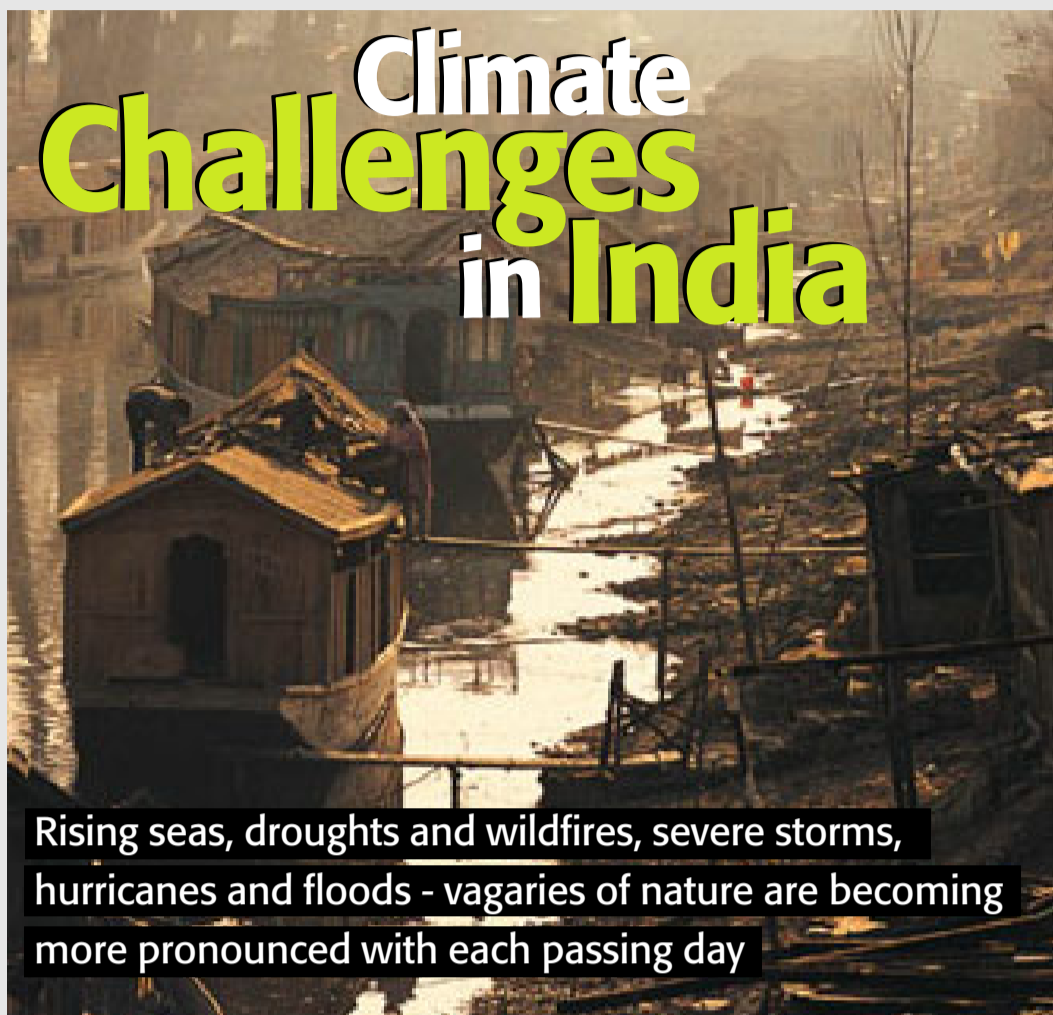


"lifenology" for India

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Climate Challenges in India

Rising seas, droughts and wildfires, severe storms, hurricanes and floods - vagaries of nature are becoming more pronounced with each passing day

NAMRATA KOHLI

The earth is puffy with heat-trapping carbon dioxide, which threatens large-scale disruptions in climate. Evidence of this is visible in the form of drastic variations in rain pattern, extreme hot and cold periods, even glaciers shrinkage worldwide affecting run-off and water resources downstream.

Every other day a new natural calamity is striking some part of the globe, followed by another, each time increasing the level of ferocity. Take the case of recent hudhud cyclone in coastal Andhra Pradesh which wreaked havoc in the coastal areas especially in the city of Vishakapatnam, or the recent floods in Jammu & Kashmir where heavy rainfalls battered the western Himalayas killing over 400 people and displacing thousands of them, or the case of Uttarakhand cloudburst which culminated in the most devastating flood and landslides, killing over 5,000 people. Destruction of bridges and roads left about 100,000 pilgrims and tourists trapped in the valleys of Hindu pilgrimage sites.

Islands of heat that are getting formed nowadays make it unbearable for all living beings. Irregularities in weather have a direct impact on farming industry and agriculture. This is impacting the crop yield especially that of wheat and maize. Reductions in crop yield leads to increased food prices and also creates food insecurity which adversely affects the poor.

But who is the culprit for all this. Changes in the environment pattern are brought about not in a day, but over a sustained period of unplanned construction of buildings and roads, especially in

the floodplains of the rivers and the banks of the lakes; cutting of trees for uncontrolled construction in the hills, rampant and unchecked dumping of garbage in the rivers and lakes; overuse of chemical fertilizers by farmers.

Global warming has led to increase in average temperatures thereby resulting in faster rate of melting of glaciers and polar ice caps. It has been projected that the many islands will get submerged by mid 21st century with the rise in sea level. Coastal systems and low-lying areas will experience adverse impacts such as submergence, coastal flooding, and coastal erosion. Global marine-species redistribution and marine-biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity and other ecosystem services. Many terrestrial, freshwater, and marine species have shifted their geographic ranges, seasonal activities, migration patterns, abundances, and species interactions in response to ongoing climate change. Spatial shifts of marine species due to projected warming will cause high-latitude invasions and high local extinction rates in the tropics and semi-enclosed seas. Species richness and fisheries catch potential are projected to increase, on average, at mid and high latitudes and decrease at tropical latitudes. Climate change will impact human health mainly by exacerbating health problems that already exist. Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions and especially in developing countries with low income, as compared to a baseline without climate change.



Prevention is the key

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FAST FACTS

Knowledge and awareness about an impending climate danger helps one equip oneself with sufficient aids to combat the threat. Weather forecasting is the attempt by meteorologists to predict the state of the atmosphere at some future time and the weather conditions that may be expected.

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Scorching summers, bone-chilling winters and deluges that resemble cloudbursts are signs that all is not well with climatic conditions. Climate change is the single biggest environmental and humanitarian crisis of our time.

The question arises - how do we address this? There are a few personal lifestyle changes that one can make to mitigate the risk and certain initiatives can be taken up at the level of community as well. Things that each of us must do to manage and mitigate the environmental risks and challenges.

Like they say, forewarned is forearmed. Weather forecasting is one way to anticipate emergencies and provide protection for human life and buildings. While global warming is leading to frequent weather extremes such as drought, flooding, hurricanes and tsunamis, one way to reduce the risks of people and structures is by weather forecasting. Improved weather tracking would contain the risk to a great extent.

In this regard, technological intervention in the name of weather radar systems will be pertinent. This is basically a surveillance system that allows one to detect weather threat with greater precision. It can be used to locate precipitation, calculate its motion, and estimate its form such as rain, snow, hail, etc.

Apart from this, as far as possible we must make an effort to progressively

reduce our dependence on fossil fuels and employ alternatives such as biodiesel, wind power, etc.

One way to dramatically curtail transportation fuel needs is to move closer to work, use mass transit, or switch to walking, cycling or some other mode of transport that does not require anything other than human energy. There is also the option of working from home and telecommuting several days a week.

Swapping old gadgets with more efficient ones would save billions of kilowatt-hours. Purchasing energy-efficient gadgets and gizmos is an important way to save both energy and money. Think green when making purchases and go for efficient refrigerators, air conditioners and other appliances. Look for products that will last the longest and have the least impact on the environment.

Knowledge and awareness about an impending climate danger helps one equip oneself with sufficient aids to combat the threat. Weather forecasting is the attempt by meteorologists to predict the state of the atmosphere at some future time and the weather conditions that may be expected. Accurate weather forecasts can tell a farmer the best time to plant; an airport control tower what information to send to planes that are landing and taking off; and residents of a coastal region when a hurricane might strike.

Should there be an impending crisis then one needs to be well prepared with disaster management or mitigation techniques. This implies using community resources to fight the effects of an event until the situation can be stabilized. Through disaster management, we cannot completely counteract the damage but it is possible to minimize the risks through early warning, provide developmental plans for recuperation from the disaster, generate communication and medical resources, and aid in rehabilitation and post-disaster reconstruction. The 72 hours following a major event is the most difficult time because of a lack of coordination among relief organizations. Problems that interrupt rather than coordinate the rescue efforts of all groups involved often occur because of hasty decision making under complicated circumstances and the large number of organizations, which are unsure of their roles.

When compared to the world, India has been a safer land in terms of natural calamities. However, the times have changed in the past few years. Having witnessed some severe natural calamities due to floods in Uttarakhand last year and Kashmir this year, advanced disaster resistance and management has become an absolute necessity for India.

Cutting-edge solutions for natural disasters

Japan is one of the most prone countries to natural calamities due to earthquakes, floods, typhoons, etc. It turns out to be one of the reasons they have one of the best disaster management systems in the world.

Before 1960 in Japan, the

measurement against the flood was not sufficient and thousands of people were killed or lost lives each time heavy typhoons hit the country. The Japanese government then made a five-year-plan for flood control. The measures included flood control

by improving bank, dam, river system and weather radar, etc., and every five year the number of flood victims began to decrease.

Toshiba has been supplying many weather radars and its applied systems to government and autonomous companies.

Toshiba delivered its first weather radar system to the government of Japan in 1955.

In India, Toshiba plans to promote total solutions that help to minimize the impacts of disasters by utilizing highly accurate, high density

information obtained from the cutting-edge weather radars.

One of latest offerings in the safety solutions, Toshiba is already in the process of implementing its weather radar system in Kashmir. With the starting point already made,

Toshiba will expand its offerings in disaster resistant solutions for India and its commitment is to bring in total solutions for disaster resistance to all the regions of the nation in need. The entry of Toshiba's new business venture, which is focussed on solving yet another social issue of India, reassures Toshiba's commitment to the people of Indian society.

Advanced weather radar in Kashmir by Toshiba

In order to avoid the mishaps that occurred in Uttarakhand and Kashmir, Indian Meteorological Department (IMD) has been making several efforts to bring in the best of world technologies in weather radar. Toshiba having superior technology in weather radars and proven track record in Japan has been awarded to implement the advanced weather radar system in Kashmir.

Toshiba has partnered with Electronics Corporation of India Ltd. (ECIL) to handle the IMD project. ECIL, with several superior technologies like antenna and several branches and service centres across the nation, will maintain the weather radars after being installed.

Weather radars emit electric waves towards the sky and observe rain and wind by receiving electric waves that is reflected upon raindrops.

Conventionally, the technology used is called Klystron Transmitter but Toshiba has put this functionality in a small semiconductor chip which is called Solid-state Transmitter.

The significant benefits of such a weather radar are as follows:



DOWNSIZING

The transmitter weight is cut down by 98% as compared to conventional radar. As a result, the transmitter that required a space of around

three racks has been replaced by two small boxes which can even be put on a desk.

ENERGY SAVING

The conventional transmitters require up to 100 KW of power in order to produce electric waves that could reach far. Many cooling devices are also required as too much heat is generated.

If special processing is conducted by Solid-state Transmitter, the power needed for the observation of the same range is 200 watts that is about one five-hundredth as against conventional transmitters.

Toshiba has been successful in saving energy up to 90% without heat generation.

ECO-FRIENDLY DUE TO LONG LIFE

Klystron transmitter, which has short exhaustion for high power, is required to be replaced and disposed of every two years. On the other hand, semiconductor devices used in solid-state have a long life. The garbage obtained is also not much when replaced.

ACCURACY OF OBSERVATION

Traditional weather radar provides data about every 10 minutes, but solid-state weather radar gets the data in more detail in lesser time and spatially also.

By analysing the particles in a special technology, you can also identify rain, snow, hailstone and measure the wind.

COST EFFECTIVE

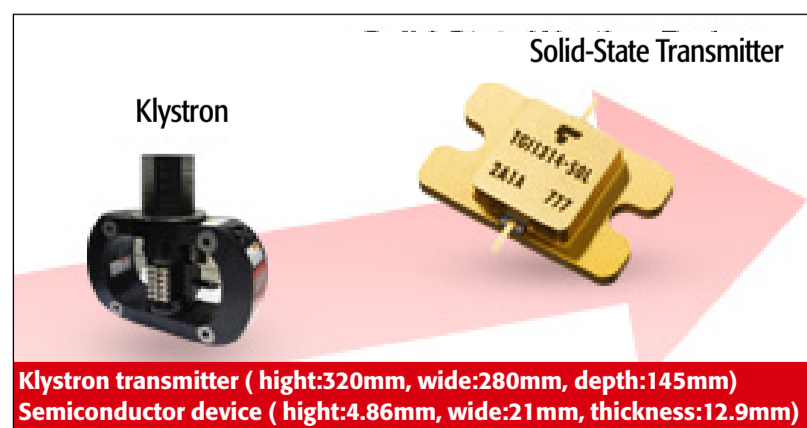
The initial cost is different, but by

having solid-state radar, you don't need to replace the transmitter frequently and buy a new one. This way one can reduce the running costs significantly.

EFFICIENT FREQUENCY UTILISATION

The demand for using GHz band will progressively increase as the use of broadband wireless communication expands.

Generally speaking, the lifecycle of a weather radar system is 15 years.



Klystron transmitter (height:320mm, wide:280mm, depth:145mm)
Semiconductor device (height:4.86mm, wide:21mm, thickness:12.9mm)

What you decide now will determine the country's situation in weather radar system in the near future. Weather radar is an essential equipment to help protect people's lives. Also the wireless communication is an essential infrastructure for the development of any country. We recommend all the countries to chosen to have the benefit of both advanced radar systems and wireless communication systems by adapting Solid-State technology into Weather Radar.

While technology plays a major role in the life of the modern man, the most important aspect becomes the ability to integrate technology and combine the data from all social infrastructures to create useful information for the well-being of the society. Toshiba with its new brand vision of "lifenology", a coinage of life and technology, has brought in a major shift in focus from 'Products' to 'Products with services' globally to all its business divisions. Impacting the lives of people by providing solutions to their problems, Toshiba has been expanding its services in India too.