# ENVIRONMENTAL EDUCATION IN COLLEGES OF MIZORAM: AN ANALYTICAL STUDY

BY

P.C. LALREMRUATI

Department of Education

Submitted

in partial fulfillment of the requirement of the Degree of Doctor of Philosophy in Education of Mizoram University, Aizawl

**MIZORAM UNIVERSITY, AIZAWL**

**Department of Education**

**Tanhril , AIZAWL- 796004,**

**Dr.Lynda Zohmingliani** **Phone: 9436145408**

**Department of Education** **E-mail: lynda. zohmingliani @gmail.com**

**Dated the Aizawl , 5th March 2020**

## CERTIFICATE

This is to certify that **P.C. Lalremruati, Ph.D Scholar, Department of Education, Mizoram University, Regn No.MZU/ Ph.D. / 814 of 09.11.2015,** has written her thesis titled **'Environmental Education in Colleges of Mizoram: An analytical study'** under my guidance and supervision. In preparing the thesis Miss. P.C.Lalremruati has complied with all the requirement as laid down in the Ph.D. Regulation of the University. The thesis is the original work of the scholar and has not been submitted for any degree to any other University.

(Dr. LYNDA ZOHMINGLIANI)

Supervisor

**MIZORAM UNIVERSITY**

**AIZAWL: MIZORAM -796004**

**Month: March** **Year: 2020**

## DECLARATION

I, P.C. Lalremruati, hereby declare that the thesis/ subject matter of this thesis entitled 'Environmental Education in Colleges of Mizoram: An analytical study' is a record of work done by me; that the contents of this thesis did not form basis of the award of any previous degree to me, or to do the best of my knowledge, to anybody else; and that the thesis has not been submitted by me for any research degree in any other University / Institute.

This is being submitted to the Mizoram University, Aizawl for the award of Doctor of Philosophy in Education.

(P. C. LALREMRUATI)

Candidate

(Prof. H.MALSAWMI)

Head

Department of Education

(Dr. LYNDA ZOHMINGLIANI)

Supervisor

Department of Education

## ACKNOWLEDGEMENT

I express my sincere gratitude to my supervisor Dr. Lynda Zohmingliani for her valuable guidance and untiring help throughout the study who supervised my research study with enduring interest and dedication. This thesis would not be able to come out in its present form without her constant encouragement, inspiration, prayers and dedication to the work.

I am profoundly thankful to Prof. B.B. Mishra, Professor and Head, Department of Education for his tremendous support and understanding and I am also thankful to all the Professors and office staff of the Department of Education, Mizoram University for continuous support and encouragement.

I am sincerely thankful to my friends Lalmuankimi, V.Vanlalruati and Lalhmangaihzuali, for lending me a helping hand during my study and for providing deep understanding in my time of need during the study.

I am profoundly thankful to all the respondents from the selected colleges who took time to respond to my questionnaire without which this research could not have been possible.

I am also thankful to my family for their moral support, encouragement and prayers during the course of my study. Above all I thank Almighty God for blessing me with good health, knowledge, strength and wisdom to complete this thesis.

Dated: Aizawl
the 5th March,2020

(P.C. LALREMRUATI)
Department of Education
Mizoram University

## CONTENTS

## LIST OF TABLES

# CHAPTER-I

# INTRODUCTION

## 1.1.0 Environment

Earth is the only planet known so far to have life in the solar system. During millions and millions of years, life evolved on this earth. Each living things is habituated to a certain way of life either in water, on land or underneath the soil. The surrounding features have to be amenable for a certain species to survive and thrive. This surrounding feature is called the environment. The environment is a broad concept encompassing the whole range of diverse surroundings in which we perceive, experience and react to events and changes. It is the aggregate of all external conditions and influences that support living things. The term environment is very wide in the sense that it takes into account all the factors that directly or indirectly have a bearing on the natural surroundings of human beings. The word environment has been derived from a French word “Environia” meaning to surround. It refers to abiotic (physical or non-living) and biotic (living) environment which means surrounding or condition in which a person, animal, decomposer or plants lives or operates.

Environment refers to all social, economic, biological, physical and chemical factors which constitute the surroundings of man and includes all those things on which we are directly or indirectly dependent on our survival, whether it is living components like animals, plants or non-living component like soil, air and water. It consists of components like atmosphere, hydrosphere, lithosphere and biosphere which can be further divided into physical and biotic environment. Physical

environment comprised of atmosphere, hydrosphere and lithosphere and include all those abiotic factors like rainfall, light, temperature, soil etc. Biotic environment comprised of biosphere and includes all living factors like animals, plants, micro organisms etc. It refers to the materials and forces that surrounds the living organism and consists of the sum total of the stimulation that the individual receives from conception until death. Environment regulates the life of the organisms including human beings. Among all the living things, human beings are the one that interact more with the environment than any other living.

Environment is defined more comprehensively by others as holistic view of the world as it functions at any point of time with a multitude of spatial element and socio economic systems distinguished by quality and attributes of space and mode of behavior of physical and biological form. Thus environment refers to the forces and materials that is immediately surrounding the living organisms and have a direct influence on it. It is the condition in which living organisms has to survive and maintain their life process. The environment by which man is surrounded and affected by the different factors may be natural, social, psychological, artificial and biological factors and also influence the growth and development of living things. This environment is not static and goes through a number of constant changes. Landforms change and are replaced by new landforms. Temperature changes and these changes have lasting impact on the environment. Animals and plants become extinct and new species are born. These changes are not negative and are part of this environment's unique way to improve and become stronger. However, when these changes are induced by outside factors and the changes are too fast, the environment does not have time to heal itself and slowly weakens. Due to massive growth in the

industrial sector in the last century, these changes have become dangerous enough not just for animals and plants but for human beings who, in fact, are the original culprits of this imbalance in nature. Therefore, it falls on him to do whatever he can to restore earth's equilibrium and bring back to nature what has been stolen from it. Since the changes have become too drastic for the healing process to be done in an expedient manner, just as the destruction was a slow process, the healing also has to be a slow and sure process designed to make the environment not just healthier but also make the human beings, the most highly developed among all species, to live a more environmentally friendly life so that this environment could go on and for the coming generations.

### 1.2.0 Environmental Education

Environmental Education is education that is intimately connected with the environment. It is education about the environment, through the environment and for the environment. It is an essential tool for achieving effective resource management and sustainable development and provides an understanding of how natural system work and the impact of human activities upon the natural system and fosters environmental awareness and concern. It gives reality, relevance and practical experience to learning through direct contact with the environment, develops aesthetic appreciation and skills for data gathering and field investigations. It also develops an informed concerned and sense of responsibility for the environment and skills to participate in environmental improvement and also promotes an ability to adopt lifestyles compatible with the wise used of environmental resources.

Environmental education can never remain static, it must change with the changing times, which inevitably changes our environment. It is a process that allows the individuals to explore environmental issues, engage in problem solving, and take action in order to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions. It is a process by which people develop awareness, concern and knowledge of the environment and learn to use this understanding to preserve, conserve and utilize the environment in a sustainable manner for the benefit of present and future generations. It helps students develop their own insights into the functioning of several things or understanding human processes in their environment. Such interactions with their surrounding environment are important in the healthy development. Thus, the study that involves different things in human surroundings is environmental education.

Education is regarded as an important instrument and means for generating proper awareness and adequate knowledge and skills regarding environmental protection. It is, therefore, felt essential to develop education about the environment, education for the environment and education through the environment. So as a whole, it will be environmental education.

Environmental education has a long history linked with human's growing interaction with the natural environment and developing appropriate attitude towards the same. The main objective of environmental education is to develop knowledge based awareness that will lead to cultivation of responsible attitude to environment, without losing sight of value system of society and individual.

Environmental education in college is necessary so as to teach students on how to use the present and future resources optimally and to provide experience in problem solving and decision making and also to develop opportunities for students to interact with the environment and with each others. It prepares each and every individual for life through an understanding of the contemporary world and should constitute a lifelong education and makes one responsive to changes in rapidly changing world. It gives an individual an idea about balance in the ecosystem which is disturbed due to human interference and teaches us about everything that influence man.

The world's first intergovernmental conference on environmental education was the Tbilisi Declaration which was held in 1977 and it was organized by the United Nations Education, Scientific and Cultural Organization (UNESCO) in cooperation with the U.N. Environment Programme (UNEP) and was convened in Tbilisi, Georgia (USSR) from October 14-26, 1977.

Environmental education in colleges in India has been framed so as to meet these objectives. Therefore environmental education in college seek to bring about students who have awareness to the total environment with a basic knowledge of the environment and its associated problems and have strong attitude and enthusiastic participation in activities that lead to the resolution of environmental challenges.

### 1.2.1 Importance of Environmental Education

Environmental education is a necessary process in promoting the need for personal initiatives and social participation in order to achieve sustainability. In this growing human population many people have realized the need for environmental

education. People living in rural, tribal, slum and urban areas, students and teachers in schools, colleges and universities need to be educated about the environment at all levels of education. Besides environmental education being an important component for an effective policy framework for protecting and managing the environment, it is also necessary for understanding the basis of our existence and those that surround us. It is needed for helping individuals in resolving fundamental issues relating to the present and future use of the world's resources. Our nation's future depends on a well-educated people to be wise on the environment that sustains our communities and future generation. Environmental education is thus an education which can help an individual in making complex connection between economic prosperity benefits to society, environmental health and our own well-being.

Environmental education is both valuable and necessary. Starting from a very young age children should be taught about the environment that surrounds them. As these children grow, their environmental awareness and knowledge of the area in which they live should also grow. Their education should be integrated with core disciplines. Thus environmental education provides the foundation for all future education and learning. It can produce children who are not only happy but are also happy with others, find learning exciting and develop enquiring minds. It enables children to develop a storehouse of knowledge about the world and seek knowledge that they can use and develop throughout their lives. Environmental education also empowers adults by enabling them to participate in a sustainable future. Thus it lays the foundation for a lifelong learning. In effect, the importance of environmental education can be stated as follows:

1. It is essential for the self-fulfillment and social development of the child and the adult.
2. It is essential for understanding the different food chains and the nature's ecological balance.
3. It inculcates a concern for the systematic change of environment for the distant and the immediate welfare of mankind.
4. It makes one conscious of the problems of population explosion, depletion of natural resources, global warming etc.
5. It also plays an important role in understanding and appreciating how the environment is used for making a living and promoting material culture.

The importance of environmental education may further be traced under a number of heads. But for the present study, six main areas may be discussed as follows:

1. Health and hygiene: The amount of waste created is not just a nuisance as it is but potentially dangerous because wastes do not just sit and remain harmless. On the other hand, they are the roots of a number of fatal diseases. Moreover, the absence of hygiene in our cities has created a massive environmental disaster which has brought forth a number of unforeseen calamities in city life making it a danger to walk under broad day light on some days.
2. Wildlife: Wildlife has a close link with the environment because it is one of the most important factors to maintain environmental equilibrium. But due to lack of knowledge, the rate of extinction of wildlife has increased in a manner not heard of before. This has not just lessened the number of animals and

plants but has also given rise to global warming and other repercussions which are all harmful for human beings.

3. Polluters: Pollution is a harmful activity and each individual now knows about it. But what is lesser known is that each individual is a polluter at his own level. From morning till night, a single person's consumption is much larger than expected. From the water used to clean oneself and to drink, the left-over food, use of various chemicals and different forms of communication, nobody is free from guilt. But a sound environmental knowledge goes a long way in shaping the behavior of an individual in less disruptive ways.

4. Forests: The forest is the source of living for many people. For the rest of the population who do not depend on it directly, it yields the much-needed oxygen supply without which living things cannot subsist on earth. But intense human actions have created vast areas of deserts that cannot be utilized in any way. Reforestation activities are expensive and take a long time too. Therefore, in the areas like Mizoram where the extent of deforestation is still comparatively small, it is best to take preventive measures by providing sound environmental education.

5 Population explosion: India 2019 population is estimated at 1,366,417,754 people according to UN data. This amounts to 17.71% of the total world population. So, India ranks number 2 in the list of countries and dependencies by population. The population density in India is 460 per $Km^2$ (1,190 people per $mi^2$). Although it is one of the world's fastest growing economy, its growth has been quite slow in the current year. This fact, in consideration of the fact that it has one of the highest population count in the

world, second only to China (which has been ranked as the fastest growing economy since several years) explains why there are still so many people living below poverty line. Therefore, if human population is allowed to increase at the rate it has been allowed to increase, there is soon going to be a population crisis where the resources will not be able to support the human population.

6. Environmental concern: Environmental concern is a feeling that is expected of every individual if India and the world at large is an environmentally safe earth and sustainable developments are the goals. Therefore, if college students are to be the future leaders, they need a solid grounding in the subject so that they will become environmentally aware citizens equipped with the necessary skills to combat environmental hazards. For this a sound, environmental education has to be given by well-informed teachers.

In light of the above few points that have been highlighted and many more that can be witnessed, there is an urgent call for an environmentally concerned curriculum that would enable the present and coming generations to live an environmentally safe life. Without this, the destruction of the environment will go on in the absence of aware citizens and a time will ultimately come when the environment will not be able to hold life and even human beings will then meet their end.

### 1.2.2 Background of Environmental Education

Environmental education is not a contemporary subject matter. It can be dated back to as early as the 18th century with the treatise of Jean-Jacques Rousseau who

stressed the value of an education that revolved on the environment. Some years later, the Swiss-born naturalist, Louis Agassiz, echoed Rousseau's philosophy. It was these two influential scholars who laid the foundation for a concrete environmental education program, known as the Nature Study, which occurred between the late 19th century and early 20th century.

Following the effortful work of many other naturalists, April 22nd of the year 1970 was declared as the first Earth Day; a national teach-in concerning environmental issues. This memorable event paved the way for the current environmental education movement. Environmental education was globally acknowledged when the UN Conference on the Human Environment held in 1972, in Stockholm, Sweden, affirmed that environmental education must be utilized as the key to address environmental issues all around the world. The United Nations Education Scientific and Cultural Organization (UNESCO) and the United Nations Environment Program (UNEP) generated three major declarations that have guided the course of environmental education. These were namely the Stockholm declaration, the Belgrade charter and the Tbilisi declaration.

The Tbilisi declaration of October 1977 "noted the unanimous accord in the important role of environmental education in the preservation and improvement of the world's environment, as well as in the sound and balanced development of the world's communities" (Tbilisi, 1977). The Tbilisi declaration not only rationalized and elucidated the Stockholm declaration and the Belgrade charter but also included new aims and objectives as well as guiding principles of environmental education. Later that year, the Intergovernmental Conference on Environmental Education in Tbilisi, Republic of Georgia accentuated the responsibility of environmental

education in the conservation and development of the environment as a whole on a worldwide level.

In 1992, the United Nations Conference on Environment and Development which took place in Rio de Janeiro, Brazil, supported and embellished the goal of obtaining sustainability. This was achieved by means of international agreements made on climate variation, woodland and biodiversity.

Another crucial step forward in sustainable development was held in 2002 by the United Nations Commission; the Johannesburg Summit in Johannesburg, South Africa. This summit "brought together tens of thousands of participants to focus the world's attention and direct action towards conserving our natural resources in a world that is growing in population, with ever-increasing demands for food, water, shelter, sanitation, energy, health services and economic security" (Johannesburg Summit, 2002).

In 2005, the National Environmental Education and Training Foundation held the first National Environmental Education Week between the10th and 16th of April. Later that year, the Centre for Environment Education held the Education for a Sustainable Future Conference in Ahmadabad in India.

Environmental education has long been considered as a crucial aspect of our existence. It is an international concern which has brought and has yet to bring all the nations together striving to reach one important goal, one which gives the interdependency of the environment and that of organisms, including us, the major precedence they deserve.

### 1.2.3 Environmental Education in India

The concern for the environment is not a recent one. Comprehensive legislation has been done by the Union Government to preserve and protect wild life from a very early period, even before India became an independent country. Some of the examples may be as seen below:

1. The Elephants Preservation Act, 1879.
2. The Wild Birds and Animals Protection Act, 1912.
3. The Madras Wild Elephants Preservation Act, 1873.
4. The Wild Animals and Wild Birds Protection Act, 1951.
5. The Mysore Wild Animals and Wild Birds Act, 1963.

Furthermore, the Wildlife Protection Act, 1972 was a global enactment on wildlife. This act which was enacted by the Parliament of India intended to:

1. Constitute a wildlife advisory board for each state.
2. Regulate hunting of wildlife and birds.
3. Lay down the procedure for declaring areas as sanctuaries, national parks etc.
4. Regulate possession, acquisition or transfer of trade in wild animals, animals, articles etc.
5. Provide penalties for the contravention of this act.

India incorporated environmental concerns in the constitution through 42$^{nd}$ amendment in 1976. After the establishment of full-fledged ministry of environment and forest, environment has become a priority in different policies, plans and strategies at regional and national level. The growing concerns about the environment in India provoked government to plan a policy for introduction of environmental education in schools. As most of the environmental problems are development

induced, thus a new paradigm of development and environment has to be the order of the day. So, various steps have also been undertaken in order to protect the forests and the living things residing in it. During the year 1982 to 1983, afforestation and social forestry were taken up on a grand scale. Moreover, various strategies for ecological management have been taken up. In fact, there was no area uncovered. Laws on land use policy, use of water, antipollution acts, protection of wild life acts against misuse of chemicals by industrial plants and various laws concerned with environmental protection have been passed by the government. But these have not stopped the slow deterioration of our environment.

These concerns towards the environment did not stop at the legislative level only. Governmental bodies were set up in order to deal with environmental problems in the most efficient manner. Education also took part in this endeavor to help save the environment. Researches were done on the then existing environmental condition and steps were suggested so as to have some measures to combat these environmental deteriorations. Third world countries and first world countries were identified along with their environmental problems and need. Accordingly, curricula were set up and syllabus was framed for different levels of education from primary to college and even university education. Priorities were set up for different countries and environmental education was designed to be interdisciplinary so that nobody was neglected. But despite the deteriorating status of the environment, the formal study of environment did not receive adequate attention in our academic domain for a long time.

However, as time went on, recognizing the need to create awareness among the students regarding preservation of the environment for future generations, the

Honorable Supreme Court directed the University Grants Commission (UGC) to introduce a basic course on environment for students. Accordingly, the matter was considered by the UGC and it was decided that a six-month compulsory core module course in environmental studies may be prepared and compulsorily implemented in all the universities/colleges in India. The expert committee appointed by the UGC has looked into all the pertinent questions, issues and other relevant matters and this was followed by the framing of the core module syllabus for environmental studies for undergraduate courses of all branches of higher education. As per the directions of the Supreme Court, the UGC had instructed all the universities to include environmental studies (EVS) in one semester, the decision to create a six-module course on environmental studies was taken by the supreme court in 1991.

The Honorable supreme court of India then gave a directive on 18$^{th}$ December 2003 to impart environmental education in educational institutions as a compulsory subject although in one or other form, environmental education existed in school curriculum. Centre for environmental education, Ahmadabad India in collaboration with Commonwealth of Learning (COL) Canada, 2005 launched a green teacher initiatives as a distance education course in environmental education for practicing teachers and educators. The green teacher programme was an outcome of India's National Policy of Education (1986) and the Supreme Court ruling of 2003 envisages that environmental education should be a compulsory curricular component at all levels of education.

It took the University Grants Commission over two decades to conceptualize and introduce a course on environmental studies for environmental education. The six-module course on environmental education for undergraduate courses was

designed by the University Grants Commission and then came into existence in the year 2013. It is mainly aimed at making students ecologically aware for a sustainable future. The UGC routinely advises its affiliate colleges and universities to introduce this six- month course. In recent years, it has begun to give strong instructions to introduce this six-month module course at all branches of undergraduate degree.

### 1.3.0 Development of College Education in Mizoram

Since the present study deals with college students and their attitude towards the environment, a small introduction to college education in the state is therefore necessary. Education is one of the most important processes that contribute to all round development of a society. It does not bring about the best in human personality, but it can also be the medium of peace and progress of a nation. Education is a critical factor in improving the quality of life of the people, in eradicating poverty and accelerating economic growth. Without education, we cannot see beyond ourselves and our narrow surroundings to the reality of global interdependence.

College education holds the key to students future. It helps students in reaching their life goals and dreams and helps them to choose what they pursue in their life. Education opens up the doors for students. The more education students get, the more choices and opportunities they will have. Through an education, students have more options that will bring them to greater success and happiness in life. By going to college, students can choose what they want to do in life. Student will be able to choose a career that interests him or her and that will enable them to achieve their dreams. The more educational opportunities students is exposed to, the more knowledge and skills he or she will obtain. Growth and development will occur in

many areas, including decision-making, analytical awareness, reasoning, creative expression, verbal expression, and more. Education can help students improve the community. Going to college will help to teach students how to make a difference in their community.

Mizoram is a North Eastern State in India with Aizawl as its capital. The start of the college was primarily at the behest of the enthusiastic locals in order to meet the growing need of higher education among the native Mizo youth. College education started with the opening of Pachhunga University College which is the earliest and today the most well endowed institute of undergraduate education and was founded in the year 1958 on 15th August. The mizo's had by then clearly acknowledge the significance of college education for government jobs and eventually a life that would free from the shackles of daily labor.

The Directorate of Higher & Technical Education of the Government of Mizoram supervises the quality of higher education imparted in the state. The state government aims at constant development of the education system by upgrading the standard of regional colleges in Mizoram and organizing the academic structure according to the standards of University Grants Commission. Colleges in Mizoram provide undergraduate, post graduate and doctoral research programs. They offer courses in various subjects. There are also professional institutes in the state offering courses in law, engineering, management, nursing etc.

The main aim of colleges in Mizoram is to make the students well versed in every aspect by providing advanced education and make provisions for research facilities. During the time this study was undertaken, the well known mainstream colleges in Mizoram which are affiliated to Mizoram University were 26 in number

namely Pachhunga University College, Gov't. Aizawl College, Zirtiri Residential Science College, Gov't.Kolasib College, Gov't. Champhai College, Gov't.Saiha College, Gov't. Hrangbana College, Gov't. Aizawl West College, Gov't Saitual College, HATIM, Gov't Aizawl North College, Gov't. J Thankima College, Gov't. J Buana College, Gov't. T. Romana College, Gov't Lunglei College, Gov't Kamalanagar College, Gov't Zawlnuam, College, Gov't Hnahthial College, Gov't Khawzawl College, Gov't Serchhip College, Gov't Lawngtlai College, Gov't Mamit College, Gov't Johnson College, St Xavier College, City College and Helen Lowry College. Infact, these colleges make up the universe of the present study.

### 1.4.0 Rationale of the Study

Environment is degrading at a much faster pace than our imagination. Most of this mess is caused by human activities. Human beings are facing grave environmental problems and adjustment to changes in the environment has become a huge challenge. All members of society depend on natural resources to survive. The availability of these resources has limits. The impacts of the environmental issues are affecting not only at the local level and it is global problem of important phenomena. Many industrial and infrastructural developments, human population growth and urbanization, plastic usage, electronic wastes, vehicular emissions, contamination of pollutants in the water bodies, soil and atmospheric pollution have devastated the natural environment causing severe ill health effects on human beings. Many developed countries are slowly finding several alternative and innovative technologies to minimize the effects of pollution and optimal utilization of the natural sources. It is therefore essential that college students who are supposed to be our

future leaders should understand the need of environment to their quality of life and should have the knowledge, tools and skills to live in ways that minimize the impact of their actions on environment. It is thus essential that students should be inculcated the effective and optimal use of our natural resources and energy to safeguard our mother nature and in conserving our resources in order to attain sustainability in all levels. There is a need of environmental awareness on every aspect of the environment and conservation of natural resources and biodiversity so as to produce socially responsible citizens of tomorrow. Creating better environmental practices among the college students is one of such initiative to achieve environmental protection by inculcating moral values and sustainable practices among them to develop as role model in the society. The future health and welfare of our nation depends on our earth's resources and sustained developmental activities. A positive attitude and informed environmental decisions are conducive to sustainability. These are possible only through a sound understanding of the environment.

Therefore to meet the present environmental situation it is essential that everyone makes a contribution which will emerge from environmental knowledge. Education is an effective means for social reconstruction and to a great extent offers solution to the problem societies are faced with. To protect and manage environment , it is thus important to have a sound environmental education. Today's students will be responsible for making decisions that will shape the health of the environment. To prepare them for such responsibilities, they need a sound environmental education from which to make those decisions. Hence the present study has been undertaken.

### 1.5.0 Research Questions

The following questions came to mind regarding the status of environmental education in colleges of Mizoram:

1. Is there a proper syllabus for environmental education at college level in Mizoram? If so, what are the contents?
2. Is the mode of transaction of environmental education at college level in Mizoram uniform in all colleges? If yes, what mode(s) are followed?
3. Is there any special procedure for evaluating environmental education at college level in Mizoram?
4. What is the qualification of teachers teaching environmental education at the college level?
5. Will there be a balance of the two genders among the teachers teaching environmental education in colleges?
6. Are experienced teachers being given the responsibility of teaching environmental education in the colleges of Mizoram?
7. How much time is devoted to the teaching of environmental education at colleges of Mizoram?
8. What is the attitude of college students of Mizoram towards the environment?
9. Is there any difference between male and female college students in their attitude towards the environment?
10. Will students of different streams be different in their attitude towards the environment?
11. Can there be a more effective way to teach environmental education at college level?

### 1.6.0 Statement of the Problem

The present study has been stated as *Environmental Education in Colleges of Mizoram: An analytical study.*

### 1.7.0 Objectives of the Study

The objectives of the present study are as follows:

1. To assess the contents of the syllabus for degree students on environmental education in colleges of Mizoram.
2. To find out the mode of transaction of environmental education at college level.
3. To study the evaluation procedures of environmental education at college level.
4. To study the profile of teachers teaching environmental education at college level.
5. To study the time devoted for environmental education in the college time tables.
6. To study the attitude of college students towards the environment.
7. To find the difference in the attitude of male and female students towards the environment in the colleges of Mizoram.
8. To find the difference in the attitude among students from different streams towards the environment.
9. To suggest measures for making environmental education effective at college level in Mizoram.

### 1.8.0 Hypotheses

The following hypotheses have been stated so as to realize the 7th and 8th objectives of the study:

1. There is no significant difference in the attitude of male and female college students towards the environment.
2. There is no significant difference in the attitude of male and female college students of arts stream towards the environment.
3. There is no significant difference in the attitude of male and female college students of commerce stream towards the environment.
4. There is no significant difference in the attitude of male and female college students of science stream towards the environment.
5. There is no significant difference in the attitude of male and female college students towards the environment in the area of health and hygiene.
6. There is no significant difference in the attitude of male and female college students towards the environment in the area of wildlife.
7. There is no significant difference in the attitude of male and female college students towards the environment in the area of forests.
8. There is no significant difference in the attitude of male and female college students towards the environment in the area of polluters.
9. There is no significant difference in the attitude of male and female college students towards the environment in the area of population explosion.
10. There is no significant difference in the attitude of male and female college students towards the environment in the area of environmental concern.

11. There is no significant difference in the attitude of male and female science students towards the environment in the area of health and hygiene.
12. There is no significant difference in the attitude of male and female science students towards the environment in the area of wildlife.
13. There is no significant difference in the attitude of male and female science students towards the environment in the area of forests.
14. There is no significant difference in the attitude of male and female science students towards the environment in the area of polluters.
15. There is no significant difference in the attitude of male and female science students towards the environment in the area of population explosion.
16. There is no significant difference in the attitude of male and female science students towards the environment in the area of environmental concern.
17. There is no significant difference in the attitude of male and female arts students towards the environment in the area of health and hygiene.
18. There is no significant difference in the attitude of male and female arts students towards the environment in the area of wildlife.
19. There is no significant difference in the attitude of male and female arts students towards the environment in the area of forests.
20. There is no significant difference in the attitude of male and female arts students towards the environment in the area of polluters.
21. There is no significant difference in the attitude of male and female arts students towards the environment in the area of population explosion.
22. There is no significant difference in the attitude of male and female arts students towards the environment in the area of environmental concern.

23. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene.
24. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of wildlife.
25. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of forests.
26. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of polluters.
27. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of population explosion.
28. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of environmental concern.
29. There is no significant difference in the attitude of science, arts and commerce students towards the environment in the colleges of Mizoram.
30. There is no significant difference between arts and science students in their attitude towards the environment in the colleges of Mizoram.
31. There is no significant difference between science and commerce students in their attitude towards the environment in the colleges of Mizoram.
32. There is no significant difference between commerce and arts students in their attitude towards the environment in the colleges of Mizoram.
33. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of health and hygiene.
34. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of wildlife.

35. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of forests.
36. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of polluters.
37. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of population explosion.
38. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of environmental concern.
39. There is no significant difference between science and arts students in their attitude towards the environment in the area of environmental concern.
40. There is no significant difference between arts and commerce students in their attitude towards the environment in the area of environmental concern.
41. There is no significant difference between science and commerce students in their attitude towards the environment in the area of environmental concern.

### 1.9.0 Operational Definitions of Key Terms Used

**Environmental education:** Environmental education in the present study means the subject of environmental studies given in degree colleges of Mizoram.

**College:** College in the present study means those bachelor degree awarding tertiary educational institutions. It is the education that takes place after the completion of 12 years in school education i.e., after completion of 10+2 or higher secondary education.

## 1.10.0 References


Akhtar, R. (1990). *Environmental Pollution and Health Problems*. New Delhi: Ashish Publishing House.

Bharucha, E. (2015). *Textbook of environmental studies for undergraduate courses.* Universities Press.

Best, J.W., & James, V.K. (2000). *Research in education*. New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

Chitrabhanu, T.K. (2007). *Environmental education.* Delhi: Authors press Tarun Offset.

Chauhan, A. S., (2004). *Environmental Studies.* New Delhi: Jain Brothers.

Chhokar, K. B., Pandya, M., & Raghunathan, M. (2004). *Understanding Environment.* New Delhi: Sage Publications.

Dash, M.C., & Mishra, P.C. (2001). *Man and environment.* Kolkata: Macmilan India Limited.

Eugine, T. (2004). *Environmental economics*. New Delhi: Vrinda Publications (P) Ltd.

Ghanta, R., & Rao, D. B. (1998). *Environmental Education: Problems and Prospects.* New Delhi: Discovery Publishing House.

Joseph, C. (2011).*Environmental education*. New Delhi: Neelkamal Publications.

Jain, K.(2005). *An Introduction to environmental education*. New Delhi: Mohit Publications.

Kopardekar, H.D. (1987). *Environmental education*. New Delhi: India Environmental Society.

Kumar, T. P. (2009). *Environmental education*. New Delhi: A.P.H. Publishing House.

Lalremruati, P.C. (2014). *Environmental education in elementary schools in Mizoram: An analytical study*. (Unpublished M.Phil Thesis). Mizoram University.

Lob, R.E. (1987). *Project based teaching in environmental education*. New Delhi: Indian Environmental Society.

Louis,V. (2006). *Pedagogy in environmental education*. New Delhi: AIU House.

Jain, K. (2005). *An introduction to environmental education*. New Delhi: Mohit Publications.

Molia, M.S. (2006). *Global issues on environmental education.* New Delhi: AIU House.

Maliwal, G.L. (2006). *Handbook of environmental management.* New Delhi: Agrotech Publishing Academy.

Nasrin (2007). *Education, environment and society*. New Delhi: APH Publishing Corporation.

Nanda, V. K. (2004). Environmental education. New Delhi: Anmol Publications Pvt.Ltd.

Prap,K. (2009). *Environmental education.* New Delhi: A.P.H Publishing Corporation.

Pandey, S. (2000). Status of environmental education. *University News, 38(39).*New Delhi: AIU House.

Patil, C. S., & Biradar, P. M. (2009). *Environmental education.* New Delhi: A.P.H Publishing Corporation.

Praharaj, M.B. (1996). *A Study of the Effect of Programmes Developing Awareness towards Environment among the Pupils of Standard IV,* Indian Educational Abstract, Issue-4,198,NCERT New Delhi, P.83.

Rao, V. K., & Reddy, R. S. (2012). *Environmental education*. New Delhi: Commonwealth Publishers.

Reddy, G.S. & Krishnamacharyulu, V. (2007). *Environmental education*. New Delhi: Neelkamal Publications PVT. Ltd.

Sahoo, R.K., Tilottama, S. (2003). *Environmental education and pollution control.* New Delhi: Mittal Publication.

Sethi, P., & Kulkarni, V.S.(2001). *Environmental education*. New Delhi: Alfa Publications.

Sharma, S.R. (2006). *Environmental education*. New Delhi: Shri Sai Printographers.

Senapati & Sahoo, R.K. (2009). *Environmental education and pollution control*. New Delhi: Mittal Publications.

Sharma, R.A. (2010). *Environmental education.* Jaidevi Nagar Meerut: Raj Printers.

Shrivastava, K.K. (2007). *Environmental education*. New Delhi: Kanishka Publishers, Distributors.

Sharma, B.M. (2004). *Teaching environmental education*. New Delhi: Akansha Publishing House.

Sharma, H.L. (2006) *Environmental conservation: key to sustainable development*. New Delhi: AIU House.

Sabata, U.C. (1997). *Biodiversity and its importance towards protecting the planet*. New Delhi: Mittal Publications.

Souza, B.D. (1987). *Key issues of human settlements in Indian perspective*. New Delhi: Indian Environmental Society.

Senapati, T., & Rajan, K.S. (2009). *Environmental education and pollution control*. New Delhi: Mittal Publications.

Shrivastava, K.K.(2004). *Environmental education*. New Delhi: Kanishka Publishers Distributors.

# CHAPTER- II

# REVIEW OF RELATED LITERATURE

Review of literature is very important in any research work. A number of studies on and about the environment have been done. While some of these studies have focused on the attitude, some have focused on the effect and still others on the relationship between certain factors in the environment. This chapter includes studies conducted on environmental education in India and abroad. The investigator has divided the work under the following sub headings:

1. Studies conducted in India
2. Studies done abroad

## 2.1.0 Studies Conducted in India

**Deopuria (1984)** did a study on *"*A comparative study of teaching of science through environment and traditional approach in schools of Madhya Pradesh" and found that:

1. The environmental approach in teaching will help in developing better attitude in students towards the environment.
2. Students of primary schools of the experimental group showed improvement towards environmental awareness.
3. Environmental approach showed greater cognitive gain in knowledge, understanding and application of science concepts related to environmental education to primary, middle and secondary school levels.

**Kopardekar (1987)** in his study on "Environmental education" observed that:

1. Education on nature will have to be a very important item on the agenda of environmental education.
2. Education on nature will help to restore the composure of human beings and their relationships with their surroundings.
3. If people are educated in this way they are less likely to take part in spoiling nature in their day to day life.

**Dayal (1987)** has conducted a study on "Environmental education for conservation and development" and identified that:

1. At both formal and non formal level there should be involvement of each and every human being on the continent.
2. Children literature should be produced bringing out various aspects of environmental problems and environmentally safe technologies.

**Chittibabu (1987)** carried out a study on "Environmental education for conservation and development" and concluded that:

1. Education creates the urge for a clean environment.
2. It inculcates in the young minds the basic principles of sanitation and hygiene.
3. It helps pupils and students to appreciate the need for conservation of our multifaceted heritage.

**Rajput (1988)** conducted a study on "A research study for identification of teaching skills and training strategies for implementing the environmental approach at primary level". His findings are as follows:

1. The mean scores of environmental awareness for the experimental and the control group at pre-test and post-test level indicated that out of 14 comparison

groups in seven schools, nine groups had no significant difference and the remaining five groups had a significant difference as a result of the treatment.

2. The result of comparison between the groups and within the groups indicated that out of 14 groups, five groups had no significant differences in both cases.
3. The significant difference obtained in some groups did not follow any uniform pattern.

**Rane (1989)** did a study on "Evaluation of the environmental studies of approach of Parisar Asha in municipal schools in Greater Bombay" and found that:

1. Parisar Asha has gained momentum within a short period by way of organizing various programmes for implementing the environmental studies approach to learning in a large number of schools of varied kinds.
2. There is need to have departmental heads for the three units of training.
3. The monitoring system which was introduced by Parisar Asha helped to get feedback on the functioning of the environmental studies project.
4. The teachers of standard II had a favorable opinion about the environmental studies approach and they made efforts to use this new approach in their classrooms along with the traditional method of teaching.

**Devi (1990)** has undertaken "A critical study of the environmental curriculum in Andhra Pradesh" and found that:

1. The environmental studies curricula did not cater to the essential needs of learners for whom they were meant.
2. The environmental studies curricula did not introduce children to the desired scientific skills and attitudes.

3. The prescribed curricula did not adequately reflect the stated curriculum objectives. The investigator highlighted that environmental studies curricula in order to be more effective, should be comprehensive, sequential and full of experiences that link children school based learning with their environment and the universe.

**Shanawaj (1990)** studied "Environmental awareness and environmental attitude of secondary school teachers and students" and revealed that:

1. 95% teachers and 94% students possessed positive environmental attitudes.
2. The environmental trained teachers and untrained teachers did not differ in their attitudes.
3. Teachers had more awareness of the environment than students.
4. Trained and untrained teachers did not differ on environmental awareness.
5. Girls possessed significantly more awareness of the environment than boys.

**Praharaj (1991)** conducted a study on "Environmental knowledge, environmental attitude and perception regarding environmental education among pre-service and in-service secondary school teachers" and observed that:

1. The level of environmental knowledge was found low among pre-service teachers, although conceptual knowledge was moderate.
2. Among the in-service teachers environmental knowledge was moderate and factual knowledge about the environment was low.
3. Both the group differed significantly in their level of environmental knowledge. They had a favorable attitude towards environmental education although the in-service group had a higher level of attitude than that of the pre-service group.

4. Teachers perceived that environmental education should be a core part of social science subjects in secondary school as well as mass media have a potential role to play in imparting environmental education.
5. There was a moderate correlation between environmental knowledge and environmental attitude.

**Kidwai (1991)** did a study on "Development of an environmentally oriented curriculum in geography at secondary stage" and revealed that, a framework for an environmentally oriented geography curriculum at secondary stage was presented.

**Gopalakrishnan (1992)** made a study on "Impact of environmental education on primary school children" and had found that:

1. Distribution of the total environmental education had a very good impact on the children.
2. Analyzing the environmental education test area wise, the children of Madras scored better when compared to that of Coimbatore and the Nilgiris and this could be due to the better exposure of the Madras children.
3. The study showed that the participatory learning approach could bring about a better impact.
4. Teachers in general felt that there was no sufficient time to give importance to learner- centered activities.

**Sahoo (1992)** did a study on "A critical study of the conception and perception of environmental education" and the study showed that:

1. The concept of the environment is broadly divided as natural and man-made types.
2. Flora and fauna constitute the biotic environment.

3. The atmosphere, hydrosphere and lithosphere constitute the abiotic environment.
4. Man made environments are of different types, such as social, economic, political, cultural, aesthetic, historical, geographical, psychological, religious and academic.
5. The fusion of different types of environment forms the holistic concept of environment. The relationship between man and environment is symbolic in nature.
6. Man's domination over the environment has created complexities in the man-environment relationship.
7. Self management is perceived as the best formula for good environmental management.
8. Several workshops, committees and bodies at national and international levels have thrown light on the conceptual analysis of environmental education. Environmental education is a broad concept and is perceived as lifelong experiences for all.
9. Efforts are continuing with regard to environment management, with focus on unity of life, sustainable development, human welfare, futuristic and cultural progress.

**Harjitpal (1992)** made "A study of population awareness in relation to attitudes towards environmental education and population education of professional teachers". The results of the study showed that:

1. In the case of both males and females no difference existed in the population awareness of different categories of teachers.

2. Sex difference existed in the population awareness of different categories of teachers.
3. The level of population awareness was not related to the attitude towards environmental education.

**Rau (1995)** did a study on "A study of the awareness and attitude of teachers and students of high schools towards environmental education in Jabalpur district". His study revealed that:

1. Boys and girls differ significantly on their awareness towards environmental problems in favor of boys.
2. Rural and urban students differed significantly on their environmental awareness in favor of urban students.
3. Male and female teachers differed significantly on their environmental attitudes, in favor of female teachers.
4. Students and teachers differed significantly on their environmental knowledge, in favor of teachers.
5. Students studying in government schools and private schools differed significantly in favor of the private schools.

**Sabhlok (1995)** in his study on "A study of the awareness and attitude of teachers and students of high school schools towards environmental education in Jabalpur District" found that:

1. Urban teachers differed significantly from rural and tribal teachers on their awareness of environmental problems.
2. No difference was observed between rural teachers and the tribal teachers.

**Patel and Patel (1995)** conducted a study on "An investigation into the environmental awareness and its enhancement in the secondary school teachers: The Progress of Education" and discovered that:

1. There was a significant effect of environmental awareness programme as a whole on treatment of environmental awareness of the teachers of experimental group.
2. There was no significant difference in the mean score of environmental awareness possessing high and low experience of the teachers.
3. There was no significant interaction between independent factors of environmental awareness programme and experience upon environmental awareness of teachers.

**Sabata (1997)** in her study on "Biodiversity and its importance towards protecting the planet" reported that:

1. It was of paramount importance to create love and concern for nature in young minds so that they grow up with an awareness that would lead to action.
2. Proper inventory methods are to be taken for identifying and later monitoring and conserving the biodiversity for protection of the plants.

**Bhattacharya (1997)** conducted a study on the "Environmental awareness among higher secondary students of science and non science stream" and found out that:

1. Students belonging to science stream were better in terms of their environmental awareness compared to non science stream.
2. Formation of attitude towards any issue or object may not depend upon the nature of discipline and the formal instructional situation as well as of curriculum structure.

3. Female groups of higher secondary students were better than their male counterparts in environmental awareness.
4. Male and female students differed significantly in terms of environmental awareness. Female students were better than their male counterparts.

**Jinarajan (1999)** in his book on "A study of environmental awareness towards environmental education of student teachers of Bangalore city" did not find any gender difference in environmental awareness.

**Agarwal (1999)** in his study on "International law and human rights" reported that:

1. The tremendous advancement of industrialization resulted into economic development had also continuously degraded the human environment.
2. Urbanization, over population and poverty intensified the problem.

**Ayishabi (1999)** from his study on "Environmental literacy of science and non science students at degree level" found that:

1. Science students were better than non science students in environmental literacy and its components.
2. All science students were similar in their literacy but among the non science students, it was the history students who were least environmentally literate.
3. English students had better awareness of environment compared to the commerce students but in other components the groups were alike.

**Pandey (2000)** in his article "Status of environmental education" had revealed that:

1. Training of teachers into effective strategies for environmental components, both at the school and university level should be introduced as an integral part of the programmes of teacher education departments.

2. The regional resource centre in environmental education should be made more dynamic and functional by undertaking programmes of teachers involvement and teacher preparation at the grass roots level.
3. He also suggested for use of variety of methods, media and techniques with reference to environmental education instead of following a global approach.

**Tripathi (2000)** did a study on "A comparative study of environmental awareness of students studying in schools at levels in Uttar Pradesh". The findings indicated that:

1. Boys students had better awareness than girls students of central school.
2. No significant difference was found in the environmental awareness of science and arts students of central schools.

**Suni (2000)** developed an identification key on the topic "Inflorescence" using environmental method. The study arrived at the conclusion that environmental method is significantly superior to lecture method and self learning method with regard to post test achievement and therefore environmental method can be adopted as an effective method for teaching "Inflorescence" at higher secondary level.

**Rai (2000)** studied "The role of education and cultural practices in creating environmental awareness". The findings show that:

1. Respondents with higher level of education in the formal system possessed greater awareness towards the environment.
2. Both male and female respondents were found to be equally aware of environmental issues.
3. Both rural and urban respondents showed non-significant difference in their concern for environment.

**Bhawalkar (2000)** in his study on "An analysis of school syllabus in context of environmental education" revealed that:

1. Majority of teachers considered environmental awareness as a part of moral values and found that most of the teachers considered that environmental education had been embodied in our ancient culture whereas most of them disagreed with the statement that environmental education is a concept generated from western countries.
2. Majority of the teachers agreed that they can persuade the students to play responsible role towards environment.
3. Majority of the teachers accepted the occurrence of the content related to environmental education in the syllabus, necessity of inclusion of environmental education in school syllabus, and suitability of not only science but other subjects also to teach environmental education.

**Sahoo (2003)** conducted a study entitled "Population growth and sustainable development of forest resources" and discovered that:

1. The level of population and that availability of forest resources are the two major determinants of the sustainable development of forest resources.
2. The population of the state of the country will either be controlled or stabilized and the forest resources will have to be regenerated and the existing resources have to be protected.

**Bhosle (2006)** in her research paper "Environmental education in schools" has examined that the limitless greed, neck less consumption of natural resources and unkind treatment meted out to environment have increasingly damaged the world.

This has caused a global concern about the conservation and protection of the earth's environment.

**Molia (2006)** studied "Global issues on environmental education" and revealed that environmental issues, especially global issues can often appear and disconnected from a learners life. It can mean concepts in ecology, outdoor education, environmental science or instruction about issues.

**Mishra (2006)** did a study on "Environmental awareness of secondary school students with reference to their intelligence and school background". The findings of the study show that:

1. The average level of awareness of all groups of secondary school students on the four aspects of environment included in the study viz, air, water, soil and sound and also their overall environmental awareness is not encouraging.
2. Intelligence has significant independent effect on the awareness of secondary school students on air, water and soil aspects of environment and on overall environment but not on sound aspect of environment.
3. Secondary school students of average intelligence differ significantly in their awareness about air aspect of environment from the low intelligent as well as high intelligent students and they have better awareness.
4. High intelligent secondary school students have significantly better awareness about water and soil aspect of environment than the low intelligent students.
5. The secondary school students of low intelligent group have less awareness of environment as compared to both high intelligent and average intelligent groups.

**Sharma (2006)** conducted a study on "Environmental conservation: key to sustainable development" and had pointed out that:

1. The preservation and conservation of environmental heritage is our sacred duty.
2. All of us living on this planet, whether rich or poor industrialist or workmen, farmers or laborers, as individuals or groups are responsible for the present dismal state of our environment.
3. Each one of us has to contribute towards its rehabilitation, preservation, and conservation.

**Naseema (2006)** in her study entitled "Influence on sex and social position on attitude towards environment of secondary school pupils" has examined that:

1. The sex of the students does not seem to cause any difference in their attitude towards environment.
2. Influence of both physical and psychological environments which are caused due to the socio economic condition of the family, parents, education, home condition of living parents, love, care along with the cultural forces provide a resultant effect on the pupils acquisition of environmental concepts.

**Lalremruati (2014)** in her study on "Environmental education in elementary schools in Mizoram: An analytical study" found that:

1. Students at the elementary levels of education had at least a minimal knowledge about the environment.
2. Since environmental education had been introduced as an integral part of the school curriculum from class 1, earlier studies of the subject prove helpful for the students in presenting their knowledge about the environment.

3. There is a significant difference on environmental awareness between boys and girls.
4. Female students had better awareness on environmental education than male students.

**Lalremruata (2016**) conducted a study on "Assessment of learning outcomes of Class IV children in environmental studies in Mizoram in relation to minimum levels of learning (MLL)". His findings revealed that:

1. In environmental studies 0.25% of children achieved mastery level of learning and not less than 99% of children had failed to attain mastery level of learning in environmental studies which is very low and far from satisfactory.
2. The performance of children from gov't primary schools was found significantly better than children of private primary schools in environmental studies.
3. Children of primary schools located in urban areas were significantly better than children of primary schools located in rural areas in the subject of environmental studies.
4. There is no significant difference in the performance (mean scores) of boys and girls of class IV in primary schools in environmental studies.

**Katoch (2017)** in his study on "Awareness and attitude of school students towards environment" revealed that:

1. There is no difference in the environmental awareness between male and female school students. Both male and female have equal awareness towards environment.

2. There is significant difference in attitude towards environment of male and female school students. Female students are having better attitude towards environment than male students

**Krishnakumari (2017)** did a study on "Environmental attitude of school students" 200 samples were collected on random sampling technique and a normative survey method was utilized and found out that there exists no significant difference between sub samples.

### 2.2.0 Studies done Abroad

**Blum (1982)** in his book entitled "Assessment of subjective usefulness of an environmental science curriculum" evaluated an environmental studies curriculum in terms of student perceptions of course usefulness for achieving various goals. Results were interpreted as evidence that an inquiry-oriented curriculum can have a positive effect on student's perception of the usefulness of school subjects.

**Lob (1987)** in his study on "Project based teaching in environmental education" reported that the aspects of environmental education are regarded as to be integrated in to curricula already existing and developed in the future so that environmental education should not be perceived as an additional or separate but as an integral aspects of education.

**Hart (1996)** in his recent study on "Teachers ideas about environmental education for the next generation" interviewed over 200 elementary teachers across Canada and found that the reason that most teachers teach environmental education in the absence of specific curriculum guidelines is based on values and experiences rather than knowledge.

**Atwood (1998)** found that in her own teaching on environmental outdoor school programme "an investigation of the student and teacher perceptions" it is important to schedule frequent and cumulative activities that allow students to build knowledge and awareness towards environmental issues.

**Volk (2003)** studied "The effects of an environmental education program on students, parents and community*"* and revealed that students who have participated in an environmental education program have actually shown improved reading, writing, and oral communication skills.

**Loughland et al.** (2003) carried out a study on "Factors influencing young people's conception of environment" stresses the need for students to receive some sort of environmental education in their early development years so they can view the environment as a relation rather than an object. The only way to develop this kind of thinking in students is to instill it in them at an early age so it becomes second nature to them.

**Vaugha (2003)** conducted a study on "The effect of environmental education on school children, their parents, and community members: A study of intergenerational and intercommunity learning" revealed that if environmental education programs for children are guided in a proper way, parents and other adults could also benefit from them. Knowledge gain passed on from children to parents (and other adults) indicates that awareness can be delivered in a consecutive way from the classroom to the community.

**Mc Clarenet al.** (2005) in their study on "Integrating education and action in environmental education" discuss the different paradigms that have evolved in researching the ideal approach to environmental education. Before the environmental

education community defines standards of practice it should be sure that it has a full understanding of the range of possibilities and challenges which might nurture a transformation in human-environment relations.

**Wilson et al.** (2005) have done a study on "Biodiversity curriculum that supports education reform" emphasize that implementing environmental education into a teacher's every day curriculum has been proven to help students earn higher scores in many, if not all of the subjects addressed on standardized tests.

**Sward et al.** (2005) conducted a study on **"**Environmental sensitivity: A review of the research 1980–1998". The study revealed that while environmental sensitivity itself is viewed as an affective variable, its development appears to result from interplay of outdoor experiences, favorable human interactions, and knowledge about the natural environment.

**Louis (2006)** studied "Pedagogy in environmental education" and found that:

1. Children from their earlier years should be oriented towards learning from the surroundings using the local environment as a medium for inquiry or discovery as a source of materials for realistic activities.
2. He has further pointed out that in environmental education there is more stress on environmental actions and skills.

**Padmanabhan (2008**) did a study on "Environmental awareness and environmental attitude of secondary school teachers of Maldives". The findings showed that:

1. Majority of the Maldivian secondary school teachers have a moderate awareness of environmental problems, issues and other related aspects.

2. They also have a positive attitude towards conserving the environment.

3. The study revealed that there was a relationship between environmental awareness and environmental attitude

4. There was no significant difference between male and female teachers in their awareness and attitude towards environmental education.

5. The studies also found out that the environmental awareness do predict the environmental attitude of Maldivian secondary school teachers.

**Ozden (2008)** conducted a study on "Environmental awareness and attitude of student teachers: An empirical research" and revealed that female elementary student teachers in the last year of an instruction programme who have less than three brothers and sisters with high socio economic level (student teachers income level of family, fathers job and education, mothers job, living residence) living in Marmara region had more positive attitude towards the four dimensions of environmental attitude than the other student teachers.

**Heyl at al. (2013)** in their studies on "Environmental attitude and behaviors of college students: A case study conducted at a Chilean University" and found that:

1. Encouraging the adoption of a pro environmental behavior is critical in order to reduce the environmental impacts and move toward a more sustainable future.

1. Higher education plays an important role in training professionals who have an important role in protecting the environment in the future.

2. The sample consisted of 383 engineering students in first, third and sixth year with two instruments designed to measure environmental attitude and

behavior. Significant differences were found between students pursuing diplomas related to the environment and those who are not.

3. No significant differences were observed between students enrolled in different levels.

**Kose (2015)** in his study on "Environment awareness and attitude towards environment of male and female class V students of Chandigarh, Haryana and Punjab" revealed that:

1. Students had positive attitude towards the environment as regard to their gender and faculty types.
2. Female students were more sensitive towards than male students.

**Artunet.al. (2016)** conducted a study on "Evaluation of the applicability of an environmental education modular curriculum" and observed that Environmental Education Modular Curriculum (EEMC) not only included a content which met the students needs and which allowed them to procedure solutions to environmental problems but also had the quality of a dynamic modular curriculum.

**Dr.Hooda (2016)** in his study on "A study of attitude and awareness of college students towards environmental pollution" found that:

1. Majority of the students of colleges are aware of the consequence of environmental pollution.
2. A significant difference was found between the students of private and government schools with reference to environmental awareness.
3. The private college students are significantly more positive than government college students towards environmental problems.

**Lahnstein et al. (2019)** in their studies on "School teachers conceptions of environmental education: reinterpreting a typology through a thematic analysis" revealed that there was full and partial associations between the teachers ideas and Sauve typology which shows that the conceptions of teachers were complex and could not be fully represented by single environmental education types.

### 2.3.0 Relevance of the Present Study in Relation to Studies Reviewed

A review of the studies related to the present study clearly showed that no study which is exactly similar to the present study has been done. Although studies had been done separately on curriculum of environmental education and attitude towards environment, there was no study within and outside India where the status of environmental education was studied along with the attitude of students. Especially within the state of Mizoram, no study has been done on the present topic although studies had been done on environmental education itself.

Since environmental education is such an important topic, the investigator considers the absence of data regarding the status of environmental education and the attitude of students a grave mistake in light of present need for environmental knowledge among today's youth. Therefore, the need to take up a study regarding the status of environmental education in colleges and the attitude of students towards the environment in Mizoram was greatly felt. With this in mind, and to fill up certain research gaps, the present study was taken up.

The study, besides filling certain research gaps, is expected to enable policy makers and researchers to have a reliable data regarding the need of environmental education in the state of Mizoram. Moreover, it is expected to yield much needed

information regarding the difference in the attitude of different disciplines towards the environment and enable teachers and educational administrators to take necessary steps.

### 2.4.0 References


Agarwal, H.O. (1999). *International law and human rights.* Allahabad: Central Law Publications.

Akhtar, R. (1990). *New World Environment Series: Environmental Pollution and Health Problems.* New Delhi: Ashish Publishing House.

Artun, H. A. & Ozsevgec, T. (2016). A study on the evaluation of the applicability of an environmental education modular curriculum. *International Journal of Environmental and Science Education 2016, II (15).*7318-7347.

Atwood,S.L. (1998). *An environmental outdoor school program: an investigation of the student and teacher perceptions.* (Unpublished Ph.d thesis). The University of British Columbia.

Ayishabi, T.C. (1999). Environmental literacy of science and non science students at degree level. *Journal of All India Association for Educational Research.II (192),* 23-29.

Bhatacharya,G.C.(1997). Environmental awareness among higher secondary students of science and non Science students. *School Science.30(I),*24-32.

Bhawalkar,S. (2000). *An analysis of school syllabus in context of environmental education.School science, Sept 2000*. New Delhi : NCERT.

Bhostle,S. (2006). *Environmental education in schools*. New Delhi : AIU House.

Blum, A. (1982). Assessment of subjective usefulness of an environmental science curriculum. *Science Education, No 1,66.*25-34.

Chauhan, A. S. (2004). *Environmental Studies.* New Delhi: Jain Brothers.

Chhakar, K. B., Pandya, M & Raghunathan, M (2004). *Understanding Environment.* New Delhi: Sage Publications.

Chittibalu, S.V. (1987). *Environmental education for conservation and development.* New Delhi: Indian Environmental Society.

Dayal, M. (1987). *Environmental education for conservation and development*. New Delhi: Indian Environmental Society.

Deopuria, R.P. (1984). *A comparative study of teaching of science through environment and traditional approach in schools of Madhya Pradesh.* (Unpublished PhD thesis). Jabalpur University.

Devi, S.A.(1990). *A critical study of environmental curriculum in Andhra Pradesh. Fifth Survey of Educational Research 1988-1992, II.* New Delhi: NCERT.

Ghanta, R. (2003). *Environmental Education: Problems and Prospects.* New Delhi: Discovery Publishing House.

Gopalkrishnan, S. (1992). Impact of environmental education on primary school children. *Fifth Survey of Educational Research 1988-1992, II.* New Delhi: NCERT.

Hart. (1996).Teachers ideas about environmental education: Environmental education for the next generation: twenty fifth Annual Conference of the North American Association for environmental education.

Heyl. (2013). Environmental attitude and behaviors of college students: a case study conducted at a Chilean University. *Revista Latino americana de Psicologia, 45 (3)* Bogota Sept/Dec.2013.

Hooda, S. (2016). A study of attitude and awareness of college students towards environmental pollution. *EPRA International Journal of Economic and Business, 4 (2).*

Jinarajan, S.(1999). *A study of environmental awareness and attitude towards environmental education of student teachers of Bangalore City.* (Unpublished M.Phil. dissertation). Department of Education, Bangalore University.

Kose, A.N. (20l5). *Environment awareness and attitude towards environment of male and female class V students of Chandigarh, Haryana and Punjab.* (Unpublished M.Ed dissertation). Punjab University.

Katoch, K.S. (2017). Awareness and attitude of school students towards environment. *Scholarly Research Journal for Interdisciplinary Studies.*

Kaur, H.P. (1992). A study of population awareness in relation to attitudes towards environmental education and population education of professional teachers. *Fifth Survey of Educational Research1988-92, II.* New Delhi: NCERT.

Kidwai, Z. (1991). Development of an environmentally oriented curriculum in geography at secondary stage. *Fifth Survey of Educational Research 1988-92.II.*

Krishnakumari, S. & Ponmozhi, D. (2017). Environmental attitude of school students. *IOSR Journal of Humanities and Social Science(IOSR-JHSS). 22(7),*3.

Lalremruati, P.C. (2014). *Environmental education in elementary schools in Mizoram: An analytical study.* (Unpublished M.Phil. dissertation). Mizoram University.

Lalremruata, C. (2016). Assessment of learning outcomes of class IV children in environmental studies in Mizoram in relation to MLL. *Mizoram Educational Journal.II (1& 2).*

Lahnstein & Ryder, J. (2019). School teacher conceptions of environmental education: Reinterpreting a typology through a thematic analysis. Retrieved from https://www.tandfonline.com/author/Benavides-Lahnstein%2C+Ana+IIse

Lob,R.E. (1987). *Project based teaching in environmental education*. New Delhi: Indian Environmental Society.

Loughland, Tony, Reid, A.,Walker, K. and Petoc, P.(2003*).* Factors Influencing Young People's Conceptions of Environment. *Environmental Education Research. 9 (1)*3-19.

McClaren M.& Hammond, B.(2005). *Integrating education and action in environmental education. Environmental education and advocacy: Changing perspectives of ecology and education.* Cambridge University Press.

Mishra,B.B. (2006). Environmental awareness of secondary school students with reference to their intelligence and school background. *Journal of All India Association for Educational Research.18 (1&2).*

Molia, M.S. (2006).*Global issues on environmental education.* New Delhi. AIU House.

Naseema, C. (2006)**.** *Influence of sex and social position on attitude towards environment of secondary school pupils*.AIU.

Ozden, M. (2008). Environmental education as a subject in schools. Retrieved from http://www.tandfonline.com/doi/abs/10.2167/irgee227.0

Pandey, S. (2000). *Status of environmental education*. University News, 38-39, AIU House, New Delhi.

Padmanabhan, J. (2008). *Environmental awareness and environmental attitude of secondary school teachers of Maldives: A study*. Retrieved from https://www.researchgate.net/publication/291695465

Patel, D.G. and Patel, S.K. (1995). An investigation into the environmental awareness and its enhancement in the secondary school teachers. *The Progress of Education, LXIX (12):256-259 &268.*

Praharaj, M. B. (1991). Environmental knowledge, environmental attitude, and perception regarding environmental education among pre service and in service secondary school teachers. *Fifth Survey of Educational Research 1756-1757, II.* New Delhi, NCERT.

Praharaj, M.B. (1996). A Study of the effect of programmes developing awareness towards environment among the pupils of standard –IV. *Indian Educational Abstract. 4(198),* 83.

Rou,S.(1995). A study of awareness and attitude of teachers and students of high school towards environmental education in Jabalpur District. *Indian Educational Abstract I(62-63).*

Rai, D.K. (2000). Role of education and cultural practices in creating environmental awareness. *Indian Educational Abstracts 2002, 2(1).*66.

Rane, A.J. (1989). Evaluation of the environmental studies approach of Parisar Asha in Municipal schools in Greater Bombay. *Fifth Survey of Educational Research 1988-92 II.* Delhi: NCERT.

Sabhlok, R.(1995). A study of the awareness and attitude of teachers and students of high school towards environmental education in Jobalpur District. Ph.d. *thesis Ani Dugavati Vishwavidyalaya, Indian Educational Abstract, I (24:6).*

Sahoo (2003). Population growth and sustainable development of forest resources. *Orissa Economic Journal, Orissa Economics Association, Bhubaneshwar, Jan-June and July-Dec.*

Sahoo, K.C. (1992). A critical study of the conception and perception of environmental education. *Fifth Survey of Educational Research 1988-92.II.*

Shanawaj (1990). Environmental awareness and environmental attitude of secondary and higher secondary school teachers and students. *Fifth Survey of Education Research 1988-1992, 2(33).*

Suni, L. (2000). *Development of an identification key on inflorescence for higher secondary students.* (Unpublished M.Ed. Thesis).University of Kerala Trivandrum.

Sward, L. & Marcibkowski, T. (2005). *Environmental sensitivity: A review of the research 1980-1998.*

Tripathi, M.P. (2000). A comparative study of environmental awareness of students in central schools and other schools at 10+2 level. *Indian Educational Abstract 2(1), 12-13.*

Vaughan, Christopher, Robert and Julie (2003).The effect of environmental education on school children, their parents and community members: A study of intergenerational and intercommunity learning. *Journal of Environmental Education.34, (3)*12.

Volk, Trudi, L. & Marie, J.C. (2003). The effects of an environmental education program on students, parents and community. *The Journal of Environmental Education. 34(4)*12-25.

Wilson, J.R. & Monroe, M.C. (2005). Biodiversity curriculum that supports education reform. *Applied Environmental Education and Communication An International Journal 4(2),*125-138.

# CHAPTER – III

# METHODOLOGY OF THE STUDY

## 3.1.0 Method of Study

The present study was mainly focused on the status of environmental education in colleges and the attitude of college students towards the environment. Therefore it was largely descriptive in nature. In order to gain primary data about subjects, the use of questionnaire and interview schedule was adopted. Secondary data was also collected and analyzed. Both quantitative as well as qualitative approaches were employed for successful realization of objectives.

## 3.2.0 Population

In the present study, for the assessment of attitude of college students, the target population of the study comprised of all the 4th semester students of arts, science and commerce streams of degree colleges of Mizoram.

## 3.3.0 Sample

For the present study, the sample selected comprised of 600 degree college students of Mizoram from 3 streams viz. arts, science and commerce, out of which 300 were males and 300 were females. 100 male and 100 female students were selected from each of these streams for the sample. The samples were selected on the basis of stratified random sampling.

For finding out the profile of teachers, mode of transaction of environmental education and evaluation procedures used, all the teachers who taught environmental education during the time this test was done were considered as the population.

In order to find out the profile of teachers teaching environmental education in colleges, mode of transaction of the subject and the evaluation procedures, no sampling was done and the population was studied as a whole. This is reflected in table 3.1.

The following table 3.1 shows the details of sample selected for the present study.

**Table 3.1**

**List of Colleges where Samples for Testing the Attitude of College Students were Collected**

| Si. no | Name of College | Stream | | | | | |
|---|---|---|---|---|---|---|---|
| | | Arts | | Science | | Commerce | |
| | | Male | Female | Male | Female | Male | Female |
| 1. | Pachhunga University College | 25 | 25 | 20 | 20 | 30 | 30 |
| 2. | Gov't Hrangbana College | 25 | 25 | | | 30 | 30 |
| 3. | Zirtiri Residential Science College | | | 40 | 40 | | |
| 4. | Gov't Aizawl College | 10 | 10 | | | 20 | 20 |
| 5. | Gov't Lunglei College | 10 | 10 | 10 | 10 | | |
| 6. | Gov't. Champhai College | 10 | 10 | 10 | 10 | 10 | 10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7. | Gov't. Kolasib College | 10 | 10 | 10 | 10 | | |
| 8. | Gov't Serchhip College | 10 | 10 | 10 | 10 | 10 | 10 |
| Total | | 100 | 100 | 100 | 100 | 100 | 100 |

The following table 3.2 shows the list of colleges and the number of teachers teaching environmental education in colleges of Mizoram.

**Table 3.2**

**List of Colleges and the Number of Teachers Teaching Environmental Education**

| Si. no. | Name of College | Number of teachers teaching environmental education |
|---|---|---|
| 1. | Pachhunga University College | 5 |
| 2. | Gov't. Aizawl College | 3 |
| 3. | Gov't Hrangbana College | 5 |
| 4. | Gov't Aizawl West college | 1 |
| 5. | Gov't Aizawl North college | 1 |
| 6. | Zirtiri Residential Science College | 8 |
| 7. | City College | 1 |
| 8. | Helen Lowry College | 1 |
| 9. | Gov't Lunglei College | 5 |
| 10. | Gov't. Champhai College | 6 |

| | | |
|---|---|---|
| 11. | Gov't. Kolasib College | 5 |
| 12. | Gov't. Serchhip College | 6 |
| 13. | Gov't.J. Thankima College | 2 |
| 14. | St. Xavier College | 1 |
| 15. | Gov't. Khawzawl College | 4 |
| 16. | Gov't. Mamit College | 5 |
| 17. | Gov't. J. Buana College | 2 |
| 18. | Gov't. Zawlnuam College | 2 |
| 19. | Gov't. KamalaNagar College | 2 |
| 20. | Gov't. T. Romana College | 2 |
| 21. | Gov't. Lawngtlai College | 1 |
| 22. | Gov't. Saitual College | 2 |
| 23. | HATIM | 3 |
| 24. | Gov't. Saiha College | 2 |
| 25. | Gov't. Hnahthial College | 4 |
| 26. | Gov't. Johnson College | 6 |
| | TOTAL | 85 |

### 3.4.0 Tools and Techniques Used

Data were collected from primary and secondary sources. Primary data were obtained through:

1. Taj Environmental Attitude Scale (TEAS)
2. Interview schedule developed by the investigator.

### 3.4.1 Taj Environmental Attitude Scale (TEAS)

Taj Environmental Attitude Scale (TEAS) was developed by Dr. Haseen Taj in 2001. Following the Likert's method of summated rating procedure Taj Environmental Attitude Scale (TEAS) was developed with 61 items consisting of six areas which aimed to identify the attitudes of people towards various aspects of environment. The six areas included in the scale are attitudes towards:

1. Health and Hygiene
2. Wildlife
3. Forests
4. Polluters
5. Population Explosion
6. Environmental Concern

Each item alternatives is assigned a weightage ranging from 4 (strongly agree) to 1 (strongly disagree) for favorable items and the scoring is reversed from 1 (strongly agree) to 4 (strongly disagree) in the case of unfavorable items. The attitude score of an individual is the sum total of item scores on all the six areas. The range of scores is from 61 to 244. For each statement there are no right or wrong answers. What is required is each individual feeling or opinion about the statement. The reliability of the scale was estimated by two methods (a) split half (odd-even and 1$^{st}$ half-2$^{nd}$ half) and (b) test retest reliability co-efficient with a time gap of one month on a sample of 150. The details of reliability co-efficient are presented in table 3.3.

**Table 3.3**

**Methods, Reliability Co-efficient and Index of Reliability**

| Si. no. | Method | Reliability | Corrected Co-efficient | Index of Reliability |
|---|---|---|---|---|
| 1. | Test-retest (1 month) | 0.60 | | 0.77 |
| | Split half | | | |
| 2. | a) Odd –even method | 0.51 | 0.67 | 0.82 |
| | b)1st half-2nd half method | 0.49 | 0.66 | 0.81 |

### 3.4.2. Construction of Interview Schedule

The interview schedule was constructed keeping in mind the research objectives that were to be realized through this tool as such ten questions were framed so as to find out the profile of teachers, the teaching mode of transaction as well as the evaluation procedures of environmental education. The questions were all close ended questions so as to enable respondents to answer easily and also to make the task of analysis of the answers easier for the researcher.

### 3.5.0 Collection of Data

For gathering information regarding teachers profile, mode of transaction as well as evaluation procedure, the researcher made use of the interview schedule that had been constructed by the herself. Permission was taken from respective college Principals and concerned teachers for the administration of the interview schedule.

The investigator personally visited all the concerned teachers and also took care to retrieve all the interview schedule that had been answered. Care was taken to see that all respondents answered each questions.

For collection of data concerning the attitude of college students regarding their attitude towards the environment, the researcher took permission from college Principals where the questionnaire was to be administered. She personally went to all the colleges until she had gathered enough data from the different streams of arts, science and commerce. Each response questionnaire was checked to ensure that respondents had addressed all the items. No problem was encountered during the collection of data.

### 3.6.0 Statistical Treatment of Data

Keeping in view the objectives of the study the investigator employed the following statistical techniques for tabulating and analyzing the data.

1. Content analysis to assess the syllabus of environmental education.
2. Descriptive statistics like mean, standard deviation and percentage to divide and find out the attitude of college students towards the environment.
3. Inferential statistics like ANOVA and t tests to find out the significance of difference among different variables.

### 3.7.0 References

Best, J.W., & Kahn, J.V. (2000) . *Research in education*. Ashoke K. Ghosh. New Delhi: Prentice Hall of India Private Limited.

Garrett, H.E. (2011). *Statistics in psychology and education*. New Delhi: Paragon International Publishers.

Kothari, C.R. (2012). *Research methodology methods and techniques*. New Delhi: New Age International Private Limited.

Mangal, S.K. (2013) . *Statistics in psychology and education*. New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

Sharma, K.V.S. (2015). *Statistics made simple.* New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

# CHAPTER -IV

## ANALYSIS AND INTERPRETATION OF DATA

The present study deals with the analysis and interpretation of data. They are presented in the following order:

4.1.0 Assess of contents of syllabus for degree students on environmental education in colleges of Mizoram.

4.2.0 Mode of transaction of environmental education at college level.

4.3.0 Evaluation procedures of environmental education at college level.

4.4.0 Profile of teachers teaching environmental education at college level.

4.5.0 Time devoted for environmental education in the college time tables.

4.6.0 Attitude of college students towards the environment.

4.7.0 Difference in the attitude of male and female students towards the environment in the colleges of Mizoram.

4.8.0 Difference in the attitude among students from different streams towards the environment.

### 4.1.0 Assess of Contents of Syllabus for Degree Students on Environmental Education in Colleges of Mizoram

The concern for environment disaster became worldwide following the widely circulated news and guidelines from international organizations with regards to the environment. The supreme court of India also, with a deeply felt realization of the need for environmental awareness of the present and coming generations of India had already instructed that environmental education and problems related to pollution should be taught as a compulsory subject as per its order dated 22nd Nov 1991.

With urgent callings for environmental education in the conference on environment and development held in Rio de Janeiro in 1992 and world summit on sustainable development at Johannesburg in 2002, the honorable Supreme Court has directed the UGC to introduce a basic course on environment at every level in college education. This matter was carefully considered by the UGC and it was finally decided that a six months compulsory core module course in environmental studies should be prepared and compulsorily implemented in all universities and colleges of India.

The contents of syllabus for degree students on environmental education was measured against the syllabus suggested by UGC who had prepared it with the help of experts on the subject.

### 4.1.1 Macro Analysis for Checking the Overall Contents of Syllabus for Degree Students

Table 4.1 and table 4.2 show the contents of syllabus suggested by UGC and Mizoram University (for undergraduates) respectively:

**Table 4.1**

**Contents of Syllabus Suggested by UGC for Degree Students on Environmental Education**

| Unit | Topic |
|---|---|
| Unit-1: Multidisciplinary nature of environmental studies | 1. Definition, scope and importance<br>2. Need for public awareness |
| Unit-2: Natural resources: renewable and non renewable resources: natural resources and associated problems | 1. Forest Resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people<br>2. Water Resources: Use and over -utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems<br>3. Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies<br>4. Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies<br>5. Energy Resources: Growing energy needs |

| | |
|---|---|
| | renewable and non renewable energy sources, use of alternate energy sources, case studies<br>6. Land Resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification<br>7. Role of an individual in conservation of natural resources<br>8. Equitable use of resources for sustainable development |
| Unit-3: Ecosystems | 1. Concept of ecosystem.<br>2. Structure and function of an ecosystem.<br>3. Producers, consumers and decomposers<br>4. Energy flow in the ecosystem<br>5. Ecological succession<br>6. Food chains, food webs and ecological pyramids.<br>7. Introduction, types, characteristics features, structure and function of the following ecosystem:<br>a) Forest ecosystem<br>b) Grassland ecosystem<br>c) Desert ecosystem<br>d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) |

| | |
|---|---|
| Unit-4: Biodiversity and its conservation | 1. Introduction - Definition: genetic, species and ecosystem biodiversity<br>2. Bio-geographical classification of India<br>3. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values<br>4. Biodiversity at global, national and local levels<br>5. India as a mega-diversity nation<br>6. Hot-spots of biodiversity<br>7. Threats to biodiversity: habitat loss, poaching of wild life, man- wildlife conflicts<br>8. Conservation of biodiversity: in - situ and ex- situ conservation of biodiversity |
| Unit-5:Environmental pollution | 1. Definition cause, effects and control measures of: a)Air pollution b) Water pollution c) Soil pollution d)Marine pollution e)Noise pollution f)Thermal pollution g)Nuclear hazards<br>2. Solid waste management: Causes, effects and control measures of urban and industrial wastes<br>3. Role of an individual in prevention of pollution<br>4. Pollution case studies |

| | |
|---|---|
| | 5. Disaster management: Floods, earthquake, cyclone and landslides |
| Unit-6: Social issues, and the Environment | 1. From unsustainable to sustainable development<br>2. Urban problems related to energy<br>3. Water conservation, rain water harvesting, watershed management<br>4. Resettlement and rehabilitation of people; its problems and concerns. Case studies<br>5. Environmental ethics: issues and possible solutions<br>6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies<br>7. Wasteland reclamation<br>8. Consumerism and waste products<br>9. Environment Protection Act<br>10. Air (Prevention and Control of Pollution) Act<br>11. Water (Prevention and Control of Pollution)Act<br>12. Wildlife Protection Act<br>13. Forest Conservation Act<br>14. Issues involved in enforcement of environmental legislation<br>15. Public awareness |

| | |
|---|---|
| Unit-7:Human population and the environment | 1. Population growth, variation among nations<br>2. Population explosion- Family welfare programme<br>3. Environment and human health<br>4. Human Rights<br>5. Value Education<br>6. HIV/AIDS<br>7. Woman and child Welfare<br>8. Role of information technology in environment and human health<br>9. Case studies |
| Unit-8: Field work | 1. Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain<br>2. Visits to a local polluted site-urban/rural/industrial/agriculture<br>3. Study of common plants, insects, birds<br>4. Study of simple ecosystems-pond, river, hill slopes, etc. (Field work equal to five lecture hours) |

As seen in the table 4.1 units 1- 6 are entirely theoretical whereas unit 7 deals with current issues regarding environment. Unit 8 the last unit is comprised of fieldwork. A more in depth analysis is presented at a later stage in the same chapter.

**Table 4.2**

**Contents of syllabus for Degree Students of Mizoram on Environmental Education (Suggested by Mizoram University)**

| Unit | Topic |
|---|---|
| Unit-1: Introduction and natural resources : renewable resources and associated problems | 1. Forest Resources: Use and over exploitation, deforestation<br>2. Water Resources: Use and over utilization of surface and ground water; conflicts over water<br>3. Mineral Resources: Use and exploitation, environmental effects of extraction and using mineral resources<br>4. Food Resources: Changes caused by agriculture and effects of modern agriculture<br>5. Energy Resources: Renewable and non renewable energy sources<br>6. Land Resources: Land degradation, soil erosion and desertification |

| | |
|---|---|
| Unit-2: Ecosystems | 1. Concept of ecosystem<br>2. Structure and function of an ecosystem<br>3. Producers, consumers and decomposers<br>4. Energy flow in the ecosystem<br>5. Food chains, food webs and ecological pyramids |
| Unit-3: Biodiversity and its conservation | 1. Definition of biodiversity<br>2. Bio-geographical classification of India<br>3. Biodiversity at national and local levels; hot spots of biodiversity in India<br>4. Threats to biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts; endangered and endemic species of India<br>5. Conservation of biodiversity: in - situ and ex- situ conservation of biodiversity |

| | |
|---|---|
| Unit-4:Environmental pollution | 1. Definition, causes, effects and control measures of: a)Air Pollution b)Water Pollution c)Soil Pollution<br>2. Solid waste management : Causes, effects and control measures of urban and industrial wastes<br>3. Disaster management: Floods, earthquakes, cyclones and landslides |
| Unit-5: Social issues, development and the environment | 1. Sustainable development, carrying capacity of the environment<br>2. Water conservation: Rain water harvesting, watershed management<br>3. Environmental movements, resettlement and rehabilitation of people, its problems and concerns<br>4. Shifting cultivation and its impact, wasteland reclamation<br>5. Population growth: population explosion |

A look at table 4.1 and 4.2 clearly reveals that there is a drastic reduction in the number of units and topics in the syllabus suggested for colleges under Mizoram University. The macro analysis revealed the following features of the syllabus of environmental education in colleges of Mizoram:

1. The syllabus contents suggested for colleges under Mizoram University has been adapted from the one suggested by UGC.
2. The syllabus contents suggested for colleges under Mizoram University is divided into 5 units whereas the syllabus suggested by the UGC is completed in 8 units.
3. The units of the syllabus for degree colleges of Mizoram are further sub divided into 43 sub topics. The topics in the syllabus suggested by UGC are further divided into 136 sub topics.
4. The approach of the syllabus content for the degree colleges of Mizoram is majorly lecture centered whereas the one suggested by the UGC has a balance of lecture, demonstration and practical methods.
5. Both the syllabus contents suggested for degree colleges under Mizoram University and the one suggested by UGC are to be completed in 50 classes.

The syllabus contents suggested for colleges under Mizoram University while it has been adapted from the one suggested by UGC, is much less than the suggestion of syllabus made by the UGC. However, while it may be impossible to attain the ideal, the real extent of coverage of the syllabus maybe understood only by a micro analysis.

### 4.1.2 Micro Analysis for Checking the Contents of Syllabus for Degree Students

A Micro analysis of the syllabus contents suggested for degree students for colleges under Mizoram University was done by studying each unit separately and also comparing it with the one suggested by UGC as follows.

**Table 4.3**

**Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-1**

| Name of Unit | Topic | | Sub-topics | | Total no. of sub topics |
|---|---|---|---|---|---|
| | Si. no. | Name of topic | Si. no. | Name of sub-topic | |
| Introduction and natural resources: renewable resources and associated problems | 1 | Forest resources | 1 | Use and over exploitation, deforestation | 2 |
| | 2 | Water resources | 2 | Use and over utilization of surface and ground water; conflicts over water | 2 |
| | 3 | Mineral resources | 3 | Use and exploitation, environmental effects of extraction and using mineral resources | 3 |
| | 4 | Food resources | 4 | Changes caused by agriculture and effects of modern agriculture | 2 |
| | 5 | Energy resources | 5 | Renewable and non renewable energy sources | 2 |
| | 6 | Land resources | 6 | Land degradation, soil erosion and desertification | 3 |
| Total no of topics | 6 | | Total no. of sub-topics | | 14 |

Table 4. 3 reveals that the first topic under unit-1 of the study are quite adequate to inculcate a sense of awareness and concern about the importance of utilizing the different renewable resources and provide learners with the knowledge and skills for managing the resources that must be protected for future generations. The syllabus aims at providing children with knowledge, attitudes and skills so that they are equipped to contribute meaningfully towards the betterment of the environment and accomplish the goal of sustainable development. It enables the students to know the meaning of resources, their variety, location and distribution and also to understand the importance of resources in our life. The topic is important to develop awareness towards resource conservation and to take initiative towards conservation process. It caters to making the students learn about the natural resources.

A deeper study clearly revealed that:

1. The title of this unit 'Introduction and atural resources: renewable resources and associated problems' when assessed against the syllabus suggested by UGC, shows that there is difference in the number of topics and sub topics under one heading/unit. There are 6 topics, namely: 1) forest resources, 2) water resources, 3) mineral resources, 4) food resources, 5) energy resources and 6) land resources and subdivided into 14 sub topics.
2. The 6 topics are sub divided as follows:

a. Forest resources are sub divided into use and over exploitation and deforestation. Timber extraction, mining, dams and their effects on forest and tribal people that appear in the UGC syllabus have been excluded. Case

studies which are to be accomplished in a practical manner have been excluded although they have been suggested by the UGC.

b. Water resources are sub divided into use and over utilization of surface and ground water as well as conflicts over water and important problems caused by floods and droughts that appear in the UGC syllabus have been excluded.

c. Mineral resources are sub divided into use and exploitation, environmental effects of extraction and using mineral resources. But case studies which are to be accomplished in a practical manner have been excluded although they have been suggested by the UGC.

d. Food resources are again sub divided into two namely changes caused by agriculture and effects of modern agriculture. Important topics in the syllabus suggested by UGC like world food problems, water logging, salinity and fertilizer - pesticide problems which are pertinent topics for Mizoram have been excluded. Case studies which have also been suggested for this topic by the UGC are also excluded.

e. Energy resources are sub divided into two topics namely renewable and non renewable energy sources. Topics like growing energy needs, use of alternate energy sources and case studies which are suggested by UGC have been excluded.

f. Land resources contain three sub topics which are land degradation, soil erosion and desertification, which are all important topics that directly concerns Mizoram have been included. But suggested topics like land as a resource and man- induced landslides which are also important topics for the state have been cut off although they have been suggested by UGC.

g. It does not include topics on role of individual in conservation of natural resources and equitable use of resources for sustainable development which are suggested by UGC. Although colleges are under no compulsion to follow the syllabus suggested by UGC and are allowed to make necessary modifications according to local needs, the investigator feels that too many topics, some of them with direct consequence to the environment of Mizoram have been excluded. Moreover, case studies, which are practical and give firsthand experience to learners, have been excluded.

**Table 4.4**

**Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-2**

| **Name of Unit** | **Topic** | | **Sub-topics** | | **Total no. of sub topics** |
|---|---|---|---|---|---|
| | **Si. no.** | **Name of topic** | **Si. no.** | **Name of sub-topic** | |
| Ecosystems | 1 | Concept of ecosystem | 1 | - | 1 |
| | 2 | Structure and function of an ecosystem | 2 | - | 1 |
| | 3 | Producers , consumers and decomposers | 3 | - | 1 |
| | 4 | Energy flow in the ecosystem | 4 | - | 1 |
| | 5 | Food chains, food webs and ecological pyramids | 5 | - | 1 |
| Total no. of topics | 5 | | Total no. of sub-topics | | 5 |

*Note: Those cases where the topic is not sub- divided into sub- topics are counted as one sub- topic*

A look at table 4.4 shows the contents of the syllabus under unit 2. The table revealed that:

1. The name of this unit is ‘Ecosystems’. There are 5 topics namely: 1) concept of eco-system, 2) structure and function of an eco- system, 3) producers, consumers and decomposers, 4) energy flow in the eco-system, 5) food chains, food webs and ecological pyramids. The syllabus suggested by UGC has 7 topics.
2. None of the five topics are sub divided into smaller sub topics and are learnt as sub topics in themselves.
3. Topics like ecological succession and study of different ecosystems like grassland, forest, desert and aquatic (ponds, streams, lakes, oceans, estuaries and rivers) ecosystems have been excluded although they have been suggested by UGC.

**Table 4.5**

**Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit- 3**

| Name of Unit | Topic | | Sub-topics | | Total no. of sub topics |
|---|---|---|---|---|---|
| | Si. no. | Name of topic | Si. no. | Name of sub-topic | |
| Biodiversity and its conservation | 1 | Definition of biodiversity | 1 | - | 1 |
| | 2 | Bio-geographical classification of India | 2 | - | 1 |
| | 3 | Biodiversity at national and local levels; hot spots of biodiversity in India | 3 | | |
| | 4 | Threats to biodiversity | 4 | Habitats loss, poaching of wild life; man wildlife conflicts; endangered and endemic species | 4 |
| | 5 | Conservation of biodiversity | 5 | In-situ and ex-situ conservation of biodiversity | 2 |
| Total no. of topics | 5 | | Total no. of sub-topics | | 8 |

*Note: Those cases where the topic is not sub- divided into sub- topics are counted as one sub- topic*

Table 4.5 shows the contents of the syllabus under Unit-3. The topic tries to develop in the learner, knowledge and awareness about diversity of living organisms and also foster in the learner a strong participation in the preservation and conservation of biological resources which is essential for the survival of mankind. The syllabus aims at generating among learners an awareness of and sensitivity to the total environment in a holistic manner and the problems associated with it. The processes and strategies suggested would help develop positive attitude, social values and strong concern for sustainable development and further improvement of the environment.

A deeper study of table 4.5 revealed that:

1. The title of this unit is 'Biodiversity and its Conservation'.
2. It consists of 5 topics namely: 1) definition of biodiversity, 2) bio geographical classification of India, 3) biodiversity at national and local levels: hot spots of biodiversity in India, 4) threats to biodiversity, 5) conservation of biodiversity: in situ and ex situ conservation of biodiversity. On the other hand, the syllabus suggested by UGC has 8 topics.
3. The 5 topics are further sub divided as follows:

a. Three topics namely, definition of biodiversity, bio geographical classification of India and biodiversity at national and local levels: hot spot of biodiversity in India have no sub topics of their own.

b. Threats to biodiversity is sub divided into habitat loss, poaching of wildlife, man- wildlife conflicts, endangered and endemic species of India.

c. Conservation of biodiversity is further split into in-situ and ex situ conservation of biodiversity.

4. Topics like genetic, species and ecosystem biodiversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values and biodiversity at global level and India as a mega-diversity nation have been excluded although they have been suggested by UGC.

**Table 4.6**

**Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-4**

| **Name of Unit** | **Topic** | | **Sub-topics** | | **Total no. of sub topics** |
|---|---|---|---|---|---|
| | **Si. no.** | **Name of topic** | **Si. no.** | **Name of sub-topic** | |
| Environmental pollution | 1 | Definition, causes, effects and control measures of: | 1 | a) Air pollution<br>b) Water pollution<br>c) Soil pollution | 3 |
| | 2 | Solid waste management: | 2 | Causes, effects and control measures of urban and industrial wastes | 2 |
| | 3 | Disaster management | 3 | Floods, earthquakes, cyclones and landslides | 4 |
| Total no. of topics | 3 | | Total no. of sub-topics | | 9 |

As shown by table 4.6 unit- 4 of the syllabus is concerned with environmental pollution which is one of the most dangerous ecological crises being faced by man nowadays. The topic lays emphasis on the need to protect and control environmental pollution that is occurring at a faster pace and to actively get involved or participate in managing environmental problems. It also instills in the learners an attitude and skills needed so as to live in harmony with our environment, which are in fact, some of the objectives of environment as suggested by Tbilisi Conference back in 1977. The unit also contains lessons that should enable learner to understand right and wrong actions for the environment which is a useful skill. The topic under study instill in the students an awareness and attitude towards reducing the emission of major source of pollution and enable them to take remedial action in those areas where pollution increased beyond the carrying capacity of the environment.

However, as found in the previous unit, this unit when compared with the contents suggested by UGC show that there has also been a drastic cut down in the contents. The table shows that:

1. The name of this unit is 'Environmental Pollution'. It consists of 3 topics namely: 1) pollution, 2) solid waste management, and 3) disaster management. On the other hand, the syllabus suggested by UGC has 5 topics.
2. The 3 topics are further sub divided as follows:

a. Pollution is sub divided into definition, causes, effects and control measures of air, water and soil pollutions.

b. Solid waste management is further sub divided into causes, effects and control measures of urban and industrial waste.

c. Disaster management is sub divided into floods, earth quakes, cyclones and landslides.

3. All the above topics are indeed directly relevant to the environmental condition of Mizoram. However, topics like marine pollution, noise pollution, thermal pollution, nuclear hazards and role of individual in prevention of pollution have been excluded along with case studies on pollution although they have been suggested by UGC. Although topics like marine pollution, noise pollution, thermal pollution, nuclear hazard may not be of immediate concern to the state at present, they are topics of international concern and students might gain an important insight into pollution by their addition.

**Table 4.7**

**Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-5**

| Name of Unit | Topic | | Sub- topics | | Total no. of sub topics |
|---|---|---|---|---|---|
| | Si. no. | Name of topic | Si. no. | Name of sub-topic | |
| Social issues, development and the environment | 1 | Sustainable development, carrying capacity of the environment | 1 | - | 1 |
| | 2 | Water conservation | 2 | Rain water harvesting, watershed management | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | 3 | Environmental movements, resettlement and rehabilitation of people; its problems and concerns | 3 | - | 1 |
| | 4 | Shifting cultivation and its impact, Wasteland reclamation | 4 | - | 1 |
| | 5 | Population growth; Population explosion | 5 | - | 1 |
| Total no. of topics | 5 | | Total no. of sub-topics | | 6 |

*Note: Those cases where the topic is not sub- divided into sub- topics are counted as one sub- topic*

Table 4.7 shows the contents of the syllabus under unit-5.The table revealed that:

1. This unit is entitled 'Social Issues, Development and the Environment'. It consists of 5 topics namely: 1) sustainable development, carrying capacity of the environment, 2) water conservation, 3) environmental movements, resettlement and rehabilitation of people: its problems and concerns, 4) shifting cultivation and its impact, wasteland reclamation, and 5) population growth: population explosion. On the other hand, the syllabus suggested by UGC has a total of 15 topics under the same unit.

2. The topics are not further sub divided except for water conservation which is sub divided into two namely: rain water harvesting and watershed management.
3. Unlike other units where topics have been excluded from the main UGC suggested content, an important topic, i.e., development has been wisely included although it has not been suggested by UGC.
4. Topics suggested by the UGC that have been excluded are namely: from unsustainable to sustainable development, urban problems related to energy, environmental ethics: issues and its possible solutions, case studies of climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
5. Many other topics like consumerism and waste products, environment and wildlife protection act, air and water(prevention and control of pollution) act, forest conservation act and the issues involved in enforcement of environmental legislation and awareness of the public have also been excluded in the syllabus contents for degree students of Mizoram.
6. Two sub topics such as carrying capacity of the environment and impact of shifting cultivation that were not included in the syllabus suggested by UGC has been added in the syllabus contents of degree students of Mizoram. This is a welcome addition and shows that the planners of the syllabus had put a lot of thought while they were formulating it. Besides these, topics like population growth and population explosions that were given in unit 7 of the syllabus suggested by UGC were added in this unit.

**Missing units**

The following units and activities (which are a part of the UGC suggested syllabus) are found to be missing from the syllabus for environmental education suggested for degree colleges of Mizoram under Mizoram University.

1. Multidisciplinary nature of environmental studies
2. Human population and the environment
3. Field work.

These three components, if added to the present syllabus would be a very welcome addition because they are the very topics through which many of the objectives of environmental education would be met.

### 4.2.0 Mode of Transaction of Environmental Education at College Level

**Table 4.8**

**Mode of Transaction of Environmental Education at College Level**

| **Number of Colleges** | **Colleges following MZU syllabus** | | **College using lecture method** | | **College using demonstration method** | | **College using project method** | | **College using fieldtrips** | |
|---|---|---|---|---|---|---|---|---|---|---|
| 26 | No | % | No | % | No | % | No | % | No | % |
| | 26 | 100% | 26 | 100% | 0 | 0 | 0 | 0 | 0 | 0 |

*Source: Field work*

A glimpse of the result as seen in table 4.8 revealed that the teaching methods adopted in all the colleges in Mizoram are the same throughout the state. From table 4.8 it was found that 100% of all the colleges in Mizoram used only lecture method for the teaching of environmental education. None of the colleges had adopted demonstration, project methods of teaching or fieldtrips for the study of environmental education. The table also revealed that all the colleges of Mizoram subscribed to the syllabus suggested by Mizoram University for environmental studies.

Although lecture method has a number of advantages and is the most economic form of transaction it is not adequate because it tends to be theoretical and environmental education is much more than theory. Other modes of transaction like demonstration, projects, and fieldtrips may also be much more beneficial. To create a healthy learning environment there is a need to conduct activity based learning to motivate students in the learning of environmental education. The mode of transaction does not meet expectations as environmental education deserves much more than classroom lecture for students to fully appreciate its importance. Lecturing method alone is not sufficient for the study of environmental education since environmental education need a much more illustrative mode of teaching. This indicates the need to conduct more activity based learning that might prove significant for the students for the study of environmental education as it will enhance and encourage students to actively participate and bring awareness of a variety of environmental concerns and working towards environmental conservation.

### 4.3.0 Evaluation Procedures of Environmental Education at College Level

As outlined by the affiliating university, i.e., Mizoram University, environmental education, called environmental tudies (EVS), belongs to one of the foundation courses. Foundation courses are courses based upon the content that should lead to enhancement of knowledge and man- making education. It is to be evaluated on the scale of 100. A continuous internal assessment also known as internal examination carrying 25 marks and an end- semester examination (written examination) carrying 75 marks are compulsory.

**Table 4.9**

**Evaluation Procedures of Environmental Education at College Level**

| **Number of Colleges** | **Number of colleges having written examination on environmental education for evaluation** | | **Number of colleges not having projects on environmental education** | | **Number of colleges having continuous internal assessment(written test)** | | **Number of colleges not having seminars** | |
|---|---|---|---|---|---|---|---|---|
| 26 | No | % | No | % | No | % | No | % |
| | 26 | 100% | 0 | 0 | 26 | 100% | 0 | 0 |

*Source: Field work*

The result seen in table 4.9 shows that 100% of all the colleges in Mizoram had written examination on environmental education for evaluation and there were no colleges that did not have written examination on environmental education. No project on environmental education was conducted by the colleges. None of the college did not conduct seminars on environmental education. However, internal examination is conducted by all the colleges. An evaluation procedure which is entirely based on the theoretical aspect of environmental education cannot do full justice to environmental education. Therefore some kind of revision in the evaluation procedure is in order.

### 4.4.0 To study the Profile of Teachers Teaching Environmental Education at College Level

**Table 4.10**

**Profile of Teachers Teaching Environmental Education in Colleges of Mizoram according to Gender**

| Gender | Number | Percentage |
|---|---|---|
| Male | 57 | 67.06% |
| Female | 28 | 32.94% |
| Total | 85 | 100% |

*Source: Field work*

Table 4.10 shows the profile of teachers teaching environmental education in colleges of Mizoram according to gender. The table indicates that 67.06 % of teachers were male while 32.94% of teachers were female teachers teaching environmental education in colleges of Mizoram. This is an unbalanced ratio with a large majority of

the teachers being male. Female teachers should be encouraged to teach environmental education as well.

As the affiliating university, i.e., Mizoram University is a recognized university of the University Grants Commission, teachers should also be recruited based on the qualifications outlined by the UGC. Accordingly, each teacher has to have completed a masters degree in the subject he/she is recruited for along with a certificate of NET (National Eligibility Test). In Mizoram, a teacher who has also qualified for SLET (State Level Eligibility Test) is also recruited within the state only.

**Table 4.11**

**Profile of Teachers Teaching Environmental Education in Colleges of Mizoram according to Educational Qualification**

| Educational qualification | No of teachers teaching environmental education in colleges in Mizoram | Percentage |
|---|---|---|
| M.A | 45 | 52.94% |
| M.Sc | 36 | 42.35% |
| M.Com | 4 | 4.71% |
| Ph.D | 13 | 15.29% |
| M.Phil | 4 | 4.71% |
| NET | 25 | 29.41% |
| SLET | 7 | 8.24% |

*Source: Field work*

Table 4.11 shows the qualification of teachers teaching environmental education in colleges of Mizoram. Since there is no particular qualification for teaching environmental education subject in colleges of Mizoram, teachers from different streams were appointed based on conveniences depending on the college.

Table 4.11 clearly shows that out of the total of 85 teachers teaching environmental education 52.94 % of the teachers have Masters of Arts (M.A) qualification with different subjects like geography, education , economics, history, english, mizo, political science . There were 42.35% of teachers who have a Masters degree in science (M.Sc) and 4.71% of teachers were from commerce background (M.Com).

Moreover out of all the 85 teachers teaching environmental education in colleges of Mizoram, 15.29 % of teachers have Ph. D degree and 4.71% of the teachers have an M. Phil degree.

The fact that teachers from different disciplines do not matter much as this subject is multidisciplinary in nature. However, only 29.41% of the teachers have qualified for NET (National eligibility test) and there were only 8.24% of the teachers who have qualified for SLET (State level eligibility test). This means that 62.35% of the teachers are without either NET or SLET qualification which is a rather dismal figure for a state with such a high level of literacy even at the national level.

**Table 4.12**

**Profile of Teachers Teaching Environmental Education in Colleges of Mizoram according to Employment Status**

| Employment status | | | |
|---|---|---|---|
| **Number of permanent teachers teaching environmental education** | **%** | **Number of temporary teachers teaching environmental education** | **%** |
| 55 | 64.71% | 30 | 35.29% |

*Source: Field study*

Table 4.12 shows the profile of teachers teaching environmental education in colleges of Mizoram according to their employment status. The table shows that while there were 64.71 % of permanent teachers, there were only 35.29 % of teachers who were working as temporary teachers. This may not affect the quality of environmental education too deeply, the fact that this subject is very much relegated as an additional subject with no special significance. As shown by the data collected, the teachers teaching this subject teach it as an extra subject besides their own course paper. In this regard, no special treatment can be expected of these teachers towards the subject. To add to this problem, environmental education, being a multidisciplinary subject, has its own topics which necessitates some experience in the field. Since majority of the teachers do not seem to have the required experience or background in environmental education, they take the teaching of environmental education as an extra burden. This does not bode well for the future of college students who are going to be the planners

of the state policies in a sort while. In an ideal situation, it would be beneficial for society to recruit teachers who have special training in environmental science.

**Table 4.13**

**Profile of Teachers Teaching Environmental Education in Colleges of Mizoram according to Teaching Experience**

| Teaching experience | Number of teachers | Percentage |
|---|---|---|
| Below 5 years | 12 | 14.12% |
| 5 - 9 years | 23 | 27.06% |
| 10 - 14 years | 26 | 30.59% |
| 15 - 19 years | 13 | 15.29% |
| 20 years and above | 11 | 12.94% |

*Source: Field study*

Table 4.13 shows the profile of teachers teaching environmental education in colleges of Mizoram according to their teaching experience. The table shows that out of all the 85 teachers teaching environmental education, 14.12 % of them have below 5 years teaching experience and 27.06 % of them have a teaching experience between 5-9 years. The highest percentages i.e. 30.59 % of teachers have a teaching experience between 10-14 years. 15.29% of teachers have a teaching experience between 15-19 years while only 12.94% of teachers teaching environmental education in colleges of Mizoram have a teaching experience of 20 years and above.

The teaching experience in this study is pertains to the teaching experience in general and not the teaching experience of the teachers in teaching environmental

education. Since environmental education was introduced all over India in 2003 by the UGC as per a supreme court order, it is a relatively young subject. The fact that the teachers of this subject have experiences ranging from less than five years to more than 20 years indicate that colleges will have different levels of awareness and attitude towards the environment. This is because teachers with more experience tend to have a better idea of the concept of teaching and may give a much more enriching experience based on their long expertise in the world of teaching. Colleges with teachers having less experience may not have a similarly enriching introduction to the subject. In this regard, it may be advisable to employ more innovative modes of teaching where two or more teachers may share their experiences in one class to make environmental education an enriching experience.

### 4.5.0 Time Devoted for Environmental Education in the College Time Table

The University has clearly outlined that environmental education requires 5 credits in a week. This means that this subject has to be given 5 hours in a week in a semester that has 18 weeks of academic work. Among the 26 degree colleges, only 9 colleges had periods with the duration of 1 hour and the rest had periods ranging from 45 minutes to 50 minutes. As such, among those colleges that did not have 1 hour periods, even 5 classes in a week did not amount to 5 credits.

**Table 4.14**

**Percentage of Environmental Education Classes in a Week**

| **Colleges having 5 credits in a week** | | **Colleges having 4 credits in a week** | |
|---|---|---|---|
| Number | % | Number | % |
| 17 | 65.38 % | 9 | 34.62 % |

*Source: Field study*

Table 4.14 shows the credits given to environmental education classes in a week. The table shows that among the 26 degree colleges in Mizoram:

1. 19.23 % of them gave 5 credits to environmental education classes in a week.
2. 15.40% of them gave 4 credits in a week to environmental education classes in a week.
3. It is noteworthy to mention that only 9 degree colleges, i.e., 34.61% of the degree colleges had periods of one hour duration. The rest of them i.e., 65.39 % had periods lasting from 45 to 50 minutes.

### 4.6.0 Attitude of College Students towards Environment

An attitude is a particular feeling about something. An attitude towards the environment means the behavior or concern or interest of the people towards the environment and its problems and development. In order to present the college students according to their attitude towards the environment, the mean and SD of all samples were calculated. In order to classify the sample students of 600, as high positive, moderate positive and low positive mean +/- 1 SD was applied. It was decided that those students who had a standard deviation of more than +1σwould be

considered as having high positive attitude towards the environment. On the other hand, those students who had less than -1σ from the mean would be considered as having low positive attitude towards the environment. Those students who scored in between +1 σ and -1σ would be considered as having moderate positive attitude towards the environment. With respect to the attitude of college students towards the environment, the number and percentage in their attitude towards the environment was thus calculated and is presented in the following table 4.15.

Attitude score ranged from 146-206 with mean of 176 and standard deviation of 11.35. The minimum possible score was 61 and the maximum possible score was 224. Thus it indicates that all the college students had favorable attitude towards the environment. The distribution is given in table 4.15 below.

**Table 4.15**

**Classification of Students on their Attitude towards the Environment**

| **Respondents** | **Low positive attitude** | **Moderate positive attitude** | **High positive attitude** |
|---|---|---|---|
| All samples (N=600) | 101 (16.83%) | 395 (65.83%) | 104 (17.33%) |

The above table 4.15 shows that while 65.83% of college students have a moderate positive attitude towards the environment only 16.83% of college students have a low positive attitude towards the environment while the other 17.33% of college students have a high positive attitude towards the environment. It may also be

interpreted that college students already have a healthy attitude towards the environment and only need more in depth knowledge about it so that they can apply it in their everyday lives. This can be possible through a sound teaching of environmental education.

*Attitude of students towards the environment in the colleges of Mizoram are again classified under different dimensions and are presented in the following tables as follows:*

**Table 4.16**

**Classification of Students on their Attitude towards the Environment in the Area of Health and Hygiene**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 15.68 | 2.00 | 80 (13.33%) | 419(69.84%) | 101(16.83%) |

Table 4.16 shows that while majority 69.84 % of college students have a moderate positive attitude towards the environment in the area of health and hygiene only 16.83% of college students have a high positive attitude towards the environment in the area of health and hygiene while the other 13.33% of college students have a low positive attitude towards the environment in the area of health and hygiene.

**Table 4.17**

**Classification of Students on their Attitude towards the Environment in the Area of Wildlife**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 18.04 | 2.68 | 92(15.33%) | 401(66.83%) | 107(17.83%) |

A look at table 4.17 reveals that while 66.83 % of college students have a moderate positive attitude towards the environment in the area of wildlife only 17.83% of college students have a high positive attitude towards the environment in the area of wildlife while the other 15.33% of college students have a low positive attitude towards the environment in the area of wildlife.

**Table 4.18**

**Classification of Students on their Attitude towards the Environment in the Area of Forests**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 13.41 | 167 | 64 (10.66%) | 491 (81.84%) | 45 (7.5%) |

An analysis of table 4.18 shows that 81.84 % of college students have a moderate positive attitude towards the environment in the area of forests. There were 7.5 % of college students who have a high positive attitude towards the environment

in the area of forests while there were 10.66 % of college students who have a low positive attitude towards the environment in the area of forests.

**Table 4.19**

**Classification of Students on their Attitude towards the Environment in the Area of Polluters**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 71.05 | 572 | 90 (15%) | 409 (68.17%) | 101 (16.83%) |

As seen in table 4.19, 68.17 % of college students have a moderate positive attitude towards the environment in the area of polluters. There were 16.83 % of college students who have a high positive attitude towards the environment in the area of polluters while the other 15 % of college students have a low positive attitude towards the environment in the area of polluters.

**Table 4.20**

**Classification of Students on their Attitude towards the Environment in the Area of Population Explosion**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 13.57 | 2.00 | 80 (13.33%) | 428 (71.33%) | 92 (15.33%) |

An analysis of table 4.20 shows that 71.33% of college students have a moderate positive attitude towards the environment in the area of population explosion. There were 15.33 % of college students who have a high positive attitude towards the environment in the area of population explosion while the other 13.33 % of college students have a low positive attitude towards the environment in the area of population explosion.

**Table 4.21**

**Classification of Students on their Attitude towards the Environment in the Area of Environmental Concern**

| Respondents | Mean | SD | Low positive attitude | Moderate positive attitude | High positive attitude |
|---|---|---|---|---|---|
| All samples (N=600) | 44.17 | 4.17 | 114 (19 %) | 384 (64 %) | 102 (17 %) |

An analysis of table 4.21 shows that 64% of college students have a moderate positive attitude towards the environment in the area of environmental concern. There were 17 % of college students who have a high positive attitude towards the environment in the area of environmental concern, while the other 19 % of college students have a low positive attitude towards the environment in the area of environmental concern.

### 4.7.0 Attitude of Male and Female Students towards the Environment in the Colleges of Mizoram

Hypothesis No.1 states that there is no significant difference in the attitude of male and female college students towards the environment. Table 4.22 shows the difference in the attitude of male and female college students towards the environment.

**Table 4.22**

**Difference in the Attitude of Male and Female College Students towards the Environment**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 174.9 | 3.04 | 0.26 | 8.84 | 0.05 | 0.01 |
| Female | 300 | 177.2 | 3.5 | | | Significant | Significant |

A look at table 4.22 reveals that the t value for the significance of difference between the attitude of male and female college students towards the environment is 8.84.Since the calculated t value is greater than the critical t value at 0.05 and 0.01 levels of significance it can be concluded that there is a significant difference between the attitude of male and female college students towards the environment. Therefore, the null hypothesis (No.1) that assumes there is no significant difference in the attitude of male and female college students towards the environment is rejected since there exist a significant difference at 0.05 and 0.01 levels of significance. A comparison of their mean score shows that this difference is in favor of female college students as their mean score is higher than the mean score of male college

students. The result indicates that female college students have a more favorable attitude towards the environment when compared with male college students.

*The difference in attitude towards the environment was also compared between male and female students of different streams as follows:*

### 4.7.1 Difference in the attitude of male and female college students of arts stream towards the environment.

Hypothesis No.2 states that there is no significant difference in the attitude of male and female college students of arts stream towards the environment. Table 4. 23 shows the difference in the attitude of male and female college students of arts stream towards the environment.

**Table 4.23**

**Difference in the Attitude of Male and Female Students of Arts Stream towards the Environment**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 174.22 | 10.69 | 0.56 | 0.38 | 0.05 | 0.01 |
| | Female | 100 | 174.78 | 9.97 | | | NS | NS |

From table 4.23 the ‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment is 0.38.Since the calculated ‘t’ value of which is 0.38 is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female students of arts stream with regards to their attitude towards the environment. Therefore the null hypothesis (No.2) which assumes there is no

significant difference in the attitude of male and female students of arts stream towards the environment is accepted. A comparison of their mean score shows that although there is no significant difference between male and female arts students with regards to their attitude towards the environment female students have a slightly higher mean score in their attitude towards the environment than male students of arts stream.

### 4.7.2 Difference in the Attitude of Male and Female Students of Commerce Stream towards the Environment

Hypothesis No. 3 states that there is no significant difference in the attitude of male and female students of commerce stream towards the environment. Table 4.24 shows the difference in the attitude of male and female college students of commerce stream towards the environment.

**Table 4.24**

**Difference in the Attitude of Male and Female Students of Commerce Stream towards the Environment**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 176.56 | 11.56 | 1.75 | 1.13 | 0.05 | 0.01 |
| | Female | 100 | 178.31 | 10.13 | | | NS | NS |

As seen in table 4.24 the‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment is 1.13.Since the calculated t value of which is 1.13 is less than the critical‘t’ value at 0.05 and 0.01

levels of significance, it can be concluded that there is no significant difference in the attitude of male and female students of commerce stream with regards to their attitude towards the environment. Therefore the null hypothesis (No.3) which assumes there is no significant difference in the attitude of male and female students of commerce stream towards the environment is accepted. A comparison of their mean score shows that although there is no significant difference between male and female commerce students with regards to their attitude towards the environment female students have a higher mean score in their attitude towards the environment than male students of commerce stream.

### 4.7.3 Difference in the Attitude of Male and Female Students of Science Stream towards the Environment

Hypothesis No. 4 states that there is no significant difference in the attitude of male and female students of science stream towards the environment. Table 4.25 shows the difference in the attitude of male and female college students of science stream towards the environment.

**Table 4.25**

**Difference in the Attitude of Male and Female Students of Science Stream towards the Environment**

| Stream | Gender | No. | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 173.89 | 17.73 | 4.29 | 2.50 | 0.05 | 0.01 |
| | Female | 100 | 178.18 | 11.49 | | | Significant | NS |

An analysis of table no 4.25 reveals that the 't' value for the significance of difference in the attitude of male and female science students towards the environment is 2.50. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female students of science stream with regards to their attitude towards the environment. Therefore the null hypothesis (No.4) which assumes there is no significant difference in the attitude of male and female students of science stream towards the environment is rejected. A comparison of their mean score shows that this difference is in favor of female college students of science stream as their mean score is higher than the mean score of male college students of science stream. The result indicates that female students of science stream have a more favorable attitude towards the environment when compared with male students of science stream.

*Difference in attitude among male and female college students towards the environment under different dimensions was further compared as follows*:

### 4.7.4 Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Health and Hygiene

Hypothesis No.5 states that there is no significant difference in the attitude of male and female college students towards the environment in the area of health and hygiene. Table 4.26 shows the difference in the attitude of male and female college students towards the environment in the area of health and hygiene**.**

**Table4.26**

**Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Health and Hygiene**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 15.49 | 2.07 | 0.37 | 2.31 | 0.05 | 0.01 |
| Female | 300 | 15.86 | 1.92 | | | Significant | NS |

A look at table 4.26 reveals that the‘t’ value for the significance of difference in the attitude of male and female college students towards the environment in the area of health and hygiene is 2.31. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female college students with regards to their attitude towards the environment in the area of health and hygiene. Therefore the null hypothesis (No.5) which assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of health and hygiene is rejected. A comparison of their mean score shows that this difference is in favor of female college students as their mean score is higher than the mean score of male college students. The result indicates that female college students have a more favorable attitude towards the environment in the area of health and hygiene when compared with male college students.

### 4.7.5 Difference in the Attitude of Male and Female College Students towards the Environment in the area of Wildlife

Hypothesis No.6 states that there is no significant difference in the attitude of male and female college students towards the environment in the area of wildlife. Table 4.27 shows the difference in the attitude of male and female college students towards the environment in the area of wildlife.

**Table 4.27**

**Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Wildlife**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 17.58 | 2.77 | 0.92 | 4.15 | 0.05 | 0.01 |
| Female | 300 | 18.5 | 2.51 | | | Significant | Significant |

A closer look at table 4.27 reveals that the‘t’ value for the significance of difference in the attitude of male and female college students towards the environment in the area of wildlife is 4.15. Since the calculated t value is greater than the critical t value at 0.05 and 0.01 levels of significance, it can be concluded that there is a significant difference in the attitude of male and female college students with regards to their attitude towards the environment in the area of wildlife. Therefore the null hypothesis (No.6) which assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of wildlife is rejected. A comparison of their mean score shows that this difference is in favor of

female college students as their mean score is higher than the mean score of male college students. The result signifies that female college students have a more favorable attitude towards the environment in the area of wildlife when compared with male college students.

### 4.7.6 Difference in the Attitude of Male and Female College towards the Environment in the Area of Forests

Hypothesis No.7 states that there is no significant difference in the attitude of male and female college students towards the environment in the area of forests. Table 4.28 shows the difference in the attitude of male and female college students towards the environment in the area of forests.

**Table 4.28**

**Difference in the Attitude of Male and Female College towards the Environment in the Area of Forests**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 13.30 | 1.60 | 0.23 | 1.82 | 0.05 | 0.01 |
| Female | 300 | 13.53 | 1.73 | | | NS | NS |

An analysis of the result vide table no 4.28 reveals that the‘t’ value for the significance of difference in the attitude of male and female students towards the environment in the area of forests is 1.82.Since the calculated ‘t’value is lower than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female college students

with regards to their attitude towards the environment in the area of forests. Therefore the null hypothesis (No.7) which assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of forests is accepted. A comparison of their mean score shows that although there is no significant difference between male and female college students with regards to their attitude towards the environment in the area of forests female students have a slightly higher mean score in their attitude towards the environment in the area of forests than male college students.

### 4.7.7 Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Polluters

Hypothesis No. 8 stated that there is no significant difference in the attitude of male and female college students towards the environment in the area of polluters. Table 4.29 shows the difference in the attitude of male and female college students towards the environment in the area of polluters.

**Table 4.29**

**Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Polluters**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 70.79 | 5.73 | 0.52 | 1.09 | 0.05 | 0.01 |
| Female | 300 | 71.31 | 5.70 | | | NS | NS |

As seen on table 4.29 the‘t’ value for the significance of difference in the attitude of male and female students towards the environment in the area of polluters is 1.09. Since the calculated’value is lower than the critical ‘t’ value at 0.05 and 0.01

levels of significance, it can be concluded that there is no significant difference in the attitude of male and female college students with regards to their attitude towards the environment in the area of polluters. Therefore the null hypothesis (No.8) that assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of polluters is accepted. A comparison of their mean score shows that although there is no significant difference between male and female college students with regards to their attitude towards the environment in the area of polluters female students have a slightly higher mean score in their attitude towards the environment in the area of polluters than male college students.

### 4.7.8 Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Population Explosion

Hypothesis No. 9 stated that there is no significant difference in the attitude of male and female college students towards the environment in the area of population explosion. Table 4.30 shows the difference in the attitude of male and female college students towards the environment in the area of population explosion.

**Table 4.30**

**Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Population Explosion**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 13.72 | 1.99 | 0.29 | 1.74 | 0.05 | 0.01 |
| Female | 300 | 13.43 | 2.01 | | | NS | NS |

Table 4.30 shows that the ‘t’ value for the significance of difference in the attitude of male and female students towards the environment in the area of population explosion is 1.74. Since the calculated ‘t’ value is lower than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female college students with regards to their attitude towards the environment in the area of population explosion . Therefore the null hypothesis (No.9) that assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of population explosion is accepted. A comparison of their mean score shows that although there is no significant difference between male and female college students with regards to their attitude towards the environment in the area of population explosion, male college students have a slightly higher mean score in their attitude towards the environment in the area of population explosion than female college students.

### 4.7.9 Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Environmental Concern

Hypothesis No.10 states that there is no significant difference in the attitude of male and female college students towards the environment in the area of environmental concern. Table 4.31 shows the difference in the attitude of male and female college students towards the environment in the area of environmental concern.

**Table 4.31**

**Difference in the Attitude of Male and Female College Students towards the Environment in the Area of Environmental Concern**

| Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Male | 300 | 43.98 | 4.12 | 0.39 | 1.15 | 0.05 | 0.01 |
| Female | 300 | 44.37 | 4.21 | | | NS | NS |

Table 4.31 shows that the 't' value for the significance of difference in the attitude of male and female students towards the environment in the area of environmental concern is 1.15. Since the calculated 't'value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female college students with regards to their attitude towards the environment in the area of environmental concern. Therefore the null hypothesis (No.10) that assumes there is no significant difference in the attitude of male and female college students towards the environment in the area of environmental concern is accepted. However a comparison of their mean score shows that although the findings is not significant female college students have a slightly higher mean score in their attitude towards the environment in the area of environmental concern than male college students.

*Comparison between male and female students within different streams of study was also done on the 6 dimensions of environmental attitude and results are as follows:*

*Difference in the attitude of male and female students of science stream towards the environment under different dimensions are as follows:*

### 4.7.10 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Health and Hygiene

Hypothesis No.11 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of health and hygiene. Table 4.32 shows the difference in the attitude of male and female science students towards the environment in the area of health and hygiene.

**Table 4.32**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Health and Hygiene**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 15.51 | 2.29 | 0.57 | 1.92 | 0.05 | 0.01 |
| | Female | 100 | 16.08 | 1.86 | | | NS | NS |

Table 4.32 shows that the 't' value for the significance of difference in the attitude of male and female science students towards the environment in the area of health and hygiene is 1.92. Since the calculated 't'value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female science students with regards to their attitude towards the environment in the area of health and hygiene. Therefore the null hypothesis (No.11) that assumes there is no significant difference in the attitude of male and female science students towards the environment in the

area of health and hygiene is accepted. However a comparison of their mean score shows although the findings is not significant, female science students have a higher mean score in their attitude towards the environment in the area of health and hygiene than male science students.

### 4.7.11 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Wildlife

Hypothesis No.12 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of wildlife. Table 4.33 shows the difference in the attitude of male and female science students towards the environment in the area of wildlife.

**Table 4.33**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Wildlife**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 17.35 | 2.72 | 0.77 | 2.00 | 0.05 | 0.01 |
| | Female | 100 | 18.12 | 2.47 | | | Significant | NS |

A look at table 4.33 reveals that the‘t’ value for the significance of difference in the attitude of male and female science students towards the environment in the area of wildlife is 2.00. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female students of science stream with regards to their attitude towards the environment in the area of wildlife. Therefore the null hypothesis (No.12) which assumes there is no significant difference in the attitude of male and

female students of science stream towards the environment in the area of wildlife is rejected. A comparison of their mean score shows that this difference is in favor of female students as their mean score is higher than the mean score of male students The result indicates that female students of science stream have a more favorable attitude towards the environment in the area of wildlife when compared with male students of science stream.

### 4.7.12 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Forests

Hypothesis No.13 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of forests. Table 4.34 shows the difference in the attitude of male and female science students towards the environment in the area of forests.

**Table 4.34**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Forests**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 13.4 | 1.81 | 0.27 | 1.06 | 0.05 | 0.01 |
| | Female | 100 | 13.67 | 1.63 | | | NS | NS |

Table 4.34 shows that the ‘t’ value for the significance of difference in the attitude of male and female science students towards the environment in the area of forests is 1.06. Since the calculated ‘t’ value is less than the critical ‘t’ value at 0.05

and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female science students with regards to their attitude towards the environment in the area of forests. Therefore the null hypothesis (No.13) that assumes there is no significant difference in the attitude of male and female science students towards the environment in the area of forests is accepted. However a comparison of their mean score shows although the findings is not significant, female students of science stream have a slightly higher mean score in their attitude towards the environment in the area of forests than male students of science stream.

### 4.7.13 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Polluters

Hypothesis No.14 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of polluters. Table 4.35 shows the difference in the attitude of male and female science students towards the environment in the area of polluters.

**Table 4.35**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Polluters**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 69.46 | 5.97 | 2.34 | 2.83 | 0.05 | 0.01 |
| | Female | 100 | 71.8 | 5.75 | | | Significant | significant |

A closer look at table 4.35 reveals that the‘t’ value for the significance of difference in the attitude of male and female science students towards the environment in the area of polluters is 2.83. Since the calculated t value is greater than the critical t value at 0.05 and 0.01 levels of significance, it can be concluded that there is a significant difference in the attitude of male and female students of science stream with regards to their attitude towards the environment in the area of polluters. Therefore the null hypothesis (No.14) which assumes there is no significant difference in the attitude of male and female students of science stream towards the environment in the area of polluters is rejected. A comparison of their mean score shows that this difference is in favor of female science students as their mean score is higher than the mean score of male students of science stream. The result signifies that female students of science stream have a more favorable attitude towards the environment in the area of polluters when compared with male students of science stream.

### 4.7.14 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Population Explosion

Hypothesis No.15 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of population explosion. Table 4.36 shows the difference in the attitude of male and female science students towards the environment in the area of population explosion.

**Table 4.36**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Population Explosion**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 13.93 | 2.11 | 1.6 | 1.29 | 0.05 | 0.01 |
| | Female | 100 | 15.53 | 1.86 | | | NS | NS |

Table 4.36 shows that the 't' value for the significance of difference in the attitude of male and female science students towards the environment in the area of population explosion is 1.29. Since the calculated 't'value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female science students with regards to their attitude towards the environment in the area of population explosion . Therefore the null hypothesis (No.14) that assumes there is no significant difference in the attitude of male and female science students towards the environment in the area of population explosion is accepted. However a comparison of their mean score shows although the findings is not significant, female science students have a higher mean score in their attitude towards the environment in the area of population explosion than male students of science stream.

### 4.7.15 Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Environmental Concern

Hypothesis No.16 states that there is no significant difference in the attitude of male and female science students towards the environment in the area of environmental

concern. Table 4.37 shows the difference in the attitude of male and female science students towards the environment in the area of environmental concern.

**Table 4.37**

**Difference in the Attitude of Male and Female Science Students towards the Environment in the Area of Environmental Concern**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Science | Male | 100 | 44.34 | 4.17 | 0.55 | 1.05 | 0.05 | 0.01 |
| | Female | 100 | 44.89 | 3.77 | | | NS | NS |

An analysis of table 4.37 shows that the‘t’ value for the significance of difference in the attitude of male and female science students towards the environment in the area of environmental concern is 1.05. Since the calculated ‘t’value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female science students with regards to their attitude towards the environment in the area of environmental concern. Therefore the null hypothesis (No.16) that assumes there is no significant difference in the attitude of male and female science students towards the environment in the area of environmental concern is accepted. However a comparison of their mean score shows that although the findings is not significant, female science students have a higher mean score in their attitude towards the environment in the area of environmental concern than male students of science stream.

*Difference in the attitude of male and female students of arts stream towards the environment under different dimensions are as follows:*

### 4.7.16 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Health and Hygiene

Hypothesis No.17 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of health and hygiene. Table 4.38 shows the difference in the attitude of male and female arts students towards the environment in the area of health and hygiene.

**Table 4.38**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Health and Hygiene**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 15.49 | 1.92 | 0.08 | 0.39 | 0.05 | 0.01 |
| | Female | 100 | 15.57 | 2.09 | | | NS | NS |

An analysis of table 4.38 shows that the‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment in the area of health and hygiene is 0.39. Since the calculated ‘t’value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of health and hygiene. Therefore the null hypothesis (No.17) that assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of health and hygiene is accepted. However a comparison of their mean score shows that although there is no significant difference between male and female arts students in their attitude towards the environment in the area of health and hygiene, female arts

students have a higher mean score in their attitude towards the environment in the area of health and hygiene than male students of arts stream.

### 4.7.17 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Wildlife

Hypothesis No.18 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of wildlife. Table 4.39 shows the difference in the attitude of male and female arts students towards the environment in the area of wildlife.

**Table 4.39**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Wildlife**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 17.54 | 2.70 | 0.97 | 2.48 | 0.05 | 0.01 |
| | Female | 100 | 18.51 | 2.59 | | | Significant | NS |

A closer look at table 4.39 reveals that the‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment in the area of wildlife is 2.48. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of wildlife. Therefore the null hypothesis (No.18) which assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of wildlife is rejected. A comparison

of their mean score shows that this difference is in favor of female arts students as their mean score is higher than the mean score of male arts students. The result signifies that female students of arts stream have a more favorable attitude towards the environment in the area of wildlife when compared with male students of arts stream.

### 4.7.18 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Forests

Hypothesis No.19 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of forests. Table 4.40 shows the difference in the attitude of male and female arts students towards the environment in the area of forests.

**Table 4.40**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Forests**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 13.22 | 1.58 | 0.07 | 0.53 | 0.05 | 0.01 |
| | Female | 100 | 13.29 | 1.65 | | | NS | NS |

An analysis of table 4.40 shows that the‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment in the area of forests is 0.53. Since the calculated ‘t’value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of forests. Therefore the null

hypothesis (No.19) that assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of forests is accepted. However a comparison of their mean score shows that although there is no significant difference between male and female arts students in their attitude towards the environment in the area of forests, female arts students have a higher mean score in their attitude towards the environment in the area of forests than male students of arts stream.

### 4.7.19 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of polluters

Hypothesis No. 20 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of polluters. Table 4.41 shows the difference in the attitude of male and female arts students towards the environment in the area of polluters.

**Table 4.41**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of polluters**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 70.72 | 4.97 | 0.01 | 0.05 | 0.05 | 0.01 |
| | Female | 100 | 70.71 | 5.65 | | | NS | NS |

An analysis of table 4.41 shows that the‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment in the area of polluters is 0.05. Since the calculated‘t’ value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no

significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of polluters. Therefore, the null hypothesis (No.20) that assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of polluters is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female arts students in their attitude towards the environment in the area of polluters, male arts students have a slightly higher mean score in their attitude towards the environment in the area of polluters than female students of arts stream.

### 4.7.20 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Population Explosion

Hypothesis No.21 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of population explosion. Table 4.42 shows the difference in the attitude of male and female arts students towards the environment in the area of population explosion.

**Table 4.42**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Population Explosion**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 13.87 | 1.87 | 0.61 | 2.13 | 0.05 | 0.01 |
| | Female | 100 | 13.26 | 2.20 | | | Significant | NS |

A closer look at table 4.42 reveals that the‘t’ value for the significance of difference in the attitude of male and female arts students towards the environment in the area of population explosion is 2.13. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of population explosion .Therefore the null hypothesis (No.21) which assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of population explosion is rejected. A comparison of their mean score shows that this difference is in favor of male students of arts stream as their mean score is higher than the mean score of female students of arts stream. The result signifies that male students of arts stream have a more favorable attitude towards the environment in the area of population explosion when compared with female students of arts stream.

### 4.7.21 Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Environmental Concern

Hypothesis 22 states that there is no significant difference in the attitude of male and female arts students towards the environment in the area of environmental concern. Table 4.43 shows the difference in the attitude of male and female arts students towards the environment in the area of environmental concern.

**Table 4.43**

**Difference in the Attitude of Male and Female Arts Students towards the Environment in the Area of Environmental Concern**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Arts | Male | 100 | 43.41 | 3.81 | 0.07 | 0.11 | 0.05 | 0.01 |
| | Female | 100 | 43.34 | 3.82 | | | NS | NS |

An analysis of table 4.43 shows that the 't' value for the significance of difference in the attitude of male and female arts students towards the environment in the area of environmental concern is 0.11.Since the calculated 't'value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female arts students with regards to their attitude towards the environment in the area of environmental concern. Therefore, the null hypothesis (No.22) that assumes there is no significant difference in the attitude of male and female arts students towards the environment in the area of environmental concern is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female arts students in their attitude towards the environment in the area of environmental concern, male students of arts stream have a higher mean score in their attitude towards the environment in the area of environmental concern than female students of arts stream.

*Difference in the attitude of male and female students of commerce stream towards the environment under different dimensions are as follows:*

### 4.7.22 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Health and Hygiene

Hypothesis No. 23 stated that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene. Table 4.44 shows the difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene.

**Table 4.44**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Health and Hygiene**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 15.49 | 2.01 | 0.4 | 1.62 | 0.05 | 0.01 |
| | Female | 100 | 15.94 | 1.78 | 5 | | NS | NS |

Table 4.44 shows that the 't' value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene is 1.62.Since the calculated 't' value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female commerce students with regards to their attitude towards the environment in the area of health and hygiene. Therefore, the null hypothesis (No.23) that assumes there is no significant difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female commerce students in their attitude towards the environment in the area of health and

hygiene, female students of commerce stream have a higher mean score in their attitude towards the environment in the area of health and hygiene than male students of commerce stream.

### 4.7.23 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Wildlife

Hypothesis No. 24 stated that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of wildlife. Table 4.45 shows the difference in the attitude of male and female commerce students towards the environment in the area of wildlife.

**Table 4.45**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Wildlife**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 17.87 | 2.90 | 0.3 | 2.55 | 0.05 | 0.01 |
| | Female | 100 | 18.87 | 2.44 | 5 | | Signifi cant | signifi cant |

A closer look at table 4.45 reveals that the‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of wildlife is 2.55. Since the calculated t value is greater than the critical t value at 0.05 level of significance, it can be concluded that there is a significant difference in the attitude of male and female commerce students with regards to their attitude towards the environment in the area of wildlife. Therefore the null hypothesis (No.24) which assumes there is no significant difference in the

attitude of male and female commerce students towards the environment in the area of wildlife is rejected. A comparison of their mean score shows that this difference is in favor of female commerce students as their mean score is higher than the mean score of male commerce students. The result signifies that female students of commerce stream have a more favorable attitude towards the environment in the area of wildlife when compared with male students of commerce stream.

### 4.7.24 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Forests

Hypothesis No. 25 stated that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of forests. Table 4.46 shows the difference in the attitude of male and female commerce students towards the environment in the area of forests.

**Table 4.46**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Forests**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 13.29 | 1.40 | 0.35 | 1.50 | 0.05 | 0.01 |
| | Female | 100 | 13.64 | 1.88 | | | NS | NS |

Table 4.46 shows that the‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of forests is 1.50. Since the calculated‘t’ value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female commerce students with regards to their

attitude towards the environment in the area of forests. Therefore, the null hypothesis (No.25) that assumes there is no significant difference in the attitude of male and female commerce students towards the environment in the area of forests is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female commerce students in their attitude towards the environment in the area of forests female students of commerce stream have a higher mean score in their attitude towards the environment in the area of forests than male students of commerce stream.

### 4.7.25 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Polluters

Hypothesis No. 26 stated that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of polluters. Table 4.47 shows the difference in the attitude of male and female commerce students towards the environment in the area of polluters.

**Table 4.47**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Polluters**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 72.19 | 5.93 | 0.77 | 0.88 | 0.05 | 0.01 |
| | Female | 100 | 71.42 | 5.70 | | | NS | NS |

A look at table 4.47 shows that the ‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of polluters is 0.88. Since the calculated ‘t’ value is less than the critical ‘t’ value

at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female commerce students with regards to their attitude towards the environment in the area of polluters. Therefore, the null hypothesis (No.26) that assumes there is no significant difference in the attitude of male and female commerce students towards the environment in the area of polluters is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female commerce students in their attitude towards the environment in the area of polluters female students of commerce stream have a higher mean score in their attitude towards the environment in the area of polluters than male students of commerce stream.

### 4.7.26 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Population Explosion

Hypothesis No. 27 stated that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of population explosion. Table 4.48 shows the difference in the attitude of male and female commerce students towards the environment in the area of population explosion.

**Table 4.48**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Population Explosion**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 13.36 | 1.94 | 0.1 | 0.36 | 0.05 | 0.01 |
| | Female | 100 | 13.46 | 1.96 | | | NS | NS |

Table 4.48 shows that the‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of population explosion is 0.36. Since the calculated‘t’ value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female commerce students with regards to their attitude towards the environment in the area of population explosion. Therefore, the null hypothesis (No.27) that assumes there is no significant difference in the attitude of male and female commerce students towards the environment in the area of population explosion is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female commerce students in their attitude towards the environment in the area of population explosion, female students of commerce stream have a higher mean score in their attitude towards the environment in the area of population explosion than male students of commerce stream.

### 4.7.27 Difference in the Attitude of Male and Female Commerce Students towards the Environment in the area of Environmental concern

Hypothesis No. 28 states that there is no significant difference in the attitude of male and female commerce students towards the environment in the area of environmental concern. Table 4.49 shows the difference in the attitude of male and female commerce students towards the environment in the area of environmental concern.

**Table 4.49**

**Difference in the Attitude of Male and Female Commerce Students towards the Environment in the Area of Environmental Concern**

| Stream | Gender | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|---|
| Commerce | Male | 100 | 44.19 | 4.34 | 0.69 | 1.11 | 0.05 | 0.01 |
| | Female | 100 | 44.88 | 4.82 | | | NS | NS |

Table 4.49 shows that the‘t’ value for the significance of difference in the attitude of male and female commerce students towards the environment in the area of environmental concern is 1.11. Since the calculated‘t’ value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of male and female commerce students with regards to their attitude towards the environment in the area of environmental concern. Therefore, the null hypothesis (No.28) that assumes there is no significant difference in the attitude of male and female commerce students towards the environment in the area of environmental concern is accepted. However, a comparison of their mean score shows that although there is no significant difference between male and female commerce students in their attitude towards the environment in the area of environmental concern, female students of commerce stream have a higher mean score in their attitude towards the environment in the area of environmental concern than male students of commerce stream.

*The difference in the attitude of college students from the three streams of study i.e., science, arts and commerce were compared by ANOVA as follows:*

### 4.8.0 Difference in the Attitude among Students from Different Streams towards the Environment

Hypothesis No. 29 states that there is no significant difference in the attitude of science, arts and commerce students towards the environment in the colleges of Mizoram. Table 4.50 shows the attitude of science, arts and commerce students towards the environment.

**Table 4.50**

**Difference in the Attitude of Students from Science, Arts and Commerce Streams towards the Environment in the Colleges of Mizoram**

| Source of variation | SS | Df | MS | f calculated | f critical | Significance |
|---|---|---|---|---|---|---|
| Between groups | 862.03 | 2 | 431.015 | 3.438862 | 3.010815 | Significant |
| Within groups | 74825.91 | 597 | 125.3365 | | | |
| Total | 75687.94 | 599 | | | | |

As found in the table 4.50 the calculated f value is greater than the critical f value, the hypothesis stating that 'there is no significant difference in the attitude of science, arts and commerce students towards the environment in the colleges of Mizoram' has to be rejected and it can be concluded that there is a significant difference between the three streams of study i.e., science, arts and commerce.

*The above interpretation was based on calculations of analysis of variance among the three streams (ANOVA). Since there is no evidence of the reason of the variance among these three streams, a t-test was employed between two streams each so as to calculate the variance between the different streams. Accordingly, separate hypotheses were also framed between the streams as shown in tables 4.51, 4.52 and 4.53 as follows:*

### 4.8.1 Difference in the Attitude of Students from Arts and Science Streams towards the Environment

Hypothesis No. 30 states that there is no significant difference between arts and science students in their attitude towards the environment in the colleges of Mizoram. Table 4.51 shows the difference in the attitude of students from arts and science stream towards the environment.

**Table 4.51**

**Difference in the Attitude of Students from Arts and Science Streams towards the Environment**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Arts | 200 | 174.5 | 10.32 | 1.53 | 1.35 | 0.05 | 0.01 |
| Science | 200 | 176.03 | 12.29 | | | NS | NS |

Table 4.51 shows that the 't' value for the significance of difference in the attitude of arts and science students towards the environment is 1.35. Since the calculated 't' value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude

of students from arts and science stream with regards to their attitude towards the environment Therefore, the null hypothesis (No.30) that assumes there is no significant difference in the attitude of arts and science students towards the environment is accepted. However, a comparison of their mean score shows that although there is no significant difference between arts and science students in their attitude towards the environment science students have a higher mean score in their attitude towards the environment than arts students.

### 4.8.2 Difference in the Attitude of Students from Science and Commerce Streams towards the Environment

Hypothesis No. 31 states that there is no significant difference between science and commerce students in their attitude towards the environment in the colleges of Mizoram. Table 4.52 shows the difference in the attitude of students from science and commerce stream towards the environment

**Table 4.52**

**Difference in the Attitude of Students from Science and Commerce Streams towards the Environment**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Science | 200 | 176.03 | 12.29 | 1.4 | 1.20 | 0.05 | 0.01 |
| Commerce | 200 | 177.43 | 10.88 | | | NS | NS |

Table 4.52 shows that the ‘t’ value for the significance of difference in the attitude of science and commerce students towards the environment is 1.20. Since the

calculated ‘t’ value is less than the critical ‘t’ value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference in the attitude of students from science and commerce stream with regards to their attitude towards the environment. Therefore, the null hypothesis (No.31) that assumes there is no significant difference in the attitude of science and commerce students towards the environment is accepted. However, a comparison of their mean score shows that although there is no significant difference between science and commerce students in their attitude towards the environment students from commerce stream have a higher mean score in their attitude towards the environment than students from science stream.

### 4.8.3 Difference in the Attitude of Students from Commerce and Arts Streams towards the Environment

Hypothesis No. 32 states that there is significant difference between commerce and arts students in their attitude towards the environment in the colleges of Mizoram. Table 4.53 shows the difference in the attitude of students from commerce and arts stream towards the environment.

**Table 4.53**

**Difference in the Attitude of Students from Commerce and Arts Streams towards the Environment**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Commerce | 200 | 177.43 | 10.88 | 2.93 | 2.76 | 0.05 | 0.01 |
| Arts | 200 | 174.5 | 10.32 | | | Significant | Significant |

A perusal of data vide table 4.53 reveals that the 't' value for the significance of difference in the attitude of commerce and arts students towards the environment is significant. Since the calculated 't' value of which is 2.76 is greater than the critical 't' value at 0.05 and 0.01 levels of significance. It can be concluded that there is a significant difference between commerce and arts students with regards to their attitude towards the environment. Therefore, the null hypothesis (No.32) that assumes there is no significant difference in the attitude of commerce and arts students towards the environment is rejected. A comparison of their mean score shows that this difference is in favor of commerce students as their mean score is higher than the mean score of arts students. The result signifies that students of commerce stream have a more favorable attitude towards the environment when compared with students of arts stream.

*Difference in attitude among college students of different streams (namely arts, science and commerce) towards the environment under different dimensions was further compared and results are as follows:*

### 4.8.4 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Health and Hygiene

Hypothesis No. 33 stated that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of health and hygiene. Table 4.54 shows the difference among science, arts and commerce students in their attitude towards the environment in the area of health and hygiene.

**Table 4. 54**

**Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Health and Hygiene**

| Source of variation | SS | Df | MS | F Calculated | f critical | Significant |
|---|---|---|---|---|---|---|
| Between groups | 7.39 | 2 | 3.695 | 0.91563277 | 3.010815204 | NS |
| Within groups | 2409.17 | 597 | 4.035460637 | | | |
| Total | 2416.56 | 599 | | | | |

As found in the table 4.54 the calculated F value is less than the critical F value, the null hypothesis (No.33) that assumes there is no significant difference in the attitude of science, arts and commerce students in their in their attitude towards the environment in the area of health and hygiene is accepted. It can be concluded that there is no significant difference between the three streams of study i.e., science, arts and commerce in the area of health and hygiene.

### 4.8.5 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Wildlife

Hypothesis No. 34 stated that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of wildlife. Table 4.55 shows the difference among students of science, arts and commerce streams in their attitude towards the environment in the area of wildlife

**Table 4.55**

**Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Wildlife**

| Source of variation | SS | Df | MS | F calculated | f critical | Significant |
|---|---|---|---|---|---|---|
| Between groups | 40.42333333 | 2 | 20.21166667 | 2.81237749 | 3.010815204 | NS |
| Within groups | 4290.45 | 597 | 7.186683417 | | | |
| Total | 4330.873333 | 599 | | | | |

As found in the table 4.55 the calculated F value is less than the critical F value, the null hypothesis(No.34) that assumes there is no significant difference in the attitude of science, arts and commerce students towards the environment in the area of wildlife is accepted. It can be concluded that there is no significant difference between the three streams of study i.e., science, arts and commerce streams in their attitude towards the environment in the area of wildlife.

### 4.8.6 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Forests

Hypothesis No. 35 states that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of forests.

Table 4.56 shows the difference among students of science, arts and commerce streams in their attitude towards the environment in the area of forests.

**Table 4.56**

**Difference among students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Forests**

| **Source of variation** | **SS** | **Df** | **MS** | **F calculated** | **f critical** | **Significant** |
|---|---|---|---|---|---|---|
| Between groups | 8.493333333 | 2 | 4.246666667 | 1.518569876 | 3.010815204 | NS |
| Within groups | 1669.505 | 597 | 2.796490787 | | | |
| Total | 1677.9983333 | 599 | | | | |

As found in the table 4.56 the calculated F value is less than the critical F value, the null hypothesis(No.35) that assumes there is no significant difference in the attitude of science, arts and commerce students towards the environment in the area of forests is accepted. It can be concluded that there is no significant difference between the three streams of study i.e., science, arts and commerce streams in their attitude towards the environment in the area of forests.

### 4.8.7 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Polluters

Hypothesis No. 36 stated that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of polluters. Table 4.57 shows the difference among students of science, arts and commerce streams in their attitude towards the environment in the area of polluters.

**Table 4.57**

**Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Polluters**

| Source of variation | SS | Df | MS | F calculated | f critical | Significance |
|---|---|---|---|---|---|---|
| Between groups | 171.73 | 2 | 85.865 | 2.637070401 | 3.010815204 | NS |
| Within groups | 19438.77 | 597 | 32.56075377 | | | |
| Total | 19610.5 | 599 | | | | |

As found in the table 4.57 the calculated F value is less than the critical F value, the null hypothesis(No.36) that assumes there is no significant difference in the attitude of science, arts and commerce students towards the environment in the area of polluters is accepted. It can be concluded that there is no significant difference between the three streams of study i.e., science, arts and commerce streams in their attitude towards the environment in the area of polluters.

### 4.8.8 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Population Explosion

Hypothesis No.37 states that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of population explosion. Table 4.58 shows the difference among students of science, arts and commerce streams in their attitude towards the environment in the area of population explosion.

**Table 4.58**

**Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Population Explosion**

| Source of variation | SS | Df | MS | F calculated | f critical | Significant |
|---|---|---|---|---|---|---|
| Between groups | 12.30333333 | 2 | 6.151666667 | 1.530217519 | 3.010815204 | NS |
| Within groups | 2400.015 | 597 | 4.020125628 | | | |
| Total | 2412.318333 | 599 | | | | |

As found in the table 4.58 the calculated F value is less than the critical F value, the null hypothesis(No.37) that assumes there is no significant difference in the attitude of science, arts and commerce students towards the environment in the area of population explosion is accepted. It can be concluded that there is no significant

difference between the three streams of study ie, science, arts and commerce streams in their attitude towards the environment in the area of population explosion.

### 4.8.9 Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Environmental Concern

Hypothesis No. 38 stated that there is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of environmental concern. Table 4.59 shows the difference among science, arts and commerce streams in their attitude towards the environment in the area of environmental concern.

**Table 4.59**

**Difference among Students of Science, Arts and Commerce Streams in their Attitude towards the Environment in the area of Environmental Concern**

| Source of variation | SS | Df | MS | F calculated | f critical | Significance |
|---|---|---|---|---|---|---|
| Between groups | 192.64 | 2 | 96.32 | 5.615539476 | 3.010815204 | Significant |
| Within groups | 10239.985 | 597 | 17.15240369 | | | |
| Total | 10432.625 | 599 | | | | |

As found in the table 4.59 the calculated F value is greater than the critical F value, the null hypothesis(No.38) that assumes there is no significant difference in the attitude of science, arts and commerce students towards the environment in the area of environmental concern is rejected. It can be concluded that there is a significant difference between students from the three streams of study i.e., science, arts and commerce streams in their attitude towards the environment in the area of environmental concern.

*Since there is a significant difference among the three streams of study in the area of environmental concern, separate hypothesis regarding the three streams of study i.e., science ,arts and commerce in the area of environmental concern have to be compared by means of t test as shown in the following table 4.60, 4.61, 4.62.*

### 4.8.10 Difference in the Attitude of Students from Science and Arts Streams towards the Environment in the area of Environmental Concern

Hypothesis No. 39 stated that there is no significant difference between science and arts students in their attitude towards the environment in the area of environmental concern. Table 4.60 shows the difference between science and arts students in their attitude towards the environment in the area of environmental concern.

**Table 4.60**

**Difference in the Attitude of Students from Science and Arts Streams towards the Environment in the area of Environmental Concern**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Science | 200 | 44.61 | 3.98 | 1.24 | 3.26 | 0.05 | 0.01 |
| Arts | 200 | 43.37 | 3.81 | | | Significant | Significant |

A perusal of data vide table 4.60 reveals that the ‘t’ value for the significance of difference in the attitude of students from science and arts streams towards the environment in the area of environmental concern is significant since the calculated ‘t’value of which is 3.26 is greater than the critical ‘t’ value at 0.05 and 0.01 levels of significance. It can be concluded that there is a significant difference between students from science and arts stream with regards to their attitude towards the environment in the area of environmental concern. Therefore, the null hypothesis (No.39) that assumes there is no significant difference in the attitude of science and arts students towards the environment in the area of environmental concern is rejected. A comparison of their mean score shows that this difference is in favor of science students as their mean score is higher than the mean score of arts students. The result signifies that students of science stream have a more favorable attitude towards the environment in the area of environmental concern when compared with students of arts stream.

### 4.8.11 Difference in the Attitude of Students from Arts and Commerce Streams towards the Environment in the area of Environmental Concern

Hypothesis No.40 states that there is no significant difference between arts and commerce students in their attitude towards the environment in the area of environmental concern. Table 4.61 shows the difference between arts and commerce students in their attitude towards the environment in the area of environmental concern.

**Table 4.61**

**Difference in the Attitude of Students from Arts and Commerce Streams towards the Environment in the area of Environmental Concern**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Arts | 200 | 43.37 | 3.81 | 1.16 | 2.80 | 0.05 | 0.01 |
| Commerce | 200 | 44.53 | 4.59 | | | Significant | Significant |

A perusal of data vide table 4.61 reveals that the 't' value for the significance of difference in the attitude of students from arts and commerce streams towards the environment in the area of environmental concern is significant since the calculated 't'value of which is 2.80 is greater than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is a significant difference between students from arts and commerce stream with regards to their attitude towards the environment in the area of environmental concern. Therefore, the null hypothesis (No.40) that assumes there is no significant difference in the attitude of arts and commerce students towards the environment in the area of environmental concern is rejected. A comparison of their mean score shows that this difference is in favor of commerce students as their mean score is higher than the mean score of arts students. The result signifies that students of commerce stream have a more favorable attitude towards the environment in the area of environmental concern when compared with students of arts stream.

### 4.8.12 Difference in the Attitude of Students from Science and Commerce Streams towards the Environment in the area of Environmental Concern

Hypothesis No.41 states that there is no significant difference between science and commerce students in their attitude towards the environment in the area of environmental concern. Table 4.62 shows the difference between science and commerce streams in their attitude towards the environment in the area of environmental concern.

**Table 4.62**

**Difference in the Attitude of Students from Science and Commerce Streams towards the Environment in the area of Environmental Concern**

| Stream | Number | Mean | SD | MD | t-value | Sig. level | |
|---|---|---|---|---|---|---|---|
| Science | 200 | 44.61 | 3.98 | 0.08 | 0.20 | 0.05 | 0.01 |
| Commerce | 200 | 44.53 | 4.59 | | | NS | NS |

The information given by table no 4.62 reveals that the 't' value for the significance of difference in the attitude of science and commerce students towards the environment in the area of environmental concern is 0.20. Since the calculated 't' value is less than the critical 't' value at 0.05 and 0.01 levels of significance, it can be concluded that there is no significant difference between science and commerce students with regards to their attitude towards the environment in the area of environmental concern. Therefore the null hypothesis (No.41) which assumes there is no significant difference between science and commerce students with regards to their

attitude towards the environment in the area of environmental concern is accepted. The result indicates that science students had a more favorable attitude towards the environment in the area of environmental concern when compared with commerce students.

# CHAPTER-V

# MAJOR FINDINGS AND DISCUSSIONS, RECOMMENDATIONS AND SUGGESTIONS

The present chapter deals with the major findings and discussions of the study, recommendations for making environmental education effective at college level and suggestions for further research.

Major findings and discussions of the study are arranged in the following order:

5.1.0 Major Findings and Discussions regarding Contents of Syllabus for Degree Students on Environmental Education in Colleges of Mizoram.

5.2.0 Major Findings and Discussions regarding Mode of Transaction of Environmental Education at College Level.

5.3.0 Major Findings and Discussions regarding Evaluation Procedures of Environmental Education at College Level.

5.4.0 Major Findings and Discussions regarding Profile of Teachers Teaching Environmental Education at College Level.

5.5.0 Major Findings and Discussions regarding the Time Devoted for Environmental Education in the College Time Table.

5.6.0 Major Findings and Discussions regarding Attitude of College Students towards Environment.

5.7.0 Major Findings and Discussions regarding Difference in the Attitude of Male and Female Students towards the Environment in the Colleges of Mizoram.

5.8.0 Major Findings and Discussions regarding Difference in the Attitude among Students from Different Streams towards the Environment,

5.9.0 Conclusion

5.10.0 Educational Implications of the Study

5.11.0 Recommendations for Making Environmental Effective at College Level in.

5.12.0 Suggestions for Further Research

### 5.1.0 Major Findings and Discussions regarding Contents of Syllabus for Degree Students on Environmental Education in Colleges of Mizoram

The contents of syllabus for degree students on environmental education were assessed against the syllabus suggested by UGC which had prepared it with the help of experts in the field.

**Macro Analysis:** The macro analysis revealed the following features of the syllabus of environmental education in colleges of Mizoram:

a. The syllabus contents suggested for colleges under Mizoram University had been adapted from the one suggested by UGC.

b. The syllabus contents suggested for colleges under Mizoram University was divided into 5 units whereas the syllabus suggested by the UGC were completed in 8 units.

c. The units of the syllabus for degree colleges of Mizoram were further sub divided into 43 sub topics. The topics in the syllabus suggested by UGC were further divided into 136 sub topics.

d. The approach of the syllabus content for the degree colleges of Mizoram was majorly lecture centered whereas the one suggested by the UGC had a balance of lecture, demonstration and practical methods.

e. Both the syllabus contents suggested for degree colleges under Mizoram University and the one suggested by UGC were to be completed in 50 classes.

**Discussions:** From the macro analysis, it could be concluded that the syllabus contents suggested for colleges under Mizoram University, while it has been adapted from the one suggested by UGC, is much less in content than the suggestion of syllabus made by the UGC. Although Universities are allowed freedom to modify

the UGC suggested syllabus according to their regional differences. But as seen from the gestalt view of the two, it was obvious that while they were both designed for 50 classes, the syllabus suggested by Mizoram University did not contain a number of topics vital to today's environmental needs.

**Micro Analysis:** The micro analysis was done on each five units of the syllabus for degree students of Mizoram on environmental education. The following were the findings:

**1. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-1**

a. The title of this unit 'Introduction and Natural Resources: renewable resources and associated problems' when assessed against the syllabus suggested by UGC, showed that there was difference in the number of topics and sub topics under one heading/unit. There were 6 topics, namely: 1) forest resources, 2) water resources, 3) mineral resources, 4) food resources, 5) energy resources and 6) land resources and subdivided into 14 sub topics.

b. The 6 topics were sub divided as follows:

i. Forest resources were sub divided into use and over exploitation and deforestation. Timber extraction, mining, dams and their effects on forest and tribal people that appear in the UGC syllabus had been excluded. Case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

ii. Water resources were sub divided into use and over utilization of surface and ground water as well as conflicts over water and important problems caused by floods and droughts that appeared in the UGC syllabus had been excluded.

iii. Mineral resources were sub divided into use and exploitation, environmental effects of extraction and using mineral resources. But case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

iv. Food resources were again sub divided into two namely changes caused by agriculture and effects of modern agriculture. Important topics in the syllabus suggested by UGC like world food problems, water logging, salinity and fertilizer- pesticide problems which are pertinent topics for Mizoram were excluded. Case studies which had also been suggested for this topic by the UGC were also excluded.

v. Energy resources were sub divided into two topics namely renewable and non renewable energy sources. Topics like growing energy needs, use of alternate energy sources and case studies which were suggested by UGC had been excluded.

vi. Land resources contained three sub topics which were land degradation, soil erosion and desertification which are all important topics that directly concerns Mizoram were included. But suggested topics like land as a resource and man- induced landslides which are also important topics for the state were cut off although they had been suggested by UGC.

c. It did not include topics on role of individual in conservation of natural resources and equitable use of resources for sustainable development which

were suggested by UGC. Although colleges are under no compulsion to follow the syllabus suggested by UGC and are allowed to make necessary modifications according to local needs, the investigator felt that too many topics, some of them with direct consequence to the environment of Mizoram were excluded. Moreover, case studies, which are practical and give firsthand experience to learners, were excluded.

**2 Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-2**

a. This unit was entitled 'Ecosystems'. There were 5 topics namely: 1) concept of ecosystem, 2) structure and function of an ecosystem, 3) producers, consumers and decomposers, 4) energy flow in the ecosystem, food chains, 5) food webs and ecological pyramids. On the other hand, the syllabus suggested by UGC had 7 topics.

b. None of the five topics were sub divided into smaller sub topics and were learnt as sub topics in themselves.

c. Topics like ecological succession and study of different ecosystems like grassland, forest, desert and aquatic (ponds, streams, lakes, oceans, estuaries and rivers) ecosystems had been excluded although they were suggested by UGC.

**3. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-3**

a. The title of this unit was 'Biodiversity and its Conservation'. It consists of 5 topics namely: 1) definition of biodiversity, 2) bio geographical classification

of India, 3) bio-diversity at national and local levels: hot spots of biodiversity in India, 4) threats to biodiversity, 5) conservation of biodiversity. On the other hand, the syllabus suggested by UGC had 8 topics.

b. The 5 topics were further sub divided as follows:

i. Three topics namely, definition of biodiversity, bio geographical classification of India and biodiversity at national and local levels: hot spot of biodiversity in India had no sub topics of their own.

ii. Threats to biodiversity were sub divided into habitat loss, poaching of wildlife, man- wildlife conflicts, endangered and endemic species of India.

iii. Conservation of biodiversity was further split into in-situ and ex situ conservation of biodiversity.

c. Topics like genetic, species and ecosystem biodiversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values and biodiversity at global level and India as a mega-diversity nation had been excluded although they were suggested by UGC.

**4. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-4**

a. The name of this unit was entitled 'Environmental Pollution'. It consists of 3 topics namely: 1) pollution, 2) solid waste management and 3) disaster management. On the other hand, the syllabus suggested by UGC had 5 topics.

b. The 3 topics were further sub divided as follows:

i. Pollution was sub divided into definition, causes, effects and control measures of air, water and soil pollutions.

ii. Solid waste management were further sub divided into causes, effects and control measures of urban and industrial waste.

iii. Disaster management was sub divided into floods, earthquakes, cyclones and landslides.

c. All the above topics were indeed directly relevant to the environmental condition of Mizoram. However, topics like marine pollution, noise pollution, thermal pollution, nuclear hazards and role of individual in prevention of pollution had been excluded along with case studies on pollution although they were suggested by UGC. Although topics like marine pollution, noise pollution, thermal pollution, nuclear hazard might not be of immediate concern to the state at present, they were topics of international concern and students might gain an important insight into pollution by their addition.

**5. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-5**

a. This unit was entitled 'Social Issues, Development and the Environment'. It consists of 5 topics namely: 1) sustainable development, carrying capacity of the environment, 2) water conservation, 3) environmental movements, resettlement and rehabilitation of people: its problems and concerns, 4) shifting cultivation and its impact, wasteland reclamation, and 5) population growth: population explosion. On the other hand, the syllabus suggested by UGC had a total of 15 topics under the same unit.

b. The topics were not further sub divided except for water conservation which were sub divided into two namely rain water harvesting and watershed management.

c. Unlike other units where topics had been excluded from the main UGC suggested content, an important topic, i.e., development, had been wisely included although it was not suggested by UGC.

d. Topics suggested by the UGC that had been excluded were namely: from unsustainable to sustainable development, urban problems related to energy, environmental ethics: issues and its possible solutions, case studies of climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

e. Many other topics like consumerism and waste products, environment and wildlife protection act, air and water (prevention and control of pollution) act, forest conservation act and the issues involved in enforcement of environmental legislation and awareness of the public were also excluded in the syllabus contents for degree students of Mizoram.

f. Two sub topics such as carrying capacity of the environment and impact of shifting cultivation that were not included in the syllabus suggested by UGC had been added in the syllabus contents of degree students of Mizoram. This was a welcome addition and showed that the planners of the syllabus had put a lot of thought while they were formulating it. Besides these, topics like population growth and population explosions that were given in unit 7 of the syllabus suggested by UGC were added in this unit.

**Missing units**

The following units and activities (which are a part of the UGC suggested syllabus) were found to be missing from the syllabus for environmental education suggested for degree colleges of Mizoram under Mizoram University.

1. Multidisciplinary nature of environmental studies.
2. Human population and the environment.
3. Field work.

These three components, if added to the present syllabus would be a very welcome addition because they are the very topics through which many of the objectives of environmental education would be met.

**Discussions:** From a micro analysis of each unit, it was concluded that while the syllabus content of Mizoram University on environmental education was quite good in itself, when compared with the syllabus suggested by UGC, it was much lighter in content. A number of pertinent topics like fresh water management, causes of deforestation in the context of Mizoram, building of roads and its consequences, landslides and a host of other topics of vital interest to Mizoram were not in the syllabus. It would be ideal to include these topics and enable college students to really understand their circumstances.

Besides, the syllabus was solely prepared for lecture method of teaching. There were 5 units which were broken down into 43 sub units covering a wide range of topics and were not short of vital information that would be of use in creating awareness and a positive attitude towards the environment among the college students of Mizoram. On the other hand, the UGC has suggested a syllabus which is to be completed in 8 units, with each unit divided into several sub topics which are again

divided into as many as four sub topics. The content of syllabus given by the UGC under unit 7 and 8 are especially crucial for environmental awareness because they cover current concerns of the environment as well as demonstration and field work. In fact, this field based study of environmental education is very much encouraged by international organizations for environmental awareness rather than the largely theoretical and lecture based syllabus made by the government of Mizoram for degree students. Therefore, the syllabus for environmental education in Mizoram, while it has its strengths in being very informative to students, still needs to be reviewed with a view to ensure that college students are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment.

### 5.2.0 Major Findings and Discussions regarding Mode of Transaction of Environmental Education at College Level

a. All the degree colleges of Mizoram subscribed to the syllabus suggested by Mizoram University for environmental education.

b. Lecture method of teaching was the most commonly used technique for the teaching of environmental education at college level in Mizoram with 100% of the colleges adopting it as the main teaching method. This also explained why the syllabus for environmental education was basically framed to cater to topics suitable for a lecture method of transaction.

c. It was found out that none of the colleges in Mizoram had adopted demonstration and project methods of teaching or fieldtrips for the study of environmental education.

**Discussions:** With regards to the mode of transaction of environmental education, it was found that all of the degree colleges of Mizoram adopted the lecture method. This finding is in contradiction to the findings of Tewksbury and Harris (1982) who conducted a study on the methodologies used in environmental education and found that majority of the teachers used discussion method. There is also enough research evidence to show that project method is also very effective in the teaching of environmental studies. The possible reason why the present study found that lecture method of teaching is one of the most commonly used technique for the teaching of environmental education at colleges in Mizoram may be due to the fact that since lecture method is one of the easiest ways of classroom teaching all of the teachers applied for it. Although this was the most convenient mode of transaction, it would be much better to teach environmental education in an activity based manner. The reason why lecture method was adopted as the main method could be that no extra financial investments seem to have been made for this subject. But it should be strongly recommended that more financial investment be made for this subject so that students could have a more realistic understanding of the subject and its importance. None of the colleges had adopted demonstration, discussion, experimental or field trips methods for the transaction of environmental education at colleges in Mizoram. However, the investigator strongly supports the addition of other methods of transaction of environmental education.

### 5.3.0 Major Findings and Discussions regarding Evaluation Procedures of Environmental Education at College level

a. All the colleges in Mizoram had written examination on environmental education for evaluation.

b. There was no practical examination on environmental education.

c. None of the colleges conducted class test on environmental education.

d. All of the colleges applied internal tests to secure internal marks.

**Discussions:** The study discovered that 100% of the colleges in Mizoram subscribed to the evaluation standards set by the affiliating university, Mizoram University which stipulates 25 as internal marks and 75 as external marks. While the investigator could not deny the importance of written examination from the point of view of education, an educational experience solely based on theoretical knowledge is not enough and cannot be considered an all-round development.

Therefore, it may be concluded that the evaluation system for environmental education under the University itself was hardly adequate to inculcate an awareness of the environment in the college students. It would be ideal if environmental education could include practical elements that would give students a first-hand experience rather than theoretical knowledge alone.

### 5.4.0 Major Findings and Discussions regarding Profile of Teachers Teaching Environmental Education at College Level

**1. Findings regarding Profile of Teachers according to Gender**

a. A total of 67.06% of the teachers who were appointed for the teaching of environmental education in colleges were male teachers while there were only

32.94% of female teachers who were appointed for the teaching of environmental education in colleges of Mizoram.

**Discussions**: The present study clearly revealed that teachers from various subjects were simply given the responsibility of teaching environmental education. The fact that more male teachers were given the task of teaching environmental education could mean a number of things. It could mean that male teachers were preferred to female teachers to teach the subject. It could also mean that there were more available male teachers to be given the responsibility of teaching the subject. Last but not least, it could also mean that male teachers were more willing to teach the subject. Whatever the case may be, the conclusion is that more male teachers are given the task of teaching the subject and this indicated a bias in gender which is not at all acceptable by today's standards of equality of genders.

**2. Findings regarding Profile of Teachers according to Educational Qualification**

a. Out of the total of 85 teachers teaching environmental education, 52.94 % of the teachers had master degree in Arts (M.A). There were 42.35% of teachers who had a master degree in science (M.Sc.) and 4.71 % of teachers were from commerce background (M.Com).

b. Out of all the 85 teachers teaching environmental education in colleges of Mizoram, 15.29% of teachers had a degree of Ph. D and 4.71% of the teachers had an M.Phil.Degree.

c. There were 29.41 % of teachers who were qualified for NET (National eligibility test) and 8.24 % of teachers who were qualified for SLET (State level eligibility test).

**Discussions**: From the findings, it may be concluded that colleges of Mizoram still recruited teachers who had not qualified for NET at the time this investigation was done. Although the main aim of this investigation was not on the qualification of teachers, it was still disheartening to find that teachers with varying qualifications were teaching the same subject. It would be a boost to quality if the university could implement the rules of UGC regarding recruitment of teachers in the undergraduate colleges of Mizoram. This would have further positive impact on the general standards of the University.

**3. Findings regarding Profile of Teachers according to Employment Status**

a. There were 64.71 % of permanent teachers teaching environmental education in colleges of Mizoram while there were only 35.29 % of teachers who were working as temporary teachers.

**Discussions:** Since the present research was focused on the status of environmental education and not the status of teaching in colleges in general, no conclusion could be made regarding the status of teaching in the colleges of Mizoram. But it was clear that there were still a number of teachers working on a temporary basis. This could mean that the government is not providing enough opportunity for permanent employment and that some of the teachers are working beyond the requirement of their employment. The sad part is that temporary teachers can leave their place anytime they want to. Therefore, permanent teachers are much preferable

to temporary teachers so that students have a stable experience. If the government could look into this and take necessary steps, colleges would be in a much better place,

**4. Findings regarding Profile of Teachers according to Teaching Experience**

a. There were 14.12 % of teachers who had below 5 years teaching experience.

b. There were 27.06 % of teachers who had teaching experience between 5-9 years.

c. The highest percentage i.e. 30.59% of teachers had a teaching experience between 10-14 years.

d. A total of 15.29% of teachers had a teaching experience between 15-19 years.

e. Only 12.94% of teachers teaching environmental education in colleges of Mizoram had a teaching experience of 20 years and above.

**Discussions:** As found in the study, only a few of the teachers teaching environmental education had a teaching experience less than five years. Otherwise, all of them had a good teaching experience. It may be concluded that as far as teaching is concerned, environmental education is taught by experienced teachers who have more than five years' experience in teaching. Therefore, as far as teaching is concerned, students are not being left at the hands of inexperienced teachers in majority of the colleges.

### 5.5.0 Major Findings and Discussions regarding the Time Devoted for Environmental Education in the College Time Table

a. 19. 23% of degree colleges gave 5 credits to environmental education classes in a week.

b. 15.40% of degree colleges gave 4 credits in a week to environmental education classes.

c. A staggering 65.37% of them had less than 4 credits in a week, not conforming to University standards.

d. It is noteworthy to mention that only 9 degree colleges, i.e., 34.61% of the degree colleges had periods of one hour duration. The rest of them i.e., 65.39% had periods lasting from 45 to 50 minutes.

**Discussions**: It was clearly stated by the affiliating University, Mizoram University, that Environmental Education, as one of the foundation courses, was to have 5 credits in a week. But less than 20% of the colleges could conform to this. Moreover, it was found that colleges did not have uniformity where the duration of each period was concerned. Therefore, it would be good if the university could insist on uniformity in the number and length of periods in a day for colleges to follow on a weekly basis. If environmental education was given the 5 credits it deserved, students would be much more benefitted. Moreover, a uniform time table would be a step in the right direction because students under the degree colleges affiliated to Mizoram University would be subjected to uniform class experience. This would be a massive improvement because at the time this study was done , different colleges gave different number of classes to their students.

### 5.6.0 Major Findings and Discussions regarding Attitude of College Students towards Environment

a. All the college students were found to have positive attitude towards the environment although the degree of positivity differed.

b. Majority (65.83%) of the college students had moderate positive attitude towards the environment.

c. A small number of them 16.83% had low positive attitude towards the environment.

d. 17.34 % of the college students had high positive attitude towards the environment.

*Classifications of students on their attitude towards the environment under different dimensions as outlined in the scale used were as follows:*

**1. Findings regarding Attitude of College Students towards the Environment in the area of Health and Hygiene**

a. All the college students were found to have positive attitude towards the environment in the area of health and hygiene although the degree of positivity differed.

b. 69.84% of the college students had moderate positive attitude towards the environment in the area of health and hygiene.

c. 13.33 % of the college students had low positive attitude towards the environment in the area of health and hygiene.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of health and hygiene.

**2. Findings regarding Attitude of College Students towards the Environment in the area of Wildlife**

a. All the college students were found to have positive attitude towards the environment in the area of wildlife although the degree of positivity differed.

b. 66.83% of the college students had moderate positive attitude towards the environment in the area of wildlife.

c. 15.33 % of the college students had low positive attitude towards the environment in the area of wildlife.

d. 17.83 % of the college students had high positive attitude towards the environment in the area of wildlife.

**3. Findings regarding Attitude of College Students towards the Environment in the area of Polluters**

a. All the college students were found to have positive attitude towards the environment in the area of polluters although the degree of positivity differed.

b. 68.17 % of the college students had moderate positive attitude towards the environment in the area of polluters.

c. 15 % of the college students had low positive attitude towards the environment in the area of polluters.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of polluters.

**4. Findings regarding Attitude of College Students towards the Environment in the area of Forests**

a. All the college students were found to have positive attitude towards the environment in the area of forests although the degree of positivity differed.

b. 81.84 % of the college students had moderate positive attitude towards the environment in the area of forests.

c. 10.66 % of the college students had low positive attitude towards the environment in the area of forests.

d. 7.5 % of the college students had high positive attitude towards the environment in the area of forests.

**5. Findings regarding Attitude of College Students towards the Environment in the area of Population Explosion**

a. All the college students were found to have positive attitude towards the environment in the area of population explosion although the degree of positivity differed.

b. 71.33 % of the college students had moderate positive attitude towards the environment in the area of population explosion.

d. 13.33 % of the college students had low positive attitude towards the environment in the area of population explosion.

e. 15.33 % of the college students had high positive attitude towards the environment in the area of population explosion.

**6. Findings regarding Attitude of College Students towards the Environment in the area of Environmental Concern**

a. All the college students were found to have positive attitude towards the environment in the area of environmental concern although the degree of positivity differed.

b. 64 % of the college students had moderate positive attitude towards the environment in the area of environmental concern.

c. 19 % of the college students had low positive attitude towards the environment in the area of environmental concern.

d. 17 % of the college students had high positive attitude towards the environment in the area of environmental concern.

**Discussions:** The study revealed the attitude of students towards the environment in general as well as their attitude towards different aspects of the environment. It was heartening to find that all the college students had a positive attitude towards the environment even though the level of positivity differed. This showed that students in the colleges of Mizoram had a positive attitude towards the environment and understood the needs of the environment to a great extent. Considering that they only had theory classes, it was concluded that this was quite a positive finding in itself and showed the society in a good light. This spoke well for an early start in environmental education. In Mizoram, schools start environmental education from primary levels. However, times could come when progress might hit the still relatively untouched society and colleges have to prepare students for the future. Therefore, much needed area to be covered is the topic on sustainable development because students are indeed future leaders of the state.

### 5.7.0 Major Findings and Discussions regarding Difference in the Attitude of Male and Female Students towards the Environment in the Colleges of Mizoram

*Comparison was done between male and female students with regard to their attitude towards the environment in general and then with regard to each dimension of environmental attitude as outlined in the scale used.*

a. Significant difference was found in the attitude of male and female college students towards the environment.

b. Female college students had a more favorable attitude towards the environment when compared with male college students.

*Difference in attitude of college students towards the environment was also compared between male and female students of different streams as follows:*

**1. Findings regarding Difference in the Attitude of Male and Female College Students of Arts Stream towards the Environment**

a. No significant difference was found between male and female arts students with regards to their attitude towards the environment.

**2. Findings regarding Difference in the Attitude of Male and Female College Students of Commerce Stream towards the Environment**

a. No significant difference was found between male and female commerce students with regards to their attitude towards the environment.

**3. Findings regarding Difference in the Attitude of Male and Female College Students of Science Stream towards the Environment**

a. Significant difference was found between male and female science students with regards to their attitude towards the environment.

b. Female students of science stream had a more favorable attitude towards the environment than male students.

**Discussions:** It could be concluded that female colleges' students had a more positive attitude towards the environment in general. Among the different streams, male and female science students differed in their attitude towards the environment. It was clear that female science students had more positive attitude towards the environment. In this regard, the investigators concluded that, since in Mizo society, women are subjected to number chores that are related to the environment, they had a natural affinity with nature. On the other hand, male members are associated with masculine characteristics like hunting and cutting down trees, male students had a naturally slightly less sensitivity towards nature.

*Difference in attitude among male and female college students towards the environment under different dimensions as outlined in the scale used was further compared and results were as follows*:

**4. Findings regarding Difference in the Attitude of Male and Female College Students towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found between male and female college students with regards to their attitude towards the environment in the area of health and hygiene and wildlife. Female college students had a significantly more favorable attitude towards the environment in the area of health and hygiene as well as wildlife than male college students.

b. No significant difference was found between male and female college students with regards to their attitude towards the environment in the area of forests, polluters, population explosion and environmental concern.

**Discussions:** It was concluded that male and female college students had mostly equally positive attitude towards the environment in general in the six specific areas that were selected in the scale used in the present study except for the areas of wildlife and health and hygiene. The researcher concluded that this could be because of expectation of so called female and male traits attributed by society.

*Comparison between male and female students within different streams of study was also done on the 6 dimensions of environmental attitude scale and results were as follows:*

**5. Findings regarding Difference in the Attitude of Male and Female Students of Science Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of science stream towards the environment in the area of wildlife and polluters. Female students of science stream had a more significantly favorable attitude

towards the environment in the area of wildlife and polluters than male students of science stream.

b. No significant difference was found in the attitude of male and female students of science stream towards the environment in the area of health and hygiene, forests, population, explosion and environmental concern.

**Discussions:** Not surprisingly, female science students again had a more positive attitude towards the environment in the area of polluters and wildlife when compared with male students. Here, too, the researcher concluded that female students had a more positive attitude towards the environment mainly because the different ways in which male and female students are broad up in Mizo society.

**6. Findings regarding Difference in the Attitude of Male and Female Students of Arts Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of wildlife and population explosion. Female students of arts stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students whereas male students of arts stream had a significantly more favorable attitude towards the environment in the area of population explosion than female students of arts stream.

b. No significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of health and hygiene, polluters, forests, and environmental concern.

**Discussions:** It was concluded that among the arts students, male and female students had an almost equally positive attitude towards the environment. They differed only in two areas, i.e., towards wildlife and population explosion. The investigator again concluded that this could be because of the different environment provided to men and women in the Mizo society.

**7. Findings regarding Difference in the Attitude of Male and Female Students of Commerce Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female commerce students towards the environment in the area of wildlife. Female students of commerce stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students of commerce stream.

b. No significant difference was found in the attitude of male and female commerce students towards the environment in the area of health and hygiene, polluters, forests, population explosion and environmental concern.

**Discussions:** Here again, it was concluded that male and female students had equally positive attitude towards the environment under different areas except for the area of wildlife. This finding regarding attitude towards wildlife was in fact similar in

other streams as well. The researcher could only conclude that it was the result of the different attitudes girls and boys are taught to grow up within the Mizo society.

The difference in the attitude of college students from the three streams of study i.e., science, arts and commerce were compared by ANOVA as follows:

### 5.8.0 Major Findings and Discussions regarding Difference in the Attitude among Students from Different Streams towards the Environment

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment.

*Since the null hypothesis was rejected, the group means were further subjected to t test in order to find out where those differences existed. The results were as follows:*

**1. Findings regarding Difference in the Attitude of Students from Arts and Science Streams towards the Environment**

a. No significant difference was found between arts and science students with regards to their attitude towards the environment.

**2. Findings regarding Difference in the Attitude of Students from Science and Commerce Streams towards the Environment**

a. No significant difference was found between science and commerce students with regards to their attitude towards the environment.

**3. Findings regarding Difference in the Attitude of Students from Commerce Arts Streams towards the Environment**

a. Significant difference was found between commerce and arts students with regards to their attitude towards the environment.

b. Commerce students had a more favorable attitude towards the environment than arts students.

**Discussions:** It could be concluded that there was significant difference among the three streams because there was a difference among arts and commerce students in their attitude towards the environment, with commerce students having a slightly more positive attitude.

*Difference in attitude among college students of different streams (namely arts, science and commerce) towards the environment under different dimensions was further compared and results were as follows:*

**4. Findings regarding Difference in the Attitude among Students from Different Streams towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment in the area of environmental concern only.

When subjected to t tests, significant difference was found between science and arts as well as arts and commerce college students in their attitude towards the environment in the area of environmental concern. Science students had a more favorable attitude towards the environment in the area of environmental concern when compared with arts students and commerce students had a more favorable attitude

towards the environment in the area of environmental concern when compared with arts students.

**Discussions:** Among the three streams mainly arts, science and commerce, commerce students had the most positive attitude towards the environment. This was interesting as a general expectation was to have students from science, especially life sciences, to have the most positive attitude. This particular finding could be useful in reiterating that environmental education is not necessarily born out of studying a subject close to it. The same information could also be used to motivate students from other streams to develop a more positive attitude towards the environment.

### 5.9.0 Conclusion

From the present study on environmental education in colleges of Mizoram, the investigator concluded that degree colleges of Mizoram are not in a very bad place where environmental awareness is concerned. College students had an averagely positive attitude towards the environment in spite of minimal efforts given by colleges in terms of teaching, resources, study materials and time. Inspite of all the drawbacks in the status of environmental education that were found in the study, the students still have quite an average understanding of the environment. There is high possibility that greater results will be found with a higher investment in this subject. Mizoram has the distinction of having one of the cleanest environment in the country. But with the advent of technology and more and more industries, its environment is slowly deteriorating especially within city and town areas. Therefore a deeper attention needs to be given to environmental education so that future generations are more

environmentally aware and Mizoram continues to one of the cleanest environments in the nation.

### 5.10.0 Educational Implications of the Study

The present study has important implications for educational planners, administrators, teachers and students. It was found from the study that most of the students of colleges of Mizoram had a positive attitude towards the environment although the degree of positivity was not the same. This may be due to the fact that since environmental education has been introduced from the early stages of elementary education, college students developed a healthy attitude towards the environment and only need more in depth knowledge about it so that they can apply it in their everyday lives. This was a good indicator that starting environmental education early in formal education is a good practice since evidence clearly showed a lasting positive effect on students. Among the three streams of study i.e., commerce, arts and science, students from commerce stream show a much more positive attitude towards the environment. Thus, if teachers made the same effort to inculcate positive attitude in students, there would be no disparity in the attitude of students from different streams towards the environment.

The syllabus contents of environmental education for colleges under Mizoram University showed that it was mainly prepared for lecture method of teaching only. Since lecture method is the most easiest and convenient way of teaching, it would be beneficial if students could be engaged in more and more environmental activities which will further enhance students environmental knowledge and sensitivity and are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment. During the time this study was undertaken, it was

discovered that no separate teachers were recruited for the teaching of environmental education like it is done in other subjects. Thus environmental education was mainly taught by regular or temporary teachers who had been recruited for other subjects. This was not a good discovery as these teachers could not give their full attention to the subject and did not exercise their full potential. Moreover, most of the teachers did not go through any sort of training in environmental education and they too relied on text book knowledge for the teaching of environmental education. Since environmental education is multidisciplinary in nature, teachers from all streams may not be able to do justice to it without some training. Therefore, orientation training or a short course in environmental education would be beneficial to the teachers and ultimately the students so that they might gain a better knowledge and experience of the subject. However it would be more beneficial for students to have a special teacher with the proper educational background to teach environmental education. In this regard the government may be approached to render the financial help needed by the colleges so that students could have a richer experience.

### 5.11.0 Recommendations for Making Environmental Effective at College Level in Mizoram

Importance should be given to environmental education so that the basic objectives of developing awareness, skill and attitude are attained and new patterns of behavior of individuals, group and society as a whole towards the environment is created. Furthermore based on the knowledge gained through this study the following measures are suggested as improvements to the study of environmental education at the college level.

1. The findings in the present study strongly indicated that not much financial back up is received by colleges for the teaching of environmental education. In order to secure a more appropriate method of transacting environmental education in the colleges of Mizoram, a greater amount of financial assistance is called for. Therefore, the government should provide the college with necessary funds and resources in order to enhance the learning of environmental education. If this cannot be the case, more creative means of generating financial assistance should be employed so as to make Environmental Education in colleges of Mizoram a worthwhile course of study.
2. Environmental education should be activity based learning in order to enhance, encourage and motivate the students to learn and bring new life and meaning into their learning experience rather than simply through classroom lecture. Projects on environment as well as field trips should be encouraged. In this regard, educational planners need to be informed so that they are aware of the needs of this subject and take necessary steps.
3. As far as possible college should take part in local environmental campaigns. The institution as well as the teacher must be responsible in motivating and engaging the students to get involved in community action and to take part in various local environmental campaigns.
4. Separate teachers for the teaching of environmental education need to be recruited so that more priority is given to this subject and it would not be a secondary burden for teachers in charge. If possible, teachers with background in environmental science should be selected so that justice may be done to this

subject. Teachers in charge of environmental education should be given thorough in-service orientation in environmental education so as to equip them with the latest knowledge regarding environmental education.

5. During the time this study was undertaken, a visit to the respective libraries and an unstructured interview with the librarians showed that none of the colleges had any of the foreign editions suggested as reading materials. Regarding the suggested reading materials of Indian origin as well, only a few of the colleges had a small collection of certain titles. None of the colleges visited had all the national publications that were listed as reading resources. This clearly indicates that reading materials need to be enriched so that students would be able to make use of them. For this a larger financial investment is again called for. If a larger financial investment is not practicable, prominent persons may also be invited to donate pertinent books for this course and non- governmental organizations may also be encouraged to give helping hands. This will help a lot in the way of making environmental education effective among students and also encourage healthy reading habits among them.

6. As found in the study, degree colleges of Mizoram did not have uniformity in the duration for each class and the number of classes in a day. This meant that students in different colleges had varying class experience. As institutions affiliated to one university, it would be much better if undergraduate colleges under the university had a time tables that are uniform in distribution of classes.

7. It was found that female students had a better attitude towards the environment. For this, the investigator recommends that bigger efforts be made so that the two genders have equally positive attitude towards the environment.

8. Since a large percentage of the teachers teaching environmental education were not NET qualified, it is strongly recommended that the University makes strict guidelines to conform to UGC rules as far as recruitment of teachers; even on a temporary basis is concerned.

9. Since a high percentage of the teachers were on a temporary basis, they had the liberty to leave their college whenever a better prospect came up. This was not healthy for the development of students, not just for environmental education but for other subjects too. Therefore, it would be a most welcome qualitative improvement if recruitment on permanent basis could be conducted in an expedient manner so that temporary teachers need not be recruited time and time again since this practice could be a major disruption to quality education.

10. It was interesting to note that commerce students had the highest positive attitude towards the environment. The investigator, in this regard, recommends that each discipline be given the right information to understand their place in the healing process of the environment and their respective roles in protection of the environment.

11. A most interesting finding was that when male and female students were compared according to their attitude towards the environment, it was found that female students has a more positive attitude whenever there was a

difference. The investigator concluded that this was because of the difference in societal expectations of the two genders. Therefore, it is important for the society to let go of a number of customs where males are expected to be more macho and ruthless. It is time to start having a fresh outlook towards masculinity and associate it with kindness and care for the environment. This way, even males of the society will slowly but surely learn to love nature and have a more positive attitude towards it.

### 5.12.0 Suggestions for Further Research

Environmental education is an important subject of study in itself. More and more researches need to be done on this topic so as to generate an environmentally aware generation in the present as well as the future. The following topics may be taken up for further research:

1. A study of the syllabus for environmental education in elementary, secondary and higher secondary education in Mizoram.
2. An analysis of the attitude of rural and urban adolescents towards the environment in Mizoram.
3. An experimental study on the effects of various methods of transaction of environmental education at secondary level, college level and university level of education in Mizoram.
4. A critical study regarding the policies for environmental education by governmental bodies as well as non- governmental bodies.
5. A comparative study of two different states regarding the environmental attitude of college students.

6. An analysis of the awareness of college students of Mizoram towards the environment.
7. A study of the environmental activities of students at various levels of education in Mizoram.

## SUMMARY

### Introduction

Earth is the only planet known so far to have life in the Solar System. During millions and millions of years, life evolved on this earth. Each living things is habituated to a certain way of life either in water, on land or underneath the soil. The surrounding features have to be amenable for a certain species to survive and thrive. This surrounding feature is called the environment. The environment is a broad concept encompassing the whole range of diverse surroundings in which we perceive experience and react to events and changes. It is the aggregate of all external conditions and influences that support living things. The term environment is very wide in the sense that it takes into account all the factors that directly or indirectly have a bearing on the natural surroundings of human beings. The word environment has been derived from a French word “Environia” meaning to surround. It refers to abiotic (physical or non-living) and biotic (living) environment. It means surrounding or condition in which a person, animal, decomposer or plants lives or operates.

Environmental education is education that is intimately connected with the environment. It is education about the environment, through the environment and for the environment. It is an essential tool for achieving effective resource management and sustainable development. It provides an understanding of how natural system work and the impact of human activities upon the natural system and fosters environmental awareness and concern. It gives reality, relevance and practical experience to learning through direct contact with the environment, develops aesthetic appreciation and skills for data gathering and field investigations. It also develops an

informed concerned and sense of responsibility for the environment and skills to participate in environmental improvement and promotes an ability to adopt lifestyles compatible with the wise used of environmental resources.

Environmental education in college is necessary so as to teach students on how to use the present and future resources optimally and to provide experience in problem solving and decision making and also to develop opportunities for students to interact with the environment and with each others. Environmental education prepares each and every individual for life through an understanding of the contemporary world and should constitute a lifelong education and makes one responsive to changes in rapidly changing world. It gives an individual an idea about balance in the ecosystem which is disturbed due to human interference and teaches us about everything that influence man.

Environmental education is a necessary process in promoting the need for personal initiatives and social participation in order to achieve sustainability. In this growing human population many people have realized the need for environmental education. People living in rural, tribal, slum and urban areas, students and teachers in schools, colleges and universities need to be educated about the environment at all levels of education. Besides environmental education being an important component for an effective policy framework for protecting and managing the environment it is also necessary for understanding the basis of our existence and those that surround us. It is needed for helping individuals in resolving fundamental issues relating to the present and future use of the worlds resources. Our nation's future depends on a well-educated people to be wise on the environment that sustains our communities and future generation. Environmental education is thus an education which can help an

individual in making complex connection between economic prosperity benefits to society, environmental health and our own well-being.

**Rationale of the Study**

Environment is degrading at a much faster pace than our imagination. Most of this mess is caused by human activities. Human beings are facing grave environmental problems and adjustment to changes in the environment has become a huge challenge. All members of society depend on natural resources to survive. The availability of these resources has limits. The impacts of the environmental issues are affecting not only at the local level and it is global problem of important phenomena. Many industrial and infrastructural developments, human population growth and urbanization, plastic usage, electronic wastes, vehicular emissions, contamination of pollutants in the water bodies, soil and atmospheric pollution have devastated the natural environment causing severe ill health effects on human beings. Many developed countries are slowly finding several alternative and innovative technologies to minimize the effects of pollution and optimal utilization of the natural sources. It is therefore essential that college students who are supposed to be our future leaders should understand the need of environment to their quality of life and should have the knowledge, tools and skills to live in ways that minimize the impact of their actions on environment. It is thus essential that students should be inculcated the effective and optimal use of our natural resources and energy to safeguard our mother nature and in conserving our resources in order to attain sustainability in all levels. There is a need of environmental awareness on every aspect of the environment and conservation of natural resources and biodiversity so as to produce socially responsible citizens of

tomorrow. The future health and welfare of our nation depends on our earth's resources and sustained developmental activities. A positive attitude and informed environmental decisions are conducive to sustainability. These are possible only through a sound understanding of the environment.

Therefore to meet the present environmental situation it is essential that everyone makes a contribution which will emerge from environmental knowledge. It is universally acknowledged that education is an effective means for social reconstruction and to a great extent offers solution to the problem societies are faced with. To protect and manage environment it is thus important to have a sound environmental education. Today's students will be responsible for making decisions that will shape the health of the environment. To prepare them for such responsibilities, they need a sound environmental education from which to make those decisions. Hence the present study has been undertaken.

**Research Questions**

The following questions came to mind regarding the status of environmental education in colleges of Mizoram:

1. Is there a proper syllabus for environmental education at college level in Mizoram? If so, what are the contents?
2. Is the mode of transaction of environmental education at college level in Mizoram uniform in all colleges? If yes, what mode(s) are followed?
3. Is there any special procedure for evaluating environmental education at college level in Mizoram?

4. What is the qualification of teachers teaching environmental education at the college level?
5. Will there be a balance of the two genders among the teachers teaching environmental education in colleges?
6. Are experienced teachers being given the responsibility of teaching environmental education in the colleges of Mizoram?
7. How much time is devoted to the teaching of environmental education at colleges of Mizoram?
8. What is the attitude of college students of Mizoram towards the environment?
9. Is there any difference between male and female college students in their attitude towards the environment?
10. Will students of different streams be different in their attitude towards the environment?
11. Can there be a more effective way to teach environmental education at college level?

**Statement of the Problem**

The present study has been stated as *Environmental Education in Colleges of Mizoram : An analytical study.*

**Objectives of the Study**

The objectives of the present study are as follows:

1. To assess the contents of the syllabus for degree students on environmental education in colleges of Mizoram.

2. To find out the mode of transaction of environmental education at college level.
3. To study the evaluation procedures of environmental education at college level.
4. To study the profile of teachers teaching environmental education at college level.
5. To study the time devoted for environmental education in the college time tables.
6. To study the attitude of college students towards the environment.
7. To find the difference in the attitude of male and female students towards the environment in the colleges of Mizoram.
8. To find the difference in the attitude among students from different streams towards the environment.
9. To suggest measures for making environmental education effective at college level in Mizoram.

**Hypotheses**

The following hypotheses have been stated so as to realize the $7^{th}$ and $8^{th}$ objectives of the study:

1. There is no significant difference in the attitude of male and female college students towards the environment.
2. There is no significant difference in the attitude of male and female college students of arts stream towards the environment.

3. There is no significant difference in the attitude of male and female college students of commerce stream towards the environment.
4. There is no significant difference in the attitude of male and female college students of science stream towards the environment.
5. There is no significant difference in the attitude of male and female college students towards the environment in the area of health and hygiene.
6. There is no significant difference in the attitude of male and female college students towards the environment in the area of wildlife.
7. There is no significant difference in the attitude of male and female college students towards the environment in the area of forests.
8. There is no significant difference in the attitude of male and female college students towards the environment in the area of polluters.
9. There is no significant difference in the attitude of male and female college students towards the environment in the area of population explosion.
10. There is no significant difference in the attitude of male and female college students towards the environment in the area of environmental concern.
11. There is no significant difference in the attitude of male and female science students towards the environment in the area of health and hygiene.
12. There is no significant difference in the attitude of male and female science students towards the environment in the area of wildlife.
13. There is no significant difference in the attitude of male and female science students towards the environment in the area of forests.
14. There is no significant difference in the attitude of male and female science students towards the environment in the area of polluters.

15. There is no significant difference in the attitude of male and female science students towards the environment in the area of population explosion.
16. There is no significant difference in the attitude of male and female science students towards the environment in the area of environmental concern.
17. There is no significant difference in the attitude of male and female arts students towards the environment in the area of health and hygiene.
18. There is no significant difference in the attitude of male and female arts students towards the environment in the area of wildlife.
19. There is no significant difference in the attitude of male and female arts students towards the environment in the area of forests.
20. There is no significant difference in the attitude of male and female arts students towards the environment in the area of polluters.
21. There is no significant difference in the attitude of male and female arts students towards the environment in the area of population explosion.
22. There is no significant difference in the attitude of male and female arts students towards the environment in the area of environmental concern.
23. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene.
24. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of wildlife.
25. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of forests.
26. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of polluters.

27. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of population explosion.
28. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of environmental concern.
29. There is no significant difference in the attitude of science, arts and commerce students towards the environment in the colleges of Mizoram.
30. There is no significant difference between arts and science students in their attitude towards the environment in the colleges of Mizoram.
31. There is no significant difference between science and commerce students in their attitude towards the environment in the colleges of Mizoram.
32. There is no significant difference between commerce and arts students in their attitude towards the environment in the colleges of Mizoram.
33. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of health and hygiene.
34. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of wildlife.
35. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of forests.
36. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of polluters.
37. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of population explosion.
38. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of environmental concern.

39. There is no significant difference between science and arts students in their attitude towards the environment in the area of environmental concern.

40. There is no significant difference between arts and commerce students in their attitude towards the environment in the area of environmental concern.

41. There is no significant difference between science and commerce students in their attitude towards the environment in the area of environmental concern.

**Method of Study**

The present study was mainly focused on the status of environmental education in colleges and the attitude of college students towards the environment. Therefore it was largely descriptive in nature. In order to gain primary data about subjects, the use of questionnaire and interview schedule was adopted. Secondary data was also collected and analyzed. Both quantitative as well as qualitative approaches were employed for successful realization of objectives.

**Population**

In the present study, for the assessment of attitude of college students, the target population of the study comprised of all the 4th semester students of arts, science and commerce streams of degree colleges of Mizoram.

**Sample**

For the present study, the sample selected comprised of 600 degree college students of Mizoram from 3 streams viz. Arts, Science and Commerce, out of which 300 were males and 300 were females. 100 male and 100 female students were

selected from each of these streams for the sample. The samples were selected on the basis of stratified random sampling.

For finding out the profile of teachers, mode of transaction of environmental education and evaluation procedures used, all the teachers who taught environmental education during the time this test was done were considered as the population.

In order to find out the profile of teachers teaching environmental education in colleges, mode of transaction of the subject and the evaluation procedures, no sampling was done and the population was studied as a whole.

**Tools and Techniques Used**

Data were collected from primary and secondary sources. Primary data were obtained through:

1. Taj Environmental Attitude Scale (TEAS)
2. Interview schedule developed by the investigator.

**Taj Environmental Attitude Scale (TEAS)**

Taj Environmental Attitude Scale (TEAS) was developed by Dr. Haseen Taj in 2001. Following the Likert's method of summated rating procedure Taj Environmental Attitude Scale (TEAS) was developed with 61 items consisting of six areas which aimed to identify the attitudes of people towards various aspects of environment. The six areas included in the scale are attitudes towards:

1. Health and Hygiene
2. Wildlife
3. Forests
4. Polluters

5. Population Explosion

6. Environmental Concern

Each item alternatives is assigned a weightage ranging from 4 (strongly agree) to 1 (strongly disagree) for favorable items and the scoring is reversed from 1 (strongly agree) to 4 (strongly disagree) in the case of unfavorable items. The attitude score of an individual is the sum total of item scores on all the six areas. The range of scores is from 61 to 244. For each statement there are no right or wrong answers. What is required is each individual feeling or opinion about the statement. The reliability of the scale was estimated by two methods (a) split half (odd-even and $1^{st}$ half-$2^{nd}$ half) and (b) test retest reliability co-efficient with a time gap of one month on a sample of 150.

**Construction of Interview Schedule**

The interview schedule was constructed keeping in mind the research objectives that were to be realized through this tool as such ten questions were framed so as to find out the profile, the teaching mode of transaction as well as the evaluation procedures. The questions were all close ended questions so as to enable respondents to answer easily and also to make the task of analysis of the answers easier for the researcher.

**Collection of Data**

For gathering information regarding teachers profile, mode of transaction as well as evaluation procedure, the researcher made use of the interview schedule that had been constructed by the herself. Permission was taken from respective college Principals and concerned teachers for the administration of the interview schedule.

The investigator personally visited all the concerned teachers and also took care to retrieve all the interview schedule that had been answered. Care was taken to see that all respondents answered each questions.

For collection of data concerning the attitude of college students regarding their attitude towards the environment, the researcher took permission from college Principals where the questionnaire was to be administered. She personally went to all the colleges until she had gathered enough data from the different streams of arts, science and commerce. Each response questionnaire was checked to ensure that respondents had addressed all the items. No problem was encountered during the collection of data.

**Statistical Treatment of Data**

Keeping in view the objectives of the study the investigator employed the following statistical techniques for tabulating and analyzing the data.

1. Content analysis to assess the syllabus of environmental education.
2. Descriptive statistics like mean, standard deviation and percentage to divide and find out the attitude of college students towards the environment.
3. Inferential statistics like ANOVA and t tests to find out the significance of difference among different variables.

## Major Findings and Discussion of the study

### 1. Major Findings and Discussions regarding Contents of Syllabus for Degree Students on Environmental Education in Colleges of Mizoram

The contents of syllabus for degree students on environmental education were assessed against the syllabus suggested by UGC which had prepared it with the help of experts in the field.

**Macro Analysis:** The macro analysis revealed the following features of the syllabus of environmental education in colleges of Mizoram:

a. The syllabus contents suggested for colleges under Mizoram University had been adapted from the one suggested by UGC.

b. The syllabus contents suggested for colleges under Mizoram University was divided into 5 units whereas the syllabus suggested by the UGC were completed in 8 units.

c. The units of the syllabus for degree colleges of Mizoram were further sub divided into 43 sub topics. The topics in the syllabus suggested by UGC were further divided into 136 sub topics.

d. The approach of the syllabus content for the degree colleges of Mizoram was majorly lecture centered whereas the one suggested by the UGC had a balance of lecture, demonstration and practical methods.

e. Both the syllabus contents suggested for degree colleges under Mizoram University and the one suggested by UGC were to be completed in 50 classes.

**Discussions:** From the macro analysis, it could be concluded that the syllabus contents suggested for colleges under Mizoram University, while it has been

adapted from the one suggested by UGC, is much less in content than the suggestion of syllabus made by the UGC. Although Universities are allowed freedom to modify the UGC suggested syllabus according to their regional differences. But as seen from the gestalt view of the two, it was obvious that while they were both designed for 50 classes, the syllabus suggested by Mizoram University did not contain a number of topics vital to today's environmental needs.

**Micro Analysis**

The micro analysis was done on each five units of the syllabus for degree students of Mizoram on environmental education. The following were the findings:

**A. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-1**

a. The title of this unit 'Introduction and Natural Resources: renewable resources and associated problems' when assessed against the syllabus suggested by UGC, showed that there was difference in the number of topics and sub topics under one heading/unit. There were 6 topics, namely: 1) forest resources, 2) water resources, 3) mineral resources, 4) food resources, 5) energy resources and 6) land resources and subdivided into 14 sub topics.

b. The 6 topics were sub divided as follows:

i. Forest resources were sub divided into use and over exploitation and deforestation. Timber extraction, mining, dams and their effects on forest and tribal people that appear in the UGC syllabus had been excluded. Case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

ii. Water resources were sub divided into use and over utilization of surface and ground water as well as conflicts over water and important problems caused by floods and droughts that appeared in the UGC syllabus had been excluded.

iii. Mineral resources were sub divided into use and exploitation, environmental effects of extraction and using mineral resources. But case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

iv. Food resources were again sub divided into two namely changes caused by agriculture and effects of modern agriculture. Important topics in the syllabus suggested by UGC like world food problems, water logging, salinity and fertilizer- pesticide problems which are pertinent topics for Mizoram were excluded. Case studies which had also been suggested for this topic by the UGC were also excluded.

v. Energy resources were sub divided into two topics namely renewable and non renewable energy sources. Topics like growing energy needs, use of alternate energy sources and case studies which were suggested by UGC had been excluded.

vi. Land resources contained three sub topics which were land degradation, soil erosion and desertification which are all important topics that directly concerns Mizoram were included. But suggested topics like land as a resource and man- induced landslides which are also important topics for the state were cut off although they had been suggested by UGC.

c. It did not include topics on role of individual in conservation of natural resources and equitable use of resources for sustainable development which

were suggested by UGC. Although colleges are under no compulsion to follow the syllabus suggested by UGC and are allowed to make necessary modifications according to local needs, the investigator felt that too many topics, some of them with direct consequence to the environment of Mizoram were excluded. Moreover, case studies, which are practical and give firsthand experience to learners, were excluded.

**B Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-2**

a. This unit was entitled 'Ecosystems'. There were 5 topics namely: 1) concept of ecosystem, 2) structure and function of an ecosystem, 3) producers, consumers and decomposers, 4) energy flow in the ecosystem, food chains, 5) food webs and ecological pyramids. On the other hand, the syllabus suggested by UGC had 7 topics.

b. None of the five topics were sub divided into smaller sub topics and were learnt as sub topics in themselves.

c. Topics like ecological succession and study of different ecosystems like grassland, forest, desert and aquatic (ponds, streams, lakes, oceans, estuaries and rivers) ecosystems had been excluded although they were suggested by UGC.

**C. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-3**

a. The title of this unit was 'Biodiversity and its Conservation'. It consists of 5 topics namely: 1) definition of biodiversity, 2) bio geographical classification

of India, 3) bio-diversity at national and local levels: hot spots of biodiversity in India, 4) threats to biodiversity, 5) conservation of biodiversity. On the other hand, the syllabus suggested by UGC had 8 topics.

b. The 5 topics were further sub divided as follows:

i. Three topics namely, definition of biodiversity, bio geographical classification of India and biodiversity at national and local levels: hot spot of biodiversity in India had no sub topics of their own.

ii. Threats to biodiversity were sub divided into habitat loss, poaching of wildlife, man- wildlife conflicts, endangered and endemic species of India.

iii. Conservation of biodiversity was further split into in-situ and ex situ conservation of biodiversity.

c. Topics like genetic, species and ecosystem biodiversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values and biodiversity at global level and India as a mega-diversity nation had been excluded although they were suggested by UGC.

**D. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-4**

a. The name of this unit was entitled 'Environmental Pollution'. It consists of 3 topics namely: 1) pollution, 2) solid waste management and 3) disaster management. On the other hand, the syllabus suggested by UGC had 5 topics.

b. The 3 topics were further sub divided as follows:

i. Pollution was sub divided into definition, causes, effects and control measures of air, water and soil pollutions.

ii. Solid waste management were further sub divided into causes, effects and control measures of urban and industrial waste.

iii. Disaster management was sub divided into floods, earthquakes, cyclones and landslides.

c. All the above topics were indeed directly relevant to the environmental condition of Mizoram. However, topics like marine pollution, noise pollution, thermal pollution, nuclear hazards and role of individual in prevention of pollution had been excluded along with case studies on pollution although they were suggested by UGC. Although topics like marine pollution, noise pollution, thermal pollution, nuclear hazard might not be of immediate concern to the state at present, they were topics of international concern and students might gain an important insight into pollution by their addition.

**E. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-5**

a. This unit was entitled 'Social Issues, Development and the Environment'. It consists of 5 topics namely: 1) sustainable development, carrying capacity of the environment, 2) water conservation, 3) environmental movements, resettlement and rehabilitation of people: its problems and concerns, 4) shifting cultivation and its impact, wasteland reclamation, and 5) population growth: population explosion. On the other hand, the syllabus suggested by UGC had a total of 15 topics under the same unit.

b. The topics were not further sub divided except for water conservation which were sub divided into two namely rain water harvesting and watershed management.

c. Unlike other units where topics had been excluded from the main UGC suggested content, an important topic, i.e., development, had been wisely included although it was not suggested by UGC.

d. Topics suggested by the UGC that had been excluded were namely: from unsustainable to sustainable development, urban problems related to energy, environmental ethics: issues and its possible solutions, case studies of climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

e. Many other topics like consumerism and waste products, environment and wildlife protection act, air and water (prevention and control of pollution) act, forest conservation act and the issues involved in enforcement of environmental legislation and awareness of the public were also excluded in the syllabus contents for degree students of Mizoram.

f. Two sub topics such as carrying capacity of the environment and impact of shifting cultivation that were not included in the syllabus suggested by UGC had been added in the syllabus contents of degree students of Mizoram. This was a welcome addition and showed that the planners of the syllabus had put a lot of thought while they were formulating it. Besides these, topics like population growth and population explosions that were given in unit 7 of the syllabus suggested by UGC were added in this unit.

**Missing units**

The following units and activities (which are a part of the UGC suggested syllabus) were found to be missing from the syllabus for environmental education suggested for degree colleges of Mizoram under Mizoram University.

1. Multidisciplinary nature of environmental studies.
2. Human population and the environment.
3. Field work.

These three components, if added to the present syllabus would be a very welcome addition because they are the very topics through which many of the objectives of environmental education would be met.

**Discussions:** From a micro analysis of each unit, it was concluded that while the syllabus content of Mizoram University on environmental education was quite good in itself, when compared with the syllabus suggested by UGC, it was much lighter in content. A number of pertinent topics like fresh water management, causes of deforestation in the context of Mizoram, building of roads and its consequences, landslides and a host of other topics of vital interest to Mizoram were not in the syllabus. It would be ideal to include these topics and enable college students to really understand their circumstances.

Besides, the syllabus was solely prepared for lecture method of teaching. There were 5 units which were broken down into 43 sub units covering a wide range of topics and were not short of vital information that would be of use in creating awareness and a positive attitude towards the environment among the college students of Mizoram. On the other hand, the UGC has suggested a syllabus which is to be completed in 8 units, with each unit divided into several sub topics which are again

divided into as many as four sub topics. The content of syllabus given by the UGC under unit 7 and 8 are especially crucial for environmental awareness because they cover current concerns of the environment as well as demonstration and field work. In fact, this field based study of environmental education is very much encouraged by international organizations for environmental awareness rather than the largely theoretical and lecture based syllabus made by the government of Mizoram for degree students. Therefore, the syllabus for environmental education in Mizoram, while it has its strengths in being very informative to students, still needs to be reviewed with a view to ensure that college students are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment.

## 2. Major Findings and Discussions regarding Mode of Transaction of Environmental Education at College Level

a. All the degree colleges of Mizoram subscribed to the syllabus suggested by Mizoram University for environmental education.

b. Lecture method of teaching was the most commonly used technique for the teaching of environmental education at college level in Mizoram with 100% of the colleges adopting it as the main teaching method. This also explained why the syllabus for environmental education was basically framed to cater to topics suitable for a lecture method of transaction.

c. It was found out that none of the colleges in Mizoram had adopted demonstration and project methods of teaching or fieldtrips for the study of environmental education.

**Discussions:** With regards to the mode of transaction of environmental education, it was found that all of the degree colleges of Mizoram adopted the lecture method. This finding is in contradiction to the findings of Tewksbury and Harris (1982) who conducted a study on the methodologies used in environmental education and found that majority of the teachers used discussion method. There is also enough research evidence to show that project method is also very effective in the teaching of environmental studies. The possible reason why the present study found that lecture method of teaching is one of the most commonly used technique for the teaching of environmental education at colleges in Mizoram may be due to the fact that since lecture method is one of the easiest ways of classroom teaching all of the teachers applied for it. Although this was the most convenient mode of transaction, it would be much better to teach environmental education in an activity based manner. The reason why lecture method was adopted as the main method could be that no extra financial investments seem to have been made for this subject. But it should be strongly recommended that more financial investment be made for this subject so that students could have a more realistic understanding of the subject and its importance. None of the colleges had adopted demonstration, discussion, experimental or field trips methods for the transaction of environmental education at colleges in Mizoram. However, the investigator strongly supports the addition of other methods of transaction of environmental education.

**3. Major Findings and Discussions regarding Evaluation Procedures of Environmental Education at College level**

a. All the colleges in Mizoram had written examination on environmental education for evaluation.

b. There was no practical examination on environmental education.

c. None of the colleges conducted class test on environmental education.

d. All of the colleges applied internal tests to secure internal marks.

**Discussions:** The study discovered that 100% of the colleges in Mizoram subscribed to the evaluation standards set by the affiliating university, Mizoram University which stipulates 25 as internal marks and 75 as external marks. While the investigator could not deny the importance of written examination from the point of view of education, an educational experience solely based on theoretical knowledge is not enough and cannot be considered an all-round development.

Therefore, it may be concluded that the evaluation system for environmental education under the University itself was hardly adequate to inculcate an awareness of the environment in the college students. It would be ideal if environmental education could include practical elements that would give students a first-hand experience rather than theoretical knowledge alone.

**4. Major Findings and Discussions regarding Profile of Teachers Teaching Environmental Education at College Level**

**A. Findings regarding Profile of Teachers according to Gender**

a. A total of 67.06% of the teachers who were appointed for the teaching of environmental education in colleges were male teachers while there were only 32.94% of female teachers who were appointed for the teaching of environmental education in colleges of Mizoram.

**Discussions**: The present study clearly revealed that teachers from various subjects were simply given the responsibility of teaching environmental education. The fact that more male teachers were given the task of teaching environmental education could mean a number of things. It could mean that male teachers were preferred to female teachers to teach the subject. It could also mean that there were more available male teachers to be given the responsibility of teaching the subject. Last but not least, it could also mean that male teachers were more willing to teach the subject. Whatever the case may be, the conclusion is that more male teachers are given the task of teaching the subject and this indicated a bias in gender which is not at all acceptable by today's standards of equality of genders.

**B. Findings regarding Profile of Teachers according to Educational Qualification**

a. Out of the total of 85 teachers teaching environmental education, 52.94 % of the teachers had master degree in Arts (M.A). There were 42.35% of teachers who had a master degree in science (M.Sc.) and 4.71 % of teachers were from commerce background (M.Com).

b. Out of all the 85 teachers teaching environmental education in colleges of Mizoram, 15.29% of teachers had a degree of Ph.D and 4.71% of the teachers had an M.Phil.Degree.

c. There were 29.41 % of teachers who were qualified for NET (National eligibility test) and 8.24 % of teachers who were qualified for SLET (State level eligibility test).

**Discussions**: From the findings, it may be concluded that colleges of Mizoram still recruited teachers who had not qualified for NET at the time this investigation was done. Although the main aim of this investigation was not on the qualification of teachers, it was still disheartening to find that teachers with varying qualifications were teaching the same subject. It would be a boost to quality if the university could implement the rules of UGC regarding recruitment of teachers in the undergraduate colleges of Mizoram. This would have further positive impact on the general standards of the University.

**C. Findings regarding Profile of Teachers according to Employment Status**

a. There were 64.71 % of permanent teachers teaching environmental education in colleges of Mizoram while there were only 35.29 % of teachers who were working as temporary teachers.

**Discussions:** Since the present research was focused on the status of environmental education and not the status of teaching in colleges in general, no conclusion could be made regarding the status of teaching in the colleges of Mizoram. But it was clear that there were still a number of teachers working on a temporary basis. This could mean that the government is not providing enough opportunity for permanent employment and that some of the teachers are working beyond the requirement of their employment. The sad part is that temporary teachers can leave their place anytime they want to. Therefore, permanent teachers are much preferable

to temporary teachers so that students have a stable experience. If the government could look into this and take necessary steps, colleges would be in a much better place,

**D. Findings regarding Profile of Teachers according to Teaching Experience**

a. There were 14.12 % of teachers who had below 5 years teaching experience.

b. There were 27.06 % of teachers who had teaching experience between 5-9 years.

c. The highest percentage i.e. 30.59% of teachers had a teaching experience between 10-14 years.

d. A total of 15.29% of teachers had a teaching experience between 15-19 years.

e. Only 12.94% of teachers teaching environmental education in colleges of Mizoram had a teaching experience of 20 years and above.

**Discussions:** As found in the study, only a few of the teachers teaching environmental education had a teaching experience less than five years. Otherwise, all of them had a good teaching experience. It may be concluded that as far as teaching is concerned, environmental education is taught by experienced teachers who have more than five years' experience in teaching. Therefore, as far as teaching is concerned, students are not being left at the hands of inexperienced teachers in majority of the colleges.

**5. Major Findings and Discussions regarding the Time Devoted for Environmental Education in the College Time Table**

a. 19. 23% of degree colleges gave 5 credits to environmental education classes in a week.

b. 15.40% of degree colleges gave 4 credits in a week to environmental education classes.

c. A staggering 65.37% of them had less than 4 credits in a week, not conforming to University standards.

d. It is noteworthy to mention that only 9 degree colleges, i.e., 34.61% of the degree colleges had periods of one hour duration. The rest of them i.e., 65.39% had periods lasting from 45 to 50 minutes.

**Discussions**: It was clearly stated by the affiliating University, Mizoram University, that Environmental Education, as one of the foundation courses, was to have 5 credits in a week. But less than 20% of the colleges could conform to this. Moreover, it was found that colleges did not have uniformity where the duration of each period was concerned. Therefore, it would be good if the university could insist on uniformity in the number and length of periods in a day for colleges to follow on a weekly basis. If environmental education was given the 5 credits it deserved, students would be much more benefitted. Moreover, a uniform time table would be a step in the right direction because students under the degree colleges affiliated to Mizoram University would be subjected to uniform class experience. This would be a massive improvement because at the time this study was done; different colleges gave different number of classes to their students.

## 6. Major Findings and Discussions regarding Attitude of College Students towards Environment

a. All the college students were found to have positive attitude towards the environment although the degree of positivity differed.

b. Majority (65.83%) of the college students had moderate positive attitude towards the environment.

c. A small number of them 16.83% had low positive attitude towards the environment.

d. 17.34 % of the college students had high positive attitude towards the environment.

*Classifications of students on their attitude towards the environment under different dimensions as outlined in the scale used were as follows:*

**A. Findings regarding Attitude of College Students towards the Environment in the area of Health and Hygiene**

a. All the college students were found to have positive attitude towards the environment in the area of health and hygiene although the degree of positivity differed.

b. 69.84% of the college students had moderate positive attitude towards the environment in the area of health and hygiene.

c. 13.33 % of the college students had low positive attitude towards the environment in the area of health and hygiene.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of health and hygiene.

**B. Findings regarding Attitude of College Students towards the Environment in the area of Wildlife**

a. All the college students were found to have positive attitude towards the environment in the area of wildlife although the degree of positivity differed.

b. 66.83% of the college students had moderate positive attitude towards the environment in the area of wildlife.

c. 15.33 % of the college students had low positive attitude towards the environment in the area of wildlife.

d. 17.83 % of the college students had high positive attitude towards the environment in the area of wildlife.

**C. Findings regarding Attitude of College Students towards the Environment in the area of Polluters**

a. All the college students were found to have positive attitude towards the environment in the area of polluters although the degree of positivity differed.

b. 68.17 % of the college students had moderate positive attitude towards the environment in the area of polluters.

c. 15 % of the college students had low positive attitude towards the environment in the area of polluters.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of polluters.

**D. Findings regarding Attitude of College Students towards the Environment in the area of Forests**

a. All the college students were found to have positive attitude towards the environment in the area of forests although the degree of positivity differed.

b. 81.84 % of the college students had moderate positive attitude towards the environment in the area of forests.

c. 10.66 % of the college students had low positive attitude towards the environment in the area of forests.

d. 7.5 % of the college students had high positive attitude towards the environment in the area of forests.

**E. Findings regarding Attitude of College Students towards the Environment in the area of Population Explosion**

a. All the college students were found to have positive attitude towards the environment in the area of population explosion although the degree of positivity differed.

b. 71.33 % of the college students had moderate positive attitude towards the environment in the area of population explosion.

d. 13.33 % of the college students had low positive attitude towards the environment in the area of population explosion.

e. 15.33 % of the college students had high positive attitude towards the environment in the area of population explosion.

**F. Findings regarding Attitude of College Students towards the Environment in the area of Environmental Concern**

a. All the college students were found to have positive attitude towards the environment in the area of environmental concern although the degree of positivity differed.

b. 64 % of the college students had moderate positive attitude towards the environment in the area of environmental concern.

c. 19 % of the college students had low positive attitude towards the environment in the area of environmental concern.

d. 17 % of the college students had high positive attitude towards the environment in the area of environmental concern.

**Discussions:** The study revealed the attitude of students towards the environment in general as well as their attitude towards different aspects of the environment. It was heartening to find that all the college students had a positive attitude towards the environment even though the level of positivity differed. This showed that students in the colleges of Mizoram had a positive attitude towards the environment and understood the needs of the environment to a great extent. Considering that they only had theory classes, it was concluded that this was quite a positive finding in itself and showed the society in a good light. This spoke well for an early start in Environmental Education. In Mizoram, schools start environmental education from primary levels. However, times could come when progress might hit the still relatively untouched society and colleges have to prepare students for the future. Therefore, much needed area to be covered is the topic on sustainable development because students are indeed future leaders of the state.

## 7. Major Findings and Conclusion regarding Difference in the Attitude of Male and Female Students towards the Environment in the Colleges of Mizoram

*Comparison was done between male and female students with regard to their attitude towards the environment in general and then with regard to each dimension of environmental attitude as outlined in the scale used.*

a. Significant difference was found in the attitude of male and female college students towards the environment.

b. Female college students had a more favorable attitude towards the environment when compared with male college students.

*Difference in attitude of college students towards the environment was also compared between male and female students of different streams as follows:*

**A. Findings regarding Difference in the Attitude of Male and Female College Students of Arts Stream towards the Environment**

a. No significant difference was found between male and female college students of arts stream with regards to their attitude towards the environment.

**B. Findings regarding Difference in the Attitude of Male and Female College Students of Commerce Stream towards the Environment**

a. No significant difference was found between male and female college students of commerce stream with regards to their attitude towards the environment.

**C. Findings regarding Difference in the Attitude of Male and Female College Students of Science Stream towards the Environment**

a. Significant difference was found between male and female college students of science stream with regards to their attitude towards the environment.

b. Female students of science stream had a more favorable attitude towards the environment than male students of science stream.

**Discussions:** It could be concluded that female colleges' students had a more positive attitude towards the environment in general. Among the different streams, male and female science students differed in their attitude towards the environment. It was clear that female science students had more positive attitude towards the environment. In this regard, the investigators concluded that, since in Mizo society, women are subjected to number chores that are related to the environment, they had a natural affinity with nature. On the other hand, male members are associated with masculine characteristics like hunting and cutting down trees, male students had a naturally slightly less sensitivity towards nature.

*Difference in attitude among male and female college students towards the environment under different dimensions as outlined in the scale used was further compared and results were as follows*:

**A. Findings regarding Difference in the Attitude of Male and Female College Students towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found between male and female college students with regards to their attitude towards the environment in the area of health and hygiene and wildlife. Female college students had a significantly more favorable attitude towards the environment in the area of health and hygiene as well as wildlife than male college students.

b. No significant difference was found between male and female college students with regards to their attitude towards the environment in the area of forests, polluters, population explosion and environmental concern.

**Discussions:** It was concluded that male and female college students had mostly equally positive attitude towards the environment in general in the six specific areas that were selected in the scale used in the present study except for the areas of wildlife and health and hygiene. The researcher concluded that this could be because of expectation of so called female and male traits attributed by society.

*Comparison between male and female college students within different streams of study was also done on the 6 dimensions of environmental attitude scale and results were as follows:*

**A. Findings regarding Difference in the Attitude of Male and Female Students of Science Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of science stream towards the environment in the area of wildlife and polluters. Female students of science stream had a more significantly favorable attitude towards the environment in the area of wildlife and polluters than male students of science stream.

b. No significant difference was found in the attitude of male and female students of science stream towards the environment in the area of health and hygiene, forests, population, explosion and environmental concern.

**Discussions:** Not surprisingly, female science students again had a more positive attitude towards the environment in the area of polluters and wildlife when compared with male students. Here, too, the researcher concluded that female students had a more positive attitude towards the environment mainly because the different ways in which male and female students are broad up in Mizo society.

**B. Findings regarding Difference in the Attitude of Male and Female Students of Arts Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of wildlife and population explosion. Female students of arts stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students whereas male students of arts stream had a significantly more favorable attitude towards the environment in the area of population explosion than female students of arts stream.

b. No significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of health and hygiene, polluters, forests, and environmental concern.

**Discussions:** It was concluded that among the arts students, male and female students had an almost equally positive attitude towards the environment. They differed only in two areas, i.e., towards wildlife and population explosion. The

investigator again concluded that this could be because of the different environment provided to men and women in the Mizo society.

**C. Findings regarding Difference in the Attitude of Male and Female Students of Commerce Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female commerce students towards the environment in the area of wildlife. Female students of commerce stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students of commerce stream.

b. No significant difference was found in the attitude of male and female commerce students towards the environment in the area of health and hygiene, polluters, forests, population explosion and environmental concern.

**Discussions:** Here again, it was concluded that male and female students had equally positive attitude towards the environment under different areas except for the area of wildlife. This finding regarding attitude towards wildlife was in fact similar in other streams as well. The researcher could only conclude that it was the result of the different attitudes girls and boys are taught to grow up within the Mizo society.

The difference in the attitude of college students from the three streams of study i.e., science, arts and commerce were compared by ANOVA as follows:

**8. Major Findings and Conclusions regarding Difference in the Attitude among Students from Different Streams towards the Environment**

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment.

*Since the null hypothesis was rejected, the group means were further subjected to t test in order to find out where those differences existed. The results were as follows:*

**A. Findings regarding Difference in the Attitude of Students from Arts and Science Streams towards the Environment**

a. No significant difference was found between arts and science students with regards to their attitude towards the environment.

**B. Findings regarding Difference in the Attitude of Students from Science and Commerce Streams towards the Environment**

a. No significant difference was found between science and commerce students with regards to their attitude towards the environment.

**C. Findings regarding Difference in the Attitude of Students from Commerce and Arts Streams towards the Environment**

a. Significant difference was found between commerce and arts students with regards to their attitude towards the environment.

b. Commerce students had a more favorable attitude towards the environment than arts students.

## Conclusion

**Discussions:** It could be concluded that there was significant difference among the three streams because there was a difference among arts and commerce students in their attitude towards the environment, with commerce students having a slightly more positive attitude.

*Difference in attitude among college students of different streams (namely arts, science and commerce) towards the environment under different dimensions was further compared and results were as follows:*

**A. Findings regarding Difference in the Attitude among Students from Different Streams towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment in the area of environmental concern only.

When subjected to t tests, significant difference was found between science and arts as well as arts and commerce college students in their attitude towards the environment in the area of environmental concern. Science students had a more favorable attitude towards the environment in the area of environmental concern when compared with arts students and commerce students had a more favorable attitude towards the environment in the area of environmental concern when compared with arts students.

**Discussions:** Among the three streams mainly arts, science and commerce, commerce students had the most positive attitude towards the environment. This was interesting as a general expectation was to have students from science, especially life sciences, to have the most positive attitude. This particular finding could be useful in reiterating that environmental education is not necessarily born out of studying a subject close to it. The same information could also be used to motivate students from other streams to develop a more positive attitude towards the environment.

## Conclusion

From the present study on environmental education in colleges of Mizoram, the investigator concluded that degree colleges of Mizoram are not in a very bad place where environmental awareness is concerned. College students had an averagely positive attitude towards the environment in spite of minimal efforts given by colleges in terms of teaching, resources, study materials and time. Inspite of all the drawbacks in the status of environmental education that were found in the study, the students still have quite an average understanding of the environment. There is high possibility that greater results will be found with a higher investment in this subject. Mizoram has the distinction of having one of the cleanest environment in the country. But with the advent of technology and more and more industries, its environment is slowly deteriorating especially within city and town areas. Therefore a deeper attention needs to be given to environmental education so that future generations are more environmentally aware and Mizoram continues to one of the cleanest environments in the nation.

**Educational Implications of the Study**

The present study has important implications for educational planners, administrators, teachers and students. It was found from the study that most of the students of colleges of Mizoram had a positive attitude towards the environment although the degree of positivity was not the same. This may be due to the fact that since environmental education has been introduced from the early stages of elementary education, college students developed a healthy attitude towards the environment and only need more in depth knowledge about it so that they can apply it in their everyday lives. This was a good indicator that starting environmental education early in formal education is a good practice since evidence clearly showed a lasting positive effect on students. Among the three streams of study i.e., commerce, arts and science, students from commerce stream show a much more positive attitude towards the environment. Thus, if teachers made the same effort to inculcate positive attitude in students, there would be no disparity in the attitude of students from different streams towards the environment.

The syllabus contents of environmental education for colleges under Mizoram University showed that it was mainly prepared for lecture method of teaching only. Since lecture method is the most easiest and convenient way of teaching, it would be beneficial if students could be engaged in more and more environmental activities which will further enhance students environmental knowledge and sensitivity and are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment. During the time this study was undertaken, it was discovered that no separate teachers were recruited for the teaching of environmental education like it is done in other subjects. Thus environmental education was mainly

taught by regular or temporary teachers who had been recruited for other subjects. This was not a good discovery as these teachers could not give their full attention to the subject and did not exercise their full potential. Moreover, most of the teachers did not go through any sort of training in environmental education and they too relied on text book knowledge for the teaching of environmental education. Since environmental education is multidisciplinary in nature, teachers from all streams may not be able to do justice to it without some training. Therefore, orientation training or a short course in environmental education would be beneficial to the teachers and ultimately the students so that they might gain a better knowledge and experience of the subject. However it would be more beneficial for students to have a special teacher with the proper educational background to teach environmental education. In this regard the government may be approached to render the financial help needed by the colleges so that students could have a richer experience.

**Recommendations for Making Environmental Effective at College Level in Mizoram**

Importance should be given to environmental education so that the basic objectives of developing awareness, skill and attitude are attained and new patterns of behavior of individuals, group and society as a whole towards the environment is created. Furthermore based on the knowledge gained through this study the following measures are suggested as improvements to the study of environmental education at the college level.

1. The findings in the present study strongly indicated that not much financial back up is received by colleges for the teaching of environmental education. In order to secure a more appropriate method of transacting environmental

education in the colleges of Mizoram, a greater amount of financial assistance is called for. Therefore, the government should provide the college with necessary funds and resources in order to enhance the learning of environmental education. If this cannot be the case, more creative means of generating financial assistance should be employed so as to make environmental education in colleges of Mizoram a worthwhile course of study.

2. Environmental education should be activity based learning in order to enhance, encourage and motivate the students to learn and bring new life and meaning into their learning experience rather than simply through classroom lecture. Projects on environment as well as field trips should be encouraged. In this regard, educational planners need to be informed so that they are aware of the needs of this subject and take necessary steps.

3. As far as possible, college should take part in local environmental campaigns. The institution as well as the teacher must be responsible in motivating and engaging the students to get involved in community action and to take part in various local environmental campaigns.

4. Separate teachers for the teaching of environmental education need to be recruited so that more priority is given to this subject and it would not be a secondary burden for teachers in charge. If possible, teachers with background in environmental science should be selected so that justice may be done to this subject. Teachers in charge of environmental education should be given thorough in-service orientation in environmental education so as to equip them with the latest knowledge regarding environmental education.

5. During the time this study was undertaken, a visit to the respective libraries and an unstructured interview with the librarians showed that none of the colleges had any of the foreign editions suggested as reading materials. Regarding the suggested reading materials of Indian origin as well, only a few of the colleges had a small collection of certain titles. None of the colleges visited had all the national publications that were listed as reading resources. This clearly indicates that reading materials need to be enriched so that students would be able to make use of them. For this a larger financial investment is again called for. If a larger financial investment is not practicable, prominent persons may also be invited to donate pertinent books for this course and non- governmental organizations may also be encouraged to give helping hands. This will help a lot in the way of making environmental education effective among students and also encourage healthy reading habits among them.

6. As found in the study, degree colleges of Mizoram did not have uniformity in the duration for each class and the number of classes in a day. This means that students in different colleges had varying class experience. As institutions affiliated to one university, it would be much better if undergraduate colleges under the university had a time tables that are uniform in distribution of classes.

7. It was found that female students had a better attitude towards the environment. For this, the investigator recommends that bigger efforts be made so that the two genders have equally positive attitude towards the environment.

8. Since a large percentage of the teachers teaching environmental education were not NET qualified, it is strongly recommended that the University makes strict guidelines to conform to UGC rules as far as recruitment of teachers; even on a temporary basis is concerned.

9. Since a high percentage of the teachers were on a temporary basis, they had the liberty to leave their college whenever a better prospect came up. This was not healthy for the development of students, not just for environmental education but for other subjects too. Therefore, it would be a most welcome qualitative improvement if recruitment on permanent basis could be conducted in an expedient manner so that temporary teachers need not be recruited time and time again since this practice could be a major disruption to quality education.

10. It was interesting to note that commerce students had the highest positive attitude towards the environment. The investigator, in this regard, recommends that each discipline be given the right information to understand their place in the healing process of the environment and their respective roles in protection of the environment.

11. A most interesting finding was that when male and female students were compared according to their attitude towards the environment, it was found that female students has a more positive attitude whenever there was a difference. The investigator concluded that this was because of the difference in societal expectations of the two genders. Therefore, it is important for the society to let go of a number of customs where males are expected to be more macho and ruthless. It is time to start having a fresh outlook towards

masculinity and associate it with kindness and care for the environment. This way, even males of the society will slowly but surely learn to love nature and have a more positive attitude towards it.

**Suggestions for Further Research**

Environmental education is an important subject of study in itself. More and more researches need to be done on this topic so as to generate an environmentally aware generation in the present as well as the future. The following topics may be taken up for further research:

1. A study of the syllabus for environmental education in elementary, secondary and higher secondary education in Mizoram.
2. An analysis of the attitude of rural and urban adolescents towards the environment in Mizoram.
3. An experimental study on the effects of various methods of transaction of environmental education at secondary level, college level and university level of education in Mizoram.
4. A critical study regarding the policies for environmental education by governmental bodies as well as non- governmental bodies.
5. A comparative study of two different states regarding the environmental attitude of college students.
6. An analysis of the awareness of college students of Mizoram towards the environment.
7. A study of the environmental activities of students at various levels of education in Mizoram.

# APPENDIX-I


Consumable Booklet

of

# T E A S

(English Version)

**Dr. Haseen Taj** *(Bangalore)*

**Please fill in the following informations :—**

**Name**.....

**Age**..... **Sex**.....

**Educational Qualification**.....

**Occupation**.....

**Annual income from all sources**.....

**Religion**..... **Locality**.....

## INSTRUCTIONS

This scale consists of 61 statements aimed to identify the attitudes of people towards various aspects of environment. There are no right or wrong answers. What is required is your own individual feeling or opinion about the statements for each statement, four alternatives are given and you have to express your view in any of the four alternatives, by making tick mark ( √ ) on the cell below that preferred response.

**SCORING TABLE**

| Areas | I | II | III | IV | V | VI | Total |
|---|---|---|---|---|---|---|---|
| Raw Scores | | | | | | | |
| Stanine | | | | | | | |
| Interpretation | | | | | | | |

**Estd. 1981**

✆ (0562) 352245

**NANDINI ENTERPRISES**

**23/451, WAZIRPURA, AGRA – 282 003 (INDIA)**

| Sl. No. | AREAS | STATEMENTS | Strongly Agree | Agree | Dis-agree | Strongly Disagree |
|---|---|---|---|---|---|---|
| • 1. | IV | The use of fertilizers is essential to increase agricultural yield. | ☐ | ☐ | ☐ | ☐ |
| 2. | V | Over population leads to poverty. | ☐ | ☐ | ☐ | ☐ |
| • 3. | I | Food additives are not hazardous to the health. | ☐ | ☐ | ☐ | ☐ |
| 4. | V | Family planning should be made mandatory to decrease population growth. | ☐ | ☐ | ☐ | ☐ |
| • 5. | III | Cutting of forests is essential to increase agricultural yields. | ☐ | ☐ | ☐ | ☐ |
| • 6. | V | Children are future investments ; the more children a family has, the better for the country. | ☐ | ☐ | ☐ | ☐ |
| 7. | VI | All are responsible for environmental pollution. | ☐ | ☐ | ☐ | ☐ |
| • 8. | IV | More and more hydroelectric power stations should be created to meet the need of people. | ☐ | ☐ | ☐ | ☐ |
| • 9. | V | Developing countries should have more population in order to accelerate growth. | ☐ | ☐ | ☐ | ☐ |
| 10. | VI | Education about local issues and environmental pollution should be made mandatory in schools. | ☐ | ☐ | ☐ | ☐ |
| 11. | VI | Shop keepers should stop handing out plastic carry-bags. | ☐ | ☐ | ☐ | ☐ |
| • 12. | IV | More and more power stations should be built as a mark of human progress. | ☐ | ☐ | ☐ | ☐ |
| 13. | VI | People who leave their picnic litters in parks should be fined. | ☐ | ☐ | ☐ | ☐ |
| 14. | VI | There should be more wind mills. | ☐ | ☐ | ☐ | ☐ |
| 15. | IV | The construction of new ski-resorts should be forbidden. | ☐ | ☐ | ☐ | ☐ |
| • 16. | IV | Destruction to ozone layer will hardly affect the near future. | ☐ | ☐ | ☐ | ☐ |
| • 17. | IV | Engine idling is inevitable though it wastes fuel and contributes to air pollution. | ☐ | ☐ | ☐ | ☐ |
| • 18. | II | Habitual meat eaters need not change their food habits, just to show mercy towards animals. | ☐ | ☐ | ☐ | ☐ |
| • 19. | II | Legislation on prevention of killing of animals are unwanted. | ☐ | ☐ | ☐ | ☐ |
| • 20. | IV | Possessors of more vehicles contributing to more air pollution should be punished. | ☐ | ☐ | ☐ | ☐ |
| 21. | IV | High income groups who directly or indirectly account for most green house gas emission should be penalized. | ☐ | ☐ | ☐ | ☐ |

| Sl. No. | AREAS | STATEMENTS | Strongly Agree | Agree | Dis-agree | Strongly Disagree |
|---|---|---|---|---|---|---|
| • 22. | IV | It is a right of high level income groups to have high level of resource consumption and waste generation. | ☐ | ☐ | ☐ | ☐ |
| 23. | VI | Protection of environment should be the sole responsibility of the governments and not of the individuals. | ☐ | ☐ | ☐ | ☐ |
| • 24. | IV | Toxic wastes will not harm the human beings. | ☐ | ☐ | ☐ | ☐ |
| 25. | IV | Excessive energy consumers should be fined heavily. | ☐ | ☐ | ☐ | ☐ |
| • 26. | II | All people need not be kind and compassionate towards animals. | ☐ | ☐ | ☐ | ☐ |
| • 27. | IV | The large sums of money spent on environment pollution control could be put to better use on other things. | ☐ | ☐ | ☐ | ☐ |
| • 28. | IV | Water pollution is not a serious problem because 80% of the world's surface is water. | ☐ | ☐ | ☐ | ☐ |
| 29. | IV | Even a layman can do a lot to prevent pollution of environment. | ☐ | ☐ | ☐ | ☐ |
| 30. | IV | Parking fees should be made compulsory in places of work to those who commute by their personal vehicles. | ☐ | ☐ | ☐ | ☐ |
| 31. | IV | Higher gasoline prices should be charged to discourage the use of personal vehicles. | ☐ | ☐ | ☐ | ☐ |
| 32. | VI | Conservation of energy should be regarded as the responsibility of everyone. | ☐ | ☐ | ☐ | ☐ |
| • 33. | III | The government should increase its revenue by clearing the forests. | ☐ | ☐ | ☐ | ☐ |
| • 34. | IV | Mining brings more benefits than problems to the local community. | ☐ | ☐ | ☐ | ☐ |
| • 35. | V | Population control does not assure a reasonable standard of living for future generations. | ☐ | ☐ | ☐ | ☐ |
| • 36. | VI | It is not necessary to spend money to clean the drainages, because any way that will be washed away by rain. | ☐ | ☐ | ☐ | ☐ |
| 37. | VI | We are all responsible in one way or the other for the depletion of ozone layer. | ☐ | ☐ | ☐ | ☐ |
| • 38. | VI | Aspiring for a better quality of life need not involve one's personal efforts to stem out the increasing toxification of earth. | ☐ | ☐ | ☐ | ☐ |
| • 39. | VI | The interests of the future generations should be sacrificed for luxurious life at present. | ☐ | ☐ | ☐ | ☐ |
| 40. | IV | One should use energy resources, such as solar, which cause least pollution. | ☐ | ☐ | ☐ | ☐ |
| 41. | IV | The government should ban the use of plastic containers to reduce pollution of our surroundings. | ☐ | ☐ | ☐ | ☐ |

| Sl. No. | AREAS | STATEMENTS | Strongly Agree | Agree | Dis-agree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 42. | IV | People should be encouraged to ride bicycles and paddled bancas to prevent pollution. | ☐ | ☐ | ☐ | ☐ |
| 43. | IV | Solid wastes should be made to dispose only in the land fills or pits. | ☐ | ☐ | ☐ | ☐ |
| 44. | IV | The government should reduce the tax paid by factories that possess anti pollution facilities. | ☐ | ☐ | ☐ | ☐ |
| 45. | IV | The explosion of science and technology has lead to the poisonous effect on the environment. | ☐ | ☐ | ☐ | ☐ |
| 46. | I | Over pollution of the environment can cause misery and sufferings to human beings. | ☐ | ☐ | ☐ | ☐ |
| 47. | IV | All the smoke belching vehicles should be removed from the roads. | ☐ | ☐ | ☐ | ☐ |
| 48. | III | Participation in afforestation programmes is a mere waste of time and energy. | ☐ | ☐ | ☐ | ☐ |
| 49. | VI | People having no concern for environmental protection should be penalised. | ☐ | ☐ | ☐ | ☐ |
| • 50. | IV | Environment is least affected though domestic garbage is dumped on the roadsides. | ☐ | ☐ | ☐ | ☐ |
| 51. | VI | Conservation of resources is necessary for the sake of future generations. | ☐ | ☐ | ☐ | ☐ |
| 52. | I | Pesticides should not be sprayed on vegetables. | ☐ | ☐ | ☐ | ☐ |
| • 53. | III | Even the steep hill sides should not be left out of cultivation in order to increase the productivity. | ☐ | ☐ | ☐ | ☐ |
| 54. | II | Excessive use of animals in laboratory experiments for testing medicines should be forbidden. | ☐ | ☐ | ☐ | ☐ |
| • 55. | III | The effects of acid rain on our forests are still acceptable. | ☐ | ☐ | ☐ | ☐ |
| • 56. | II | It is not wrong to hunt animals for commercial purposes. | ☐ | ☐ | ☐ | ☐ |
| 57. | IV | One should participate in campaigns on "stop pollution". | ☐ | ☐ | ☐ | ☐ |
| • 58. | II | It is not wrong to hunt animals for food. | ☐ | ☐ | ☐ | ☐ |
| • 59. | I | The industrial and toxic waste dumps located away from residential areas do not pose any safety risks. | ☐ | ☐ | ☐ | ☐ |
| 60. | VI | Every individual should complain against waste dumping whether it is near to their residences or far. | ☐ | ☐ | ☐ | ☐ |
| 61. | I | Environmental pollution leads to health hazards. | ☐ | ☐ | ☐ | ☐ |

## APPENDIX II

## INTERVIEW SCHEDULE FOR TEACHERS TEACHING ENVIRONMENTAL EDUCATION IN COLLEGES OF MIZORAM

1. Personal information

a) Sex/gender:

b )Subject:

d )Educational qualification:

e )Permanent/temporary:

f )Ph.D/M.Phil:

g )Net/Slet:

h )Length of service:

2. Have you attended any training programme offered concerning environmental education?

(a)Yes (b)No

If yes,

a) No of training undergone:

b )Type-Regional/national/institutional :

c) Duration -I week/2 weeks :

3. Do you use teaching aids to teach environmental education?

(a)Yes (b) No

If yes from where are these teaching aids procured?

a) Government b) College resources c)Funds collected from students

4. What method you adopted for teaching environmental education?

a )Lecture b)Demonstration c)Field trip d)Experiments

5. Are students given class test on this subject?

a) Yes (b) No

If yes what is the frequency

a)weekly b) monthly c)one semester

6. Does the college take part in any local environmental campaigns?

a )Yes

b) No

7. Does the college offer any special activity related to environmental education?

a) Yes b) No

If yes what are they?

a) b)

8. What is the length (in minutes ) of each class on environmental education?

a) 60 mins b)50 mins c)45 mins

9. No of periods/classes allotted for environmental education in a week?

a) 2

b) 3

c) 4

d) 5

10. How are students evaluated on environmental education/how are examinations carried out for environmental education?

a)Written examination b)viva voce

## BIBLIOGRAPHY


Agarwal, H.O. (1999). *International law and human rights.*Allahabad: Central Law Publications.

Ayishabi, T.C. (1999). Environmental literacy of science and non science students at degree level. *Journal of All India Association for Educational Research*, Vol. II (192), 23-29.

Atwood,S.L. (1998). *An environmental outdoor school program: an investigation of the student and teacher perceptions.* (Unpublished doctoral thesis).The University of British Columbia.

Artun, H.A and Ozsevgec, T. (2016). A study on the evaluation of the applicability of an environmental education modular curriculum. *International Journal of Environmental and Science Education* 2016, II, No.15,7318-7347.

Blum, A (1982). Assessment of subjective usefulness of an environmental science curriculum. Science Education, No 1, 66, 25-34.

Balasubramaniam, S and Fonseka, R.N. (1987). *Oppurtunities and constraints for training ecologists and environmental scientists in Sri Lanka*. New Delhi: lndian environmental society.

Badkobi A, Hadipour M (2001). *Assessment of primary school teacher's educational condition in different zones of Tehran Municipality in Environmental subjects and the ways of elevating their Awareness.*Scientific Quarterly Journal Environment, 33: 79-80.

Bhatacharya,G.C.(1997). Environmental awareness among higher secondary students of science and non Science students. School Science 30(I) New Delhi : NCERT p 24-32.

Bhostle,S. (2006). *Environmental education in schools*. New Delhi: AIU House.

Blum, A.(1982). Assessment of subjective usefulness of an environmental science curriculum.Science Education, No 1, 66.25-34.

Bhawalkar,S.(2000). An analysis of school syllabus in context of environmental education. School science, Sept 2000, New Delhi : NCERT.

Best, J.W., & Kahn, J.V. (2000). *Research in education*. Ashoke K. Ghosh. New Delhi: Prentice Hall of India Private Limited.

Catherine Joseph (2011). *Environmental education*. New Delhi: Neelkamal Publications.

Chittibalu, S.V. (1987). *Environmental education for conservation and development.*New Delhi: Indian Environmental Society.

Deopuria, R.P. (1984). *A comparative study of teaching of science through environment and traditional approach in schools of Madhya Pradesh.* (Unpublished doctoral thesis). Jabalpur University.

Dayal, M.(1987).*Environmental education for conservation and development*. New Delhi: Indian Environmental Society.

Devi, S.A.(1990). A critical study of environmental curriculum in Andhra Pradesh. Fifth Survey of Educational Research 1988-1992, II. NewDelhi: NCERT

Dr.Hooda, S. (2016). A study of attitude and awareness of college students towards environmental pollution. EPRA International Journal of Economic and Business Review Vol-4,Issue-2,February 2016.

Dighal, K.C. (1988). *Improved methods of teaching biological science in schools of Tripura and West Bengal*.Fourth Survey of Research in Education. 1983-1988-Vol. 1

Eugine, T (2004) .*Environmental Economics*. Delhi: Vrinda Publications (P) Ltd.Environmenta1 education and adventure education. Dissertation abstracts international*57,* (8). p. 2673-A.

Fifth Survey of Educational Research (1988-92) Trends Reports Volume 1.

Fourth Survey of Research in Education 1983-88, Volume 2. New Delhi: NCERT.

Filho, Walter Leal, Bandeira, Monica Villa (1995). *Media and environmental education.* Convergence, Vol.28, Issue 4.

Gopalkrishnan,S.(1992). Impact of environmental education on primary school children.*Fifth Survey of Educational Research Vol. II P1754*.New Delhi: NCERT.

Garrett, H.E. (2011). *Statistics in psychology and education*. New Delhi: Paragon International Publishers.

Heeney, Adam(1997). *Environmental education in an urban setting: a case for frequent, locally-based implementation*. Master's Thesis. Faculty of Education, The University of British Columbia.

Hart (1996).Teachers ideas about environmental education: Environmental education for the next generation:twenty fifth Annual Conference of the North American Association for environmental education.

Heyl (2013). Environmental attitude and behaviors of college students: a case study conducted at a Chilean University.RevistaLatinoamericana de Psicologia vol.45 no.3 Bogota Sept/Dec.2013.

Jinarajan Shabina(1999). a STUDY OF Environmental awareness and attitude towards Environmental Education of student Teachers of Bangalore City, M.Phil. Dissertation, Department of Education Bangalore University.

K.V.S. Sarma(2015)*Statistics Made Simple*. New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

Kose, A.N. (20l5). Environment Awareness and attitude towards Environment of Male and Female class V students of Chandigarh, Haryana and Punjab P.U. Department of Education, M.Ed. Dissertation.

Katoch, K.S. (2017).Awareness and attitude of school students towards environment. Scholarly Research Journal for Interdisciplinary Studies.

Kaur.H.P.(1992). A study of population awareness in relation to attitudes towards environmental education and population education of professional teachers.Fifth Survey of Educational Research 1988-92 vol.II. NCERT.

Krishnakumari,S. & Ponmozhi, D.(2017). Environmental attitude of school students. IOSR Journal of Humanities and Social Science(IOSR-JHSS) Vol 22, Issue7,Ver.3(July 2017).

Kothari, C.R. ( 2012). *Research methodology methods and techniques*. New Delhi: New age International Private Limited.

Loughland, Tony, Anna Reid, Kim Walker, and Peter Petoc(2003*). "Factors Influencing Young People's Conceptions of Environment."*Environmental Education Research Vol. 9 (1):3-19.

Lindenmeier,D.K. (1996). An *investigation of the congruency of outdoor education components – Environmenal education and adventure education.* Dissertation abstracts international, *57*, (8). p. 2673-A.

Lob,R.E. (1987). Project based teaching in environmental education. New Delhi : Indian Environmental Society.

Lalremruati,P.C.(2014).Environmental education in elementary schools in Mizoram: An Analytical study. Unpublished M.Phil Thesis.Mizoram University.

Lalremruata,C.(2016).Assessment of learning outcomes of class IV children in environmental studies in Mizoram in relation to MLL. Mizoram Educational Journal vol.ii Issue 1& 2. March &June, 2016.

Lahnstein & Ryder, J.(2019). School teacher conceptions of environmental education: reinterpreting a typology through a thematic analysis.https://www.tandfonline.com/author/BenavidesLahnstein%2C+Ana+IIse

Molia, Maganlal S. (2006).*Global issues on environmental education*: New Delh: AIU House.

Mishra,B.B.(2006).Environmental awareness of secondary school students with reference to their intelligence and school background.Journal of All India Association for Educational Research vol.18,Nos.1&2, March & June 2006.

Mangal, S.K. (2013).*Statistics in psychology and education*. New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

McClaren M. and B. Hammond (2005).*Integrating education and action in environmental education. Environmental Education and Advocacy: Changing perspectives of ecology and education*.Cambridge University Press.

Maliwal G.L. (2006).*Handbook of environmental management.* New Delhi :Agrotech Publishing Academy.

Nayak, Arjuna Charan (2006). *Ethico Environmentalism.* An outlook souvenir U.G.C sponsored National Seminar, Department of Economics, Kendrapara Autonomous College Kendraprasa, Orissa.

Naseema, C. (2006).*Influence of sex and social position on attitude towards environment of secondary school pupils*. New Delhi: AIU.

Ozden,M.(2008).Environmental education as a subject in schools. http://www.tandfonline.com/doi/abs/10.2167/irgee227.0

Palmer, J.A. (1991). *Implementing CGT: policy into practice*. Journal of Environmental Education.

Praharaj ,M.B.(1996).A Study of the Effect of Programmes Developing Awareness towards Environment among the Pupils of Standard –IV, Indian Educational Abstract, Issue-4,198,NCERT New Delhi,P.83.

Praharaj,B.(1991).Environmental knowledge, environmental attitude, and perception regarding environmental education among pre service and in service secondary school teachers in Fifth Survey of Educational Research, Vol.II,NCERT. New Delhi, pp.1756-1757.

Pandey, S. (2000) *Status of environmental education*. University News, Vol 38 (39), New Delhi: AIU House.

Padmanabhan, J. (2008). Environmental awareness and environmental attitude of secondary school teachers of Maldives: A study. https://www.researchgate.net/publication/291695465 Environmental awareness and Environmental Attitude of Secondary School Teachers of Maldives: A study

Patel DG, and Patel SK(1995). An investigation into the Environmental Awareness and its enhancement in the secondary school teachers. The Progress of Education, LXIX(12):256-259 and 268.

Rou,S.(1995).A study of awareness and attitude of teachers and students of high school towards environmental education in Jobalpur District Indian Educational Abstract Issue I NCERT New Delhi p 62-63.

R.Sabhlok (1995) A study of the awareness and attitude of teachers and students of high school towards environmental education in Jobalpur District. Ph. d Thesis AniDugavati Vishwavidyalaya, Indian Educational Abstract, Issue I, section 24:6.

Rai,D.K. (2000). Role of education and cultural practices in creating environmental awareness, Indian Educational Abstracts 2002,Vol.2(1),NCERT. New Delhi, pp.66.

Rane,A.J.(1989) Evaluation of the environmental studies approach of ParisarAsha in Municipal schools in Greater Bombay. Fifth Survey of Educational Research 1988-92 vol.II. NCERT.

Shanawaj.(1990).Environmental awareness and environmental attitude of secondary and higher secondary school teachers and students. Ph.d Thesis. University of Rajasthan, *Fifth Survey of Education Research 2(33)1759.*

Suni,L.(2000). Development of an identification key on 'Inflorescence' for higher secondary students. M.Ed Thesis, University of Kerala Trivandrum.

Sward,L. & Marcibkowski, T.(2005) Environmental Sensitivity: A review of the research 1980-1998.

Sahoo (2003)Population growth and sustainable development of forest resources, Orissa Economic Journal, Orissa Economics Association, Bhubaneswar, Jan-June and july-Dec, 2003.

Sharma, K.V.S. (2015). *Statistics made simple.* New Delhi: Ashoke K. Ghosh Prentice Hall of India Private Limited.

Tripathi,M.P.(2000). A comparative study of environmental awareness of students in Central schools and other schools at 10+2 level. Indian Educational Abstract Vol.2 (1)2002,NCERT. New Delhi pp.12-13.

TilottamaSenapati and Rajan Kumar Sahoo (2009).*Environmental Education and Pollution Control*. New Delhi: Mittal Publication

Volk, Trudi, L. & Marie, J.C.(2003). The effects of an environmental education program on students, parents and community. The Journal of Environmental Education.Vol.34 (4):12-25.

Vaughan, Christopher, Robert and Julie (2003).The effect of environmental education on school children, their parents and community members: A study of intergenerational and intercommunity learning. Journal of Environmental Education,Vol.34, issue 3,p 12.

Wilson, J.R. & and Monroe, M.C. (2005). Biodiversity curriculum that supports education reform. Applied Environmental Education and Communication An International Journal 4(2):125-138.April 2005.

ISSN 2395-731X

# Mizoram Educational Journal

(A National Refereed Bi-Annual Journal)

Vol. V Issue 1, June, 2019

# CONTENTS

# An Analysis of the Quality of Environmental Education for Degree Students in Mizoram

P. C. Lalremruati *
Lynda Zohmingliani**

**Abstract**

*It is a known fact that environmental education has been a part of formal education for a long time in India and has also been evolving as a separate subject so as to suit the needs of various states. This article is an attempt to find out as to whether or not the syllabus prescribed for environmental education at the degree level clearly meets the needs of the students. Moreover, this article also reveals the time allotted to environmental education in the college time table and the mode of transaction of environmental education and makes suggestions for further improvements so as to enable the reader to make conclusions about the quality of environmental education at this level.*

***Keywords:*** *Environmental education, Awareness, Skills, Syllabus, Time table, Transaction*

## Introduction

Environment refers to all social, economic, biological, physical and chemical factors which constitute the surroundings of man and includes all those things upon which we are directly or indirectly dependent for our survival. Environmental education is education that is intimately connected with the environment. It is education about the environment, through the environment and for the environment. It is a process by which people develop awareness of, concern for and knowledge of the environment and learn to use their understanding to preserve, conserve and utilize the environment in a sustainable manner for the benefit of present and future generations.

To meet the present environmental situation, it is essential that everyone makes a contribution which will emerge from environmental knowledge. It is universally

*P.C. Lalremruati, Research Scholar, Department of Education, Mizoram University, Aizawl, Mizoram. Email: remruati.peecee@gmail.com.
** Dr. Lynda Zohmingliani, Assistant Professor, Department of Education, Mizoram University, Aizawl, Mizoram. Email: lynda.zohmingliani@gmail.com

acknowledged that education is an effective means for social reconstruction as it offers solutions to the problems societies face with. To protect and manage the environment, it is imperative to have a sound environmental education. It not only offers opportunities for experiential learning outside of the classrooms but also enables students to make connections and apply their learning in the real world. It helps learners to see the interconnectedness of social, ecological, economic, cultural and political issues. In this way, they become citizens who are truly aware of the environment and its problems, thus meeting one of the most important objectives of environmental education, which is to create awareness among students.

**Rationale of the study:**

The environment is degrading at a much faster pace than our imagination. Most of this mess is caused by human activities. Human beings are facing grave environmental problems and adjustment to changes in the environment has become a huge challenge. All members of society depend on natural resources to survive. The availability of these resources has limits. It is therefore essential that people understand the need for environmental education for their quality of life and have the knowledge of tools and skills to live in ways that minimize the impact of their actions on the environment. The future health and welfare of our nation depends on our earth's resources and sustained developmental activities. A positive attitude and informed environmental decisions are conducive to sustainability. These are possible only through a sound understanding of the environment.

It is universally acknowledged that education is an effective means for social reconstruction as it creates awareness and educates people for solutions to the problems societies are faced with. To protect and manage the environment, it is imperative to have a sound environmental education. Today's students will be responsible for making decisions that will shape the health of the environment. To prepare them for such responsibilities, they need sound environmental education which would help them to take informed decisions. For this reason, it was considered important to know the status of environmental education at the degree level of education in Mizoram and to reveal the positive and negative aspects so that required steps, if required, may be taken by appropriate bodies.

**Objectives of the Study:**

1. To find out the adequacy of the syllabus for environmental education at college level based on the curriculum outlined by UGC.
2. To find out the time allotted in the colleges of Mizoram to the subject of environmental education on weekly basis.

3. To assess the mode of transaction of environmental education at college level within the state of Mizoram.

**Methodology of the study:**

Descriptive survey method was followed for the study. The population of the study was all the under-graduate colleges of Mizoram. Ten colleges were included in the sample of the study. Data was collected from primary sources with the help of questionnaire cum interview schedule developed by the investigators. The analysis of data was done by descriptive statistics like percentage.

**Analysis and interpretation of data:**

The data collected for the realization of the objectives were analyzed and interpreted according to the three objectives of the study and the results are presented below followed by discussions.

**1. Adequacy of the Syllabus based on the Curriculum outlined by UGC**

The first objective of the study was to find out the adequacy of the syllabus for environmental education at college level based on the curriculum outlined by UGC. The syllabus for environmental education at college level was found to have four units. Unit wise contents are presented in Tables -1(i) to 1(iv) followed by interpretations.

**Table – 1(i)**

**Unit 1 of the Syllabus for Degree Students on Environmental Education**

| | |
|---|---|
| Unit 1 – Introduction and Natural resources | Renewable resources and associated problems.<br>1) Forest resources: Use and over exploitation, Deforestation.<br>2) Water resources: Use and over utilization of surface and ground water; conflicts over water.<br>3) Minerals resources: use and exploitation, environmental effects of extraction and using mineral resources.<br>4) Food resources: Changes caused by agriculture and effects of modern agriculture.<br>5) Energy resources: Renewable and non renewable energy sources.<br>6) Land resources: Land degradation, soil erosion and desertification. |

Our dependence on nature is so great that we cannot continue to live without protecting the earth's environmental resources. The topics mentioned under first unit of the syllabus are quite adequate to inculcate a sense of awareness and concern about the importance of utilizing the different renewable resources and provide learners with the knowledge and skills for managing the resources that must be protected for future generations. The syllabus aims at providing children with knowledge, attitudes and skills necessary to equip them to contribute meaningfully towards the betterment of the environment and accomplish the goal of sustainable development. It enables the students to know the meaning of resources, their variety, location and distribution and also to understand the importance of resources in our life. The topics seemed to be adequate for development of awareness on natural resources, conservation process and to take initiatives for the purpose.

**Table – 1(ii)**

**Unit 2 of the Syllabus for Degree Students on Environmental Education**

| | |
|---|---|
| Unit 2– Biodiversity and its conservation | 1. Definition of biodiversity.<br>2. Bio-geographical classification of India.<br>3. Biodiversity at national and local levels, hot spots of Biodiversity in India.<br>4. Threats to biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts, endangered and endemic species of India.<br>5. Conservation of biodiversity: in situ and ex situ conservation of biodiversity. |

Unit 2 of the syllabus deals with biodiversity and its conservation. The topics included in this unit are intended to develop knowledge and awareness about diversity of living organisms among the learners and also to foster a strong sense of participation towards the preservation and conservation of biological resources which is essential for the survival of mankind. Besides, the topics aim at generating among learners a need for awareness of and sensitivity to the total environment in a holistic manner and the problems associated with it. The processes and strategies suggested would help develop positive attitude, social values and strong concern for sustainable development and further improvement of the environment.

**Table – 1(iii)**

## Unit 3 of the Syllabus for Degree Students on Environmental Education

| | |
|---|---|
| Unit 3– Environmental Pollution | 1. Definition, causes, effects and control measures of air pollution, water pollution, soil pollution.<br>2. Solid waste management: Causes, effects and control measures of urban and industrial wastes.<br>3. Disaster management: Floods, earthquakes, cyclones and landslides. |

Unit 3 of the syllabus is concerned with the environmental pollution which is one of the most dangerous ecological crises being faced by man nowadays. The topics emphasize on the need to protect and control environmental pollution that is occurring at an alarming pace and the ways to actively get involved or participate in managing environmental problems. The topics can instill in the learners the skills and attitude needed to live in harmony with our environment. The unit also contains lessons that should enable a learner to understand right and wrong actions for the environment which is a useful skill. The topics aim at instilling in the students an awareness of and a healthy attitude towards reducing the emissions of major sources of pollution and attempt to enable them to take remedial actions in those areas where pollution has increased beyond the carrying capacity of the environment.

**Table – 1(iv)**

**Unit 4 of the Syllabus for Degree Students on Environmental Education**

| | |
|---|---|
| Unit 4–Social issues, development and the environment | 1. Sustainable development, carrying capacity of the environment.<br>2. Water conservation: Rain water harvesting, watershed management.<br>3. Environmental movements, resettlement and rehabilitation of people, its problems and concerns.<br>4. Shifting cultivation and its impact, wasteland reclamation<br>5. Population growth: Population explosion. |

Unit 4 of the syllabus deals with the social issues, development and the environment. The topics aim at enabling the learners to develop and acquire knowledge about the issues that affect our daily lives. Some of these issues are related to the conflict between the existing development strategies and the need for environmental conservation. The topics also aim at leading the students towards positive attitude for the improvement of the environment.

**2. Time Allotted to the subject of Environmental Education on Weekly basis**

To find out the time allotted in the colleges of Mizoram to the subject of environmental education on weekly basis was the second objective of the study. For this purpose, the time tables of the ten colleges were examined and the results are presented in Table-2 followed by interpretation.

**Table-2**

**Time devoted for Environmental Education in the Colleges of Mizoram**

| No of colleges having 5 environmental education classes in a week | | No of colleges having 4 environmental education classes in a week | | No of colleges having 3 environmental education classes in a week | |
|---|---|---|---|---|---|
| No | % | No | % | No | % |
| 6 | 60% | 3 | 30% | 1 | 10 |

***Source: Field study***

Table-2 indicates that, among the sampled colleges, 60%, 30% and 10% of colleges of Mizoram had allotted 5, 4 and 3 periods respectively per week for environmental education. Considering the importance of environmental education, it would be immensely better to have colleges hold the same number of environmental education classes in one week. This will take care of any disparity that might exist among college students within the state with regards to environmental knowledge and awareness.

**1. Assessment of the Mode of Transaction of Environmental Education at College Level**

The third objective of the study was to assess the mode of transaction of environmental education at college level within the state of Mizoram. The data collected were analyzed and the results are presented in Table-3 followed by interpretation.

**Table-3**

**Mode of Transaction of Environmental Education at College Level**

| No of colleges | College using lecture method | | College using demonstration method | | College using fieldtrips method | | College using practical method | |
|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | No | % |
| 10 | 10 | 100% | Nil | - | Nil | - | Nil | - |

***Source: Field Study***

Through the analysis of data it was found that the most common teaching method adopted in all the colleges was lecture method of teaching. No colleges use other methods of teaching for transaction of environmental education. Although lecture method is the most economic form of transaction, it is not adequate because it tends to be too theoretical and environmental education is much more than theory. Other modes of transaction like demonstration, practical classes and field trips may also be much more beneficial. This indicates the need to conduct more activity based learning for the study of environmental education at college level in order to motivate and encourage the students regarding environmental awareness.

**Suggestions:**

Importance should be given to environmental education so that the basic objectives of developing awareness, skills and attitude are attained and new patterns of behaviour of individuals, group and society as a whole towards the environment is created. Based on the this study, the following suggestions are made for better transaction of environmental education at the college level.

- The syllabus opted by colleges is suitable but requires support for proper transaction of it by capable and environmentally aware teachers.
- Adequate resource supports to teachers in shape of books, manuals and other relevant teaching materials should be provided.
- The government should provide the college with necessary funds and resources for attainment of the objectives of environmental education.
- Environmental education should be activity based learning in order to enhance, encourage and motivate the students to learn and bring new life and meaning into their learning experience rather than simply learn through class teaching.

- As far as possible, colleges should take part in local environmental campaigns. The institutions as well as the teachers must be responsible for motivating and engaging the students to get involved in community actions and to take part in various local environmental campaigns.
- Environmental education should not be given only through lecture method. Project works related to the contents of environmental education should be assigned to the students for developing interest and investigative attitude.
- Teachers in charge of environmental education should be given thorough in-service orientation in environmental education so as to equip them with the latest knowledge regarding environmental education.

**Conclusion**

The main objective of environmental education is to impart proper knowledge, awareness and trainings to solve various problems of our environment systematically. The study revealed that the course content of environmental education at college level is aimed to open the minds of students towards the environment in a positive way. It is aimed to create in students a sense of awareness, knowledge and positive attitude towards the environment while actively striving to teach students much needed skills to battle environmental disasters and take part in environmental activities. Hence, it is required to be transacted by well qualified and trained teachers. Most importantly the syllabus aims to produce students who understand the importance of caring for the environment and minimizing societies' impact on the environment in order to secure better utilization of life for present and future generations. The course would prepare them to initiate and carry on practical initiatives at individual, group and community level for solving environment-related problems and move towards a life of perfect harmony with their social and natural environment.

The study also revealed that lecturing in the classroom is the most commonly used technique for teaching environmental topics. To create a healthy learning environment there is a need to conduct activity based learning to motivate students in the learning of environmental education. Teachers are the backbone for students' development and so it is necessary that teachers have adequate knowledge about the environment, as without it students will not be able to get the right kind of information. Teachers also play central roles in building necessary abilities and competencies in students for exploring, understanding appreciating and participating in environmental protection and conservation. The findings also indicate that majority of the colleges have given much priority to environmental education classes to help foster in the students an awareness concerning the environment while a few colleges did not seem to give it much importance. Ultimately what is important is that each college be made

aware of the importance of this subject. A sound understanding of environmental education will surely go a long way in solving the existing environmental problems and lessen upcoming anticipated problems.

**References**

Bhostle, S. (2006). *Environmental education in schools*. New Delhi: AIU House.

Dayal, M. (1987). *Environmental education for conservation and development*. Indian Environmental Society: New Delhi.

Lalremruati, P.C. (2014). *Environmental education in elementary schools in Mizoram: An analytical study* (Unpublished master's thesis). Department of Education, Mizoram University, Aizawl, Mizoram.

Vernal, L. (2006). *Pedagogy in environmental education*. New Delhi: AIU House.

**BRIEF BIO-DATA OF THE CANDIDATE**

| | | |
|---|---|---|
| NAME | : | P.C. LALREMRUATI |
| FATHER'S NAME | : | ZONUNDANGA |
| DOB | : | 09.11.1989 |
| ADDRESS | : | H.No.RK-55, ZEMABAWK,<br>AIZAWL, MIZORAM |
| GENDER | : | FEMALE |
| RELIGION | : | CHRISTIANITY |
| MARRITAL STATUS | : | MARRIED |
| EDUCATIONAL QUALIFICATION | : | M.A., M. PHIL |
| PH.D. REGISTRATION NO & DATE | : | MZU / Ph.D. / 814 of 09.11.2015 |
| DEPARTMENT | : | EDUCATION, MIZORAM UNIVERSITY |
| TITLE OF THE THESIS | : | ENVIRONMENTAL EDUCATION IN COLLEGES OF MIZORAM: AN ANALYTICAL STTUDY |

**DEPARTMENT OF EDUCATION**

**PARTICULARS OF THE CANDIDATE**

| | | |
|---|---|---|
| Name of the Candidate | : | P.C. Lalremruati |
| Degree | : | Doctor of Philosophy |
| Department | : | Education |
| Title of Thesis | : | Environmental Education in Colleges of Mizoram: An Analytical Study |
| Date of Admission | : | 07/08/2015 |
| Approval of Research Proposal | | |
| 1. BOS | : | 04.11.2015 |
| 2. School Board | : | 09.11.2015 |
| Registration No. & Date | : | MZU / Ph. D/ 814 of 09.11.2015 |
| Extension if any | : | Nil |

(Prof. H.MALSAWMI)

Head

Department of Education

# ABSTRACT

## ENVIRONMENTAL EDUCATION IN COLLEGES OF MIZORAM: AN ANALYTICAL STUDY

BY

P.C. LALREMRUATI

Department of Education

Submitted

in partial fulfillment of the requirement of the Degree of Doctor of Philosophy in Education of Mizoram University, Aizawl

## ABSTRACT

### Introduction

Earth is the only planet known so far to have life in the Solar System. During millions and millions of years, life evolved on this earth. Each living things is habituated to a certain way of life either in water, on land or underneath the soil. The surrounding features have to be amenable for a certain species to survive and thrive. This surrounding feature is called the environment. The environment is a broad concept encompassing the whole range of diverse surroundings in which we perceive experience and react to events and changes. It is the aggregate of all external conditions and influences that support living things. The term environment is very wide in the sense that it takes into account all the factors that directly or indirectly have a bearing on the natural surroundings of human beings. The word environment has been derived from a French word “Environia” meaning to surround. It refers to abiotic (physical or non-living) and biotic (living) environment. It means surrounding or condition in which a person, animal, decomposer or plants lives or operates.

Environmental education is education that is intimately connected with the environment. It is education about the environment, through the environment and for the environment. It is an essential tool for achieving effective resource management and sustainable development. It provides an understanding of how natural system work and the impact of human activities upon the natural system and fosters environmental awareness and concern. It gives reality, relevance and practical experience to learning through direct contact with the environment, develops aesthetic appreciation and skills for data gathering and field investigations. It also develops an

informed concerned and sense of responsibility for the environment and skills to participate in environmental improvement and promotes an ability to adopt lifestyles compatible with the wise used of environmental resources.

Environmental education in college is necessary so as to teach students on how to use the present and future resources optimally and to provide experience in problem solving and decision making and also to develop opportunities for students to interact with the environment and with each others. Environmental education prepares each and every individual for life through an understanding of the contemporary world and should constitute a lifelong education and makes one responsive to changes in rapidly changing world. It gives an individual an idea about balance in the ecosystem which is disturbed due to human interference and teaches us about everything that influence man.

Environmental education is a necessary process in promoting the need for personal initiatives and social participation in order to achieve sustainability. In this growing human population many people have realized the need for environmental education. People living in rural, tribal, slum and urban areas, students and teachers in schools, colleges and universities need to be educated about the environment at all levels of education. Besides environmental education being an important component for an effective policy framework for protecting and managing the environment it is also necessary for understanding the basis of our existence and those that surround us. It is needed for helping individuals in resolving fundamental issues relating to the present and future use of the worlds resources. Our nation's future depends on a well-educated people to be wise on the environment that sustains our communities and future generation. Environmental education is thus an education which can help an

individual in making complex connection between economic prosperity benefits to society, environmental health and our own well-being.

**Rationale of the Study**

Environment is degrading at a much faster pace than our imagination. Most of this mess is caused by human activities. Human beings are facing grave environmental problems and adjustment to changes in the environment has become a huge challenge. All members of society depend on natural resources to survive. The availability of these resources has limits. The impacts of the environmental issues are affecting not only at the local level and it is global problem of important phenomena. Many industrial and infrastructural developments, human population growth and urbanization, plastic usage, electronic wastes, vehicular emissions, contamination of pollutants in the water bodies, soil and atmospheric pollution have devastated the natural environment causing severe ill health effects on human beings. Many developed countries are slowly finding several alternative and innovative technologies to minimize the effects of pollution and optimal utilization of the natural sources. It is therefore essential that college students who are supposed to be our future leaders should understand the need of environment to their quality of life and should have the knowledge, tools and skills to live in ways that minimize the impact of their actions on environment. It is thus essential that students should be inculcated the effective and optimal use of our natural resources and energy to safeguard our mother nature and in conserving our resources in order to attain sustainability in all levels. There is a need of environmental awareness on every aspect of the environment and conservation of natural resources and biodiversity so as to produce socially responsible citizens of

tomorrow. The future health and welfare of our nation depends on our earth's resources and sustained developmental activities. A positive attitude and informed environmental decisions are conducive to sustainability. These are possible only through a sound understanding of the environment.

Therefore to meet the present environmental situation it is essential that everyone makes a contribution which will emerge from environmental knowledge. It is universally acknowledged that education is an effective means for social reconstruction and to a great extent offers solution to the problem societies are faced with. To protect and manage environment it is thus important to have a sound environmental education. Today's students will be responsible for making decisions that will shape the health of the environment. To prepare them for such responsibilities, they need a sound environmental education from which to make those decisions. Hence the present study has been undertaken.

**Research Questions**

The following questions came to mind regarding the status of environmental education in colleges of Mizoram:

1. Is there a proper syllabus for environmental education at college level in Mizoram? If so, what are the contents?
2. Is the mode of transaction of environmental education at college level in Mizoram uniform in all colleges? If yes, what mode(s) are followed?
3. Is there any special procedure for evaluating environmental education at college level in Mizoram?

4. What is the qualification of teachers teaching environmental education at the college level?
5. Will there be a balance of the two genders among the teachers teaching environmental education in colleges?
6. Are experienced teachers being given the responsibility of teaching environmental education in the colleges of Mizoram?
7. How much time is devoted to the teaching of environmental education at colleges of Mizoram?
8. What is the attitude of college students of Mizoram towards the environment?
9. Is there any difference between male and female college students in their attitude towards the environment?
10. Will students of different streams be different in their attitude towards the environment?
11. Can there be a more effective way to teach environmental education at college level?

**Statement of the Problem**

The present study has been stated as *Environmental Education in Colleges of Mizoram : An analytical study.*

**Objectives of the Study**

The objectives of the present study are as follows:

1. To assess the contents of the syllabus for degree students on environmental education in colleges of Mizoram.

2. To find out the mode of transaction of environmental education at college level.
3. To study the evaluation procedures of environmental education at college level.
4. To study the profile of teachers teaching environmental education at college level.
5. To study the time devoted for environmental education in the college time tables.
6. To study the attitude of college students towards the environment.
7. To find the difference in the attitude of male and female students towards the environment in the colleges of Mizoram.
8. To find the difference in the attitude among students from different streams towards the environment.
9. To suggest measures for making environmental education effective at college level in Mizoram.

**Hypotheses**

The following hypotheses have been stated so as to realize the $7^{th}$ and $8^{th}$ objectives of the study:

1. There is no significant difference in the attitude of male and female college students towards the environment.
2. There is no significant difference in the attitude of male and female college students of arts stream towards the environment.

3. There is no significant difference in the attitude of male and female college students of commerce stream towards the environment.
4. There is no significant difference in the attitude of male and female college students of science stream towards the environment.
5. There is no significant difference in the attitude of male and female college students towards the environment in the area of health and hygiene.
6. There is no significant difference in the attitude of male and female college students towards the environment in the area of wildlife.
7. There is no significant difference in the attitude of male and female college students towards the environment in the area of forests.
8. There is no significant difference in the attitude of male and female college students towards the environment in the area of polluters.
9. There is no significant difference in the attitude of male and female college students towards the environment in the area of population explosion.
10. There is no significant difference in the attitude of male and female college students towards the environment in the area of environmental concern.
11. There is no significant difference in the attitude of male and female science students towards the environment in the area of health and hygiene.
12. There is no significant difference in the attitude of male and female science students towards the environment in the area of wildlife.
13. There is no significant difference in the attitude of male and female science students towards the environment in the area of forests.
14. There is no significant difference in the attitude of male and female science students towards the environment in the area of polluters.

15. There is no significant difference in the attitude of male and female science students towards the environment in the area of population explosion.
16. There is no significant difference in the attitude of male and female science students towards the environment in the area of environmental concern.
17. There is no significant difference in the attitude of male and female arts students towards the environment in the area of health and hygiene.
18. There is no significant difference in the attitude of male and female arts students towards the environment in the area of wildlife.
19. There is no significant difference in the attitude of male and female arts students towards the environment in the area of forests.
20. There is no significant difference in the attitude of male and female arts students towards the environment in the area of polluters.
21. There is no significant difference in the attitude of male and female arts students towards the environment in the area of population explosion.
22. There is no significant difference in the attitude of male and female arts students towards the environment in the area of environmental concern.
23. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of health and hygiene.
24. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of wildlife.
25. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of forests.
26. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of polluters.

27. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of population explosion.
28. There is no significant difference in the attitude of male and female commerce students towards the environment in the area of environmental concern.
29. There is no significant difference in the attitude of science, arts and commerce students towards the environment in the colleges of Mizoram.
30. There is no significant difference between arts and science students in their attitude towards the environment in the colleges of Mizoram.
31. There is no significant difference between science and commerce students in their attitude towards the environment in the colleges of Mizoram.
32. There is no significant difference between commerce and arts students in their attitude towards the environment in the colleges of Mizoram.
33. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of health and hygiene.
34. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of wildlife.
35. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of forests.
36. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of polluters.
37. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of population explosion.
38. There is no significant difference among science, arts and commerce students in their attitude towards the environment in the area of environmental concern.

39. There is no significant difference between science and arts students in their attitude towards the environment in the area of environmental concern.

40. There is no significant difference between arts and commerce students in their attitude towards the environment in the area of environmental concern.

41. There is no significant difference between science and commerce students in their attitude towards the environment in the area of environmental concern.

**Method of Study**

The present study was mainly focused on the status of environmental education in colleges and the attitude of college students towards the environment. Therefore it was largely descriptive in nature. In order to gain primary data about subjects, the use of questionnaire and interview schedule was adopted. Secondary data was also collected and analyzed. Both quantitative as well as qualitative approaches were employed for successful realization of objectives.

**Population**

In the present study, for the assessment of attitude of college students, the target population of the study comprised of all the 4th semester students of arts, science and commerce streams of degree colleges of Mizoram.

**Sample**

For the present study, the sample selected comprised of 600 degree college students of Mizoram from 3 streams viz. Arts, Science and Commerce, out of which 300 were males and 300 were females. 100 male and 100 female students were

selected from each of these streams for the sample. The samples were selected on the basis of stratified random sampling.

For finding out the profile of teachers, mode of transaction of environmental education and evaluation procedures used, all the teachers who taught environmental education during the time this test was done were considered as the population.

In order to find out the profile of teachers teaching environmental education in colleges, mode of transaction of the subject and the evaluation procedures, no sampling was done and the population was studied as a whole.

**Tools and Techniques Used**

Data were collected from primary and secondary sources. Primary data were obtained through:

1. Taj Environmental Attitude Scale (TEAS)
2. Interview schedule developed by the investigator.

**Taj Environmental Attitude Scale (TEAS)**

Taj Environmental Attitude Scale (TEAS) was developed by Dr. Haseen Taj in 2001. Following the Likert's method of summated rating procedure Taj Environmental Attitude Scale (TEAS) was developed with 61 items consisting of six areas which aimed to identify the attitudes of people towards various aspects of environment. The six areas included in the scale are attitudes towards:

1. Health and Hygiene
2. Wildlife
3. Forests
4. Polluters

5. Population Explosion

6. Environmental Concern

Each item alternatives is assigned a weightage ranging from 4 (strongly agree) to 1 (strongly disagree) for favorable items and the scoring is reversed from 1 (strongly agree) to 4 (strongly disagree) in the case of unfavorable items. The attitude score of an individual is the sum total of item scores on all the six areas. The range of scores is from 61 to 244. For each statement there are no right or wrong answers. What is required is each individual feeling or opinion about the statement. The reliability of the scale was estimated by two methods (a) split half (odd-even and 1$^{st}$ half-2$^{nd}$ half) and (b) test retest reliability co-efficient with a time gap of one month on a sample of 150.

**Construction of Interview Schedule**

The interview schedule was constructed keeping in mind the research objectives that were to be realized through this tool as such ten questions were framed so as to find out the profile, the teaching mode of transaction as well as the evaluation procedures. The questions were all close ended questions so as to enable respondents to answer easily and also to make the task of analysis of the answers easier for the researcher.

**Collection of Data**

For gathering information regarding teachers profile, mode of transaction as well as evaluation procedure, the researcher made use of the interview schedule that had been constructed by the herself. Permission was taken from respective college Principals and concerned teachers for the administration of the interview schedule.

The investigator personally visited all the concerned teachers and also took care to retrieve all the interview schedule that had been answered. Care was taken to see that all respondents answered each questions.

For collection of data concerning the attitude of college students regarding their attitude towards the environment, the researcher took permission from college Principals where the questionnaire was to be administered. She personally went to all the colleges until she had gathered enough data from the different streams of arts, science and commerce. Each response questionnaire was checked to ensure that respondents had addressed all the items. No problem was encountered during the collection of data.

**Statistical Treatment of Data**

Keeping in view the objectives of the study the investigator employed the following statistical techniques for tabulating and analyzing the data.

1. Content analysis to assess the syllabus of environmental education.
2. Descriptive statistics like mean, standard deviation and percentage to divide and find out the attitude of college students towards the environment.
3. Inferential statistics like ANOVA and t tests to find out the significance of difference among different variables.

## Major Findings and Discussion of the study

### 1. Major Findings and Discussions regarding Contents of Syllabus for Degree Students on Environmental Education in Colleges of Mizoram

The contents of syllabus for degree students on environmental education were assessed against the syllabus suggested by UGC which had prepared it with the help of experts in the field.

**Macro Analysis:** The macro analysis revealed the following features of the syllabus of environmental education in colleges of Mizoram:

a. The syllabus contents suggested for colleges under Mizoram University had been adapted from the one suggested by UGC.

b. The syllabus contents suggested for colleges under Mizoram University was divided into 5 units whereas the syllabus suggested by the UGC were completed in 8 units.

c. The units of the syllabus for degree colleges of Mizoram were further sub divided into 43 sub topics. The topics in the syllabus suggested by UGC were further divided into 136 sub topics.

d. The approach of the syllabus content for the degree colleges of Mizoram was majorly lecture centered whereas the one suggested by the UGC had a balance of lecture, demonstration and practical methods.

e. Both the syllabus contents suggested for degree colleges under Mizoram University and the one suggested by UGC were to be completed in 50 classes.

**Discussions:** From the macro analysis, it could be concluded that the syllabus contents suggested for colleges under Mizoram University, while it has been

adapted from the one suggested by UGC, is much less in content than the suggestion of syllabus made by the UGC. Although Universities are allowed freedom to modify the UGC suggested syllabus according to their regional differences. But as seen from the gestalt view of the two, it was obvious that while they were both designed for 50 classes, the syllabus suggested by Mizoram University did not contain a number of topics vital to today's environmental needs.

**Micro Analysis**

The micro analysis was done on each five units of the syllabus for degree students of Mizoram on environmental education. The following were the findings:

**A. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-1**

a. The title of this unit 'Introduction and Natural Resources: renewable resources and associated problems' when assessed against the syllabus suggested by UGC, showed that there was difference in the number of topics and sub topics under one heading/unit. There were 6 topics, namely: 1) forest resources, 2) water resources, 3) mineral resources, 4) food resources, 5) energy resources and 6) land resources and subdivided into 14 sub topics.

b. The 6 topics were sub divided as follows:

i. Forest resources were sub divided into use and over exploitation and deforestation. Timber extraction, mining, dams and their effects on forest and tribal people that appear in the UGC syllabus had been excluded. Case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

ii. Water resources were sub divided into use and over utilization of surface and ground water as well as conflicts over water and important problems caused by floods and droughts that appeared in the UGC syllabus had been excluded.

iii. Mineral resources were sub divided into use and exploitation, environmental effects of extraction and using mineral resources. But case studies which were to be accomplished in a practical manner had been excluded although they had been suggested by the UGC.

iv. Food resources were again sub divided into two namely changes caused by agriculture and effects of modern agriculture. Important topics in the syllabus suggested by UGC like world food problems, water logging, salinity and fertilizer- pesticide problems which are pertinent topics for Mizoram were excluded. Case studies which had also been suggested for this topic by the UGC were also excluded.

v. Energy resources were sub divided into two topics namely renewable and non renewable energy sources. Topics like growing energy needs, use of alternate energy sources and case studies which were suggested by UGC had been excluded.

vi. Land resources contained three sub topics which were land degradation, soil erosion and desertification which are all important topics that directly concerns Mizoram were included. But suggested topics like land as a resource and man- induced landslides which are also important topics for the state were cut off although they had been suggested by UGC.

c. It did not include topics on role of individual in conservation of natural resources and equitable use of resources for sustainable development which

were suggested by UGC. Although colleges are under no compulsion to follow the syllabus suggested by UGC and are allowed to make necessary modifications according to local needs, the investigator felt that too many topics, some of them with direct consequence to the environment of Mizoram were excluded. Moreover, case studies, which are practical and give firsthand experience to learners, were excluded.

**B Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-2**

a. This unit was entitled 'Ecosystems'. There were 5 topics namely: 1) concept of ecosystem, 2) structure and function of an ecosystem, 3) producers, consumers and decomposers, 4) energy flow in the ecosystem, food chains, 5) food webs and ecological pyramids. On the other hand, the syllabus suggested by UGC had 7 topics.

b. None of the five topics were sub divided into smaller sub topics and were learnt as sub topics in themselves.

c. Topics like ecological succession and study of different ecosystems like grassland, forest, desert and aquatic (ponds, streams, lakes, oceans, estuaries and rivers) ecosystems had been excluded although they were suggested by UGC.

**C. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-3**

a. The title of this unit was 'Biodiversity and its Conservation'. It consists of 5 topics namely: 1) definition of biodiversity, 2) bio geographical classification

of India, 3) bio-diversity at national and local levels: hot spots of biodiversity in India, 4) threats to biodiversity, 5) conservation of biodiversity. On the other hand, the syllabus suggested by UGC had 8 topics.

b. The 5 topics were further sub divided as follows:

i. Three topics namely, definition of biodiversity, bio geographical classification of India and biodiversity at national and local levels: hot spot of biodiversity in India had no sub topics of their own.

ii. Threats to biodiversity were sub divided into habitat loss, poaching of wildlife, man- wildlife conflicts, endangered and endemic species of India.

iii. Conservation of biodiversity was further split into in-situ and ex situ conservation of biodiversity.

c. Topics like genetic, species and ecosystem biodiversity, value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values and biodiversity at global level and India as a mega-diversity nation had been excluded although they were suggested by UGC.

**D. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-4**

a. The name of this unit was entitled 'Environmental Pollution'. It consists of 3 topics namely: 1) pollution, 2) solid waste management and 3) disaster management. On the other hand, the syllabus suggested by UGC had 5 topics.

b. The 3 topics were further sub divided as follows:

i. Pollution was sub divided into definition, causes, effects and control measures of air, water and soil pollutions.

ii. Solid waste management were further sub divided into causes, effects and control measures of urban and industrial waste.

iii. Disaster management was sub divided into floods, earthquakes, cyclones and landslides.

c. All the above topics were indeed directly relevant to the environmental condition of Mizoram. However, topics like marine pollution, noise pollution, thermal pollution, nuclear hazards and role of individual in prevention of pollution had been excluded along with case studies on pollution although they were suggested by UGC. Although topics like marine pollution, noise pollution, thermal pollution, nuclear hazard might not be of immediate concern to the state at present, they were topics of international concern and students might gain an important insight into pollution by their addition.

**E. Major Findings on Contents of Syllabus for Degree Students of Mizoram on Environmental Education under Unit-5**

a. This unit was entitled 'Social Issues, Development and the Environment'. It consists of 5 topics namely: 1) sustainable development, carrying capacity of the environment, 2) water conservation, 3) environmental movements, resettlement and rehabilitation of people: its problems and concerns, 4) shifting cultivation and its impact, wasteland reclamation, and 5) population growth: population explosion. On the other hand, the syllabus suggested by UGC had a total of 15 topics under the same unit.

b. The topics were not further sub divided except for water conservation which were sub divided into two namely rain water harvesting and watershed management.

c. Unlike other units where topics had been excluded from the main UGC suggested content, an important topic, i.e., development, had been wisely included although it was not suggested by UGC.

d. Topics suggested by the UGC that had been excluded were namely: from unsustainable to sustainable development, urban problems related to energy, environmental ethics: issues and its possible solutions, case studies of climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

e. Many other topics like consumerism and waste products, environment and wildlife protection act, air and water (prevention and control of pollution) act, forest conservation act and the issues involved in enforcement of environmental legislation and awareness of the public were also excluded in the syllabus contents for degree students of Mizoram.

f. Two sub topics such as carrying capacity of the environment and impact of shifting cultivation that were not included in the syllabus suggested by UGC had been added in the syllabus contents of degree students of Mizoram. This was a welcome addition and showed that the planners of the syllabus had put a lot of thought while they were formulating it. Besides these, topics like population growth and population explosions that were given in unit 7 of the syllabus suggested by UGC were added in this unit.

**Missing units**

The following units and activities (which are a part of the UGC suggested syllabus) were found to be missing from the syllabus for environmental education suggested for degree colleges of Mizoram under Mizoram University.

1. Multidisciplinary nature of environmental studies.
2. Human population and the environment.
3. Field work.

These three components, if added to the present syllabus would be a very welcome addition because they are the very topics through which many of the objectives of environmental education would be met.

**Discussions:** From a micro analysis of each unit, it was concluded that while the syllabus content of Mizoram University on environmental education was quite good in itself, when compared with the syllabus suggested by UGC, it was much lighter in content. A number of pertinent topics like fresh water management, causes of deforestation in the context of Mizoram, building of roads and its consequences, landslides and a host of other topics of vital interest to Mizoram were not in the syllabus. It would be ideal to include these topics and enable college students to really understand their circumstances.

Besides, the syllabus was solely prepared for lecture method of teaching. There were 5 units which were broken down into 43 sub units covering a wide range of topics and were not short of vital information that would be of use in creating awareness and a positive attitude towards the environment among the college students of Mizoram. On the other hand, the UGC has suggested a syllabus which is to be completed in 8 units, with each unit divided into several sub topics which are again

divided into as many as four sub topics. The content of syllabus given by the UGC under unit 7 and 8 are especially crucial for environmental awareness because they cover current concerns of the environment as well as demonstration and field work. In fact, this field based study of environmental education is very much encouraged by international organizations for environmental awareness rather than the largely theoretical and lecture based syllabus made by the government of Mizoram for degree students. Therefore, the syllabus for environmental education in Mizoram, while it has its strengths in being very informative to students, still needs to be reviewed with a view to ensure that college students are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment.

## 2. Major Findings and Discussions regarding Mode of Transaction of Environmental Education at College Level

a. All the degree colleges of Mizoram subscribed to the syllabus suggested by Mizoram University for environmental education.

b. Lecture method of teaching was the most commonly used technique for the teaching of environmental education at college level in Mizoram with 100% of the colleges adopting it as the main teaching method. This also explained why the syllabus for environmental education was basically framed to cater to topics suitable for a lecture method of transaction.

c. It was found out that none of the colleges in Mizoram had adopted demonstration and project methods of teaching or fieldtrips for the study of environmental education.

**Discussions:** With regards to the mode of transaction of environmental education, it was found that all of the degree colleges of Mizoram adopted the lecture method. This finding is in contradiction to the findings of Tewksbury and Harris (1982) who conducted a study on the methodologies used in environmental education and found that majority of the teachers used discussion method. There is also enough research evidence to show that project method is also very effective in the teaching of environmental studies. The possible reason why the present study found that lecture method of teaching is one of the most commonly used technique for the teaching of environmental education at colleges in Mizoram may be due to the fact that since lecture method is one of the easiest ways of classroom teaching all of the teachers applied for it. Although this was the most convenient mode of transaction, it would be much better to teach environmental education in an activity based manner. The reason why lecture method was adopted as the main method could be that no extra financial investments seem to have been made for this subject. But it should be strongly recommended that more financial investment be made for this subject so that students could have a more realistic understanding of the subject and its importance. None of the colleges had adopted demonstration, discussion, experimental or field trips methods for the transaction of environmental education at colleges in Mizoram. However, the investigator strongly supports the addition of other methods of transaction of environmental education.

**3. Major Findings and Discussions regarding Evaluation Procedures of Environmental Education at College level**

a. All the colleges in Mizoram had written examination on environmental education for evaluation.

b. There was no practical examination on environmental education.

c. None of the colleges conducted class test on environmental education.

d. All of the colleges applied internal tests to secure internal marks.

**Discussions:** The study discovered that 100% of the colleges in Mizoram subscribed to the evaluation standards set by the affiliating university, Mizoram University which stipulates 25 as internal marks and 75 as external marks. While the investigator could not deny the importance of written examination from the point of view of education, an educational experience solely based on theoretical knowledge is not enough and cannot be considered an all-round development.

Therefore, it may be concluded that the evaluation system for environmental education under the University itself was hardly adequate to inculcate an awareness of the environment in the college students. It would be ideal if environmental education could include practical elements that would give students a first-hand experience rather than theoretical knowledge alone.

**4. Major Findings and Discussions regarding Profile of Teachers Teaching Environmental Education at College Level**

**A. Findings regarding Profile of Teachers according to Gender**

a. A total of 67.06% of the teachers who were appointed for the teaching of environmental education in colleges were male teachers while there were only 32.94% of female teachers who were appointed for the teaching of environmental education in colleges of Mizoram.

**Discussions**: The present study clearly revealed that teachers from various subjects were simply given the responsibility of teaching environmental education. The fact that more male teachers were given the task of teaching environmental education could mean a number of things. It could mean that male teachers were preferred to female teachers to teach the subject. It could also mean that there were more available male teachers to be given the responsibility of teaching the subject. Last but not least, it could also mean that male teachers were more willing to teach the subject. Whatever the case may be, the conclusion is that more male teachers are given the task of teaching the subject and this indicated a bias in gender which is not at all acceptable by today's standards of equality of genders.

**B. Findings regarding Profile of Teachers according to Educational Qualification**

a. Out of the total of 85 teachers teaching environmental education, 52.94 % of the teachers had master degree in Arts (M.A). There were 42.35% of teachers who had a master degree in science (M.Sc.) and 4.71 % of teachers were from commerce background (M.Com).

b. Out of all the 85 teachers teaching environmental education in colleges of Mizoram, 15.29% of teachers had a degree of Ph.D and 4.71% of the teachers had an M.Phil.Degree.

c. There were 29.41 % of teachers who were qualified for NET (National eligibility test) and 8.24 % of teachers who were qualified for SLET (State level eligibility test).

**Discussions**: From the findings, it may be concluded that colleges of Mizoram still recruited teachers who had not qualified for NET at the time this investigation was done. Although the main aim of this investigation was not on the qualification of teachers, it was still disheartening to find that teachers with varying qualifications were teaching the same subject. It would be a boost to quality if the university could implement the rules of UGC regarding recruitment of teachers in the undergraduate colleges of Mizoram. This would have further positive impact on the general standards of the University.

**C. Findings regarding Profile of Teachers according to Employment Status**

a. There were 64.71 % of permanent teachers teaching environmental education in colleges of Mizoram while there were only 35.29 % of teachers who were working as temporary teachers.

**Discussions:** Since the present research was focused on the status of environmental education and not the status of teaching in colleges in general, no conclusion could be made regarding the status of teaching in the colleges of Mizoram. But it was clear that there were still a number of teachers working on a temporary basis. This could mean that the government is not providing enough opportunity for permanent employment and that some of the teachers are working beyond the requirement of their employment. The sad part is that temporary teachers can leave their place anytime they want to. Therefore, permanent teachers are much preferable

to temporary teachers so that students have a stable experience. If the government could look into this and take necessary steps, colleges would be in a much better place,

**D. Findings regarding Profile of Teachers according to Teaching Experience**

a. There were 14.12 % of teachers who had below 5 years teaching experience.

b. There were 27.06 % of teachers who had teaching experience between 5-9 years.

c. The highest percentage i.e. 30.59% of teachers had a teaching experience between 10-14 years.

d. A total of 15.29% of teachers had a teaching experience between 15-19 years.

e. Only 12.94% of teachers teaching environmental education in colleges of Mizoram had a teaching experience of 20 years and above.

**Discussions:** As found in the study, only a few of the teachers teaching environmental education had a teaching experience less than five years. Otherwise, all of them had a good teaching experience. It may be concluded that as far as teaching is concerned, environmental education is taught by experienced teachers who have more than five years' experience in teaching. Therefore, as far as teaching is concerned, students are not being left at the hands of inexperienced teachers in majority of the colleges.

**5. Major Findings and Discussions regarding the Time Devoted for Environmental Education in the College Time Table**

a. 19. 23% of degree colleges gave 5 credits to environmental education classes in a week.

b. 15.40% of degree colleges gave 4 credits in a week to environmental education classes.

c. A staggering 65.37% of them had less than 4 credits in a week, not conforming to University standards.

d. It is noteworthy to mention that only 9 degree colleges, i.e., 34.61% of the degree colleges had periods of one hour duration. The rest of them i.e., 65.39% had periods lasting from 45 to 50 minutes.

**Discussions**: It was clearly stated by the affiliating University, Mizoram University, that Environmental Education, as one of the foundation courses, was to have 5 credits in a week. But less than 20% of the colleges could conform to this. Moreover, it was found that colleges did not have uniformity where the duration of each period was concerned. Therefore, it would be good if the university could insist on uniformity in the number and length of periods in a day for colleges to follow on a weekly basis. If environmental education was given the 5 credits it deserved, students would be much more benefitted. Moreover, a uniform time table would be a step in the right direction because students under the degree colleges affiliated to Mizoram University would be subjected to uniform class experience. This would be a massive improvement because at the time this study was done; different colleges gave different number of classes to their students.

## 6. Major Findings and Discussions regarding Attitude of College Students towards Environment

a. All the college students were found to have positive attitude towards the environment although the degree of positivity differed.

b. Majority (65.83%) of the college students had moderate positive attitude towards the environment.

c. A small number of them 16.83% had low positive attitude towards the environment.

d. 17.34 % of the college students had high positive attitude towards the environment.

*Classifications of students on their attitude towards the environment under different dimensions as outlined in the scale used were as follows:*

**A. Findings regarding Attitude of College Students towards the Environment in the area of Health and Hygiene**

a. All the college students were found to have positive attitude towards the environment in the area of health and hygiene although the degree of positivity differed.

b. 69.84% of the college students had moderate positive attitude towards the environment in the area of health and hygiene.

c. 13.33 % of the college students had low positive attitude towards the environment in the area of health and hygiene.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of health and hygiene.

**B. Findings regarding Attitude of College Students towards the Environment in the area of Wildlife**

a. All the college students were found to have positive attitude towards the environment in the area of wildlife although the degree of positivity differed.

b. 66.83% of the college students had moderate positive attitude towards the environment in the area of wildlife.

c. 15.33 % of the college students had low positive attitude towards the environment in the area of wildlife.

d. 17.83 % of the college students had high positive attitude towards the environment in the area of wildlife.

**C. Findings regarding Attitude of College Students towards the Environment in the area of Polluters**

a. All the college students were found to have positive attitude towards the environment in the area of polluters although the degree of positivity differed.

b. 68.17 % of the college students had moderate positive attitude towards the environment in the area of polluters.

c. 15 % of the college students had low positive attitude towards the environment in the area of polluters.

d. 16.83 % of the college students had high positive attitude towards the environment in the area of polluters.

**D. Findings regarding Attitude of College Students towards the Environment in the area of Forests**

a. All the college students were found to have positive attitude towards the environment in the area of forests although the degree of positivity differed.

b. 81.84 % of the college students had moderate positive attitude towards the environment in the area of forests.

c. 10.66 % of the college students had low positive attitude towards the environment in the area of forests.

d. 7.5 % of the college students had high positive attitude towards the environment in the area of forests.

**E. Findings regarding Attitude of College Students towards the Environment in the area of Population Explosion**

a. All the college students were found to have positive attitude towards the environment in the area of population explosion although the degree of positivity differed.

b. 71.33 % of the college students had moderate positive attitude towards the environment in the area of population explosion.

d. 13.33 % of the college students had low positive attitude towards the environment in the area of population explosion.

e. 15.33 % of the college students had high positive attitude towards the environment in the area of population explosion.

**F. Findings regarding Attitude of College Students towards the Environment in the area of Environmental Concern**

a. All the college students were found to have positive attitude towards the environment in the area of environmental concern although the degree of positivity differed.

b. 64 % of the college students had moderate positive attitude towards the environment in the area of environmental concern.

c. 19 % of the college students had low positive attitude towards the environment in the area of environmental concern.

d. 17 % of the college students had high positive attitude towards the environment in the area of environmental concern.

**Discussions:** The study revealed the attitude of students towards the environment in general as well as their attitude towards different aspects of the environment. It was heartening to find that all the college students had a positive attitude towards the environment even though the level of positivity differed. This showed that students in the colleges of Mizoram had a positive attitude towards the environment and understood the needs of the environment to a great extent. Considering that they only had theory classes, it was concluded that this was quite a positive finding in itself and showed the society in a good light. This spoke well for an early start in Environmental Education. In Mizoram, schools start environmental education from primary levels. However, times could come when progress might hit the still relatively untouched society and colleges have to prepare students for the future. Therefore, much needed area to be covered is the topic on sustainable development because students are indeed future leaders of the state.

## 7. Major Findings and Conclusion regarding Difference in the Attitude of Male and Female Students towards the Environment in the Colleges of Mizoram

*Comparison was done between male and female students with regard to their attitude towards the environment in general and then with regard to each dimension of environmental attitude as outlined in the scale used.*

a. Significant difference was found in the attitude of male and female college students towards the environment.

b. Female college students had a more favorable attitude towards the environment when compared with male college students.

*Difference in attitude of college students towards the environment was also compared between male and female students of different streams as follows:*

**A. Findings regarding Difference in the Attitude of Male and Female College Students of Arts Stream towards the Environment**

a. No significant difference was found between male and female college students of arts stream with regards to their attitude towards the environment.

**B. Findings regarding Difference in the Attitude of Male and Female College Students of Commerce Stream towards the Environment**

a. No significant difference was found between male and female college students of commerce stream with regards to their attitude towards the environment.

**C. Findings regarding Difference in the Attitude of Male and Female College Students of Science Stream towards the Environment**

a. Significant difference was found between male and female college students of science stream with regards to their attitude towards the environment.

b. Female students of science stream had a more favorable attitude towards the environment than male students of science stream.

**Discussions:** It could be concluded that female colleges' students had a more positive attitude towards the environment in general. Among the different streams, male and female science students differed in their attitude towards the environment. It was clear that female science students had more positive attitude towards the environment. In this regard, the investigators concluded that, since in Mizo society, women are subjected to number chores that are related to the environment, they had a natural affinity with nature. On the other hand, male members are associated with masculine characteristics like hunting and cutting down trees, male students had a naturally slightly less sensitivity towards nature.

*Difference in attitude among male and female college students towards the environment under different dimensions as outlined in the scale used was further compared and results were as follows*:

**A. Findings regarding Difference in the Attitude of Male and Female College Students towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found between male and female college students with regards to their attitude towards the environment in the area of health and hygiene and wildlife. Female college students had a significantly more favorable attitude towards the environment in the area of health and hygiene as well as wildlife than male college students.

b. No significant difference was found between male and female college students with regards to their attitude towards the environment in the area of forests, polluters, population explosion and environmental concern.

**Discussions:** It was concluded that male and female college students had mostly equally positive attitude towards the environment in general in the six specific areas that were selected in the scale used in the present study except for the areas of wildlife and health and hygiene. The researcher concluded that this could be because of expectation of so called female and male traits attributed by society.

*Comparison between male and female college students within different streams of study was also done on the 6 dimensions of environmental attitude scale and results were as follows:*

**A. Findings regarding Difference in the Attitude of Male and Female Students of Science Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of science stream towards the environment in the area of wildlife and polluters. Female students of science stream had a more significantly favorable attitude towards the environment in the area of wildlife and polluters than male students of science stream.

b. No significant difference was found in the attitude of male and female students of science stream towards the environment in the area of health and hygiene, forests, population, explosion and environmental concern.

**Discussions:** Not surprisingly, female science students again had a more positive attitude towards the environment in the area of polluters and wildlife when compared with male students. Here, too, the researcher concluded that female students had a more positive attitude towards the environment mainly because the different ways in which male and female students are broad up in Mizo society.

**B. Findings regarding Difference in the Attitude of Male and Female Students of Arts Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of wildlife and population explosion. Female students of arts stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students whereas male students of arts stream had a significantly more favorable attitude towards the environment in the area of population explosion than female students of arts stream.

b. No significant difference was found in the attitude of male and female students of arts stream towards the environment in the area of health and hygiene, polluters, forests, and environmental concern.

**Discussions:** It was concluded that among the arts students, male and female students had an almost equally positive attitude towards the environment. They differed only in two areas, i.e., towards wildlife and population explosion. The

investigator again concluded that this could be because of the different environment provided to men and women in the Mizo society.

**C. Findings regarding Difference in the Attitude of Male and Female Students of Commerce Stream towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found in the attitude of male and female commerce students towards the environment in the area of wildlife. Female students of commerce stream had a significantly more favorable attitude towards the environment in the area of wildlife than male students of commerce stream.

b. No significant difference was found in the attitude of male and female commerce students towards the environment in the area of health and hygiene, polluters, forests, population explosion and environmental concern.

**Discussions:** Here again, it was concluded that male and female students had equally positive attitude towards the environment under different areas except for the area of wildlife. This finding regarding attitude towards wildlife was in fact similar in other streams as well. The researcher could only conclude that it was the result of the different attitudes girls and boys are taught to grow up within the Mizo society.

The difference in the attitude of college students from the three streams of study i.e., science, arts and commerce were compared by ANOVA as follows:

**8. Major Findings and Conclusions regarding Difference in the Attitude among Students from Different Streams towards the Environment**

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment.

*Since the null hypothesis was rejected, the group means were further subjected to t test in order to find out where those differences existed. The results were as follows:*

**A. Findings regarding Difference in the Attitude of Students from Arts and Science Streams towards the Environment**

a. No significant difference was found between arts and science students with regards to their attitude towards the environment.

**B. Findings regarding Difference in the Attitude of Students from Science and Commerce Streams towards the Environment**

a. No significant difference was found between science and commerce students with regards to their attitude towards the environment.

**C. Findings regarding Difference in the Attitude of Students from Commerce and Arts Streams towards the Environment**

a. Significant difference was found between commerce and arts students with regards to their attitude towards the environment.

b. Commerce students had a more favorable attitude towards the environment than arts students.

## Conclusion

**Discussions:** It could be concluded that there was significant difference among the three streams because there was a difference among arts and commerce students in their attitude towards the environment, with commerce students having a slightly more positive attitude.

*Difference in attitude among college students of different streams (namely arts, science and commerce) towards the environment under different dimensions was further compared and results were as follows:*

**A. Findings regarding Difference in the Attitude among Students from Different Streams towards the Environment in the areas of Health and Hygiene, Wildlife, Polluters, Forests, Population Explosion and Environmental Concern in particular**

a. Significant difference was found among students from the three streams of study i.e., science, arts and commerce in their attitude towards the environment in the area of environmental concern only.

When subjected to t tests, significant difference was found between science and arts as well as arts and commerce college students in their attitude towards the environment in the area of environmental concern. Science students had a more favorable attitude towards the environment in the area of environmental concern when compared with arts students and commerce students had a more favorable attitude towards the environment in the area of environmental concern when compared with arts students.

**Discussions:** Among the three streams mainly arts, science and commerce, commerce students had the most positive attitude towards the environment. This was interesting as a general expectation was to have students from science, especially life sciences, to have the most positive attitude. This particular finding could be useful in reiterating that environmental education is not necessarily born out of studying a subject close to it. The same information could also be used to motivate students from other streams to develop a more positive attitude towards the environment.

## Conclusion

From the present study on environmental education in colleges of Mizoram, the investigator concluded that degree colleges of Mizoram are not in a very bad place where environmental awareness is concerned. College students had an averagely positive attitude towards the environment in spite of minimal efforts given by colleges in terms of teaching, resources, study materials and time. Inspite of all the drawbacks in the status of environmental education that were found in the study, the students still have quite an average understanding of the environment. There is high possibility that greater results will be found with a higher investment in this subject. Mizoram has the distinction of having one of the cleanest environment in the country. But with the advent of technology and more and more industries, its environment is slowly deteriorating especially within city and town areas. Therefore a deeper attention needs to be given to environmental education so that future generations are more environmentally aware and Mizoram continues to one of the cleanest environments in the nation.

**Educational Implications of the Study**

The present study has important implications for educational planners, administrators, teachers and students. It was found from the study that most of the students of colleges of Mizoram had a positive attitude towards the environment although the degree of positivity was not the same. This may be due to the fact that since environmental education has been introduced from the early stages of elementary education, college students developed a healthy attitude towards the environment and only need more in depth knowledge about it so that they can apply it in their everyday lives. This was a good indicator that starting environmental education early in formal education is a good practice since evidence clearly showed a lasting positive effect on students. Among the three streams of study i.e., commerce, arts and science, students from commerce stream show a much more positive attitude towards the environment. Thus, if teachers made the same effort to inculcate positive attitude in students, there would be no disparity in the attitude of students from different streams towards the environment.

The syllabus contents of environmental education for colleges under Mizoram University showed that it was mainly prepared for lecture method of teaching only. Since lecture method is the most easiest and convenient way of teaching, it would be beneficial if students could be engaged in more and more environmental activities which will further enhance students environmental knowledge and sensitivity and are made aware of the detrimental impacts of pollution, burden of wastes and other vital features of the environment. During the time this study was undertaken, it was discovered that no separate teachers were recruited for the teaching of environmental education like it is done in other subjects. Thus environmental education was mainly

taught by regular or temporary teachers who had been recruited for other subjects. This was not a good discovery as these teachers could not give their full attention to the subject and did not exercise their full potential. Moreover, most of the teachers did not go through any sort of training in environmental education and they too relied on text book knowledge for the teaching of environmental education. Since environmental education is multidisciplinary in nature, teachers from all streams may not be able to do justice to it without some training. Therefore, orientation training or a short course in environmental education would be beneficial to the teachers and ultimately the students so that they might gain a better knowledge and experience of the subject. However it would be more beneficial for students to have a special teacher with the proper educational background to teach environmental education. In this regard the government may be approached to render the financial help needed by the colleges so that students could have a richer experience.

**Recommendations for Making Environmental Effective at College Level in Mizoram**

Importance should be given to environmental education so that the basic objectives of developing awareness, skill and attitude are attained and new patterns of behavior of individuals, group and society as a whole towards the environment is created. Furthermore based on the knowledge gained through this study the following measures are suggested as improvements to the study of environmental education at the college level.

1. The findings in the present study strongly indicated that not much financial back up is received by colleges for the teaching of environmental education. In order to secure a more appropriate method of transacting environmental

education in the colleges of Mizoram, a greater amount of financial assistance is called for. Therefore, the government should provide the college with necessary funds and resources in order to enhance the learning of environmental education. If this cannot be the case, more creative means of generating financial assistance should be employed so as to make environmental education in colleges of Mizoram a worthwhile course of study.

2. Environmental education should be activity based learning in order to enhance, encourage and motivate the students to learn and bring new life and meaning into their learning experience rather than simply through classroom lecture. Projects on environment as well as field trips should be encouraged. In this regard, educational planners need to be informed so that they are aware of the needs of this subject and take necessary steps.

3. As far as possible, college should take part in local environmental campaigns. The institution as well as the teacher must be responsible in motivating and engaging the students to get involved in community action and to take part in various local environmental campaigns.

4. Separate teachers for the teaching of environmental education need to be recruited so that more priority is given to this subject and it would not be a secondary burden for teachers in charge. If possible, teachers with background in environmental science should be selected so that justice may be done to this subject. Teachers in charge of environmental education should be given thorough in-service orientation in environmental education so as to equip them with the latest knowledge regarding environmental education.

5. During the time this study was undertaken, a visit to the respective libraries and an unstructured interview with the librarians showed that none of the colleges had any of the foreign editions suggested as reading materials. Regarding the suggested reading materials of Indian origin as well, only a few of the colleges had a small collection of certain titles. None of the colleges visited had all the national publications that were listed as reading resources. This clearly indicates that reading materials need to be enriched so that students would be able to make use of them. For this a larger financial investment is again called for. If a larger financial investment is not practicable, prominent persons may also be invited to donate pertinent books for this course and non- governmental organizations may also be encouraged to give helping hands. This will help a lot in the way of making environmental education effective among students and also encourage healthy reading habits among them.

6. As found in the study, degree colleges of Mizoram did not have uniformity in the duration for each class and the number of classes in a day. This means that students in different colleges had varying class experience. As institutions affiliated to one university, it would be much better if undergraduate colleges under the university had a time tables that are uniform in distribution of classes.

7. It was found that female students had a better attitude towards the environment. For this, the investigator recommends that bigger efforts be made so that the two genders have equally positive attitude towards the environment.

8. Since a large percentage of the teachers teaching environmental education were not NET qualified, it is strongly recommended that the University makes strict guidelines to conform to UGC rules as far as recruitment of teachers; even on a temporary basis is concerned.

9. Since a high percentage of the teachers were on a temporary basis, they had the liberty to leave their college whenever a better prospect came up. This was not healthy for the development of students, not just for environmental education but for other subjects too. Therefore, it would be a most welcome qualitative improvement if recruitment on permanent basis could be conducted in an expedient manner so that temporary teachers need not be recruited time and time again since this practice could be a major disruption to quality education.

10. It was interesting to note that commerce students had the highest positive attitude towards the environment. The investigator, in this regard, recommends that each discipline be given the right information to understand their place in the healing process of the environment and their respective roles in protection of the environment.

11. A most interesting finding was that when male and female students were compared according to their attitude towards the environment, it was found that female students has a more positive attitude whenever there was a difference. The investigator concluded that this was because of the difference in societal expectations of the two genders. Therefore, it is important for the society to let go of a number of customs where males are expected to be more macho and ruthless. It is time to start having a fresh outlook towards

masculinity and associate it with kindness and care for the environment. This way, even males of the society will slowly but surely learn to love nature and have a more positive attitude towards it.

**Suggestions for Further Research**

Environmental education is an important subject of study in itself. More and more researches need to be done on this topic so as to generate an environmentally aware generation in the present as well as the future. The following topics may be taken up for further research:

1. A study of the syllabus for environmental education in elementary, secondary and higher secondary education in Mizoram.
2. An analysis of the attitude of rural and urban adolescents towards the environment in Mizoram.
3. An experimental study on the effects of various methods of transaction of environmental education at secondary level, college level and university level of education in Mizoram.
4. A critical study regarding the policies for environmental education by governmental bodies as well as non- governmental bodies.
5. A comparative study of two different states regarding the environmental attitude of college students.
6. An analysis of the awareness of college students of Mizoram towards the environment.
7. A study of the environmental activities of students at various levels of education in Mizoram.