

Economic Recession and Climatic Change

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Introduction

Both developed and developing nations have been striving for achieving faster economic growth for satisfying the material wants of their people. In the pursuit of faster economic growth every nation has been more vigorously 'axing' nature' by way of burning more fossil fuels, deforestation and industrial production. These unbridled human interventions in nature lead to more devastating issues faced by mankind such as global warming, climate change etc.

Early Researches on Climatic Change

In the 19th century several scientists started to investigate on the ice ages of the distant past. However, in 1940s Guy Stewart compiled temperature measurements and found the warming trend. After the second world war and cold war money is injected into scientific research but they diverted the money for the pressing needs of military for national security.

It is observed by experts that since the beginning of the industrial revolution, the average amount of carbon dioxide in the atmosphere has increased by nearly 40 percent. Humans emit around 32 gigatons of carbon dioxide each year. Half of this stays in the atmosphere; the rest is absorbed by oceans and vegetation. With sharp increases in man-made CO₂ emissions, the natural CO₂ cycle gets thrown out of balance: vegetation can no longer transform the increased amount of CO₂ into oxygen, and oceans are steadily reaching saturation level. The result of the increasing amount of carbon dioxide in the atmosphere is an



enhanced greenhouse effect and subsequently, climate change. CO₂ is responsible for 60 percent of the anthropogenic greenhouse effect that is causing the latest wave of global warming. CO₂ emission level is growing rapidly at faster pace (3.1% from 2000 to 2006). The Inter Governmental Panel on climate change has predicted an average global rise in temperature of 1.4°C (2.5°F) to 5.8°C (10.4°F) between 1990 and 2100.

The question of Global warming need to be addressed with concerted action and restraints from all global players. In order to reduce the GHG emissions by the industrialized nations, Kyoto protocol (1977) defined more flexible mechanisms such as Emissions Trading and the Clean Development Mechanisms etc. This requires unified global approach and massive long-term investment involving clean energies for their economy.

Many Countries across the world are now witnessing slowing down in their economic growth owing to the global liquidity crisis, which started with the turbulence in the U.S financial market associated with the sub-prime crisis. Following the crisis there is substantial contraction in industrial and food production through out the world. Economist's fear that this may slip into an economic recession sometimes with such magnitudes as the world faced during the Great depression in 1930s.

Indian economy has been facing the grim reminders of the global crisis. All the sectors of the economy directly or indirectly affected by the troublesome spurts of the crisis. However, like other states Kerala Economy is also look towards for the aftermaths of global recession. At the same time climate is at stake, owing to the greater economic activities. Several research reports forecasts that lower economic activity can bring forth lower emissions. There is a positive relationship exists between economic recession and global warming. In comparison with the earlier CO₂ emissions the looming recession can lighten the projected emissions.

This may lead to further Economic cycles and emission trajectories; less economic activity means lower emissions. Deutsche Bank recently forecasted that due to the looming global recession, Europe's industrial CO₂ emissions would fall by 100 million tons next year, compared with last year.

Over consumption is a global problem and being caused by the increased population even in the developing nations. However, the Worldwatch Institute said the booming economies of China and India are planetary forces that are shaping the global biosphere. The State of the World 2006 report said the two countries' high economic growth hid a reality of severe pollution. The report states.(Wikipedia). UN Food and Agriculture Organisation (FAO) repoted that 2008 had seen the biggest increase in malnourished people in decades. According to its data, more than 960 million people – one in every six people in the world – now go to bed hungry, and 40 million suffered malnourishment in 2008 because of higher food prices. Countries are concerned about fast rising global populations dwindling food and fuel supplies

“The world's ecological capacity is simply insufficient to satisfy the ambitions of China, India, Japan, Europe and the United States as well as the aspirations of the rest of the world in a sustainable way”



Governments across the world are desperately trying to fight recession by injecting more liquidity in the economy through tinkering monetary and fiscal policy measures. The U.S has announced a \$700 billion economic stimulus package, while China has announced a \$ 586 billion package (14 percent of its GDP). The Indian government has also announced various measures to combat the slowing economic growth and shore up confidence. The government has announced to increase plan expenditure by Rs 50,000 crore in infrastructure.

As the global economic crisis takes precedence in governmental initiatives, climate change caused by CO₂ emissions remains one if not the most serious challenges facing the world. Developing nations like India needs financial aid from developed nations to acquire cleaner technology and fight climate change. There should be a special fund for developing nations, which should not be less than 0.5 percent of the GNP.

Land use changes and carbon cycle

Changes to the terrestrial environment may lead to a loss or gain of carbon stocks in vegetation, soils, and biomass products over time. The conversion of forests and grasslands to agricultural lands, for example, can stimulate the release of carbon from vegetation and soils to the atmosphere as CO₂. If croplands are abandoned and allowed to revert to forest or grassland, the amount of carbon sequestration may gradually increase. Landscape processes such as soil erosion and deposition also impact the net exchange of carbon between terrestrial ecosystems and atmospheric and oceanic pools.

Understanding how land-use and land-cover changes affect carbon storage in the terrestrial biosphere is essential to quantifying the historical and future patterns of human influences on the global carbon cycle. This knowledge, combined with data about the impact of various physical and biological processes on carbon dynamics, can lead to a more complete understanding of the global carbon budget, one that is essential for developing appropriate carbon management strategies and policies.

Land-use and land-cover changes can also affect the concentrations of greenhouse gases other than CO₂, including methane and N₂O. USGS/EROS researchers are involved in a number of studies that assess and model how changes to the terrestrial environment affect both the carbon cycle and N₂O emissions from soils.

Externality of Public Goods

Hardin's, a biologist, thesis on The Tragedy of Commons explains that the externalities arise because of the common ownership of property. It's a dilemma in which multiple individuals acting independently in their own self-interest can ultimately led to pollution. Externality arises because properties are not specified. This externality can be avoided by specifying property rights Thus there lies the coarse theorem. Parties can bargain without costs and to their mutual advantage, the resultant outcome will be efficient regardless of how the property rights are specified. Here through this theorem externality arising out of ownership of property can be internalized, i.e., external costs are included in the market price. According to the Peterson Institute for International Economics, India's agriculture will suffer more than any other country's. Assuming



a global temperature increase of 4.4°C over cultivated areas by 2080, India's agricultural output is projected to fall by 30-40%.

Diseconomies of Transportation

The elasticity of crude oil or petrol can be considered to be inelastic in demand. Henceforth; the change in price is not affected by the quantity of petroleum products demanded. The substantially increased usage of oil in the transportation sector has increased the social costs pertaining to it (pollution and environmental degradation). The Kerala economy is also adversely affected by the increased price in crude oil and led to the hiked price tags of various products. Pollution is yet another diseconomy of increased transportation.

Environmental Impacts of Transportation

The structure of urban land use has an important impact over transport demand and over the capacity of transportation systems to answer such needs. Thus transportation and land use have impacts on environment, and is explained theoretically by three dimensions.

Spatial form. Spatial form simply means the spatial aspect of the city in terms of its extent. Accessibility or centrality is the major aspect needed for transportation network. Thus limited centrality can end up with more environmental impacts.

Spatial pattern. Spatial pattern refers to the organization of the land use in terms of location. So the spatial pattern especially residence, commercial and industrial space should be designed in a zonal pattern, whereas fragmented pattern of a city needs more transportation and thus its environmental cost is higher.

Spatial interaction. Spatial pattern means the intensity of movements between spatial entities. Here the transportation networking should be along a major path with higher intensity (serviced by public transit).

Urban Density and Energy Consumption

There is an intricate relationship between urban density and energy (fuel) consumption. North American cities are among the most energy intensive while Asian cities are highly energy friendly. "India's GDP has grown at an annual average of 9% while its energy consumption has risen by 4%. And yet, to achieve its target of long-term 8% growth, India will have to boost its power-generation capacity at least six fold by 2030. Over the period, its emissions are expected to increase over fourfold. (Economist.com)".

Kerala Economic Recessionary Scenario

It appears that United States and rest of the world is heading towards a long and painful economic recession. It has caused the bankruptcy of a country (Iceland) and even capitalists are nationalizing banks



to protect investors and bank customers! The most affected area of this recession seems to be banking, finance, insurance and IT service industries.

It may take a while to see the ripple effects in Kerala. Already Indian stock market has crashed and a lot of people including Malayalees lost huge investments. People who have invested their only savings will be the most affected since they won't be able to withdraw money from stocks for a long time (unless they book loss).

Another problem area is IT/BPO service industries. These are the only industries in Kerala and many of them belong to the high income group in Kerala. Layoffs in this industry means bad news for real estate, car companies, hotels and other Even the gulf countries are getting affected due to the recession and oil prices are falling. This means that salaries/job opportunity may shrink and that alone will cause huge impact on the Kerala economy.

Mitigation Measures

Nevertheless economic recession in the economy has got a direct linkage between the environmental upswings. Thus the Kerala government has to deal with the emission trajectories by imposing pigovian tax i.e., Green tax (a special tax that is often levied on companies that pollute the environment or create excess social costs called negative externalities, through business practices) A pigovian tax is the most efficient and effective way to correct negative externalities.

Tradable Market permit is another measure to mitigate the specific causes of global warming. Since the quantity of market permit issued is equal to the desired level of total emissions, assuming compliance, the achieved reduction in the pollution is the intended one. Tradable permits are dependable, as well as least cost when it compared to the green tax. Britain has already taken steps to reduce the emissions of ozone depleting green house gases around 80 percent by 2050. But the increased government expenditure to combat recession makes only less attention to the environmental fluctuations. The end of 2007 and especially the year 2008 has been considered as the worst affected year for the combined phenomenon.

General measures for Controlling Pollution are:

- Command Control
 - Limit on permitted discharges
 - Regulation of processes and or equipment
- Incentive Oriented Instruments
 - Taxes of emission, tradable permits.
- Institutional approaches



Promotion of bargaining

Liability specification

Development of societal responsibilities

General measures for Controlling recession are:

- Prudent fiscal measures
- Sector wise stimulation
- Promotional activities for building up confidence level

Impact of recession on Transport infrastructure development

There is a direct relation between provision of quality Transport Infrastructure and economic development. Provision of transport infrastructure such as good roads/ railways/IWT promote industrial and tourism development in the country. Kerala is very backward and lags behind other states in providing quality transport infrastructure although all its Panchayats and villages have basic minimum connectivity by road. The major reasons for traffic conflicts experienced in the city roads in Kerala are due to ribbon development and inter-mixing of fast and slow modes, sharing the same carriageway, obstructions on main carriageway caused by parking, slow modes, pedestrians and other non-transport users. Lack of bus bays, footpath, side drains and cutting up of roads for utility repairs add to the chaos. The roads in Kerala do not have adequate right of way to segregate the above activities resulting in road side frictions and vehicle conflicts. There should be a green strip on both sides of the major road corridors which reduce vehicle-pedestrians friction and also act like smoke screen. Provision of foot path and cycle tracks do not cost much except the need for space.

Economic recession throughout the globe and particularly in the country has caused for less private initiatives and reduced spending. The Government is planning to fight recession by increase in their public spending of which a major share is oriented towards creating quality infrastructure. Hence road transport is poised to get a good share of these public spending and the fund should be used for widening the arterial and sub arterial roads to 6/4 lane status. Advance action is required to ensure the required right of way for these development schemes as many schemes in the past had failed due to delay in land acquisition.

Planting trees on the proposed green buffer strip along the roads also need adequate buffer land space and point towards the need for ensuring adequate right of way. If sufficient land is made available alongside roads part of the construction cost roads can be met by real estate development. Ensuring adequate right of way for roads alone would reverse the trend of economic recession in Kerala.



Conclusion

The question of Global warming need to be addressed with concerted action and restraints from all global players. In order to reduce the GHG emissions by the industrialized nations, Kyoto protocol defined more flexible mechanisms such as Emissions Trading and the Clean Development Mechanisms etc. This require unified global approach and massive long term investment.

Many countries across the world are now witnessing deterioration in their economic growth owing to the turbulence in the U.S financial market initiated with the sub-prime crisis. There is substantial contraction in industrial and food production through out the world. Economists fear that this may slip into an economic recession sometimes with such magnitudes as the world faced during the great depression in 1930s. This may lead to further economic cycles and emission trajectories; less economic activity means lower emissions. Deutsche Bank recently forecasted that due to the looming global recession, Europe's industrial CO2 emissions would fall by 100 million tones next year, compared with last year.

The Government is planning to fight recession by increase in their public spending of which a major share is oriented towards creating quality infrastructure. Road sector is poised to get a good share of the public spending and the fund should be used for widening the arterial and sub arterial roads to 6/4 lane status. Traffic blockades and hold ups in cities and junctions cause wasteful burning of precious fossil fuel and emission of GHG.

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“No matter if the science is all phoney, there are collateral environmental benefits.... climate change [provides] the greatest chance to bring about justice and equality in the world.”

- **Christine Stewart**, former Canadian Environment Minister