Science Update

GLOBAL WARMING AND SRI LANKA

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Carl Sagan, a world–renowned US astronomer and science populariser, says global warming is "In a way the most serious, the most difficult of the environmental problems. Responding to it requires the greatest change in how we think of the world".

Global warming is now world's number one worry. It is specially so for the littoral states and island nations like Sri Lanka. These countries may lose their low lying coastal areas due to a rise in the sea level besides suffering from climatic changes and other ill effects.

Global warming is the outcome of man's own activities. He is furiously burning fossil fuels and is cutting down the forests at a frenzied rate. He is also releasing into the atmosphere a variety of gases which are disturbing the natural balance that had prevailed for centuries since the birth of planet earth.

The worst of all these is the upsetting of the carbon dioxide cycle. There is carbon dioxide in the atmosphere. The concentration of this non–poisonous gas is 0.03 per cent by volume. This concentration is maintained by the process of constant addition and removal, one balancing the other. Carbon dioxide is added to the atmosphere by the breathing of living organisms, by the decay of organic matter and by burning. It is removed by the plants which use the carbon in it to synthesise carbohydrates and by the oceans and other water bodies which dissolve it.

Since the industrial revolution, man has been using the fossil fuels – coal, natual gas and oil (which had been stored in the bowels of the earth) at an increasing rate. This has resulted in releasing more carbon dioxide than during earlier years. In addition, man has been felling trees and forests as never before. Thus, while releasing larger quantities of carbon dioxide, he is reducing the source which removes it.

The increase in the atmospheric concentration of carbon dioxide has been measured by scientists and meteorologists. They say that in 1860 when Industrial Revolution had not begun, the atmospheric concentration of carbon dioxide was 290 parts per million. But in 1958 it was 310 parts per million and in 1985 the figure was 340 parts per million. This shows that the concentration of carbon dioxide is rising at the rate of 0.7 parts per million every year. The rate of growth of the concentration is rising continuously.

Carbon dioxide has the property of absorbing and retaining sun's heat radiation. The sun emits energy through heat radiation and a small percentage of it falls on the earth surface. The earth absorbs that heat and radiates most of it back into space. Carbon dioxide which forms a shield over the earth traps some of the heat and helps keep the earth warm. As the concentration of the carbon dioxide rises, the quantity of the heat trapped will also rise–thus causing the earth's temperature to rise.

Carbon dioxide is not the sole gas that causes global warming. Methane, a gas released during the decay of organic matter, sulphur dioxide and nitrous oxide which are released during the burning of coal and petroleum products and

chloroflurocarbon, the man–made industrial gas used in refrigeration, aerosols and in the manufacture of foam rubbet are the other culprits.

Chloroflurocarbon (CFCs) plays another role also. It destroys the ozone layer, a layer which floats about 15 kilometres above sea level and shields the earth from sun's ultra–violet rays. Scientists say that wide holes have been formed over the south and north poles which allow ultra–violet rays to reach earth surface. These rays are harmful to living organisms and in man, they cause skin cancer. These rays also add to the heating of the earth.

Scientists have estimated the extent of the heating of the earth surface. They say that in the next 40 years, that is, in the year 2030 A.D., the average temperature will rise by 2 degrees Celsius. and by 2090 A.D. the rise will be 4 degrees Celsius.

When the temperature rises, the ocean waters will expand and the polar ice caps and glaciers will melt thus increasing the volume of the ocean waters. The resulting rise has been calculated at 18 centimetres above the pre–industrial level by the year 2030 A.D. and another 40 centimetres by the year 2090 A.D.

Prof. K. D. Arudpragasam, chairman, Central Environmental Authority, says: "The world is taking this sea level rise very seriously. But we in Sri Lanka have not approached it with the required seriousness".

The world has taken the matter very seriously. Our tiny neighbour Maldives hosted an international conference on global warming in 1989 where a declaration called the Male Declaration was adopted. The declaration urged all island nations to formulate a common program to monitor the sea level rise and to develop projects to counter that. It also urged all nations to mount a campaign of afforestation.

For Maldives, the danger is greater than for Sri Lanka. Most of the islands that form the island chain of Maldives will sink if the water level rises. Prof. Arudpragasam says that Sri Lanka too would suffer severely.

He warns that the entire coast will be eaten up. The southern and the west coasts would suffer most and all those areas where the water would enter are highly populated. He says: "all coastal areas which are 20 centimetres above mean sea level will go under water; coastal railway line and parts of Galle road will be washed away; many parts of Colombo city will go under water; and backing of river discharge and intrusion of salt water will cause heavy damage."

Prof. Arudpragasam also warns of severe effect on monsoon winds and the sea currents generated by them. He adds that changes in monsoonal patterns and intensity, changes in distribution of agro–climatic boundaries and changes in soil moisture conditions, with attendant changes in plant growth pattern and vegetable cover should be anticipated.

"I am giong to take these things seriously and am going to set up a core group to study the problem and suggest ways and means of tackling them", he says.

The task of the core group will include: assessment of the impact ; development of the outlines of possible response strategies; liaison with small states and regional states; alerting the government and its agencies.

The global temperature rise will also have other effects on the world: climatic patterns may change; plant growth may be affected. These are also bound to affect Sri Lanka.

Scientists studying coral reefs around the caribbean islands, Jamaica, the Bahamas, Puerto Rico, the Caymans, the Florida Keys etc. say that the sensitive corals have begun sending the first biological signals of global warming. The corals are suffering extensive bleaching and possible death from high water temperatures. Coral reefs are

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made up of colonies of small animals that live in symbiosis with microscopic algae that give the coral its colour and nutrition. The algae are sensitive to extremes in water salinity, temperature, sedimentation, pollution and variations in light intensity. If the world's reefs begin dying, the economic consequences will be incalculable. Some 109 countries around the globe, including Sri Lanka, have reef systems which support marine life.

Sagan feels that science and technology can solve the growing environmental crisis and earlier this year speaking at a conference of American business he suggested the setting up of a special research institute to undertake this task. He suggested three areas for intense research : more efficient burning of fossil fuels, alternate energy sources and massive reforestation on a global scale.

On the first he said that almost a third of carbon dioxide release is from motor vehicles and adds : "Why do we drive cars that get less than 10 kilometres per litre. We could reduce the amount of carbon dioxide from that source by two—thirds".

Of the alternate energy sources he says : "The paragon of these alternatives is solar power. It converts sunlight into electricity or into hot water, producing no polluting gases, no greenhouse gases and no radioactive waste. Such systems are within hailing distance of being competitive".

On massive reforestation he says : "Growing trees take carbon dioxide out of the atmosphere. They are a kind of anti—greenhouse machines. We plant forests; carbon dioxide gets taken out of the atmosphere".

SOURCES OF GLOBAL WARMMING