पंचायत

PEOPLE'S EFFORT BRINGS SUSTAINABILITY

tgk g gfj ;kyhA
ogk g [k'kgkyhAA

Vol. XIV No. 4 Year 2011

Role of Panchayat in "COMBATING CLIMATE CHANGE"

Published by :
ENVIS Centre on Panchayati Raj and Environment
Indian Environmental Society

Sponsored by :
Ministry of Environment and Forests
Government of India

ENVIS Centre on
ROLE OF PANCHAYAT IN ENVIRONMENTAL MANAGEMENT

CONTENTS

CLIMATE CHANGE: CALL TO ACTION

- *Climate change is one of the most critical global challenges of our time – one that can only be countered by global action.*
- *The climate is changing. The earth is warming up, and there is now overwhelming scientific consensus that it is happening, and human-induced. With global warming on the increase and species and their habitats on the decrease, chances for ecosystems to adapt naturally are diminishing.*
- *Climate-related disasters do not threaten everyone equally. While climate-related hazards – droughts, floods, storms, etc. – affect billions, not everyone is equally vulnerable. The degree, to which a community suffers long-term – or even irreversible – setbacks, is determined not only by how often it is exposed to these hazards, but also by how vulnerable it is.*
- *India is a large developing country with nearly 700 million rural populations directly depended on climate sensitive sectors like (agriculture, forests and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal zones, grasslands) for their subsistence and livelihoods.*
- *Judging by the increase in climate-related disasters in developing countries, the world's poor are facing a seemingly relentless increase in their exposure and vulnerability to climate-related hazards. Climate-related disasters are a major cause of human suffering, poverty and diminished opportunity.*
- *Human and economic losses as a consequence of climate-related hazards are not inevitable. We must redouble our efforts to understand and manage risks so that countries at risk can take actions to reduce their vulnerability and prevent the loss of life and livelihoods.*

Articles are invited on the topic of **"Role of Panchayat in Women Empowerment"** for the next issue of this Newsletter "PANCHAYAT"

Editorial

Human induced climate change is confronting our planet with its gravest peril ever, threatening widespread extinction of species and destruction of habitats. Our insatiable hunger for development, fueled by the extensive consumption of natural resources such as forests, fossil fuels, rivers and land has discharged enormous quantities of greenhouse gases into the atmosphere, causing a progressive rise in temperatures after the industrial period. This rise in temperature will continue unabated for centuries to come, even if we arrest all emissions immediately. The impacts of climate change are already being witnessed everywhere, and will gradually begin to worsen. Ironically, despite bearing witness to the various indications of climate change such as rising sea levels, increase in frequency of extreme weather events, and change in precipitation patterns, the world is still a fair distance away from mitigating climate change. We are still continuing to emit increasingly large quantities of greenhouse gases, exacerbating the impacts of climate change.

Changes in climate will affect India's entire environment, especially the nation's water resources, sea levels and biodiversity, impacting a wide range of sectors, particularly agriculture. The Nation's economy is closely tied with natural resource with over 65% of workers engaged in agriculture and allied sectors, and many others earning their living in coastal areas through tourism or fishing. There are many climate related problems that people in India are already facing, such as diminishing water resources and frequent natural disasters, which are likely to be further aggravated by the impending changes in the climate. The poorest in the country, most of who live in rural areas, are almost totally reliant on natural resources for their food, shelter and living exposing their vulnerability to the impact of climate change.

I am sure, this issue of newsletter and our combined efforts of us all will definitely have a cumulative effect in reducing emissions and ultimately in combating the impending peril of climate change.

Dr. Desh Bandhu
President

WHAT IS CLIMATE CHANGE?

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.

The Earth is the only planet in our solar system that supports life. The complex process of evolution occurred on Earth only because of some unique environmental conditions that were present: water, an oxygen-rich atmosphere, and a suitable surface temperature.

Mercury and Venus, the two planets that lie between Earth and the sun, do not support life. This is because Mercury has no atmosphere and therefore becomes very hot during the day, while temperatures at night may reach -140 C. Venus, has a thick atmosphere which traps more heat than it allows to escape, making it too hot (between 150 and 450 C) to sustain life.

Only the Earth has an atmosphere of the proper depth and chemical composition. About 30% of incoming energy from the sun is reflected back to space while the rest reaches the earth, warming the air, oceans, and land, and maintaining an average surface temperature of about 15 C.

The chemical composition of the atmosphere is also responsible for nurturing life on our planet. Most of it is nitrogen (78%); about 21% is oxygen, which all animals need to survive; and only a small percentage (0.036%) is made up of carbon dioxide which plants require for photosynthesis.

The atmosphere carries out the critical function of maintaining life-sustaining conditions on Earth, in the following way: each day, energy from the sun (largely in the visible part of the spectrum, but also some in the ultraviolet, and infra red portions) is absorbed by the land, seas, mountains, etc. If all this energy were to be absorbed completely, the earth would gradually become hotter and hotter. But actually, the earth both absorbs and, simultaneously releases it in the form of infra red waves (which cannot be seen by our eyes but can be felt as heat, for example the heat that you can feel with your hands over a heated car engine). All this rising heat is not lost to space, but is partly absorbed by some gases present in very small (or trace) quantities in the atmosphere, called GHGs (greenhouse gases).

Greenhouse gases (for example, carbon dioxide, methane, nitrous oxide, water vapour, ozone), re-emit some of this heat to the earth's surface. If they did not perform this useful function, most of the heat energy would escape, leaving the earth cold (about -18 C) and unfit to support life.

However, ever since the Industrial Revolution began about 150 years ago, man-made activities have added significant quantities of GHGs to the atmosphere. The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have grown by about 31%, 151% and 17%, respectively, between 1750 and 2000.

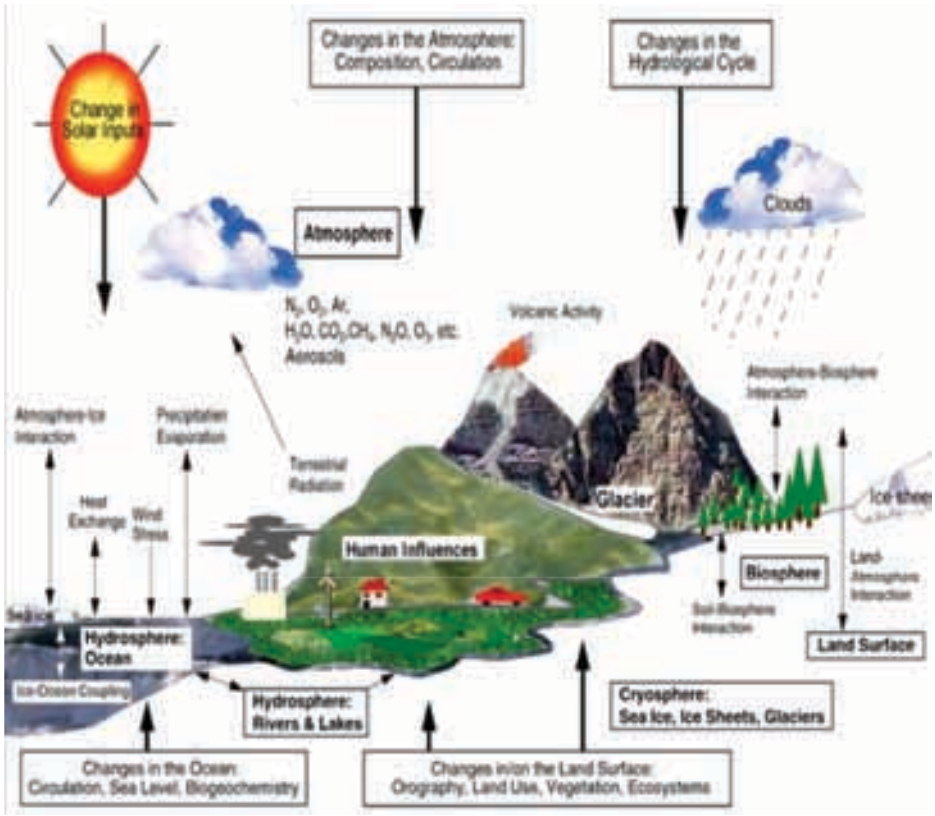
(Source- IPCC- 2001)

CLIMATE CHANGE SCENARIO IN INDIA

- India is a large developing country with nearly 700 million rural populations directly depended on climate sensitive sectors like (agriculture, forests and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal zones, grasslands) for their subsistence and livelihoods.
- The Intergovernmental Panel on Climate Change, in its 2007 report, predicts that global temperatures will rise by 2-4.5°C by the end of this century, with a 2.7-4.3°C increase over India by the 2080s. The panel also predicated an increase in rainfall over the Indian sub-continent by 6-8 percent and that the sea level would rise by 88 centimeters by 2100.
- An annual mean surface temperature rise by the end of this century, ranging from 3°C to 5°C (under IPCC scenario) and 2.5°C to 4°C (under IPCC scenario), with the warming more pronounced in the northern parts of India.
- A 20 percent rise in all India summer monsoon rainfall and a further rise in rainfall is projected over all except Punjab, Rajasthan, and Tamil Nadu, which show a slight decrease.
- Extreme rise in maximum and minimum temperatures is also expected and similarly extreme precipitation is also projected, particularly over the West Coast of India and West Central India.
- The contribution of India to the cumulative global Carbon dioxide emissions is only 5 percent. Historically and at present, India's share in carbon stock in the atmosphere is relatively very small in terms of per capita emissions.

  India's per capita carbon emissions average one-twentieth of those of the US and one-tenth of most countries in Western Europe and Japan.

THE COMPONENTS OF THE GLOBAL CLIMATE SYSTEM A SCHEMATIC VIEW



(Source: IPCC 2001)

CAUSES OF CLIMATE CHANGE

The earth's climate is dynamic and always changing through a natural cycle. What the world is more worried about is that the changes that are occurring today have been speeded up because of man's activities. These changes are being studied by scientists all over the world who are finding evidence from tree rings, pollen samples, ice cores, and sea sediments. The causes of climate change can be divided into two categories - those that are due to natural causes and those that are created by man.

Natural causes There are a number of natural factors responsible for climate change. Some of the more prominent ones are continental drift, volcanoes, ocean currents, the earth's tilt, and comets and m eteorites.

- **Continental drift**

The continents we see today were formed when the landmass began gradually drifting apart, millions of years back. This drift changed the position of water bodies of the landmass and the flow of ocean currents and winds. These changes affect theclimate. This drift of the continents continues even today.

- **Volcanoes**

When a volcano erupts it throws out large volumes of sulphur dioxide (SO2), water vapor, dust, and ash into the atmosphere. Although the volcanic activity may last only a few days, yet the large volumes of gases and ash can influence climatic patterns for years. The gases and dust particles partially block the incoming rays of the sun, leading to cooling.

- **The earth's tilt**

The earth is tilted at an angle of 23.5° to the perpendicular plane of its orbital path. Changes in the tilt of the earth affect the severity of the seasons. More tilt means warmer summers and colder winters; less tilt means cooler summers and milder winters.

- **Ocean currents**

The oceans are a major component of the climate system. They cover about 71% of the Earth. The oceans absorb the sun's radiation about twice as much as the atmosphere

HOW DO HUMAN ACTIVITIES CONTRIBUTE TO GREENHOUSE GAS EMISSIONS AND GLOBAL WARMING?

Global warming can occur from a variety of causes, both natural and human induced. Volcanic eruptions, changes in the earth's orbit and earth's orientation toward the sun, are some of the natural causes of Global Warming. However, since the beginning of Industrial Revolution, the concentrations of greenhouse gases (GHGs) in the atmosphere have escalated drastically due to human activities such as:

DEFORESTATION - Forests act as the largest sink as well as source of carbon. However, by depleting almost 70% of the earth's forest cover for agriculture and other development projects, we have caused two-w ay damage. Firstly, slashing trees releases vast amounts of carbon (that was previously stored in the plant body) in the form of carbon dioxide into the

FOSSIL FUEL USAGE - Coal, oil and natural gas have originated from the decomposition of plant and animal matter. These fossil fuels are rich in carbon and emit vast amounts of carbon dioxide, nitrogen oxides and sulphur dioxide when ignited. Carbon rich fossil fuels are being extensively used for generating electricity for artificial power as well as at homes and industries as a fuel. Almost 70% of rural and semi-urban India is still dependent on coal, Kerosene and wood for satisfying their everyday energy requirements. Atmosphere; Secondly, due to deforestation, the number of trees available to absorb and recapture the atmospheric carbon dioxide is reduced drastically. As a result, the carbon dioxide concentrations in the atmosphere increase drastically.

ENERGY - Every human activity involving electricity like watching TV, switching on the fan etc, emits GHGs. It is estimated that in India, nearly 80% of the energy requirements are satisfied by fossil fuels alone. Renewable sources of energy have not yet attained popularity in our country. Most of our power comes from thermal power stations that use coal, are one of the largest emitters of carbon dioxide. The energy sector alone accounts for 21.3% of annual greenhouse gas emissions globally.

TRANSPORTATION - The transportation sector is responsible for about 14% of global GHG emissions every year. Road transportation sectors like cars and buses are responsible for

emission of huge volumes of GHGs. However, it is the aviation sector that emits the most GHG per traveler/ km and is responsible for nearly 2% of all GHG emissions.

INDUSTRY - Industrial emissions account for 16.8% of annual greenhouse gas emissions. The industries are largely dependent on fossil fuels for their energy needs. They consume vast amounts of coal and other fossil fuels and ultimately emit huge quantities of greenhouse gases. Apart from captive power generation, the production cycle and industrial transport also contribute significantly to GHG emissions.

AGRICULTURE - Agriculture is responsible for nearly 12.5% of annual GHG emissions. Particularly cultivation of paddy in flooded rice fields emits significant quantities of methane gas, the second largest greenhouse gas. Even cattle and other farm animals generate small quantities of Methane (from belching). Clearing of vegetation for agriculture (slash and burn method) and biomass burning contributes to almost 10% of the annual GHG emissions.

WASTES - The decomposition of wastes in the municipal garbage dumps and sanitary landfill sites (especially the anaerobic decomposition of organic waste) emits large quantities of methane gas. Open burning of solid wastes, which is quite common in our country, generates a lot of smoke in addition to emission of gases like carbon dioxide, carbon monoxide, sulphur dioxide, dioxins, etc.

IMPACTS OF CLIMATE CHANGE

Global Warming and the resulting Climate change is a threat to mankind! More frequent and powerful cyclones and hurricanes, more frequent and intense floods and droughts are clear indications that climate change has already begun. The potential impacts of climate change on disasters cover all sectors of human society and functions of ecosystems, as explained below:

Changing climatic conditions can have the big effect on our life and our environment. In fact, it is the greatest environmental threat faced by planet earth. The change in weather conditions can be best observed through the extreme rise in temperature, melting of glaciers and sudden rise in sea level. These changes are causing serious problems to humans and other forms of life. Biologist and Environmentalists are constantly searching for the new solutions to combat these environmental changes.

Agriculture : Agriculture in India and entire world is mostly dependent on the persisting weather conditions. The alteration in

Global warming has dramatically affected agriculture and its productivity. The incre ase in temperature has significantly led to a change in the agricultural zones and shift in the growing seasons. On the other hand the change in the rainfall pattern is the serious threat to the agriculture, which in turn affects the country's economy and food security. The delayed or inadequate monsoons also cause influence on the sale of the agriculture inputs such as fertilizers, agro-chemicals, tractors etc. Some of the areas in India receive more than normal rainfall while some of the areas receive almost no rainfall. The various studies show the overall loss in the crop production in the country in the last few years due to the anticipated rise in the temperature. It is expected that in the near future India is going to face the challenges that includes unwanted pressure from the growing population, and changing scenario of world trade in agriculture.

Biodiversity : The changes in the climatic conditions are already felt by the biodiversity and wildlife habitats across the world. Many plant and animal species are eventually becoming extinct as a result of the climatic changes. Some of the plant and animal species are unable to adapt to the changing climate. While some of the mammals have already reached the suitable places, appropriate for their survival. Green houses gases are the main reason for the climatic change which in turn posses the threat to the vast biodiversity. Furthermore the redistribution of life on the earth's surface is increasing at an alarming fast pace. The tremendous change in the climatic conditions can be best felt at mountains, where due to the excessive heat; trees have started growing on the much higher elevations. Another example that apt to explain the impact of climate change is in the great Rann of Kutch, where the population of Lesser Florican and Indian Ass is plummeting sharply. As the global warming causes the rise in the sea level, it is expected that the marshes and mudlands of the Kutch will be submerged. Climate change not only influences the animal behavior but also slash the genetic diversity of the animals.

Coastal Areas : The changing climatic conditions are also the severe threat to the coastal areas, which has led to the increase in the sea level. This could result in flooding and can cause damage to the coastal infrastructure. This will displace the large section of population and force others to migrate. The worst hit coastal areas in India will be Maharashtra, Goa and Gujarat. As for the purpose of information these coastal regions provide human with wide variety of goods and services including food, recreational opportunities and transportation corridors. As well as support the great wealth of marine life and diverse habitats. So the treat to the coastal areas is the threat to the human population at large.

HOW WILL CLIMATE CHANGE AFFECT INDIAN AGRICULTURE?

The major challenge faced by the entire world today is Climate Change or Global Warming. Every country is taking various measures to reduce the global warming. The climate change causes a greater impact on the agriculture. Particularly, Indian agriculture is hardly affected due to the climate change or global warming. The success of Indian agriculture much depends on the normal monsoon as also on favorable weather conditions. The fact is that all over the world, wherever, whenever the farmers meet, the crops and the prevailing prices. Aberrant weather conditions worry them. During recent years, burning of fossil fuels by the vehicles, coal burning by the power plants, emission from the industrial factories as also as a result of the large scale deforestation, the earth's surface temperature is increasing, rainfall pattern is shifting causing loss of moisture, occurrence of cyclones, thunderstorms, floods as also the rising of the sea-level, which may ultimately see many coastal cities and towns inundated. As far as foodgrains production is concerned, even a slight rise in the earth's surface temperature could cause drop in the country's wheat production substantially as also it could much impair the quality of rice (specially of the basmati rice), fruits, vegetables and medicinal plants, products now being much valued for their export. Despite these limitations, much useful work has been done on estimating the impacts of different climate change scenarios. In this paper climate change impacts in agriculture are examined with particular to Indian scenario.

Agriculture is one of the most weather-dependent of all human activities. In India, agriculture and allied activities constitute the single largest component of Grass Domestic Product (GDP) contributing nearly 25% of the total. The tremendous importance of this sector to the Indian economy can be ganged by the fact that it provides employment to to-thirds of the total workforce. The share of agricultural products in exports is also substantial, with agriculture accounting for 15% of export earnings. Agricultural growth also has a direct impact on poverty eradication, and is an important factor in employment generation. Further, Indian agriculture is fundamentally dependent on weather for higher productivity.

The changes can be caused by natural processes like volcanic eruptions, variations in the sun's intensity, or very slow changes in ocean circulation or land surfaces.

Indian Agriculture Scenario

In the backdrop of a burgeoning population where food and nutritional security is a constant challenge, agriculture has emerged as a key component for the growth of the Indian economy. With a contribution of approximately 15.7 % to India's GDP and 10.23 % (provisional) to the total exports in 2008 -09 as suggested by the latest reports1 and the fact that it provides employment to 58.2% of the population, a consistent growth of this sector is vital to meet other challenges as well. In India, agriculture is substantially dependent on the south-west monsoon. This is evident from the fact that the net irrigated area of the country is 60.9 million hectares from a total net sown area of 140.3 million hectares. Thus, a large part of the net sown area is rain-fed, thereby making the agriculture sector in India very sensitive to any changes in the pattern of rainfall. For instance, the impact of overall deficit of 23% in rainfall during the south-west monsoon in 2009-10, which adversely affected Kharif production, is reflected in the agriculture GDP growth rate which shows a decline of 0.2 per cent as against the previous year's growth rate of 1.6 percent.

General trend of climate change

The changes in climate parameters are being felt globally in the form of changes in temperature and rainfall pattern. The global atmospheric concentration of carbon dioxide, a greenhouse gas (GHG) largely responsible for global warming, has increased from a pre-industrial value of about 280 ppm to 387 ppm in 2010. Similarly, the global atmospheric concentration of methane and nitrous oxides, other important GHGs, has also increased considerably resulting in the warming of the climate system by 0.74°C between 1906 and 2005 (IPCC, 2007). Of the last 12 years (1995–2006), 11 years have been recorded as the warmest in the instrumental record of global surface temperature (since 1850). The global average sea level rose at an average rate of 1.8 mm per year over 1961 to 2003. This rate was faster over 1993 to 2003, about 3.1 mm per year (IPCC, 2007). There is also a global trend of an increased frequency of droughts as well as heavy precipitation events over many regions. Cold days, cold nights and frost events have become less frequent, while hot days, hot nights and heat waves have become more frequent. It is also likely that future tropical cyclones will become more intense with larger peak wind speeds and heavier precipitation. The IPCC (2007) projected that temperature increase by the end of this century is expected to be in the range 1.8 to 4.0°C. For the Indian region (South Asia), the IPCC projected 0.5 to 1.2°C rise in temperature by 2020, 0.88 to 3.16°C by 2050 and 1.56 to 5.44°C by 2080, depending on the future development scenario (IPCC 2007). Overall, the temperature rise is likely to be much higher during the winter (Rabi) rather than in the rainy season (Kharif). It is projected that by the end of the 21st century, rainfall over India will increase by 10-12% and the mean annual temperature by 3-5°C. The warming is more pronounced over land areas with a maximum increase over northern India. These environmental changes are likely to increase the pressure on Indian agriculture, in addition to the on-going stresses of yield stagnation, land-use, competition for land, water and other resources and globalisation. It is estimated that by 2020, food grain requirement would be almost 30-50% more than the current demand . This will have to be produced from the same or even the shrinking land resource due to increasing competition for land and other resources by the non-agricultural sector. (Source- Annual Report 2009 -2010, Department of Agriculture & Co – operation, Ministry of Agriculture, Government of India)

Impact of Climate Change in Agriculture

Agriculture is the mainstay of Indian economy and provides food and livelihood security to a substantial section of the Indian population. The impact of climate change as witnessed in recent times has immense potential to adversely affect agriculture in this country in a variety of ways. As a large part of the arable land in India is rain-fed, the productivity of agriculture depends on the rainfall and its pattern. Agriculture will be adversely affected not only by an increase or decrease in the overall amounts of rainfall but also by shifts in the timing of the rainfall. Any change in rainfall patterns poses a serious threat to agriculture, and therefore to the economy and food security. Summer rainfall accounts for almost 70% of the total annual rainfall over India and is crucial to Indian agriculture.

Climate Change is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run off. It affects agriculture in more ways than one. It can affect crop yield as well as the types of crops that can be grown in certain areas, by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pests.

Rise in temperatures caused by increasing green house gases is likely to affect crops differently from region to region. As a result of climate change the amount of arable land in high-latitude region is likely to increase by reduction of the amount of frozen lands. At the same time arable land along the coast lines are bound to be reduced as a result of rising sea level. Erosion, submergence of shorelines, salinity of the water table due to the increased sea levels, could mainly affect agriculture through inundation of low lying lands.

The impact of climate change on agriculture could result in water shortages and drought, new diseases, heat stress for animals and risks liked to extreme weather events. Scientists are studying very closely the effect of climate change in different fields including agriculture. Various studies have indicated that rise in temperature is going to affect the agricultural production though its contribution to green house gas is only 28%. Climate change is already upon us. Indian agriculture, despite being a relatively minor contributor to greenhouse gas (GHG) emissions, will be a big loser if global temperatures rise.

Agriculture will be adversely affected not only by an increase or decrease in the overall amounts of rainfall, but also by shifts in the timing of the rainfall. Higher temperatures reduce the total

duration of a crop cycle, leading to a lower yield per unit area, especially for India's wheat and paddy crops. Soil erosion, increased numbers of pests and weeds brought by climate change will also affect agriculture in India. For instance, the amount of moisture in the soil will be affected by changes in factors such as rainfall, runoff and evaporation. Global warming will seriously affect agriculture. Some species of agricultural crops will be adversely affected by higher temperatures, increased weeds and harmful insects. It is also possible that global warming will lead to global food shortages.

Impact of Climate Change in Indian Agriculture

The Food and Agricultural Organization (FAO) has warned that India could lose upto 125 million tones of cereals. The Intergovernmental Panel on Climate Change (IPCC) which was awarded Nobel Prize in the year 2008 has warned that due to global warming, the sea levels in Asia will rise by atleast 40cm by 2100 flooding vast areas on the coastline, including some of the most densely populated cities, whose population will be forced to migrate inland (The Hindu Business Line dated 03-11-2007). The first to be affected by the climate change will be those living in the fringe zones, working outdoors or whose livelihoods depend directly on the physical environment. Viewed from these perspectives, the main sectors facing risks from direct impact could be agriculture, water resources and health.

The IPCC report indicates high probability of crop losses with increase in temperature in the tropical regions. Studies do confirm this trend. Among cereal crops important for food security, wheat is most sensitive to even small increase in temperature. Relatively, rice has greater tolerance to temperature increases. Increasing climate variability could result in considerable season/ annual fluctuation in food production. All agricultural commodities are subject to such variability.

WORKING TOWARDS A CHANGE IN AGRICULTURAL SECTOR TO COMBAT CLIAMTE CHANGE!!

Each one of us just by the seemingly inconsequent act of doing our daily chores, emits carbon dioxide that accumulates in the atmosphere to cause global warming.

Over the past couple of years, the technological advances in agriculture have dramatically increased crop yields. But, despite these improvements, agriculture is still highly dependent on climate since sunlight; temperature and precipitation are the main drivers of the crop growth. Since the industrial revolution, we have been changing the global climate by emitting large amounts of greenhouse gas into the atmosphere resulting in higher global temperatures and increased climatic variability.

There is a need to reduce energy-use in agriculture and promoting cost effective alternatives to fossil fuel in agriculture. The agricultural sector can reduce its own emissions, offset emissions from other sectors by reducing carbon dioxide from the atmosphere (via photosynthesis) and storing the carbon in soils, and reduce emissions in other sectors by displacing fossil fuels with bio-fuels. Through adoption of agricultural best management practices, Indian farmers can reduce the emissions of nitrous oxide from agricultural soils, methane fro livestock production and manure and carbon dioxide from one-far energy use. Improved management practices can also increase the uptake and storage of carbon in plants and soil.

Furthermore, biomass from the agricultural sector can be used to reduce bio-fuels, which can substitute for a portion of the fossil fuels currently used for energy. Agriculture can also reduce greenhouse gas emissions by providing bio-fuels – fuels derived from biomass sources such as corn, soyabeans, crop residues, trees and grasses.

Application of best management practices in agriculture and use of bio-fuels for greenhouse gas mitigation can have substantial co-benefits. Increasing the organic matter content of soils (which accompanies soil carbon storage) improves soil quality and fertility, increases water retention, and reduce erosion. More efficient use of nitrogen can reduce nitrogen runoff and improve water quality o both surface and ground waters. Similarly, improving manure management to reduce methane and nitrous oxide emissions is beneficial to water and air quality and reduces odors. Bio-fuel, [particularly substituting energy crops for imported petroleum for transportation, has important energy security benefits. However, as bio-fuel use expands, it will be important to ensure that biomass is produced responsibly, taking both environmental and socio-economic impacts into consideration. Considerable mitigation potential is also available from reductions in methane and nitrous oxide emissions in some agricultural systems.

Sustainable Agriculture: The Way Out

A basic understanding of sustainability is making things last, making them permanent and durable. What is being sustained can be an object of choice- an economy, a culture, an ethnic grouping, an eco-system or sets of eco-systems. It fuses both economic sustainability and ecological sustainability in its definition. The term sustainability relates to the ability of a characteristic to maintain itself, i.e. not to decline with the passage of time. Conceptually speaking the focus of 'sustainability' is on the issues of inter-generational equity. Sustainability or rather survivability, in a situation of low pressure on resources was possible through traditional

Humans also cause climates to change by releasing greenhouse gases and aerosols into the atmosphere, by changing land surfaces, and by depleting the stratospheric ozone layer.

land extensive practices. In the changed circumstances with high pressure on fragile resources, the required high resource use intensity (for high productivity) with conservation is not possible through traditional measures. This requires application of modern science and technology blended with the rationale of indigenous practices.

Sustainable Agriculture can be defined as an integrated farming system (with crops, trees, livestock etc.) which is based on locally adapted agro-diverse cropping patterns and use of local resources (natural resources and natural processes), based on local knowledge, skills and innovations. It means an integrated system of plant and animal production practices having a site specific application that will, over the long term satisfy human food and fibre needs, enhance environmental quality and the natural resource base upon which the agricultural economy depends, make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls, sustain the economic viability of farm operations and enhance the quality of life for farmers and society as a whole.

The sustainability of agriculture is the crisis India faces today. This sustainability of agriculture is in danger at the levels of biology and soil health and also at the level of economics. The cornerstone of sustainable agriculture is prevention- measures that preserve and protect topsoil so that it can remain productive indefinitely. The food grown on soils is much like an interest from a bank account. We can draw on it forever, as long as we do not deplete the soil itself. Soil is, therefore, one form of natural capital on which society depends.

- **Soil conservation** is a practice featuring sustainable agriculture and soil erosion is something featuring extensive crop reduction. Excessive soil erosion is the reason behind the same and consequently soil loses its fertility as well as water retention capacity. The obvious fallout is desertification. In desertification the productive potential of dry lands falls by 10% or more because of a combination of natural climate change that causes prolonged drought and human activities that reduce or degrade topsoil. For instance, it is reported that about two-thirds of the sown area in the country is drought-prone and around 40 million hectares is flood-prone. Global warming, overgrazing and deforestation are the human causes.

  The organic carbon levels and moisture in the soil will go down while the incidence of run- off erosion will increase. The quality of the crop will also undergo change with lower levels of nitrogen and protein and an increased level of amylase content. In paddy, zinc and iron content will go down which will impact reproductive health of animals. Insect lifecycles will increase which in turn will raise the incidence of pest attacks and virulence. Other likely impacts are changes in farm ecology viz. bird-insect relations, and an increase in the sea levels which will cause salinity ingression and submergence. There is an urgent need to resort to traditional farming patterns like contour farming, strip cropping, gullies reclamation and shelterbelts etc.

- **The gravest fallout of soil erosion is desertification and rising temperatures** leave no room for drought resistant areas. Drought prone areas are characterized by a recurrence of rainfall deficiency coupled with inadequate irrigation, suffer from environmental degradation, low and uncertain agricultural productivity, migration of labour and mass poverty. Compared to drought free areas, agriculture in drought prone areas has lower cropping intensity, less valuable cropping pattern, lower per hectare crop yields and therefore lower per capita income from farming. There has to be implementation of environment friendly major irrigation works. One cannot control when or where prolonged droughts may occur, but one can reduce overgrazing, deforestation and destructive forms of planting, irrigation and mining that leave behind barren soil. For sustaining agricultural lands for our future generations we need to take recourse towards agro forestry pathways and strike a balance between the urge for development via. Deforestation and the importance of food production for the so developed generation. Primarily there are two ways of arriving at agro-forestry: by integrating trees into farming systems or by integrating farmers into forests. Agro forestry is a collective name for land use systems and technologies in which woody perrenials are deliberately combined on the same management unit with herbaceous crops and/or animals, either in some form of spatial arrangement or temporal sequence. In India agro forestry systems were introduced a couple of decades ago. However there has to be a selective management of the region spread over Rajasthan, Gujarat, Punjab, Haryana, Maharashtra, Karnataka and Andhra Pradesh being the arid and semi arid land regime. This region is characterized by hostile environmental conditions viz. productivity potential of the land is low, soils are immature, structure less, coarse in texture and poor nutrient status with low water holding capacity. Correct selection of trees is of prime significance in this region for the development of agro forestry. The trees should have drought tolerance mechanism like deep root system, leaf shading in summer to conserve moisture, water binding mechanism; also the tree crops should have tolerance to salinity and alkalinity which are common features in these areas.

- **Application of best management practices in agriculture and use of bio-fuels** for GHG mitigation can have substantial co-benefits. Increasing the organic matter content of soils (which accompanies soil carbon storage) improves soil quality and fertility, increases water retention, and reduces erosion. More efficient use of nitrogen can reduce nutrient runoff and improve water quality in both surface and ground waters. Similarly, improving manure management to reduce

methane and nitrous oxide emissions is beneficial to water and air quality and reduces odors. Bio-fuel use, particularly substituting energy crops for imported petroleum for transportation, has important energy security benefits. However, as bio-fuel use expands, it will be important to ensure that biomass is produced responsibly, taking both environmental and socio-economic impacts into consideration. Considerable mitigation potential is also available from reductions in methane and nitrous oxide emissions in some agricultural systems.·

- **Organic farming: -** The methods of **organic farming decrease the release of such harmful gases by cutting the amount thereof into half.** This is because they only utilize half (or lesser) the energy intended in producing energy, which is essential in making the same amount of food using conventional means. Other non-organic farms often rely on artificial fertilizers because these improve crop production. Unfortunately, such fertilizers are a major contributor to the production of greenhouse gases. This happens to be caused by the necessary energy in the process of making such fertilizers, which contribute a great deal to increasing the level of carbon dioxide as well as nitrous oxide, a process that directly affects the immediate part of the atmosphere that living organisms depe nd on. In the same manner, when fertilizers are incorporated on soil, the land involved also becomes a part of the crisis since it releases harmful nitrous oxide. At the same time non-organic farms are compelled to add lime therein for the purpose of neutralizing the harmful elements in the soil. However, this process only releases more carbon dioxide. Moreover, fertilizers hinder the microorganisms in the soil to continue with the natural processes they undergo in their habitat. As a result, methane is released because the organisms responsible for regulating it are repressed. However, good news is, carbon is stored in the soil during the process of organic farming. If the level of carbon stored therein increases, then the level of carbon released is reduced and so is the production of carbon dioxide. This only shows that people, especially farmers, should avoid soil mismanagement as this is a backdoor to massive carbon dioxide production. For this reason, farmers are encouraged to use organic fertilizers, thus helping the effects on global warming. The benefits of organic farming regarding climate change can be summarized as follows:

  - Organic agriculture has considerable potential for reducing emissions of greenhouse gases.
  - Organic agriculture in general requires less fossil fuel per hectare and kg of produce due to the avoidance of synthetic fertilizers. Organic agriculture aims at improving soil fertility and nitrogen supply by using leguminous crops, crop residues and cover crops.
  - The enhanced soil fertility leads to a stabilization of soil organic matter and in many cases to a sequestration of carbon dioxide into the soils.
  - This in turn increases the soil's water retention capacity, thus contributing to better adaptation of organic agriculture under unpredictable climatic conditions with higher temperatures and uncertain precipitation levels. Organic production methods emphasizing soil carbon retention are most likely to withstand climatic challenges particularly in those countries most vulnerable to increased climate change. Soil erosion, an important source of CO2 losses, is effectively reduced by organic agriculture.
  - Organic agriculture can contribute substantially to agro forestry production systems.
  - Organic systems are highly adaptive to climate change due to the application of traditional skills and farmers' knowledge, soil fertility-building techniques and a high degree of diversity.

- **Waste management -** Waste minimization and recycling provide important indirect mitigation benefits through the conservation of energy and materials. Existing waste management practices can provide effective mitigation of GHG emissions from this sector: a wide range of mature, environmentally effective technologies are commercially available to mitigate emissions and provide c o-benefits for improved public health and safety, soil protection and pollution prevention, and local energy supply. Management of municipal solid waste presents many opportunities for greenhouse gas emission reductions. Source reduction and recycling can reduce emissions at the manufacturing stage, increase carbon sinks, and avoid landfill methane emissions. Diverting organic materials from landfills also reduces methane emissions. Sending your domestic waste to the landfill contributes to climate change. This is because the heavy vehicle that takes your garbage to the landfill releases greenhouse gases as it burns fuel. And when your waste begins to decompose in the landfill, it releases methane gas into the atmosphere. Methane is one of the key greenhouse gases that cause climate change. Composting your domestic waste means fewer truck loads of waste transported to a landfill or industrial composting facility which means fewer fossil

fuels are burnt and less GHGs emitted. Using your home-made compost means less GHG emission in the production, packaging and transportation of fertilizers and soils. So by composting, we not only reduce the amount of harmful greenhouse gases released into the atmospheres, but by nurturing trees and plants we also help in the process of removing CO2 (a GHG) from the atmosphere.

- **Forestry :** Forest ecosystems are highly vulnerable to climate change. According to the IPCC reports, even with a modest global warming of 1-2 degrees Celsius, most forest ecosystems will be impacted through changes in forest species composition, biodiversity and plant productivity. Forests play a crucial economic, social and cultural role in India. Many river systems originate in forests and anchor rich biodiversity. Forests provide timber, industrial wood, and fuel wood and non-timber products to the local communities and the national economy.

Changing climate requires dynamic forest planning and management strategies. There is a need to incorporate climate change concern in the long-term forest planning and policy making process. Examples of forest policies, which may reduce the vulnerability of forest ecosystems to climate change, include preventing fragmentation of forests, forest conservation, enhancing the coverage under protected areas and linking them, large afforestation with multiple species to reduce pressure on natural forests, and involvement of local communities in forest conservation and management. India has a large afforestation programme of over one million hectares annually and also has a plan to bring a third of the geographic area under forest cover. These newly planted forests, particularly the long rotation species such as teak, will be subjected to changing climate parameters. Thus, it is important to consider and incorporate adaptation practices even in the afforestation program. (Source: Survey of the Environment 2007. The Hindu)

Forest-related mitigation activities can considerably reduce emissions from sources and increase CO2 removals by sinks at low costs, and can be designed to create synergies with adaptation and sustainable development. About 65% of the total mitigation potential is located in the tropics and about 50% of the total could be achieved by reducing emissions from deforestation.

CONCLUSION

Each one of us, just by the seemingly inconsequential act of doing our daily chores, emits carbon dioxide that accumulates in the atmosphere to cause global warming. Our drive to work or school burns fossil fuel in a vehicle causing global climate change. These few simple steps can help us heal the world. To avoid the worst predicted impacts of climate change, institutions and individuals must act now. In terms of planning both adaptation measures to respond to the predicted impacts of climate change and mitigation measures to avoid rapid increases in global emissions, nowhere in the world are coordinated responses as critical as in Asia and the Pacific. Finally, our approach must also be compatible with our role as a responsible and enlightened member of the international community, ready to make our contribution to the solution of a global challenge, which impacts on humanity as a whole.

From Print Media

GLOBAL WARMING HITS FOOD PRODUCTION

The Pioneer

Real population density differs from country to country. But the rise of one degree Celsius in average global temperature has a uniform impact on food production, This, in turn, is contributing to the food shortage in the international market.

Why is India's future brighter than Chinas' especially in a warming world? Because India has more good agricultural land per person. That will get more and more important as the temperature goes up.

I first encountered the concept of Real Population Density (note the "Real ") when I was interviewing people in the Netherlands last year about how the country would fare as the temperature rose. My initial focus was on sea level rise, because 20 per cent of the country is already below sea level. But the Dutch are confident that they have the sea level problem under control, at least for the rest of this century.

They are already committed to spending large amounts of money to prevent flooding, not by raising the dikes even further, but by "beach replenishment." When dikes fail, it is generally because they are battered by huge waves - but if you extend the beaches far out to sea (by dredging up sand from even further out), then the waves do not reach the dikes.

The Dutch sea-level experts were also confident that the Netherlands' would not face any problems with food when the temperature rises. The country is, after all, the second or third biggest agricultural exporter in the world. But it still feels like a very crowded country, so I looked up a few agricultural expects, and they explanined the concept of Real Population Density to me.

"It would take a country there or four times the size of the Netherlands to support our present diet," said Mr. Huib Silvis of the Agricultural Economics Research Institute at Wageningen

University. "We import huge amounts of soybean and other animal feed, which we could not produce ourselves. If we had to be self sufficient, we would not be eating meat."

The Real Population Density of the Netherlands – how many people there are per square km of farmland – is 2,205. That's higher than Bangladesh (1,946 people per sq km), and it means that the Netherlands, to be self-sufficient in food would have to feed 22 people from each hectare of land.

So how can the country be the second- or third-biggest agricultural exporter in the world? Because that's the cash value of its exports, which are mostly high valueadded products. You get a lot more for a tonne of cut flooers than you do for a tonne of potatoes - but you can't eat cut flowers, and the Dutch could bearly feed themselves from their own resources even now.

Global warming makes matters much worse, because it hits food production very hard. The rule of thumb is that the world loses about 10 per cent of its food production for every rise of one degree Celsius in average global temperature.

So the amount of food that is for sale on the international market drops drastically, because some of the big food-exporting countries aren't producing enough food to export it any more. As the food gets scarce, the price goes up.

Countries that can't feed themselves either pay huge amounts to buy the limited amount of food that is still available on the international market (if they have the money), or else they go hungry. Which brings us back to India and China.

Almost half the total land area of India is good arable land, whereas only 15 per cent of China is . So although China looks bigger on the map, India has a significanely lower . Real Population Density; 753 people per square km of farmland compared to 943 for China Add in the fact that China is currently losing about one per cent of its arable land per year to buildings, roads and parking lots, and the numbers for China start to look seriously bad.

They look even worse for the East Asian countries that are already fully.

CLIMATE CHANGE MEET BEGINS ON FEB 21

HINDUSTAN TIMES

CONFERENCE TO BRING TOGETHER POLICY MAKERS, SCIENTISTS & ACTIVISTS WORKING ON MINIMISING THE EFFECTS OF CLIMATE CHANGE ACROSS INDIA

The Delhi government will engage in a two-day brainstorming process with the best in the business on climate change mitigation and get a closer look at what other states are doing towards sustainable development.

The first New Delhi International Conference on Cities & Climate Change will begin on February 21, and bring together policy makers industrialists, scientists and environmental activits who in theirown ways are working on minimising the effects of climate change at various parts of the country.

The government's Environment department has tied up with ICLEI- Local Governments for Sustainability – an international association of local governments as well as national and regional local government organization that have made a commitment to sustainable development- to learn from the best in the world in the field of sustainable development.

"During these two days, we will listen to all those who are doing some pioneer work in climate change and also see how many other cities tackle similar problems," said an official .

Planning Commission deputy chairman Montek Singh "Ahluwalia will deliver the keynote address as the chief guest on the first day.

The meet will also have an exhibition on how Delhi has been tackling various challenges posed by environmental degradation. Municipal commissioners from Bhubaneshwar, Hyde5rabad and Ahmedabad will also share their experiences in managing solid waste and turning waste into a reasource. Transport and energy efficiency and renewable energy are the other key subjects of the meet.

क्या है ग्लोबल वॉर्मिंग

संडे नवभारत टाइम्स

एनवायरनमेंट पर जब भी चिंता जताई जाती है, ग्लोबल वॉर्मिंग का जिक्र सबसे पहले होता है। लेकिन बहुत–से लोग यह नहीं जानते कि ग्लोबल वॉर्मिंग असल में है क्या? दरअसल, धरती के लगातार बढ रहे तापमान को ग्लोबल वॉर्मिंग कहा जाता हैं। संसाधनों का बेजा इस्तेमाल, पेडों का काटा जाना, ग्रीनहाउस गैसों का उत्सर्जन आदि इसकी प्रमुख बजहें है। आंकडे बताते है कि 20वीं सदी में धरती का तापमान 0.74 डि.से. बढा। आने वाले वक्त में तापमान के और तेजी से बढने की आशंका है। अनुमान है कि 2100 तक धरती का तापमान 1 से 6 डि.से. तक बढ सकता है। अगर ऐसा हुआ तो तमाम ग्लेशियर पिंघल जाएंगें, जिससे समुद्र का लेवल बढ जाएगां। ऐसा होने पर मुंबई, कोलकाता समेत दुनिया के कई बडे शहरों के लिए खतरा पैदा हो जाएगा। दूसरी ओर कई इलाके रेगिस्तान की चपेट में आ जाएंगें। इसके अलावा सूखा, बाढ, तूफान जैसी आपदाएं भी बढ जाएंगी। यही नहीं, बहुत से इलाके लोगों के रहने लायक नही बचेंगें। दरअसल, इस स्थिति के हम इंसान सबसे ज्यादा जिम्मेदार है। विकसित देशों में ग्रीनहाउस गैसों में कटौती कर धरती को बचाने की कोशिश के तहत कयोटो प्रोटोकॉल पर हस्ताक्षर किए है। हालाकि इन कागजी बातों पर अमल अभी बाकी है।

The resulting changes in the global climate bring a range of risks to health, from deaths in extreme high temperatures to changing patterns of infectious disease.

प्रकृति से तालमेल ही बचाएगा जीवन

राष्ट्रीय सहारा
नरेन्द्र कुमार राय

मानव एवं प्रकृति का संबंध अटूट है। सभ्यता के विकार में प्रकृति की महती भूमिका है। विकास के प्रारंभिक चरण में कोई भी जीवधारी या मनुश्य सर्वप्रथम प्रकृति के साथ अनुकूलन का प्रयास करता है। इसके पश्चात् वह धीरे–धीरे प्रकृति में परिवर्तन का प्रयास करता हैं लेकिन अपने विकास क्रम में मानव की बढती भौतिकवादी और उपयोगितावादी मानसिकता ने पर्यावरण में इतना परिवर्तन कर दिया है कि मानव और प्रकृति के बीच का संतुलन, जो पृथ्वी पर जीवन का आधार है, नष्ट होने के कगार पर पहुॅच गया है, साथ ही मानव की अंधी विकास प्रक्रियाओं ने विनाश का रूप धारण कर लिया है।

जलवायु परिवर्तन का मुद्दा अंतरराश्ट्रीय मंचो पर प्रायः विकसित और विकासशील देशों के बीच वाद–विवाद का विशय बनकर रह गया है। लेकिन सच्चाई यह है कि हवा, पानी, खेती, भोजन, स्वास्थ्य इत्यादि पर प्रतिकूल असर डालने वाली इस समस्या से देर सबेर, कम–ज्यादा सभी का जीवन प्रभावित होता है। चाहे वह समुद्री जलस्तर बढने से प्रभावित होते तटीय या द्वीपीय क्षेत्रों के लोग हो या असमान्यमानसून अथवा जल संकट से त्रस्त किसान। विनाशकारी समुद्री तूफान का कहर झेलते तटवासी हो अथवा सूखे एवं बाढ की विकट स्थितियों से त्रस्त लोग। वस्तुतः इन सारी समस्याओं की जड जलवायु परिवर्तन है।

जलवायु परिवर्तन का कारण है प्रदूशण । प्रदूशण कई प्रकार के होते है जैसे – वायू प्रदूशण, जल प्रदूशण, ध्वनि प्रदूषण। इनमे से वायु प्रदूषण के कारण जलवायु में तेजी से परिवर्तन हो रहा है, जिसका प्रमुख कारण है ग्रीन हाउस गैसे। ग्रीन हाउस गैसे भूमंडलीय तापन के लिए जिम्मेदार है। मुख्य ग्रीन हाउस गैसे है– कार्बन डाई आक्साइड, मीथेन, नाईट्रस ऑक्साइड, हाइड्रोफ्लोरो कार्बन, परफ्लूरोकार्बन्स, सल्फर हेक्सा फ्लोराइड। ग्रीन हाउस गैसों, वाहनों एवं औद्योगिक चिमनियों से वायुमंडल में लगभग 230 अरब टन कार्बन डाई आक्साइड प्रतिवर्ष उत्सर्जित हो रही हे जो वातावरण को बुरी तरह प्रभावित कर रही है। इसी प्रकार अन्य ग्रीन हाउस गैसे क्लोरोफ्लोरोकार्बन (सीएफसी) और मीथेन आदि भी वातावरण को तेजी से प्रदूशित करने के लिए जिम्मेदार हैं इनमें हो रही बेतहाशा वृद्धि से पृथ्वी के बढते तापमान के रूप में ग्लोबल वार्मिंग की समस्या उत्पन्न हो गई है।

1988 में जलवायु परिवर्तन पर गठित 'इंटर गवर्नमेंटल पैनल ऑन क्लाइमेंट चेंज' ने पृथ्वी का तापमान बढने और उसके दुष्परिणाम झेलने की चेतावनी दी। लेकिन उस वक्त इस रिपोर्ट को न केवल खारिज किया गया, बल्कि उसकी जमकर आलोचना भी की गई कि जलवायु परिवर्तन कोरी कल्पना है और इसका वैज्ञानिक आधार नही है। रिपोर्ट के खिलाफ सबसे मुखर होने वाले देशों में संयुक्त राज्य अमेरिका, कनाडा और तत्कालीन सोवियत संघ भाामिल थे। लेकिन आज सच्चाई दुनिया के सामने हैं जलवायु परिवर्तन न केवल दिख रहा है, बल्कि कहें कि जलवायु परिवर्तन ने पूरी दुनिया को बुरी तरह से प्रभावित कर दिया है। जलवायु परिवर्तन के परिणाम साफ–साफ दिखाई दे रहे है। नदियॉ सूख रही है , ग्लेशियर पिंघल रहे है। विनाशकारी बाढ और तूफान आ रहे है । असहय गर्मी पड रही है। समुद्र का जल स्तर बढ रहा हैं मानसूनी बारिश का चक्र गडबडा गया हैं। खाद्यान्न की कमी होने लगी हैं जीवजन्तु और वनस्पति लुप्त होने लगी है। जलवायु परिवर्तन के प्रभाव को विभिन्न शीर्षकों के अंतर्गत बांट सकते है–जल संसाधन पर प्रभाव, मिट्टी पर प्रभाव, पशुओं पर प्रभाव, फसलों पर प्रभाव, कीट व रोगों से संबंधित प्रभाव इत्यादि।

पृथ्वी पर इस समय 140 करोड घन मीटर जल है। इसका 97 फीसद भाग खारा पानी के रूप में समुद्रों में है। मानव के हिस्से कुल 136 हजार घन मीटर जल ही बचता हैं। पूरे विश्व मे पानी की खपत प्रत्येक 20 साल में दुगुनी हो जाती है जबकि धरती पर उपलब्ध पानी की मात्रा सीमित हैं जीवन में भूमिगत जल की महता सबसे अधिक हैं पीने के साथ–साथ कृषि व उद्योगों के लिए इसी जल का उपयोग होता हैं परन्तु बढते जल प्रदूशण और उचित जल प्रबंघन न होने के कारण पानी एक बडी समस्या बनने लगा हैं जलवायु परिवर्तन के कारण ग्लेशियर तेजी से पिंघल रहे हे जिससे कई नदियों में अचानक बाढ की सम्भावना है और इसके बाद ये नदियां सूख जाएंगी क्योकि नदियों के जल का स्त्रोत ग्लेशियर है।

कृषि के अन्य घटकों की तरह मिट्टी भी जलवायु परिवर्तन से प्रभावित हो रही हैं रासायनिक खादों के प्रयोग से मिट्टी पहले ही जैविक कार्बन रहित हो रही थी अब तापमान बढने से मिट्टी की नमी और कार्य क्षमता प्रभावित होगी। मिट्टी में लवणता बढेगी और जैव विविधता घटती जाएगी। भूमिगत जलस्तर गिरते जाना भी इसकी उर्वरता को प्रभावित करेंगा। बाढ जैसी आपदाओं के कारण मिट्टी का क्षरण खेतों को बंजर बनाने में सहयोगी होना। फसलों और पेड–पौधों के साथ जानवरों पर भी जलवायु परिवर्तन का प्रतिकूल प्रभाव दिखाई दे रहा है। तापमान में वृद्धि के कारण जानवरों के दुग्ध उत्पादन व प्रजनन क्षमता पर सीधा असर पड रहा है। एक अनुमान के मुताबिक तापमान वृद्धि से दुग्ध उत्पादन में 2020 तक 1.6 करोड तथा 2050 तक 15 करोड टन तक की गिरावट आ सकती हैं।

कृशि क्षेत्र में जलवायु परिवर्तन के जो संभावित प्रभाव दिखने वाले है वे मुख्य रूप से दो प्रकार के हो सकते है– पहला क्षेत्र आधारित तथा दूसरा फसल आधारित। अर्थात विभिन्न क्षेत्रों में विभिन्न फसलों पर अथवा एक ही क्षेत्र की प्रत्येक फसल पर अलग– अलग प्रभाव पड सकमता है। अध्ययनों में पाया गया है कि यदि तापमान 2 से.ग्रे. के करीब बढता है तो अधिकांश स्थानों पर गेहूॅ की उत्पादकता में कमी आएगी। जहां उत्पादकता ज्यादा है (उत्तरी भारत) वहॉ कम प्रभाव दिखेगा, जहां कम उत्पादकता है वहां ज्यादा प्रभाव दिखेगा। प्रत्येक एक से.ग्रे. तापमान बढने पर गेहूॅ का उत्पादन 4–5 करोड टन कम होता जायेगां तापमान में वृद्धि से धान के उत्पादन में भी गिरावट आ जायेगी। एक अनुमान है कि 2 से. ग्रे. तापमान वृद्धि से धान का उत्पादन 0.75 टन प्रति हेक्टेयर कम हो जायेगा। जलवायु परिवर्तन से केवल फसलों का उत्पादन ही प्रभावित नही होगा। वरन उनकी गुणवत्ता पर भी नकारात्मक प्रभाव पडेगा। अनाज पोषक तत्वों और प्रोटीन की कमी पाई जाएगी। जिसके कारण संतुलित भोजन लेने पर भी मनुष्यों का स्वास्थ्य प्रभावित होगा। जलवायु परिवर्तन से कीट व रोगी की बढत पर बहुत प्रभाव पडता है। तापमान, नमी तथा वातावरण की गैसों से पौधों, फफूंद तथा अन्य रोगाणुओं के प्रजनन में वृद्धि तथा कीटों और उनके प्राकृतिक शत्रुओं के अंतर्संबंधों में बदलाव आदि दुष्परिणाम देखने को मिलेगें। गर्म जलवायु कीट–पतंगों की प्रजनन क्षमता में वृद्धि हेतू सहायक होती है। जो मनुष्य तथा फसलों के लिए समान रूप से हानिकारक होते हैं।

जलवायु परिवर्तन और इसके प्रभाव को बृहद परिप्रेक्ष्य में देखने की आवश्कता है। यह समस्या किसी एक देश या समूह से जुडी हुई नही हैं, बल्कि इसका प्रभाव वैश्विक हैं भूमंडलीय तापमान में वृद्धि का सर्वप्रथम प्रभाव समुद्र तटीय क्षेत्रों पर पडेगा। इसका परिणाम यह होगा कि तटीय क्षेत्रों में भीतरी क्षेत्र की ओर पलायन होगा और फिर जनता के पुनर्वास, पानी, बिजली, खाद्यान्न, हवा, यातायात इत्यादि की समस्या शुरू हो जायेगी। जलवायु परिवर्तन के ये तात्कालिक प्रभाव है जो कुछ ही वर्षो में दिखने लगेंगें। इस प्रकार के उदाहारण से जलवायु परिवर्तन की भयावहता को समझा जा सकता है।

यदि मनुष्य प्रकृति के प्रति उतना ही संवेदनशील हो जाए जितना वह अपनी भौतिक इच्छाओं और महत्वाकांक्षाओं के प्रति रहता है तो इस समस्या का समाधान किया जा सकता हैं करना यही होगा कि उपयोगितावादी दृष्टि त्याग कर आवश्यकतावादी दृष्टि अपनानी होगी। अर्थात किसी भी प्राकृतिक संसाधन का उतना ही उपयोग किया जाए जितना जीवन जीने के लिए आवश्यक है।

Messages

Rural development schemes and role of Panchayat in tree planting is very good for the awareness among rural public through this journal.

R. Babu, *Buddha Outcast Social Society, Tamil Nadu*

This Panchayat newsletter is very useful and covers useful articles related to environment, agriculture and specifically organic farming, pollution etc.

Dr. A. Noor, *Agricultural Resource Station (R.A.U.), Jodhpur*

This magazine is useful for social worker, write ups are informative.

Dr. B. C. Srivastava, *Shohratgarh Environmental Society, Uttar Pradesh*

The articles are the very knowledgeable.

S. Santwana Kumari, *Mahila Vikas Sansthan, Aligarh*

Panchayat special issue is very good for NGO sector related to environmental education.

P. K. Chak, *Institute of Entrepreneurship Development and Management Studies, Uttar Pradesh*

The articles in the Panchayat are good and theme wise which attracts planners, environmentalists, officials and others.

Dr. S. G. S. Swamy, *Karnataka State Council for Science and Technology, Karnataka*

The journal is very useful for farming and agricultural development.

Dr. M. Abbas Ali Khan, *Environment Science Lab, Environmental Conservation Society*

Role of Panchayats in Environmental Management

ENVIS Newsletter

Glimpse of the Website

www.iesenvis.nic.in

ENVIS CENTRE ON
ROLE OF PANCHAYATS IN ENVIRONMENTAL MANAGEMENT

The website has compiled all the relevant data and comprehensive information on different components of Panchayati Raj and Environment. The website contains information on databases developed; geographical distribution of Panchayats; success stories, areas of Panchayati Raj co-operation; elections, finance, query services; bibliography; resource repository etc.

We hope that the information contained in the website will suffice your requirements.

We would appreciate your comments & suggestion about the website so that we can update it as per the requirements of our browsers.

Wish you a Happy browsing on www.iesenvis.nic.in

The Centre invites for Publications :

- Reports on Panchayati Raj (specially related to environment) and rural development
- Short report on seminars/workshops on the related topics are also invited. Those found suitable will be published in the newsletter.
- Articles for the newseletter "Panchayat" are invited.

Forthcoming Events

- **Conference on "Earth Science and Climate Change Research",** International Center, Goa- Sept 25-28, 2011
- **Exhibition on Environment in Don Bosco School,** Panjim, Goa- 13-14 Oct, 2011
- **GLOBE Teachers Training Workshop,** Vijayawada, Andra Pradesh- Nov 23-26, 2011
- **Workshop on Resettlement and Rehabilitation Policy: Hype and Hope,** Darjeeling- Nov 29-30, 2011
- **GLOBE Teachers Training Workshop,** Vizag, Andra Pradesh - December 10-13, 2011
- **GLOBE Teachers Training Workshop Hyderabad,** Andra Pradesh- January, 2012
- **GLOBE Teachers Training Workshop,** Bhubaneswar, Orissa – January, 2012.

Book Post

Please return, if undelivered :

Indian Environmental Society
U-112 (3rd Floor) Vidhata House
Vikas Marg, Shakarpur
Delhi - 110092 INDIA
Phone : 22450749, 22046823, 22046824 Fax : 22523311
E-mail : iesenro@vsnl.com
Website : www.iesglobal.org • www.iesenvis.nic.in

To

_____

_____

_____

_____