1. INTRODUCTION

1.1 Man-Environment Relationship

1.1.1 Meaning of Environment

To define environment is as difficult as defining life. In general terms it refers to all the external conditions in which an organisms lives. Literally the very word 'Environment' comes from a French word 'Environner' which means 'to surround 'or 'to encircle'. Thus the word environment is used to describe everything that surrounds the organism, air, soil, water, climate, food supply and a myriad of their external conditions including the things created by man. Etymologists frequently conclude that in English usage at least, environment is the total of the things or circumstances around or organism – including humans though environs is limited to the " surrounding neighborhood of a specific place, the neighborhood or vicinity." In simple word, Environment is the 'Surroundings of the Self.' It is the totality of the biotic and a-biotic factors. According to the **Encyclopaedia Britanica (1994)** "Environment is the complex of physical, chemical and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival." So in reference to man, the environment has two broad components viz. physical or natural environment and social environment of human race which is a by-product of economic, social, and political interactions.

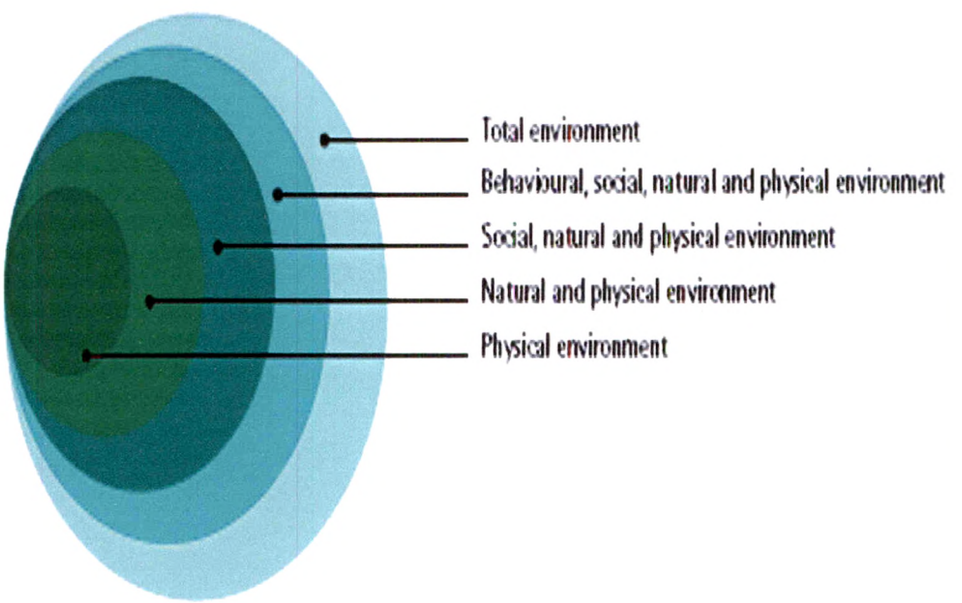
According to the International **Encyclopaedia of the Social and Behavirоual Science (2001)** "Environment is the total external conditions and influences affecting the life and fortunes of organisms, affecting the parameters of life."

The environment is thus the aggregate of all the conditions that support living things. In turn, living things, including humans, are all interactive parts of the environment. The environment consists of both natural and human-made systems. The natural environment includes the bio-system that supports all living things. The built environment is the human-made system, which is supported by the natural environment. The state of the natural environment ultimately determines the quality and survival of life on Earth.

In the medical sense, the environment includes the surroundings, conditions or influences that affect an organism **(Davis, 1989).** Along these lines, **Last (2001)** defined the environment for the International Epidemiological Association as: 'All that which is external to the human host can be divided into physical, biological, social, cultural, etc., any or all of which can influence health status of populations ...'. According to this definition, the environment would include anything that is not genetic, although it could be argued that even genes are influenced by the

environment in the short or long-term. Figure 1 shows one way to represent the environment, from the most inclusive to the most restrictive definition **(Smith, Corvalàn and Kjellström, 1999).**

FIGURE 1 DEFINITION OF THE ENVIRONMENT [a]



[a] (Adapted from Smith, Corvalàn and Kjellström, 1999)

For the purposes of environmental health, however, a more practical definition of the environment is needed, because environmental health action generally tries to change only the natural and physical environments and related behaviours (e.g. hand washing). Such interventions can rarely modify the social and cultural aspects of a community, which are usually independent of the environment (e.g. cultural pressures on lifestyle, unemployment). As a result, a more practical definition of the environment might be 'The environment is all the physical, chemical and biological factors external to a person, and all the related behaviours.'

1.1.2 Classification and Components of Environment

The classification of the environment can be described from the following figure:

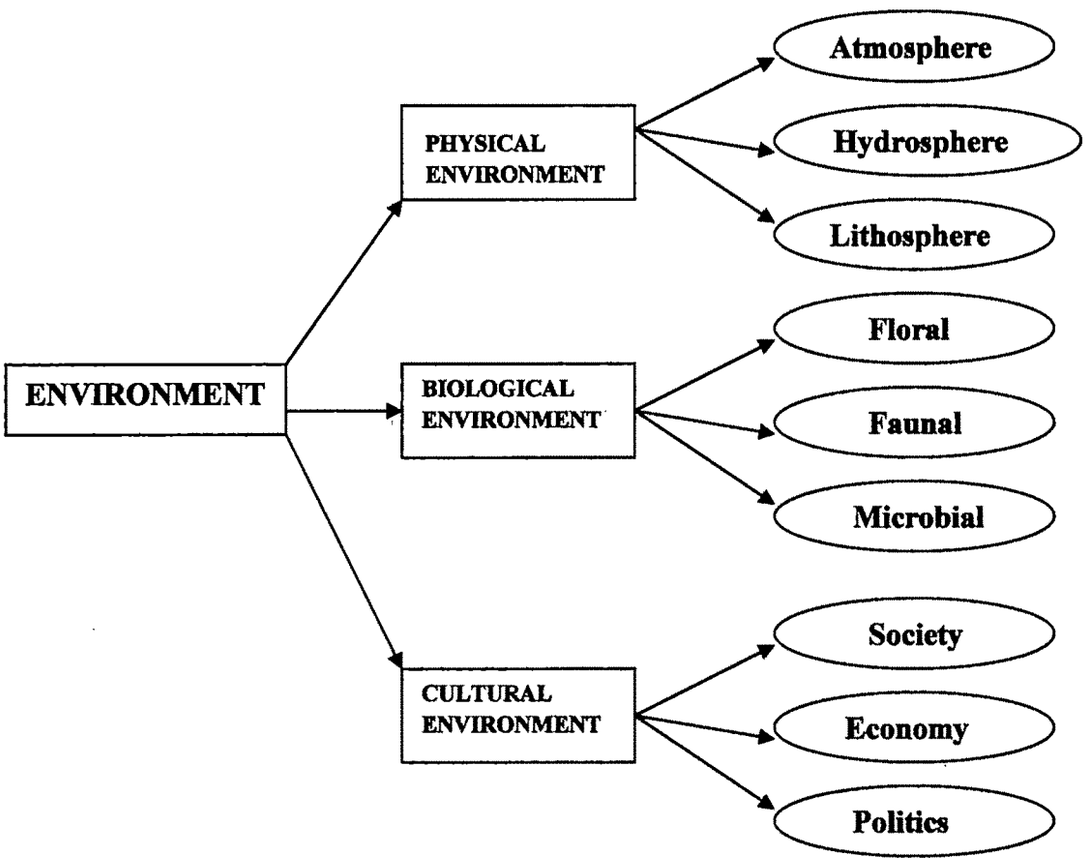


Fig 2. Classification of the Environment (Source: www.scribd.com/doc/.../11 - components of environment)

Environment has three distinct dimensions namely: Physical environment, Biological environment and Cultural environment. All the same, the study of the cultural environment has been allocated to sociologists, economists and managers. The biologists and doctors are in charge of studying our biological environment. This leaves the physical environment, which is taken care of by the environmentalists.

The components of the environment are broadly classified into two major categories:

1. Biological components or Biotic components
2. Physical components or Abiotic components

(Shrivastava, 2007)

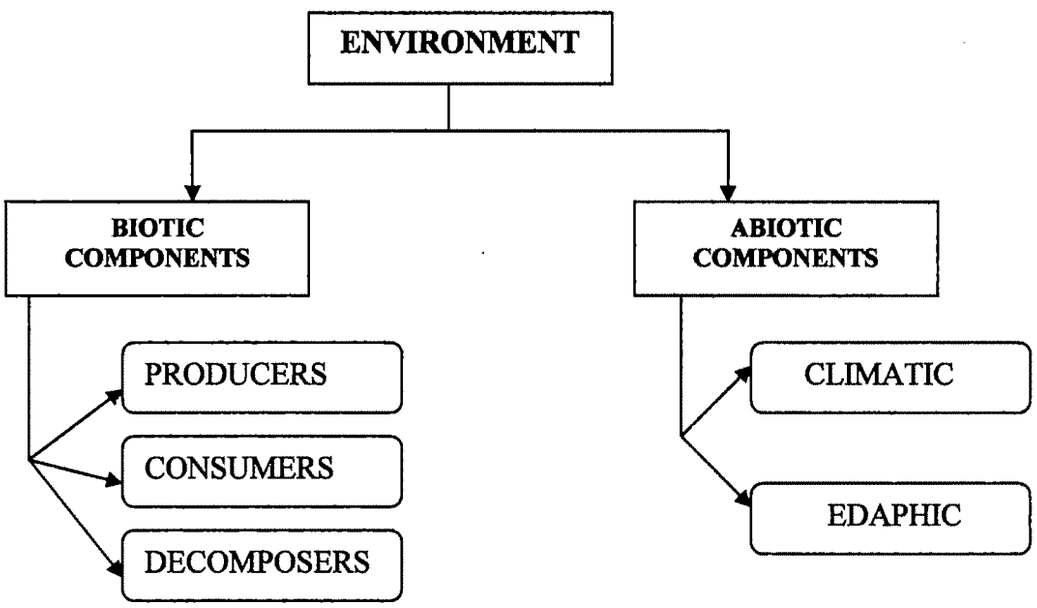


Fig3. Classification of the Environmental components

Here the components are classified in terms of life. The biotic components are further listed as producers, consumers and decomposers and the abiotic components are classified as climatic (water, air) and edaphic (land /soil).On the other hand if ecospheres are taken into consideration then the components of Environment are as follows:

1. Hydrosphere (Water)
2. Atmosphere (Air)
3. Lithosphere (Soil)
4. Biosphere (Flora / Fauna / Microbes)
5. Anthrosphere (Man made things)

1.1.3 The Environmental Crisis

A grave fear about the declining quality of the environment has been growing throughout the world, first among the scientists and more recently among the general public.

- The environmental crisis in the world has already started, and will continue to get worse if something is not done soon.
- Damage to the environment caused by mankind can be minimized or eliminated completely if certain steps are taken.
- Stopping the current environmental crisis in the world is critical to protecting the earth and all life on it.

The environmental crisis in the world has already started, and it is having a big effect on every country. This crisis has occurred for a number of reasons, but there are steps which can be taken to stop this crisis and improve the environment. Many people and companies do not want the statuesque changed, because they profit immensely from it. Coal burning power plants pollute the air and earth, yet pay no price for the greenhouse gas emissions and particle pollution that they profit from. The same is true for the big oil and other fossil fuel energy corporations, and they lobby with almost unlimited resources to keep energy changes from happening anywhere in the world. Alternative renewable energy sources are available, and have proven to be very eco-friendly while also being just as efficient and effective as fossil fuels. Oil, natural gas, and coal are limited resources, and much of the oil left is under foreign countries. Recovering fossil fuels also damages the earth and environment, because mining, drilling, and leeching can destroy habitats, and poison the air, water, and land. The environmental crisis in the world can be turned around, but action must be taken now before the earth reaches the tipping point, and the damage can not be reversed.

The environmental crisis in the world is caused by many things. An increasing population, over consumption of natural resources, deforestation of the rain forests, fossil fuel use, and garbage created by humans all play a part. Steps can be taken to resolve these issues, and keep from damaging the world even more. Switching to alternative renewable fuels and energy sources can eliminate carbon emissions which speed up the global warming and damage the ozone layer, as well as damage to the environment caused by the locating and recovery of fossil fuels. Biodiesel and ethanol can be created using biomass, and this biomass does not have to come from the food supply or use fertile land that could be used for food crops instead. Algae, some types of fungus, some types of waste, and many plant species can be used to create these fuels, without causing any food shortage or increasing world hunger. The environmental crisis in the world has already started, but energy conservation can still make a big difference as well.

Conserving energy can be done in many ways, and each step taken towards this goal will decrease the energy needed and consumed. Use energy efficient appliances, turn off the lights and televisions when not in use, and unplug appliances when they are not being used. Many homes have items like toasters and blenders which stay plugged in all the time, and even when turned off these appliances can pull electricity and use power in small amounts. Waste to energy programmes can also help keep the current environmental crisis in the world from becoming worse. One environmental problem is the waste dumped in landfills, and this waste

can pollute the environment while taking up large amounts of space. Highways, open land, and even the oceans are full of garbage, and this can be used to generate electricity. This process eliminates two of the contributing factors to the environmental crisis in the world, municipal waste and fossil fuel use. There are many ways to help the environment, instead of causing harm, while still generating the energy needed to prevent an energy crisis across the globe. Fossil fuel prices will go up steadily as the supplies dwindle, and these fuels do severe damage to the environment. Preventing their use would go a long way towards resolving the environmental crisis in the world right now.

The present environmental crisis has resulted not from our failures but from what we thought our great success -'The Industrial Revolution'. In this process we treated all natural resources as income items although they were undeniably capital items. We ate the capitals not the interest. Some prominent environmentalists, however, maintain the view that 'the real disease is the very concept and pattern of growth and development that are being followed in the resource rich but technologically poor developing countries and resource poor but technologically rich industrial countries.'

Honestly speaking, our Globe is in crisis. We, the civilized people have degraded our Environment in such a degree that our own race is facing the threat of extinction. Environmental degradation is one of the ten threats officially cautioned by the High-level threat panel of the United Nations. WRI (the World Resources Institute), UNEP (the United Nations Environment Programme), UNDP (the United Nations Development Programme) and the World Bank have made public an important report on health and the environment worldwide on May 1, 1998. Anthropogenic warming over the last three decades has likely had a discernible influence at the global scale on observed changes in many physical and biological systems. (IPCC-2007).

1.1.4 Major Global Environmental Threats

Anthoni (2001) classified the environmental threats into following categories:

1. *Threats to humans:* Health, food and water, shelter, recreation, hindrance, social cohesion, wealth etc.
2. *Threats to atmosphere and water cycle:* climate change, sea level rise, atmospheric pollution.
3. *Threats to land and soil:* water, exploitation, soil erosion, species diversity etc.
4. *Threats to the sea:* exploitation, soil erosion, habitat loss, nutrient discharge etc.

The major global environmental threats of the present day may be listed as follows:

- Green House effect
- Global Warming
- Depletion of ozone layer
- Population Pressure
- Deforestation, Soil Erosion, Desertification and Drought
- Pollution of Air,water,Soil and Sound
- Acid precipitation / Rain
- Toxic waste disposal
- Resource depletion
  - Depletion of ground water
  - Depletion of biological diversity
  - Depletion of genetic variability
  - Depletion of ocean bed resources
  - Depletion of nonrenewable resources
- Energy crisis – Nuclear energy , radiation ,coal and synthetic fuel
- Biological and chemical weapons research and nuclear arms race
- Ecological refugees –a growing problem.

1.1.5 Approaches to the study of man-environment relationship

The study of relationships between man and environment has always been a focal theme of environmental science and facets of man- environment relationship changed through time with the development of human society and the dimension of environment. As the man become social, economic and technological, he broadened his environment by creating his own environment through his design and skill to have provision for better food, shelter, access and comfort. The man environment relationships, thus, can be perceived and evaluated in a variety of ways and approaches as followings:

A. Deterministic Approach

This approach is based on the basic tenet of 'earth made man' and pays more attention on the complete control of physical environment on man and his activities. In fact, according to deterministic perspectives of man-environment relationships, man is subordinate to natural environment as all aspects of human life viz.physical (health and comfort), social, economic,

political, ethical and aesthetic etc. not only depend but are dominantly controlled by physical environment.

B. Teleological Approach

Teleological Approach is based on religious faith of man being superior to nature and all other creatures. This school emanated from the teaching of Judeo-Christian religious tradition which preached that 'man is superior to all creatures and everything is created for his use and enjoyment'. This ideology of man- environment / nature relationship fostered the man to exploit natural resources and to subdue nature without considering the after effects of reckless and uncontrolled plundering of natural resources.

C. Possibilistic Approach

Possibilistic Approach to the study of man-environment relationships emerged through the criticism of environment determinism and overtone of teleological approach. Right from the very inception of the school of environmental determinism there was dissenting voice raised by those who believed that 'no doubt physical environment influences man and his activities but there is ample scope for man to change the environment so much so that it becomes suitable for man and his society.' Possibilists were quite aware that man cannot fully tame the nature and is not always victorious. Possibilists replaced more deterministic terms 'control' by 'influence' and 'influence' by more moderate terms 'response' or 'adjustment'.

D. Economic Deterministic Approach

This approach is based on the basic ideology of Man's mastery over environment and continued economic and industrial expansion through the application of modern technologies. The basic thesis of the growth (affluence) school is that because economic growth is required for political, social and economic stability, the 'quality of environment' normally assumes lower priority in formulating planning proposals and in long – term planning because the deterioration of the environment is generally protracted and socially less oblique than a deterioration in the economy.

It may be pointed out that this extreme concept of economic determinism led to rapacious exploitation of natural resources in the western developed countries and thus created most of the environmental and ecological problems of global dimension.

E. Ecological Approach

Ecological Approach to the study of man- environmental relationships is based on the basic principle of ecology which is the study of mutual interactions between organisms and physical

environment on the one hand and interactions among the organisms on the other hand in a given ecosystem. Thus, man is considered as an integral part of nature/ environment.
It is obvious that the relationship between man and environment is two directional as the environment affects and influences man and in turn man also influences and modifies the environment. This type of mutual interactions and relationship between man and environment is symbiotic in character.

1.1.6 Man's interaction with Environment through ages

The history of mankind has revealed that the present configuration of human life is determined and affected by social as well as natural environment. International Encyclopedia of the Social and Behavioural Science (2001) defines environment as the total external conditions and influences affecting the life and fortune of organisms, effectively the 'parameters of life'. 'According to the biophilia hypothesis, the human species evolved in the company of other life forms, and we continue to rely — physically, emotionally, intellectually - on the quality and richness of our affiliations with natural diversity' (Saunders 2003). Healthy and diverse natural environment is necessary pre- condition for human lives of satisfaction and fulfillment (Kellert and Wilson 1993). So, it is the technology of man which has drastically changed the man-environment relationship from prehistoric period to the present most advanced industrial period.In fact, ' the industrial and scientific revolutions' have led to rapid changes in our environment ,but all technology, from the most primitive to the most advanced ,causes some changes in the environment.

As asserted by Gardner & Stern, (1996) the underlying cause of the depletion of natural resources in a large-scale social dilemma is the unrestricted access to natural resources – either renewable or nonrenewable – that people have, such as electricity, water, oil, clean air, etc. Though there is a traditional debate between conservationist and non-conservationist, still people in general are highly concerned with the quality of the environment (Gagnon Thompson & Barton, 1994; Manzo, & Weinstein, 1987; Mohai, 1985; Prester, Rohrmann, & Schellhammer, 1987). In spite of this general concern, people greatly differ in the level of their environmental involvement and in the amount of time and energy they are willing to invest in behaviours aimed at conserving or improving the quality of the environment. A comparatively recent study on motivation towards the environment suggests that these behaviours are not necessarily equal in terms of their perceived level of difficulty (Green-Demers, Pelletier, & Menard, 1997).

Many environmental problems have the structure of a social dilemma, namely a conflict between private interests and the interests of the collective at large (Dawes, 1980). Sachs (1993) mentioned how individual affinity to consumerism contradicts with concept of social solidarity of global citizenship. Posch (1993) has stated that 'the effects and side-effects of human activity become less and less predictable', and 'any judgement about environmental damage is based on value assumptions'. Johnston (1989) has noted: Understanding the nature of environment problems and how they might be solved requires much more than a scientific appreciation of environmental processes. It demands an understanding of how societies work and how collective action within those societies is both organized and constrained. Maha Haidar Makki *et.al.* (2003) categorically mentioned uninformed environmental decisions and behaviours could be very costly at the ecological, economic, and social levels.

The human systems are divided into socio-political activities (decision making, institutional organization, culture and values); and to physical activities (demography, consumption, production). This model provides at least a very general framework for cross-disciplinary discussions. Three basic dimensions of the role of humans can be differentiated (Clark, 1988):

- The interactions between human and environmental systems (the sources of global changes, the consequences of these changes).
- The choices that individuals, governments and organizations make in efforts to manage interaction (public perceptions, options, values).
- The underlying elements of social structure or culture that shape these interactions and choices.

According to the report prepared by IPCC (2007), the human influences on the issue of climate change may have-

- very likely contributed to sea level rise during the latter half of the 20th century
- likely contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns
- likely increased temperatures of extreme hot nights, cold nights and cold days
- more likely than not increased risk of heat waves, area affected by drought since the 1970s and frequency of heavy precipitation events. IPCC-2007

At this juncture where in one hand, we are accelerating the exploitation of nature indiscriminately on the other, people have felt the need of eco-friendly development which is further manifested through different sphere of life. O'Riordan (1992), basing his classification

on European perspectives on the way in which the environment might be managed, identified three main positions:

- Dry green, reflecting the prevalent scientific prediction within an 'enlightened' market economy;
- Shallow green, reflecting 'eco-auditing' in which production, marketing and consumption would be adjusted to a more 'ethically acceptable' environmental philosophy; and
- Deep green, reflecting a more sustainable approach to the planet as an entity, through emphases such as more 'self-reliant communities' (what might be called communalism) and a greater emphasis on 'global co-existence' and 'green rights' (what might be called Gaianism).

Only an environmentally literate society will be able to adequately and constructively participate in the on-going discussions and reflection. The present generation of students, and likely several successive generations, will inherit the Earth's environmental problems and be faced with addressing them, as they are problems that cannot be solved in one generation as suggested by Catherine Gautier and Stacy Rebich (2005). Therefore, humanity needs a new relationship with nature, a healthier bond between the `Self' and the `Surroundings', a new set of cultural values and a `paradigmatic shift' in the global vision of earth-man relationship. Development of healthy personal and social attitudes in learners will go a long way towards environmental sustenance, building a vigilant society, and promoting sustainable development, as well as maintaining a standard of health, hygiene and sanitation (NCERT-2003).

One indicator of environmentalism is environmental citizenship, which refers to support and acceptance of public policies that may require material sacrifice in order to reach environmental goals (Stern, Dietz, Abel, Guagnano & Kalof, 1999). A strong sense of environmental citizenship may help people to overcome potential barriers to environmentally benign behaviour. However, when a specific behaviour is received as easy to perform there is less need for a strong environmental citizenship to motivate a behavioural change (Chris von Borgstede and Anders Biel, 2002).

Thus if we look at the historical progression of man- environment relationships it become clear that purely natural relationship between 'physical primitive man' and natural environment during prehistoric period has changed to hostile relationship between

'technological man' and the environment at present. This substantial change and shift in the nature and magnitude of man's interactions with the natural environment has given birth to numerous environmental problems of serious consequences because the changes effected by man in the environment have become unadjustable by the in-built self regulatory mechanism of the natural environmental system / ecosystem.

1.1.7 Population, Environment and Quality of life

The relationship between population, environment and quality of life is quite complex, firstly because of the complexity of the characteristic of each and secondly because of lack of agreement among experts as to the cause and effect relationship between these factors. Therefore, one has to study the interrelationship without taking any firm position on which of the factors is the cause of other.

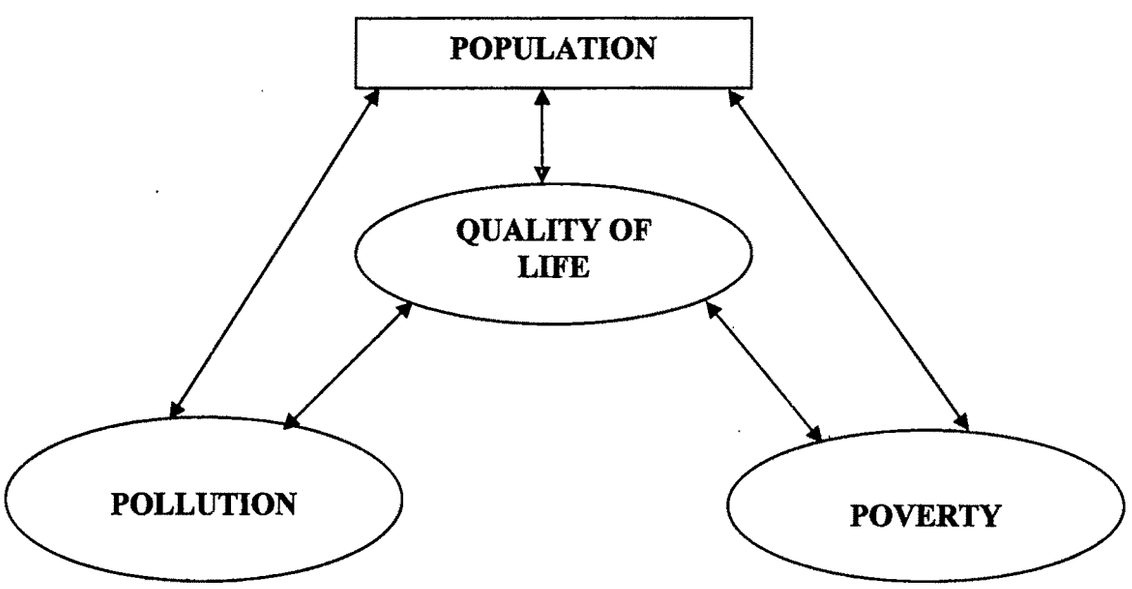


Fig4. Inter-relationship among the three problems and quality of life

The figure shows that the three problems of population growth, poverty and environmental pollution are inter-related and in turn affect the quality of life of the people. Unplanned population growth has been recognized by most people as a cause to environmental pollution and to promoting quality of life of the people. There are however people who hold entirely an opposite view. There has been a controversy between the 'doomsayers' who see the concurrent pressures of population growth, increased demand for resources and environmental degradation as serious threats to the earth's capacity to sustain development ; and the 'cornucopians' who see opportunities rather than problems, who predict with equanimity that human ingenuity ,technological advances and efficient distribution systems will overcome the

problems. There are others who combine different shades of arguments between the two extreme view points.

The relationship between population, environment and development is highly complex. Unless the value judgment is made as to what a developed society is, it is difficult to determine which changes are parts of the development process. Alternatives themselves range from different political, ideological or social systems to strategies of development concern with technical issues or simply to notion of the 'Third World' in which things are done in other ways than those pursued in the other two worlds. Many of the alternatives suggested for the Third World have, of course, Western origins which in many cases are unsuitable to the prevailing conditions in the Third World countries.

One of the criteria which can be applied to assess the quality of life may be the degree to which a society is stable or can live in harmony with the nature without endangering itself or the environment for an indefinite period of time. There may be four principles conditions of a stable society- one that to all intents and purpose can be sustained indefinitely while giving optimum satisfaction to its members. These are –

i. Minimum disruption of ecological process.
ii. Maximum conservation of material and energy or an economy of stock rather than flow.
iii. A population in which recruitment equals loss ; and
iv. A social system in which the individual can enjoy, rather than restricted by, the first three conditions.

The UNESCO declaration that 'since wars begin in the minds of men, it is in the minds of men that defenses of peace are to be constructed' is equally relevant to alleviating the problems of population increase, poverty, environment and sustainable development. It is in the 'minds of men' that radical changes will have to be made in order to ensure sustainable development and maintain optimum quality of life for all without endangering the environment..... .

1.1.8 Psychological factors of man-environment relationship

1.1.8.1 Awareness

According to Dictionary of Philosophy the term 'awareness' implies subjective state of being 'alert' or 'conscious'. Awareness makes people cognisant of information received from the immediate environment. Being aware simply means being conscious of relevant or necessary

components of the environment. However, awareness is intrinsically subjective in nature (Sengupta, 2005).

Environmental awareness can be defined as a general concept. It includes:

- Perception and understanding of threats, changes, and the options available.
- Values, attitudes and preferences among conflicting goals (Takala, 1991).

As Jean (1974) argued that real environment is seen through a culture filter made up of attitudes. The process is shown diagrammatically –

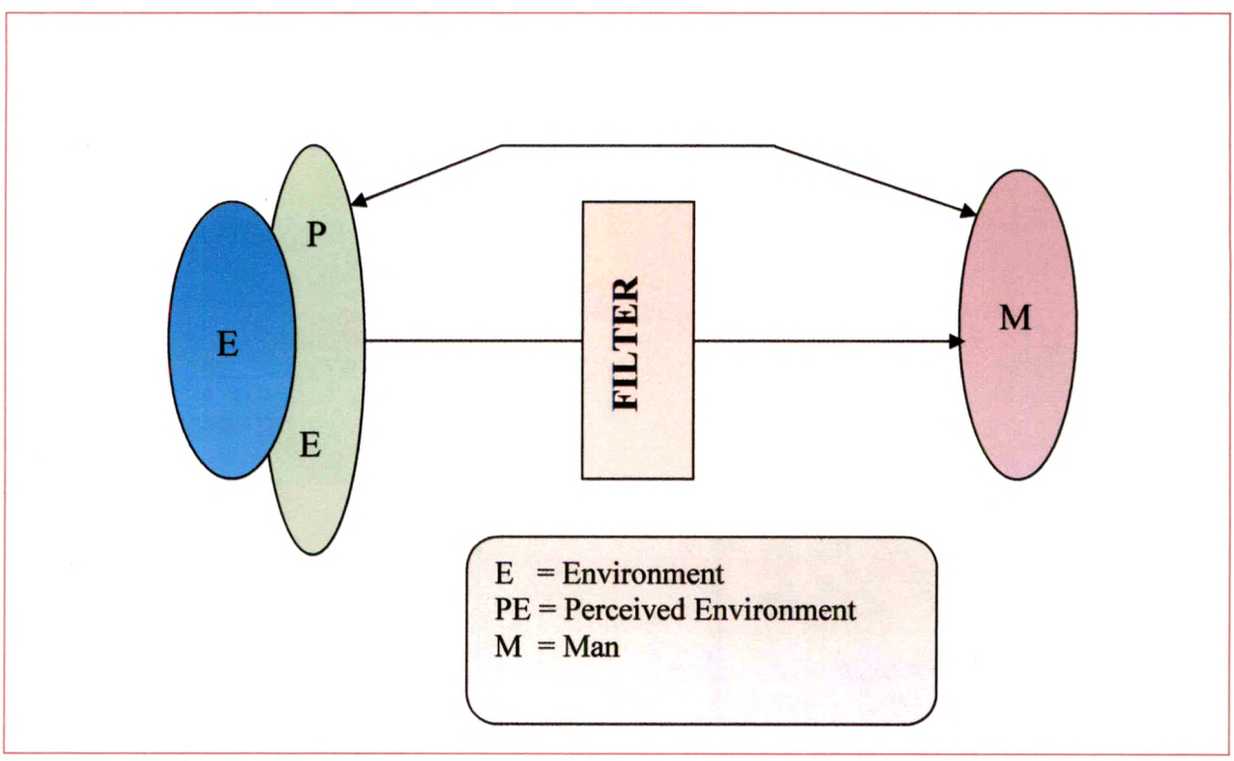


Fig 5. The Culture Filter (Source: Jeans 1974)

Perception, a basic psychological factor, makes an individual aware of his environment. Perceived environment emerges as a result of intellectual process of analytical abstraction and logical inference, which is highly individualistic in nature .Apart from being subjective in nature; permanent concepts about environment are formed when perceptual priming and perceptual fluency are present.

In case of automatic nonconscious or unconscious thought processing metacognitive mechanisms play little role and the task or the behaviour enters the conscious level readily. In this respect, the influence of implicit perception (Kihlstrom et.al. 1992) on individual's thought process may be mentioned. The primacy of implicit has been asserted and it is held that unconscious learning processes are axiomatic. In the context of environmental awareness the conscious as well as nonconscious processing should help an individual to peak up cues and signals whenever the environment is endangered.

1.1.8.2 Knowledge

Acquiring knowledge is another psychological factor which has important implication in man-environment relationship. Knowledge is personally acquired individual constructs. It is difficult to assess the level of knowledge of an individual regarding environmental issues. A more useful concept will be environmental literacy. Roth (1992) provides a frame work for environmental literacy with relation to knowledge, affect, skills and behaviour at three levels of competence (nominal, functional, operational).Palmer (1998) had depicted the inter-related components of Environmental education, the basis of acquiring knowledge about environment.

Environmental knowledge consists of the factual information people possess on the state of the environment and the influence of human actions on this environment (Arcury & Johnson, 1987). Knowledge regarding beneficial and harmful environmental behaviours is an obvious prerequisite for environmentally conscious action.

The acquired knowledge about the environment may influence the subsequent actions of an individual. But in this context it should also be mentioned that conscious metacognitive knowledge of behaviour may not be always free from error. The metacognitive knowledge may be extremely limited and liable to be erroneous.

1.1.8.3 Motivation

Motivation is an internal or psychological process initiated by some need, which leads to the action which will satisfy the need. Needs may be organic, psychological and social. In order to satisfy the needs, a person feels some inner urge for some specified action to achieve a goal. This urge is called 'drive'. This drive arouses the individual to do something and the motive directs him towards the satisfaction of need.

Need ⟶ Drive ⟶ Motive ⟶ Motivated behaviour ⟶ Achievement of goal ↓ **Need reduction**

The derivation of the word tells us that *motivation* refers to getting someone *moving*. When we motivate ourselves or someone else, we develop incentives - we set up conditions that start or stop behaviour. In education motivation deals with the problem of setting up conditions so that learners will perform to the best of their abilities in academic settings. We often motivate learners by helping them develop an expectancy that a benefit will occur as a result of their participation in an instructional experience. In short, motivation is concerned with the factors that stimulate or inhibit the desire to engage in behaviour.

Motivation consists of internal processes that spur us on to satisfy some needs .Needs are activating drive states or arousal level which make us to do something to ameliorate these needs. When we see a person is motivated, it means that he exhibits goal-directed behaviour. There are several theories of motivation .However, human behaviour and motivation is so complex, no one theory has explained motivation entirely satisfactorily. These theories can be viewed as a continuum from biogenic (related to biological processes) to sociogenic (originating from social processes).Biogenic theories (Hull, 1943) emphasize on innate biological mechanisms such as instincts, biological needs or internal drives being responsible for our actions. Sociogenic theories stress on the influence of cultural determinants. In between these two views, there is further division between extrinsic theory of motivation and intrinsic theory of motivation. In extrinsic theory, external factors play important role in satisfying biological and social needs and in intrinsic theory internal cognitive state and arousal influence the direction of behaviour.

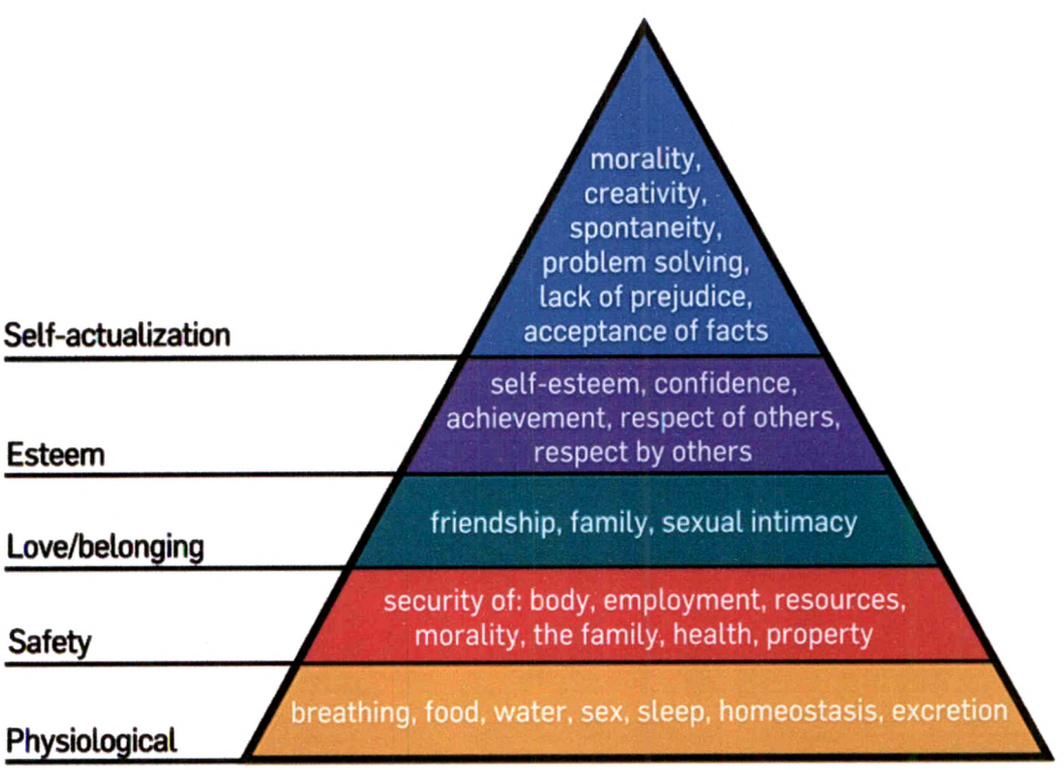


Fig 6. A Schematic representation of Maslow's hierarchy of motivation

(Source: http://en.wikipedia.org/wiki/Maslow%27s_hierarchy_of_needs)

Maslow (1987) link together the biogenic and sociogenic needs in the form of a hierarchy. He distinguishes needs in order of their importance and, therefore, prepotence. That is, physiological needs must be satisfied before we fully attend to satisfy needs. When man's physiological and safety needs are relatively satisfy, the next level, social needs become

important motivators. Self-esteem needs include those for self confidence, achievement, competence, knowledge, self respect and independence and freedom. At the top of the hierarchy there is the need for self realization. This implies man's eternal search for knowledge, understanding, curiosity, exploration and search for meaning in life. Essentially, these are ingredients of intrinsic motivation. The present study tries to probe this particular factor of motivation i.e. social needs, egoistic needs as well as intrinsic motivation.

Researchers and theorists in the area of human motivation identified two types of motivation: Extrinsic and Intrinsic. Extrinsic motivation is operative when an individual is motivated by an outcome that is external or motivation that is based on external factors such as reward and punishment. It may be presented symbolically or as object material. On the other hand, intrinsic motivation means finding value and motivation within its activity itself, regardless of the outcome.

The general pattern of motivational components were presented by Lawson and Shen (1998)

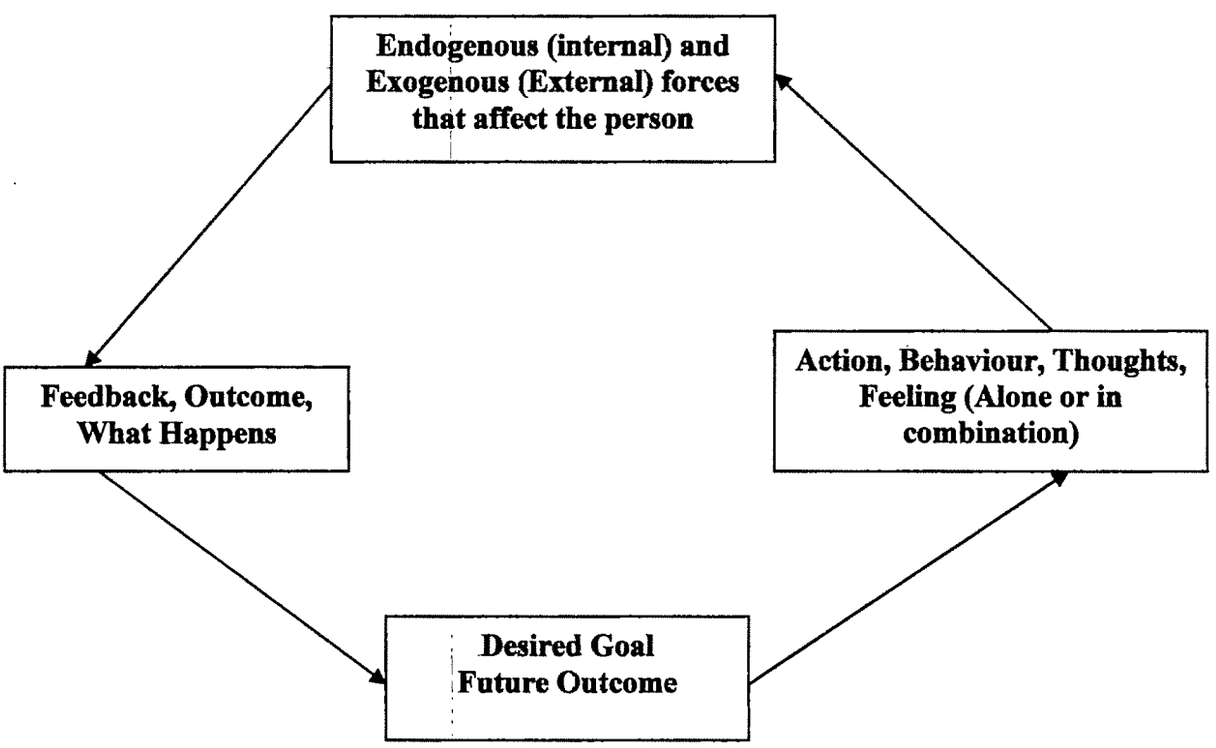


Fig 7. The general pattern of motivational components (Source: Lawson and Shen, 1998)

According to Thierry and Koopman- Iwema (1984) there is a large number of 'partial theories' which differ from one another in various respects. In the present study, effort has been made to split theories into motivation by push from external environment and motivation by a pull from the internal environment in the context of environmental behaviour.

1.1.8.4 Altruism

In the context of environmentalism, altruism and moral involvement, which are closely associated with self concept, should be taken into consideration as sources of motivation. In fact, research findings prove that individuals were motivated by altruistic feelings about the environment and attach great importance to conservation (Ebreo *et.al.*1999, Hopper *et.al.*1991, Shultz 2001).

Etzioni (1975) maintains that there are two kinds of moral involvement viz. pure and social. Pure moral involvement is the result of internalization of norms, while social involvement results from sensitivity to pressure from primary groups and their members. Leonard *et.al.* (1995) postulated that normal involvement is not based on expected satisfaction of needs and may even demand the denial of need satisfaction and the sacrifice of personal pleasure e.g. various energy saving behaviours .In this cases the consequences of acting in line with one's internalized values is not a sense of pleasure or need fulfillment, but rather a sense of affirmation attained when the person abides by his moral commitments. Katzev and Wang (1994) studied to show that commitment can change behaviour especially in the case of resource conservation.

Moral values and self evaluative standards too regulate people's behaviour. According to Schwartz (1968 b) values are the criteria people used to select and justify actions and to evaluate people including self and events. There is much scope in doing research with moral values in environmental activism. According to Bagozzi and Dholakia (2002) values are normative concepts and address questions of right and wrong and prescription for acting in Carver and Scheirer (1998) cybernetic theory of control, values ,functions as abstract standard that constrain programme goals. Along with moral values self evaluative standards function as second order mental states to regulate both goal selection and goal striving.

People achieve higher social status, and are much more likely to behave eco-friendly, in situations where their actions are public than when they will might go unnoticed. A recent '*TIME Magazine*' article states that people are more likely to behave altruistically, or in layman's terms, behave in a good manner, if their actions are more likely to draw attention back onto themselves. While environmentalists may not like these findings, there is a sense of truth in it. Much like people have begun using Twitter, Facebook, and other social networking sites to relay the events of their daily lives to their friends and family, people have begun to buy eco-friendly and green products because it will reflect back upon themselves positively.

Likewise, in a recent article titled "A Room With A View: Using Social Norms to Motivate Environmental Conservation in Hotels" researchers discovered that hotel guests are more likely to reuse their towels if they're told that other hotel guests do the same, rather than simply requesting they do so for the sake of the environment(Jackson ,2009).

A schematic representation of variables in the values-beliefs-norms theory of environmentalism was given by Stern (2000) and shown here in the Fig 8. Arrows represent postulated direct effects. Direct effects may also be observed on variables more than one level downstream from a causal variable. Empirically, measures of self-interest values have been negatively correlated with indicators of environmentalism. The abbreviations NEP, AC, and AR refer to the new ecological paradigm, awareness of adverse consequences, and ascription of responsibility to self, respectively.

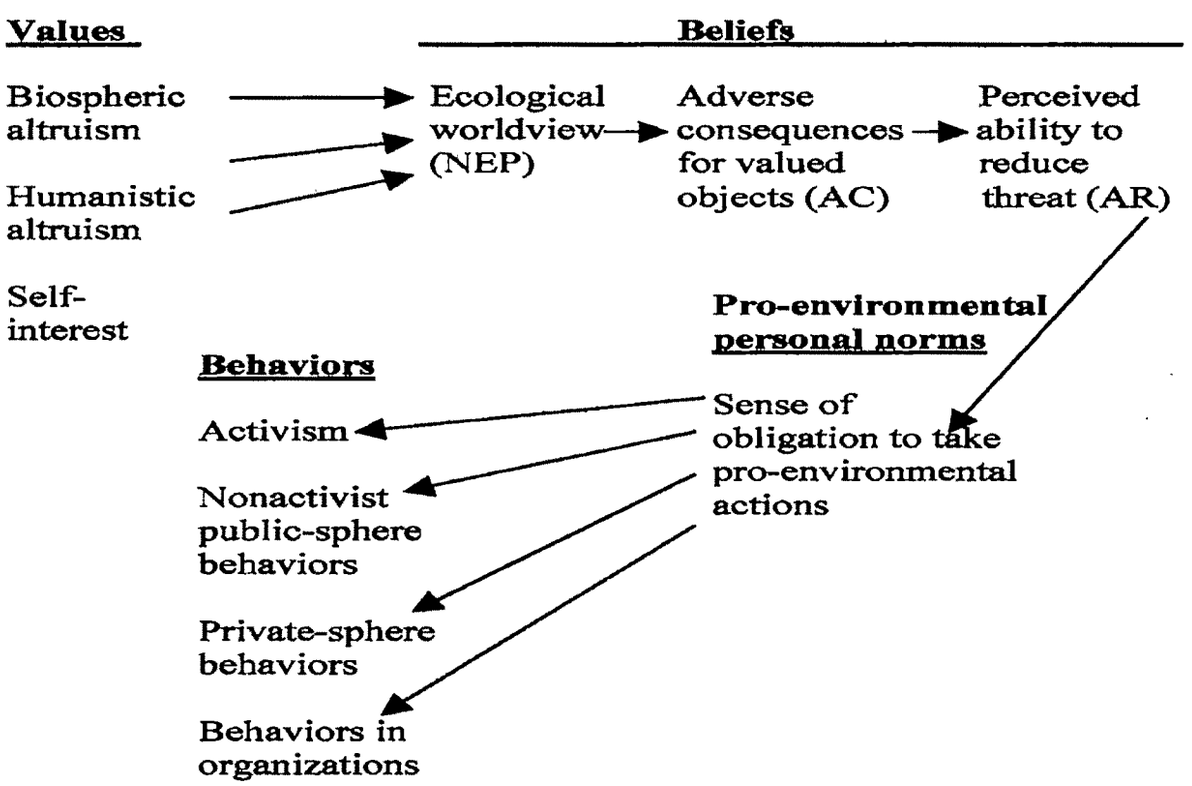


Fig 8. A schematic representation of variables in the values-beliefs-norms theory of environmentalism (Source: Stern P. C, 2000)

1.1.8.5 Emotions

Emotions, an important psychological factor, may also be considered as a determining factor of environment related behaviour. Consumer oriented research, which could have implication for environmentalism, showed that anticipated emotions (AEs) in decision making are crucial factors (Baggozi *et.al* 2002). Baggozi *et.al* (2001) proposed that 17 AEs (7 positive AEs viz. excited, delighted ,happy, glad, satisfied, proud, self assured and 10 negative emotion: angry , frustrated, guilt, ashamed ,sad disappointed ,depressed, worried ,uncomfortable, fearful) function to influence volitions in decision making.

Damasio (1994,1999) maintains that nonconscious emotion affect decision making .Prior to the processing of pros and cons of rational decision making, people experienced pleasant or unpleasant feelings which highlight options and create either positive or negative biases, which favour or eliminate options from considerations.Proenvironmental behaviour may greatly be influenced by nonconscious affect.

1.1.8.6 Proenvironmental Behaviour

The environmental movement must have to cross the boundary of 'movement of protest' and find new ways to motivate people to behave in a pro-environmental manner for the protection and restoration of earth (Roszak 1992). Mental health or unhealth cannot be understood simply in the narrow context of only intrapsychic phenomena or social relations. One also has to include the relationship of humans to other species and immediate ecosystem (Roszak, Gomes, Kanner 1995). These relations have a deep evolutionary history; reach a natural affinity within the structure of their brains and they have deep psychic significance in the present time, in spite of urbanization. Humans are dependent on healthy nature not only for their physical sustenance, but for mental health, too. The destruction of ecosystems means that something in humans also dies. In this context it will be noteworthy to mention as advocated by Saunders (2003). Psychology can help in providing insight into moral reasoning and moral functioning, which lie in the heart of human-nature relationships (Saunders 2003).

Therefore, human action is the critical element in environmental degradation. Now it can be safely said that Pro-environmental behaviour can protect the environment. Kollmuss and Agyeman (2002) define it as actions taken by an individual in consciously seeking to minimize the negative impact of human activities on the environment and Jensen (2002) refers to those personal actions that are directly related to environmental improvements.

Attitudes and belief are important variable which are useful for environmental practices (Grob 1995). Therefore, it is possible to develop positive attitude and belief by providing them education and relevant information. Research also indicates that ecological behavioural intentions are correlated with environmental knowledge (Kaiser, 1996). It is stated that 'behaviour' only refers to those personal actions that are directly related to environmental improvement, that is to say, direct environmental action. Pro-environmental behaviour thus becomes a sub-set of environmental action (Bjarne Bruun Jensen, 2002).

How can an individual be persuaded to behave in a pro-environmental fashion? McGuire, 1985, advocated the Process Model of Persuasion to show that the effect of persuasive communication is determined by a five stage process-a) attention, b) comprehension, c) yielding, d) retention and e) behaviour. Two important factors focused here are motivation comprehension ability which is essential for pro-environmental behaviour.

The Theory of Reasoned Action as advocated by Ajzen and Fishbein (Ajzen, 1991, Ajzen and Fishbein, 1980, quoted in Hirose, 1995) predicts the behaviour from attitude as explained in the Fig 9.The 'intention of taking any action is determined by two factors: 'attitude towards taking action' and 'subjective norm'. Attitude is defined as decisions taken based on his/her personal norm. The subjective norm is defined as decision taken based on how the individual is expected to behave in the society.

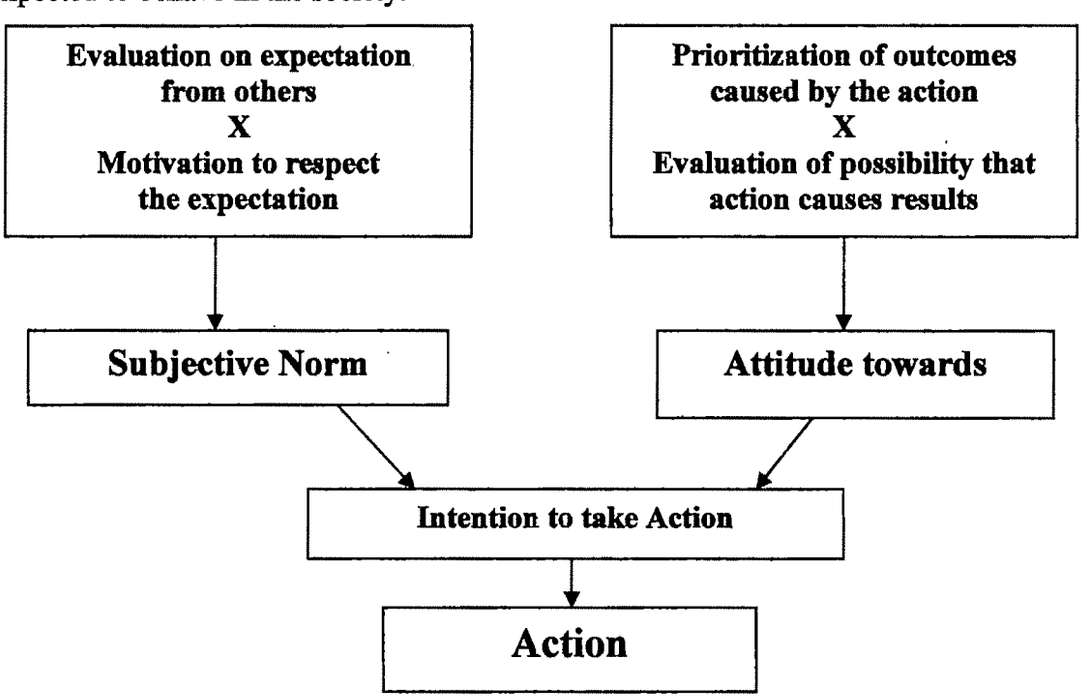


Fig 9 . Fishbein and Ajzen Attitude and Action Model drawn by Hirose

Source: Hirose, 1995

Thus it is a fact that Pro-environmental behaviour was determined by environmental values and attitudes in one hand (Corraliza & Berenguer, 2000). Furthermore, inhibitory and facilitory situational conditions also affected environmental behaviour on the other (Chris von Borgstede and Anders Biel-2002).

1.2 Environmental Education

1.2.1 Concept of Environmental Education

Environmental Education(EE) is a process in which individuals gain awareness of their environment and acquire knowledge, skills, values, experiences, and also the determination, which will enable them to act - individually and collectively - to solve present and future environmental problems. EE enhances critical thinking, problem solving, and effective decision-making skills and teaches individuals to weigh various sides of an environmental issue to make informed and responsible decisions. EE does not, rather should not advocate a particular viewpoint or course of action.

The components of EE include awareness and sensitivity to the environment and environmental challenges; knowledge and understanding of the environment and environmental challenges; attitudes of concern for the environment and motivation to improve or maintain environmental quality; skills to identify and help resolve environmental challenges and participation in activities that lead to the resolution of environmental challenges.

EE is aimed at producing a citizenry that is knowledgeable concerning the bio-physical environment and its associated problems, is aware of how to help solve these problems and motivated to work towards their solution, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (Stapp *et al.*, 1969).

Like the environment itself, EE is complex, requiring multi-information applied at multi-levels, using multi-media, and targeting multi-stakeholders. Every potential decision that has an environmental impact right from the micro level to global concerns has an element of education and awareness building built into it.

The core themes or underlying principles of EE which lay the foundation for a set of strategic actions and initiatives include –

Lifelong learning: The potential for learning about sustainability throughout one's life exists both within formal and non-formal educational settings;

Interdisciplinary approaches: Education for sustainability provides a unique theme to integrate content and issues across disciplines and curricula;

Systems thinking: Learning about sustainability offers an opportunity to develop and exercise integrated systems approaches;

Partnerships: Partnerships forged between educational institutions and the broader communities are key to advancing education for sustainability;

Empowerment: Lifelong learning, interdisciplinary approaches, systems thinking, partnerships, and multicultural perspectives empower individuals and institutions to contribute to sustainability.

A useful framework for EE programmes and projects is the triple foci of education, research and practice.

Education helps in building awareness among the target audience, primarily using knowledge and information as its resources.

Research helps in assessment of the environment, using a number of problem issues as starting points.

Practice helps in developing the appropriate action, using a number of skills and expertise for the purpose.

Growth and development of human life is not only determined by social structure but also natural environment. This is become evident if we really want to restore the quality of human life, we must protect and preserve our environment. In this context Environmental Education is becoming the priority area.

According to the definition of IUCN-1970 "Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness of man, his culture and his biophysical surroundings. Environmental education also entails practice in decision making and self formulation of a code of behaviours about issues concerning environment quality."

According to Environmental Encyclopaedia (1999), Environmental Education aims to merge the ideas of philosophy of environmentalism with the structure of formal education system.

'Environmental Education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action' (UNESCO, Tbilisi Declaration, 1977). Therefore, rather than defining a subject area, environmental education is a learning process in which individuals gain awareness of their environment, and acquire knowledge, skills, values, experiences and also the determination that will enable them to act as citizens as well as professionals, and contribute to solving present and future environmental problems. This also requires a holistic understanding of environmental problems, taking into account their social, economic and cultural causes.

UNESCO declaration (1980) says: "Environmental Education is fundamental to all learning providing the elementary knowledge, skills and motivation to participate in the solution and anticipation of environmental problems thus making its indispensable contribution to sustainable development and improved quality of life".

Agenda 21 (UNCED, 1992: 221) recommends: To be effective, environment and development education should deal with the dynamics of both the physical-biological and socio-economic environment, and human, development should be integrated in all disciplines.

Though Biological perspectives is major focal area in the field of environmental studies but knowledge of biology alone is not sufficient to solve conservation problems, and the role of the social sciences in solving these problems has become increasingly important (Mascia *et al.* 2003).

According to Kirk, 1992, Environmental Education is the process that fosters greater understanding of society's environmental problems and also the process of environmental problem solving and decision-making. It involves development of skills and insights needed to understand the structure, requirements and impact of interaction within and among various environmental entities, subsystems and systems.

At this juncture, the following definitions can be relevant as advocated by Environmental Education for a sustainable future national action plan, environmental education unit, environment Australia, 2000:

Environmental Education is a lifelong multi-disciplinary approach to learning that helps people to understand and appreciate the environment and their connection to and impact on it.

Environmental Education is a process which develops awareness, knowledge and understanding of the environment, positive and balanced attitudes towards it and skills which will enable students to participate in assessing the state of the environment.

Environmental Education prepares us for an ecologically sustainable future. It empowers individuals to maintain and restore the Earth's natural systems and fosters support for the wellbeing of future generations by promoting sustainable lifestyles. This requires understanding of the need to achieve a balance between the environmental, social and economic impacts of development.

Environmental Education involves respecting and valuing the achievements of the past and supporting the preservation of those aspects of the built environment which remind us of those achievements.

Environmental Education also has a spiritual focus, inspiring an emotional and sensitized response from people, not only in their appreciation of the wonders of the natural world, but making those feels at one with the environment.

'Environmental Education' is defined in its broadest sense to encompass raising awareness, acquiring new perspectives, values, knowledge and skills, and formal and informal processes leading to changed behaviour in support of an ecologically sustainable environment.

Value education approaches have been summarised by several authors including Huckle (1985) and Fien and Slater (1985). A useful classification from the latter identified four possibilities:

- ***Values clarification***: In relation to an environmental issue, students clarify different perspectives including their own;
- ***Values analysis***: Students evaluate different perspectives and make decisions about an issue;
- ***Moral reasoning***: Students learn a process of thinking about moral dilemmas; and
- ***Values probing***: Students evaluate different perspectives including their own, make and justify decisions, and may have opportunities to translate their decisions into some form of action.

The process of environmental education, however, is complex and aims to attain several goals at the affective, cognitive, meta-cognitive, and behavioural levels (Sanera, 1998). Environmental education is crucially needed to prepare environmentally literate students who,

as future citizens, would play an active role in protecting the environment through making informed decisions and taking environmental friendly actions (UNESCO–UNEP, 1991).

At present, the curricular organisers are engaged in research work to find out the best way of framing curriculum so as to impart environmental education effectively. The two issues that confront them are, whether environmental education should be taught as a separate subject or should be subsumed as integral part of different disciplines like physical science, biological science, earth science and of course social science. The two types of models have been proposed for this purpose are called Interdisciplinary or infused model and Multidisciplinary or infusion model as shown by the following diagram.

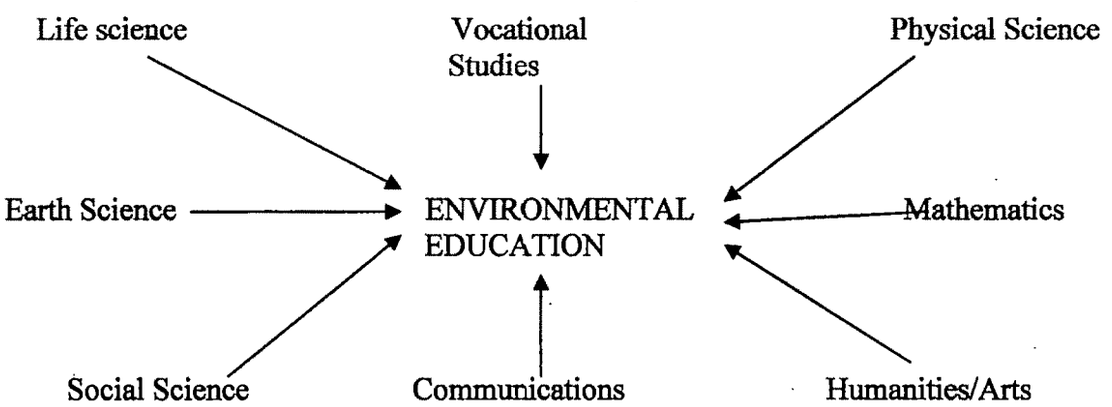


Fig 10. Interdisciplinary (Infused) Model of Environmental Education

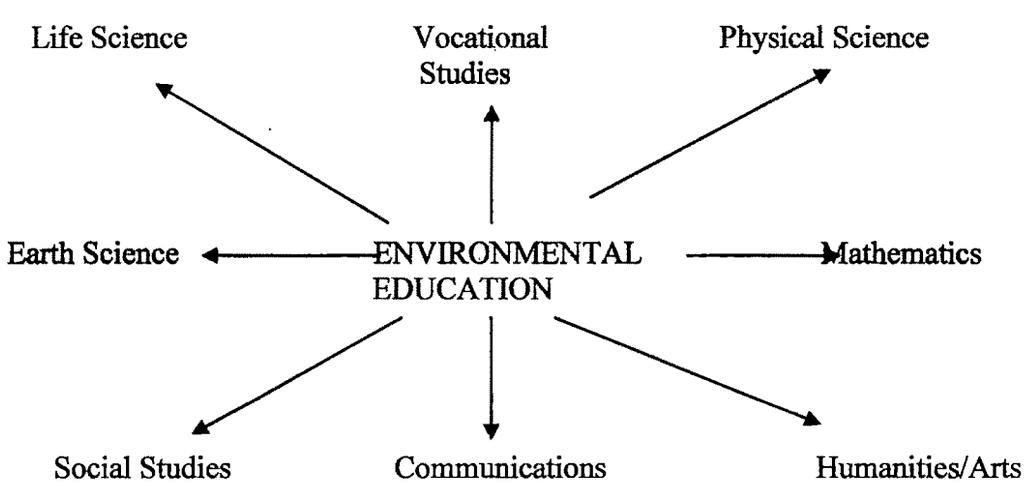


Fig 11. Multidisciplinary (Infusion) Model of Environmental Education

Source: UNESCO, Strategies for Developing Environmental Education Curriculum, Paris, UNESCO, ED-80/NS/134, 1980.

In India the National Policy of Education 1986 had attempted, in the context of evolving a new curriculum to introduce textbooks which are student-based, activity-oriented and related to the environment. Environmental conservation is considered one of the major values to be included in the child through the education system.

The Kothari commission (1964-66) also suggested that basic education had to offer EE and relate it to the life needs and aspirations of the people and the nation. At the primary stage, the report recommended that " the aims of teaching science in the Primary schools should be to develop proper understanding of the main facts, concepts, principles and processes in physical biological environment" Environmental education at primary, secondary, Higher secondary levels was treated in different way. Environmental education is an essential part of every pupil's learning. It helps to encourage awareness of the environment, leading to informed concern for and active participation in resolving environmental problems.

The National Policy on Education - 1986 (renewed in 1992) stated: "There is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and colleges. This aspect will be integrated in the entire educational process. Accordingly, the *National Curriculum for Elementary and Secondary Education: A Framework - 1988* presented the NCERT's view: "The school curriculum should highlight the measures for protection and care of the environment, prevention of pollution and conservation of energy." *The National Curriculum Framework for School Education (NCFSE)* -2000 also highlights the need for including environmental concerns at all the levels of schooling. It asserts the Fundamental Duties (Article 51 A of part IV A of the Indian Constitution): " ... protect and improve the national environment including forests, lakes, rivers, wildlife and to have compassion for the living creatures.

According to report of national consultation on environmental education in school (2004) EE is not teaching-learning transaction alone. It has to become a way of life of all the stakeholders in the school, as also the community. Therefore, the process needs to permeate the school system and be reflected both in the physical environment of the school (e.g., water and sanitation facilities, garbage management, green school campuses, energy conservation, etc.) and the attitudes and actions of all those who are part of the school education system teachers, parents, administrative staff and the management.

The main focus of EE is to expose students to the actual world they live in. They have to be acquainted with the environment related issues and problems. They must also be able to look at the environmental problems and concerns, analyse, evaluate, draw inferences and equip themselves to resolve them. To achieve this, according to NCERT (2004), the curriculum could be based on the three common aspects:

- Learning *about* the environment
- Learning *through* the environment _ implying a systematic exploration through a variety of activities
- Learning *for* the environment by developing a genuine concern for and sensitivity towards its protection and preservation.

The environment and the society are in a process of continuous change. Most of these processes and their consequences are so complex and subtle that they escape comprehension. It is education that should provide the young the tools needed to comprehend the processes and accommodate to the consequences. The need for a holistic view in education is obvious (Anitha S. 2004).

Environmental literacy is defined differently by many authors. Some have short definitions, while others have multiple terms. There is no one specific definition that is in general use to identify environmental literacy *(Stables and Bishop 2001, Roth 1992).* In the last twenty years of usage of the term "environmental literacy", no general accepted meaning has emerged (Morrone, *et al.,* 2001). According to the National Environmental Education Advisory Council, to be environmentally literate is to understand how each and every component in an ecosystem interacts with and affects one another. In this formulation, environmental literacy has four aspects.

• ***Ecological concepts:*** Provide knowledge to make ecologically sound environmental decisions.

• ***Conceptual awareness:*** Develop awareness of how individual and collective behaviours influence the quality of life and the quality of the environment.

•***Issue investigation and evaluation:*** Develop the knowledge and skills to investigate environmental issues and evaluate solutions for remedying them.

•***Environmental action skills:*** Develop skills for taking positive actions to help resolve environmental issues (Hungerford, et al., 1980). According to another definition, environmental literacy is where an individual is not only knowledgeable about ecology, but is also able to combine knowledge and values, leading to action (Morrone, *et al.*, 2001).

Environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental system and take appropriate action to maintain, restore or improve the health of those systems. It requires that people should be able to demonstrate in some observable form what they have learned- their knowledge of key concepts, skills acquired, disposition toward issues and the like. (Roth 1992).

Roth also proposed three levels of environmental literacy namely

- Nominal level- ability to recognize many of the basic terms used in communicating about the environment and working definitions of their meanings.
- Functional level- indicates a broader knowledge and understanding of the nature and interactions between human social systems and other natural systems
- Operational level- indicating progress beyond functional literacy in both the breadth and depth of understanding and skills.

Borders bind the countries, but when it comes to the natural environment it is found to be global. Any change in the climate or vegetation or ocean current brings a substantial change in the subcontinent and world over. As we share the same natural resources throughout the world, we need to develop world citizenry who can think globally and act locally. After all environment is affected by the actions of people both individually and collectively. We overuse the environment for our selfish purposes without realizing the ill effects. Environmental education will help in developing various values, attitudes, skill necessary for solving environmental crises. The people will be able to cast their votes on environmental issues to bring about proper policies.

The foundation for strong environmental action resets to a large degree, on what happens in our homes, schools, youth programme, community, media and interest groups. Each of these has a particular role to play in the education of the individual. Today's youth will soon be citizen and voters whose decision will affect not only the immediate environment in which they live, but also that there nation and other parts of the world. They will make the choices and directly or indirectly by their behaviour cast the votes about recreation, transportation and beautifications, water needs and control of air and water pollution. Therefore, it is imperative that our education systems develop comprehensive environmental education programmes so that our youth and adult become aware about the environmental problems; they developed skill to solve environmental problems. They are equipped with the skills to reduce the emerging challenges of environment.

The following flow chart (Fig.12) clearly depicts the different inter-related aspects of Environmental Education in a very clear manner.

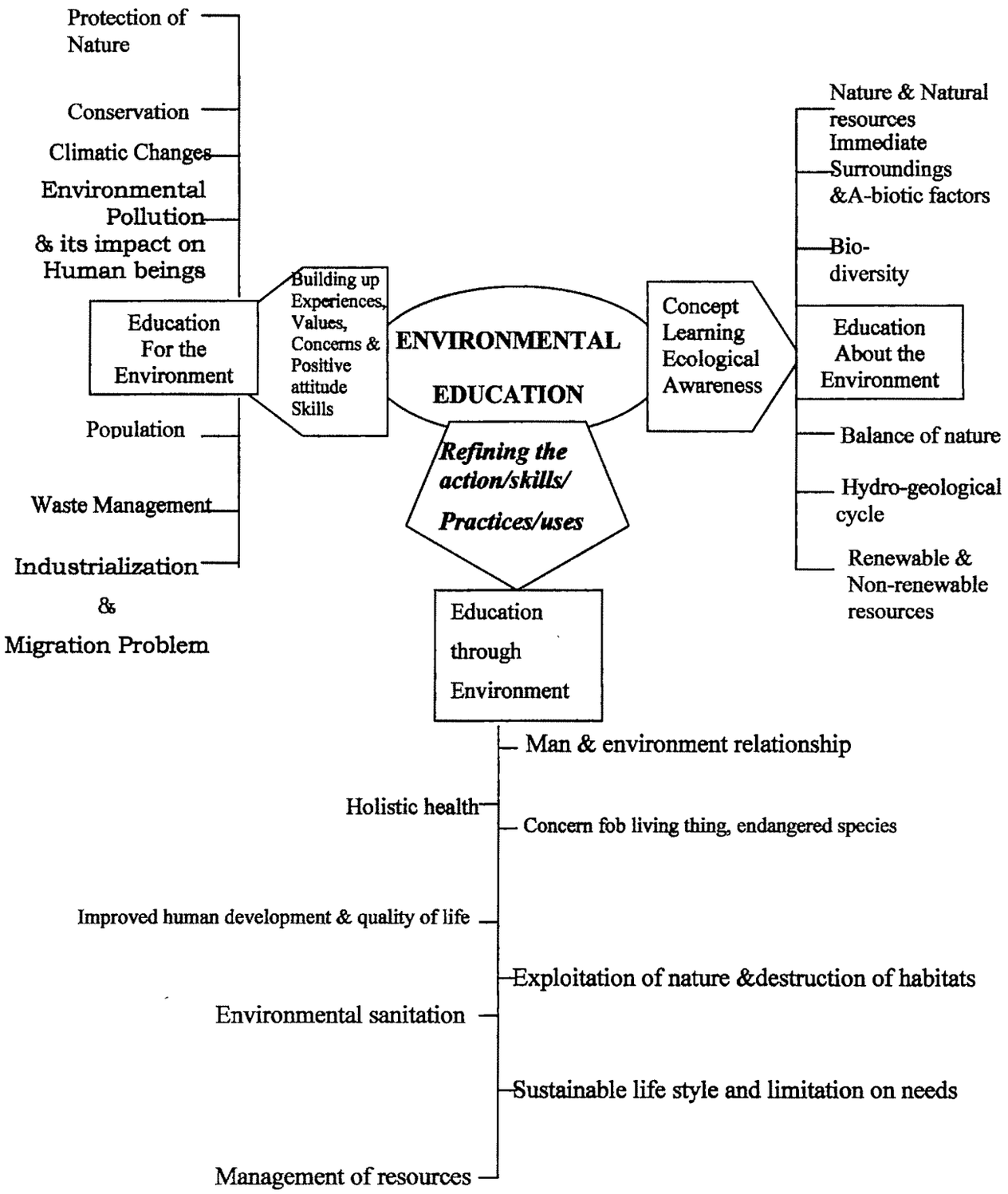


Fig 12. A Model for Environmental Education

Source: Education, Environment and Sustainable Development, Satapathy, M.K., 2007

Therefore it can be said that environmental education is directed towards establishing new patterns of behaviour by individuals, groups and society as a whole toward the environment. The environment education Programmes should assist learners to understand the complex nature of the natural and built environments, the social, political and cultural factors that influence them and their interdependence including that between urban and rural environments. Environment Education needs to develop Awareness, Knowledge, Attitudes, Skills and Commitment to participate in the solution of environmental problems.

The following basic principles of environmental education are emerged based upon Tbilisi Report Recommendation No.2 (1978):

- ◆Environmental Education is a lifelong process.
- ◆Environmental Education is inter-disciplinary and holistic in nature and application
- ◆Environmental Education is an approach to education as a whole, rather than a subject.
- ◆Environmental Education concerns the inter-relationship and interconnectedness between human and natural system.
- ◆Environment Education views the environment in its entirety including social, political, economic, technological, moral aesthetic and spiritual aspects
- ◆Environment Education encourages participation in the learning experiences
- ◆Environment Education concerned with local to global dimensions, and past/present/future dimensions.
- ◆Environment Education encourages the clarification of values and development of values sensitivity to the environment
- ◆Environment Education is concerned with building with an environmental ethics.

According to T. Chelliah (1985), environmental education should be-

- Integrated into the whole system of formal education at all levels.
- Truly interdisciplinary in nature.
- Adopt holistic perspective which will examine the ecological, social, cultural and other aspects of particular problems.
- Centered on practical problems related to real life.
- Aim at building up a sense of values.

Palmer (1998) had framed the inter-related components of environmental education, the basis of acquiring knowledge about environment. The following diagram(Fig 13) suggest the three components of environment education leading to hierarchical outcome from

knowledge to attitude, that is from cognitive to the affective objectives achieved through the designed learning process.

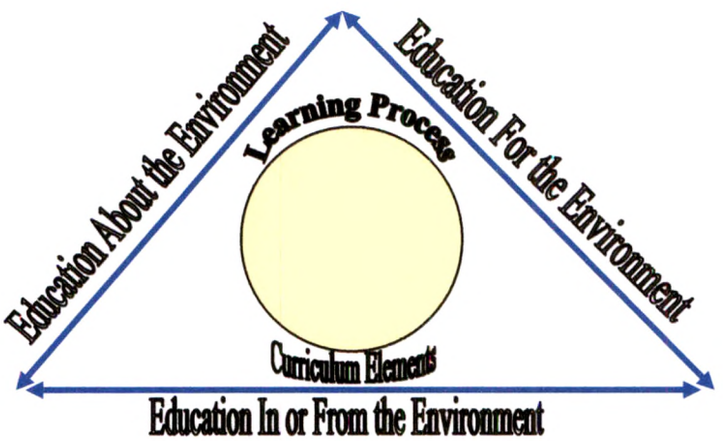


Fig13. Inter-related Components of Environmental Education

Source: Palmer J.A., (1998)

There is a recurrent recognition that it consists of various components, including subject matter, pedagogy, curriculum and learners (Calderhead, 1996). The 'new' environmental stance is more forward thinking. It aims to do things differently in the first place, instead of just cleaning up the symptoms of underlying problems (Tilbury and Cooke, 2005). This perspective supports environmental education practice which develops skills to tackle the root causes of environmental problems and focus on creating a better future.

1.2.2 Goals of Environmental Education

The main goals of Environmental Education are as follows:

- To foster clear awareness of and concern about economic, social, political and ecological interdependence in urban and rural areas.
- To provide every person with opportunities to acquire the knowledge, value, attitudes, commitment and skills needed to protect and improve the environment.
- To create new patterns of behaviour of individuals, groups and society as a whole towards the environment.

Environmental Education also involves teaching about value judgments and the ability to think clearly about complex problems about the environment – which are as political, economical and philosophical as they are technical.

Environmental Education is to be considered not a separate branch of science or as a subject of study but as a new dimension in the education system, which can penetrate all subject areas

of curriculum drawing its contents from different disciplines and it should be carried out according to the principle of life long integral education.

In summary, Environmental Education is an action process related to the work of almost all subject areas. Its main concern is the dynamic relationship between man and nature. It aims at improving the quality of our environment.

Environmental Education seeks to develop the following qualities in individuals and social groups.

a) **Awareness:** of the total environment and its associated problems.
b) **Knowledge and understanding:** of the environment and its interrelationship with man.
c) **Attitude:** Social values and a feeling of concern for the environment and a motivation.
d) **Skills:** for identifying and solving environmental problems.
e) **Participation:** a sense of responsibility and urgency towards the environment so as to motivate social groups and individuals for actively participating in environmental improvement and protection.

These objectives can be summarized in the following formula:

EE = 3A (Awareness, Attitudes and Action) + **SP** (Skill development and participation)

To meet these objectives, a number of guiding principles are to be framed related to the design and structure of the present educational content, which ultimately should inspire a mass movement for the protection of Mother, earth.

1.2.3 Historical perspectives of Environmental Education

With the emerging needs of conservation and preservation of nature there is a paradigm shift in the thoughts of environmentalist and educationist and now the focus is to inculcate positive attitude towards environment and bring modification of environmental behaviour. There fore, perspectives of environmental education changes along with time. The evolutionary development reveals that the term 'Environmental Education' was emerged in mid 1960s and the development of which incorporated the ideas of the great thinkers of eighteen and nineteenth centuries.

The early 70s witnessed the initial impetus to a worldwide interest into formulating strategies of facing the crisis of environmental degradation. In 1970, the International Union for Conservation of Nature and Natural Resources (IUCN) Commission of Education emphasized

the need of EE. The commission defined EE as 'the process of recognizing values and classifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness of man, his culture and his biophysical surroundings. EE also entails practices in issues concerning environmental quality.' In June 1972, the representatives of various nations of the world met at the International Conference on Human Environment at Stockholm. This was the first International Meet to think how the precious environment could be preserved and gained historical significance since it resulted in the establishment of the United Nations Environment Programme (UNEP), which, together with United Nations Educational, Scientific, and Cultural Organization (UNESCO) launched the International Environmental Education Programme (IEEP). The Stockholm Conference also designated the 5th of June as World Environment Day and encouraged governments to celebrate the day each year by organizing activities aimed at promoting environmental protection. Every year the UNEP chooses a theme for the day. Subsequently, the Charter of International Environmental Education Workshop, held at Belgrade, Yugoslavia in 1975 and popularly known as the Belgrade Charter recognized the urgent need of EE in the global perspectives. Participants at this workshop, proposed a global framework for EE.

Subsequent to this came the Tbilisi Declaration, this is considered to be one of the most important seminal documents in EE. It was the world's first Intergovernmental Conference on EE, and was organized by UNESCO in cooperation with the UNEP which was convened in Tbilisi, Georgia (USSR) from 14 to 26 October 1977. It noted the harmony and consensus, which had prevailed, and the unanimous accord on the important role of EE in the preservation and improvement of the world's environment, as well as, in the sound and balanced development of the world's communities. The Declaration described EE as a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations and commitments to make informed decisions and take responsible action. It recommended that EE should cater to all ages and socio-professional groups in the population and in both formal and non-formal education. It should be addressed to (a) the general non specialist public of young people and adults whose daily conduct has a decisive influence on the preservation and improvement of the environment; (b) to particular social groups whose professional activities affect the quality of the environment; and (c) to scientists and technicians whose specialized research and work will lay the foundations of knowledge on which education, training, and efficient management of the environment should be based. Environmental specialists, as well as, those whose actions and decisions can have a marked

effect on the environment, should be provided in the course of their training with the necessary knowledge and skills and be given a full sense of their responsibilities in this respect.

The Declaration also emphasised that EE, should constitute a comprehensive lifelong education, which will be responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values. By adopting a holistic approach, rooted in a broad interdisciplinary base, it should recreate an overall perspective, which acknowledges the fact that natural environment and manmade environment are profoundly interdependent. It should also help to reveal the enduring continuity, which links the acts of today to the consequences of tomorrow. It should demonstrate the interdependencies among national communities and the need for solidarity among all mankind. EE must look outward to the community. It should involve the individual in an active problem-solving process within the context of specific realities, and it should encourage initiative, a sense of responsibility and commitment to build a better tomorrow. By its very nature, EE should be able to make powerful contribution to the renovation of the educational process.

To achieve the effective development of EE, full advantage must be taken of all public and private facilities available to society for the education of the population: the formal education system, different forms of non-formal education, and the mass media. It stressed upon the responsibility of mass media to make their immense resources available for this educational mission.

Ten years later, the 'Tbilisi Plus 10' International Congress on Environmental Education and Training held in Moscow in 1987 resolved among other things that - teacher training is a key factor in the development of EE; the application of new EE programmes and proper use of teaching materials depends on suitably-trained personnel, as regards to both the content and the methods specific to this form of education; Teachers well trained in the contents, methods and process of EE development can also play a crucial role in spreading the impact of EE at the national level, thus increasing the cost-effectiveness of the efforts made by member States to develop EE. It also emphasised that there is a need to identify the national objectives of the

training of teachers and to develop plans for the training of teachers which can be implemented by the training authorities (UNESCO-UNEP 1988).

The UN Conference on Environment and Development (1992), known as the Earth Summit held at Rio de Janeiro gave high priority in its Agenda 21 to the role of education in pursuing the kind of development that would respect and nurture the natural environment. It focused on the process of orienting and re-orienting education in order to foster values and attitudes of respect for the environment and envisaged ways and means of doing so. The human and social aspects of sustainable development meant that solidarity, equity, partnership and cooperation were as crucial as scientific approaches to environmental protection. It was pointed out that peace; health and democracy are mutually reinforcing prerequisites for sustainable development.

The Johannesburg Summit (2002) broadened the vision of sustainable development and re-affirmed the educational objectives of the Millennium Development Goals. The Summit proposed the Decade of Education for Sustainable Development and the United Nations General Assembly in its 57th Session in December 2002, proclaimed the Decade of Education for Sustainable Development for the period 2005 – 2014.

The UNESCO organized the 'Future Environmental Trends Conference - Education, Environment and Health' during June 17-18, 2004 in Paris, France. Drawing on the analysis and testimonials of renowned international experts, the first conference on future environmental trends was intended to be the starting point for a new debate aimed at identifying the fields of action and collaboration, stimulating the desire to take action and measuring progress made through time. The two-day conference was marked with discussions by representatives of international organizations working in research, education, health and the environment, as well as public authorities, members of NGOs and environmental services specialists. It was unanimously decided that education, environment and health are central to the major issues for tomorrow's society. The overlapping elements between these three areas open up possibilities for innovative proposals that will shed new light on the sustainable development debate.

The International Conference on Environmental Education was held at Helsinki, Finland during 13-15 June, 2005. The conference aimed to present a wide range of practices and research related to EE and education for sustainable development. The conference was intended to be useful for all professionals working in the fields of education for sustainable

development, EE and nature studies, including teachers, pre-school teachers, nature school teachers, researchers, youth workers, nature guides, students and other environmental educators. The conference also aimed at helping decision-makers and civil servants to find out how education can help to promote sustainable development.

The recommendations of all the conferences in unison recognized the need of working knowledge of environmental wisdom among people, to incorporate the environmental and developmental education as an integral part of learning in both formal and non-formal education systems to strive towards creation of a better world environment.
Some landmarks events are mentioned below.

1948: IUCN Conference, Paris – first use of term "Environmental education".

1949: Founding of IUPN (International Union for the Protection of Nature).

1956: Man's role in changing the face of the earth. An International symposium held at Chicago.

1957: The IUPN becomes the IUCN (International Union for the Conservation of Nature and Natural resources.

1960: Formation of National Rural Environmental studies Association.

1965: First use of term "Environmental education" in UK.

1968: UNESCO Biosphere Conference, Paris.

1970: Founding of Council for Environmental Education (CEE), U.K.

1970: IUCN/UNESCO International Working Meeting on Environmental education in the School Curriculum, Neveda, USA

1972: UN Conference on the Human Environment, Stockholm, Sweden

1975: Founding of UNEP (United Nation Environmental Education Programme) and IEEP (International Environmental Education Programme.)

1975: UNESCO/UNEP International Workshop on Environmental Education, Belgrade.

1977: UNESCO – First Inter-governmental conference on Environmental Education, Tbilisi, USSR.

1980: World Conservation Strategy (IUCN, UNEP, WWF).

1980: Conference on Strategies for Developing Environmental Education Curriculum, Paris, UNESCO.

1987: UNESCO/UNEP Educational Congress on Environment Education and Training, Moscow.

1987: European Year of the Environment.

1987: World Commission on Environment and Development.

1987: Our Common -Future published by WCED.

1987: The Brundtland Report.

1988: European Resolution on Environmental Education.

1988: The formation of Inter-Governmental Panel on Climate Change (IPCC)

1990: Publication of National Curriculum Documentation for Environmental Education in England.

1991: Publication on Caring for the Earth: A Strategy for Sustainable Living (IUCN)

1992: UN Conference on Environmental and Development – 'The Earth Summit`.

1996: Publication of Government Strategy for Environmental Education in England.

1997: Kyoto conference on Global Warming.

1997: International conference on *"Educating for a Sustainable Future"* at Thessaloniki (UNESCO)

2001: Publication of Synthesis Report 'Environmental education in the educational systems of the European Union'.

2002: The World Summit on Sustainable Development (WSSD), held at Johannesburg.

2005: UN Decade of Education for Sustainable Development (2005-2014): international implementation scheme. Paris: UNESCO.

2005: A Situational Analysis of Education for Sustainable Development in the Asia-Pacific Region / UN Decade of Education for Sustainable Development (2005-2014) at Bangkok, UNESCO

2008: Publication of UNESCO report 'ESD on the move: National and Sub-regional ESD initiatives in the Asia-Pacific Region'.

2008: Publication of UNESCO report Reinventing 'Higher Education: Toward Participatory and Sustainable Development'.

2009: Climate Conference in Copenhagen 6 – 18 December 2009: emphasizing the climatological changes allover the world and to prevent global warming and climate changes.

2010: International Year of Biodiversity.

2011: International Year of Forests.

The evolutionary milestone of environmental education are-

United Nation Conference on the Human Environment, Stockholm, Sweeden, 1972: This is the first international conference held to address the issue of environmental crisis. This

conference reflects the growing global interest and concern for the environment of the 1970s. It led to the establishment in 1975 of the United Nation Environment Programme (UNEP) which together with UNESCO founded the International Environmental Education Programme in 1975.

International Workshop on Environmental Education, Belgrade, 1975: This Conference was marked by the framing of document- 'The Belgrade Charter-A Global Framework for Environmental Education'. A comprehensive set of objectives of environmental education was prepared in this conference. The key feature of this conference is that whilst it was attended by educationist, it was planned to hold a follow up conference with the involvement of world politician. Thus this conference generated expectation to translate the recommendation of the conference into policy.

Intergovernmental Conference on Environmental Education, Tbilisi, Georgia, USSR, 1977: This conference was organized by UNESCO in co-operation with UNEP, attended by Govt. delegation of 66 UNESCO members country. The declaration of this conference known as 'Belgrade Charter' established frame work for an international consensus which without doubt has been the seminal influence on the development of the environment education policies around the Globe. A set of statement published as Conference's Recommendation 2, which still regarded as a guiding principal of environmental education. The three goals of environment education were finalized at this conference.

Launching of World Conservation Strategy, 1980: This was launched jointly by IUCN, UNEP and the then WWF. The Key documents emphasized the importance of resources conservation through sustainable development and asserted that development and conservation can go hand by hand they are mutually interdependent. The drafted strategy included a chapter on environmental education with a message- 'Ultimately, the behaviour of entire societies towards the biosphere must be transformed if the achievement of conservation objectives is to be assured ....the long task of environmental education is to foster or reinforce attitudes and behaviour , compatible with new ethics'.

Publication of the report of the World Commission on Environment and Development, 1987: The report titled as 'Our Common Future' also known as Brundtland Report, presented a major statement on a Global agenda to reconcile environment with development. Along with providing principle of 'Sustainable Development' another focal point of this agenda is 'The

change in human attitude that we call for depend on a vast campaign of education, debate and public participation.

The formation of Inter-Governmental Panel on Climate Change (IPCC), 1988: Climate change is a very complex issue: policymakers need an objective source of information about the causes of climate change, its potential environmental and socio-economic consequences and the adaptation and mitigation options to respond to it. This is why WMO and UNEP established the Intergovernmental Panel on Climate Change (IPCC), a scientific intergovernmental body in 1988. The IPCC was established to provide the decision-makers and others interested in climate change with an objective source of information about climate change. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation. The report needs to deal objectively with policy relevant scientific, technical and socio economic factors. The findings of the first IPCC Assessment Report of 1990 played a decisive role in leading to the United Nations Framework Convention on Climate Change (UNFCCC), which was opened for signature in the Rio de Janeiro Summit in 1992 and entered into force in 1994. It provides the overall policy framework for addressing the climate change issue. The IPCC Second Assessment Report of 1995 provided key input for the negotiations of the Kyoto Protocol in 1997 and the Third Assessment Report of 2001 as well as Special and Methodology Reports provided further information relevant for the development of the UNFCCC and the Kyoto Protocol. The fourth assessment report published in 2007 highlighted the alarming situation of Global Climate status and the mitigation recommendation is presently under the process of execution. All these reports have an extreme relevancy and influence on environmental education as the main objectives of environmental education is to develop ability to solve environmental problems.

Caring for the earth: A Strategy for Sustainable Living, 1991: It is probably the most significant publication of the early 1990s, published jointly by IUCN, UNEP and the then WWF. This report was organized into three parts. The first begins with the basic principles of Sustainable Living. The second part focuses the main components of biosphere and human activities with in them. While the final part provided guide lines that aims to help people and organization adopt and develop the Caring for the Earth strategy in their own circumstances along with appropriate environmental education.

United Nation Conference on Environment and Development - The Earth Summit, Rio de Janeiro, Brazil, 1992: This gala event of World Environment was attended by some 120 heads of state of Government together with the delegates of 170 countries. Parallel to the Governmental summit was the Global Forum, involving representatives from special interest group and NGOs to hold the discussion on all hot issues. The centre piece of Rio agreement is 'Agenda 21', a major action programme setting out what nations should do to achieve the sustainable development in the 21st century. While the 25 th chapter discuss the role of children and youth in Sustainable Development the chapter 36 focused on Promoting Education, Public Awareness and Training. A second crucial document emerged from summit termed as 'Rio Declaration' put forward 27 principles for Sustainable Development.

World Summit on Sustainable Development, Johannesberg, South Africa, 2002: The World Summit on Sustainable Development was organized by the United Nations (UN) in Johannesburg, South Africa in the year 2002. Tens of thousands participated in this World Summit, heads of State and Government, national delegates and leaders from non-governmental organizations (NGOs), businesses, and other major groups. Kofi Annan, UN Secretary-General, outlined five topic areas which were to be the key points of discussion at the summit: (1) Water and sanitation, (2) Energy, (3) Human health, (4) Agricultural productivity, and (5) Biodiversity and ecosystem management.

A Plan of Implementation of 'Johannesburg Declaration' laid down more specific goals. Along with other environmental goals a most significant event was proposal for establishing the Decade of Education for Sustainable Development (DESD) and which was endorsed at this World Summit. The 57th Session of the UN General Assembly later adopted the Decade by consensus, designating the years of the Decade as 2005-2014, and appointing the United Nations Educational, Scientific and Cultural Organization (UNESCO) as the lead agency in coordinating the initiative. The Decade provides an opportunity for a focused effort on the widespread global implementation of Education for Sustainable Development (ESD).

Climate Conference in Copenhagen 6 – 18 December, 2009: In 2012 the Kyoto Protocol to prevent climate changes and global warming runs out. To keep the process on the line there is an urgent need for a new climate protocol. At the conference in **Copenhagen** 2009 the parties of the UNFCCC meet for the last time on government level before the climate agreement need to be renewed. Therefore the Climate Conference in Copenhagen was essential for the world's climate and the Danish government and UNFCCC were putting hard effort in making the meeting in Copenhagen a success ending up with a ***Copenhagen Protocol*** to prevent global

warming and climate changes. Governmental representatives from 170 countries werere participated in Copenhagen in the days of the conference accompanied by other governmental representatives, NGO's, journalists and others. In total 8000 people were present to Copenhagen in the days of the climate meeting. The Climate Conference in Copenhagen was organized in cooperation between the Ministry of Climate and Energy, Ministry of Foreign Affairs, Ministry of Science - Technology and Innovation, Ministry of Finance and the Prime Minister's Office.

Forest Europe Ministerial Conference in Oslo, Norway 14 – 16 June, 2011: Forests are crucial for the goods and services they provide, which people all over the world and our environment depend on. The United Nations has declared 2011 as the International Year of Forests. The overall objective of this global initiative is to raise awareness about the need to strengthen the sustainable management, conservation and sustainable development of all types of forests for the benefit of current and future generations. The International Year of Forests was launched in February at the Ninth Session of the United Nations Forum on Forests (UNFF) in New York, USA. Events and activities throughout the world will highlight the key role of forests in our life under the theme "Forests for people". They will illustrate how we can both protect these unique renewable resources while at the same time sustainably use environmentally friendly forest and wood products. The FOREST EUROPE Ministerial Conference on the Protection of Forests in Europe on 14-16 June in Oslo, Norway, is a major European contribution to the International Year of Forests. The European countries were take decisions to meet today's global challenges and focus on the role of forests in a green economy, climate change mitigation, biodiversity conservation and combating illegal logging. Various activities linked to the conference, such as tree planting and photo exhibitions, aim to engage people, create dialogue and enhance knowledge about forests while emphasizing what needs to be done to sustain their health, growth and diversity.

In addition to the above mentioned events recommendations for the promotion of environmental education and the increase of public awareness of environmental issues can be found in several action plans and documents from international conferences dealing with, for example, population issues (Cairo, 1994), social development (Copenhagen, 1995), gender issues (Beijing, 1995) and housing issues (Istanbul, 1996). In addition, environmental education is included in several international conventions such as the Convention on Biological Diversity, the Deserts Convention and the Convention on World Climate.

The above discussion points out that the world opinions regarding Environmental Education have consolidated over the years and at present the world bodies specially United Nations giving enormous thrust on arresting degradation of environment and its protection.

1.2.4 Principles of Environmental Education

- To consider environment in its totality (natural, artificial, technological, ecological, moral and aesthetic),
- To consider a continuous life process (from pre school to higher levels as well as non formal)
- To be interdisciplinary in approach.
- To examine major environmental issues.
- To focus on current, potential environmental situations.
- To emphasize active participation in prevention and solution to problems.
- To develop critical thinking and problem solving skills.
- To promote cooperation in solving problems.
- To discover the symptoms and root cause of environmental degradation.
- To provide an opportunity for making decisions and accepting their consequences.

1.2.5 Psychological basis of Environmental Education

Environmental Psychology is a branch of psychology that investigates the effects of the physical environment on human behaviour and the effects of behaviour on the environment. Social behaviour concentrates on moral development of individual, which is a deciding factor in the concept of universal brotherhood. So, it is the responsibility of researches to find out congenial environment to bring out desirable changes in the behaviour. Then, it becomes the primary duty of individuals to protect the nature to return life .As the physical environment effects human behaviour, it is very essential to conduct researches in the field of environmental psychology. If physical environment effects an individual, he /she is only person to suffer from physical ailments , but if the physical environment influences a person psychologically, then there will be great loss to his /her social behaviour personally and to the great extent to the society . The person who is disturbed psychologically by the physical environment may even take revenge against physical environment and tries to destroy it.The main aim of education is to train citizens who can help in the development of the nation by applying their good physical, moral ,social ,aesthetic, emotional and intellectual skills. All the mental and physical faculties of individuals can be developed only in amiable environment.

Ajzen and Fishbein (1980) theory of reasoned action and Ajzen's (1991) theory of planned behaviour can also be applied in studying environmental behaviour. The present study is primarily about motivational aspect of environmental behaviour. The study can be elaborated to test the two above mentioned theories depicted below.

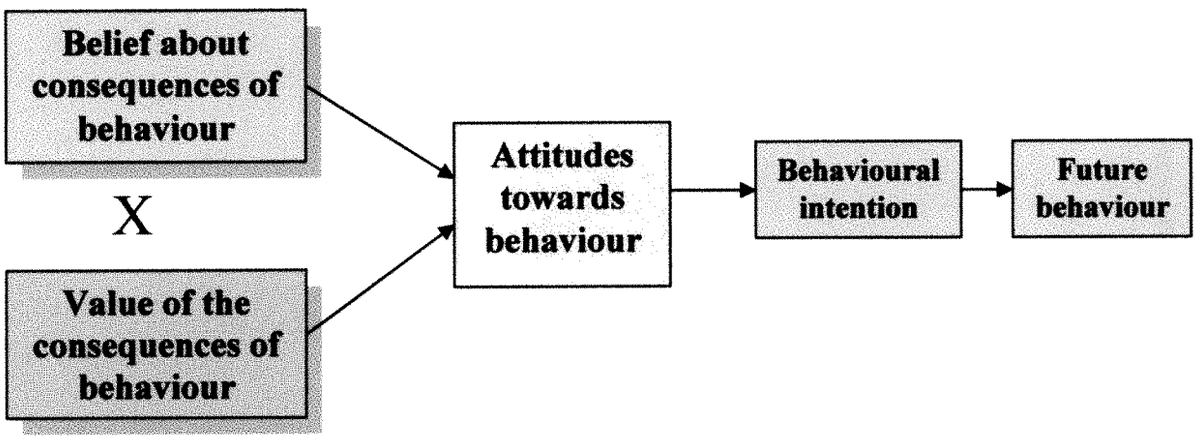


Fig 14. Model: Theory of reasoned action (Source: Ajzen and Fishben, 1980)

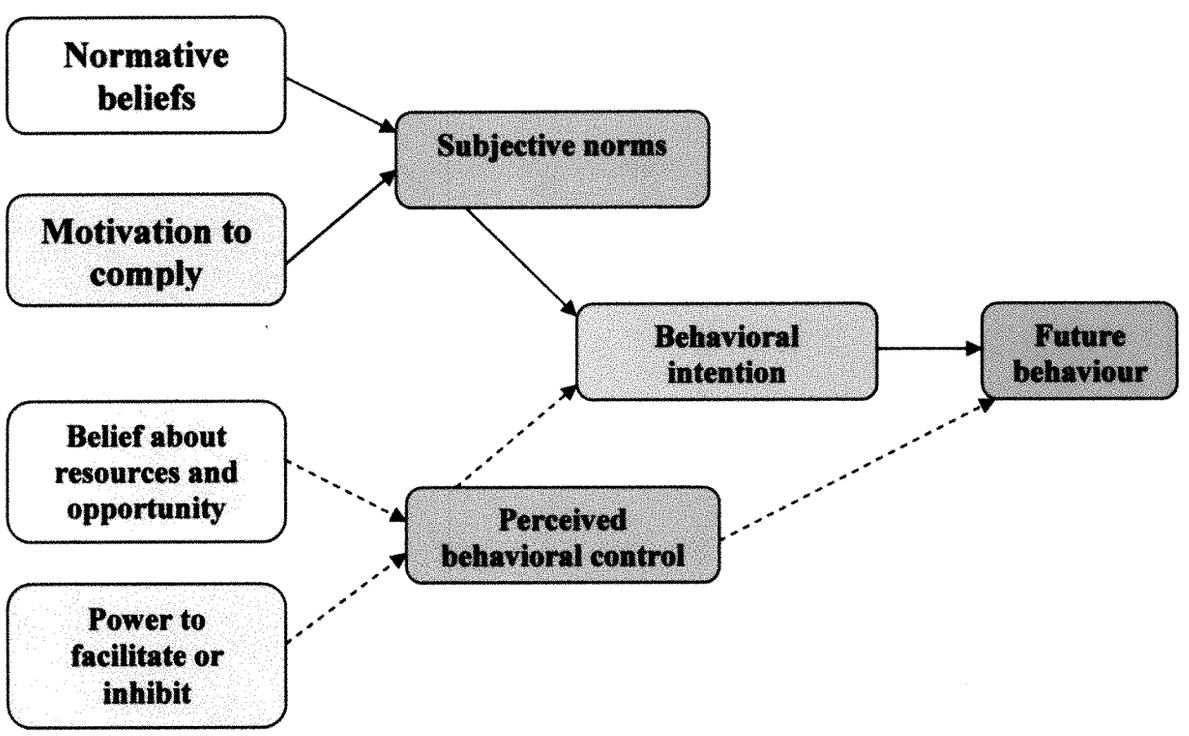


Fig 15. Ajzen's revised model of the theory of planned behaviour (Source: Ajzen, 1991)

However, these two theories neglected the role of habit in future behaviour .In environment related behaviour, habit should play significant role as conditioned responses are likely to be effective in saving environment.

1.2.6 Philosophical basis of Environmental Education

The subject matter of Philosophy is as wide as human experience .It is as old as human life. Education in India has been a major seat of learning for thousand of years. Etymologically, Philosophy means love of wisdom. All Philosophers are considered as the seekers of wisdom. The philosophical inquiry is the reality itself. There are different schools of philosophy depending on the answers they seek to the question of the reality. It is the search for understanding Man, Nature and the Universe. There are different branches of philosophy namely, Epistemology, Metaphysics etc. Besides, other fields of philosophy are Educational philosophy, Social philosophy, Political philosophy etc. There are different philosophical approaches such as Idealism, Naturalism, Pragmatism, Materialism and so on. Philosophy of life and education are two sides of the same coin. Philosophy of life is the foundation and education is the superstructure.

In recent times the philosophical bases of environmentalism and especially environmental ethics have been given much importance. The ethical behaviour on the part of the human beings towards nature, animal and plants is studied extensively. In Western culture this study is steadily gaining ground although in Indian philosophy love and respect for nature is an age old tradition beginning from the days of the Vedas. The basic principle of Hindu philosophy eulogized the interconnectedness of everything living and nonliving entities.

In the Western culture, the environmental ethics was first discussed by Leopold (1949). Later on, Hardin (1968) pointed out if man does not check his behaviour then he would in all probability destroy the Earth by overusing the resources.

Gradually two views regarding the philosophy of environmentalism emerged namely

- Anthropocentric view of environmentalism
- Ecocentric view of environmentalism.

Anthropocentric view proclaims that man is the centre of the universe as he is the most important living being. (Campbell 1983). The natural resources are to be exploited for the benefit of the mankind. Other living things are only important to the extent they serve the humanity. Anthropocentrism is also related with technocentrism, which proclaims absolute faith in technology and industry. Technocentrists believe that man exerts absolute control over nature and all environment related problems can be solved by technology introduced by man. Thus technocentrism values are based on technology.

Ecocentrism is based on the values attached to ecology. This philosophy upholds the intrinsic value of nature. Universe is the originator of life. Nature itself is worthy of preservation irrespective of its uses. (Campbell 1983). This view point gave rise to the philosophy of 'deep ecology' (Nash 1989).

While studying the environmental attitude the researchers have tried to measure the constructs like anthropocentrism and ecocentrism. Dregner and Chandler (1993) developed anthropocentric construct and Thomson and Barton (1994) developed ecocentric and anthropocentric scale.

The two other related concepts emerged in this respect viz. conservationist and preservationist approaches. Conservationist view is often synonymous with shallow ecology which maintains that human progress should continue but not at the expense of environmental degradation. Shallow environmentalists believe that unspoiled areas are to be preserved and degraded areas are to be restored. They are not opposed to harnessing nature per se but they are against wasteful and polluting behaviour of man.

Environmental perception underlying the philosophy of environmentalism is considered to be unidimensional construct i.e. a continuum from biocentric or ecocentric to an anthropocentric worldviews. Bogner and Wiseman (2006) proposed the two dimensional model of ecological values with two orthogonal dimensions - preservation and utilization. Preservation is about conservation and protection of environment and utilization use of natural resources or anthropocentric utilization.

Environmental Education is an approach to learning which helps individuals and groups to understand the environment with the ultimate aim. It is concerned not only with knowledge, but also with feelings, attitudes, skills and social action.Further, it is fundamentally education for problem-solving and the problem-solving from a philosophical basis is as follows:

- Provides understanding of how natural system work,
- Provides understanding of the impact of human activities upon them,
- Develops environmental investigation and thinking skill,
- Gives reality, relevance and practical experience to learning through direct contact with the environment,
- Develops skill for data gathering and analysis,
- Develops aesthetic appreciation,

- ❖ Fosters environmental awareness and concern,
- ❖ Builds on education in and about the environment.
- ❖ Develops concern and responsibility for the environment,
- ❖ Develops an environmental ethic,
- ❖ Develops the motivation and skills to participate in environmental improvement,
- ❖ Promotes a willingness and ability to make life style choices compatible with the wise use of environmental resources,
- ❖ To enable people to understand the interdependence of all life on this planet and the repercussions that there actions and decisions may have impact both now and in the future on resources, on the global community as well as their local one, and on the total environment,
- ❖ To increase people's awareness about the economic, political, social, cultural, technological and environmental forces which foster or impede a sustainable development,
- ❖ To develop people's awareness, competence , attitudes and values, enabling them to be effectively involved in sustainable development at local, national and International level and helping them to work towards a more equitable and sustainable future.

1.2.7 Development of curriculum for Environmental Education

The goal of Environmental Education is to develop a world population that is aware of and concerned about the environment and its associated problems. In order to create a thoughtful and informed citizenry that is knowledgeable about the environment, we must focus on the impact that EE had within our educational system. If education has to be an effective tool of change in the general attitude towards the treatment of the environment, teacher education will have to respond to this need effectively at all levels. Teacher education curriculum at this stage is to develop awareness about the environment. The content and process of teacher education programmes will have to equip teacher with a proper understanding of love for the nature around and the skill of inculcating these among their students. This may result not only in a healthier society, both physically and mentally, but also the much needed replenishment and sustenance of natural resources notwithstanding all the material and industrial development.

It is necessary that student teachers are to be sensitized to the need for reducing curriculum load, organize appropriate learning experiences, which are joyful in nature and related to immediate environment of the learner and help them to develop and imbibe desirable values.

One important component to developing an environmental literate society is to ensure that teachers have the knowledge and understanding of environmental concepts. If teachers are going to effectively guide their students in the exploration of environmental concepts, they must themselves have a good understanding of those concepts.

Before going to discuss curriculum of environmental education we should analyse the back ground and context in which the philosophy of environmental curricula have emerged. In this context that most commentators agree that environmental education is inherently interdisciplinary. As far back as 1977 a UNESCO conference on environmental education reached the conclusion that: interdisciplinary treatment of the basic problems of the interrelationships between people and their environment is necessary for students in all fields, not only natural and technical sciences but also social sciences and arts, because the relationships between nature, technology and society mark and determine the development of a society (UNESCO 1977). As the trend toward environmental protection, it is observed the increasing integration of environmental education in all aspects of the curriculum, including language education. International, regional, national, and local governments and institutions encourage this movement (Jacobs, G. M., 1995). Therefore, it is not enough to teach students about ecology. Students must experience a curriculum which provides them opportunity to discover how they interact with the environment themselves. Only in this way citizens of the world will be able to make sound and responsible decisions concerning environmental issues. The curriculum should provide sufficient environmental literacy to enable students to take responsibility for an environment under pressure at global and local levels (Merritt 1994).
Experience, concern and action only with these components environmental education can be meaningful and worthwhile. Therefore, these components must be incorporated with in task of planning curriculum of environmental education which is education about, in and for the environment (showing by the following figure). Three basic approach of teaching that is Education About, Education In and Education For environment (presented by three basic circles) must overlap. Educational experience should be provided that enable pupil to acquire adequate knowledge, understanding and concept about the environment. Investigatory task and opportunities for sensory experiences and reflection in the environment should be planned for and allowing for the acquisition and refinement of environmentally focused skill.

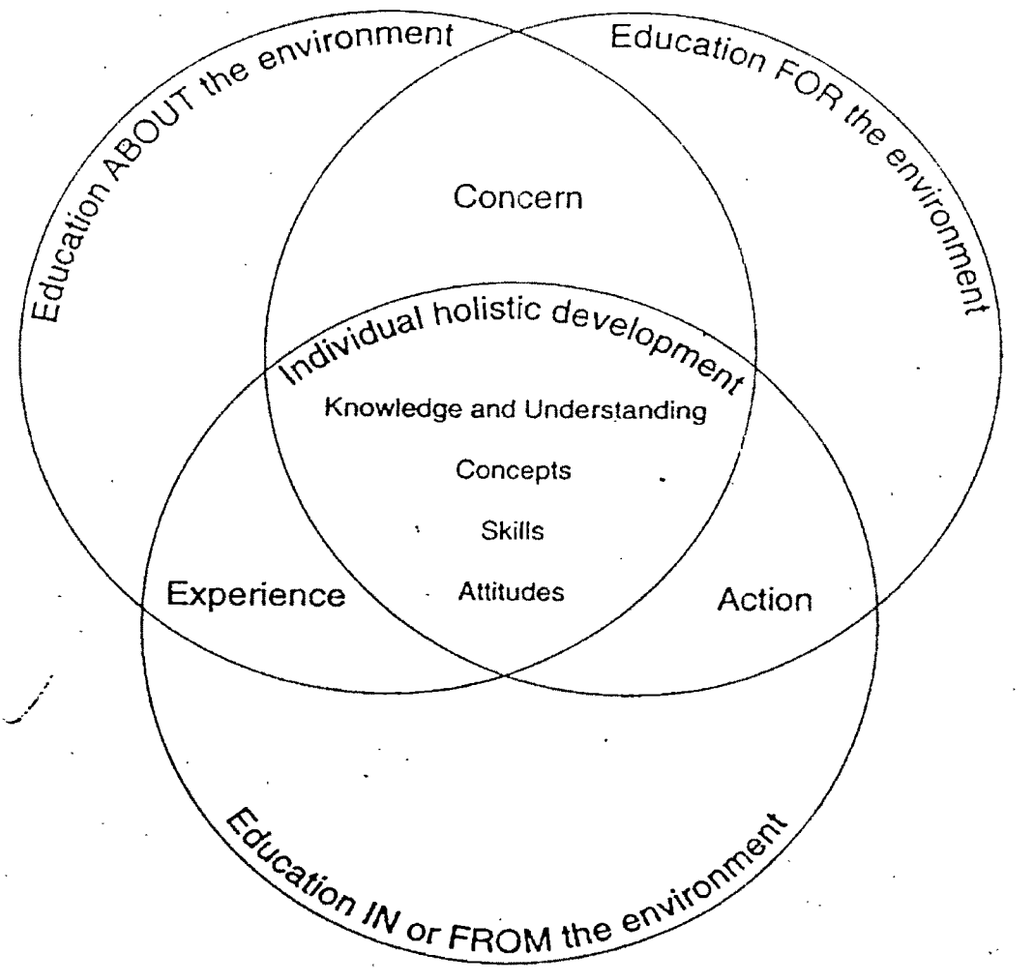


Fig 16. Model for Teaching and Learning in Environmental Education: Components of the Planning Task *(Source: Palmer J.A., 1998)*

Lieberman, Gerald. (1998) has advocated project-based interdisciplinary studies as a way of breaking down the traditional compartmentalized approach to education. Identified as using the Environment as an Integrating Context for learning, their guidelines incorporate the following goals:

1. Break down the traditional boundaries between disciplines.
2. Provide hands-on learning experiences through problem-solving and project-based activities.
3. Create collaborative relationships between teachers.
4. Adapt to individual students and their unique skills and abilities.
5. Develop knowledge, understanding and appreciation for the environment, community and natural surroundings.

Curriculum must focus the learner centeredness. Characteristics of Learner-Centered curriculum of environmental education and their suitability for Earth System Science are as follows (Catherine Gautier *et al,* 2005):

- Interdisciplinary learning
- Systems thinking
- Higher level science
- Uncertainty
- Importance given on 'Decision-making'.
- Broad and rapidly evolving
- Heterogeneous student body
- Based on cooperation and collaboration
- Integrated Learning and Assessment

There is a recurrent recognition that Environmental Education consists of various components, including subject matter, pedagogy, curriculum and learners (Calderhead, 1996).
Slater (1992: 103), for example, recognized four ideological stances: utilitarian, with an emphasis on vocational relevance; child-centered, emphasising personal development; liberal/humanitarian, emphasizing cultural heritage and intellectual development; and reconstructionalist, emphasising an ideology based on education as a means of changing society.

Constructivism is most significant approach in environmental education, refers to the process in which a person makes sense of incoming information. Specifically, a learner encounters a new experience, which causes disequilibrium in their current knowledge base. The learner then compares the new experience to prior knowledge, and if the new concept is plausible, intelligible, and fruitful, the new concept may be accommodated into the learner's knowledge base (Posner, et al., 1982). More recently, the role of dialogue and conversation have been viewed as an important component in the construction of knowledge (Fosnot, 1996).

Rationale for curriculum design

The starting place of curriculum construction is usually the identification of the basic principles upon which the curriculum is constructed. Establishing a rationale is complicated task as diverse level of educational development and contrast, even conflicting, value system and ideologies. At least three goals are common to the educative process in environmental education where ever encountered (Rao & Reddy -2005).

These are-

1. The curriculum should promote entry into the world of work - a vocational goal.
2. The curriculum should provide for the continuing functioning of society - a citizenship goal.
3. The curriculum should help individuals to enjoy many sides and meaningful lives - a personal goal

Here, the Goal-1 involves every one as a consumers and producers in the unending process of resource conversion. Goal-2 relates to the intelligence which can be brought to bear on environmental problems through laws and human behaviour where by people will act as a steward in partnership with nature rather than its adversaries. While for Goal-3 the role of nature as an uplifter of the human spirit may be difficult to document, but it is attested to by hundreds of thousands persons.

On the other the educational principles which guide curriculum planning for environmental education are-

1. The curriculum should provide for individual differences.
2. The curriculum should have meaning for the student.
3. The curriculum should be developmental in nature.
4. The curriculum should be balanced.

Organization alternatives

After specifying the rationale, the curriculum designer has to take some organizational decisions. Factors to be considered for this purpose are-

1. ***Past experiences*** - what are the weak points and strong points of the present curriculum if exist, the attitudes and skill of the teachers, the availability of material resources?
2. ***Economy of time*** - do the behavioural outcomes have a positive co-relation with the energy expended to achieve them?
3. ***Transferability*** - the carryover value to future knowledge and technology is difficult to ascertain in advance. Advocates of the process approach claim this advantage.
4. ***Flexibility*** - rigor mortis tends to set in once curriculum is established. Perhaps it is for this reason that much environmental education has been done in and ad hoc, informal way.

Goals for Curriculum Development in Environmental Education

The goals on which the curriculum of environmental education is framed world wide are those developed by Hungerford, Peyton, and Wilke and published in 1980. These goals were written to be consistent with the categories of objectives included in the Tbilisi Conference Report (1978), and encompass four levels of cognitive knowledge and skills within the broad scope of environmental literacy: 1) ecological foundations; 2) issue awareness; 3) issue investigation and evaluation; and 4) issue resolution.

The first two goal levels, foundations and awareness, focus on conceptual awareness of ecological principles and of environmental issues. The latter levels include goals which deal with the development and application of skills prerequisite to investigating and evaluating environmental issues, and to participating in the remediation of those issues. Thus, these four goal levels should be viewed as hierarchical and considered as such when infused into instructional programmes for learners.

The four goal levels and their attendant goals as suggested by 'A prototype environmental education curriculum for the middle school(Revised), A Discussion Guide for UNESCO Training Seminars on Environmental Education, UNESCO-UNEP international environmental education programme 1994', are presented below.

Goal Level I: The Ecological Foundations Level

Upon completion of instruction in environmental education, the learner should be expected to be able to

1. Communicate and apply the major ecological concepts including those focusing on individuals, species populations, communities, ecosystems, biogeochemical cycles, energy production and transfer, interdependence, niche, adaptation, succession, homeostasis, and man as an ecological variable.
2. Apply knowledge of ecological concepts to the analysis of environmental issues and identify important ecological principles involved.
3. Apply knowledge of ecological concepts in predicting the ecological consequences of alternative solutions to environmental problems.
4 Understand the principles of ecology in order to identify select and utilize appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental issues.
5. Apply a knowledge of ecological concepts to the analysis of given sustainable development anecdotes and identify important ecological principles.

Goal Level II: The Conceptual Awareness Level

Upon completion of instruction in environmental education, the learner should be expected to be able to . . .

6 Understand and communicate how man's cultural activities (e.g., religious, economic, political, social and others) influence the environment from an ecological perspective.

7. Understand and communicate how an individual's behaviours impact on the environment from an ecological perspective.

8. Identify a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues.

9. Identify and communicate the viable alternative solutions available for remediation of crucial environmental issues as well as the ecological and cultural implications of these various solutions.

10. Understand the need for environmental issue investigation and evaluation as prerequisite to sound decision making.

11 Understand the roles played by differing human beliefs and values in environmental issues and the need for personal values clarification as an important part of environmental decision making.

12. Understand the need for responsible citizenship action in the solution of environmental issues.

13 Identify and describe a wide variety of successful local, regional, national, and international sustainable development scenarios.

Goal Level III: The Investigation and Evaluation Level

Upon completion of instruction in environmental education, the learner should be expected to be able to . . .

14 Apply the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information) and synthesize the data gathered.

15. Demonstrate the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.

16 Demonstrate the ability to identify alternative solutions for important issues and the value perspectives associated with these solutions.

17. Demonstrate the ability to evaluate alternative solutions and associated value perspectives for important issues with respect to their ecological and cultural implications.

18. Demonstrate the ability to identify and clarify personal value positions related to important environmental issues and their associated solutions.

19. Demonstrate the ability to evaluate, clarify, and change value positions in light of new information.

20. Demonstrate the ability to analyze a variety of successful sustainable scenarios in terms of the components (common and dissimilar) which enable successful sustainable development to take place.

Goal Level IV: The Environmental Action Skill Level

Upon completion of instruction in environmental education, the learner should be expected to be able to . . .

21 Demonstrate a competence with a variety of citizenship action skills from the following categories of skills: persuasion, consumerism, political action, legal action, and eco-management.

22. Evaluate selected actions in light of their ecological and cultural implications.

23. Demonstrate the ability to apply one or more citizenship action skills for the purpose of resolving or helping to resolve one or more environmental issues.

24. Demonstrate the ability to apply one or more of the citizen action skills for the purpose of devising a sustainable development scenario.

Planning for Instruction: The General Teaching Model –

Regardless of the set of goals used by instructional planners, a functional instructional model must be applied in order to achieve any semblance of validity in the final product (e.g., the unit, module, activity, and curriculum). To produce instructional products without serious consideration being given to the very act of instruction usually results in invalid, inappropriate, and inconsistent materials.

Finally it may conclude that EE curriculum can be organized in two ways. Either it can follow as inter disciplinary (as a single subject) model or multidisciplinary (infusion with different subjects) model. Once the approach is decided, the first step would be to plan an environmental education curriculum keeping in view the environmental education goals and objectives and also the age group for which the curriculum is intended. The curriculum must be made by a team consisting of curriculum specialists, content specialists, pedagogists and teachers. Developed curriculum is then tried out in a limited number of Institutions in the first year for evaluation and feed back. Accordingly the curriculum should be modified for universal implementation.

1.2.8 Self-efficacy and its impact on Teaching Environmental Education

Bandura (1986) describes self-efficacy as the belief or the confidence, individuals have in their skills and abilities to perform behaviour necessary to reach a desired goal or achieve an expected outcome. Self-efficacy is not meant to be a measure of skills but of the belief individuals have in what they can do with the skills they possess. Given its association with behaviour, self-efficacy has been integrated into a number of behaviour change theories and models, including social learning theory (Bandura, 1986) the transtheoretical model (Prochaska JO, DiClemente, 1983), the health belief model (Becker, 1974) and the theory of planned behaviour, which includes a related construct (Ajzen, 1991). The association between physical activity and self-efficacy has been studied widely (Trost *et.al*, 2002) along with its ability to predict change in physical activity behaviour (Poag-DuCharme and Brawley, 1993) To date, most self-efficacy scales in the physical activity literature have been developed to measure confidence in one's ability to exercise or be physically active when faced with barriers to being active (Laffrey and Asawachaisuwikrom, 2001; Marcus. et al.,1992; Resnick and Jenkins. 2000).

Perceived self-efficacy is the belief in one's competence to tackle difficult or novel tasks and to cope with adversity in specific demanding situations. Self-efficacy makes a difference to how people feel, think, and act (Bandura, 1997). People with high self efficacy choose to perform more challenging tasks. They set themselves higher goals and stick to them. Actions are preshaped in thought, and once an action has been taken, highly self-efficacious people invest more effort and persist longer than those low in self-efficacy. When setbacks occur, they recover more quickly and remain committed to their goals. High self-efficacy also allows people to select challenging settings and explore their environment or create new ones. Thus, it represents a belief in one's competence in dealing with all kinds of demands. This implies an internalstable attribution of successful action and a prospective view. These make it a characteristics unique theoretical construct different from related ones such as self-esteem, locus of control, or self-concept of ability. Self-esteem has an emotional connotation (''I feel that I have a good character'' or ''I am proud of myself''). Locus of control refers to an attribution of responsibility for outcomes (internal agency versus external causation), and self-concept of ability pertains to a judgment of one's competence (''I am good at math'') without reference to any subsequent action. Only self-efficacy (''I am certain that I can quit smoking even if my partner continues to smoke'') is of a prospective and operative nature, which furnishes this construct with additional explanatory and predictive power in a variety of research applications. In sum, perceived self-efficacy can be characterized mainly as being

competence-based, prospective, and action-related, as opposed to similar constructs that share only part of this portrayal (Bandura, 1997, 1999). Self-efficacy is commonly understood as being task-specific or domain-specific. But some researchers have also conceptualized a generalized sense of self-efficacy that refers to a global confidence in one's coping ability across a wide range of demanding or novel situations (Schwarzer & Jerusalem, 1995; Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs & Rogers, 1982). General self-efficacy (GSE) aims at a broad and stable sense of personal competence to deal effectively with a variety of stressful situations. It might reflect a generalization across various domains of functioning in which people judge how efficacious they are. The present author agrees with Bandura (1997) that, for the majority of applications, perceived self-efficacy should be conceptualized in a situation-specific manner. However, GSE may explain a broader range of human behaviours and coping outcomes when the context is less specific.

Teacher's self-efficacy beliefs do not, of course, operate in isolation from other psychological determinants that affect their motivation and performance such as their professional aspirations, the recognition and respect they perceive to be accorded and ultimately, the satisfaction they draw from their profession. Previous findings support the critical influence of a teacher's self-efficacy beliefs on their performance and motivation (Bandura, 1997, Ross, 1998, Tschannen-Moran and Woolfolk Hoy, 2001 and Woolfolk Hoy and Davis, 2006). Self-efficacy of a teacher is a powerful predictor of how and whether a teacher will act.

Teachers who have high self-efficacy, tend

- to persist in failure situations (Gibson & Dembo, 1984)
- to take more risks with the curriculum (Guskey, 1988)
- to use new teaching approaches (Gibson & Dembo, 1984)
- to get better gains in children's achievement (Brookover et al. 1979)
- to have more motivated students (Midgely et al. 1989).

Figure 17 presents a model which attempts to illustrate how self-efficacy as a teacher, and teacher outcome expectations relate to action. Five assumptions underpin this model, all of which are supported by research findings (Gibbs Colin, 2002):

1. **Self-reflection:** Good teaching is not the mere carrying out technicist tasks. Effective teachers reflect on their own thinking and about their actions. Teachers need to be capable of self-reflection.

2. **Intentional Behaviour:** Much of teachers' behaviour is purposeful, intentional, and goal-directed. Teachers' behaviour is guided by forethought (including anticipation and prediction).
3. **Symbolic Representation:** How teachers intend to teach depends, in part, on their capacity for symbolic representation. Symbolic representation creates internal representations of experience, generates innovative and multiple solutions, and characterizes possible consequences (behavioural, cognitive, emotional) of applying these solutions.
4. **Self-Regulation:** Teachers require the capacity to self-regulate their thinking, behaviour, and emotions. They need to be able to exercise direct control over their thinking, behaviour, and teaching circumstances. Teachers might be said to be self-regulated when they are metacognitively, motivationally, and behaviourally active participants in the process of teaching (Zimmerman, 1986).
5. **Triadic Reciprocal Causation** To understand effective teachers, we need to acknowledge that teachers' actions do not occur in vacuums. There is an interaction, reciprocity, and inter-dependence of teachers' inner personal factors (cognition, emotion, biological events), teachers' behaviour, and the circumstances in which this teaching occurs. Bandura (1989) refers to this as triadic reciprocal causation.

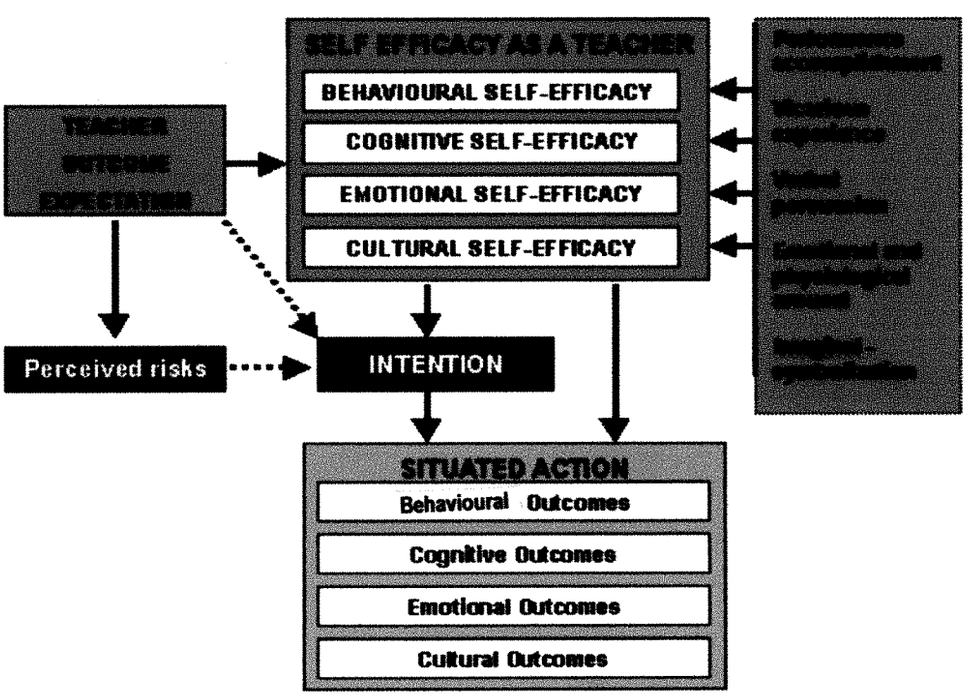


Fig17. The relationship between teacher outcome expectations, self efficacy as a teacher and teacher action.

There are at least four kinds of self-efficacy as a teacher, each of which is instrumental in explaining how teachers teach and their willingness to persist even when the odds appear to be stacked against them (Gibbs, 2000). As such, they are important indicators of teacher effectiveness.

Behavioural Self-Efficacy as a Teacher

Behavioural self-efficacy as a teacher is the self-belief in one's capability as a teacher to perform specific actions to deal with specific teaching situations.

Cognitive Self-Efficacy as a Teacher

Cognitive self-efficacy as a teacher is the self-belief in one's capability as a teacher to exercise control over one's thinking in specific teaching situations.

Emotional Self-Efficacy as a Teacher

Emotional self-efficacy as a teacher is the self-belief in one's capability as a teacher to exercise control over one's emotions in specific teaching situations.

Cultural Self-Efficacy as a Teacher

Cultural self-efficacy as a teacher is the self-belief in one's capability as a teacher to perform specific actions in culturally-appropriate ways in specific teaching situations. This construct remains relatively unresearched.

Influences on Self-Efficacy as a Teacher

These four kinds of self-efficacy as a teacher interact. Further, these self-efficacy beliefs are neither necessarily mutually exclusive nor independent. An effective teacher usually has a strong belief in her capability to exercise control over her emotions, behaviour, and thinking, and is secure in her beliefs about her capacity to teach effectively in culturally appropriate ways. The purpose of teacher education is to assist student teachers understand, explain and use self-efficacy to mediate what they know and can do, and how they teach. There are at least five sources of influence on these self-efficacy beliefs.

Performance accomplishments

Performance accomplishments are the most influential source of efficacy information. Successes perceived as genuine build a robust sense of self-efficacy. On the other hand, failures perceived as genuine undermine self-efficacy. Thus, teacher education programmes ought to enable student teachers to realistically and constructively perceive and attribute their successes and failures (Gibbs, 1997).

Vicarious experience

Modeling the behaviour of significant others can strengthen self-efficacy. While vicarious experiences are usually weaker than direct experiences, they are further strengthened by deliberate strategies which encourage the observer to self-reflect on their personal beliefs about competence and capability in similar situations. The impact of vicarious experience depends on the observer's perception of similarity with the model, the perceived influential power of the model, and the similarity between the observed and new situations and tasks (Schunk, 1986). Student teaching provides an interesting exemplar of vicarious experience. If associate teachers are to be used as vicarious models for student teachers, then the matching of student teachers with associate teachers for student teaching deserves particular attention (Gibbs, 1997).

Verbal persuasion

Verbal persuasion may strengthen student teachers' self-efficacy. Student teachers who are persuaded verbally that they possess the capabilities to overcome specific difficulties are likely to mobilise greater effort and to persist longer. However, verbal persuasion, in itself, may be limited in its power to promote enduring change.

Emotional and physiological arousal

In judging self-efficacy, people evaluate their emotional and physiological arousal in given situations. Emotional and physiological arousal impairs or enhances self-efficacy beliefs, and thereby influences subsequent performance. Teachers' emotions and moods are persuasive as a source of information that influences self-efficacy judgments. Mood despondency, anxiety, and depression are likely to have a negative effect on self-efficacy in that the teacher is less likely to believe they are capable of making a difference in challenging situations. Thus, teacher education programmes ought to explore strategies whereby teachers

a. become aware of their physiological arousal, emotions and moods.
b. become aware of the effects these may be having on their self-efficacy and performance.
c. develop strategies to exercise control over physiological states, moods, and emotions.

Imaginal-symbolization

Imaginal symbolisation occurs when teachers visualise or imagine themselves performing in particular situations (Gibbs, 1997). Imaginal symbolisation provides a source of information for teachers which affects their self-efficacy and thereby their performance. When used

intentionally in teacher education programmes, it can serve as a potentially powerful way to enhance self-efficacy.

Intention to Act

Intention is associated with *I will* whereas self-efficacy is associated with *I can.* While intentions are reasonable predictors of behaviour, predictability is significantly enhanced when self-efficacy is factored in. A person can have a good intention but believe that they are not capable of enacting that intention. To intend to act in a specific way without considering one's self-efficacy for that task, or whether certain actions will likely lead to specific outcomes (outcome expectancy beliefs) is misguided. Researchers said that, many practices in teacher education emphasise goal-setting devoid of such fundamental considerations. When situational cues automatically trigger the teacher to act in certain ways, the need to deliberately contemplate intentions is essentially by-passed. In this sense, self-efficacy directly affects teachers' behaviour. But behaviour is also indirectly influenced by intentions (Ajzen & Madden, 1986; De Vries & Backbier, 1994; de Vries, Dykstra, & Kuhlman, 1988; Dzewaltowski, 1989; Dzewaltowski, Noble, & Shaw, 1990; Schwarzer & Fuchs, 1995).

Self-Efficacy and Professional Development on Student Teaching

There is surprisingly equivocal evidence supporting the claim that field-based experiences produce reflective practitioners. Research suggests that, as a result of student teaching, student teachers generally become more controlling and more conservative, rather than innovative and reflective (Weinstein, 1988). One substantive study found that student teachers generally are not necessarily more efficacious as a result of completing student teaching, and tend to be less autonomous though not necessarily more controlling in their orientation towards children (Gibbs, 1994). Such findings give rise to some interesting yet pertinent questions about student teaching and challenges teacher educators to reconsider how student teaching might best contribute to student teachers' professional development.

What student teachers know and can do, and how they come to teach during student teaching is largely mediated by what they think and believe. Central in this mediation are student teachers' self-beliefs, and in particular, their self-efficacy as teachers, their preferred orientations as teachers, and their preferred orientations toward students. At the heart of this argument are two premises:

i. that student teachers have the cognitive capacities to self-reflect, self-motivate, and self-regulate (Scheier & Carver, 1988; Schunk & Zimmerman, 1989), and

ii. that self-efficacy, in particular, influences goal-setting and the willingness to persist at pursuing these goals (Bandura, 1986).

As student teachers exercise personal control of their thoughts (about their capability as teachers, and their teaching), their self-efficacy impacts on teaching competence, motivation, and inevitably their self-esteem as teacher.

1.2.9 Environmental Education in Teacher Education Programme

Population explosion has transformed human ecology in a big way, therefore, there is a basic need of environmental education at every stage of our educational system, but this will only be possible if teachers at every stage of our educational system are inducted with the knowledge of environmental education. Hence, there is an urgent need to include environmental education in the syllabi of teacher education programme at various levels, because teacher is the main agent for executing the process of education at every stage .We all know that education is a powerful instrument for social change as well as for social control and environmental education is problem centered, interdisciplinary value as well as community oriented programme concerned with man's survival.

The role of environmental education in the care of the environment is crucial. What of the role of the teacher in environmental education - rather, of the *environmentally educated teacher* in the vital process of education, before and after, in and out of school? Is it not, arguably, the priority of educational and, certainly, environmental priorities, as experience increasingly instructs us? For in this connection, *environment must* be conceived in its entirety- natural and built, personal and collective, economic, social and cultural, technological, ecological and esthetic (UNESCO-UNEP Environmental Education Newsletter *Vol. XV, No. 1, March 1990*). The urgent need for teacher training in environmental education (EE) is a constant theme of conference after conference, from the International Belgrade Workshop of 1975 to the ministerial-level Tbilisi Conference of 1977 and the Moscow Congress of 1987. It was the most intense EE need and priority indicated by nations of every region of the world in their response to a UNESCO questionnaire preceding the Belgrade Workshop (81%). Ministers at the Tbilisi Conference logically concluded that EE should be an obligatory part of pre- and in-service teacher education and pertinent to the area - urban or rural -where the teacher was going to practice. This is still to be universally applied.

Practical initial steps in designing EE training programmes for teachers include definition of the desired result. This in turn involves the most functional way of defining the desired result,

namely, in terms of desired teacher competencies, which may be divided into two linked categories: (1) foundational competencies in professional education and (2) competencies in EE content.

The National Council of Teacher Education (http://www.ncte-in.org) has developed a curriculum framework that emphasizes the need for environmental education (a) environmental education should be made an important and integral component of teacher education and (b) social and adult education should convey the message of ill outcomes of environmental degradation to students in particular and people in general. It is noteworthy that it is the poor and the people living below the poverty line who suffer its consequences most. There is a need for developing special educational courses on these aspects for teacher education (http://www.ncte-in.org/ curriculum framework/curriculum.htm). Discussions and presentations (made at the workshop organized by NCTE and CEE in Lucknow in November, 2008) revealed that both infusions (to some extent) as well as a separate (elective) subject approach are being followed by different institutions.

A workshop was organized 3-5 Feb 2009 by NCTE and CEE where delegates from teacher education institutes from AP and Chhattisgarh were present. They discussed the most appropriate ways of integrating EE in teacher education courses. All agreed that EE ought to be compulsory in teacher education degree and diploma programmes. Most felt that EE ought not to be a separate subject and to be effective, the concepts and methods of EE must be infused.

The 'teaching subjects', methods courses, as well as courses like the history and development of education in India, core values etc. all offer a scope for infusion.The prevalent modes of EE in teacher education are: as a unit in a compulsory course (most common), as a full optional paper (in some colleges), as a full compulsory paper (rare). Education plays a key role in shaping-up citizens and their lifestyle. Environmental Education (EE) is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems and which has the knowledge, attitudes, commitments and skills to work individually and collectively towards the solution of current problems and prevention of new ones. Thus EE plays a pivotal role in societal development. EE is one such professional field which is an ever-growing, dynamic one. The concepts in EE which seemed to have been well understood by now need constant reviewing and updating, as the context (environment and development) itself changes with a great frequency. This makes EE a **dynamic discipline.**

Also, EE is **multidisciplinary**. EE requires an educator to not only understand the core concepts in EE, but also some basic concepts of various other disciplines, like economics, politics, science, technology as well as the social and cultural contexts. With the recognition that Education is an important part of environment and development strategies, environmental educators become a key professional group in facilitating sustainable development. However, the very objectives of EE (from 'awareness to action') pose a challenge for EE professionals. EE is all-encompassing, multidisciplinary and dynamic and EE can be effective and meaningful if it takes place in real life situation and is geared towards understanding and solving real-life problems. Given this nature of EE, professionals involved in educating and communicating for environment and development need to have a multidisciplinary perspective of understanding of development processes, and they also need to possess unique set of skills. However, very often practicing teachers as educators are not necessarily trained in these. Thus a teacher already trained in the art and science of teaching, needs to be specially trained about teaching-learning of environment. This makes in-service teacher training in EE, a felt need.

In the year 2003, the concern for mainstreaming EE in India was spelled out by the Honourable Supreme Court of India in its directive making EE compulsory at all levels of schooling. Yet another set of reality is the reality of concerns with regard to teacher training in the country. These include inadequate resources or facilities for EE, limited access to teaching aids, tremendous workload on teachers and the fact that teachers cannot take off long periods of time for enhancing skills or professional development. Today in countries like ours, in-service training faces many more challenges—lack of time on behalf of trainees; training programmes, not being always relevant to the work situation and needs; limited resources available for training, etc. Over the years, working with teachers and schools, at Centre for Environment Education, India (the institution with which the authors are formally associated with) it has been felt that there is an increasing interest among the teaching community to bring environmental concerns into the classroom, as well as to explore innovative and participatory methods of teaching. Schools have become increasingly supportive of such endeavors, and the students themselves are more concerned about the environment and keen to learn about it.

In India today, while a number of teacher training institutions concerned with in-service teacher training, as well as NGOs all over the country, offer a variety of short-term training

programmes on EE, but it would be fair to say that EE training is not available at anywhere near the scale that it is either required or demanded.

Teacher Education for Environmental Education in India

There are over 7,44,000 primary and middle schools and about 92,000 secondary schools in India; with a total enrolment of about150 million students. Schools are run by state governments, central government bodies, local municipalities and private institutions. These range from large urban schools with modern equipment and facilities, to single teacher schools in rural areas where children in four grades or more share a classroom. Instruction across the country is in more than 20 languages. Higher education is imparted through 207 universities in the country. Education in India is the joint responsibility of the government at the Centre and the States. The Central Government has an overall responsibility regarding the quality and character of education. Decisions regarding the organization and structure of education are largely the responsibility of the states. The Department of Education, Ministry of Human Resource Development (MHRD) shares with the states, the task of educational planning.

India is one of the very few countries in the world where a commitment to environmental protection and improvement is enshrined in the constitution. Environmental Education has been a major thrust of both the Ministry of Environment and Forests (MoEF) and the Ministry of Human Resource Development (MHRD) of the Government of India. While the MHRD works towards the environmentalization of the formal curriculum, the MoEF focuses on non-formal educational programmes and strategies to reach the larger community that includes children, youth, urban and rural communities, industry, decision makers etc. In addition to the efforts of the government a large number of voluntary organizations are involved in promoting EE in both formal institutions and non-formal settings.

The National Policy on Education, 1986 states "There is a paramount need to create a consciousness of the Environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and colleges. This aspect will be integrated in the entire educational process".

The National Policy on Education visualizes a national curricular framework, which contains a common core including several elements having direct bearing on the natural and social environment of the pupils. These core areas are expected to occupy a place of prominence not only in instructional materials but also in classroom and out-of-school activities. Today EE in

the formal educational system in India is handled at three levels. It is a composite subject called Environment at the primary school level, it is infused into environment in regular school subjects at the middle and secondary school level, and is a separate subject at the college level.

For EE to be effectively taken up in the curricular, co-curricular and extra-curricular mode, resources and facilities have to be built up and strengthened both within and outside the school and college system. The effectiveness of EE relies heavily on the knowledge, skills and attitudes of the educator. EE is not only a change in 'what' is being taught (the content), but also a new perspective on 'why' (the objectives and goals) and how (the approaches and attitudes). The key to any change in the formal educational system is the teacher, and unless the teacher is convinced about and feels competent to handle this, very little will change. The teacher has to internalize a change in his/her role from one of 'giver of knowledge' to one of 'facilitator in the learning process'. If teachers are to be effective facilitators in bringing EE into teaching and learning their capacities in understanding and internalizing the characteristics of EE and skills in transacting these need to be built and strengthened. One way to do this is through preservice and in-service orientation and training.

EE in Pre-service Teacher Education (Primary level)

Pre-service teacher education for primary school teachers is a two-year course. It covers foundation subjects as well as methodology subjects including educational philosophy and psychology, educational administration, methods of teaching etc. The detailed guidelines and syllabus for the course has been developed by the National Council for Educational Research and Training (NCERT). The State Departments of Education in the respective states administer the institutions for pre-service teacher training courses. The teaching of Environmental Studies (EVS) is placed under both science and Social Studies syllabi recommended by the NCERT. Context related to EVS teaching takes up a large part of the first year syllabus. Training in EVS covers a total of 80 hours in the two-year course.

EE in Pre-service Teacher Training (Secondary level)

Teacher Training for secondary level is offered by B. Ed. Colleges affiliated to universities. Several universities have introduced environmental education as one of the optional or elective papers at the B. Ed. Level. This course covers a total of 40 hours and is graded for 100 marks. The course content includes basic concepts and processes of environment and ecology, as well as teaching-learning methodologies in EE, evaluation techniques etc.

Practicals and assignments are also part of the course. In some universities EE is integrated as an exclusive chapter under one of the foundation courses called 'Education in Emerging India'. The National Council of Teacher Education has recommended EE as a chapter in its overall syllabus and guidelines for B. Ed. Colleges in the country. At the post-graduate level (M.Ed) some universities have introduced EE as a special paper, while a few have given it the status of a full fledged course of two semesters.

EE in In-service Training

The NCERT, State Councils of Educational Research and Training (SCERT) and the District Institute of Education and Training (DIET) are largely involved in in-service training in India. The in-service training/orientation programmes range from one week to one month. Several of these include an orientation of EE as part of the general course. In recent years, some non-governmental agencies with focus and expertise in EE have been invited to run short courses on EE and EE approaches and methodologies as part of in-service teacher training. Another experiment has been to train the teacher instructors of the DIETs in EE approaches so that they may incorporate this into their teaching as part of the in-service teacher training curriculum, and thereby pass these on to the teacher trainees.

1.3 Emergence of the problem

In view of the rapidly escalating rate of environmental problems at the global, national and local levels during the last few decades, a new approach to its study has now emerged. This is environmental education. It demands that both teaching and learning processes have to become more and more environmental based and environment oriented.

According to the Nevada Conference of the International Union for the Conservation Of Nature and Natural Resources in 1970 'Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and appreciate the interrelatedness among man, his culture and his bio-physical surroundings. Environmental education also entails practice in decision making and self-formulating a code of behaviour about issues concerning Environmental quality.'

The issue today is not whether Environmental education should form an essential component of education .The issue is how to do it effectively. One of the significant aspects of this issue relates to the preparation of teachers to plan and teach Environmental education related competencies to future citizens.

Need of the hour is to prepare suitable strategies of Environmental education for saving our Environment. The teacher plays an important role in shaping and molding the habits, taste manners and good character of the children. Therefore, to gear up the environmental awareness programme, it is essential that teachers should have sufficient knowledge of Environmental education. It is the responsibility of the teachers' training colleges and universities to groom teachers for this task also. The existing teachers training courses should be suitably amended to incorporate Environmental education content emphasizing methods to deal with Environmental education content at school and to develop skills in organizing Environmental education programmes with co-curricular activities.

Conventional thinking in the field of EE suggested a linear model for changing behaviour. It suggested that as individuals became more knowledgeable, they became more aware of environmental problems and thus, became more motivated to act responsibly towards the environment. However certain research findings did not support this linearity. Part of the reason for the lack of consistency or prediction between attitude and behaviour in some studies was related to the gap between general environmental concern and specific environmental behaviour. Nevertheless it was noted that the correlation between beliefs and behaviour is significant although not statistically strong. It was also noted that pro-environmental attitudes significantly predicted pro-environmental behaviours and that environmental knowledge was a significant moderator for the relationship between environmental attitudes and environmental behaviours. The evidence seems to support environmental awareness, environmental knowledge and social context as the primary motivators of responsible behaviours but not the action in itself.

It was also of importance to note that environment influences behaviour at different levels. Immediate behaviour is a function of the settings in which it occurs. The characteristic personality make-up of persons in a country is shaped by the nature and type of environment to which they are subjected for long periods of time i.e. their residential surroundings. Racial differences in personality can to a large extent be traced to the influence of different environments to which people of different races have been subjected for generations. These observations form the basis of Environmental Psychology. Environmental Psychology deals with behaviour in relation to the physical environment. The physical environment includes material objects, plants, animals and human beings. It does not emphasize the interactional processes among people, which form the subject matter of other branches of Psychology.

Organisms were studied as part of the ecosystem, stressing the balance and interdependence of organisms and the environment.

A concern for nature and natural resources is the very spirit of the Indian ethos and culture. Indians wealth of literature and traditional arts and customs is replete with outstanding examples of the importance that we have placed on the orderliness of the natural systems in our day to day life. But in spite of the edge over an earlier beginning we have lagged behind in conserving our nature and natural resources. Whatever may have been the reasons for such a decline, it is now in the hands of the educationists that this grave responsibility has been placed by leaders all over the world.

It has been realised that although the teachers may have theoretical knowledge on a particular subject they still cannot use it according to the objectives of Environmental education. This means that their ability to transfer this knowledge depends not on its extent and accuracy but on the systematic characteristics and mobility that the teacher can acquire and impart to the subject. The ability to control and adjust knowledge within the curriculum will enable the teachers to instruct the students and thus implement the goals and objectives of Environmental education effectively.

1.4 Justification of the Study

Surely there can be little doubt about the urgent need for promoting change in attitudes and behaviour in relation to the environment; for encouraging people to appreciate and enjoy the world around them and for equipping policy-makers of both present and future with the knowledge, skills and attitudes that will encourage them to adopt environmentally responsible approaches. Around the world there is active debate on how best to achieve these goals and on the most appropriate strategies for developing and implementing programmes of environmental education.

Environmental problems and environmental issues have become one of the most important problems and issues in the late modernization age. Earlier, environmental problems had been accounted as technical and economical problems; however, these problems had been accounted for their societal dimensions, as well as, technical and economical dimensions for last few decades. The societal dimensions of environmental problems and environmental issues attracted more public attention and social scientific concern in the second half of the twentieth century, especially after the 1970s. New social scientific disciplines,

'environmental sociology' and 'environmental psychology' have emerged as a result of the above-mentioned circumstances. Environmental sociology hammered multi-dimensionality of environmental problems and environmental issues, especially social dimensions. Accordingly, environmental sociology is such a discipline that accounts social dimensions of the environmental problems. Environmental Psychology deals with behaviour in relation to the physical environment. The physical environment implies material objects, plants, animals and human beings. Environmental Psychology follows the systems approach, which has become the modern approach in several branches of science. It is holistic and naturalistic and studies the adaptation of organisms to their settings.

The intensive application of Science and technology combined with man's greed to over exploit the natural resources, the unprecedented rapid population growth ,modern process of production and consumption, changes in human life style, have in their wake brought serious environmental problems. These environmental problems are matters of common concern. The very survival of man depends on the solution to these problems. It is not out of place to mention here that education can play a vital role in this direction. Awareness is essential for action. Education can make man aware, conscious of and knowledgeable about environmental problems. Education can help man understand the underlining causes, the manifestations and impact of these problems, so that he may act in a concerted manner not only to alleviate and solve the exciting problems but also to prevent their recurrence. The role of the teacher is crucial to achieve these objectives. His quantum of knowledge and understanding of environment and its related problems has a direct bearing on this desired end. Therefore since today's teachers trainees are tomorrow's teachers. It is necessary to know how far they are aware of the environment and environmental problems. Whether the teacher trainees from different subject backgrounds vary in their environmental awareness and action? Whether their place of residence has any impact on their awareness, action, motivational level, self efficacy or understanding of environmental problems?

Now the most important need to have personnel who will be able to integrate Environmental Education into formal and non-formal education programmes and further implement these programmes calls for the training of teachers in Environmental Education. This need for trained personnel is becoming more and more apparent today. It may be worthwhile to point out in this regard that since 1970, both International and Intergovernmental organizations and agencies have recognized the urgent need to develop Environmental Education in teacher education programmes. This has been documented in many conferences such as International

Union for Conservation of Nature and Natural Resources (IUCN), Environmental Education Conference (1971) Belgrade workshop (1975), The Tbilisi Conference (1977) and more recent United Nations on Environmental development, the Earth Summit 1992.The UNESCO-UNEP international environmental education programme has described the preparation of teachers as "priority of priorities" for action to improve the effectiveness of Environmental Education(1990).

The Wilke (1985) stated that "The key of successful Environmental Education is the classroom teacher. If Teacher do not have the Knowledge, skill and commitment to environmentalise their curriculum, it is unlikely that environmentally literate student will be produced .For this, special training to prospective teachers is necessary." The research conducted on this issue may help to design a teacher-training programme, which can fulfill the objectives of Environmental Education.

The researcher was able to find only a few sporadic researches in this field, on a global perspective in general and specially in the Indian context and as such, felt the need for carrying out a research work in this direction. There is no such information available on the awareness, self-efficacy and motivational level of the teacher trainees in West Bengal in relation to environmental action and their impact on environmental education. In view of such paucity of information on the subject, a detailed investigation has been carried out in our present research programme. Previous studies mostly deal to study the variation, if any, in environmental awareness and action level between the teacher trainees belonging to rural and urban areas assuming that rural areas are environmental threat free zone and urban areas as threatened zone. But from the result of scientific researches it is now obvious that there is no such area in the world which can be consider as environmental threat free zone. Actually the rural areas may also suffer from different kind of pollutional threat like urban areas but there nature is quite different. So in our present study we classified the residential zone of the teacher trainees as high threat zone and low threat zone irrespective of their rural, semi-urban or urban nature. So we attempt to study that if residential zone of the teacher trainees have any impact on their environmental awareness, action, motivational level or self efficacy in relation to the environmental education, which was never attempted earlier.

The goal of environmental education is to develop a world population that is aware of and concerned about the environment and its associated problems and who has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards

solution of current environmental problems and prevention of new ones. School system provides the largest organized base for environmental education and action. It offers an effective instrument for embedding in them the desirable environmental ethics. Teacher is one of the important factors, which is bound to affect this programme. Teachers can provide a vital link in the delivery of environmental knowledge, its associated problems and their solutions. Taking into consideration this situation, the investigator felt a need to conduct a study to examine whether residential background has any effect on the environmental awareness and environmental action of teacher trainees along with other external factors.