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DISSERTATION

**ENVIRONMENTAL MANAGEMENT
STRATEGIES FOR COMBATING
CLIMATE CHANGE (CLC)**

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TN.India

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Preamble

Climate change is a serious global problem. As scientific understanding of climate change deepens, the trend is for expected impacts to be more serious, and to happen sooner. Our biologically based economy is vulnerable to the impacts of climate change. The future of our economy, environment and way of life are threatened. It is in our interest that there is a concerted global effort to reduce greenhouse gas emissions.

We can practice a large number of everyday measures to reduce greenhouse gas emissions, and we can develop more. At the same time, we have to take action to prepare ourselves for the effects of climate change such as rising temperatures and sea levels, and more frequent and severe weather including both floods and droughts.

IN THIS DISSERTATION the researcher has drawn texts from various books, magazines and articles in order to make it comprehensive in all aspects of Facts, Factors, Analysis, Strategies, Implementation and the views of the researcher, with respect to implementation aspects pertinent to India. The subject is so vast that there is still more than that can be put forth.

The reason for making this dissertation elaborate is that this will be used for preparing hand outs and literature in vernacular local language for free distribution and also for training people/the action group, to start with in the home Cuddalore District of Tamil Nadu, India. The place where the researcher has his residence and operations, Vriddhachalam in the same district, is a sandwich near Neyveli- The Neyveli Lignite Corporation with two open cut mines and two massive thermal power plants, still under expansion for the third unit. Apart from these there are private thermal power and cement plants. Vriddhachalam itself is an SSI hub for ceramic industries. The place deserves to be addressed for the Environmental Conservation with all the measures and strategies. In Chapter VI of this dissertation the researcher has given a clear account of the efforts he has already put forth towards the cause for the past 6 or 7 years. By virtue of his personal experience in public life for two decades and through his own companies and Service Org. Aravind Foundation, he has suggested some workable suggestions which have worked in the past.

Chapter I Climate Change /Global Warming

Climate change is any long-term significant change in the “average weather” that a given region experiences. Average weather may include average temperature, precipitation and wind patterns. It involves changes in the variability or average state of the atmosphere over durations ranging from decades to millions of years. These changes can be caused by dynamic process on Earth, external forces including variations in sunlight intensity, and more recently by human activities

Climate change is one of the greatest environmental, social and economic threats facing the planet. The warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level. The Earth's average surface temperature has risen by 0.76° C since 1850. Most of the warming that has occurred over the last 50 years is very likely to have been caused by human activities.

- 1) Factors
- 2) Impacts, Adaptation and Vulnerability of Climate Change
- 3) Is Climate Change a time bound catastrophe?
- 4) Who is responsible?

1) Climate change factors

Climate changes reflect variations within the Earth's atmosphere, processes in other parts of the Earth such as oceans and ice caps, and the effects of human activity. The external factors that can shape climate are often called climate forcing and include such processes as variations in solar radiation, the Earth's orbit, and greenhouse gas concentrations.

Variations within the Earth's climate

Weather is the day-to-day state of the atmosphere, and is a chaotic non-linear dynamical system. On the other hand, climate — the average state of weather — is fairly stable and predictable. Climate includes the average temperature, amount of precipitation, days of sunlight, and other variables that might be measured at any given site. However, there are also changes within the Earth's environment that can affect the climate.

Glaciations

Percentage of advancing glaciers in the Alps in the last 80 years

Glaciers are recognized as being among the most sensitive indicators of climate change, advancing substantially during climate cooling (e.g., the Little Ice Age) and retreating during climate warming on moderate time scales. Glaciers grow and collapse, both contributing to natural variability and greatly amplifying externally forced changes. For the last century, however, glaciers have been unable to regenerate enough ice during the winters to make up for the ice lost during the summer months.

Ocean variability

On the scale of decades, climate changes can also result from interaction of the atmosphere and oceans. Many climate fluctuations — including not only the El Niño Southern oscillation (the best known) but also the Pacific decadal oscillation, the North Atlantic oscillation, and the Arctic oscillation — owe their existence at least in part to different ways that heat can be stored in the oceans and move between different reservoirs. On longer time scales ocean processes such as thermohaline circulation play a key role in redistributing heat, and can dramatically affect climate.

Non-climate factors driving climate change

Greenhouse gases

Carbon dioxide variations during the last 500 million years

Current studies indicate that radioactive forcing by greenhouse gases is the primary cause of global warming. Greenhouse gases are also important in understanding Earth's climate history. According to these studies, the greenhouse effect, which is the warming produced as greenhouse gases trap heat, plays a key role in regulating Earth's temperature

Plate tectonics

On the longest time scales, plate tectonics will reposition continents, shape oceans, build and tear down mountains and generally serve to define the stage upon which climate exists. More recently, plate motions have been implicated in the intensification of the present ice age when, approximately 3 million years ago, the North and South American plates collided to form the Isthmus of Panama and shut off direct mixing between the Atlantic and Pacific Oceans

Solar variation

Variations in solar activity during the last several centuries based on observations of sunspots and beryllium isotopes. The sun is the ultimate source of essentially all heat in the climate system. The energy output of the sun, which is converted to heat at the Earth's surface, is an integral part of shaping the Earth's climate. On the longest time scales, the sun itself is getting brighter with higher energy output; as it continues its main sequence, this slow change or evolution affects the Earth's atmosphere. It is thought that, early in Earth's history, the sun was too cold to support liquid water at the Earth's surface, leading to what is known as the Faint young sun paradox.

Orbital variations

In their effect on climate, orbital variations are in some sense an extension of solar variability, because slight variations in the Earth's orbit lead to changes in the distribution and abundance of sunlight reaching the Earth's surface. Such orbital variations, known as Milankovitch cycles, are a highly predictable consequence of basic physics due to the mutual interactions of the Earth, its

moon, and the other planets. These variations are considered the driving factors underlying the glacial and interglacial cycles of the present ice age. Subtler variations are also present, such as the repeated advance and retreat of the Sahara desert in response to orbital precession.

Volcanism

A single eruption of the kind that occurs several times per century can affect climate, causing cooling for a period of a few years. For example, the eruption of Mount Pinatubo in 1991 affected climate substantially. Huge eruptions, known as large igneous provinces, occur only a few times every hundred million years, but can reshape climate for millions of years and cause mass extinctions. Initially, scientists thought that the dust emitted into the atmosphere from large volcanic eruptions was responsible for the cooling by partially blocking the transmission of solar radiation to the Earth's surface. However, measurements indicate that most of the dust thrown in the atmosphere returns to the Earth's surface within six months

Attribution of recent climate change

Human influences on climate change

Anthropogenic factors are human activities that change the environment and influence climate. In some cases the chain of causality is direct and unambiguous (e.g., by the effects of irrigation on temperature and humidity), while in others it is less clear. Various hypotheses for human-induced climate change have been debated for many years.

The biggest factor of present concern is the increase in CO₂ levels due to emissions from fossil fuel combustion, followed by aerosols (particulate matter in the atmosphere), which exert a cooling effect, and cement manufacture. Other factors, including land use, ozone depletion, animal agriculture^[3] and deforestation, also affect climate.

Fossil fuels

Carbon dioxide variations over the last 400,000 years, showing a rise since the industrial revolution. Beginning with the industrial revolution in the 1850s and accelerating ever since, the human consumption of fossil fuels has elevated CO₂ levels from a concentration of ~280 ppm to more than 380 ppm today. These increases are projected to reach more than 560 ppm before the end of the 21st century. It is known that carbon dioxide levels are substantially higher now than

at any time in the last 750,000 years.^[4] Along with rising methane levels, these changes are anticipated to cause an increase of 1.4–5.6 °C between 1990 and 2100 (see global warming).

Aerosols

Anthropogenic aerosols, particularly sulphate aerosols from fossil fuel combustion, exert a cooling influence. This, together with natural variability, is believed to account for the relative "plateau" in the graph of 20th-century temperatures in the middle of the century.

Cement manufacture

Cement manufacturing is the third largest cause of man-made carbon dioxide emissions. Carbon dioxide is produced when calcium carbonate (CaCO_3) is heated to produce the cement ingredient calcium oxide (CaO , also called quicklime). While fossil fuel combustion and deforestation each produce significantly more carbon dioxide (CO_2), cement-making is responsible for approximately 2.5% of total worldwide emissions from industrial sources (energy plus manufacturing sectors).

Land use

Prior to widespread fossil fuel use, humanity's largest effect on local climate is likely to have resulted from land use. Irrigation, deforestation, and agriculture fundamentally change the environment. For example, they change the amount of water going into and out of a given location. They also may change the local albedo by influencing the ground cover and altering the amount of sunlight that is absorbed. For example, there is evidence to suggest that the climate of Greece and other Mediterranean countries was permanently changed by widespread deforestation between 700 BC and 1 AD (the wood being used for shipbuilding, construction and fuel), with the result that the modern climate in the region is significantly hotter and drier, and the species of trees that were used for shipbuilding in the ancient world can no longer be found in the area.

A controversial hypothesis by William Ruddiman called the early anthropogenic hypothesis suggests that the rise of agriculture and the accompanying deforestation led to the increases in carbon dioxide and methane during the period 5000–8000 years ago. These increases, which reversed previous declines, may have been responsible for delaying the onset of the next glacial

period, according to Ruddimann's overdue-glaciations hypothesis. In modern times, a 2007 Jet Propulsion Laboratory study found that the average temperature of California has risen about 2 degrees over the past 50 years, with a much higher increase in urban areas. The change was attributed mostly to extensive human development of the landscape.

Livestock

According to a 2006 United Nations report, *Livestock's Long Shadow*, livestock is responsible for 18% of the world's greenhouse gas emissions as measured in CO₂ equivalents. This however includes land usage change, meaning deforestation in order to create grazing land. In the Amazon Rainforest, 70% of deforestation is to make way for grazing land, so this is the major factor in the 2006 UN FAO report, which was the first agricultural report to include land usage change into the radioactive forcing of livestock. In addition to CO₂ emissions, livestock produces 65% of human-induced nitrous oxide (which has 296 times the global warming potential of CO₂) and 37% of human-induced methane (which has 23 times the global warming potential of CO₂).

Interplay of factors

If a certain forcing (for example, solar variation) acts to change the climate, then there may be mechanisms that act to amplify or reduce the effects. These are called positive and negative feedbacks. As far as is known, the climate system is generally stable with respect to these feedbacks: positive feedbacks do not "run away". Part of the reason for this is the existence of a powerful negative feedback between temperature and emitted radiation: radiation increases as the fourth power of absolute temperature.

However, a number of important positive feedbacks do exist. The glacial and interglacial cycles of the present ice age provide an important example. It is believed that orbital variations provide the timing for the growth and retreat of ice sheets. However, the ice sheets themselves reflect sunlight back into space and hence promote cooling and their own growth, known as the ice-albedo feedback. Further, falling sea levels and expanding ice decrease plant growth and indirectly lead to declines in carbon dioxide and methane. This leads to further cooling. Conversely, rising temperatures caused, for example, by anthropogenic emissions of greenhouse

gases could lead to decreased snow and ice cover, revealing darker ground underneath, and consequently result in more absorption of sunlight.

Water vapor, methane, and carbon dioxide can also act as significant positive feedbacks, their levels rising in response to a warming trend, thereby accelerating that trend. Water vapor acts strictly as a feedback (excepting small amounts in the stratosphere), unlike the other major greenhouse gases, which can also act as forcing. More complex feedbacks involve the possibility of changing circulation patterns in the ocean or atmosphere. For example, a significant concern in the modern case is that melting glacial ice from Greenland will interfere with sinking waters in the North Atlantic and inhibit thermohaline circulation. This could affect the Gulf Stream and the distribution of heat to Europe and the east coast of the United States.

Other potential feedbacks are not well understood and may either inhibit or promote warming. For example, it is unclear whether rising temperatures promote or inhibit vegetative growth, which could in turn draw down either more or less carbon dioxide. Similarly, increasing temperatures may lead to either more or less cloud cover.^[10] Since on balance cloud cover has a strong cooling effect, any change to the abundance of clouds also affects climate.

2) Impacts, Adaptation and Vulnerability of Climate Change

There is now scientific consensus that this warming has been brought about by the increase in greenhouse gases in the atmosphere, which in turn has been caused by human activities – primarily the burning of fossil fuels and changes in land use.

The devastating floods, droughts, and storms we have witnessed in recent months and years show all too clearly how vulnerable we are to climate extremes and how high the economic, human and environmental costs can be.

What impacts of climate change have already been observed?

Regional climate change is already affecting many natural systems. For instance, it is increasingly being observed that snow and ice are melting and frozen ground is thawing, hydrological and biological systems are changing and in some cases being disrupted, migrations are starting earlier, and species' geographic ranges are shifting towards the poles.

Despite remaining gaps in knowledge, it is likely that these effects are linked to human influence on climate. At the regional level, however, responses to natural variability are difficult to separate from the effects of climate change.

Some previously unanticipated impacts of regional climate change are just starting to become apparent. For instance, melting glaciers can threaten mountain settlements and water resources, and damage associated with coastal flooding increase.

How do people adapt to climate change?

Changes in consumption habits can help address climate change.

1 Humans need to adapt to the impacts of climate change, for instance through technological solutions such as coastal defenses and changes in consumption habits. Humans are already adapting to climate change, and further adaptation efforts will be necessary during coming decades. However, adaptation alone is not expected to be able to cope with all projected effects since the options diminish and the costs increase with rising temperatures.

2 Vulnerability of human populations to climate change and its consequences can be affected by other factors, such as pollution, conflicts, or epidemics such as AIDS. An emphasis on sustainable development can help human societies reduce their vulnerability to climate change. However, climate change itself can become an impediment to their development.

3 Mitigation measures that aim to reduce greenhouse gases emissions can help avoid, reduce or delay impacts, and should be implemented in order to ensure that adaptation capacity is not exceeded.

Climate change and biodiversity

The life cycles of many wild plants and animals are closely linked to the passing of the seasons; climatic changes can lead to interdependent pairs of species (e.g. a wild flower and its pollinating insect) losing synchronization, if, for example, one has a cycle dependent on day length and the other on temperature or precipitation. In principle, at least, this could lead to extinctions or changes in the distribution and abundance of species. Wetter, milder winters might affect

temperate mammals or insects by preventing them hibernating or entering torpor during periods when food is scarce. One predicted change is the ascendancy of 'weedy' or opportunistic species at the expense of scarcer species with narrower or more specialized ecological requirements.

3) Is Climate Change a time bound catastrophe?

How is climate changing and how has it changed in the past?

Changes in temperature, sea level and snow cover since 1850 

1) The warming of global climate is now unequivocal. There are many observations of increasing air and ocean temperatures, widespread melting of snow and ice, and rising sea levels.

More specifically, eleven of the last twelve years (1995-2006) rank among the 12 warmest years ever recorded since global surface temperatures are measured (1850). Over the last 100 years (1906–2005), global temperature has increased by 0.74°C. Global sea level has risen by 17 cm during the 20th century, in part because of the melting of snow and ice from many mountains and in the Polar Regions. More regional changes have also been observed, including changes in Arctic temperatures and ice, ocean salinity, wind patterns, droughts, precipitations, frequency of heat waves and intensity of tropical cyclones.

2).The temperatures of the last half century are unusual in comparison with those of at least the previous 1300 years. The last time that the Polar Regions remained significantly warmer than now for a much extended period (125 000 years ago), the sea level rose by 4 to 6 meters.

3) Most of the increase in global temperature observed over the past fifty years is very likely due to human emissions of greenhouse gases.

What makes the climate change?

Greenhouse gases are produced mainly by the burning of fossil fuels

The Earth's climate is influenced by many factors, mainly by the amount of energy coming from the sun, but also by factors such as the amount of greenhouse gases and aerosols in the atmosphere, and the properties of the Earth's surface, which determine how much of this solar energy is retained or reflected back to space.

The atmospheric concentrations of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) have significantly increased since the beginning of the industrial revolution. This is mainly due to human activities, such as the burning of fossil fuels, land use change, and agriculture. For instance, the atmospheric concentration of carbon dioxide is now far

higher than in the last 650 000 years and has been growing faster in the last ten years than it has been since the beginning of continuous measurements around 1960.

It is very likely that, overall, human activities since 1750 have had a global warming effect on the Earth.

The memory of climate

More generally, most forms of internal variability in the climate system can be recognized as a form of hysteresis, meaning that the current state of climate reflects not only the inputs, but also the history of how it got there. For example, a decade of dry conditions may cause lakes to shrink, plains to dry up and deserts to expand. In turn, these conditions may lead to less rainfall in the following years. In short, climate change can be a self-perpetuating process because different aspects of the environment respond at different rates and in different ways to the fluctuations that inevitably occur.

How can we adapt to these changes? Is it possible to limit the extent of climate change and its impacts through mitigation efforts?

1) Who is responsible?

The most significant climate processes of the last several million years are the glacial and interglacial cycles of the present age. During the modern era, the naturally rising carbon dioxide levels are implicated as the primary cause of global warming since 1950. According to the Intergovernmental Panel on Climate Change (IPCC), 2007, the atmospheric concentration of CO₂ in 2005 was 379 ppm³ compared to the pre-industrial levels of 280 ppm³.

The US Geological Survey estimates that human activities generate more than 130 times the amount of carbon dioxide emitted by volcanoes.

Human activities that contribute to climate change include in particular the burning of fossil fuels, agriculture and land-use changes like deforestation. These cause emissions of carbon dioxide (CO₂), the main gas responsible for climate change, as well as of other 'greenhouse' gases. To bring climate change to a halt, global greenhouse gas emissions must be reduced significantly

Chapter II Analysis

A recent UK government study of 286,000 businesses focused on their levels of environmental resource depletion. What emerged was a shocking excess consumption that, were it scaled globally, we would require 3½ planets to support this copious misappropriation of our environment.

There's no justification for this abuse of our collective resources, however it would, in some meager part, be excusable if the productivity and effectiveness our businesses were higher than our counterparts and neighbors, but this is far from the case.

What this clearly shows is that conspicuous over-consumption of our environmental resources is not linked to working smarter – there's no connection to be made with doing more, faster, and better, with less. It is simply a misappropriation of resources – a squandering of our shared environment without any purpose other than 'waste for the sake of waste'.

And this waste is costing not only our precious planet, but also £billions and billions in cost for the organisations involved.

This cannot continue. Businesses must rethink the way they work – quite simply, businesses must work smarter. Key to working smarter and reducing the environmental impact of business is workplace effectiveness – understanding the holistic interaction of people, space, and infrastructure.

- 5) CLC and Business World
- 6) CLC and Common Man -The Worst Hit
- 7) CLC - Tomorrow

5) CLC and Business World

As global temperatures rise due to increasing greenhouse gases emissions, climate change is becoming a reality. Arguments over cause of global warming – whether it is man-made or it is part of a natural cycle – are not expected to die down soon, but the unavoidable fact is that the world is witnessing drastic changes in the climatic patterns. Businesses are arguably perceived by the society to be the worst contributors of greenhouse gases emissions. Society, through various options available to it, is pressurizing businesses to align their practices with environmental goals. In such a scenario, a major challenge confronting businesses all over the world, and in developing countries in particular, is being able to reconcile economic imperatives with environmental sustainability. How businesses shape up to meet the challenges posed by attendant physio-socio-economic consequences is going to be crucial

On one hand, market forces are forcing companies to adopt sound environmental business practices. With increasing customer awareness of environmental issues, due largely to media exposure, 'green consumerism' in the country is picking up. Customers are ready to pay price premium for the products which they perceive to be environmentally benign. Businesses not in a position to meet environmental standards in their products as per customers' demand may face threat to their very existence in the market.

On the other hand, with the implementation of Kyoto Protocol, emission reduction targets of Greenhouse Gases (GHGs) – the main cause of global warming - are now becoming a reality, with the focus for action turning to the private sector. Business and industry have a crucial role to play in the implementation of Kyoto Protocol and various Emissions Trading Schemes. Carbon Markets ensure that sound environmental business practices not only make sense from legal, moral and ethical perspectives but, in the present context, from economic perspective also. Businesses, by adopting green technologies and processes, can meet their all three bottom lines: Environmental, Social, and Economic. Such businesses not only lead to sustainable development in the society but ensure their own sustainability too.

Businesses in the developing countries like India can gain competitive as well as economic benefits through Clean Development Mechanism (CDM) projects. India offers vast potential for CDM projects. As per one source, the country can generate 248 million tones of carbon dioxide

equivalent or Certified Emission Reduction (CER) units per year, including 78 million tones from land-use and plantation projects.

How companies think about climate change: A McKinsey Global Survey

Fully 60 percent of global executives surveyed by The McKinsey Quarterly regard climate change as strategically important, and a majority consider it important to product development, investment planning, and brand management

Fewer companies, however, act on these opinions. More than one-third of executives say their companies seldom or never consider climate change when developing overall strategy.

Nonetheless, executives express optimism about the business prospects of addressing climate change. Sixty-one percent expect the issues associated with climate change to boost profits—if managed well.

Despite the uncertainties around regulation, a remarkable 82 percent of executives expect some form of climate change regulation in their companies' home country within five years.

Expressing Climate Change in Net Present Value Business Terms

Can we translate climate change into terms of business gain – gains that will be recognized by businesses large and small, across all commercial sectors?

Put simply; "Can we express climate change in compelling terms that all businesses will passionately want to embrace, adopt, and sustain?"

The answer is an emphatic yes.

Let's start by examining the largest dynamic factors in business. In order of magnitude, they are; - people, space, and infrastructure. These three factors eclipse all other business cost factors by many orders of magnitude.

Top of this list is people, with approximately 70 per cent of all organisations' costs being employee related.

Second on this list are facilities, often costing up to 25 per cent of all organisations' costs?

And then there's infrastructure – IT and communications – that can cost organisations millions.

Whenever there is a massive organizational cost there is an equal, and commonly greater, environmental impact.

- What's the cost to the climate of transporting millions of workers around each and every day?
- What's the cost to the climate of constructing, operating, lighting, heating, and air-conditioning trillions of square meters of unnecessary office space each and every day?
- What's the cost to the climate of operating millions of IT and communications systems each and every day?

6) CLC and Common Man –The Worst Hit

INDIA'S ACHIEVEMENTS

1) Post economic reforms, the gross development product (GNP) improved from an average, making India one of the ten fastest growing developing countries.

2) Where the dismantling of the industrial licensing system, free investments by foreign Companies, lowering of import tariffs on capital goods all contributed.

3) Encouraging progress was also made in other sectors. The percentage of the population in poverty continued to decline. Population growth decelerated below 2 per cent for the first time in four decades. Literacy increased .Software services, entertainment and information technology-enabled services emerged as new sources of strength, creating confidence about India's potential to be competitive in the world economy.

THE OTHER SIDE

4) However, the picture is not all rosy and are clouded by other features which give cause for concern. The economy is currently in a decelerating phase and urgent steps are needed to arrest the deceleration and restore momentum. Although employment growth

has almost kept pace with labor force growth, the incidence of unemployment on current daily status basis is relatively high. More than half of the children between 1-5 years in rural areas are under-nourished, with girl children suffering even more severe malnutrition. The infant mortality rate has stagnated, as many as 60 per cent of rural households and 20 per cent urban households do not have power connection. Only 60 per cent of urban households have taps within their homes, and far fewer have latrines inside the house. The decline in the juvenile sex ratio over the last decade, visible, is an indication that the Constitutional assurance of freedom and equality for women is still far from being fulfilled.

Environmental Costs

5) The development has come at a price. Rapid population growth coupled with rapid Industrialization has caused severe environmental degradation and pollution with local, National, regional and global impacts. According to a World Bank study, between 1975 and 1995, as India's GDP doubled, industrial and vehicular pollution load went up between 4 and 8 times respectively.

6) Deterioration in urban environment, increase in slum population, and in air, river, and water pollution has vastly affected the quality of life of the urban poor. The air quality of major cities indicate that ambient levels of nitrous oxides, sulphur dioxide, lead and suspended particulate matter is often higher than World Health Organization and Indian standards. Other harmful substances in like ozone are not even monitored.

7) Land and forest degradation in the rural areas and overexploitation of ground water is seriously threatening sustainability of food production.

ENVIRONMENTAL DEGRADATION, POVERTY AND ECONOMIC DEVELOPMENT

The strong linkage between environment degradation, poverty and economic development is now an established fact. It has been more or less accepted now that it is not always the poor who are the greatest polluters responsible for a degraded

environment. Urbanization and industrialization and unsustainable use of natural resources have all contributed to serious environmental problems

Conventional thinking on environment blamed the poor for overexploitation of natural resources, as poverty and environment were considered linked in a 'downward spiral,' in which poor people, forced to overuse the environmental resources for their survival, are further impoverished by the degradation of these resources. Population growth and economic change (which often bypasses the poor, or reduces their access to natural resources) were also seen to contribute to this process. It was therefore believed that poverty needs to be eradicated in developing countries before they can turn their attention to environmental protection.

The perception of the 'vicious circle' as characterizing the environmental degradation and poverty in countries is vulnerable to criticism on several counts. It is a simplistic, exaggerated and misleading thesis. In the past, when poverty levels were much higher in developing countries, there was not much environmental degradation. Now that poverty levels are declining significantly, it does not seem plausible to attribute environmental degradation to poverty. Evidently other factors play a more important role.

The poor should be viewed as the victims rather than the perpetrators of environment damage. As they are dependent on nature for livelihood, they are very vulnerable to natural calamities, environmental degradation and ecological disasters, which are often human made, such as Bhopal Gas Tragedy, and pollution caused in the river Yamuna by industries and upstream rich farmers. Thus the belief that all economic development alleviates poverty is not entirely true. There are cases of destructive development which aggravate poverty and contribute to environmental degradation at the same time.

Probably the first victim of any environmental degradation are the women among the poor. A fuel wood crisis as a result of deforestation, for example, forces village women to travel for miles in search of wood. This involves waste of energy and time which women could have devoted to more remunerative work. They have to bring water for cooking and washing from great distances. Fodder scarcity also affects women first: the care of

livestock is their responsibility. This burden on women in turn has an impact on girl children. When the mothers' time is spent on fetching fuel food and drinking water, girl children are kept at home and discouraged from attending school. They have to look after younger children, sweep the house and do the household chores.

There is enough empirical evidence to establish that environmental conservation must go hand in hand with economic development because any economic development which destroys the environment will create more poverty, unemployment and diseases and thus cannot be called even economic development. It may just be transfer of resources from the poor to the rich. Environmentally destructive economic development will impoverish the poor even further and destroy their livelihood resource base. Therefore the environmental concern in the developing world must go 'beyond pretty trees and tigers' and must link it with peoples' lives and well being.

Urban Utopia?

While rural populations suffer from an increasingly degrading natural resource base, in urban areas, populations face environmental challenges of a different kind.

There is mounting evidence that increasing pressures on urban environments is taking its toll on the quality of life of urban population. Although economic deprivation may be less acute in urban areas than in the rural, the deleterious effects of non-economic factors may indeed be more pervasive. Urban population growth is much higher than the rate of Population growth, and already about 29 per cent of India's population lives in urban areas, frequently in deplorable conditions .

HUMAN SECURITY

Human security and better quality of life depends on several factors, all of them linked to the environment. These include:

Water security for consumption and livelihood purposes

Food and nutrition security

Health security

Livelihood security

Ecological security

Social security

These linkages make the issue of environment protection all the more serious in India. The environmental problems facing India are different from those facing the affluent countries and are more immediate. Air and water pollution, soil degradation, deforestation, desertification, shrinking wetlands, inadequate public health and sanitation, indoor pollution in rural areas, growing water scarcity, falling groundwater tables, the lack of minimum flow in rivers, and over extraction of water for irrigation purposes are some of the environmental problems that need to be addressed first before any poverty alleviation programme can meet with success or human security achieved.

Thus environmental management and economic development are mutually supportive aspects of same agenda, indeed two sides of the same coin. A poor environment undermines development, while inadequate development results in lack of resources for environmental protection.


7) CLC Tomorrow.

How is the climate going to change in the future? From 1980 to the end of the 21st century, temperatures are projected to increase by 1.8°C to 4.0°C. The global average temperature is expected to increase by about 0.2°C per decade over the next two decades. Continuing greenhouse gas emissions at or above current rates would cause a further increase in global temperatures and many other climatic changes during the 21st century. The best estimates for projected global temperature increases from the 1980s to the end of the 21st century range from 1.8°C (1.1 - 2.9°C) to 4°C (2.4 - 6.4°C) for the IPCC scenarios that do not consider additional mitigation measures apart from those already in place in 2000.

Global average sea level is expected to rise by 18 to 59 cm by the end of the 21st century. Warming is expected to be greatest over land and at high northern latitudes and smallest over the Southern Ocean and parts of the North Atlantic Ocean. Other projected changes include acidification of the oceans, reduced snow cover and sea ice, more frequent heat waves and heavy precipitation, more intense tropical cyclones, and slower oceanic currents.

Warming and sea level rise caused by human activities will continue for centuries, even if greenhouse gas concentrations were to be stabilized. If warming persists over many centuries, it could lead to a complete melting of the Greenland Ice sheet, increasing global sea levels by about 7m.

What impacts are expected in the future?

Key impacts with increasing temperatures 

Over the course of the 21st century, many impacts are expected to occur in natural systems. For instance, changes in precipitation and the melting of ice and snow are expected to increase flood risks in some areas while causing droughts in others. If there is significant warming the capacity of ecosystems to adapt will be exceeded, with negative consequences such as an increased risk of extinction of species.

The most vulnerable people are in general the poor, since they have less capacity to adapt, and their livelihoods are often dependent on resources that are linked to climate. More...

Africa is found to be particularly vulnerable to climate change, because of existing pressures on its ecosystems and its low capacity to adapt. On all continents, water supply and the threat to coastal areas will be an issue. Overall future impacts are expected to be negative, although some positive effects are also expected initially, such as an increase in agricultural productivity at high latitudes accompanying a moderate warming, or decreased heating needs in cold regions.

Impacts will depend on the magnitude of the temperature increase. For instance, some crops at mid- to high latitudes will have higher productivity if local temperature increases by 1-3 °C, but will be negatively affected beyond that. If higher temperatures persist after the 21st century it could result in very large impacts. For instance, the large sea-level rise that would result from the melting of the Greenland and Antarctic ice sheets would have major repercussions on coastal areas. The cost associated with the effects of climate change is projected to increase over time with rising temperatures.

A projected increase in the severity and frequency of droughts, heat waves, and other extreme weather events is expected to cause major impacts over the course of this century.

Projected global warming this century is likely to trigger serious consequences for humanity and other life forms, including a rise in sea levels of between 18 and 59 cm which will endanger coastal areas and small islands, and a greater frequency and severity of extreme weather events.

In the last few years, scientific research and knowledge on climate change have progressed substantially, confirming that the current warming of the Earth's climate is very likely to be due to human activities such as the burning of fossil fuels. The Earth's warming is already having measurable consequences and future impacts are expected to be wide-ranging and costly.

Chapter III Strategy and Action Plan

The basic objective is to bring about all round enhancement of human well being by eradicating poverty through adopting well conceived development strategies in which environmental concerns are posited as the vital aspects. Environmental management and economic development are mutually supportive aspects of the same agenda. A poor environment undermines development, while inadequate development results in a lack of resources for environmental protection.

Environmental conservation must go hand in hand with economic development because any economic development which destroys the environment will create more poverty, unemployment and disease. Environmentally destructive economic development will impoverish the poor even further and destroy their livelihood resource base.

Environmental concern must be linked to people's lives and well being, impacts as these do various aspects of human existence that include health and livelihood amongst others.

Air pollution, soil degradation, deforestation, desertification, shrinking wetlands.

Inadequate public health and sanitation, indoor pollution in rural areas, growing water scarcity, falling ground water tables, the lack of minimum flow in the rivers and over extraction of water for irrigation purposes are some of the environmental problems that need to be addressed first before any poverty alleviation programme can meet with success.(Based on Approach Paper to the Tenth Five Year plan 2002-2007),

8) Core Areas for Concentration and Monitoring

9) Measures and Methodology for Mitigation

8) Core Areas for Monitoring

CONCENTRATION, MONITORING AND CONTROLLING CLIMATE CHANGE

Climate Change and Global Warming and the Oceans

Space-Based Observations of the Coupled Ocean-Atmosphere System

El Niño and the North Atlantic Oscillation

Non-linear Surface and Bulk Waves of the Oceans

Measurements of the Air/Sea Fluxes and Global Climate

Sustainable Environment, Health and Development

Environmental Economics

International Trade and Sustainable Development

Coastal Zone Management

Environmental Assessment and Development

Air Pollution and Water Pollution

Heavy Metal Pollution & Long-term Health Impacts

Pollution of Pesticides and Agro-chemicals

Environmental Impacts on Agriculture and Forestry

Fishery and Environmental Pollution

Waste Disposal and Pollution

Waste Management & Landfill Gas

Environmental Conservation and Pollution Control

Remote Sensing and Global Surveillance

Global Earth Observation System of Systems

Remote Sensing and GIS

GIS and Land Use

Space-Based Observations of the Coupled Ocean-Atmosphere System

Monitoring of Climate Change Indicators

Sand Storms

Climate Networks (Ocean, Polar Region, Forests)

El Nino & North Atlantic Oscillations

Treeline Advances

Water Resources Management

Impacts of Climate Change on Water Resources Management

Assessment of Current and Future Vulnerability of Water Resources

Water management and planning

Hydrological modeling

Waste water treatment and management

Groundwater flow problems and remediation

Water quality

Irrigation problems

Water markets and policies

Urban water management

Decision support systems

Pollution control

Carbon & GHG Management

International Technology Transfer

International Emission Trading

Price-induced Technical Change & Technology Diffusion

Carbon Dioxide Sequestration

Domestic Emission Trading

Clean Development Mechanism (CDM)

Extreme Events and Impacts Assessment

El Nino-like Climate Change

Floods & Drought

Heat Waves

Pacific, North Atlantic and Indian Ocean Oscillations

Extra tropical-based Northern and Southern Oscillations

Sea Level Rise

Coastal Regions Emergency Preparedness
Climate Modeling & Downscaling Techniques
Regional Climate Modeling for Impact Assessments
Forecasting the NAO
El Nino-like Climate Change

Greenhouse Gas & Ecosystems
Trace Gas Exchange Between Ecosystems and the Atmosphere
Fluxes of Nitrous Oxide and Other Nitrogen Trace Gases from Intensively Managed Landscapes

Human Health In a Changing Climate
Climate Extremes and Circulatory, Respiratory and Infectious Diseases,
Climate Change and Allergies
Climate and Health Database
Biometeorological Adaptation
Pollution and Health
Weather and Climate vs. Morbidity and Mortality
Thermal Environment and Health

Agricultural and Forestry Resources Management
Sustainable Agriculture
Assessment of Current and Future Vulnerability of Food Production and Water Resources
The Future of Food and Agriculture
Soil Carbon Sequestration & Soil Conservation
Agro forestry
Economics of Climate-Forest Policies
Reforestation & Carbon Budget
Wetland Ecology and Management in a Changing Climate
Clean Energy Technology
Renewable Energy Resources
Hydrogen & Fuel Cells

Biomass Production and Conversion

Wind Energy

PV-generated Electricity

Heat Pump

Landfill Gas

Low GHG Transportation

Alternative Fuel Vehicles

The Hydrogen Fuel Infrastructure for Fuel Cell Vehicles

Ethanol fuel

Hybrid Vehicles

Biodiesel

Education: Global Change & Sustainable Development

Climate Change Science & Environmental Education

The Role of the Media

Institutional and Life-long Learning

Sustainable Development and Corporate Learning

9) Measures and Methodology for Mitigation

The principal objective of environment sector is to integrate the objectives of the policies stressed and to take cognizance of long term developmental perspectives related to industrialization, power generation, transportation, agriculture, irrigation and other economic activities. Some of these goals have been identified as indicated below.

Environment

A. Industrial pollution control

It is to ensure that large and medium polluting industrial units and stand alone polluting small scale industrial units (SSIs) install and operate pollution control devices and meet the norms. It will be ensured that small industries located in clusters and in industrial estates are covered under common effluent treatment plants (CETPs). Setting up of pollution industries will be insisted to conform to the zoning plan which would be

integrated with state industrial policy. Action plans will have to be effectively implemented to reduce pollution in all the critically polluted areas.

B. Water pollution control

Most of the rivers, streams, and large stretches of the coastal marine environment in India are highly polluted with municipal waste, waste generated from industry, chemical agents from fertilisers, pesticides from crop protection, and silt from degraded catchments. Untreated sewage and other non- industrial wastes account for four times as much pollution as industrial effluent. In the major cities, less than 50 per cent of the total wastewater generated is collected and less than one- fourth is treated. The consequence of such pollution is high levels of waterborne diseases which account for two-thirds of all illnesses in India with a significant loss in productivity. Although there is a Coastal Regulation Zone Notification designed to protect the coastal marine ecosystems,

implementation is weak and marine pollution continues largely unabated. Close monitoring of the discharge of industrial effluents into water bodies will be enforced. A comprehensive plan be proposed to be prepared for setting up of sewage treatment facilities in all towns having populations more than 20,000. Over extraction of groundwater will have to be regulated. Areas of groundwater pollution will have to be identified and checked.

C. Air pollution control

Air quality in India's major cities indicate that ambient levels of nitrous oxides, sulphur dioxide, lead and suspended particulate matter are often higher than World Health Organization and Indian standards. Sulfur dioxide levels in nine of the country's major cities exceed national standards. Other harmful substances such as ozone are not monitored. Major contributors to air pollution problems in India include thermal power stations, industrial factories, vehicles, and the use of non-commercial fuels such as coal briquettes, animal dung and trash by large sections of the population. The negative environmental effects from increased fossil fuel use increases as India seeks to meet the energy demands of its expanding economy. Coal will play a predominant role in this expansion. The major pollutants from coal exploitation include the principal green house gases (GHGs), particulate air emissions, coal mining, runoff and wastes, and coal ash solid wastes which pose a large-scale disposal problem.

In view of the fact that cooperation of the state government is an essential factor in successfully implementing pollution control programmes, it becomes necessary to work with the state government for preparing location- specific plans for reducing automobile pollution, and prevention of burning of biomass/garbage or any other material (except approved fuel) in the cities and towns to reduce secondary sources of air pollution. It is also necessary to set up a national network of air pollution monitoring stations for the parameters notified in respect of ambient air quality standards and for parameters for which standards have been prescribed for various sources. A database of pollutants releases into the air from different sources should be built up.

D. Strengthening of central and state pollution controls Boards

The board targets/activities should be aimed at the above and the training of officers, up gradation of laboratories, capacity building in state pollution control boards / pollution control centers should be done, keeping in view the relevant considerations which may require a separate set up.

E. Environmental impact of human health

Environmental studies should be initiated to assess the impacts of various pollutants on human health and measures taken to control/eliminate major source of pollutants which have an adverse effect on human health. Phasing out of highly polluting obsolete technologies are also envisaged.

F. Hazardous substance management

Comprehensive national chemical profiles, Emergency response centers in all industrial pockets with a large number of accident hazards units as also inventorisation of isolated storage of hazardous chemicals, are necessary. Effective implementation of the Public Liability Insurance Act; preparation of database on risk-prone areas; setting up of hard hazardous-based disposal facilities in all states where significant quantities of hazardous waste are being generated; establishment of sub-regional training centres for implementation of the Basel Convention, setting up of custom laboratories and capacity building of custom officers for checking contraband trade in hazardous chemicals/waste; implementation of environmentally sound practices in ship dismantling and proper management of biomedical wastes; municipal solid waste; plastic waste; and, chemical waste should be done.

G. Soil contamination and environmental degradation

Contaminated sites should be identified and soil remediation plans should be implemented. For reclamation of degraded areas is another programme envisaged.

H. Environmental impact assessment (EIA)

Capacity building will have to be undertaken for decentralized EIA of projects and monitoring of compliance of clearance conditions. Detailed shoreline management plans and Coastal Zone Management plans should be prepared as also strengthening of state coastal zone management authorities. Plans for conservation of sensitive ecosystems should be prepared and implemented. Scoping of mega projects and strategic EIA for specific sectors should be undertaken.

I. Ecological survey, conservation and ecogeneration

Ongoing programmes should be strengthened and a status paper on achievement indicating the extent to which efforts have yielded the results should be brought out.

Added efforts should be made to conserve biodiversity for ecological security including proper evaluation of environmental risks associated with transgenic crops. The overall objective should be to set an example/model highlighting India's achievement in conserving ecologically sensitive area such as mangroves, coral reefs, wetlands and representative ecosystems through biosphere reserves.

J. Awareness, education, training and research

Comprehensive packages to be developed on critical issues making them effective so that messages reach citizens like the pulse polio programme. Schools and colleges are open to be covered for participation in environmental programmes. On the-job training models and sustainable relationships with R and D institutions and academia should be developed for formulation of programmes and their execution.

H. Environmental law and policy

Revamping of environmental laws for ensuring their effective implementation, training of judicial officers in environmental laws and strengthening of enforcement mechanism.

Forestry

Forests are natural assets and provide a variety of benefits to the economy. Though the recorded forest area is about 23 per cent of the geographical area of the country much of

this is degraded. The forests are therefore unable to play an important role in environmental sustainability and in meeting the forest produce needs of the people, industry and other sectors.

The problem and constraints in forestry development include lack of awareness about multiple roles and benefits of forests; especially its role in drought-proofing and prevention of soil and water runoff; no linkage between management and livelihood security of the people; low level of technology; inadequate research and extension; weak planning capability, wastage in harvesting a processing; market imperfections; overemphasis on government involvement and control; low level of people's participation and NGOs involvement; lack of private sector participation; unwanted restrictions on felling, transport and marketing of forest produce grown by the people; lack of inter-sectoral coordination; and, conflicting roles of public forest administration.

Existing policy, laws, rules, regulations and executive orders should be reviewed for removing constraints in holistic development of forestry with people's participation. Areas where action by government is needed and where the government programmes have not been up to the mark which includes:

- Focus on farm forestry despite its enormous potential, especially in agriculturally backward areas.

- Measures to sustain JFM beyond the project period have not been conceptualized. These relate to: building one-to-one correspondence between user groups and forest patch through a new forest settlement, recognition of JFM groups in law and linking them with statutory local bodies, and integrating the activities of such groups with other income generating programmes such as watersheds and marketing of NTFPs.

- Protecting women's traditional usufruct rights and enabling women's group to collect and market NTFPs, a viable and cost effective strategy not only for women's empowerment but also for renewal of forests.

□□ Subsidies on government auctions of wood and bamboo to industries, which act as a disincentive to industry to pay a remunerative price to farmers. Governments need to examine the pattern of subsidy to forest based industries and wipe out that subsidy in a time-bound manner so as to improve valuation of forests.

□□ The tariff structure on forest-based products such as timber and pulp keeping in view the incentive effect on farmers.

□□ Forest technology should be changed by shifting attention from timber to floor management and production of more gatherable biomass.

□□ Classification of bamboo as NTFP and thereby providing rights to tribal population and other forest dwellers over this resource. Present Bamboo harvesting policy systematically maximizes dry bamboo output for paper mills rather than green bamboo output for artisans. Infact the present practices ban felling of green bamboo. Streamlining the procedure for making green bamboo available directly to artisans.

□□ Emergency plan should be formulated to face the calamity of Gregarious flowering of bamboo

□□ Forest fire prevention and control should be given top priority to reduce losses and emission of greenhouse gases.

□□ Conservation and development of medicinal plants should be given priority to meet the local crude drug requirements and for export.

□□ Agro forestry, mountain, watershed development, river valleys, arid areas, wastelands a forestation programmes should be given priority.

□□ Research and technological development must increase productivity, production of new products, value addition, improved marketing, export and productive employment generation.

□□ Promotion of coastal shelterbelts plantations for prevention of natural calamities.

□□ An integrated system for addressing issues of animal welfare, including ecology, safety and commercial exploitation need to be evolved. Forest cover of the country should be increased to 25 per cent. This would mean bringing up extensive tracts of land under tree cover, which would require a substantial investment both by the government and private sector.

Wildlife

Security of soil, sustenance of water regimes and activation of weather regimes as well as moderation of environmental adversities of modern age depend upon the health of natural ecosystems. The benefits from conservation of natural areas are not readily quantifiable as they flow to the local communities and the country somewhat intangibly and are often taken for granted. The value of effective conservation of natural areas must hence not be linked with direct fiscal benefits. Environmental well-being and food security cannot be ensured in the long run without the care of natural areas. Efforts and Initiatives from the side of the communities for revival of natural areas thus need to be supported.

Challenges of wildlife conservation arise from population pressure, adverse impact of Industrialization as well as increasing threats from illegal wildlife trade.

Conservation of wildlife and its habitat outside the protected areas particularly in the context of critically endangered species is a challenge which the conservation efforts must address. Such efforts are equally needed for long ranging mega-herbivores like elephants and major predators like tigers and leopards.

For the protection and conserving the wildlife, people's support is an important role.

Therefore bio-resource ameliorative and livelihood supplementing participatory

ecodevelopment measures are required for local communities with a view to reducing their dependence upon protected areas. The problem of wildlife damage to human life and property need to be effectively mitigated by special management measures and expeditions and reasonable ex-gratia financial relief. Also, it is necessary to settle expeditiously the rights of local communities including voluntary relocation of habitations to alternative sites outside the protected areas. Such measures would ensure the participatory support of the people for conservation. To fructify this objective, larger investments backed by attitudinal change would be essential. Poaching of wild animals due to lucrative clandestine trade in wildlife produce has become a major threat to wildlife conservation.

Steps in this regard include filling up of vacant posts in the wildlife sector; reorganisation of field information in and around the protected areas; provision of infrastructure; capacity building; and, intelligence work. Education and awareness building measures as well as research and training have great role to play in making the conservation measures more effective.

The following thrust areas need high priority and enhanced allocation during the Tenth Plan:

- A. Mitigation of human wildlife conflict
- B. Eco-development
- C. Depredation of Wildlife
- D. Habitat improvement
- E. Control of poaching
- F. Education and awareness
- G. Research and training
- H. Research and Education

The current trends in greenhouse gas emissions

Global greenhouse gas emissions have grown markedly since pre-industrial times, with a 70% increase from 1970 to 2004 alone. Over this period, emissions from the transport and energy sectors have more than doubled. Policies put in place in some countries have been effective in

reducing emissions in those countries to a certain degree, but not sufficiently to counteract the global growth in emissions. Without additional measures to mitigate climate change, global green house gas emissions will continue to grow over the coming decades and beyond. Most of this increase would come from developing countries, where per capita emissions are still considerably lower than those in developed countries.

What actions can be taken to reduce greenhouse gas emissions?

Public transport can help reduce greenhouse gas emissions. /Source: Green Facts

Mitigation measures to reduce greenhouse gas emissions have a certain cost. However, they also constitute an economic benefit by reducing the impacts of climate change, and the costs associated with them. In addition, they can bring economic benefits by reducing local air pollution and energy resource depletion.

If the benefits of avoided climate change are taken into account and a “carbon price” is established for each unit of greenhouse gas emissions, this could create incentives for producers and consumers to significantly invest in products, technologies and processes which emit less greenhouse gases. The resulting mitigation potential is substantial and could offset the projected growth of global emissions over the coming decades or reduce emissions below current levels.

1) Mitigation measures could contribute to stabilizing the concentration of greenhouse gases in the atmosphere by 2100 or later. To achieve low stabilization levels, stringent mitigation efforts are needed in the coming decades. This could reduce global GDP by up to a few percent.

2) Changes in lifestyle and behaviors that favor resource conservation can contribute to climate change mitigation.

3) Mitigation measures can also have other benefits for society, such as health cost savings resulting from reduced air pollution. However, mitigation in one country or group of countries could lead to higher emissions elsewhere or effects on the global economy.

4) No one sector or technology can address the entire mitigation challenge. All sectors including buildings, industry, energy production, agriculture, transport, forestry, and waste management

could contribute to the overall mitigation efforts, for instance through greater energy efficiency. Many technologies and processes which emit less greenhouse gases are already commercially available or will be available in the coming years.

5) In order to stabilize the concentration of greenhouse gases in the atmosphere, emissions would have to stop increasing and then decline. The lower the stabilization level aimed for, the more quickly this decline would need to occur. World-wide investments in mitigation technologies, as well as research into new energy sources, will be necessary to achieve stabilization. Delaying emission reduction measures limits the opportunities to achieve low stabilization levels and increases the risk of severe climate change impacts.

How governments can create incentives for mitigation?

1) A wide variety of policy tools can be applied by governments to create incentives for mitigation action, such as regulation, taxation, tradable permit schemes, subsidies, and voluntary agreements. Past experience shows that there are advantages and drawbacks for any given policy instrument. For instance, while regulations and standards can provide some certainty about emission levels, they may not encourage innovations and more advanced technologies. Taxes and charges, however, can provide incentives, but cannot guarantee a particular level of emissions. It is important to consider the environmental impacts of policies and instruments, their cost effectiveness, institutional feasibility and how costs and benefits are distributed.

Although the impact of the Kyoto protocol's first commitment period 2008-2012 on global carbon emissions is expected to be limited, it has allowed the establishment of a global response to the climate problem as well as the creation of an international carbon market and other mechanisms that may provide the foundation for future mitigation efforts.

2) Switching to more sustainable development paths can make a major contribution to climate change mitigation. Policies that contribute to both climate change mitigation and sustainable development include those related to energy efficiency, renewable energies, and conservation of natural habitats. In general, sustainable development can increase the capacity for adaptation and mitigation, and reduce vulnerability to the impacts of climate change.

Environmental Entitlements: Dynamics and Institutions in Community-Based

Natural Resource Management

While community-based natural resource management (CBNRM) now attracts widespread international attention and its practical implementation frequently falls short of expectations. Focusing on the implications of intercommunity dynamics and ecological heterogeneity are essential. It should build a conceptual framework highlighting the central role of institutions — regularized patterns of behavior between individuals and groups in society — in mediating environment-society relationships. Grounded in an extended form of entitlements analysis, it should explore how differently positioned social actors command environmental goods and services that are instrumental to their well-being. Further insights are essential from analysis of social difference; “new”, dynamic ecology; new institutional economics; structuration theory, and landscape history.

MEASURES

- Capacity building of institutions, organizations and individuals, including Human Resource Development and Manpower Planning in participatory Environment management systems. Natural Resources Management (NRM), Energy and Environment/E&E/Clean and Renewable Energy /Energy Efficiency /Alternative Transport Fuels
- Assistance to NGOs and research institutions in Environmental project management
- Providing leadership to groups of foresters, NGOs, academics, researchers and other practitioners for coordinated participation in international forums and conferences
- Organizing exchange programs with professionals from other developing countries to share and learn about participatory environment management
- Technical assistance in forest science as well as socio-institutional issues in multiple-use resource management /ERM
- Developing location-specific models of resource management including watershed development approaches
- Organizing debates and discussions on policy issues and their documentation

- Sector strategy research
- Project evaluation and impact assessment
- Publications and information dissemination
- Networking

Chapter IV Implementation

A 1996 study indicated that (a) despite a strong legal framework and various ministries at the center, departments and boards at the state level; and local agencies involved in environmental management, implementation remains weak. Institutional capacity building to strengthen monitoring, enforcement, and compliance with existing laws can have a high payoff; and (b) the government alone cannot be responsible for environmental management, stronger efforts have to be made to involve the large nongovernmental organization community in programs ranging from biodiversity conservation to alternative energy programs. The study also recognized that this cooperation will require transparent policies and practices such as early involvement in the environmental impact assessment process, access to information, and actions to increase involvement through public participatory processes. (c) No one sector or technology can address the entire mitigation challenge. All sectors including buildings, industry, energy production, agriculture, transport, forestry, and waste management could contribute to the overall mitigation efforts, for instance through greater energy efficiency. Many technologies and processes which emit less greenhouse gases are already commercially available or will be available in the coming years

10) Combating CLC –

In Industry and Business

By NGOs

In Top Priority by Govt

By Community-Vital Role

Joint Effort/ Action Groups and Modules

11) Comprehensive Regional Plans and their implementation

The researchers`s views on certain issues
The problems anticipated in implementation
Remedies

10) Combating CLC

In Industry and Business

As part of Implementation Strategies by Business/Industry the slogan of PROACTIVATE may be quoted. Source Quality Times-Dr.Usha Dar

P-Pricing natural capital and factoring it in balance sheets and asset pricing.

R-Radically increasing energy efficiency by accelerated use of technology.

Energy efficiency needs to be promoted along all sectors buildings, transportation, and industry. There are mature and emerging technologies whose applications will increase energy efficiency. The World Resources Institute has a list of technologies for energy efficiency.

O-Opting for de-materialized, non-acquisitional model of growth that radically reduces material intensity.

Dematerialization means reduction in the quantity of materials used and/or the quantity of waste generated in the production of a unit of output Intensity of use is the ratio of materials used to value added. The three driving forces for dematerialization are government policies, technological developments and increase in value added for companies which means reduction in costs.

A-Adopting zero waste, closed loop systems for all future development works The focus of zero waste is a shift from negative utility to positive utility. Waste need no longer be an environmental, social and economic burden but a resource which can earn profits.

Innovative management of waste will certainly lead to cost savings and eco efficiency. It will reduce the demand for virgin materials and lead to reductions in greenhouse gas emissions. Corporate profits will increase via brand value and customer loyalty.

Examples of technological innovation in the field of waste management are the Plastics Packaging Recycling Loop of Marks and Spencer and HP's "Closed Loop" InkJet Recycling Programme.

C- Capture and sequester CO₂ through enlarging the forest carbon sink and technical solutions such as returning carbon to the underground.

Capturing and storing CO₂, separation of CO₂ from industrial energy related sources, transporting to a storage location and long term isolation from the atmosphere are essential. The large point sources include power, cement production, refineries, iron and steel industry, petrochemical industry, oil and natural gas processing.

The possible sources of storage are geological formations, ocean storage and industrial fixation of CO₂ into inorganic carbonates. The costs of capturing CO₂ need to be carefully estimated. The IPCC Report points out that "The costs of retrofitting to existing installations vary. Industrial sources of CO₂ can more easily be retrofitted with CO₂ separation while integrated power plant systems would need more profound adjustment. In order to reduce further retrofit costs new plant designs could take future CCS applications into account."

T-Turning to renewables and subsidizing technologies that empower rural and arid areas .The introduction of renewable energy technologies will reduce CO₂ emissions in rural areas and arid zones. It will improve people's livelihood by improving their access to environmentally friendly energy services. It will also lead to improvement in health by tending to reduce respiratory diseases and eye diseases. In all it will lead to improved living conditions and reduction of poverty

I- Innovating and disseminating business models that hire out services

A- Classic example is Interface Corporation, a \$1.1 billion company that provides "carpet service" rather than selling carpets. This resulted in 35 fold reduction in overall use of materials.

V-Vigorously pursue market mechanisms, raising pollutant prices and levy eco-taxes. The objective of eco taxes is eco-sustainability. They are based on the Pigovian principle of taxing externalities but the concept of externalities is extended to include the use of non-renewable resources. co taxes comprise energy taxes, transport taxes, taxes on pollution, taxes on prices of virgin materials, taxes to block waste routes to pollution such as incineration

A-Activate women and children to drive change from the school level. A number of programmes can be drawn up for schools and the schools need to be persuaded to put aside one period a week where the children actively participate in activities. Women can participate through the clubs of which they are members. Eco-clubs may be formed where the underprivileged women can participate via schemes that generate a little income for them.

T-Train and educate communities globally to eco innovate. The global training of communities may be taken up through Lions clubs, Rotary clubs, NGOs and corporations as part of their corporate social responsibility

E-Execution and not denationalization to be the focal point of effort .Some questions arise here. Is it enough to break down the big challenge into its components? Will it by itself result in positive action? Is further action required to translate PROACTIVATE into concrete action?

Future Action

Rachael Carson's 'Silent Spring' amply demonstrated the power of carefully researched and factually correct writing but by itself it was not a sufficient condition to generate the required response and appropriate action. What we required a mass movement like that was inspired by Gandhiji to educate people to make life style changes to conserve environment and protect the planet. Unless we all resolve to PROACTIVATE there is little hope we can combat change in climate. Drawing on Rachael Carson's experience, aggressive and constructive pressure groups need to be formed not only to inform and create public and expert opinion but result in concrete action at the macro and micro level. If PROACTIVATE has to be more than just a statement, we would need to have a mass mobilization of all stakeholders and government at the centre, state, district & village levels. It would need collaborative effort of all to bring about a paradigm shift which is absolutely necessary for accelerating the steps to sustainable futures .This means building partnerships to make PROACTIVATE happen. (Dr. Usha Dar)

These are general broad based implementation strategy envisaged.

Pollution Control in SMEs: Problems in implementation

The role of small industries in the economy is significant. But despite their importance, small industries pollute and are faced with numerous problems including technical and financial issues and legislative and regulative compliance. In India, industrial pollution is regarded the worst among the many environmental impacts that are causing damage through excessive exploitation of resources and degradation of the environment. The Bhopal tragedy clearly demonstrated one of the world's worst industrial accidents. The significance of this accident, however, extends well beyond avoiding such a disaster and a need to move beyond just

polluting the environment. Since the legacy of Bhopal, large manufacturing houses in India have all committed themselves to the environmental movement.

However, the crux of the problem is the pollution generated by small and medium industries.

Although they are promoted in a large way by the Indian government and play an important role within the economy with their prime role and vast scope in employment, the unsafe environmental practices of these industries for a long time have gone unnoticed, even when research has indicated that they are the worst polluters.

Industrialisation is the central dynamic force for most countries and has been a key growth objective of India's planned economy, with heavy investments being made in this sector. Labour productivity is highest in manufacturing industries; this has assisted in raising national income at a faster pace. Small units play an important role in the Indian economy, as they are labour intensive and create job opportunities. A 1999 report indicates that about 3 million SSI units employing nearly 16.7 million persons account for 35 per cent of India's total exports and about 40 per cent of industrial manufacture. The importance of industrialization in economic development is crucial for a growing economy with a large population like India, so prosperity through industrialization has been a long-term strategy for the Indian government.

As industrialization gathered momentum so did the increase in small-scale industries. They offer a higher productivity of capital than capital intensive enterprises, as they have low investment per worker. They help in dispersal of industries, rural development, and the decentralization of economic power. All this is required to increase and disperse economic growth.

Several policy initiatives and procedural simplifications have been undertaken by the Government to support this sector, not only for employment generation but also to enhance their competitive strength. The government has also provided measures such as greater infrastructural supports, more and easier availability of credit, lower rates of duty,

technology up-gradation, assistance to build entrepreneurial talent, facilities for quality improvement, and export incentives.

The government's prime role has been to encourage growth of these industries, often neglecting environmental considerations.

Industrial effluent largely comes from the three million small - and medium-sized units that are scattered throughout the country, particularly in the production of paper, sugar, leather, and chemicals.

Unfortunately, only about half the medium- to large-scale industries have partial or complete effluent treatment. Fourfold industrial growth from 1963 to 1991 resulted in six- fold growth in toxic releases.

Heavy industries like iron and steel producers contribute nearly 70 percent of the toxic wastes released but only 20 per cent of industrial output. Industrial disposal of polluted effluent occurs via open drains into streams and reservoirs or through underground injection.

Most industrial estates lack wastewater treatment systems.

Small industries lack environmental commitment, technical expertise in environmental management and the financial capabilities to address environmental problems. Nor do they have standards or effective treatment opportunities and services.

Small industries also lack additional space for pollution control facilities.

There are difficulties in obtaining the technical assistance of knowledgeable consultants. Since most of the units are dispersed, they find it difficult to come together for a joint or common treatment plant.

The concern of depressed profit margins and decline in competitiveness prevents these units from using pollution control measures. More emphasis is laid on new investments, production, and other return oriented opportunities.

Soft loans for pollution control measures are not lucrative. There are subsidies offered for investments in pollution control as incentives, but the impact of these incentives on these units is little or nothing, for they do not alter the cost-benefit analysis in favour of pollution control investments.

Regulatory compliance has been a major issue for these units. Environmental legislation in India, although seemingly as tough as that in major developed nations, is not well enforced.

High levels of pollution elicit a formal regulatory response in the form of inspections, but these inspections appear to have no impact on the emissions. Inspections are probably ineffective in bringing about desired changes in behaviour because of bureaucratic or other problems, including the probability that enforcement is low and that the penalty for non-compliance is not stringent enough to act as a deterrent.

A point worth noting is that the mandate of the Central Pollution Control Board (CPCB) is to set environmental standards for all plants in India, lay down ambient standards, and coordinate the activities of the State Pollution Control Boards (SPCBs). Unfortunately, the implementation of environmental laws and their enforcement are decentralized and so is the responsibility of the SPCBs. This is another haphazard method of addressing the issue. In addition, pollution laws have achieved little success.

The courts have been slow to respond to enforcement actions sought by state pollution boards. The boards themselves have been poorly funded and charges of corruption have been regular and widespread.

The above points have to be appraised and the bottlenecks removed for implementation of pollution control measures in SMEs. Otherwise a major polluting sector will make its unhealthy contribution to the society and the Nation unabated.

The bottom line is that in countless organisations, workplace effectiveness programmes that consider the working styles of their employees have demonstrated their contribution to increasing agility and the accompanying financial gains, with the imperative to focus on climate change, maybe now is the time for all businesses and governmental organisations to enhance the effectiveness of their workplaces – for the sake of our planet

The Industry is expected to:

- 1) Control Pollution effectively of all kinds with their respective activities/functions by appropriate measures. Waste Management should be good. Avoid dumping the debris, rejects and waste inventories on road sides and public places.
- 2) Create green cover in their premises and surroundings
- 3) Check emission with their own vehicles and minimize their use.
- 4) Totally severe business with truck operators whose vehicles are not checked for emissions. Though a clearance certificate is produced a through check on the part of the company is required.
- 5) Make efficient Environmental Management and take it to the life and spirit, CSR more realistic than considering it during pleasure as philanthropy to appease the community and the local population for the time being.
- 6) Join the local community and community based organizations either as leader or an active participator including Finance and Contributions, in environmental conservation activities in the area or locality. Use the expertise to train people, educate them and create awareness.
- 7) Represent to the Governments, Boards, Local bodies and authorities about the measures to be taken to ensure better environment in the locality.

NGOs

Non Governmental organizations are expected to supplement the services of the Government in all welfare schemes. They should be in a position to act independently in the matter of

Environmental conservation Activities. They can effectively implement the programme slated as follows.

- 1) Organize village level groups to create awareness
- 2) Organize training programmes
- 3) Act as a bridge between the Government and the People for redressal of the problems of the local community.
- 4) Effectively make the industries in the area care for environmental issues and make them do every thing to come within norms.
- 5) Interact with village folk, farmers and laborers for environmental friendly farming practices.
- 6) Act with local bodies to keep villages clean and enforce better waste management.
- 7) Choose any of the project that deems fit for the locality and implement the same on own accord or joining the community, industry, authority in the area.
- 8) Effectively make the Government machinery work better in this regard.
- 9) Propagate the use of bio degradable substances and for not using polythene carry bags in shops.

In Top Priority by Government:

- 1) Certain necessary enactments already mentioned in previous chapters and else where in this dissertation have to be carried out.
- 2) Sanction more funds for Environmental Schemes
- 3) Increase the effectiveness and improve the integrity of the authorities and Pollution Control Boards.
- 4) Effect stringent measures to all Public Sectors to follow the measures of pollution Control, effluent treatment of waste water and better waste management.
- 5) Direct all public sector companies to practice better CSR and care for Environment In the surrounding areas of the company location.
- 6) Improve the integrity of the executives in public sector.
- 7) Ban all old diesel vehicles and trucks with engine conditions very bad and are old Especially in construction business. In urban and semi urban towns this is a menace.

- 8) Instruct district authorities to cooperate with local community and groups for
Implementing best environmental measures.
- 9) Focus on environmental issues more.

By Community-Vital Role

The community, the common man is the most affected in these deteriorating environmental conditions. The responsibility of the community is the most in this regard. The entire system of Government and welfare and developmental activities are for the society. It is a pity that the politicians, burocrats, Industrialists and the Executives forget for a moment that they hail from the same society and that they are integral parts of the society. No development can take place at the cost of social welfare and well being. The development in itself is only for the welfare.

The community can take up the Environmental issues directly.

- 1) The local community can very well assess the damage caused by the industry or
From any sector in their area or locality and ask for setting right the malady.
- 2) They can form themselves in to groups to fight the cause of environmental issues.
- 3) They have to be aware of the issues, malady and aquire basic knowledge
regarding environmental issues.
- 4) They can organize organic farming, agro forestry, green cover creation and other agro
based environmental improvement projects among themselves.
- 5) They can represent the relevant matters to concerned authorities.
- 6) They aquire great power if the entire population of the village or locality join together
towards the common cause.
- 7) Some of them can get the basic training and they can train others in the same village or
the neighboring villages. They can create awareness in maximum speed with which no
other mechanism will match.
- 8) Since the villagers themselves take up the matter, it is easily possible to create awareness
and administer actions rather than an external force doing it.
- 9) Only the requirement of tutoring a few in a village is important and they will take it up
with the rest of the community.

Joint Effort/ Action Groups and Modules

It is always advisable to take up the Environmental Betterment Measures by joint effort of individuals, NGOs, Self Help Groups, industries in that area and the local community either with local bodies and government authorities or not in that particular area. The approach will be more societal and more result oriented. Since all concerned with the issue are in a single group to tackle the problem the result is easier and faster.

For the formation of such groups any person from the community, any industry in that locality, any NGO in that area, any Self Help Group from a village in that area or any arm of Government can take the initiative.

Once such a group is formed the agenda of all activities pertaining to the subject can be started one by one. By this method the rural enlistment itself is possible with sustainable development.

Urban and Semi urban Towns.

For Urban and semi urban towns and metropolis the above mentioned systems will work.

11) Comprehensive Regional Plans and their implementation

Environmental problems in developing countries partly arise out of lack of development; hence they are intricately linked to the socio-economic conditions. Environmental awareness and environmental education are critical under these conditions but these are time consuming and slow solutions. Integration of economic and environmental plans for various regions have to be attempted systematically. Time is running out, and unless comprehensive steps are taken up some of the capital assets (such as forests, fresh water, soils, etc.) are likely to be irretrievably damaged. (Dr B. Bowonder).

Making even the smallest strides in addressing these factors can make a huge environmental difference. However, the factors cannot be addressed in isolation – simply because the reality is

that, none of these factors exist in isolation. Each factor – people, space, and infrastructure – is entirely interdependent on the other and each drives the demand for the other.

Planning and implementation, both, have to be region based, to be effective and successful. Factors differ area wise, location wise. Measures required will differ from place to place depending on the maximum damage by a particular factor. At the same time a comprehensive plan capable of taking care of all the measures suggested in chapter III has to be chalked out for each region or area. Effecting pollution control measures and leaving waste management unattended in a particular area, where even more than these measures are required, will be meaningless and spoil the efforts taken. To avoid such a situation a comprehensive plan based on a region will have to be made and implemented in the manner suggested earlier, should be implemented. The region can be a district or taluk, or a cluster of villages, depending on the intensity of the problem.

Region based plans will be easy to implant and apex groups to control and monitor the activities can also be organized.

THE RESEARCHERS` VIEWS ABOUT CERTAIN ISSUES.

The researcher believes more in action, either in a small way or in a big way.

The researcher is of the view that ahimsa worked out well for Gandhiji in those times and context which will not repeat or is present now. The present day trend warrants a little more of aggressive postures to cut ice in matters like environment conservation. Such a mild preaching will miss the ears of majority whose attitudes are distant from values. Without sensationalizing, certain remedies are not possible in present day trends, in India.

Need to have a mass mobilization of all stakeholders and government at the centre, state, district & village levels. It would need collaborative effort of all to bring about a paradigm shift is a good idea. But stake holders and investors may have their concentration only on their stakes and up beat in the share markets. What the Governments up to village level were doing these years. Below certain levels, the Governments may not know the basics of the subject at all. Above

certain levels, they know too much, and that, they cannot do any thing bypassing the political power. In the middle they are corrupt and powerless.

All the welfare schemes do not reach the grassroots till the end. Environmental conservation unlike other welfare schemes, with out stakes, how it will reach the lower levels of the society? What we are attempting to do to bring about a change will not be known or understood at the lower levels. There are corporates still, who do not give a serious thought to this subject.

Public sector companies are first in this category of being anti social. All the proposals for Environmental conservation, management and strategy will only be in papers with fine prints with all graphics and diagrams, neatly filed and ready for an honorable presentation to the audience.

For effective implementation of this strategy, a scalar system of approach, flow from the top to bottom, will not work. What may be useful is starting it from the grass roots level of the society, the common man who is affected most by the squandering of his rights, liberties, health, wealth and happiness. If the mantle is meddled properly it will pick up and things will get better stage by stage upward.

How many of us are ready? For this cause, the writer is down to streets. Some efforts of the researcher in this regard in past years are mentioned in chapter VI.

Problems Anticipated in Implementation

Stringent measures are advocated to be implemented to combat CLC and conservation of environment. The problems may arise in this regard as is there in any social cause. The companies/industry may not cooperate fully or effect measures for name sake, which will not produce any result. Attempts are likely to deter the actions. (This will be done under cover, for the outside world a neatly prepared summary of completion will be shown. So many polluting industries are operating in backward areas and taluks, rural pockets for subsidies and benefits. All of them do not comply pollution control measures, effluent treatment etc.as they involve

additional costs. There are factories caring less for CSR. A small cement plant or a paper mill is sufficient to pollute in total the surrounding 20 or 25 villages, not to speak of the large public sectors like Mining and Thermal Power, Fertilizers etc. by which a radius of 50 kms will have the impact.)

All the areas of conservation measures to be addressed to each region to get maximum benefits. There is likely hood of certain aspects getting ignored which should be avoided.

Cooperation of authorities, local bodies are to be managed only through efforts, since there are no financial benefits for them.

If the polluting factories are owned by politicians or the targeted activities affect their interests, still greater problems are anticipated.

Knowledge base of the local population, the action groups and also the authorities concerned will cause poor understanding of the subject.

The Remedy

The views of the researcher in previous paragraph, to make the matter sensationalize and base it on mass movement (public) strategy will clear all problems.

Proper training and awareness will clear the rest.

Chapter V Controlling and Sustainability

12)

Controlling
Sustainability
Social Audit

Awareness and Training

Controlling:

Region wise implementation of the strategies for environmental conservation and combating climate change should be compared with the planned areas of activity for the comprehensive nature of it and the effectiveness of the reach of the programme and its objectives to the grassroots.

The progress should be periodically assessed and reports collected area wise for the completion of the task.

A sound data base of the entire system is necessary.

The targeted community/company/area should be checked and verified for the proper completion of the proposed activity.

Improvements can be done at appropriate levels for better results.

Local regional teams can be monitored for activities by an apex team at district and state levels.

Sustainability

Sustainable development is not just an issue for developing countries. A commitment to the promotion of sustainable development is deepening at the international, national and regional levels. It has become a norm of global environmental politics.

Firm Resources and Sustained Competitive Advantage. Understanding sources of sustained competitive advantage has become a major area of research in strategic management. Building on the assumptions that strategic resources are heterogeneously distributed across firms and that these differences are stable over time, this article examines the link between firm resources and sustained competitive advantage. Four empirical indicators of the potential of firm resources to generate sustained competitive advantage-value, rareness, limitability, and substitutability-are discussed. The model is applied by analyzing the potential of several firm resources for

generating sustained competitive advantages. The article concludes by examining implications of this firm resource model of sustained competitive advantage for other business disciplines.

Social Audit

The targeted areas of operation and the sections of the community as planned should be subject to social audit system. The action groups created to perform and manage the task are also subjected to social audit. The researcher has mentioned about social audit in his vernacular book on NGOs and Govt. Schemes released in 2002 at the inauguration of Aravind Foundation.

Awareness and Training

Creating awareness in the grassroots level of the society is one foremost point of implementation strategy. Awareness about the factors, impacts, adaptability, vulnerability of the climate change and the efforts required to combat the same and the measures that have to be taken to conserve environment have to be taught, explained, clarified, preached and dinned in such a way that the local population, with no idea of this, so far ignorant and the indifferent get at least the basic knowledge over the subject, that can really make them think and act.

This can be achieved by one to one meeting, printed hand outs in vernacular and local language, small village level meetings and door to door by volunteers of action groups.

Local Media support is excellent to take this to every hold I urban and semi urban towns.

Training is another point of implementation. Training has to be extended in two categories. 1) Training the trainers and 2) Training the Action Group/Task Force.

Training should be extended on the same lines as to how the awareness to be created, dressing the grievances of the public in the targeted areas on environmental issues, interactions with industry, govt, local bodies and authorities for effecting the measures suggested/planned for combating climate change and environmental conservation. They will be trained to manage efficiently the resources, energy and the funds required for the action plan. Basic technical aspects involved will also form part of the training programme. Training programme should include Risk management and problem solving strategies over the anticipated problems.

Trainers will also concentrate on schools and colleges.

The main objective of the training programme is to train the trainers and the targeted group to place them on a better footing for hitch free implementation of the strategies and exactly the conversion of theory in to practice.

Training is just not to give a first hand knowledge on environmental issues with all the statistics and graphics for a pastime. It should be a tool for implementation.

Chapter VI Efforts of the researcher and his Organization for the cause

14) Efforts towards –

Natural Gas as Kiln Fuel, Controlling Deforestation

Natural Water Resource Management

And Waste Water Recycling
Pure drinking water for villages
Pollution Control-Carbon Emission

Natural Gas as Kiln Fuel, Controlling Deforestation

Vriddhacham is a SSI hub. Government Industrial Estate for Ceramics and a Common facility Service Centre for the supply of processed ceramic raw material to SSIs and a German Designed oil fired Tunnel Kiln for firing process of ceramic products were started by State Govt in 1964. The set up is exclusive for ceramic industries and only one of its kind in Asia, as was known. The researcher started his Ceramic unit in that industrial estate in 1979. The researcher knows this industry and ceramics from very early age as his residence is situated very near.

Apart from this Govt owned Tamil Nadu Ceramics Ltd and Tancem Stoneware pipes were also functioning.

As years went on so many new factories in Refractories came up with all their Down Draft Kilns for which wood is the fuel. The total number of units using wood as fuel including the Govt owned Tancem went up and in the year 2000 the total consumption of wood rose to nearly 2000 MTS per month and today it is nearly 5000MTS. So also the pollution was very high on account of this and felling of trees caused further problems.

There is a gas well near Vriddhachalam in 22 Kms. and the researcher with his local backing and position as the President of Manufacturers Association requested a gas pipe line to be laid to Vriddhachalam industrial hub. A representation was made to the then Hon`bl Minister of state for Petroleum and Natural Gas Mr.E.Ponnusamy on 16/12/2000. and the second time in July 2001 to Hon`ble Santosh Gangwar at New Delhi. The researcher convinced the Ministers, Authorities and GAIL that the project was feasible and required very much. The researcher had several

meetings with the Industries Directorate at Chennai and also obtained all consent letters from the prospective users with great difficulty and submitted every thing to GAIL and the Department of Industries and Commerce. Several meetings were conducted by the department and site visits arranged and the researcher submitted a ground plan also for 22 kms for pipe laying, till the end of 2002-2003. All records are available. Ever since the matter is kept aside by

Government/GAIL. The pollution increased to a great extent and also felling of trees in the area, unabated. However the researcher keeping his factory pollution free.



Water Resource Management, Waste Water Recycling and Pure drinking water for villages.

The researcher thought it fit to float a Social Service outfit to take up social issues at the advice of H.H. Shankaracharya and experts in the field. H.H. Shri Shankaracharya of Kanchi Mutt named the organization as Aravind Foundation. The launching was done in Kanchi Mutt on 29/12/2002, Central and State Ministers, Judges and Officers attended the function in which nearly 2000 general public participated.

As founder chairman and Managing trustee of Aravind Foundation the researcher announced two important schemes for the Vriddhachalam area.

Scheme-1

To recycle the water (pumped out of open mines for operations) of the Mines of Neyveli Lignite Corporation through existing channels in most places, circulate through out a particular area around Vriddhachalam belt.

This may compensate the water table of the area going down on account of the mining operation and may improve water tables in certain areas

This will irrigate 25 000 hectares of dry lands and benefit a population of 2.5 lakh people.

Scheme No-2

Some villages of Vriddhachalam Taluk –Kattiya Nallur and others have no drinking water for the past 50 to 70 years as records available. The pond there contains only contaminated water and it is poisonous right from the beginning and no body will take that water. There is no under ground water in that village. The researcher planned a deep bore well could be sunk in a nearby village and water could be taken through a pipeline to kattiyannallur and adjacent villages. This will benefit nearly 7 000 people and the cattle.

Both the schemes were proposed and a detailed memorandum copies with the sketches were handed over to the Central and State Ministers while the originals were sent to the Prime Minister and the Chief Minister of the state.NLC was also sent a copy for action. Immediately the Collector of the district was also given a copy of each and was appraised. Action is pending.

Follow up of scheme 1-On 2/8/2004 the collector was again met and the researcher handed over a copy to him and asked for an early relief. The well meaning collector had already forwarded the proposal to NLC chairman and had sought for the action. In spite of repeated reminders of the Collector Neyveli Lignite Corporation did not move an inch.Susequently there was no trace of that paper in their office.



News Today ★ CHENNAI ★ MONDAY 30.12.2002 (EVENING) ★ OTHER STATIONS TUESDAY 31.12.2002 (MO)

Seer floats social service organisation

Our Staff Reporter
Kanchipuram, Dec 30: Sankaracharya of Kanchi Kamakodi Peetam Jayendra Saraswathi Swamigal has floated a non-profit social service organisation named Aravind Foundation at a simple function held at the Sri Sankara Mutt premises here yesterday.

The foundation, founded by a member of the State Executive Committee of the BJP Vriddhachalam Aravind, would be engaged in coordinating with various government agencies for rural developments.

Launching the organisation, Jayendra Saraswathi Swamigal said that even after 55 years of independence, development at the village-level was still a challenge. 'Development of villages should be the prime focus of the government and NGOs as it is central towards the economic progress of the country', he said.

A handbook on various rural development schemes for the benefit of NGOs and audio CD and cassette of Vishnu Sahasranama Ranganjali recited by Pushpa Anand were also released by Jayendra Saraswathi Swamigal.

Aravind Foundation would act as a bridge between government, NGOs and various welfare organisations while creating awareness regarding various Central and State government welfare schemes among NGOs and rural people. The organisation had submitted two

Kanchi Mutt chief Jayendra Saraswathi Swamigal releasing a handbook on 'Government schemes and NGOs' brought out by Aravind Foundation in Kanchipuram yesterday.

Union Ministers A K Moorthy, S Thirunavukkarasar, State Ministers Nainar Nagendran, S Semmalai, M C Sampath, Legislators K N Lakshmanan, H Raja, S S Thirunavukkarasu, Chief Post Master General Dr U Srinivasa Raghavan and State president of BJP Dr S P Kirubanidhi were also present.



A guide for welfare schemes & quenching thirst

ARVIND Foundation has done it again. After launching the Tamil edition of the booklet, "Gaon Chalo Abhiyan", in October last, Aravind Foundation has not only brought out a detailed handbook on the various development schemes of the Centre but has also initiated a move to quench the thirst of the villagers and their farms.

Aravind Foundation is a non-profit public trust, initiated by Shri V. Aravind, a young industrialist and social worker of Vriddhachalam in Tamilnadu and who is also a member of the BJP's State Executive and a special secretary to the party's state president Dr. S.P. Kirubanidhi, had launched his booklet, "Government Schemes and Non-government Organisation" by the Kanchi

Shankaracharya, Shri Jayendra Saraswati Swamigal at Kancheepuram on December 29, (2002) last in the presence of Central Ministers Shri Thirunavakarasar (BJP) and Shri A.K. Murthy (PMK) and State Ministers belonging to the AIADMK, Shri Nayanar Nagendran, Shri P.C. Sampath, and Shri Semmalai.

The booklet, the first of its kind, provides an insight into the schemes of the Union Government and has cataloged 293 Central Schemes for the benefit of women, youth, farmers, fishermen, ex-servicemen, backward classes, etc. It has also listed the details about the various schemes including their addresses, phones, fax etc.

Shri Aravind elaborating the aim of

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the foundation told this writer that its goal was to work at the grassroot level for the betterment of the rural people and to bring about a social change in these neglected areas.

Towards this end, the Foundation had already two major agendas and they are: provision of drinking water to the thirsty villagers numbering over 10,000 close to Vriddhachalam; and creating irrigation facilities for the 165 villagers affected by the Neyveli Lignite Corporation's mining operations. The Foundation, he said, had already sent memoranda to the Prime Minister and the Chief Minister of Tamilnadu for their help in this regard.

C.S. Jayaram
Chennai

TAMIL NADU

'Altering Neyveli stream course will turn 25,000 acres fertile'

By Our Staff Reporter

CUDDALORE, AUG. 17. The Arvind Foundation at Vriddhachalam has appealed to the district administration and the Neyveli Lignite Corporation (NLC) management to alter the course of a stream (formed by water pumped out of the open cast mines at Neyveli) to bring more areas under irrigation and to provide relief to the drought-hit people in 165 villages.

By doing so, 25,000 acres of fallow land can be turned fertile, a study conducted by the foundation showed.

This would be a viable project, as it would be just re-routing the stream from a course that had fallen into disuse, the founder-chairman, V. Aravind, told *The Hindu*.

Blueprint ready

Mr. Aravind, who is also the State executive member of the Bharatiya Janata Party, said the foundation had prepared a blueprint.

During mining operations a huge quantum of water was being evacuated and this caused depletion of groundwater level in the neighbouring areas, where even borewells sunk to the depth of 200-250 metres did not yield water.

Coupled with the drought condition, the once fertile areas became barren, and yet, he was optimistic that through diversion of the stream, the situation could be reversed.

Problem of plenty

At present, water pumped out of the mines was stored in the ash lake at Neyveli, and then taken to the Perumal Lake and the Sethiathope anicut in the east (of Neyveli) for irrigation.

The study noted that as these areas were already getting an abundant supply, the realisation from the Neyveli stream was considered surplus.

Excessive supply would be detrimental to the survival of the crops.

Therefore the foundation suggested changing the course of the stream to benefit arid land in the west and north.

Mr. Aravind said the pre-existing channel had now become bone dry and was encroached upon.

The study traced the course of this channel through Mudhanai, Kotteri, Idaikuppam, Sembalapurichi and Kavanai. It then led to the Vayaloor lake and from there joined the Manimuthar to reach the Pelandurai and Sethiathope anaicuts.

Mr. Aravind said the re-routing of the watercourse would benefit 2.5 lakh people in 165 affected villages.

A major portion of the erstwhile channel had its bunds intact, and only embankment and desilting works ought to be carried out for 17 km. These works could be entrusted to the NLC, he said.

Pollution Control-Carbon Emission

As mentioned earlier Vriddhachalam is an SSI hub with nearly 150 Down Draft Kilns and more, creating a lot of pollution. Nearly 50 to 75 Kilns are within the Municipal Limits and the maximum carbon emission kiln is that of TANCEM the State Govt.owned one, which is very much on the residential locality in the busy Junction Road. The average wood consumption in peak season is apx 400 – 700 MTs per month. The company did not mind pollution control devices. The researcher had to take up the matter with Pollution Control Authorities and they did not respond because it is a Govt owned Kiln. Then the researcher addressed a letter to the Chief Minister and under copies to the authorities. The residents of the locality also joined. The media was addressed in full tune and as a result Pollution Control Measures were taken and devices installed.

அரசு தொழிற்சாலையால் சுற்றுச்சூழல் பாதிப்பு: தொழில் அதிபர் புகார்



விருத்தாசலம் டான்செம் தொழிற்சாலை புகை கக்குவதை காணலாம்.

விருத்தாசலம், ஜன.21- அரசு தொழிற்சாலை புகையால் சுற்றுச்சூழல் பாதிப்பு ஏற்பட்டு பலவகை நோய்கள் ஏற்படுகின்றன என தொழில் அதிபர் புகார் கூறி உள்ளார்.

அரசு தொழிற்சாலை

விருத்தாசலம் ஜங்ஷன் ரோட்டில் தமிழ்நாடு சிமெண்ட் கார்ப்பரேஷன் நிறுவனத்துக்கு சொந்தமான (டான்செம்) கார் குழாய் தொழிற்சாலை உள்ளது. அது சுற்றி உள்ள முல்லைநகர், எம்.ஆர்.கே.நகர், வி.என்.ஆர்.நகர், கருணாநிதிநகர், சக்திநகர், ராமதாஸ் நகர், ஆலடி ரோடு, எதிர்பகுதியில் கல்லூரி, பள்ளி, பழமலை நாதர் நகர் குடியிருப்பு பகுதிகள் உள்ளன.

நோய்கள்

தொழிற்சாலையில் கடுதனைக்கு எரி பொருளாக விருகு-கரி பயன்படுத்தவதும் உப்பு மெருகுக்கு உப்பு-கந்தக பொருட்கள் பயன்படுத்தப்

படுவதால் கரும்புகை எழும்பி சுற்றுப் பகுதிகளில் வசிக்கும் மக்கள் பலவித நோய்களுக்கு உள்ளாகின்றனர். அதுவும் பணிக்காலத்தில் தொழிற்சாலை சுற்றுப் பகுதியிலேயே கரித்தூள் வீடுகளில் எல்லாம் படிந்து வருகின்றன.

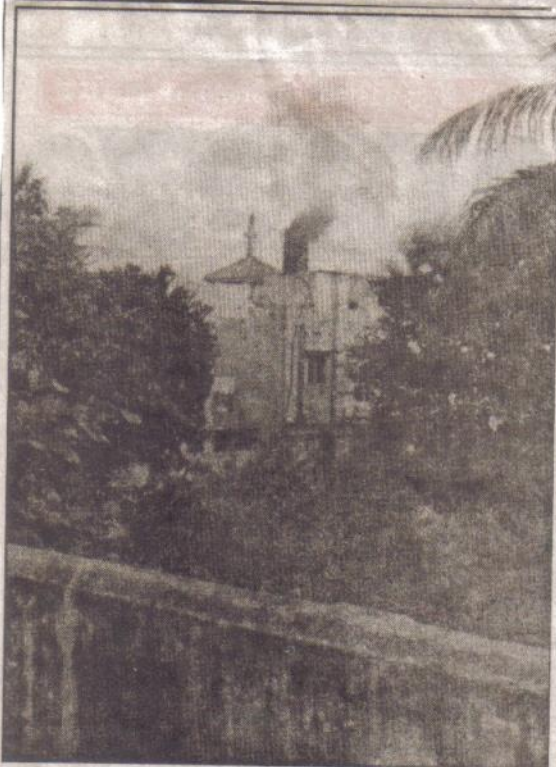
தொழிற்சாலையில் மாசுக் கட்டுப்பாடு வழிமுறைகள் ஏதும் இல்லை. இது குறித்து நக்கட்டுப்பு நடவடிக்கை எடுத்து விருத்தாசலம் நகர மக்களை காப்பாற்ற வேண்டும்.

இவ்வாறு தொழில் அதிபர் அரவிந்த், முதலமைச்சர், சுற்றுச்சூழல் கட்டுப்பாடு அதிகாரிகள், கட்டுவா மாவட்ட கலெக்டர் ஆகியோருக்கு புகார் மனு அனுப்பி உள்ளார்.



பா.ஜி. மாநில செயற்குழு உறுப்பினர் தொழிலதிபர் அரவிந்த் 'கை' காட்டுவது தொழிற்சாலை கரும்புகை எப்படி பதிந்துள்ளது என்பதற்காகத்தான்.

21-1-2005 தினகரன்-புதுவை 9



விருத்தாசலம் பின்செம் தொழிற்சாலையில் இருந்து கரும்புகை வெளியாவதை படத்தில் காணலாம்.



தொழிற்சாலையில் இருந்து வெளியேறும் புகை தொழில் அதிபர் அரவிந்த் கையில் படிந்து கரியாக காட்சி அளிக்கிறது.

விருத்தாசலம் தொழிற்சாலை கரும்புகையால் 3ஆயிரம் பேர் பாதிப்பு

தொழில் அதிபர் முதல்-அமைச்சரிடம் புகார்

விருத்தாசலம், ஜன. 22—
விருத்தாசலம் தொழிற்
சாலை கரும்புகையால்
3ஆயிரம் பேர் நோயால்
பாதிக்கப்படுகிறார்கள்
என்று தொழில் அதிபர்
முதல்-அமைச்சருக்கு
புகார் கடிதம் அனுப்பி
உள்ளார்.

முதல்-அமைச்சருக்கு கடிதம்
விருத்தாசலம் தொழில்
அதிரும் பாரதிய ஜனதா கட்சி
மாநில செயற்குழு உறுப்பினரு
மான வி.அரவிந்த் தமிழக
முதல்-அமைச்சர் ஜெயலலிதா,
மாசு கட்டுப்பாடு வாரிய மாநில
மாவட்ட அதிகாரிகள் கடலூர்
மாவட்ட கலெக்டர் ஆகியோ
ருக்கு அனுப்பி உள்ள கோரிக்கை
கடிதத்தில் கூறி இருப்பதாவது—

தொழிற்சாலை

விருத்தாசலம் ஐங்ஷன்
ரோட்டில் அரசு சார்பு 'பின்
செம்' தொழிற்சாலை உள்ளது.
அங்கு கல்சூழாய் மற்றும் உப்பு
மெருகிட்ட கல் சூழாய்
தொழிற்சாலை உள்ளது. அதை

சுற்றி முல்லைநகர், வி.என்.ஆர்.
நகர், கலைஞர்நகர், ராமதாஸ்
நகர், எம்.ஆர்.கே.நகர், ஆலடி
ரோடு, சக்திநகர், காமராஜ் நகர்,
எனினில் கல்லூரி, பள்ளிகள்,
பழமலைநாதர் நகர் போன்ற
பகுதிகளில் சுமார் 3ஆயிரம்
மக்களுக்கு மேல்வலிக்கின்றனர்.

மக்கள் பாதிப்பு

தொழிற்சாலையில் சுடு
ஆலைக்கு கரி—விற்கு பயன்
படுத்துகின்றனர். மேலும் உப்பு
மெருகு ஏற்ற உப்பு, சுந்தக
பொருட்கள் பயன்படுத்தப்படு
கின்றன. இதனால் ஏற்படும்
கரும்புகை மற்றும் மருந்து
பொடியால் சுற்றுப் பகுதி
குடியிருப்பு மக்களை பாதித்து
துரையீரல்—மூச்சுதொடர்பான
பலவித நோய்கள் ஏற்படுகின்
றன. தொழிற்சாலையில் மாசு
கட்டுப்பாடு வசதி ஏதும் முறை
யாக இல்லை. எனவே உரிய
நடவடிக்கை எடுத்து நோய்
களில் இருந்து காப்பாற்ற வேண்
டும்.

இவ்வாறு அதில் கோரி
உள்ளார்.

All the programmes and activities are widely covered by media.

Chapter VII Combating CLC in India

Environmental problems are becoming serious in India because of the interacting effects of increasing population density, industrialization and urbanization, and poor environmental management practices. Unless stringent regulatory measures are taken, environmental systems will be irreversibly degraded.

Lack of political commitment, lack of a comprehensive environmental policy, poor environmental awareness, and functional fragmentation of the public administration system, poor mass media concern, and prevalence of poverty are some of the major factors responsible for increasing the severity of the problems.

Environmental problems in India are highly complex, and management procedures have to be developed to achieve coordination between various functional departments and for this, political leaders have to be convinced of the need to initiate environmental protection measures.
(B. Bowonder)

India's rapid industrialization growth in small and large enterprises has had its impact on the environment; this has now become a major concern to the economy. The government, concerned about economic development and raising the standard of living of its people, has actively supported the development of the small enterprise sector. Due to their labour intensity and importance in generating employment opportunities for the less well-off members of Indian society, they have been encouraged and given assistance by the Indian government. However, small enterprises tended to be the worst polluters and, as the findings indicated, gave the least attention to environmental issues as part of their operations. Reasons for not installing pollution-control equipment were related to the fact that such expenditure did not contribute to the bottom line. Although existing environmental legislation is similar to that in industrialized countries, i.e. they all serve the same purpose of protecting the environment, laxity of enforcement and corruption have generally prevented effective regulation of environmental pollution.

India has achieved significant changes in environmental policy, especially in terms of regulatory procedures and organizational structure. Despite these changes, however, environmental quality

has continued to deteriorate, largely because a wide gap persists between the intent of policy and the actual achievement and because major problems have eluded serious attention. The paper analyzes major problems in the implementation of Indian environmental policy, with particular attention to policy design, policy analysis, and standard setting. Political problems are identified that underlie difficulties in policy formulation and implementation, and strategies to improve implementation are not proposed. We have to work for a Total Change.

Conclusion

Current warming trends are unequivocal. It is very likely that greenhouse gases released by human activities are responsible for most of the warming observed in the past fifty years. The warming is projected to continue and to increase over the course of the 21st century and beyond.

Climate change already has a measurable impact on many natural and human systems. Effects are projected to increase in the future and to be more severe with greater increases in temperature. Adaptation measures are already being implemented, and will be essential in order to address the projected consequences. There is, however, a limit to adaptation; mitigation measures will also be needed in order to reduce the severity of impacts.

Mitigation measures that aim to reduce greenhouse gas emissions can help avoid reduce or delay many impacts of climate change. Policy instruments could create incentives for producers and consumers to significantly invest in products, technologies and processes which emit less greenhouse gases. Without new mitigation policies, global greenhouse gas emissions will continue to grow over the coming decades and beyond. Rapid world-wide investments and deployment of mitigation technologies, as well as research into new energy sources will be necessary to achieve a stabilization of the concentration of greenhouse gases in the atmosphere.

Every citizen worth the salt to his Nation and fellow men has to put his best efforts towards this social cause Environmental Conservation, individually and collectively. This could be achieved

With the Government's support

Without the Government's support

Inspite of the Government's support