicular noise of the busy cities like Delhi, Bombay, Kolkata and Bhubaneswar, the capital of Orissa are creating noise pollution. Thus, major cities and towns in India are polluted by the impact of industrial development and lack of civic sense of knowledge on hygiene and sanitation. Some other pollutionis also the problems for environment.

I.8. ENVIRONMENTAL PROBLEMS

I.8.a. Water Pollution

Eighty percent of all diseases in human being can be attributed to polluted water. In India 70 percent of available water is polluted water (Basu, 1986). Industrial effluents, sewage, garbage, bio waste, chemicals of many kinds including artificial fertilizers pesticides herbicides, detergents and even animal carcasses are mixed with water and making it unsuitable for human use and ultimately disrupting aquatic ecosystems. The mineral rich water enhances the growth of algae. Lakes and rivers on receiving organic waste and chemicals containing nitrogen and phosphorus get eutrophicated when their threshold for biodegradation is crossed. Such rivers and lakes get clogged with growth of algae. These algae die and settle down at the bottom giving rise to a spurt of microbial decomposition and making heavy biological oxygen demand on water. In the process, all oxygen in the river gets depleted leading to death of aquatic life. The water emanates a smell of hydrogen sulfide indicating the death of lake. Hence the amount of dissolved oxygen in river water is a good parameter of its water quality. In India the Dal and Wuler lakes of Kashmir, Pushkar of Rajasthan and Lake Ooty in TamilNadu have been eutrophicated severely. Hussein sagerlake at Hyderabad is on its way to eutrophication.

With modernization of society which run towards the luxuries, men have added more than a million chemicals to the biosphere. But hardly a thousand of them have been scanned through rigorous safety evaluation system. Many of these chemicals are released into water and cause water pollution. Heavy metals, like cadmium lead mercury, arsenic etc. on entering the body, damage the brain and the central nervous systems. They can produce cancer, sterility, abnormal fetus, kidney disfunction, etc.

The tragedy that struck residents of Minamata Bay and Niigata islands during 1953 and 1965 due to consumption of fish contaminated by methyl, mercury chloride is a classic example. Even DDT(Dichloro diphenyl trichloethane) which has been banned in many countries has been detected in copious amounts in tissues of Eskimos and in Penguins. Whose inhabit places was DDT(Dichloro diphenyl trichloethane) was never sprayed. Pesticides residues have been detected in 20 percent of 100 random sample of breast milk in Tamil Nadu in amounts beyond maximum resistance limit. Most of the chemicals referred to above have entered man through food chain and in sizeable quantities through bio magnification. Sewage effluents are continuously disrupting the ecosystem of oceans radioactive wastes and spills from large oil tankers. In June 1989, a Maltese oil tanker, M. V. P. on collision with another ship in Arabian Sea near Bombay spread 5,500 tons of furnace oil in covering 700 miles of Bombay coast. The Torrey canyon disaster in North Sea drew worldwide attention. Oil being highly toxic to fishes, plankton marine birds and even hump back Whale cause colossal damage. The oil slick in the Persian Gulf near Kuwait during the Gulf war drew loud protests from environmentalists all over the world.

I.8.b. Air pollution

Emission from factories and industries, automobiles exhaust, rail engines, aero planes, and other internal combustion engines that burns fossil fuel, thermal power plants quarry and mining activities nuclear fallout's dust and particulate matter etc. pollute the air. Major air currents above the earth spread air pollutants worldwide. Breathing polluted air causes respiratory disease like bronchitis, allergy, tuberculosis, emphysema and aggravates asthma. Inhalation of Sulphur-di-oxide causes burning and irritation. Carbon monoxide and nitrogen oxide inhalation affects hemoglobin. Some pollutants like asbestos, dust, etc. are even carcinogenic. Sulfur dioxide causes

total destruction of plant, fluorine compounds on entering body of cattle, through food chain cause them to lose weight and develops abnormal bone and teeth. Proxy Acetyl Nitrate (PAN) suppresses photosynthesis and causes leaves of many plants to collapse. Leaves too become discoloured and curled. Air pollution causes acid rain, smog, greenhouse effect and depletion of ozone layer and has potential for affecting global climate adversely.

(i) Acid Rains

Air pollutants like oxides of sulfur and nitrogen react with water vapour, and oxygen in the air to form Sulfuric acid respectively. These acids fall to earth either in the wet form with rainwater and in other form of precipitation or deposited as dry gases. Acid water turns water in lakes and rivers acidic there by the size and diversity of fish population decreases. Vegetation is destroyed. It causes corrosion of outdoor equipment building and works of art especially in urban areas. Acid rain also leaches nutrients from soil reducing its fertility. Some experts ascribe stone cancer seen on the Taj Mahal to acid rain caused by Mathura refinery. Although India is not affected by acid rain many other industrialized in the tropic are experiencing it due to release of oxide of nitrogen and hydrocarbons from forest clearance agricultural activities and biomass burning. Because water droplets are removed from the atmosphere rapidly, acid rain is a regional or continental rather than global phenomenon.

(ii) Smog

Due to temperature and in version efforts sometimes smoke, sulfur dioxide and carbon monoxide and other effluents of fossil fuel combustion mix with cold fog to form smog. Smog is highly toxic and harmful to life. During the 1950s, some 4000 people were killed due to smog in London. Another type of smog is called

photochemical smog. It is formed due to hydrocarbons and nitrogen oxides. This type of smog contains a mixture of undesirable gases like ozone and peroxy acetyl nitrate.

(iii) Green House effect

The glass of a greenhouse allows sun light to stream in freely but blocks heat from escaping, mainly by preventing the warm air inside the green house from mixing with outside air. In a similar fashion, gases like carbon dioxide, methane, water vapour, oxides of nitrogen and Chloro Fluoro carbons (CFCs) emitted from different sources on earth are transparent to incoming solar radiation but trap heat near the surface of the earth by more efficiently absorbing the longer wavelength infrared radiation released by the earth. This results in global warming up and the phenomenon is called greenhouse effect. The chief source of greenhouse gases is combustion of fossil fuels, industrial practices, rice cultivation, cattle breeding, biomass burning, deforestation microbial activity in municipal landsfills and swamps. All these are increasing day-by-day resulting in greater production of these gases. Carbon dioxide concentration, which was about 280 parts per million (PPM) at the end of the last century, has risen to be current level of about 350 PPM and is likely to be 380 PPM by 2010. Computer simulation model shows that the concentration may double by 2050 A. D. Similarly, concentration of methane has risen from 700 parts per billion (ppb) at the beginning of this century to the present level of 1700 ppb Methane traps 20 times as much as carbon dioxide but is significantly less abundant. However, direct worldwide measurement shows that methane levels are growing more rapidly than carbon dioxide.

In the absence of clear quantitative historical record, it is difficult to tell how the doubling of carbon dioxide and other greenhouse gases will affect us. Mathematical models show a modest increase between 3.0 degree centigrade and 5.5 degree centigrade in earth's surface temperature. Melting Antarctica's ice rather will cause an 80 cm rise in sea level. Melting of one percent of the Antarctic sea cap (90 percent of all the ice on earth) will raise the sea level by 80 cm change in precipitation and temperature could threaten natural ecosystems, agricultural production and human settlement patterns. Stream run off may be reduced due to speed evaporation affecting irrigation and water quality. In the resulting deluge low lying cities like Bombay, Dhaka, Calcutta and the entire Maldives may be submerged. Heat distribution profile of the earth along with wind pattern and rainfall may change resulting less wheat production in Europe and U. S. S. R. and leading to collapse of world economy. In short, global climatic change would have economic, political and social consequences.

(iv) Depletion of Ozone Layer

The ozone layer in the stratosphere extending between 25.35 kms in the atmosphere serves as a shield protecting the plant from harmful effects of ultra violet radiations. This layer is, however, thinning out due to the widespread use of a group of chemicals called chlorofluorocarbons (CFCs). These chemicals are used in aerosol sprays, refrigerators and room air conditioners as refrigerating liquids, in blowing of plastic foams, etc. Use of these chemicals is on the increase in the modern world. Cold vortex measurements in the Antarctic region in 1985 have indicated a 40 percent thinning in ozone layer and even an ozone hole of the size of USA has been created over Antarctica. Destruction of ozone layer and resulting exposure to ultraviolet radiation can speed aging of skin produce skin cancer and cataracts, damage crops and

phytoplankton the basis of food chain in sea and stunt growth of many plant and marine life. Fortunately, the world community has become conscious of the problem and the Montreal protocol have been signed in 1987 in Canada aimed at reducing production of CFCs and replacing them with other harmless substitutes. Mechanism of ozone layer depletion CFCs are stable and cannot be easily decomposed. However, these CFCs are climbing up to the stratosphere through the troposphere taking 10 or more years.

I.8.c. Noise pollution

Automobiles, trains, airplanes, industry, machinery, factory sirens, market places, etc. are the major sources of noise pollution. A jet engine during takeoff produces noise pollution of the highest degree. Continuous exposure of rock music and high sound exceeding 90 decibels results in emotional distress, rise in blood pressure, tension and increased heartbeat may lead to loss of hearing.

I.8.d. Radio Active Pollution

Radio Active emissions like Alpha, Beta, Gamma rays and neutrons emitted from accidents in nuclear power plants atomic explosion, nuclear testing, radio isotopes, radioactive wastes of nuclear reactors, x-ray machines and even picture tubes of television and electron microscopes are sources of radioactive pollution. Exposure to radiation beyond threshold limits of 0.5rem/year can cause radiation sickness, cancer, leukemia, and abnormal fetus in pregnant mother and even death depending upon doses received. Chernobyl and Three Miles island nuclear power plant accidents illustrate the hazards of radioactive pollution. Nuclear waste material buried in stainless steel containers may burst and pollute ground water. Radiation exposure also can bring about genetic changes and mutant genes in the recipient.

About one million U. S dollar a minute is spent in the world for armament over fifty thousand nuclear bombs have been stock piled. Each one of us gets a share of 3. 5 ton of explosive only from the nuclear stockpile. During the Vietnam War from 1961 to 1973 the USA used herbicides and destroyed 44% of woodlands in South Vietnam. As a result, a carpet-bombing 3 billion cubic meters of soil and subsoil had been displaced.

Pollution continues to be one of the grave environmental problems. There is a worldwide debate about the causes of pollution. It may be worth mentioning here the views of Barry Commoner, the American social scientist who holds a different perception. According to Commoner, pollution and resulting environmental degradation are not due to population or affluence but the methods of production which are polluting and energy consuming. In the similar lines, Schumacher suggests to develop ‘appropriate technology’ i. e., the one that produces goods with minimal waste and pollution. He calls it “technology with human face” in his book “Small is Beautiful”.

I.8.e. Deforestation

Forests are vital to human existence as they provide fuel, fodder, timber, food and medicine. They also check soil erosion. Clean air by using up carbon dioxide in photosynthesis, helps in rainfall. It serves as wind breakers during storm and cyclone in costal areas and provides habitat for wild animals and above all provides recreation for mankind. National forest policy stipulates that on the average, 33% of the land area should have forest cover. But forests are continuously being denuded to meet increasing demand of people for grazing of live-stock, timber, fuel, agriculture, shifting cultivation, urbanization, mining quarry operations, and for construction of hydroelectric projects, hill roads and industries. As per photographs of earth taken

from remote sensing satellites, India's forest cover is around 10%. In Orissa, forest area has been reduced from 31% in 1975 to 25% in 1985. In 1980, forest denudation in the state is roughly 2.53 percent per year.

Under capitalism, profit motive is the sole motive of economic activity, resulting in destruction of environment at a frightening speed 40% of the world's plants have been destroyed and deforestation continues at the rate of 20 hectares per minute, 19% of the earth's land desertification. Coastal wet land shallows, the supporting system of two thirds of the world's fisheries are being degraded and destroyed, dumping and polluting 53.3 million square kilometers of land on earth are already deserts i. e., one third of the total land available.

The 'Chipko Movement' in the foot-hills of the Himalayas spearheaded by Sunderlal Bahuguna is the public Campaign for saving forests. Another similar movement was launched in Sambalpur district of Orissa against the bauxite-mining project of Bharat Aluminium Company, (Balco) in the Gandharmardan Hills, situated on the Eastern Ghats and is continuing till date. The program of social forestry is being undertaken on a large scale in rural areas to provide fuel and fodder. Green belts are being created around all urban areas to purify polluted air. These schemes will alleviate to certain extent the pressure on forests Tropical rain forests covering nearly 6 percent of earth's surface contain about half of the planet plant and animal species. Conservation of these forests is essential for climatic stability of the biosphere. Conservation of gene pool, safeguarding watersheds, allowing evolutionary processes to continue, providing stock of plants and animals for research and also for tourism and recreation. These forests constitute about 30% of world's total forest. The denudation of tropical rain forest it's occurring at the rate of 11-40 hectares per minute (Mabberly 1983) at this rate the world will lose bulk of its

rainforests and very little of such forests will remain in India. Social forest and other means need to be carried out and plantation needs to be increased.

I.8.f. Extinction of species

Mangrove forests saved the people of Vedaranyam and Pichavaram in Tamilnadu from the killer waves on 26th December 2004 (Tsunami). As per International Union for Conservation of Nature and Natural Resources (IUCN) report, India has about 45,000 species of plants and 65,000 species of animals out of nearly 5-10 billion species found in the world (Brich, 1986). Conservation of all these species is required for preservation of the gene pool is so essential for our survival. The economic benefits and the land ethic argument, which hold that land, have to foster all living beings, not human beings alone, also justify the conservation of species. Genetic and ecological diversity (species richness), safe number within the carrying capacity of an environment, tolerance threshold, etc., are natural parameters that decide the viability of a species. However, many species are becoming extinct or endangered due to loss of habitat on account of deforestation, pollution of habitat. Hunting of animals has also resulted and accelerated species extinction. The Red Data Book of IUCN and the 'Green Book' of Botanical Survey of India enlist endangered /rare species.

Launching of 'Man and Biosphere Programme' (MAB) and the 'World Conservation Strategy' (WCS) have helped conservation of species through 'in-situ' and "ex-situ" methods. Monitoring the endangered species education and training as well as international co-operation have helped to halt species extinction to some extent. Saving the endangered American Condors and success stories of white tiger in India through captive breeding are the examples of such efforts of IUCN and the World Wide Fund (W. W. F). Selective hunting sometimes helps conservation as it is

being done with African elephants. Social boycott of people using fur coats, banning trade in ivory and export of frog legs are steps in right direction. Voluntary organizations like 'Beauty without Cruelty', 'Green Peace', etc. are doing excellent job in conservation of species. Poaching of animals should be banned by all means. Making use of animal products, which kill the animal, must also be boycotted in totality.

I.8.g. Depletion of Natural Resources

The natural resources of the earth, particularly the non-renewable ones like fossil, fuel and minerals, are being depleted at a fast rate causing severe concern since their regular supply is vital for sustainable development. Resource use is growing at a rate of six percent per year. In short, all silver mines and easily mined crude oil deposits will be exhausted (Meadows, 1983). The earth is like space ship with respect to its resources. Overburdening of this space ship 'the Earth' with waste and squandering away its precious resources may lead to its extinction. As Meadows puts it: A society with a high level of industrialization and resource use may be non-sustainable. It may be self-extinguishing if it exhausts the natural resources on which it depends.

Natural resources are not distributed and used in proportion to population and land area, among countries or continents. The developed countries with only one-quarter of world's population consume about 80 percent of world's resources and the developing countries with three quarters of population consume less than one quarter of the world's resources. The pollution and resources load per person in developed countries on the world environmental system is about 10-20 times the load generated by a person in a developing country (Forrester, 1983). Continuous cycling and recycling of natural resources by using waste products are absolutely essential to

maintain a stable economic growth and reasonable standard of living in future. Production process should produce more easily biodegradable products unlike plastics to help recycling. Garbage, solid waste and effluents from factories should be recycled to retrieve minerals and other useful material. The non-renewable resources require careful and judicious utilization. Whenever possible the non-renewable resources need to be conserved for longer use. Making use of car pools can reduce the load of traffic on road and also reduce petrol from being used more. Making use of public transport, use of solar gas and other alternative sources of energy can save us from pollution and also from depletion of non-renewable resources.

I.8.h. Land use

The land is under stress. On account of agriculture industrialization, urbanization, railways, highways, etc. in India, extreme imbalance in land use can be seen. In Punjab, where 84 percent of geographical area is under cultivation and only 4 percent has forest cover (Kang, 1982). Government's decision to set up a National Test Range for missiles at Bali pal, occupying thousands of acres of fertile agricultural and for defense purpose is against the principles of land use. The move is being resisted by natives through a voluntary organization 'GanatantrickAdhikarSuraksh Samiti'.

Soil fertility is going down as a result of excessive irrigation. Apart from this problem land faces one more problem of increasing garbage. The garbage, being fielded in large areas, because a lot of discomfort for the people living around as it emanates foul smell and it could also invite diseases. For avoiding this, one may have to separate out dry waste and start with vermiculture to produce compost and manure for their garden. This will also reduce the garbage in the city. The dry garbage, wherever possible, can be recycled.

I.8.i. Soil Erosion

About 175 million hectares of land constituting 53 percent of India's total land area is susceptible to serious soil degradation due to desertification, salivation, alkalization, water logging and deforestation and over grazing. The country loses about 5-6 thousand million tons of topsoil every year at the rate of 10 tons/year. At this rate the entire top soil may be lost in about 250 years (Kanwar, 1988). Without top soil, which has taken several hundred years for its formation, land becomes barren and is the starting point of desertification. Proper land use planning success in social forestry and halting the deforestation can check soil erosion to some extent. The national technology mission on wasteland development will also help to save the soil. Planting trees can control soil erosion. The trees or plants of any size bind the soil and do not allow it to fly off with air or run down with water. Wherever the flow of water is carrying away soil, land bunds can be made to slow down the flow of water thus avoiding the cutting down of soil.

I.8.j. Energy Crisis

Energy is required for cooking transport, running industries and lighting the buildings and the streets. Although per capita consumption of energy in the developing countries is 4 – 7 times less than the developed countries, rapid growth in energy consumption is now occurring in these countries compared to developed countries. Since these countries are seeking to industrialize to raise their living standards, the energy crisis is being felt through shortage and increased price of fuels. The Organization of Petroleum Exporting Countries (OPEC) controls 75 percent of all crude oil reserves. The war between Iraq and Allied Nations concerning liberation of Kuwait was essentially a war to control the petroleum reservoir in the gulf region. The 25 per cent hike in petrol prices in India was due to this war, the adverse balance

of payment positions and the IMF loans are all manifestation of the energy crisis. Seventy-five per cent of Indian population use noncommercial sources like wood, animal dung and agricultural waste as fuel. A sharp rise has occurred in the price of wood and coal in the last decade. Development of alternative sources like solar, nuclear, wind, tidal and biogas holds promise for solving energy crisis.

I.8.k. Ecological Disruption

The subtle and fragile relationships in an ecosystem can be disrupted due to external factors like human intervention. Any change in an ecosystem that is imposed from outside often triggers off a chain reaction that may sometimes be irreversible. All the environmental problems described above are causes as well as manifestation of an ecological crisis in environment. Extinction of 'Dodo' and the threat from hydroelectric power projects are two classic examples that amply illustrate the ecological imbalance due to human intervention. Dodo, the flightless bird of Mauritius became extinct due to hunting by colonial rulers and the dogs that they brought with them. *Calvaria majora*, species of plant whose fruit was eaten by Dodo and the hard seeds passing through its digestive tract became soft and facilitating germination after excretion by the bird became nearly extinct after disappearance of the bird. Recently, a few seeds have been germinated after being forcibly fed to turkeys.

Largely hydroelectric projects once considered a blessing and architectural wonder, are being looked with skepticism from environment point of view. President Hussein Mubarak once said that the challenge before Egypt was to cope up with Aswan dam. Such projects are ecological disasters as they submerge vast tracts of forest land uproot local people mostly tribal from their home and hearth, cause water logging and salination due to canal network, change microclimate of the area, create

breeding ground for diseases vectors like mosquitoes, snails, etc. Dams also have potential for causing earth quake due to reservoir induced seismicity. Despite protests, Government of India has given green signal to such hydroelectric projects like Sardar Sarovar, Narmada Sagar and one at Tehri. Fasts undertaken by Mr.Sunderlal Bahuguna and Baba Amite have produced no effect. However, Kerala Shastra, Sahitya Parishad's struggle forced government to shelve the "Silent Valley Project".

Introduction of new strains of high yielding cereals, large scale monoculture, introduction of wide spectrum of insecticides, etc. have exacerbated the ecological crisis. The emergence of science and technology leads to a sophisticated life and it paves the way for the economic development of human society. But at the same time, it imitates the hostile relationship between man/woman and his/her natural environment. Most of the environmental changes that have taken place as he/she started to exploit the natural resources with the help of advancement in technology have ended with never ending problems.

The weather modification programmes like cloud seeding to induce precipitation, dispersal, clearing of clouds and fogs, etc. are the results of technological innovations but they cause a serious concern for environmentalists. Ground water is sucked out with the help of giant motor pump sets for drinking water and irrigational purposes and this is a general practice in almost all the countries. This has resulted in unit downfall of the ground water level and also in formation of big cavities beneath the ground. Consequently, saline sea water intrudes into these cavities and the well has become contaminated due to salty water. Excessive withdrawal of ground water also results in inland subsidence.

I.8.1. The Food Chain

All the animals directly or indirectly depend on plants for their food. Herbivores get their food directly from plants and carnivores eat small and weaker herbivores. This inter relationship is called food chain. Food chain can be observed in places like grazing lands, deciduous forests, rivers, seas, deserts, etc. which are inhabited by plants and animals. Insects eat plants and insects are themselves eaten by shrew and shrew is eaten by an owl. (Plant – Insects – Shrew – Owl). Zebra eats grass in African Savanna and Lion consumes Zebra. In sea, small fishes eat algae and eaten by bigger fishes which are in turn eaten by gull and gull is further consumed by seal. This cycle does not end here. When many food chains combine together, then a food web is formed. Most of the food chains start with plants.

Food chains are very delicate and they can be broken easily. If one relationship in the food chain is broken, it becomes dangerous for the whole chain. If the farmer uses pesticides to kill the pests, then shrews will also die of starvation because pests are food for them. Owls which eat shrews will also die in want of their food. At the Peru coast extensive hunting of anchobi fish leads to a decrease in the number of cormorant birds which ate anchobi fishes only caused lake of their faces which will be consumed by plankton. And decreasing planktons caused food deficiency for anchobi fishes which led to the reduction of anchobi fishes. Human being is also an important member of several food chains because of eating plants (vegetables) as well as meat, fishes, eggs, etc. for the animal conservation. One should have the knowledge about food habits and food webs of the animals.

I.8.m. Human Population and Environmental Problem

Enrich said the human population is not only too large. It is growing at a mind-boggling rate about 2 percent per year. At this rate the population doubles every 35-40 years. Every year seventy million people are currently being added to this planet. Every three years an equivalent of the United States is to be fed clothed and housed. Population size and the rate of population growth, in both developed and developing countries are important factor in producing environmental deterioration. Further, it is asserted that such deterioration is much more subtle pervasive and dangerous phenomenon than it is implied by the simplistic view of 'pollution'.

I.9. Environmental Consequences of Population Growth in Developing Countries

Increase in population is the vital factor in environmental problems. Natural resources have to be considered in relation to the size of the population which has to be provided for population in its various forms. Developing countries are thus caught up in the dilemma of lack of development and adverse effects of modern development. The Prime Minister of India, addressing the plenary session of the United Nations Conference on the Human Environment in Stockholm had this to say (Indira Gandhi, 1982). Among the areas that are hit hardest are the social services such as health and education. The director general of the World Health Organisation, in addressing the human environment conference, warned of the dangers created by polluted drinking water and low levels of housing sanitation in developing countries. Food production is a field in which the developing countries are particularly vulnerable. The observation of the director general of the food and Agricultural Organization of the United Nation is worth recalling (1985).

There will be twice as many people on our planet in the year 2000, twice as many mouths to feed. Most of this increase will occur in the developing already undernourished and over populated parts of the world. To meet their requirements agricultural production should be doubled every 18 years rate never achieved over a sustained period by the countries that are now well fed. This is applicable even today. Lack of education is an indirect factor in environmental deterioration. Education is central to development and the consequence of education being scarce in the face to environmental challenge is already a fundamental issue in developing countries.

The rural population of developing countries is among the most poorly housed. Most countries have concentrated on housing policies that favour the urban dwellers. However, in countries of the world, over 80 per cent of the population live in rural areas, the problem of providing a decent shelter for the rural population is a crisis that cannot be ignored by development programmes. Accelerated population growth particularly of rural population will intensify the difficulties of developing countries in achieving objectives of improved rural housing. This necessitates environmental education.

I.10. ENVIRONMENTAL EDUCATION

I.10.a. Meaning and Definition of Environmental Education

The term 'environmental education' has two components 'environment' and 'education'. As defined earlier, environment refers to the sum total of all conditions and influences affecting the life and development of organisms. In the present context, mankind is the referent. 'Education' is forming desirable attitudes, values, skills, understanding and interest. Environmental education is, therefore, forming desirable

belief, attitude, value, interest, understanding etc. about the environment so as to preserve it and improve it for the survival of the present and future mankind.

While understanding the meaning of environmental education three of education's connotations, i.e., about, through and for the environment are implicit in the meaning. Education about environment means making environment a subject of investigation. It is based on a specific topic or a restricted area in which the main concern is to gain information and comprehension. It can be done in the classroom as well as in the field. Education through environment usually connotes using environment as a medium for study, the use of real-life situations as the basis for learning and enquiry. It is essentially an approach or method of enquiry usually conducted through field work. Education for environment means education for conserving and improving the environment, a study of environmental problems and working for their prevention and solution. Problem solving, decision making, development of an environmental ethic and critical judgement are called for here. It is in this sense that Stockholm Conference recognizes the term 'Environmental Education'.

Environmental education is dynamic reflecting the growing understanding of the relationship with the environment. Environmental education is interdisciplinary. It derives shares and applies knowledge, concepts and skills from all disciplines. The process, which supports life, must be protected. The protection of the world environment for the long-term benefit of life on earth is a task entrusted to all people. It is the task of educators to ensure that young people are made aware of their responsibility to protect the process that support life and their ability to meet this challenge.

Environmental education seeks to respond to this challenge and also to foster enjoyment, understanding and appreciation of the fragility, diversity and beauty of life on the earth. It teaches the students about the environment by giving those skills in investigating questions and issues in the environment, and attitudes of care and concern for the environment. Environmental education encourages ecologically sustainable ways of life and seeks to instill positive but realistic attitudes toward the future. Students are prepared to evaluate, draw conclusions and take action. They draw upon facts, concepts and values from a wide range of ideological sources and perspectives, including their own. To be effective, environmental education must require learning experiences that are planned, focused and cumulative. Through environmental education students from pre-school to 12 years will learn to understand activity of environment and care for and enjoy the environment, thereby helping to ensure the continuation of the diversity of life on planet.

I.10.b. Goals and Objectives of Environmental Education

To develop a world population that is aware of, and concerned about the environment, the environment and its associated problems, and which has the awareness, knowledge, attitudes, skills and participation to work individually and collectively towards solutions of current problems and the prevention of new ones.

Awareness:- To help individuals and social groups acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge:- To help individuals and social groups acquire basic knowledge and understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it.

Attitude:- To help individuals and social groups acquire attitudes, social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.

Skills:- To help individuals and social groups acquire the skills for solving environmental problems.

Participation: - To help individuals and social groups participation and develop a sense of responsibility and urgency regarding environmental problems to ensure appropriate action to solve those problems.

I.10.c. The Role of Environmental Education

The declaration of the UN conference on Human environment organized in Stockholm in 1972 proclaimed, to defend and improve the human environment for present and future generation has become the imperative goal for mankind. Hence humanity needs to become aware of knowledgeable about environment and its problems. It has to understand the underlying causes, the manifestations and impacts of these problems, so as, to act in a concerted manner for alleviation and solution of the existing problems and their recurrence. Education can be a powerful intervention in this respect. Swaminathan (1978) has pointed out that education is essential for generating wide spread awareness of environmental problems. Awareness is essential for action. Without proper educational efforts the awareness, analysis, action chain does not move smoothly and effectively. Awareness and action have supplemented by inculcation of appropriate environmental ethics and positive attitude towards environment, as well as decision making abilities.

Considering the potential of education as an effective instrument in tackling environmental crisis, Environmental Education can be a powerful instrument in

understanding, preventing and solving environmental problems. The role of environmental education can be visualized in two ways in this context.

- i) First to develop human resource of the highly specialized and professional groups such as scientists, technologists, doctors, engineers, architects, town planners; economists, industrialist, and other skilled professionals and workers who will contribute to the solution of environmental problem through appropriate technological.
- ii) Second to promote environmental awareness among students, teachers, the members of the community and general public through a thorough understanding of environmental problems, their nature, cause manifestation, solution and inculcation of ethics and values conducive to environment. This will in the long run results in motivation, commitment and action geared towards prevention and solution of environmental problem.

I.10.d. The Importance of Environmental Education

The importance of environmental education in understanding, preventing and solving problems related to the environment has been widely recognized all over the world. Evidences to this are a number of national and international conferences, seminars and workshops on the theme and efforts made by different countries in introducing the perspectives and scope of environmental education at all levels of education during the last two decades.

The beginning in this direction was made by the international working group meeting on environmental education in school curriculum organized in 1970 at Niveda by the forests Institute for ocean and mountain studies under the UNESCO

and International Union for Conservation of Nature and Natural Resources, (IUCN), that recommended as follows:

The Working Plan

- i. **Considering** the appropriate education being a necessary pre-requisite for improvement of the total critical environmental situation.
- ii. **Being aware** of the urgent need for environmental teaching and adequate training of teaching personnel.
- iii. **Suggesting** to the governments and their responsible educational authorities as well as to the national education organizations.

I.11. PRACTICAL ENVIRONMENTAL EDUCATION

One of the most fundamental characteristics of effective environmental education is that it must lead to actions which result in better environmental outcomes; not simply the accumulation of inert knowledge or impractical skills. This is ultimately the yardstick by which the effectiveness of the efforts in environmental education is measured. Even though the concept of conflicting interests is relatively abstract and is not easy to use in practical teaching, other development programmes have shown that there are many ways of working which can give good results, both as regards pinning down the concept as well as continuing with it.

I.11.a Field trips

The students visit the site they are working on (lake, wood, motor way, the preserved area, the waste dumps, the central water station, the factory, etc.). So they themselves can experience some of the conditions to do with the issue. The responses are then worked on to find categories and treated statistically with the possible use of

the computer. It has proved useful to invite a reporter into the classroom to help the students with techniques about questioning and note taking.

I.11.b Visit by and interviews with protective adults with forceful views

The students meet and discuss with adults such as local politician, a nature conservancy member and one who have opposite provocative and clear attitudes. The students are well prepared with relevant questions. Afterwards they can categorize the conceptions for instance, by advocating the different points of views in a class debate or duplicating the attitudes in writing on wall sheets where each attitude is given a separate colour.

I.11.c Role play and Drama

The students identify themselves with one of the parties in the issue, visit and talk to them to look into their arguments. Conceptions and attitudes put them into words dress like them and then 'play' their role, in the younger classes. The children have often made glove puppets which have functioned as role models.

I.11.d Panel Debates

The students work on the different parties in the environmental issue in the same way as in the role play but ending with a panel debate in which they present and advocate the conceptions as a start to a discussion in the class. It was particularly interesting in some projects when the students are invited. These are the some of the ways through which environmental awareness can be created.

I.12. ENVIRONMENTAL AWARENESS

Environment includes all living and non-living objects. People, who live in the environment, use the environmental resources like air, land and water to meet their needs. Development also means meeting the needs of the people. While meeting the

ever-growing needs, one put pressure on the environment. When the pressure exceeds the carrying capacity of the environment to repair or replace itself, it creates a serious problem of environmental degradation. If one uses any environmental resource such as ground water beyond its limit of replacement, one may lose it forever. Therefore, there is a need to create 'awareness' about environmental protection. While efforts are being made at the national and international level to protect our environment, it is also the responsibility of every citizen to use our environmental resources with care and protect them from degradation.

Environmental awareness is to understand the fragility of the environment and the importance of its protection. Promoting environmental awareness is an easy way to become an environmental steward and participate in creating a brighter future for our children. To define environmental awareness one must first understand the environmentalist movement. Environmentalism is an ideology that evokes the necessity and responsibility of humans to respect, protect and preserve the natural world from its anthropogenic (caused by humans) afflictions. Environmental awareness is an integral part of the movement's success. By teaching one's friends and family that the physical environment is fragile and indispensable one can begin fixing the problems that threaten it. Numerous resources are available to promote environmental awareness; group learning (in or outside of class), informational and inspirational seminars, such as our Awakening the Dreamer Program and environmental books and brochures are just a few of the tools that can get one involved in promoting the environment.

In the media history of the country the media stayed under the scrutiny and control of the dictatorship governments that ruled the country for many years and there was low experience of media usage to the benefit of communities. The policies

and legislations enabling the existence of diversified print and electronic media access were denied by the feudal system and the replaced junta for a long period. Under these regimes, the media was entirely state controlled, with no private and public media service. Apart from these important aspects, there was also the lack of awareness and understanding about the liberalization of the media sector to be effectively used for different purposes.

In response to this, the current ruling government tries to use a free and diversified media through press and broadcasting laws. Following this and cognizant of the need to improved environmental information management and sharing the information to support environmentally sustainable development plans and programs in the country; the government of India has recognized the need to establish an "environmental information system".

L.13. NEED FOR ENVIRONMENTAL AWARENESS

Environmental awareness may be defined as to help the social groups and individuals to gain a variety of experiences and acquire a basic understanding of environment and its associate problems. Awareness means to guard against. Awareness is a cognitive process. It is commonly used as equivalent consciousness, sensitiveness, etc.

Environmental awareness is essential for the;

- i. Protection of the atmosphere (climate changes, depletion of ozone layer).
- ii. Protection of land resources (compacting deforestation, desertification and drought).

- iii. Conservation of biological diversity (Protection of fresh water resources and oceans and coastal area and the natural use and development of their living resources).
- iv. Environmentally sound management of biotechnology and hazardous wastes.
- v. Prevention of illegal traffic in toxic products and wastes.
- vi. Improvement in living and working conditions of the poor by eradicating poverty and stopping environmental degradation.

On promoting environmental awareness, the National Conservation Strategy and Policy statement on environment and development say: To raise public awareness and involvement in environmental activities, the mass media ranging from local folklores to electronic media should serve a vital role. To raise public awareness on environmental activities and conservation of natural resources, development of environmental education resource material and use of traditional and modern media of communication need to be strengthened. Scope and functions of the existing environment education centers should be further strengthened and enlarged to develop a network of infrastructure and environmental education including development of orientation centres and provision of education materials for visitors at the national parks, sanctuaries and tiger reservoirs.

The role of media is crucial in promoting environmental awareness. While realizing this aspect, the following should be born in mind.

- i) Effective communication strategies should be established as an integral part of any major programme of environmental awareness.
- ii) The communication should be long term interactive process aimed at particular groups and audiences.

- iii) Findings of the studies conducted in public interest should be communicated to the public on whose behalf they were carried out.
- iv) Attempts must be made to simplify complex issues like sustainable development to avoid confusion and misunderstandings.
- v) Message on environment should begin with what the audience is familiar with, largely things relating to local issues, and introduce the subject that is to be conveyed.
- vi) The credibility of the message and the carrier of the message should be beyond doubt if the message is to have the intended effect.
- vii) The policy statement for abatement of pollution lists the following strategies for creating environmental awareness in the country.
- viii) The public must be made aware in order to be able to make informed choices.

Greater emphasis will be placed on promoting awareness, undertaking and competence in schools, colleges, and training institutions. Professional and non-governmental bodies will be encouraged to be more active in environmental training and building awareness. Society has accepted many practices which cause pollution. Reckless use of loud speakers, dumping in water bodies and scattering of wastes are common. Noise nuisance requires specific devices as well as greater consideration for neighbours and there is growing concern that litter has increased in recent years. Social action in these matters by voluntary organizations and individuals will be promoted through knowledge, education, training camps and public information campaigns. In the task of creating environmental awareness, teachers also have the roles to play through the environmental activities.

I.14. THE ROLE OF GOVERNMENTAL AND NON-GOVERNMENTAL ORGANISATION IN ENVIRONMENTAL AWARENESS

Environmental awareness is the ability to understand the problems of environment through the relevant experiences and the assistance extended to the society and its individuals to solve these environmental problems. The government and various non government organizations are adopting different strategies to promote awareness on environment in the country. The Ministry of Environment and Forests accords top priority to promote environmental awareness among various age groups. The Museum of National History, New Delhi promotes non-formal education in the area of environment and conservation. Besides permanent exhibits galleries on various aspects of environment, the museum also conducts temporary exhibitions that had a large number of educational programs and activities for school children, college youth and general public. An Environmental Information System (ENVIS) has been set up by the government for collection, storage, retrieval and dissemination of environmental information to decision makers, policy planners, scientists, engineers, environmentalist, research workers and the general public all over the country. ENVIS confers are set up in various institution and organizations in the country on priority areas of environment such as environmentally sound and appropriate technology, biodegradation of wastes, desertification, estuary, mangroves, corals and lagoons media and environment, environmental education, solid waste disposal, animal ecology, Himalayan ecology, etc. Non-governmental organizations also play a critical role in advancing environmental awareness through research publications, training, funding and outreach activities. Organizations like the National Council for Educational Research and Training (NCERT) also play a crucial role in promoting environmental awareness. To an extent the corporate sectors too is playing a role in

spreading environmental awareness in the country. Therefore, there is the need to know about the process of environmental education and how to teach it.

While teaching environmental education, the following aspects should be born in mind.

- a. Environment should be considered totally, natural and manmade, social and technological.
- b. It should be a lifelong process beginning with the school and continuing throughout life.
- c. It should be interdisciplinary drawing on the contents of other subjects.
- d. The environmental issues should be examined from the local, national and regional and international points of view so as to enable the students to get the proper perspective and become familiar with the conditions and problems in other geographical areas.
- e. There should be a focus on the current and potential environmental issues.
- f. Stress on the value of local, national and International Corporation in solving environmental problems.
- g. The learners should have a role in planning the learning process.
- h. The learners should be helped to discover the symptoms and real causes of environmental problems.
- i. Use diverse learning environment with stress on practical activities.

Environment, a global concept today, is not a subject of study but an approach to learning. It helps people in overcoming prejudices and programming learning experiences ranging from simple to complex.

The declaration adopted at UNESCO's first International Conference on Environmental Education held in USSR in 1977 stated that Environment education should constitute a comprehensive lifelong education. The other points made at this conference were:

- a. Environmental education should be provided for all ages at all levels and in both formal and non-formal education.
- b. The mass media have a great responsibility in making their immense resources available for this educational mission.
- c. Environmental education should not be just one more subject added to existing programs but should be incorporated into programmes intended for all learners.
- d. A practical education-oriented approach should be adopted towards the solution of the problems of the environment or at least make the pupils better equipped for their solution by teaching them to participate in the decision-making process in environmental education.
- e. Stress was laid on the importance of environmental training of professionals.

I.14.a. Instructional Strategies for Environmental Awareness

- a. Practical hands on observation and discovery in the environmental.
- b. Inquiry and/or project based
- c. Co-operative learning and/or group projects.
- d. Service learning in collaboration with NCC, NSS and other extension activities.
- e. Simulations and models or activities of role play, social and physiological dramas.
- f. Case study.

- g. Problem based learning from society.
- h. Project based learning on major issues.

The learner is an active participant in environmental education. If learning is to become a natural and valid part of life, instructions should engage to learner in the process of building knowledge and skills and be guided in part by the student's interest.

I.14.b. The steps taken by the Schools to Create Environmental Awareness

The teaching community should create programmes to develop the capacity to integrate environmental literacy with all school subjects. They should set an example of environmental responsibility by establishing different activities as secondary school level on issues like resource conservation, recycling, waste reduction, taking up socially productive work and waste management. More than that, so many programmes can be given in educational institutions. The programme should deal with basic science, but it should not be science dominated. It should have a strong motivational impact on the participants. Experiences outside the classroom are the important instructional strategy for engaging students in direct discovery of the world around them. This awareness of their local community can prompt a personal commitment to apply skills and knowledge in pursuit of achieving environmental quantity and quality in life.

The following are a few programmes normally given in the schools.

- a. Eco-club functions in the school.
- b. Environmental day celebration in the school.
- c. Rain water harvesting existing in the school.

- d. School garden maintained in the school.
- e. Dust bin in each classroom.
- f. Banning of polythene bags and plastic cups inside the school campus.
- g. Necessary sanitary facility in the school.
- h. Students participation in classroom and campus cleaning.

Environmental club can be organised and environmental activities may be enrolled as members of the club. There should be an environmental corner where news and data related to environment may be displayed. Students may undertake field trips to the places where environment is a people's responsibility. It is a joint venture of the students, teachers and the society.

I.14.c. Innovations in Environmental Education

New strategies and innovations for environmental education have been developed and applied through the region. For example, in Singapore, the Ministry of Environment in 1996 published the Fun and Discovery through environmental clubs, outlining environmental activities and clubs. Similar publications have been developed in Japan, India and Bangladesh. The observation of National Environmental Days and Weeks across the region provide a focal point for environmental activities including seminars and exhibitions. In New Zealand, school education kits on sustainable agriculture are also provided to educate young people about agriculture and to survey changes in land management and planning. Japan has various examples of innovative education, public awareness and training activities including environmental counselor registration system, the environmental education programme and various campaigns for conservation of natural resources and energy. In addition to this programmes the "Junior Eco Club Programme" supported by the

Environment agency has been a very effective programme at the elementary and junior high school age children level.

Club activities are supported by local governments and a nation-wide festival for the club is organised at the end of each school year. There are about 4000 clubs with 70,000 children in Japan and its popularity is increasing in creating environmental awareness. India also attempts to have a green and clean society. This implies a society having sufficient forests and pollution free environment.

I.15. SIGNIFICANCE OF THE STUDY

God has created so many living and non-living beings. But the living beings particularly human beings are intentionally more responsible for environment destruction than any other species. Importance was given in almost all cultures for environmental protection. So, it is very much necessary to safe guard the environment as far as possible and it is human being's responsibility to hand over the sage environment to their future generation. Due to advancement of science and technology life has become complicated like a machine. Human beings are suffering a lot due to various natural calamities. These wastes are beginning to bury them. Due to deforestation, there is a lack of rain and fertility of soil decreased. It is the fusion of subject matter of environmental education as a central theme. Students in the class room can use enquiry skills.

“The destiny of India is shaped in the classrooms” - (Kothari Commission, 1964-66). Bearing this in mind, teachers should give opportunities to the students to make them have awareness on the environment. Most of the people recognize the urgent need for environment, but only some have clear idea about what is to be done and a very few have either the actual experience or the knowledge about the courses

that are needed to be taught. Besides introducing the subject “Environmental science” at all levels of education, one must give much emphasis on the new approaches and programmes of environment which will bring environmental concerns to all facts of life. In India much importance has been given to environmental education since 1979 when the first International Conference on Environmental Education was held in New Delhi.

Thoothukudi district is much affected by the pollutants of the factories, industries, power plants, etc. and especially it is the native place of the investigator that this place is taken for investigation. School is a society in miniature (John Dewey). Any reform in the society has to start from school. Environmental activities, awareness and attitude are not the exceptions. Hence, the present study is undertaken to find out the steps taken in the higher secondary schools of Thoothukudi district for creating environmental awareness among their students.

I.16. CONCLUSION

The next chapter deals with the review of related literature.

CHAPTER II

REVIEW OF RELATED LITERATURE

II.1. INTRODUCTION

Once a topic has been decided, then a researcher has to update his/her information about studies related to his/her problem. The survey of the related literature is a crucial aspect of the planning of the study and the time spent on such a survey fetches the researcher a rich dividend. A careful review of the research journals, books, dissertations and other sources of information on the problem related to the investigation is one of the important steps in the planning of any research study.

According to Cater V. Good (1959) “The keys to the vast storehouse of published literature may open the door to the sources of significant problem and explanatory hypothesis and provide helpful orientation or definitions of the problem background for selection of procedure and comparative data for interpretation of results”.

According to Best (1995) “brief summary of the previous research and the writing of recognized experts provide evidence that the researcher is familiar with what is already known and with what is still unknown and understand”. This step helps to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for significant investigation. The literature in any field forms the foundation upon which all future work will be built. Available literatures concerning the problem at hand must necessarily be surveyed and examined before. A definition of the researcher must be well conversant with relevant theories in the field, reports, records and all other relevant literature. He/she must devote sufficient time in the reviewing of the research already undertaken on a related

problem. Thus, review of related literature is a crucial step which invariably minimizes the risk of dead ends, rejected studies, wasted effort and trial and error actively oriented towards approach already discarded by previous investigators and erroneous findings based on a faulty research design.

II.2. SOURCE OF INFORMATION

The investigator, for this study, went through the journals, unpublished theses, books, research abstracts, etc. and browsed different websites.

II.3. CLASSIFICATION OF THE LITERATURE REVIEWED IN THE PRESENT STUDY

The literature reviewed is presented in two different captions such as (a) Studies done in India and (b) Studies done in Abroad.

II.3.a. STUDIES DONE IN INDIA

Study: 1

Kanchan Sinha, et.al.(2018) conducted a study on “Environmental awareness in relation to locality and culture among adolescents in Durg district, Chhattisgarh”.

The present study focused on the analysis of level of Environmental Awareness among adolescents (student of Government Higher Secondary School) in Durg district in the state of Chhattisgarh, in relation to locality and culture. The sample consisted of 200 Adolescents (student of higher secondary school), which include 100 boys and 100 girls of Tribal and Non-tribal Culture from rural and urban background. A Standardized Environmental Awareness Ability Measure (EAAM) by Dr. Praveen Kumar Jha were used to collect data. Data were analyzed by using t-test. The

main conclusion is that, Tribal Adolescents have more Environmental Awareness than Non-tribal Adolescents and found significant difference between rural and urban background adolescents. Rural adolescents were more aware than urban adolescents.

Study: 2

Iqbal Singh(2018) conducted a study of “Environmental awareness and attitude towards environment among ninth grade students of Ludhiana District”.

The present study was an attempt to study the environmental awareness and attitude towards environment among 9th grade students. An Environmental Awareness Scale (EAS) by Dr. Anuradha Chopra (2005) and Taj Environment Attitude Scale (TEAS) by Dr. Haseen Taj (2001) were administered on 200 students of 9th grade. The result revealed that male and female students of ninth grade of Ludhiana district differ in their level of environmental awareness and male and female students of ninth grade of Ludhiana district differ in their level of attitude towards environment.

Study: 3

Ponmozhi and Krishnakumari(2017) conducted a study on “Environmental attitude of school students”.

In this study the environmental attitudes of the school students of Cuddalore District in Tamilnadu were focused. 200 samples were collected from random sampling technique. A Normative survey method was utilized. This study was proposed to find out the levels of environmental attitudes of students and if there was any significant difference between the selected pairs of sub-samples. High school students’ environmental attitude: scale developed by Ugulu, I., Sahin, M. and Baskar, S. (2013) used by the researcher. This study disclosed that the majority of student’s environmental attitudes were high. There exists no significant difference between sub samples. A stepwise regression was used to find factors contributing

environmental attitudes of students. Among the 10 predictors 2 were found in the 2 step. The model was statistically significant and accounted for approximately 20% of the variance of environmental attitude. Inspection of the structure coefficient suggests that medium of instruction was a strong indicator of emotional intelligence.

Study: 4

Abhisek Saha (2014) conducted a study of “Environmental awareness and knowledge of occupational hazard of fishermen in a remote district of India”.

The present study covered the environmental concerns, awareness and occupational hazard level of the fishermen. The limitations have been acknowledged and recommendations have been made for the improvement of awareness level on the basis of primary and secondary data collected from Coochbehar district of West Bengal in 2013. The investigation was directed to fisherman who are involved in pisciculture and the fisherman who are directly involved in fishing from river, pond and other wetland in Coochbehar district of west Bengal, India. They have lack of environmental awareness and also the occupational hazards related with their profession. It has been found that level of perception about the environmental related outcome on fish production and occupational hazard is highly restricted. They should be ever alert to the possible occupational hazards and follow regulations and legislations adopted regionally or nationally. The occupational hazards, safety anxieties and risks to health of the fisherman are constructed on the types of operation, scale of production and the specific species of interest. The pollutants in aquatic environment are varied and complex in nature. The key sources of pollution are pesticides and leaching of dissolved chemical fertilizers, sewage and was the disposal, processing wastes; etc. Vulnerability is a biological, chemical, or physical agent with the potential to cause a hostile health effect. Fish grown in excreta-

fertilized or wastewater ponds may be polluted with pathogens. Awareness of the health hazards involved in the handling of fish is important. Very often they are at risk to many injuries, noise and sting from fish spines, sprain and fracture which are of physical hazards. Spoiled wet fish in storage may yield poisonous gases. Fish muscle can hold different concentration of the representing health risk to fertile women. Cadmium and lead concentrations are higher in fish scales and vertebral column part of the fish. The author's objective is to grow the health and safety of fisherman through the acknowledgement, evaluation, control or modification of human health risk as well as concentrating on the possible role of fisherman in the spread of communicable human diseases through pisciculture.

Study: 5

Neeraj Kumar Sharma (2013) conducted a study on "Environmental awareness of college students in relation to sex, rural-urban background and academic streams wise".

The pristine environment was so pure, virgin, undisturbed, uncontaminated and quite hospitable for all life forms to exist. Man for the first time in his entire cultural history is facing one of the most horrible problem i.e., of ecological crisis. Though the destruction of environment in the past maybe excused from the point of view of ignorance but it can't be now. Therefore the environmental education is socially more relevant today than the past. There was an urgent need for new approach to environment which cuts across barriers of class, color, creed and nationality. Everybody has to contribute its share for protection of environment before it is too late. In the present research study an attempt has been made to assess the

environmental awareness of students of Government Degree College Dharamshala Himachal Pradesh (India).

Study: 6

Arunkumar (2012) conducted a study on “Assessment of environmental awareness among teacher trainees in teacher training institutes”.

The present study was focused on the assessment on environmental awareness among teacher trainees in teacher training institutes in Tiruchirapalli district; Tamilnadu. The investigator used normative survey method for the study. The sample consists of 300 teacher trainees from seven teacher training institutes in Tiruchirapalli district. Simple random sampling technique has been used for the selection of sample. The investigator himself developed a questionnaire on assessment of environmental awareness. The statistical techniques like percentage analysis, differential analysis and correlation analysis were used to analyze the data. The major finding of study revealed that teacher trainees in Tiruchirapalli district have average level of environmental awareness. There is significant difference between environment awareness among gender, community, marital status, locality and teaching competence.

Study: 7

Kalpana Thakur (2012) conducted a study on “Environmental awareness among senior secondary school students of Chandigarh”.

The study attempted to study the level of environmental awareness among the senior secondary school students. The study was conducted on the sample of 200 senior secondary students (100 opting for Science and 100 opting for Humanities) from four schools (two Governments and two Privates) of Chandigarh and data was collected through descriptive survey method. The major findings were: (i) Students of

government and private schools exhibited comparable environmental awareness; (ii) Science students exhibited very high degree of environmental awareness than students opting for humanities; (iii) female science students exhibited higher degree of environmental awareness than male science students and overall significant difference was found between male and female students.

Study: 8

Bridget Ann Cross (2012) conducted a study on “The impact of a school garden and environmental education on the environmental awareness of fifth graders”.

Children may not be aware of the environmental dangers threatening the planet or ways their behavior can protect or harm nature. The purpose of this study was to explore the role of an 8-week school garden and environmental lesson intervention (n=67) compared to no intervention (n=20) on environmental knowledge, attitudes, and behaviors of fifth grade students. A survey was given in March and again in May (9 weeks) to determine if the intervention improved outcomes. For the intervention group, a significant improvement ($p < 0.036$) was found in the number of students who believed “pollution damages the Earth”, and positive trends were seen in all measures of attitudes and behaviors; and knowledge increased 33%. It was concluded that utilization of a school garden and environmental lessons was effective for increasing environmental awareness in fifth grade students.

Study: 9

Prashant Kumar Astalin (2011) conducted a study on “Environmental awareness among higher secondary students and some educational factors affecting it”.

This study was found the environmental awareness among higher secondary students and some educational factors affecting it. Total 608 students were selected from different board by using cluster random sampling technique having 280 male

and 328 female students. For collecting data the tool "ParyavaranJagrukataPrashnavali" constructed by investigator was used. Post Hoc Tests, F-test and t-ratio test had been used for analysis of data. Main findings of this study are the students of 11th and 12th standard were identical as far as their environmental awareness was concerned. Science stream students had more environmental awareness in comparison to arts stream students. The CBSE students had more environmental awareness in comparison to UP Board students. Parent's group of students belonging to literate, undergraduate, post graduate and research had more environmental awareness in comparison to parent's group of students belonging to high school and intermediate. Finally the male students had also more environmental awareness in comparison to female students.

Study: 10

Susan Strife (2010) conducted a study on "The concrete jungle: environmental awareness and experiences of nature among urban children".

This study voices children's (ages 10-12) experiences of nature, awareness of environmental problems, and environmental concerns through 50 in-depth interviews and child-drawn maps across three urban neighborhoods representing various socioeconomic settings and environmental conditions. Using a hermeneutic phenomenological lens, this study described and interprets children's nature experiences and feelings about environmental problems with special attention to the perspectives of minority children growing up in environmentally degraded and low-income neighborhoods. Understanding children's perspectives regarding these issues is important, especially given the profound effects that direct experience of nature have on their physical and psychological development and considering that children are important environmental stakeholders, consumers, residents, and future voters

facing the pernicious effects of local and global environmental degradation. Findings revealed that a majority of children had positive nature experiences and shared a desire to spend more time in natural settings. These findings suggested that regardless of socioeconomic background and environmental conditions, many children still manage to build positive relationships with the natural world. However, findings also showed that children confront multiple barriers to experiencing nature, including fear of strangers, gang violence, lack of free time, parental concern and lack of access to nature. These barriers ultimately hindered their consistent, unstructured and safe interactions with nearby nature. A majority of children also expressed sadness, fear and pessimism about local and global environmental problems as well as apocalyptic predictions about the future state of the planet. These results suggested that many children are becoming “ecophobic,” or fearful of environmental problems, which scholars argue, has serious implications for children’s participation in environmental stewardship and conservation efforts more broadly. Voicing the opinions and concerns of these children sheds light on the numerous social and environmental challenges that many urban children confront, and should motivate urban planners, public health professionals, government bodies and parents to work together with children to ensure the protection of both the health of children and the planet.

Study: 11

Madhumala Sengupta (2010) conducted a study on “Environmental awareness and environment related behaviour of twelfth grade students in Kolkata: effects of stream and gender”.

The main purpose of this study was to understand the effect of Stream (Arts, Science and Commerce) and Gender on Twelfth Grade Students’ Environmental Awareness and Environment Related Behaviour in Kolkata. A total of 360 (Boys

=180 and Girls =180) students under West Bengal Council of Higher Secondary Education in Kolkata were randomly chosen as sample. Two 5-point Likert type questionnaires (Environmental Awareness 27 items and Environment Related Behaviour 21 items) were used for this study and were standardized by the researchers. For statistical analysis ANOVA and Coefficient of Correlation were conducted to determine the effect of Stream and Gender on Environmental Awareness and Environment Related Behaviour. The major finding of the study was there was significant difference between male and female twelfth grade students in environmental awareness.

Study: 12

Subramanian and Sivakumar (2009) conducted the study on “Impact of environment factors on academic achievement of higher secondary biology students in Tirunelveli district”.

The aim of the present study was to find out the relationship between environmental factor and academic achievement of higher secondary students. The sample consisted 325 higher secondary students of whom 162 were male and 163 were female. The data were collected using appropriate tool and analysed by ‘t’ test and product moment correlation. The results indicated that there was significant relationship between environmental factors and academic achievement of higher secondary students.

II.3.b. STUDIES DONE ABROAD

Study: 1

Yang Li(2018) conducted a study on the “Effect of environmental education on environmental awareness and environmental attitude based on environmental protection law of the people’s republic of China”.

The rapid development of technology and economy in past years has largely enhanced the quality of life. However, the emergence of various social and environmental problems could be discovered when looking back. Implementing the idea of environmental education in school systems therefore becomes a primary issue to promote environmental education. In this case, the practice of governmental policies has to implement the idea of environmental education in school systems, provide complete and comprehensive resources, information, and channels for environmental education, and positively promote the practice of Environmental Protection Law of China and the legislation revision. Aiming at college students in Beijing City, total 322 students in 6 different departments of Minzu University of China are selected as the research objects for the 16-week (3hrs per week for total 48 hours) experimental teaching. Total 322 copies of questionnaire are distributed, and 287 valid copies are retrieved, with the retrieval rate 89%. The research results reveal significantly positive effects of 1.environmental education on environmental awareness, 2.environmental awareness on environmental attitude, and 3.environmental education on environmental attitude. It is expected to enhance environmental awareness, attitudes, and behaviors related to environmental education based on the revision of Environmental Protection Law of the People’s Republic of China.

Study: 2

Chukwumerije Okereke et.al.(2018) conducted a study on “Determinants of Nigerian managers’ environmental attitude: Africa's Ubuntu ethics versus global capitalism”.

The researcher investigated the impact of economic, institutional, and ethical pressures on African managers' corporate social and environmental attitude based on a survey involving 377 Nigerian executives in the extractive industry. The researcher found that environmental orientation and behavior are mostly induced by instrumental economic motives, while ethical considerations exert a weak impact. This finding was significant because it contradicts mainstream corporate social responsibility (CSR) literature in Africa, which suggested the dominance of the culturally based, altruistic African Ubuntu philosophy. Based on this research finding, the researcher suggested that economic globalization has spurned a transnational capitalist cadre of managers whose values are shaped far more by global capitalist instincts than any putative cultural philosophy. The findings also undercut the fundamental logic underpinning the numerous global initiatives to promote environmental responsibility by multinational corporations in developing countries, which assumes that managers will pursue environmental sustainability voluntarily in the absence of robust regulations and strict enforcement.

Study: 3

YunxiaLiu et.al.(2017) conducted a study on “Promoting green residential buildings: residents' environmental attitude, subjective knowledge, and social trust matter”.

The importance of psychological factors was increasingly being recognized in driving the green building (GB) movement. However, few empirical studies have gone deeper to explore specific psychological factors and their impacts on residents' acceptance of green labelled residential buildings (GLRBs). This study developed an extended Technology Acceptance Model (TAM) to explain residents' intention to adopt GLRBs, and examine it in a survey ($N = 342$) conducted in Tianjin City, China. The results showed that subjective knowledge about GLRBs, social trust in organizations responsible for GLRBs, perceived usefulness from GLRBs, attitude towards GLRBs, and general environmental attitude measured by the New Ecological Paradigm (NEP) scale, are the significant psychological determinants of intention to adopt GLRBs. It was also found that lacking subjective knowledge and social trust among our surveyed residents could be the psychological barriers to their acceptance of GLRBs. The psychological factors the researcher identified provide references for policymakers to effectively develop residents' behavioral intervention strategies and allocate resources in GB promoting schemes. It was highly necessary to equip residents with more knowledge about GLRBs and improve their social trust in organizations responsible for delivering GLRBs.

Study: 4

Lewis Ting on Cheung, et.al. (2016) conducted a “Study on students' academic performance in environmental studies: an empirical study of different groups of secondary school graduates”.

The Hong Kong education system has undergone a dramatic change in its secondary and tertiary level of education. A single public examination for senior secondary education namely Hong Kong Diploma of Secondary Education (HKDSE) was adopted to replace two previously used examinations in 2012. As a result, all

higher education institutes in Hong Kong admitted different groups of secondary graduates into the same cohort in 2012 for sub-degree programmes. This study investigated the academic performance of students from different secondary schooling systems in an environmental studies course. Questionnaire survey data and the assessment results of a compulsory course of the students were used for this study. Results indicated significant differences in academic performance in the environmental studies course between three different groups of students. The students that completed a three-year senior secondary education outperformed their counterparts who completed the pre-associate degree and four-year senior secondary education in the environmental course assessment results. Students' environmental attitudes were positively correlated with academic performance on the environmental course, suggesting that students with better environmental attitudes performed better in the environmental studies course.

Study: 5

Julia Maria Aurora Hall(2016) conducted a study on “Promoting environmental attitudesa case study of the human-nature relationship promoted in Chinese middle school textbooks”.

This study investigated what sort of environmental attitudes are being promoted in contemporary China. The outset of the study was the growing awareness of environmental problems and the need to educate the Chinese population about environmental behaviours and attitudes by Chinese authorities. Based on prior research showing the importance of values in constructing attitudes, the main target of the analysis will be to distinguish these values and the way they shape environmental attitudes. With a background discussion of environmental awareness and environmental education in China, the investigation is carried out as a qualitative

content analysis with compulsory middle school textbooks as a case study. The choice of school textbooks was based on their importance as mediums of officially sanctioned knowledge and attitudes. The qualitative content analysis uses ideal types belonging to the conceptions of human-nature relationship and environmental responsibility; anthropocentric vs. nature centric views on human-nature relationship and individual vs. social (state) responsibility respectively. These ideal types of environmental values are applied to a selection of value-laden environmental content: the environmental themes of pollution, sustainable development and use of resources. The results of the analysis showed that with environmental content follows expressions of environmental values that can be said to be characterised by anthropocentrism and social (state) responsibility. The overall focus on anthropocentric values indicates that a utilitarian and rational attitude towards the natural environment is promoted in the textbooks, where predominantly humans are seen as morally significant and nature is a resource to be used by and for people. The conception of responsibility shows a greater emphasis on social (state) responsibility toward nature than individual, mainly exhibited by the focus on national policies and governmental projects in environmental prevention and management. This focus was interpreted as promoting an environmental attitude that stresses external locus of control, which leaves environmental problems to experts and science/technology. Together, the pattern of highlighting anthropocentric values and social (state) responsibility in relation to environmental themes is interpreted as constructing an official environmental attitude which guides its readership, the future generation of Chinese adults, how to view the natural environment and how to behave toward it.

Study: 6

TugbaTafli and Ali Ates(2016) conducted a study on “Development of environmental attitude scale towardspre-service biology teachers”.

Healthy life for all living creatures in nature is possible with a clean and habitable environment. Raising awareness of protecting environment in human landscape is important for conservation. Upbringing of informed individuals about environment and constitute behavioral changes by gaining their positive attitudes for nature have an important role in solutions of environmental issues. For this purpose, environmental attitude scale was developed to reveal the pre-service teachers' reflection and attitude for environment. This scale was applied 178 students who were the pre-service teachers in biology education department. Reliability calculation and exploratory factor analysis of the scale were computed via packaged software SPSS 13.0 while confirmatory factor analysis was computed via software Lisrel 8.80. Internal consistency coefficient of Cronbach alpha was found as 0.87 which signifies was a good value for reliability co-efficient. As the result of factor analysis, which was applied to obtained data, it was determined that eighteen itemized scale was five-dimensional. These dimensions were as follows: environmental issues, energy saving, waste products, environmental responsibility and environmental support according to cognitive, affective and behavioral statements. It was confirmed that, there was a positive and linear relation among the marks that students got and factors of the scales. Moreover, confirmatory factor analysis studies of the survey were computed via software Lisrel 8.80. In this current study, it was found as; RMSEA=0.050; SRMR=0.062; GFI=0.90; AGFI=0.86; CFI=0.97; NFI=0.92 and RFI=0.90, in the scope of confirmatory factor analysis. It has been confirmed that, the scale that was

executed according to the results, can be used to as a reliable scale for environmental attitude.

Study: 7

Lieflander and Bogner (2015) conducted a study on “Educational impact on the relationship of environmental knowledge and attitudes”.

This study examined the relationships between the environmental attitudes and environmental knowledge of schoolchildren within the framework of an environmental intervention. The researcher employed questions from the 2-MEV model to monitor students’ environmental attitudes in terms of the model factors preservation and utilisation while concurrently monitoring three environmental knowledge dimensions (system, action-related and effectiveness knowledge) at three different test times during the course of a four-day field centre programme for fourth-graders ($N = 133$, $M_{\text{age}} = 9.8$ years). Probably due to measurement constraints (e.g. a ceiling effect, social desirability), the researcher found no correlation between environmental knowledge and the attitude Preservation at all test times. The attitude Utilisation correlated negatively with all environmental knowledge dimensions, indicating that students who score higher on Utilisation are more likely, for example, to have and gain more system knowledge through programme participation than the other students or vice versa, as a causal relationship cannot be derived from our analyses: system knowledge may also influence Utilisation. In other words, children who refrain from (ab)using nature also seem to put more effort into improving their environmental knowledge and/or children who engage in learning about the environment will become less exploitative towards the environment.

Study: 8

Carlos Fernandez Hernández, et.al. (2015) conducted a study on “Market segmentation, activities and environmental behaviour in rural tourism”.

Rural tourism has developed in recent decades with an increase in the activities available to tourists. In this study, the authors apply a cluster analysis for the segmentation of rural tourism in La Palma, Canary Islands. They consider the level of environmental attitudes of tourists as variable explaining market segmentation. The results showed that there was a large heterogeneity of market segments and that the traditional activity of agro-tourism represents a small share of the total market. The segments with a greater economic impact and producing greater tourist satisfaction are those in which tourists also exhibit higher levels of environmental behaviour. Thus, rural tourist destinations can improve their economic performance by focusing on those segments attracting tourists with higher environmental concern and by adopting policies that enhance the environmental profile of the segments.

Study: 9

Florence Le Hebel, et.al. (2014) conducted a study on “What can influence students’ environmental attitudes? Results from a Study of 15-year-old students in France”.

The purpose of this study was to investigate the environmental attitudes (EA) in the population of 15-year-old French students and, to check if the French student population presents similar EA categorization as described in the different models in the literature (e.g. the Model of Ecological Values, Wiseman and Bogner 2003). The second aim of this study was to identify the different factors influencing students’ EA. The researcher analyse the results of the questionnaire-based Relevance of Science Education Project carried out in France in 2008 as a part of a wider international

comparative study ROSE (Relevance Of Science Education). The hierarchical ascendant classification of data from 2124 French students led to three main classes reflecting three different environmental attitudes showing a high resonance with the 2-MEV scale (Wiseman and Bogner 2003). The Model of Ecological Values (2-MEV) is defined with two orthogonal dimensions, Preservation and Utilization. Ecological Values are determined according to an individual's position on two orthogonal dimensions, one dimension reflecting conservation and protection of the environment (Preservation) and another dimension reflecting the utilization of natural resources (Utilization). The researcher results showed links between students' environmental attitudes and students' level of interest in learning about specific environmental topics, their practice of extra-curricular activities linked to nature and students' value priorities in different dimensions of their future work. The researcher discussed the implications of these results for the teaching of environmental issues, and for instance, the researcher argued that EA concept could be explained to fifteen-year-old students to encourage them to take into account the diversity of views towards the environment of others, and to position themselves in this diversity of attitudes. They could be aware that for instance, individuals can support environmental issues for different reasons, and consequently may respond to different appeals.

Study: 10

Joanna Huxster (2014) conducted a study on “Student understanding of climate change: influences of college major and environmental group membership on undergraduate knowledge and mental models”.

Studies examining public understanding of climate change in the 1990s through the present study found that despite high levels of concern for the

environment, members of the public frequently hold incorrect mental models of climate change. This study examined current mental models of climate change, using a sample of undergraduate students at two Universities. Surveys were conducted at the University of Delaware and at the University of Maryland (853 respondents, 465 completed surveys) and semi structured interviews were conducted at the University of Delaware (n=26). This data was used to determine how students' mental models compare to the scientific model of climate change. Three primary aspects of climate change understanding are analyzed: the causes, the effects, and possible mitigation strategies. This research also examined the influence of scientific major and environmental group membership on understanding of climate change. Science major and membership in an environmental group were each found to increase student understanding of climate change science, but these two causes had greater effects on different components of their models. This study demonstrates that young, educated US citizens have a limited understanding of the causes, effects and mitigation strategies of climate change. This research also showed that students in science majors or in environmental groups are more likely to have mental models of climate that closely match the scientific model and that environmental group membership was a stronger predictor of a more complete understanding than science major. In general, the most common misconceptions seen in students' mental models involved incorrect transfer to climate change models of inappropriate elements from models of other environmental issues, like ozone depletion or criteria pollutants.

Study: 11

ZarrintajAminrad and MahyarSakari (2013) conducted a survey on "Environmental awareness among environmental specialists and secondary school science teachers in Malaysia".

This study aimed to investigate the level of environmental awareness in the concept of sustainable development among secondary school teachers and environmental specialists as club teachers. The survey was conducted on 35 science teachers and 20 club teachers of “Form Four” in the district of Kajang, Selangor, Malaysia. Dependent variable was included environmental awareness components while independent variables have been included demographic variables. A questionnaire was used as research instrument. Methods of analyzing data were descriptive and T- test where SPSS software (Ver. 19) was employed. Research outcomes showed that secondary school science teachers and environmental specialists had moderate level of environmental awareness. In detail, specialists were shown an in significant higher level of awareness than science teachers. In general, females were shown a higher level of environmental awareness than male group. This difference was only significant where environmental specialists were surveyed.

Study: 12

NalanDemirciogluYildiz and Suleyman Toy (2011) conducted a study on “Effects of personal characteristics on environmental awareness; a questionnaire survey with university campus people in a developing country, Turkey”.

This study was carried out to identify the awareness and sensibility levels of campus people about environmental problems in Erzurum, the largest city of the East Anatolian Region, Turkey. A standard questionnaire form was completed by 350 volunteers and the data obtained were evaluated with Chi-square (χ^2) test. Environmental sensibility of the campus population was found to be 64.4% and the relationships between the sensibility and education levels, age, gender and income groups were investigated.

Study: 13

Hc, Xueginand Liu, Lan (2011) conducted a comparative study on “Environmental knowledge, attitude and behavior among university students in China”.

Environmental problems in China are intensifying and it is vital to evaluate the environmental knowledge, attitudes and behaviours of the generation poised to inherit their management. This study examined a survey of environmental awareness among Chinese students (aged between 16 and 20 years) considering levels of regional economic development and environmental problems in the eastern/coastal and western/inland regions of China, the researcher examined how environmental differences affect university students’ environmental awareness. Data were analysed statistically using non-parametric tests to compare a population of urban residents from a developed region against a similar population of urbanites from a less-developed region. Students in the samples possessed rather low levels of environmental knowledge, but had positive environmental attitude and were willing to commit to environment friendly behaviours. Students growing up in developed versus less-developed settings had significantly different levels of general environmental awareness despite their shared exposure to institutionalized environmental education.

Study: 14

Maryam Larijani (2010) did a study on “Assessment of environmental awareness among higher primary school teachers”.

Over recent decades, global problems relating to degradation of natural resources and pollution have increased dramatically. Natural resources are developed by excessive use. Fresh water scarcity on a global scale, deforestation, degradation of coastal and marine areas, soil depletion and loss of biodiversity are some of the

problems that have become a major concern. Air and water pollution have reached such levels that have already resulted in serious health problems as well as negative impact on the environment and inevitably influencing prospects for long-term economic growth. The sample for the present study consisted of 300 higher primary school teachers. The statistical analyses were chi-square test and contingency coefficient test were employed in the present study of the 300 teachers assessed for environmental awareness. It was found that 18% of them had low awareness 57.7% of the teachers had moderate awareness and only 24.3% of them had high level of environmental awareness. Further chi square test revealed a significant difference among frequencies of different levels of environmental awareness, confirming that majority of them had moderate awareness.

Study: 15

DicleOuz and Safiye Kavas (2010) conducted a study on “Environmental awareness of University Students in Ankara, Turkey”.

This study aims to present environmental sensitivity and awareness of university students. The first and fourth year students of landscape architecture, town and regional planning and environmental engineering undergraduate programs at universities throughout Ankara, Turkey were selected as participants since these programs' curricula focus on environment. A questionnaire survey was applied to 212 students face to face. Research findings showed that even though students take many courses on the environmental issues, their environmental awareness and environmentally responsible behaviors are lower than the expected and students' grades show no significance on the results. It was concluded that environmental knowledge do not always influence awareness and behavioral intentions, a national

strategy is needed for environmental education in higher education and current curricula should be reconsidered in terms of effectiveness.

Study: 16

Baptiste, April (2010) conducted a study on “Evaluating environmental awareness: a case study of the Nariva Swamp, Trinidad”.

The purpose of this research was to examine the influence of oil and gas drilling on the varying beliefs, concerns and perceptions of danger, behaviors and support for policies among three rural communities of the Nariva Swamp, Trinidad using three independent variables of gender, village proximity to the swamp and type of livelihoods. Additionally, the levels of opposition to oil and gas drilling activities and actions taken against this activity within the swamp were also evaluated. Using a mixed methods approach, villagers from three rural wetland communities were surveyed, interviewed and participated in focus groups over a two month period. Results indicated that respondents living closer to the Nariva Swamp had higher levels of environmental beliefs, concerns, support for protection policies and pro-environmental behaviors than respondents living in villages further away from the swamp. While the results for gender and environmental beliefs were mixed, females indicated higher altruistic and egoistic concerns than males. Males had higher levels of support for policies that monitored oil and gas drilling and engaged in more pro-environmental behaviors while females had higher levels of support for policies that protected swamps from oil activities. The results for type of livelihoods were also mixed, however farmers had the highest levels of environmental concerns and the highest levels of pro-environmental behaviors related to nature based activities. Despite the high levels of environmental beliefs, concerns and perceptions, there is a surprisingly low level of action among the villagers in efforts to prevent the

development from taking place. Reasons for the incongruence between attitudes and actions are presented by this study. Finally, the research evaluates the management of the Nariva Swamp as well as the wider wetland management policies within Trinidad and Tobago.

II.4. CRITICAL ANALYSIS OF THE STUDIES REVIEWED

The investigator reviewed 28 related studies and papers in which 12 of them are Indian studies and 16 from foreign studies. In some studies, the standardized tools are used and for the rest, the investigators have developed their own tools. The investigator used survey method. The simple random sampling technique has been adopted. The statistical techniques applied normally were 't' test and 'F' test.

II.5. THE GAPS IDENTIFIED

From the studies reviewed by the investigator, the following gaps have been identified. Only a few studies have been undertaken to fix the steps taken by the higher secondary schools to create environmental awareness.

II.6. THE PRESENT STUDY

In order to bridge the gap mentioned above, the present study is undertaken to find out the steps taken by the higher secondary schools to create environmental awareness among their students.

II.7. CONCLUSION

The ensuing chapter describes the plan and procedure of the study.

CHAPTER III

PLAN AND PROCEDURE

III.1. INTRODUCTION

In the words of Best (1995) “Research is the systematic and objective analysis and recording of controlled observations, principles or theories resulting in prediction and possible ultimate control of events” (P.20). The entire research plan is reflected in the methodology. It describes the method used by the researcher, the population of the project, the size of the sample, how they are selected, the variables and dimensions used the reliability of the instruments selected and the statistical procedures used in the analysis.

For the successful conduct of any research, suitable methodology with specific operational steps and well-constructed tools are necessary. Several research methods and procedures are known for the systematic way of completing a research work. The choice of the research method depends upon the nature of the problem selected and the data necessary for the solution. Methodology enables the investigator to look at the problem in a meaningful and orderly way. Methodology comprises selection of the sources of data, collection of data for the purpose of research and various designs and techniques for analyzing the data. The data are analyzed using statistical techniques. Methodology helps the researcher to evaluate the validity and reliability of the findings. Therefore, methodology becomes necessity for any type of investigation.

III.2. SIGNIFICANCE OF THE STUDY

God has created so many living and non-living beings. But the living beings particularly human beings are intentionally more responsible for environment destruction than any other species. Importance was given in almost all cultures for environmental protection. Due to advancement of science and technology life has become complicated like a machine. Human beings are suffering a lot due to various natural calamities. These wastes are beginning to bury them. Due to deforestation, there is a lack of rain and fertility of soil decreased. It is the fusion of subject matter of environmental education as a central theme. So, it is very much necessary to safeguard the environment as far as possible and it is human being's responsibility to hand over the sage environment to their future generation. Students in the class room can use enquiry skills.

“The destiny of India is shaped in the classrooms” - (Kothari Commission, 1964-66). Bearing this in mind, teachers should give opportunities to the students to make them have awareness on the environment. Most of the students recognize the urgent need for environment, but only some have clear idea about what is to be done and a very few have either the actual experience or the knowledge about the courses that are needed to be taught. Besides introducing the subject “Environmental science” at all levels of education, one must give much emphasis on the new approaches and programmes of environment which will bring environmental concerns to all facts of life. In India much importance has been given to environmental education since 1979 when the first International Conference on Environmental Education was held in New Delhi.

Many studies have been undertaken, as far as the knowledge of the investigator is concerned to find out the environmental awareness of the students at various levels. The experiences have taught her that the activities of the schools also have the effect on their students' environmental awareness. It is therefore, the need of the hour that a study has to be undertaken to find out the measures the steps taken by the higher secondary school teachers to create environmental awareness activities among their students particularly in Thoothukudi district and its relationship with the environmental awareness of the students.

Thoothukudi district is much affected by the pollutants of the factories, industries, power plants, etc. and for that this place is taken for investigation. School is a society in miniature (John Dewey). Any reform in the society has to start from school. Environmental activities, awareness and attitude are not the exceptions. Hence, the present study is undertaken to find out the steps taken in the higher secondary schools of Thoothukudi district for creating environmental awareness and the environmental awareness found among their students.

III.3. STATEMENT OF THE PROBLEM

The present study is stated as, **“A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”**.

III.3.a. OPERATIONAL DEFINITIONS OF THE KEY TERMS

III.3. a. i. Steps taken in the Higher Secondary Schools

Higher secondary schools refer to the schools those teaching up to XII standard students. Generally, ‘Steps’ refers to the act and movement putting one leg in front of the other in walking or running. Here the term ‘Steps’ refer to the activities

undertaken to progress further. Thus “Steps taken in the Higher Secondary Schools” in this study refers to the activities and measures taken by the management of higher secondary school.

III.3.a. ii. Environmental Awareness

The term “Environmental” is used to describe in the aggregate all the external forces, influences and conditions which affect the life, nature, behavior and the growth, development and maturity of living organisms. The word awareness means “to guard against”. It means consciousness and sensitiveness. It is used in the sense of “being alive to”. “Environmental awareness” in this study means “being alive to the evil effects of environmental pollution”. It is knowing and reacting.

III.3.a.iii. Higher Secondary Students

It refers to the students studying in XI and XII standard in the higher secondary schools.

III.4. OBJECTIVES OF THE STUDY

1. To find out the level of steps taken in the higher secondary schools to create environmental awareness activities of higher secondary teachers.
2. To find out the significant difference between male and female higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.
3. To find out the significant difference between arts and science qualification higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.
4. To find out the significant difference between science and language subject higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.

5. To find out the significant difference between rural and urban school higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.
6. To find out the significant difference between government and government aided school higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.
7. To find out the significant difference among boys, girls and co-education school higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities with respect to nature of school.
8. To find out the significant difference among below 5 years, 10 years and above 10 years teaching experienced higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities with respect to experience.
9. To find out the significant difference among below 35 years, 36 to 45 years and above 46yearsage higher secondary teachers in charge, if any, in their steps taken in the higher secondary schools to create environmental awareness activities.
10. To find out the level of environmental awareness of higher secondary students.
11. To find out the significant difference, if any, between male and female higher secondary students in their environmental awareness.
12. To find out the significant difference, if any, between rural and urban school higher secondary students in their environmental awareness.
13. To find out the significant difference, if any, between Tamil and English medium higher secondary students in their environmental awareness.

14. To find out the significant difference, if any, between government and government aided school higher secondary students in their environmental awareness.
15. To find out the significant difference among boys, girls and co-education school higher secondary students, if any, in their environmental awareness with respect to nature of school.

III.5. HYPOTHESES OF THE STUDY

1. The level of the steps taken in the higher secondary schools to create environmental awareness activities among higher secondary teachers is moderate.
2. There is no significant difference between male and female higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
3. There is no significant difference between arts and science qualified higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
4. There is no significant difference between science and language subject higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
5. There is no significant difference between rural and urban school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
6. There is no significant difference between government and government aided school higher secondary teachers in charge of environmental activities in

theirsteps taken in the higher secondary schools to create environmental awareness activities.

7. There is no significant difference among boys, girls and co-education school higher secondary teachersin charge of environmental activities in their stepstaken in the higher secondary schools to create environmental awareness activities with respect to nature of the school.
8. There is no significant difference among below 5 years, 10 years and above 10 years with teaching experience higher secondary teachersin charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to teaching experience.
9. There is no significant differenceamongbelow 35 years, 36 to 45 years and above 46yearsage higher secondary teachersin charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
10. The level of the environmental awareness among higher secondary students is moderate.
11. There is no significant difference between male and female higher secondary students in their environmental awareness.
12. There is no significant difference between rural and urban school higher secondary students in their environmental awareness.
13. There is no significant difference between Tamil and English medium higher secondary students in their environmental awareness.
14. There is no significant difference between government and government aided school higher secondary students in their environmental awareness.

15. There is no significant difference among boys, girls and co-education school higher secondary students in their environmental awareness with respect to nature of school.

III.6. RESEARCH METHODS

Research methods are very important in a research process. Method is a style of conducting a research work, which is determined by the nature of the problem. Webster defined methodology as “the science of method or arrangement”. Methodology is the procedure or techniques, adopted in a research study. It has great importance in any kind of research. Research cannot carry out its function without a suitable method. The selection of a method for research will depend upon the nature of the problem and the kind of data necessary for the solution of the problem. There are basically five kinds of research methods in the field of educational research. They are,

- i. Historical method
- ii. Survey method
- iii. Experimental method
- iv. The Case Study method
- v. The Genetic method

In any specific study, it is more common to apply and one of the above methods.

III.7. METHOD USED FOR THE PRESENT STUDY

The present study attempts to study the steps taken in the higher secondary schools to create environmental awareness and the environmental awareness among

higher secondary students. Since the problem is concerned with survey type, the investigator has selected the normative survey method for conducting the study.

III.7.a. Normative survey method

The term 'survey' indicates gathering of the data regarding current conditions and the 'normative' implies the determination of normal or typical condition or practice. Thus, the term normative survey "is generally used for the type of research which proposes to ascertain what is normal or typical at present time. Normative survey method is a fact-finding study. The survey method gathers data from a relatively large number of cases at a particular time. It involves a clearly defined problem and definite objectives. It requires expert and imaginative planning, careful analysis and interpretation of the data gathered and logical and skilful reporting of the findings.

III.8. POPULATION AND SAMPLE

Population means the aggregate or totality of objects or individuals regarding which inferences are to be made. It means all those people or documents, etc. who are proposed to be covered under the scheme of study. A population is any group of individuals that have one or more characteristics in common that are of interest to the researcher.

A sample is a small proportion of a population selected for analysis, by observing the sample, certain inferences may be made about the population. Contrary to popular opinion, samples are not selected haphazardly, but are chosen in a deliberate way so that the influences of chance or probability can be estimated.

The population for the present study was identified as the higher secondary teachers and higher secondary students. Among the population 40 higher secondary teachers and 400 higher secondary students were selected. Simple random sampling technique was adopted by the investigator.

III.9. DISTRIBUTION OF THE SAMPLE

Table III.1

School Wise Distribution of the Sample

Sl.No.	Name of the School
1.	Government Higher Secondary School, Samuelpuram
2.	Kadambur Matriculation Higher Secondary School, Thoothukudi
3.	Natarajan Higher Secondary School, Kattunayakkampatti.
4.	V.O.C.Government Higher Secondary School, Ottapidaram.
5.	Dasnavis Girls Higher Secondary School, Thoothukudi.
6.	St.Aloysius Higher Secondary School, Thoothukudi.
7.	St.Thomas Matriculation Higher Secondary School, Thoothukudi
8.	V.G.S.Girls Higher Secondary School, Thoothukudi
9.	Caldwel Higher Secondary School, Thoothukudi
10.	St.Lasalle Higher Secondary School, Thoothukudi
11.	Government Higher Secondary School, Umarikadu
12.	Government Higher Secondary School, Sekkarakudi
13.	Government Higher Secondary School, Sivaganapuram
14.	St.Francis Xavier Higher Secondary School, Thoothukudi
15.	Harbour Higher Secondary School, Thoothukudi

16.	Government Higher Secondary School, Kovilpatti
17.	Government Higher Secondary School, Arumuganeri
18.	ShanmugaSundara Nadar Higher Secondary School, Aathoor
19.	John the Baptist Higher Secondary School, Puthiamputhoor
20.	Government Higher Secondary School, Aathoor
21.	K.A. Higher Secondary School, Peyanvilai
22.	Government Higher Secondary School, Soosaipuram
23.	Government Higher Secondary School, Kurukusalai
24.	V.V.D. Higher Secondary School, Thoothukudi
25.	BharathiyarVidyalayam, Thoothukudi
26.	Government Higher Secondary School, Samuelpuram
27.	V.O.C. Higher Secondary School, Kovilpatti
28.	St.Paul Higher Secondary School, Thoothukudi
29.	St.Mary's Boys Higher Secondary School, Thoothukudi
30.	St.Mary's Boys Higher Secondary School, Sawyerpuram
31.	St.Mary's Girls Higher Secondary School, Sawyerpuram
32.	SeenaVana Government Higher Secondary School, Thoothukudi
33.	BMC Higher Secondary School, Thoothukudi
34.	Government Girls Higher Secondary School, Kayalpatnam
35.	Bharati Higher Secondary School, Ettayapuram
36.	S.A.V. Higher Secondary School, Thoothukudi
37.	Government Higher Secondary School, Ettayapuram

38.	Tmt. Thangammal Higher Secondary School, Thoothukudi
39.	St.Ignatius Higher Secondary School, Thoothukudi
40.	Crescent Higher Secondary School, Thoothukudi

III.10. TOOLS

Tools should be suitable for the collection of certain type of information. Each tool is particularly appropriate for certain sources of data, yielding information of the kind and in the form that would be most effectively used. The tools commonly used in qualitative studies are observation method, interview, sociometry and projective techniques, with quantitative research, it is appropriate to use the other tools such as observation, method in which frequencies are recorded, interview schedules with rating scale, checklist, inventory and attitude scales. Collection of relevant data is one of the most important steps in any research, especially in the field of education. For this an appropriate instrument or tool is very essential. In certain researcher, readymade tools are used by the investigator to carry out the study. In such cases, where readymade tools are not available, the investigator has to prepare suitable tools. They will work adequately with the subjects selected for the study.

III.11. TOOLS OF THE PRESENT STUDY

It is necessary to adopt or evolve a systematic, relevant and valid procedure to collect the essential data. Different tools are available for collecting various kinds of information. The selection of various tools is of vital importance. In the absence of adequate tools, the investigator has to develop the same for the purpose of the research.

There are a good number of researches done on environmental awareness. But the researcher has concentrated on the steps taken in the higher secondary schools to create environmental awareness and the environmental awareness among higher secondary students. There are standardized tools to measure the environmental awareness but to measure the steps taken to create environmental awareness by higher secondary teachers and the environmental awareness of higher secondary students.

In this present study, the investigator has used two tools to measure the environmental awareness.

1. “Environmental Awareness Activities Test for Teachers” developed by Rasul Mohaideen and Geetha (2012).

2. “Environmental Awareness Test for Students” developed by Rasul Mohaideen and Geetha (2012).

III.11.1. Environmental Awareness Activities Test

This tool is a standardized tool developed by Rasul Mohaideen and Geetha (2012).

III.11.1. a.Reestablishing Validity

Content Validity

This tool has already been standardized. Standardization of the tool was redundant. However, the tool was shown to the subject expert and their approval had been obtained before administration.

III.11.1.b. Reliability

For establishing the reliability of the tool, the test-retest method was followed. For this, the tool was administered on 10 higher secondary teachers of the schools randomly selected and got the response. After 14 days investigator gave the same tools to the same set of higher secondary teachers of the schools for establishing reliability of the tool by using the test-retest method. Then the product moment coefficient of correlation was found. It is 0.72. Thus, the tool is taken as reliable.

III.11.1.c. Scoring

The answers were scored in the following manner.

Response	Score
Yes	1
No	0

Thus, the maximum mark would be 40 and minimum 0.

III.11.1.d. Administration of the Tool

The investigator personally visited the schools with the permission of headmasters and headmistress to meet the concerned higher secondary teachers of the school who is in charge of environmental activities. The personal data form and the tool to assess environment awareness activities.

III.11.2. Environmental Awareness Test

This tool is a standardized tool developed by Rasul Mohaideen and Geetha (2012).

III.11.2.a Reestablishing Validity

Content Validity

This tool has already been standardized. Standardization of the tool was redundant. However, the tool was shown to the subject expert and their approval has been obtained before administration.

III.11.2.b. Reliability

For establishing the reliability of the tool, the test-retest method was followed. For this the tool was administered on 40 higher secondary students of the schools randomly selected and got the response. After 14 days investigator gave the same tool to the same set of higher secondary students of the schools for establishing reliability of the tool by using the test-retest method. Then the product moment co-efficient of correlation was found. It is 0.78. Thus, the tool is taken as reliable.

III.11.2.c Scoring

The answers were scored in the following manner.

Response	Score
Yes	1
No	0

Thus, the maximum mark would be 40 and minimum 0.

III.11.2.d. Administration of the Tool

The investigator personally visited the schools with the permission of headmasters and headmistress to meet the concerned higher secondary students of the school. The personal data form and the tool to assess environmental awareness test.

III.12. BACKGROUND VARIABLES

The investigator has taken thirteen background variables for the present study.

They are as follows:

For Teachers

- i. Gender (Male and Female)
- ii. Academic Qualification (Arts and Science)
- iii. Subject taught at School (science and Language)
- iv. Location of the School (Rural and Urban)
- v. Management of the School (Government and Government Aided)
- vi. Nature of the School (Boys, Girls and Co-Education)
- vii. Teaching Experience (Below 5 Years, 10 Years and Above 10 Years)
- viii. Age (Below 35 Years, 36 to 45 Years and Above 46 Years)

For Students

- i. Gender (Male and Female)
- ii. Location of the School (Rural and Urban)
- iii. Medium of Instruction (Tamil and English)
- iv. Management of the School (Government and Government Aided)

- v. Nature of the School (Boys, Girls and Co-Education)

III.13. STATISTICAL TECHNIQUES USED

The following statistical techniques were used for the analysis of the data to draw meaningful generalization

- i. Percentage Analysis
- ii. t- test
- iii. F - test

III.14. DELIMITATION OF THE STUDY

Only the limited variables are taken for this study.

III.15. CONCLUSION

The procedure of the study, the method of data collection and the statistical techniques employed are discussed in this chapter. The data analysis and the interpretations are discussed in the succeeding chapter.

CHAPTER IV

ANALYSES AND INTERPRETATION OF DATA

IV.1. INTRODUCTION

The data, after collection, have to be processed and analysed. Processing implies editing, coding, classification and tabulation of collected data so that they are amenable to analysis. The raw data so collected should be arranged in an orderly fashion. The clumsy, unorganized mass of data cannot be used for the purpose of comparison and interpretation. It involves breaking down existing complex factors into simple parts and putting the parts together in new arrangement for the purpose of interpretation.

Analysis includes computation of certain measures along with searching for pattern of relationship that exists among data groups. The important task of the investigator, therefore is the analysis of collected data. The investigator of the present study 40 teachers and 400 students using two tools to find out the environment awareness.

- i. The steps taken in the higher secondary schools to create environmental awareness activities among higher secondary teachers.
- ii. The environmental awareness test among higher secondary students.

The data were collected, analysed statically and the interpretation are also given.

IV.2. ANALYSES AND INTERPRETATION OF DATA

Table IV-0

Measures taken to Create Environmental Awareness

S.No.	Measures	No. of Schools taken the measures (N=40)	Percentage of schools taken the measures
1.	Provision for providing drinking water	37	92.5
2.	Provision for underground drainage system	38	95
3.	Existence of Eco-club	38	95
4.	Plantation of saplings in and outside school	35	87.5
5.	Banning the polythene bags	36	90
6.	Usage of Eco-friendly wrappers	34	85
7.	Making useful items from waste materials	20	50
8.	Provision for rain water harvesting	33	82.5
9.	Maintaining garden in the school	32	80
10.	Plantation of saplings by the students on their birth days	20	50
11.	Celebrating environmental day in the school	38	95
12.	Provision for the disposal of wastages	36	90
13.	Provision of students in classroom and campus cleaning	33	82.5
14.	Punishment for throwing waste inside the campus	34	85
15.	Following rules for environmental cleanliness	35	87.5
16.	Satisfactory in sanitary condition	33	82.5

S.No.	Measures	No. of Schools taken the measures (N=40)	Percentage of schools taken the measures
17.	Organising seminar regarding environmental awareness	20	50
18.	Provision for dustbins in every classrooms	31	77.5
19.	Hanging banners and slogans on environmental protection	32	80
20.	Distribution of posters, magazines and pamphlets to the public	31	77.5
21.	Participation of students in inter school competition on environmental issues	33	82.5
22.	Giving environmental topic during school day events and other competitions	22	55
23.	Encouragement for the students to do project work regarding environmental protection	21	52.5
24.	Participation of the students in the campaigns regarding environmental awareness	34	85
25.	Allotment of special periods for environmental education	36	90
26.	Conducting examination for environmental education	34	85
27.	Conducting health awareness programmes	36	90
28.	Regular check-up to nail cutting	35	87.5

S.No.	Measures	No. of Schools taken the measures (N=40)	Percentage of schools taken the measures
29.	Avoiding the usage of plastic	31	77.5
30.	Prizes for better classroom cleaning	24	60
31.	Prizes for Terrace garden with pollution sensing plants	21	52.5
32.	Usage of vermin compost fertilizer for the school garden	25	62.5
33.	Make field visits to industries and polluted areas to gather the knowledge about the environmental protection	23	57.5
34.	Conducting environmental awareness exhibition in the school	22	55
35.	Reward and award for environmental project	32	80
36.	Getting fund from government and government organization regarding environmental projects	38	95
37.	Practical steps to the students regarding recycle the waste	23	57.5
38.	Conducting brain storming lesson on positive and negative effects of tourism on environment	22	55
39.	Participation of students in Radio and T.V. programmes regarding environmental awareness	37	77.5
40.	Provision for environmental protection park in the school	21	52.5

From the above table, it is understood that 75 to 100% of the high schools in Thoothukudi District are taking the following measures to create environmental awareness among their students.

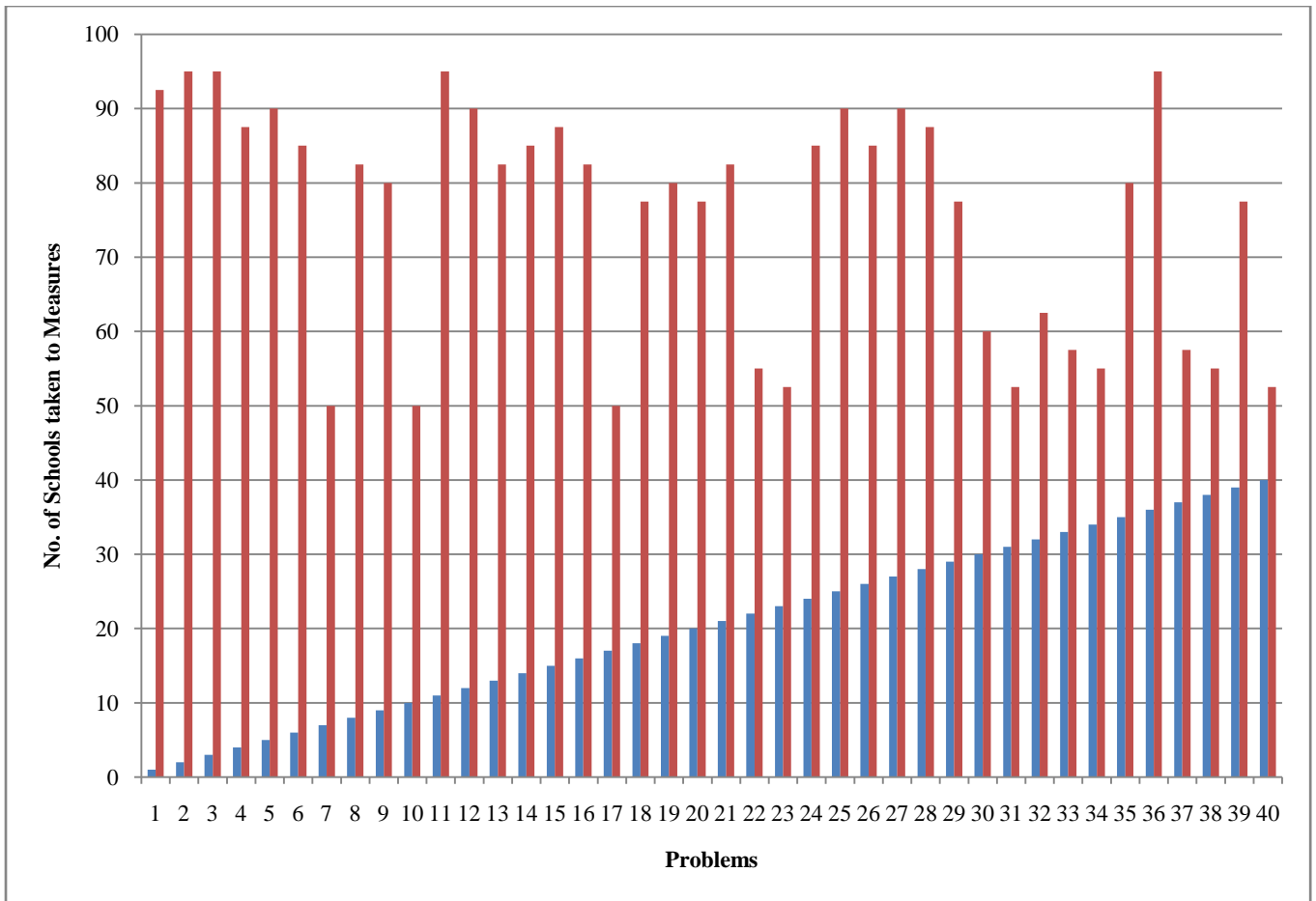
- (i) Provision for providing drinking water
- (ii) Provision for underground drainage system
- (iii) Existence of Eco-club
- (iv) Plantation of saplings in and outside school
- (v) Banning the polythene bags
- (vi) Usage of Eco-friendly wrappers
- (vii) Provision for rain water harvesting
- (viii) Maintaining garden in the school
- (ix) Celebrating environmental day in the school
- (x) Provision for the disposal of wastages
- (xi) Provision of students in classroom and campus cleaning
- (xii) Punishment for throwing waste inside the campus
- (xiii) Following rules for environmental cleanliness
- (xiv) Satisfactory in sanitary condition
- (xv) Provision for dustbins in every classrooms
- (xvi) Hanging banners and slogans on environmental protection
- (xvii) Distribution of posters, magazines and pamphlets to the public
- (xviii) Participation of students in inter school competition on environmental issues
- (xix) Participation of the students in the campaigns regarding environmental awareness
- (xx) Allotment of special periods for environmental education
- (xxi) Conducting examination for environmental education

- (xxii) Conducting health awareness programmes
- (xxiii) Regular check-up to nail cutting
- (xxiv) Avoiding the usage of plastic
- (xxv) Reward and award for environmental project
- (xxvi) Getting fund from government and government organization regarding environmental projects
- (xxvii) Participation of students in Radio and T.V. programmes regarding environmental awareness

50 to 75% of the high schools in Thoothukudi district are taking the following measures to create environmental among their students.

- (i) Making useful items from waste materials
- (ii) Plantation of saplings by the students on their birth days
- (iii) Organising seminar regarding environmental awareness
- (iv) Giving environmental topic during school day events and other competitions
- (v) Encouragement for the students to do project work regarding environmental protection
- (vi) Prizes for better classroom cleaning
- (vii) Prizes for Terrace garden with pollution sensing plants
- (viii) Usage of vermin compost fertilizer for the school garden
- (ix) Make field visits to industries and polluted areas to gather the knowledge about the environmental protection
- (x) Conducting environmental awareness exhibition in the school
- (xi) Practical steps to the students regarding recycle the waste
- (xii) Conducting brain storming lesson on positive and negative effects of tourism on environment
- (xiii) Provision for environmental protection park in the school

Figure IV.0
Measures taken to Create Environmental Awareness



Hypothesis No. 1

The steps taken in the higher secondary schools to create environmental awareness activities among higher secondary teachers is moderate.

Table IV.1

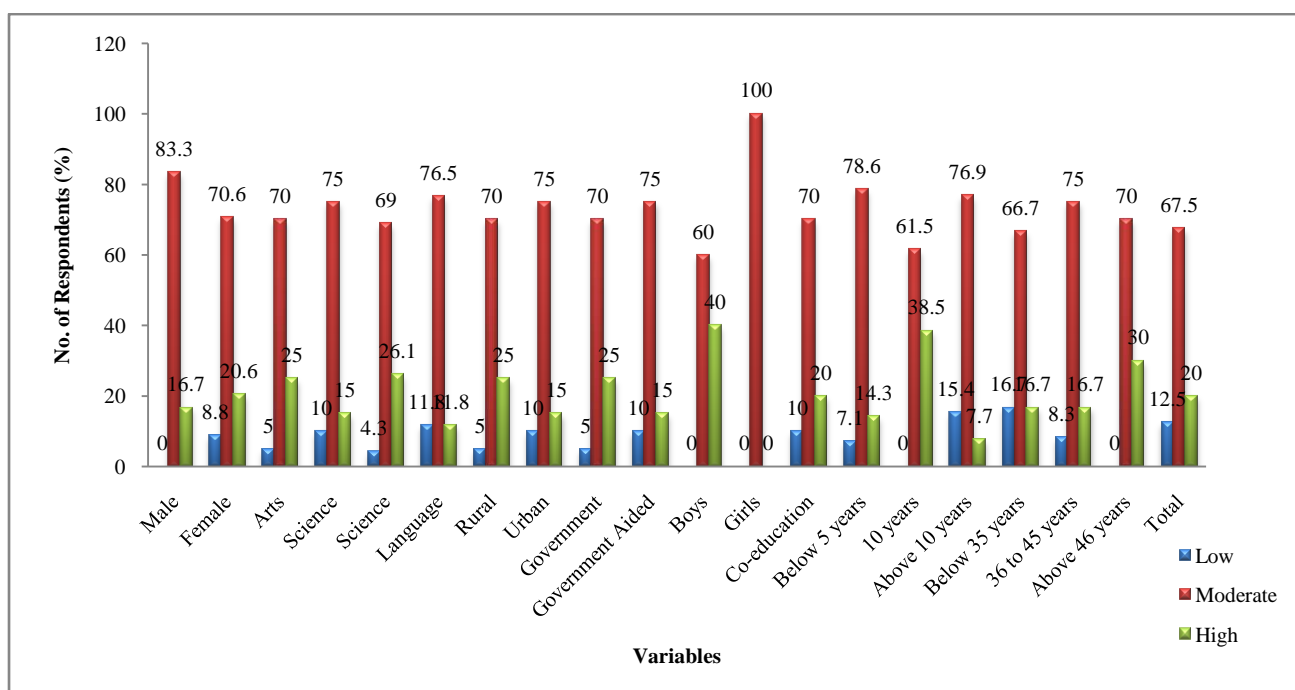
Table showing level of the steps taken in the higher secondary schools to create environmental awareness activities among higher secondary teachers

Variables	Category	Number	Low		Medium		High	
			No.	%	No.	%	No.	%
Gender	Male	6	0	0	5	83.3	1	16.7
	Female	34	3	8.8	24	70.6	7	20.6
General Academic Qualification	Arts	20	1	5.0	14	70.0	5	25.0
	Science	20	2	10.0	15	75.0	3	15.0
Subject taught at School	Science	23	1	4.3	16	69.0	6	26.1
	Language	17	2	11.8	13	76.5	2	11.8
Location of the School	Rural	20	1	5.0	14	70.0	5	25.0
	Urban	20	2	10.0	15	75.0	3	15.0
Management of the School	Government	20	1	5.0	14	70.0	5	25.0
	Government Aided	20	2	10.0	15	75.0	3	15.0
Nature of School	Boys	5	0	0	3	60.0	2	40.0
	Girls	5	0	0	5	100.0	0	0
	Co-education	30	3	10.0	21	70.0	6	20.0
Teaching	Below 5 years	14	1	7.1	11	78.6	2	14.3

Experience	10 years	13	0	0	8	61.5	5	38.5
	Above 10 years	13	2	15.4	10	76.9	1	7.7
Age	Below 35 years	6	1	16.7	4	66.7	1	16.7
	36 to 45 years	24	2	8.3	18	75.0	4	16.7
	Above 46 years	10	0	0	7	70.0	3	30.0
Total		40	5	12.5	27	67.5	8	20.0

Figure IV.1

Figure showing level of the steps taken in the higher secondary schools to create environmental awareness activities among higher secondary teachers



It is inferred from the above table that 0%, 83.3% and 16.7% of the male higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 8.8%, 70.6% and 20.6% of the female higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 5%, 70% and 25% of the arts qualified higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 10%, 75% and 15% of the science qualified higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 4.3%, 69.6% and 26.1% of the science subject higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 11.8%, 76.5% and 11.8% of the language subject higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 5%, 70% and 25% of the rural school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 10%, 75% and 15% of the urban school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 5%, 70% and 25% of the government school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 10%, 75% and 15% of the government aided school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 0%, 60% and 40% of the boys school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 0%, 100% and 0% of the girls school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 10%, 70% and 20% of the co-education school higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 7.1%, 78.6% and 14.3% of the below 5 years experienced higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 0%, 61.5% and 38.5% of the 10 years experienced higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 15.4%, 76.9% and 7.7% of the above 10 years experienced higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 16.7%, 66.7% and 16.7% of the age below 35 years higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 8.3%, 75% and 16.7% of the age 36 to 45 years higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively. 0%, 70% and 30% of the age above 46 years higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

It is inferred from the above table that 12.5%, 67.5% and 20% of the higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.

Hypothesis No.2

There is no significant difference between male and female higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Table IV.2

t-test showing the mean difference between male and female higher secondary teachers with respect to gender

Variable	Gender	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness Activities	Male	6	34.33	1.966	0.877	NS
	Female	34	35.12	2.293		

It is inferred from the above table that the calculated 't' value (0.877) is less than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference between male and female higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Hypothesis No.3

There is no significant difference between arts and science qualified higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Table IV.3

t-test showing the mean difference between higher secondary teachers with respect to academic qualification

Variable	Academic Qualification	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness Activities	Arts	20	35.10	2.573	0.279	NS
	Science	20	34.90	1.917		

It is inferred from the above table that the calculated 't' value (0.279) is less than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference between arts and science qualified higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Hypothesis No.4

There is no significant difference between science and language subject higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Table IV.4

t-test showing the mean difference between higher secondary teachers with respect to subject taught at school

Variable	Subject taught at School	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness Activities	Science	23	35.22	2.504	0.741	NS
	Language	17	34.71	1.863		

It is inferred from the above table that the calculated 't' value (0.741) is less than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference between science and language subject higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Hypothesis No.5

There is no significant difference between rural and urban school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Table IV.5

t-test showing the mean difference between higher secondary teachers with respect to location of the school

Variable	Location of the School	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness Activities	Rural	20	35.10	2.573	0.279	NS
	Urban	20	34.90	1.917		

It is inferred from the above table that the calculated 't' value (0.279) is less than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference between rural and urban school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Hypothesis No.6

There is no significant difference between government and government aided school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Table IV.6

t-test showing the mean difference between higher secondary teachers with respect to management of the school

Variable	Management of the School	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness Activities	Government	20	35.10	2.573	0.279	NS
	Government Aided	20	34.90	1.917		

It is inferred from the above table that the calculated 't' value (0.279) is less than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference between government and government aided school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.

Hypothesis No.7

There is no significant difference among boys, girls and co-education school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to nature of school.

Table IV.7

F-test showing the significant difference among higher secondary teachers with respect to nature of school

Variable	Nature of School	Source of Variance	Sum of squares	Mean of squares	df	Calculated 'F' value	Remark
Environmental Awareness Activities	Boys	Between	8.233	4.117	2	0.811	NS
	Girls						
	Co-education	Within	187.767	5.075	37		

(At 5% level of significance, the table value of 'F' is 3.23)

It is inferred from the above table that the calculated 'F' value (0.811) is lesser than the table 'F' value (3.23) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference among boys, girls and co-education school higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to nature of school.

Hypothesis No.8

There is no significant difference among below 5 years, 10 years and above 10 years with teaching experience higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to experience.

Table IV.8

F-test showing the significant difference among higher secondary teachers with respect to teaching experience

Variable	Teaching Experience	Source of Variance	Sum of squares	Mean of squares	df	Calculated 'F' value	Remark
Environmental Awareness Activities	Below 5 years	Between	22.571	11.286	2	2.408	NS
	10 years						
	Above 10 years	Within	173.429	4.687	37		

(At 5% level of significance, the table value of 'F' is 3.23)

It is inferred from the above table that the calculated 'F' value (2.408) is lesser than the table 'F' value (3.23) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference among below 5 years, 10 years and above 10 years with teaching experience higher secondary teachers in charge of environmental activities in their steps

taken in the higher secondary schools to create environmental awareness activities with respect to experience.

Hypothesis No.9

There is no significant difference among below 35 years, 36 to 45 years and above 46 years age higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to age.

Table IV.9

F-test showing the significant difference among higher secondary teachers with respect to age

Variable	Age	Source of Variance	Sum of squares	Mean of squares	df	Calculated 'F' value	Remark
Environmental Awareness Activities	Below 35 years	Between	5.808	2.904	2	0.565	NS
	35 to 45 years						
	Above 46 years	Within	190.192	5.140	37		

(At 5% level of significance, the table value of 'F' is 3.23)

It is inferred from the above table that the calculated 'F' value (0.565) is lesser than the table 'F' value (3.23) at 5% level of significance. Therefore, the null hypothesis is accepted. There is no significant difference among below 35 years, 36 to 45 years and above 46 years age higher secondary teachers in charge of environmental

activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to age.

Hypothesis No.10

The level of the environmental awareness among higher secondary students is moderate.

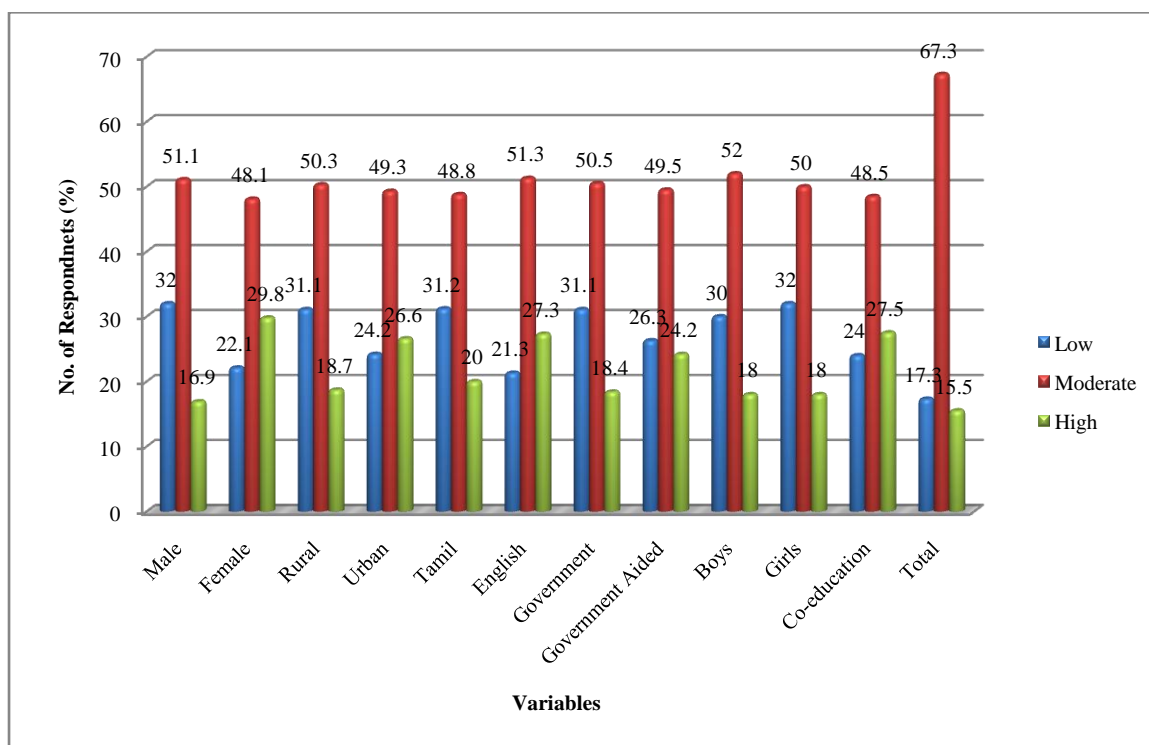
Table IV.10

Table showing level of the environmental awareness among higher secondary students

Variables	Category	Number	Low		Medium		High	
			No.	%	No.	%	No.	%
Gender	Male	219	70	32.0	112	51.1	37	16.9
	Female	181	40	22.1	87	48.1	54	29.8
Location of the School	Rural	193	60	31.1	97	50.3	36	18.7
	Urban	207	50	24.2	102	49.3	55	26.6
Medium of Instruction	Tamil	250	78	31.2	122	48.8	50	20.0
	English	150	32	21.3	77	51.3	41	27.3
Management of the School	Government	103	32	31.1	52	50.5	19	18.4
	Government Aided	297	78	26.3	147	49.5	72	24.2
Nature of School	Boys	100	30	30.0	52	52.0	18	18.0
	Girls	100	32	32.0	50	50.0	18	18.0
	Co-education	200	48	24.0	97	48.5	55	27.5
	Total	400	69	17.3	269	67.3	62	15.5

Figure IV.2

Figure showing level of the environmental awareness among higher secondary students



It is inferred from the above table that 32%, 51.1% and 16.9% of the male higher secondary students have low, medium and high level of environmental awareness respectively. 22.1%, 48.1% and 29.8% of the female higher secondary students have low, medium and high level of environmental awareness respectively.

It is inferred from the above table that 31.1%, 50.3% and 18.7% of the rural school higher secondary students have low, medium and high level of environmental awareness respectively. 24.2%, 49.3% and 26.6% of the urban school higher secondary students have low, medium and high level of environmental awareness respectively.

It is inferred from the above table that 31.2%, 48.8% and 20% of the Tamil medium higher secondary students have low, medium and high level of environmental

awareness respectively.21.3%, 51.3% and 27.3% of the English medium higher secondary students have low, medium and high level of environmental awareness respectively.

It is inferred from the above table that 31.1%, 50.5% and 18.4% of the government school higher secondary students have low, medium and high level of environmental awareness respectively.26.3%, 49.5% and 24.2% of the government aided school higher secondary students have low, medium and high level of environmental awareness respectively.

It is inferred from the above table that 30%, 52% and 18% of the boys school higher secondary students have low, medium and high level of environmental awareness respectively.32%, 50% and 18% of the girls school higher secondary students have low, medium and high level of environmental awareness respectively.24%, 48.5% and 27.5% of the co-education school higher secondary students have low, medium and high level of environmental awareness respectively.

17.3%, 67.3% and 15.5% of the higher secondary students have low, medium and high level of environmental awareness respectively.

Hypothesis No.11

There is no significant difference between male and female higher secondary students in their environmental awareness.

Table IV.11

t-test showing the mean difference between higher secondary students with respect to gender

Variable	Gender	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness	Male	219	27.04	6.655	2.880	S
	Female	181	29.75	6.595		

It is inferred from the above table that the calculated 't' value for environmental awareness (2.880) is greater than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is rejected. There is significant difference between male and female higher secondary students in their environmental awareness. While comparing the mean scores female higher secondary students (29.75) are found better than male higher secondary students (27.04) in their environmental awareness.

Hypothesis No.12

There is no significant difference between rural and urban schoolhigher secondary students in their environmental awareness.

Table IV.12

t-test showing the mean difference between higher secondary students with respect to location of the school

Variable	Location of the School	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness	Rural	193	27.68	6.534	2.972	S
	Urban	207	29.65	6.706		

It is inferred from the above table that the calculated 't' value for environmental awareness (2.972) is greater than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is rejected. There is significant difference between rural and urban schoolhigher secondary students in their environmental awareness. While comparing the mean scores urban school higher secondary students (29.65) are found better than male higher secondary students (27.68) in their environmental awareness.

Hypothesis No.13

There is no significant difference between Tamil and English medium higher secondary students in their environmental awareness.

Table IV.13

t-test showing the mean difference between higher secondary students with respect to medium of instruction

Variable	Medium of Instruction	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness	Tamil	250	28.15	6.725	2.149	S
	English	150	29.62	6.547		

It is inferred from the above table that the calculated 't' value for environmental awareness (2.149) is greater than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is rejected. There is significant difference between Tamil and English medium higher secondary students in their environmental awareness. While comparing the mean scores English medium higher secondary students (29.62) are found better than Tamil medium higher secondary students (28.15) in their environmental awareness.

Hypothesis No.14

There is no significant difference between government and government aided school higher secondary students in their environmental awareness.

Table IV.14

t-test showing the mean difference between higher secondary students with respect to management of the school

Variable	Management of the School	N	Mean	S.D.	Calculated 't' value	Remark
Environmental Awareness	Government	103	27.34	6.528	2.443	S
	Government Aided	297	29.18	6.689		

It is inferred from the above table that the calculated 't' value for environmental awareness (2.443) is greater than the table 't' value (1.96) at 5% level of significance. Therefore, the null hypothesis is rejected. There is significant difference between government and government aided school higher secondary students in their environmental awareness. While comparing the mean scores government aided school higher secondary students (29.18) are found better than government school higher secondary students (27.34) in their environmental awareness.

Hypothesis No.15

There is no significant difference among boys, girls and co-education school higher secondary students in their environmental awareness.

Table IV.15

F-test showing the significant difference among higher secondary students with respect to nature of school

Nature of School	Source of Variance	Sum of squares	Mean of squares	df	Calculated 'F' value	Remark
Boys	Between	501.648	250.824	2	5.740	S
Girls						
Co-education	Within	17347.950	43.698	397		

(At 5% level of significance, the table value of 'F' is 3.23)

It is inferred from the above table that the calculated 'F' value (5.740) is greater than the table 'F' value (3.23) at 5 % level of significance. Therefore, the null hypothesis is rejected. There is significant difference among boys, girls and co-education school higher secondary students in their environmental awareness. So, Duncan test was applied

Table IV.16**Duncan – Environmental Awareness**

Nature of School	N	Subset for alpha = 0.05
Boys	100	27.29
Girls	100	27.92
Co-education	200	29.80

While comparing the higher secondary students' nature of school is boys (27.29), girls (27.92) and co-education (29.80), Co-education higher secondary students are better awareness than others.

IV.3. CONCLUSION

The statistical analysis and its interpretation are given in this chapter. The overview of the study, the summary of the findings, educational implications and suggestions for further research are discussed in the ensuing chapter.

CHAPTER V

SUMMARY AND FINDINGS

V.1. INTRODUCTION

The summary and findings section is the most important part of the research report. Because it reviews all the information which have been presented in the previous chapters. This chapter includes discussion of findings, educational implication of the study, suggestions for further study and conclusion.

V.2. DISCUSSIONS ON FINDINGS

0.75 to 100% of the high schools in Thoothukudi District are taking the following measures to create environmental awareness among their students.

- (i) Provision for providing drinking water
- (ii) Provision for underground drainage system
- (iii) Existence of Eco-club
- (iv) Plantation of saplings in and outside school
- (v) Banning the polythene bags
- (vi) Usage of Eco-friendly wrappers
- (vii) Provision for rain water harvesting
- (viii) Maintaining garden in the school
- (ix) Celebrating environmental day in the school
- (x) Provision for the disposal of wastages
- (xi) Provision of students in classroom and campus cleaning
- (xii) Punishment for throwing waste inside the campus

- (xiii) Following rules for environmental cleanliness
- (xiv) Satisfactory in sanitary condition
- (xv) Provision for dustbins in every classroom
- (xvi) Hanging banners and slogans on environmental protection
- (xvii) Distribution of posters, magazines and pamphlets to the public
- (xviii) Participation of students in inter school competition on environmental issues
- (xix) Participation of the students in the campaigns regarding environmental awareness
- (xx) Allotment of special periods for environmental education
- (xxi) Conducting examination for environmental education
- (xxii) Conducting health awareness programmes
- (xxiii) Regular check-up to nail cutting
- (xxiv) Avoiding the usage of plastic
- (xxv) Reward and award for environmental project
- (xxvi) Getting fund from government and government organization regarding environmental projects
- (xxvii) Participation of students in Radio and T.V. programmes regarding environmental awareness.

50 to 75% of the high schools in Thoothukudi district are taking the following measures to create environmental among their students.

- (i) Making useful items from waste materials
- (ii) Plantation of saplings by the students on their birth days
- (iii) Organising seminar regarding environmental awareness

- (iv) Giving environmental topic during school day events and other competitions
 - (v) Encouragement for the students to do project work regarding environmental protection
 - (vi) Prizes for better classroom cleaning
 - (vii) Prizes for Terrace garden with pollution sensing plants
 - (viii) Usage of vermin compost fertilizer for the school garden
 - (ix) Make field visits to industries and polluted areas to gather the knowledge about the environmental protection
 - (x) Conducting environmental awareness exhibition in the school
 - (xi) Practical steps to the students regarding recycle the waste
 - (xii) Conducting brain storming lesson on positive and negative effects of tourism on environment
 - (xiii) Provision for environmental protection park in the school
1. 12.5%, 67.5% and 20% of the higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively.
 2. There is no significant difference between male and female higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
 3. There is no significant difference between arts and science qualified higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities.
 4. There is no significant difference between science and language subject higher secondary teachers in charge of environmental activities in their steps

taken in the higher secondary schools to create environmental awareness activities.

5. There is no significant difference between rural and urban schools in their steps taken in the higher secondary schools to create environmental awareness activities.
6. There is no significant difference between government and government aided higher secondary schools in their steps taken in the higher secondary schools to create environmental awareness activities.
7. There is no significant difference among boys, girls and co-education school higher secondary schools in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to nature of school.
8. There is no significant difference among below 5 years, 10 years and above 10 years with teaching experience higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to experience.
9. There is no significant difference among below 35 years, 36 to 45 years and above 46 years age higher secondary teachers in charge of environmental activities in their steps taken in the higher secondary schools to create environmental awareness activities with respect to age.
10. 17.3%, 67.3% and 15.5% of the higher secondary students have low, medium and high level of environmental awareness respectively.
11. There is significant difference between male and female higher secondary students in their environmental awareness. While comparing the mean scores

female higher secondary students (29.75) are found better than male higher secondary students (27.04) in their environmental awareness.

12. There is significant difference between rural and urban school higher secondary students in their environmental awareness. While comparing the mean scores urban school higher secondary students (29.65) are found better than male higher secondary students (27.68) in their environmental awareness.
13. There is significant difference between Tamil and English medium higher secondary students in their environmental awareness. While comparing the mean scores English medium higher secondary students (29.62) are found better than Tamil medium higher secondary students (28.15) in their environmental awareness.
14. There is significant difference between government and government aided school higher secondary students in their environmental awareness. While comparing the mean scores government aided school higher secondary students (29.18) are found better than government school higher secondary students (27.34) in their environmental awareness.
15. There is significant difference among boys, girls and co-education school higher secondary students in their environmental awareness. While comparing the higher secondary students' nature of school is boys (27.29), girls (27.92) and co-education (29.80), Co-education higher secondary students are better awareness than others.

V.3. RECOMMENDATIONS

V.3.a. Recommendations in General

It is found out from the study that 12.5%, 67.5% and 20% of the higher secondary schools have low, medium and high level of steps taken to do environmental awareness activities respectively.

It is found from the study that the female higher secondary students are better than male higher secondary students in their environmental awareness. It is therefore, recommended the level of aspiration, interest, concentration and involvement of male students are to be developed in education. They will be enjoying in their studies. Now a days female students are more aware in environment. This awareness helps them for the development of their family and society.

It is found from the study that the urban school higher secondary students are better than rural school higher secondary students in their environmental awareness. It is therefore, recommended that the steps may be taken to change their life style. They share their things, ideas, feelings and cooperate with each other.

It is found from the study that the English medium higher secondary students are better than Tamil medium higher secondary students in their environmental awareness. It is therefore, recommended that Tamil medium students must be made to read some newspapers and articles regarding environmental related problems and solutions for developing their environmental awareness.

It is found from the study that the government aided school higher secondary students are better than government school higher secondary students in their environmental awareness. It is therefore, recommended that government school can organize some programmes related to environmental awareness. Government aided

higher secondary school students had the chances to attend conference, seminar, workshops and environmental awareness programmes.

It is found from the study that the co-education school higher secondary students are better than boys' and girls' school higher secondary students in their environmental awareness. It is therefore, recommended that the students other than co-education school students may be made to have practical awareness.

V.3.b. Recommendations for the School

Schools are organs of the nation's life which are ultimately responsible for the development of well-integrated, all round, wholesome personalities, intelligence, media skills, environmental awareness and values of their adults physically, socially, morally, emotionally, personally and intellectually. They have to develop moral as well as national character. The role of higher secondary students in fostering the environmental awareness should in no way be underestimated. They have a magnificent role to play by making use of all opportunities in and out of the society to develop the environmental awareness. Unless the adults make conscious efforts in his direction, it will prove too unserviceable. The higher secondary students should have themselves first try to develop their knowledge, values and environmental awareness. The opportunities and freedom must be given to organize environmental awareness activities among higher secondary teachers.

V.3.c. Recommendations for the Government

The government can increase the higher secondary students' environmental awareness through use of by using special techniques and programmes. A potential approach to any kind of intellectual activity in education should be followed.

Education is a powerful instrument to fight out the parochial, communal, narrow minded and sectarian tendencies by fostering better understanding and by widening the mental horizons of all people concerned. Different educational, sociological and propagandistic agencies should work with responsibility and systematically to inculcate right values and proper attitudes in order to develop the sense of environmental awareness.

V.3.d. Recommendations for Higher Secondary Students

Higher secondary students need to be paid more attention to their environmental awareness through the steps taken by the higher secondary teachers related to environmental awareness activities. Respondents can increase their environmental awareness through use by reading newspapers, listening news, attending the awareness programmes, participating in all the activities and developing the spiritualism. They should be aware of the social problems and develop social skills, social tolerance and social leadership skills etc. For in this case give proper guidance and counseling and give opportunity to develop the environmental awareness through the steps taken by the higher secondary teachers.

Guidance and counseling programmes can be given in school for adolescents to develop use of environmental awareness. Opportunity for developing the environmental awareness must be provided. Adults can be taken to the nearby hiking places in order to improve their environmental awareness. Awareness programmes on use of environmental awareness can be organized. Reading newspapers should be made as a habit. The students are to be encouraged to participate in all activities that promote the environmental awareness.

V.4. EDUCATIONAL IMPLICATIONS

Environmental programme like environmental camp, Eco club, Green campus program, seminar, conference, workshop and training programme make environmental aspiration among higher secondary school students. Tamilnadu government must give importance to the environmental studies in curricular plan. Schools must arrange the field trip every year to various places,so that the students can experience about various environment. Teachers should join hands with students and environmental organizations to increase the green in the world.

V.5. SUGGESTIONS FOR FURTHER RESEARCH

1. A similar study may be undertaken for college students, student teachers and polytechnic students.
2. This study can be extended to primary school and high school teachers.
3. The sample is taken from Thoothukudi District only. It can be extended to other districts.
4. Some dimensions may have been included and can be taken into account for further investigation.
5. A similar study may be undertaken for colleges and colleges of education.
6. This study can be extended to university and technical colleges.
7. Some more background variables were included in this study.

V.6. CONCLUSION

John Ruskin said that education does not mean teaching people to know what they do not know. It means teaching them to behave as they have to behave. If there is a deficit of educated people, society will stop its further progress. School is a society in miniature.The Present study proves that environmental

awareness of students depends on the measures taken in the schools. The attempt to create environmental awareness should be made from the school so that the society will flourish with environmental awareness.

BIBLIOGRAPHY

BOOKS

Aggarwal, J.C. (1966).*Educational Research: An Introduction.* New Delhi: Arya Book Depot.

Aggarwal, J.C. (1991).*Educational Research*(4thed.).New Delhi: Arya Book Depot.

Aggarwal, J.C. (2008).*Educational Reforms in India*(3rded.). New Delhi: Shipra Publications.

Aggarwal, Y.P. (1998).*Statistical Methods.*(2nded.). New Delhi: Sterling Publishers Private Limited.

Amarjit Singh and Clar Doyle, (2006).*Teacher Training Studies.* London: Mac Millan Press Ltd.,

Avinashilingam, N.A.V. and Sharma, G. (2005). Identification of factors influencing the students' academic performance. *Journal of Educational Research and Extension*, 42(1), 25-32.

Bhatia.K.K and Narang.C.L. (2006).*Teacher and Education Indian Society.*Ludhiana:Tandon Publications.

Buckley, R. and Caple, J. (2010).*The Theory and Practice of Training.* New Delhi: Kogan Page India Private Limited.

Chaube, S.P. (1985).*Experimental Psychology.* Agra: Navyug Printers.

- Chinyere Stella Okunna, (1992).** “Sources of Development Information among Rural Women in Nigeria: A Case Study”, *Africa Media Review*, Vol. 6 No. 31992, African Council for Communication Education
- Clegg, B. (2009).***Personal Development*. New Delhi: Kogan page India private limited.
- Cohen, J.et al. (2003).***Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*(3rded.). Mahwah, NJ: Lawrence Erlbaumassociates.
- Daivadeenam, P. (2002).***Research Methodology in Extension Education*. Udaipur:Geethasomaniagrotech Publishing Academy.
- Daivadeenam, P. (2002).***Research Methodology in Extension Education*. New Delhi: Print line.
- Frederick, E. et al. (1979).***General Statistics*(3rded.). New Delhi: Prentice-hall of India(pvt.) Ltd.
- Gandhi, M. (2008).***Conquest of Self*. Chandigarh: Abhishek Publications.
- George J. Mouly, (1964).***The Science of Educational Psychology*. New Delhi: Anmol Publications Pvt. Ltd.
- Good V. Carter, A.S. Barr and D.E. Scater, (1935).** *Mehodology of Educational Reasearch*. New York: Appleton Century Crafts nc.
- Gottfredsonand Linda, S. (2004).** Schools and the G Factor. *The Wilson Quarterly* (Summer), 35–45.
- Gupta, M. (2007).***Education in India*. New Delhi: KSK Publishers and Distributers.
- Gupta.S.P. (1992).***Statistical Methods*.New Delhi: Sultan chand and Sons Publishers.

Ilgan, D. R. et al. (1979). Consequences of individual feedback on behavior in organizations, *Journal of Applied Psychology*, 64, 349-371.

John W. Best and James V. Khan, (1987).*Research in Education*. New Delhi: Prentice Hall of India Pvt. Ltd.,

John,J., et al. (2005).*Research in Education*(9thed.). New Delhi: Prentice-hall ofIndia.

Kothari, C.R. (1985).*Research Methodology*(2nded.). New Delhi: Wiley eastern limited.

Kothari, C.R. (2004).*Research Methodology: Methods and Techniques*. New Delhi: New Age International Publications, Pvt. Ltd.

Kumar, (1999).*Research Methodology*. Agra: Lakshmi Narain Aggarwal.

INTERNATIONAL ABSTRACTS

Brekelmans, M. et al. (2013).Teacher experience and the teacher-student relationship in the classroom environment. *Studies in educational learning environments: an international perspective*. 73-99.

Coward, Wayne, T. (2012). Family structure and its effects on academic achievement. *Dissertation Abstracts International*. 62(9), March, 2934.

Fataneh N. and Ma'rof R. (2012).The moderating role of family ecological factors on the relationships between family environment and emotional intelligence. *Journal of American Science*, 8(6).

Harriel, Greta, (2011). Parental involvement increases the academic achievement of minority students at the secondary level. *Dissertation Abstracts International*. 63(7), January, 2425.

Pelt and Juanita, (2009). The relationship between self-regulate learning and academic achievement in middle school students: A cross-cultural perspective. *Dissertation Abstracts International*. Vol.70, No.3, September, p.799-A.

Potts, Robin, M.Y. (2007). An investigation of the relationship between teachers' perceptions of school improvement and the academic achievement of their students. *Dissertation Abstracts International*. 66(7), January, 2456.

Xia and Nailing, (2010). Family factors and student outcomes. *Dissertation Abstracts International*. 71(2), August, 505.

JOURNALS

AbhasMukharjee (2003). “School Science”.*Journal of Science Education*.Vol. XI.

Benita Raphael, M.S. (2008). “Problems faced by the students and teachers of IX standard due to implementation of environmental education as compulsory subject”. *Journal of Educational Research and Extension*. Vol.45.

Ekambram and Nagaraja (2010).“An analysis of level of environmenta awareness the case of prospective teachers”. *Eductracks*. Vo.9, No.8.

Feng Zhenmin and Wang Xiashua (2002). “Survey and Education on resident’s environmental awareness in Jinangsu province of Clise”. *International Journal of Environment and Pollution*. Vol.17, X104. Pg.312-322.

Geetalipodiyar and Sunitha Godiyal (2008). Environmental awareness among University students. A case study of under graduate students. Experiments in Education. Vol.XXXVI, No.3.

Saraswathi, R. and Chandra, R. (2011). “A study on the effectiveness of activity-based tracking ecological concepts in environmental education at school level”. *Research highlights*, Vol.21, No. 17. Pg.52-56.

Sivakumar, D. (2010). “Audio Cassette in teaching environmental education”.

Vipinder Nagar, (2010). “Environmental education awareness among school teachers”. *Perspectives in Education*. Vol.22, No.3.

WEBLIOGRAPHY

<http://www.allacademic.com/meta/inten-html>(retrieved on 23.01.2018)

<http://www.formal.stanford.eduljmc/progress/ideology.html>(retrieved on 10.02.2018)

<http://www.lessonplanet.com/directary> - articles(retrived on 22.02.2018)

<http://www.christinian and climate.org/learn/cell> (retrived on 03.03.2018)

<http://www.merium-webster.com/pollution>(retrived on 09.03.2018)

<http://www.gov.history/topic>(retrived on 25.03.2018)

V.O.C. COLLEGE OF EDUCATION

Thoothukudi -628008

Project Director

Dr. S. Usha Parvathi,

Assistant Professor in Mathematics,

V.O.C. College of Education,

Thoothukudi, Tamil Nadu.

India.

Respected teachers,

I request you to answer the questions asked in this questionnaire. As a researcher, I assure you that information furnished in this tool will be kept confidential and used for research purpose only. Your co-operation in this regard will be highly appreciated.

Thanking you

Yours sincerely,

Personal Data Sheet for the Teachers who is in charge

Environmental related Activities

Name of the Teacher	:	
Gender	:	Male / Female
General academic Qualification	:	Arts / Science
Subject taught at School	:	Science / Language
Location of the School	:	Rural / Urban
Management of the School	:	Govt./Govt. Aided
Nature of the School	:	Boys / Girls / Co-education
Experience of the Staff-in-charge (years)	:	5Years /10years/above 10years
Age of the Staff-in-charge (years)	:	Below 35 / 36 – 45 / Above 45

Tool 1

ENVIRONMENTAL AWARENESS ACTIVITIES TEST

S.No.	Statement	Yes	No
1.	Are the students provided with clean drinking water?	Yes	No
2.	Is underground drainage system around the school properly created and maintained?	Yes	No
3.	Does eco-club exist in your school?	Yes	No
4.	Does the activity of eco-club insist planting of saplings both inside and outside the school campus?	Yes	No
5.	Has the usage of polythene bags been banned in the school?	Yes	No
6.	Are the students advised to use Eco-friendly wrappers?	Yes	No
7.	Are the students involved in doing handicrafts and other useful items from the waste materials?	Yes	No
8.	Does the rain water harvesting exist your school?	Yes	No
9.	Have you set up the garden in the school?	Yes	No
10.	Do the students present sapling on their birthday?	Yes	No
11.	Is environmental day celebrated in your school?	Yes	No
12.	Is there provision for proper disposal of waste in your school?	Yes	No
13.	Do the children participate in classroom and campus cleaning?	Yes	No
14.	Is there any punishment for throwing waste in your school campus?	Yes	No
15.	Are there any rules in school regarding environmental cleanliness?	Yes	No

16.	Is sanitary condition satisfactory in your school?	Yes	No
17.	Do the students attend seminar on environmental awareness?	Yes	No
18.	Are dustbins provided in each classroom?	Yes	No
19.	Do the students prepare banners and slogans on the theme “Environmental protection”?	Yes	No
20.	Do the students distribute posters, magazines and pamphlets based on environmental awareness to the public?	Yes	No
21.	Do the students participate in interschool competition regarding environmental awareness?	Yes	No
22.	Is the topic on environmental awareness given during the School Annual Day events as the title for competition?	Yes	No
23.	Are the students encouraged to do any project work based on environmental protection?	Yes	No
24.	Do the students participate in the campaigns related to environmental awareness?	Yes	No
25.	Have the students been allotted with specific period during the school hours for environmental education?	Yes	No
26.	Are examinations conducted on environmental education	Yes	No
27.	Are health awareness program conducted in your school?	Yes	No
28.	Is there any periodical check – up related to nail and hair cutting?	Yes	No
29.	Do you avoid using plastic disposal cups during your school functions?	Yes	No
30.	Do you give prize for better classroom cleaning?	Yes	No

31.	Do you have Terrace garden with pollution sensing plants in your school?	Yes	No
32.	Do you use the manure formed from the vermin compost to fertilize the soil where plants are grown in your school?	Yes	No
33.	Have you conducted any field visits to industries and polluted areas to enable the students to feel the first and knowledge about the need and importance of environmental protection?	Yes	No
34.	Do you conduct Environmental awareness exhibition in your school once in a year?	Yes	No
35.	Have you got any reward and award for your environmental project?	Yes	No
36.	Have you got any fund from the government and non government organizations for environmental related project?	Yes	No
37.	Do you teach practical steps to the students regarding how to recycle the waste (Vermi culture)?	Yes	No
38.	Do you conduct any brain storming lesson on positive and negative effects of tourism on environment?	Yes	No
39.	Do you allow your students to participate in Radio and T.V. programmes regarding Environmental awareness?	Yes	No
40.	Do you have Environmental protection park in you school?	Yes	No

V.O.C. COLLEGE OF EDUCATION

Thoothukudi -628008

Project Director

Dr. S. Usha Parvathi,

Assistant Professor in Mathematics,

V.O.C. College of Education,

Thoothukudi, Tamil Nadu.

India.

Dear Students,

I request you to answer the questions asked in this questionnaire. As a researcher, I assure you that information furnished in this tool will be kept confidential and used for research purpose only. Your co-operation in this regard will be highly appreciated.

Thanking you

Yours sincerely,

PERSONAL DATA

Name of the Student :
Gender : Boys/Girls
Medium of Instruction : Tamil/English
Locality of the School : Rural / Urban
Management of School : Govt./Govt. Aided
Nature of School : Boys/Girls/Co-education

Tool 2

ENVIRONMENTAL AWARENESS TEST

S.No.	Statements	Yes	No
1.	Do you think that Science and Technology is the cause for environment pollution?		
2.	Since natural resources are meant for the progress of human being, can it be used fully?		
3.	Do you think that aquatic living organisms are not affected by the oil tankers wrecked in oceans?		
4.	Do we need not bother about the acid rains because it occurs very rare?		
5.	Is experiment done by atom under the ocean not a dangerous one?		
6.	Do you think environment is not polluted by human's excreta on the road sides?		
7.	Is it not desirable to construct modern toilets in the houses?		
8.	Do you accept the crackers' cracking noise is a happy one, so it can be permitted?		
9.	Is rain water harvesting not a beneficial one?		
10.	Can chlorinated water be forbidden due to its irritation smell?		

S.No.	Statements	Yes	No
11.	Do you accept that the earth, air, water and land can be polluted by factories?		
12.	Do you think that the happiness given by loud speaker cannot be prohibited?		
13.	Are factorization and urbanization the main causes for the environment pollution?		
14.	Do you think that it is not wrong to burn the wormed material during “Bogi” as it is a cultural habit?		
15.	Is using chemical manure not a mistake as it gives more production?		
16.	Is it better to have a sound observing device than planting trees in our house?		
17.	Do you like to keep your classroom and school campus neat and clean?		
18.	Do you feel happy to plant and water plants and trees?		
19.	Do you accept to use more petrol Coal and diesel easy because the energy produced from sunlight and sea waves are in sufficient?		
20.	Do you think water can be used plentifully as the three fourth earth’s surface is covered with water?		
21.	Can chimneys be attached very highly in the factories, to		

S.No.	Statements	Yes	No
	avoid air pollution?		
22.	Is it difficult to avoid the land, air and water pollution in the densely populated area?		
23.	Is it right to throw decomposed garbage on the streets?		
24.	Is it the duty for the government to restrict the loud speakers?		
25.	Does plant help to maintain a gaseous balance in atmosphere?		
26.	Is ozone layer not affected by environment pollution?		
27.	Do you think that the mineral sources invented in Antarctica should be used immediately?		
28.	Is melting ice in polar region dangerous to the world?		
29.	Is it correct to use the water reservoirs as toilet?		
30.	Do you think that the smoke emitted by the vehicles does not affect the environment?		
31.	Do you think that using natural resources abundantly indicate the human development?		
32.	Is it right to process the waste materials from factories and let out to avoid environmental pollution?		
33.	Is deforestation essential to the revenue to government and benefit to society?		

S.No.	Statements	Yes	No
34.	Are environment problems restricted by science and technology?		
35.	Can environment pollution be controlled only by law and order?		
36.	Does environment education give environment awareness to the students?		
37.	Do you think that population and industrialization are the symptoms of village development?		
38.	Are water reservoirs not polluted by cleaning the vehicle and washing cloths inside?		
39.	Can ceaseless sources like electricity, natural gas, solar energy wind mill be used excessively?		
40.	Is it safe to use pesticides to restrict mosquitoes, flies, etc.,		

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

ACCEPTANCE CERTIFICATE FOR RESEARCH PROJECT

Name :**Dr.S.USHAPARVATHI**

No.F. **MRP-6610/16(SERO/UGC)** Dated: **30.06.2017**

Title of the Project “**A STUDY INTO THE STEPSTAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS**”

1. The research project is not being supported by any other funding agency.
2. The terms and conditions related to the grant are acceptable to the Principal Investigator and University/College/Institution.
3. At present, I have no research project approved by UGC and the accounts for the previous project, if any have been settled.
4. The College/University is fit to receive financial assistance from UGC and is included in the list of Section 2(f) & 12 (B) prepared by the UGC.
5. The Principal Investigator is a retired teacher and eligible to receive honorarium as he/she is neither getting any honorarium from any agency nor is he/she gainfully employed anywhere.
6. (i) His/her date of birth is **09.06.1973**
(ii) Age **46 years**
7. The date of implementation of the project is **01.08.2017**

Signature of Principal Investigator

Signature of Principal

Date:

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

STATEMENT OF EXPENDITURE IN RESPECT OF MINOR RESEARCH PROJECT

1. Name of Principal Investigator : **Dr.S.USHAPARVATHI**
 2. Department of PI : **MATHEMATICS EDUCATION**
 Name of College : **V.O.C.COLLEGE OF EDUCATION**
 3. UGC approval Letter No. and Date : **MRP-6610/16(SERO/UGC)**
Dated :30.06.2017
 4. Title of the Research Project : **A STUDY INTO THE STEPSTAKEN IN THE
 HIGHER SECONDARY SCHOOLS TO
 CREATE ENVIRONMENTAL AWARENESS
 AND THE ENVIRONMENTAL
 AWARENESS AMONG HIGHER
 SECONDARY STUDENTS**
 5. Effective date of starting the project : **01.08.2017**
 6. a. Period of Expenditure : **From 01.08.2017 to 15.06.2019**
 b. Details of Expenditure :

S. No.	Item	Amount Approved (Rs.)	Expenditure Incurred (Rs.)
i.	Books & Journals	25,000.00	25,000.00
ii.	Equipment	0.00	0.00
iii.	Contingency including special needs	5,000.00	5,000.00
iv.	Field work/Travel (Give details in the proforma)	20,000.00	20,000.00
v.	Hiring Services	12,000.00	12,000.00
vi.	Chemicals & Glassware	0.00	0.00
	Total	62,000.00	62,000.00

7. if as a result of check or audit objection some irregularly is noticed at later date,action will be taken to refund, adjust or regularize the objected amounts.
8. It is certified that the grant of Rs.62,000/-(Rupees Sixty Two Thousand only) received fromthe University Grants Commission under the scheme of support for Minor ResearchProject entitled “**A STUDY INTO THE STEPSTAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS**”vide UGC letter No. F. **MRP-6610/16(SERO/UGC)**dated **30.06.2017** has been fully utilized for the purpose for which it was sanctioned andin accordance with the terms and conditions laid down by the University GrantsCommission.

Signature of Principal Investigator

Signature of Principal

Date :

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

STATEMENT OF EXPENDITURE INCURRED ON FIELD WORK

Name of the Principal Investigator: Dr.S.USHAPARVATHI

Name of the Place visited	Duration of the Visit		Mode of Journey Expenditure Incurred (Rs.)	
	From	To		
Ottapidaram	22.08.2017	22.08.2017	Taxi	2200
Sivaganapuram	24.08.2017	24.08.2017	Taxi	2200
Kovilpatti	06.09.2017	06.09.2017	Taxi	2300
Kovilpatti	07.09.2017	07.09.2017	Taxi	2300
Aathoor&Umarikadu	12.09.2017	12.09.2017	Taxi	2200
Kayalpatnam&Arumuganeri	13.09.2017	13.09.2017	Taxi	2200
Kurukusalai&Ettayapuram	05.10.2017	05.10.2017	Taxi	2000
Sawyerpuram	10.10.2017	10.10.2017	Taxi	1500
Sawyerpuram	11.10.2017	11.10.2017	Taxi	1500
Puthiamputhoor	07.11.2017	07.11.2017	Taxi	1600
Total :				20,000

Certified that the above expenditure is in accordance with the UGC norms for Major Research Projects.

Signature of Principal Investigator

Signature of Principal

Date :

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

Utilization certificate

Certified that the grant of **Rs.62,000/- (Rupees Sixty Two Thousand only)** received from the University Grants Commission under the scheme of support for Minor Research Project entitled **“A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”** vide UGC letter No. **F.MRP-6610/16(SERO/UGC)** dated : **30.06.2017** has been fully utilized for the purpose for which it was sanctioned and in accordance with the terms and conditions laid down by the University Grants Commission.

Signature of Principal Investigator

Signature of Principal

**Signature of
Statutory Auditor**

Date :

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.**

**Annual/Final Report of the work done on the Minor Research Project.
(Report to be submitted within 6 weeks after completion of each year)**

1.	Project report No. 1 st / Final	:	FINAL
2.	UGC Reference No. F	:	MRP-6610/16(SERO/UGC) DATE : 30.06.2017
3.	Period of report	:	From 01.08.2017 to 15.06.2019
4.	Title of research project	:	A STUDY INTO THE STEPSTAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS
5.	(a) Name of the Principal Investigator	:	Dr.S.USHAPARVATHI
	(b) Department	:	MATHEMATICS EDUCATION
	(c) College where work has progressed	:	V.O.C.COLLEGE OF EDUCATION
6.	Effective date of starting of the project	:	01.08.2017
7.	Grant approved and expenditure incurred during the period of the report	:	
	a. Total amount approved	:	Rs.62,000/-
	b. Total expenditure	:	Rs.62,000/-
	c. Report of the work done	:	Attached
	i. Brief objective of the project	:	To find the measure into steps taken in the higher secondary schools to create environmental awareness, To find the measure the environmental awareness among higher secondary students, To find out the significance difference to measure into steps taken in the higher secondary schools to create environmental awareness with background variables and To find out the significance difference to measure the environmental awareness among higher secondary students with

			background variables
	ii. Work done so far and results achieved and publications, if any, resulting from the work (Give details of the papers and names of the journals in which it has been published or accepted for publication	:	Nil
	iii. Has the progress been according to original plan of work and towards achieving the objective. If not, state reasons	:	As per Original Plan
	iv. Please enclose a summary of the findings of the study. One bound copy of the final report of work done may also be sent to the concerned Regional Office of the UGC.	:	Attached
	v. Any other information	:	Nil

Signature of Principal Investigator

Date :

Signature of Principal

REPORT

Name of the Project Director: S. USHA PARVATHI

No.F. MRP-6610/16(SERO/UGC) Dated: 30.06.2017

Duration: TWO YEARS

Title of the Project:

“A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”

Name of The Institution :

V.O.C. COLLEGE OF EDUCATION, THOOTHUKUDI, TAMILNADU-8

Amount of Funding: Rs.62,000

Brief Report :

God has created so many living and non-living beings. But the living beings particularly human beings are intentionally more responsible for environment destruction than any other species. Importance was given in almost all cultures for environmental protection. Due to advancement of science and technology life has become complicated like a machine. Human beings are suffering a lot due to various natural calamities. These wastes are beginning to bury them. Due to deforestation, there is a lack of rain and fertility of soil decreased. It is the fusion of subject matter of environmental education as a central theme. So, it is very much necessary to safe guard the environment as far as possible and it is human being's responsibility to hand over the sage environment to their future generation. Students in the class room can use enquiry skills. Many studies have been undertaken, as far as the knowledge of the investigator is concerned to find out the environmental awareness of the students at various levels. The experiences have taught her that the activities of the schools also have the effect on their students' environmental awareness. It is therefore, the need of

the hour that a study has to be undertaken to find out the measures the steps taken by the higher secondary school teachers to create environmental awareness activities among their students particularly in Thoothukudi district and its relationship with the environmental awareness of the students.

Thoothukudi district is much affected by the pollutants of the factories, industries, power plants, etc. and for that this place is taken for investigation. School is a society in miniature (John Dewey). Any reform in the society has to start from school. Environmental activities, awareness and attitude are not the exceptions. Hence, the present study is undertaken to find out the steps taken in the higher secondary schools of Thoothukudi district for creating environmental awareness and the environmental awareness found among their students.. The investigator, in this study, adopts the survey method of research. The population for the present study was identified as the higher secondary teachers and the higher secondary students. Among the population, 40 higher secondary teachers and 400 higher secondary students were selected. Simple random sampling technique was adopted by the investigator. The statistical techniques applied were percentage analysis, 't' test, 'F' test and graphical representation. It is found out from this study that 12.5%, 67.5% and 20% of the higher secondary schools have low, medium and high level of steps taken to do environmental awareness activities respectively. 17.3%, 67.3% and 15.5% of the higher secondary students have low, medium and high level of environmental awareness respectively. The suitable recommendations are also given.

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

**PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING
THE FINAL REPORT OF THE WORK DONE ON THE PROJECT**

1.	Title of the Project	:	A STUDY INTO THE STEP TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS
2.	Name and address of the Principal Investigator	:	Dr.S.USHAPARVATHI ASSISTANT PROFESSOR OF MATHEMATICS V.O.C.COLLEGE OF EDUCATION THOOTHUKUDI, TAMIL NADU-628008.
3.	Name and address of the Institution	:	V.O.C.COLLEGE OF EDUCATION THOOTHUKUDI, TAMIL NADU-628008.
4.	UGC Approval Letter No. and Date	:	MRP-6610/16(SERO/UGC) DATE : 30.06.2017
5.	Date of Implementation	:	01.08.2017
6.	Tenure of the Project	:	TWO YEARS
7.	Total Grant Allocated	:	Rs.62,000/-
8.	Total Grant Received	:	Rs.43,500/-
9.	Final Expenditure	:	Rs.62,000/-
10.	Title of the Project	:	A STUDY INTO THE STEP TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS
11.	Objectives of the Project	:	To find the measure into steps taken in the higher secondary schools to create environmental awareness, To find the measure the environmental awareness among higher secondary students, To find out the significance difference to measure into steps taken in the higher secondary schools to create environmental awareness with background variables and To find out the significance difference to measure the environmental awareness among higher secondary students with

			background variables
12.	Whether Objectives were Achieved	:	12.5%, 67.5% and 20% of the higher secondary teachers have low, medium and high level of steps taken in the higher secondary schools to create environmental awareness activities respectively and 17.3%, 67.3% and 15.5% of the higher secondary students have low, medium and high level of environmental awareness respectively.
13.	Achievements from the Project	:	<p>75 to 100% of the high schools in Thoothukudi District are taking the following measures to create environmental awareness among their students.</p> <ul style="list-style-type: none"> (i) Provision for providing drinking water (ii) Provision for underground drainage system (iii) Existence of Eco-club (iv) Plantation of saplings in and outside school (v) Banning the polythene bags (vi) Usage of Eco-friendly wrappers (vii) Provision for rain water harvesting (viii) Maintaining garden in the school (ix) Celebrating environmental day in the school (x) Provision for the disposal of wastages (xi) Provision of students in classroom and campus cleaning (xii) Punishment for throwing waste inside the campus (xiii) Following rules for environmental cleanliness (xiv) Satisfactory in sanitary condition (xv) Provision for dustbins in every classroom (xvi) Hanging banners and slogans on environmental protection (xvii) Distribution of posters, magazines and pamphlets to the public (xviii) Participation of students in inter school competition on environmental issues (xix) Participation of the students in the campaigns regarding environmental awareness (xx) Allotment of special periods for

		<p>environmental education</p> <ul style="list-style-type: none"> (xxi) Conducting examination for environmental education (xxii) Conducting health awareness programmes (xxiii) Regular check-up to nail cutting (xxiv) Avoiding the usage of plastic (xxv) Reward and award for environmental project (xxvi) Getting fund from government and government organization regarding environmental projects (xxvii) Participation of students in Radio and T.V. programmes regarding environmental awareness. <p>50 to 75% of the high schools in Thoothukudi district are taking the following measures to create environmental among their students.</p> <ul style="list-style-type: none"> (i) Making useful items from waste materials (ii) Plantation of saplings by the students on their birth days (iii) Organising seminar regarding environmental awareness (iv) Giving environmental topic during school day events and other competitions (v) Encouragement for the students to do project work regarding environmental protection (vi) Prizes for better classroom cleaning (vii) Prizes for Terrace garden with pollution sensing plants (viii) Usage of vermin compost fertilizer for the school garden (ix) Make field visits to industries and polluted areas to gather the knowledge about the environmental protection (x) Conducting environmental awareness exhibition in the school (xi) Practical steps to the students regarding recycle the waste (xii) Conducting brain storming lesson on positive and negative effects of tourism on environment
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		(xiii) Provision for environmental protection park in the school
14.	Summary of the findings	<p>: It is found from the study that the female higher secondary students are better than male higher secondary students in their environmental awareness. It is therefore, recommended the level of aspiration, interest, concentration and involvement of male students are to be developed in education. They will be enjoying in their studies. Now a days female students are more aware in environment. This awareness helps them for the development of their family and society.</p> <p>It is found from the study that the urban school higher secondary students are better than rural school higher secondary students in their environmental awareness. It is therefore, recommended that the steps may be taken to change their life style. They share their things, ideas, feelings and cooperate with each other.</p> <p>It is found from the study that the English medium higher secondary students are better than Tamil medium higher secondary students in their environmental awareness. It is therefore, recommended that Tamil medium students must be made to read some newspapers and articles regarding environmental related problems and solutions for developing their environmental awareness.</p> <p>It is found from the study that the government aided school higher secondary students are better than government school higher secondary students in their environmental awareness. It is therefore, recommended that government school can organize some programmes related to environmental awareness. Government aided higher secondary school students had the chances to attend conference, seminar, workshops and environmental awareness programmes.</p> <p>It is found from the study that the co-education school higher secondary students are better than boys' and girls' school higher secondary students</p>

			in their environmental awareness. It is therefore, recommended that the students other than co-education school students may be made to have practical awareness.
15.	Contribution to the Society	:	John Ruskin said that education does not mean teaching people to know what they do not know. It means teaching them to behave as they have to behave. If there is a deficit of educated people, society will stop its further progress. School is a society in miniature. The Present study proves that environmental awareness of students depends on the measures taken in the schools. The attempt to create environmental awareness should be made from the school so that the society will flourish with environmental awareness.
16.	Whether any Ph.D. Enrolled/Produced out of the Project	:	Nil
17.	No.of Publications out of the Project	:	Nil

Signature of Principal Investigator

Date :

Signature of Principal

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

ASSESSMENT CERTIFICATE
(to be submitted with the proposal)

It is certified that the proposal entitled “**A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS**” by **Dr.S.USHAPARVATHI** Department of **MATHEMATICS EDUCATION** has been assessed by the **RESEARCH COMMITTEE** consisting the following members for submission to the **UGC Regional Office, HYDERABAD** for financial support under the scheme of Minor Research Projects:

Details of Expert Committee:

Sl. No.	Name and Designation of Member	Signature
1	Dr.J.Josephine Saleth Mary Associate Professor of Mathematics Education V.O.C.College of Education Thoothukudi-628008.	
2	Dr.S.Rasul Mohaideen Former Director and Associate Professor of English Education Centre for Research in Education V.O.C.College of Education Thoothukudi-628008.	

The proposal is as per the guidelines.

Signature of Principal

Date :

FIRST YEAR REPORT SUBMITTED TO UGC (2017-2018)

Name of the Project Director: S. USHA PARVATHI

No.F. MRP-6610/16(SERO/UGC)Dated : 30.06.2017

Duration: TWO YEARS

Title of the Project:

“A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”

Name of The Institution:

V.O.C. COLLEGE OF EDUCATION, THOOTHUKUDI, TAMILNADU-8

Amount of Funding: Rs.62,000

Project Progress :

I have to bring your kind notice that I have prepared one-year progress report. My title is “A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”.I have kept in my mind your guidance about the project. First, I discussed on various angles of research with experts. Next, I have framed objectives and hypotheses. I have collected materials related to this topic. Survey method was adopted. I have referred many books, journals and articles related to this topic. Population and sample were finalised.I have selected the tools from other sources. I have reviewed many numbers of Indian and Foreign studies. I have prepared Chapter I and Chapter II.

SECOND YEAR REPORT SUBMITTED TO UGC (2018-2019)

Name of the Project Director : S. USHA PARVATHI

No.F. MRP-6610/16(SERO/UGC) Dated : 30.06.2017

Duration: TWO YEARS

Title of the Project:

“A STUDY INTO THE STEPS TAKEN IN THE HIGHER SECONDARY SCHOOLS TO CREATE ENVIRONMENTAL AWARENESS AND THE ENVIRONMENTAL AWARENESS AMONG HIGHER SECONDARY STUDENTS”

Name of The Institution:

V.O.C. COLLEGE OF EDUCATION, THOOTHUKUDI, TAMILNADU-8

Amount of Funding : Rs.62,000

Project Progress :

Tool is standardised one. The permissions have been obtained from the Headmistress of the Higher Secondary Schools. Data were collected from Thoothukudi District in and around. Data were analysed. I have prepared Chapter III, Chapter IV and Chapter V.