

CLIMATE CHANGE VULNERABILITY

Challenges for Bangladesh

The most important characteristic of climate change as a policy problem is uncertainty. From climatology to economics, uncertainties are pervasive, large and difficult to resolve. However, the economic theory of environmental policy under uncertainty provides a clear guide to the design of an appropriate policy. An efficient and practical approach would be a hybrid that incorporates the best features of tradable permits and emissions taxes.

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BANGLADESH is recognized to be one of the most susceptible countries in the world, highly vulnerable to climatic manifestations (short-term and long-term impacts of climate change) due to its unique geographic location, hydrogeological characters like dominance of floodplains, low elevation from the sea and lastly the socio-economic characters like high population density, high levels of poverty, and overwhelming dependence on nature. Unfortunately, the country's future is now trapped between the melting Himalaya in the north and the encroaching Bay of Bengal to the south.

Impact of climate change

Sea level rise: Bangladeshi scientists believe that because of sea level rise coastal Bangladesh has already experienced worst impacts of inundation and erosion, saline intrusion, deforestation, loss of bio-diversity and agriculture, and migration. About 830,000 million hectares of arable land has been affected by varying degrees of soil salinity. During the period 1973-1987, about 2.18 million tons of rice was damaged due to drought and 2.38 million tons due to flood. Drought affects annually about 2.32 million hectares and 1.2 million hectares of cropped land during the Kharif (November to June) and Rabi (July to October) seasons, respectively, while soil salinity, water logging and acidification affect 3.05 million, 0.7 million and 0.6 million hectares of crop land, respectively, in the country.

The temperature and rainfall projections for Bangladesh over the next decades show significant temperature increases for both monsoon and winter period. General Circulation Model (GCM) has reported that the average increase in temperature would be 1.3°C and 2.6°C for the years 2030 and 2070, respectively. It was found that there would be a seasonal variation in changed temperature: 1.4°C in the winter and 0.7°C in the monsoon in 2030. For 2070, the variation would be 2.1°C and 1.7°C for winter and monsoon, respectively.

Increased frequencies of natural disasters: Much of the future vulnerability due to climate change would not necessarily add any new climatic havoc to the already well known ones of floods, droughts and cyclones, but would enhance both the frequency as well as the intensity of such events. Particularly, the areas prone to floods, cyclones and salinity intrusion may increase in the coming decades. The climatic manifestation will in turn be compounded by other factors including land use patterns, water management and control of river flows in the upstream. Flash

floods can also be a problem in the north-eastern and south-eastern regions of the country. It is predicted that by the year 2030, an additional 14.3% of the country would become extremely vulnerable to floods, while the existing flood-prone areas will face higher levels of flooding.

On the other hand, a severe tropical cyclone hit Bangladesh, on an average, every 3 years. The storm surges are higher in Bangladesh than in the neighbouring countries because the Bay of Bengal narrows towards the north, where Bangladesh is located. In recent years, general cyclonic activity in the Bay of Bengal has become more frequent, creating rougher seas. The very recent cyclones Sidr and Aila in addition to the cyclone in 1991 are the most severe amongst all the natural cyclones that the country has experienced so far.

The risk environment

Identifying the risk environment is the priority factor of any policy making. The building blocks of climate change policies of Bangladesh stand on four pillars: natural infrastructures (e.g., physiology, proximity to the sea, landscape and terrain, watersheds, land type characteristics etc.), socio-economic infrastructure (e.g., socio-economic profile of major livelihood groups, poverty dimension etc.), physical infrastructure (e.g., roads and highways, healthcare centres, urban centres, village growth centres, industries and factories, school buildings etc.) and institutional infrastructure (e.g., community organizations, Local government Institutes, arrangements of government wings etc.).

According to IPCC, in their recently published Fourth Assessment, the following changes have been observed in climate trends, variability and extreme events:

- In Bangladesh, average temperature has registered an increasing trend of about 1°C in May and 0.5°C in November during the 14 year period from 1985 to 1998.
- The annual mean rainfall exhibits increasing trends. Decadal rain anomalies are above long-term averages since 1960s.
- Serious and recurring floods have taken place during 2002, 2003, and 2004. Intensity of cyclones originating from the Bay of Bengal has increased.
- Frequency of monsoon depressions and cyclones formation in Bay of Bengal has increased.
- Salt water from the Bay of Bengal is reported to have penetrated 100 km or more inland along tributary channels.
- The precipitation decline and droughts have resulted in the drying up of wetlands and severe degradation of ecosystems.

International efforts

UNFCCC: In 1991, the Intergovernmental Panel on Climate Change (IPCC) raised the

alarm globally by presenting scientific findings on evidence of global warming, emission increase and climate change impacts. This resulted in a worldwide recognition that some serious actions are necessary to save our planet. In 1992, United Nations produced an inter-governmental environmental treaty named United Nations Framework Convention on Climate Change (UNFCCC). This series of agreements aimed at stabilizing greenhouse gas concentrations in the atmosphere at a certain level. In 1994, Bangladesh including 192 countries ratified the UNFCCC.

Kyoto Protocol: The Convention led to the development of the Kyoto Protocol in 1997 which provides the mechanisms, targets and timetable for greenhouse gas emission reductions. To help vulnerable countries and people adapt to climate change and increase resilience, additional support was also agreed.

Most industrialized nations and some central European economies in transition (all defined as Annex I countries) agreed to legally binding reductions in greenhouse gas emissions of an average of 6 to 8% below 1990 levels between the years 2008-2012. Unfortunately, United States administration explicitly rejected the protocol in 2001. Only parties to the Convention that have also become parties to the Protocol are bounded by the Protocol's commitments.

Since then, twelve years have passed. But progress made in reducing greenhouse gas emissions is disappointing. Convention commitments to address current impacts and future risks from global warming through support for reducing vulnerability and adaptation measures is yet to materialize in a manner that will match current and future priorities. Funding through the creation of the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF) under the Convention has been only fractions of the amount required as priority by the poorest and vulnerable countries.

National efforts

National Adaptation Programme of Action (NAPA): In 2005, the GoB developed the National Adaptation Programme of Action (NAPA) after extensive consultations with communities across the country, professional groups, and other members of civil society. In the NAPA 15 adaptation measures have been suggested for Bangladesh to address adverse effects of climate change including variability and extreme events based on existing coping mechanisms and practices (MoEF 2005).

Strategy and action plan: Development of NAPA was a significant kick-off start for dealing with climate change impacts. This process has been taken forward, with the adoption of the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008, which is the main basis of Bangladesh's efforts to combat climate change over the next ten years. The Climate Change Action Plan is built on six pillars (MoEF, 2008) which are:

- Food security, social protection and health: To ensure that the poorest and most vulnerable in society, including women and children, are protected from climate change effects and that all programmes focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- Comprehensive disaster management:



Increasing frequency and severity of natural disasters.

To further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.

- Infrastructure: To ensure that existing assets (e.g., coastal and river embankments) are well-maintained and fit-for-purpose and that urgently needed infrastructure (e.g. cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
- Research and knowledge management: To predict the likely scale and timing of climate change impacts on different sectors of the economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.
- Mitigation and low carbon development: To evolve low carbon development options and implement these as the country's economy grows over the coming decades.
- Capacity building and institutional strengthening: To enhance the capacity of government ministries and agencies, civil society and the private sector to meet the challenge of climate change.

Areas of concern

The most important characteristic of climate change as a policy problem is uncertainty. From climatology to economics, uncertainties are pervasive, large and difficult to resolve. However, the economic theory of environmental policy under uncertainty provides a clear guide to the design of an appropriate policy. An efficient and practical approach would be a hybrid that incorporates the best features of tradable permits and emissions taxes. Unfortunately, international negotiations have taken a different approach, focusing on rigid targets and timetables for emissions reduction.

Climate change, however, is one of the most important environmental and developmental issues for the Least Developed Countries (LDCs). Like many other LDCs, Bangladesh is a low-lying coastal country

that shares similar sustainable development challenges, including large population, susceptibility to natural disasters, vulnerability to external shocks, and excessive dependence on international trade and foreign aid. Its growth and development is often further stymied by high transportation and communication costs, disproportionately expensive public administration and infrastructure, and little opportunity to create economies of scale.

Considering these facts food security, social protection and health was given the highest priority in the BCCSAP followed by comprehensive disaster management, infrastructure, research and knowledge management, mitigation and low carbon development, and capacity building and institutional strengthening.

Recommendations

Adopt meaningful, achievable climate change targets: Although the focus of the action plan of Bangladesh is on low carbon development, but the emission is actually negligible. Bangladesh approximately produces one fifth of 1% global CO₂. So the government must be careful at setting out the target considering our developing economy.

Pursue strong, binding emissions targets in international negotiations: In international climate change negotiations, Bangladesh Government should support strong, binding emissions reduction targets for developed countries that will keep global warming below 2.0°C, including emission reduction targets of 25-40% below 1990 levels by 2020, and at least 80% below 1990 levels by 2050.

Ensure commitment of developing countries' fair share to climate change adaptation for Bangladesh: Bangladesh Government should strongly negotiate for increasing aid directed towards helping developing countries like Bangladesh to improve energy efficiency, to adopt energy-efficient production processes, to adopt renewable energy technologies and to adapt to climate change

through measures such as disaster preparedness, planning, and improving food and water security.

Create education, training and public awareness: Bangladesh Government should develop and implement educational and public awareness programmes on climate change and its effects. Public should have access to information on climate change and its effects and should participate in addressing the issue and develop adequate responses. Government should train scientific, technical and managerial personnel on climate change and its effects; and programmes should include strengthening of national institutions and the exchange of personnel to train experts in this field.

Seek more support for climate change mitigation and adaptation research: Bangladesh Government should look for increased funding support for research into innovative technologies including renewable energy, understanding climate change dynamics, carbon capture and sequestration, energy efficiency, crop varieties, and other adaptation and mitigation innovations.

Encourage environmental solutions in other countries: Bangladesh should support and play advocacy role for global, regional, national and local efforts to address climate change through leading-edge biosequestration programmes including agricultural diversification, reforestation and reduction of deforestation.

Collaborate with neighbours who are victim of climate change: Bangladesh Government should take more initiatives for better collaboration with neighbours for jointly dealing with the climate change impacts and implement adaptation strategies.

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CLIMATE CHANGE MITIGATION

Towards a low-carbon economy

It is urgent to construct an energy system based on renewable energy sources to secure future of the planet earth from the disaster of global warming and climate change. The major renewable energy sources are solar energy, wind power, tidal power and biomass energy.

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YOUR Planet Needs You! Unite to Combat Climate Change! has been the slogan of this year's World Environment Day; 'Kick the Habit! Towards a Low Carbon Economy' was last year's. With these for three successive times the United Nations Environment Programme (UNEP) has declared 'climate change' related themes for observing World Environment Day. This phenomenon helps us understand how much emphasis is given by UNEP on global warming and climate change issue. Climate change due to global warming is an all-encompassing global disaster. But it is impossible to mitigate it unless economic production system of this planet is made carbon neutral.

The process of deforestation to make more room for the mankind and fossil fuel burning to generate energy are two primary causes of CO₂ emission in the atmosphere. There are many Green House Gases (GHGs) but CO₂ contributes mostly to the ongoing global warming due to its cumulative increase in the atmosphere.

Climate change impact: Already we are experiencing the impacts of climate change world wide with more severe and longer droughts; more violent storms affecting our coastlines and more flooding in parts of floodplains. Bangladesh is also experiencing the severe impacts.

Adaptation and mitigation: It is a remarkable consensus among the scientists that to smoothen or avoid the adverse effects of climate change there are two options: reducing the emission of green house gases substantially and/or adaptation to the climate change conditions. Even if we opt for adaptation, reduction of emission should be complementary to it.

Collective approach: Global warming is linked to everyday habits and practices of billions of people of the earth. Modern way of living and pursuing livelihood are linked with emission of CO₂. Though it is not impossible to live in this planet without harming it but it needs a systematic observation of rules of change, formulation of sustainable way of living and leading life accordingly. The latter implies policy makers, decision makers and most significantly mass people. So efforts towards mitigating the climate crisis should be focused on people.

Change of habit: In the theme of last year's World Environment Day habit means the way of living at personal level in the existing local, national and international economic system. Habit means the adapted way of living that is harming the ecological balance of this planet specially warming its atmosphere to an adverse climate change. And its asked for a change to low carbon economy.

Horizons of low carbon economy

It is true that the economic activities of

people not friendly to the environment of the earth are major factors responsible for the climate change crisis. So we need:

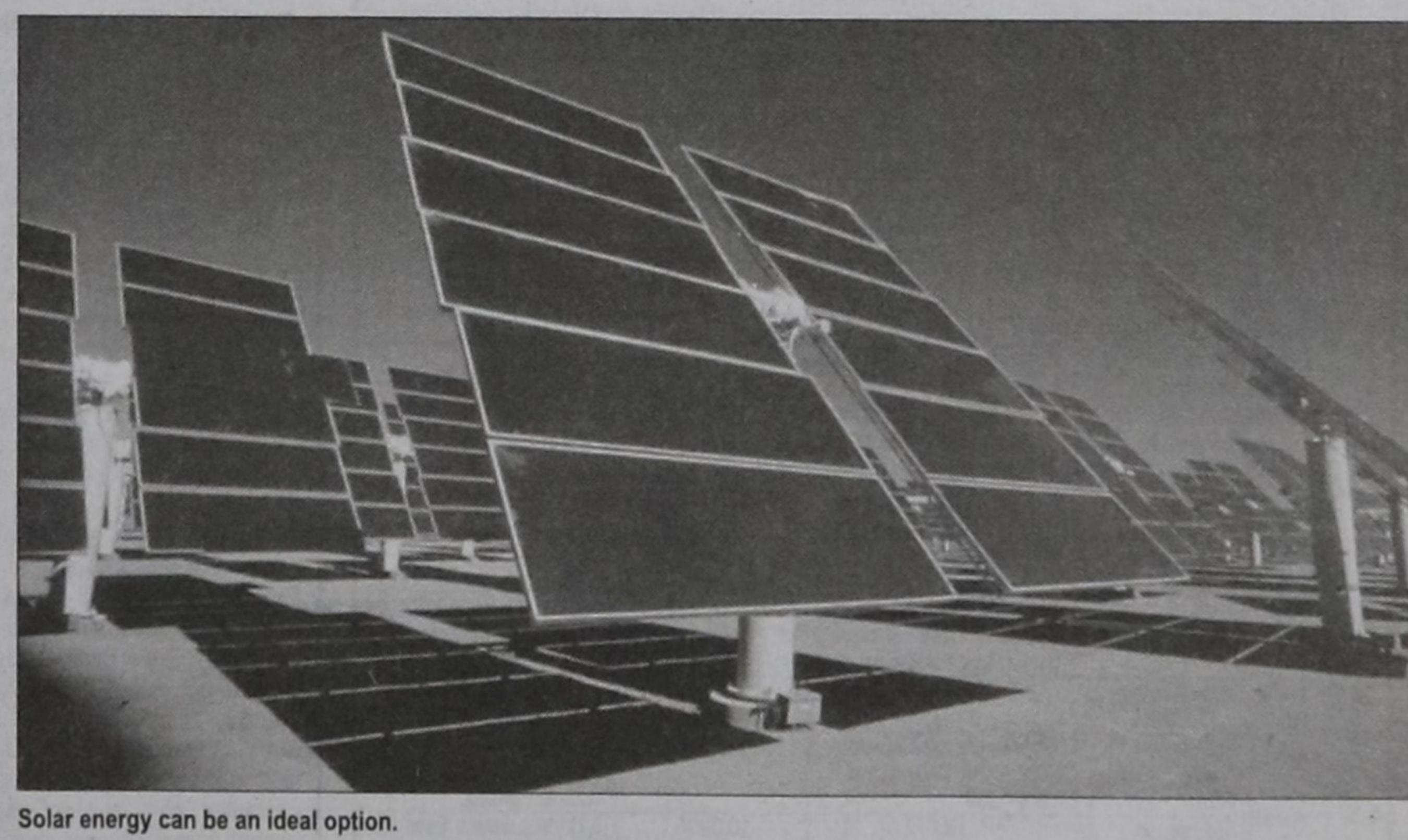
Sustainable building design: Sustainable building design is environment friendly design of building. There must be provision for:

- Less energy requirement for cooling and heating
- Devices to capture solar and wind energy
- A system to capture rainwater to use for domestic purpose
- Design to support roof-top plantation

Renewable energy source: An energy system comprises its production, distribution and utilization regimes. The conventional energy system is based on fossil fuels -- coal, mineral oil and natural gas. When burnt these fuels produce CO₂ and CO₂ emitted by power stations and automobiles are mostly responsible for global warming and climate change. So, it is urgent to construct an energy system based on renewable energy sources to secure future of the planet earth from the disaster of global warming and climate change. The major renewable energy sources are solar energy, wind power, tidal power and biomass energy.

Population control: Without controlling population it is not possible to control the green house gas emission effectively. The population of the earth is increasing steadily and it is easily understandable that for more people more energy and more living space are a must that imply more fossil fuel burning and more clearing of natural forests.

Kick the luxury: Luxury is the major culprit that contributes most to aggravate the climate change situation. Due to our luxurious lifestyles we are doing more things than what we actually need. Doing unnecessary things imply more energy use that generate more heat and CO₂ in atmosphere. Thus we need to shun this



Solar energy can be an ideal option.

useless extravagance.

Using fewer machines: Love for idleness and less physical work made people more dependent on machines that are run by fossil fuels or use energy derived from fossil fuel. It has become people's habit to get simple works done by various machines instead of doing it manually. But only changing this habit can help a lot towards achieving a low carbon economy.

Mitigating crisis in sustainable manner:

How to cut emission? Massive forestation, raising energy efficiency and reduction in fossil fuel burning are promising options to mitigate the climate change crisis.

Reducing energy use: World wide demand for energy is rising rapidly. In this

scenario it is impossible to reduce overall energy use but by changing our habit i.e. avoiding waste of energy and turning to more manual work can be a promise towards sustainable livelihood.

Fostering energy efficiency: From generation to transmission to utilization -- all the stages of energy system need more efficient technology and more efficient handling.

Maximizing use of renewable energy: Sustainable energy aims at lowering the amount of fossil fuel use while increasing the share of renewable energy sources for electricity generation and if possible for total energy requirement.

Choice of renewable energy sources: The best option among renewable energy sources is the solar energy because it is

the manmade imitation of natural process of photosynthesis. Biomass is produced by photosynthesis capturing the solar energy. Burning biomass does not harm to the environment.

Conclusion

If our hearts beat to save planet earth we must act now or it will be too late to tackle the demise of this only known fountain of life in the universe. Controlling population, being frugal in and lifestyle adapting to the natural processes are some principles for marching toward our destination of low carbon economy for a blissful and happy living on the globe.

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