

CODE RED

An overview of the IPCC AR6 report





Eco Club, TERI SAS brings to you "Code Red", the eighth edition of Vasundhara magazine, highlighting the key findings of the latest IPCC Report, "Climate Change 2021: The Physical Science Basis", how the state of the climate is deteriorating and what the future holds for our planet.

The information in the magazine is for general use only and has been compiled from various research papers/articles/government databases. Some personal experiences and anecdotes have also been shared for which we extend our sincere gratitude to the contributors.

The content is accurate to the best of our knowledge as of 20th December, 2021. We apologize for any inadvertent errors that may exist.

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IPCC AR6 Climate Change 2021: The Physical Science Basis

IPCC stands for the intergovernmental panel on climate change. It is the scientific government body established under the UN in 1988 to analyze climate change and its economic and political impacts on the nations. It has three working groups (WG's). The WGI contribution to the AR6 report came out in August 2021 and the contributions of WG2 and WG3 will be released in 2022. This report is the most recent one on climate change and would be a foundation for many more years to come. It explains the current state of the climate, how it is changing, how human activities are influencing climate change, what the future possibly holds, information that is pertinent to regions and sectors and limiting human-induced climate change.

The Current State of the Climate

The earlier reports published by IPCC mentioned the impact of human activities on climate but the AR6 confirms this with ample evidence that human-led activities have undeniably caused a major threat to the environment. There is an increase in the pace of warm up of the atmosphere, ocean, and land. The increase in the concentration level of greenhouse gases is also causing an extensive increase in temperature. The AR6 gives an updated and new set of data even for future periods by revaluing the metrics of the data used to assess global warming.

It was noticed that during 2015-2020 every year becomes warmer than the previous one. In fact, 2021 was the warmest of the seven hottest years on record. With warmer years global mean sea level has risen faster since 1900. Evidence of human-induced climate change has been observed in the form of heat waves, heavy precipitation, droughts, and tropical cyclones. It puts emphasis on the fact that human-led climate change has had more impact after the AR5. Human-led climate change has affected every region across the globe and no one remains untouched by its impact. Hot extremes, heavy precipitation, and agricultural and ecological droughts have been assessed as a consequence in various regions.

Possible Climate Futures

The overall average surface temperature of the earth is expected to cross 1.5 °C, over pre-industrial levels in the next 20 years, that is by 2040. The IPCC report for the first time has said that 1.5°C warming was inevitable even in the best-case scenario. It has been predicted that global warming of 1.5°C and 2°C will be exceeded during the 21st century until and unless deep reductions in CO2 and other greenhouse gas emissions take place in the coming years.

Many changes in the climate are related to the direct impact of global warming which includes an increase in the frequency and intensity of hot extremes, marine heat waves, and heavy precipitation, in some regions agricultural and ecological droughts, an increase in the proportion of intense tropical cyclones and reductions in Arctic Sea ice, snow cover, and permafrost. The report says that it is likely that regions with a higher scale of global warming would experience heavy precipitation. A warmer climate will lead to the intensification of very dry and wet weather conditions which could further lead to droughts or flooding depending upon the projected changes in regional atmospheric circulations. With rising CO2 emissions from land and ocean, carbon sinks won't prove to be much effective. Hence human activities affect all climate system components and are an unavoidable concern.

Climate Information for Risk Assessment and Regional Adaptation

The consequences of human activities leading to climate change are assessed by physical climate information, which addresses the interconnection among human actions, natural drivers(like change in sun's energy output, regular changes in earth's orbital cycle, etc.), and internal variability(which mainly includes El Niño-Southern Oscillation, Pacific decadal variability, and Atlantic Multi-Decadal variability). The likelihood of extreme to low impact events in terms of climate response helps climate services with information to assess these risks and

formulate plans accordingly. Variability in historical global surface temperature has been found to have escalated with the underlying human-caused longterm changes and is likely to continue in the future (stated with high confidence). For example, the period of 1998-2012 witnessed surface global warming with noticeable regional and seasonal impacts, due to internal decadal variability and variations in volcanic and solar drivers partly covered under human-caused consequences (high confidence). Moreover, the continued warming up of the global oceans and hot extremes over land (medium confidence) during this period reflected the continued heating of the climate system. It has been observed that decadal-to-multi-decadal humancaused mean precipitation changes over land regions have been majorly amplified and accentuated by the internal variability.

- Volcanic Activity: The report suggests that at least one large volcanic eruption is likely to occur during the 21st century, which, partially masking the human-caused climate change, would reduce global surface temperature and precipitation for approximately 1-3 years (particularly over the land), alter global monsoon circulation, modify extreme precipitation and alter many CIDs (Climate Impact Drivers of the type heat and cold, wet and dry, snow and ice, coastal and open oceans). The changes in these CIDs have been projected to be more widespread in global warming above 1.5°C to 2°C.
- Sea Level Rise and Flooding: As per the observations, most regions of Africa, North America, Europe, and the Pacific islands have been projected to experience more frequent and intensive flooding and heavy precipitation at 1.5°C of global warming. On the contrary, fire weather; severe agricultural and ecological droughts will become more frequent in regions of the north and southern Africa. A few regions of Africa, Australasia, Europe, and North America are projected to be affected by increased hydrological and meteorological droughts. Similarly, southern and eastern Australia will receive low rainfall but the central and northeast parts of the continent

- will experience heavy rainfall leading to flooding. Central and South America will face extreme heat conditions much more frequently than in 2100, adding to which melting glaciers and thawing permafrost over the Andes will reduce the river flow in all future warming conditions, leading to "high magnitude glacial outburst floods."Following this, the rise in sea level will lead to frequent floods or coastal flooding in the lowlying areas, especially the small islands. The Pacific north-west, for instance, has experienced a recordbreaking "heat dome", wildfires in the western US and Europe, destructive flooding in China and Europe accompanied by rainfall-induced landslides in India during mid-2021.
- Urbanization and Climate change: Urbanization contributes to the problem of intensified warming locally, and frequent hot extremes in addition to this, lead to an increase in the severity of heat waves. The development of cities also leads to rising mean and heavy precipitation. Coastal cities are more likely to experience flooding owing to rising sea levels and extreme rainfall/river flow events. As per the report, there is an increased probability for many regions to face compound events with higher global warming. For instance, droughts and concurrent heat waves, in the form of compound events are more likely to be experienced.
- **Polar Impact:** The occurrence of less likely outcomes like Antarctic ice sheet collapse, abrupt ocean circulation changes, forest dieback, some compound extreme events, and higher future warming than the assessed levels, which have high impact and higher probability with increased alobal warming, cannot be ruled out of the risk assessment.



• Limiting Future Climate Change: The estimates for the carbon budget have been enhanced since AR5, with improved methodology and updated as well, with integrated evidence. In line with the Physical Science perspective, the report suggests that limiting global warming to a specified limit requires efforts on reduction of CO2 emissions cumulatively(reaching at least net-zero CO2 emissions), along with a strong reduction in other GHGs and CH4(methane) which will also lead to decreased aerosol pollution and enhanced air quality. As part of a solution, anthropogenic CO2 removal (CDR) has the potential to remove CO2 from the atmosphere, which will also aid in reaching net-zero CO2 and other GHGs emissions, given anthropogenic removal exceeds the

anthropogenic emissions. These CDR methods widely influence biogeochemical cycles, food production, biodiversity, water quality and availability, and climate. This might affect their potential impact on removing CO2 and reducing global warming.

Conclusion

With the advancement of scientific calculations and estimations as compared to AR5, there's a scope of improvement and more targeted efforts to address the climate change issues. The IPCC report AR6 signals a red alert to the global society. Thus, it is high time for the policymakers as well as individuals, to work in their capacity, towards the fulfillment of commitments put forth during COP26 at Glasgow.

INTERVIEW



DR PRANAB J. PATAR



India is an old civilisation with rich traditional ecological knowledge, thus it has all the wisdom and experience to get into a sustainable growth mode that can cater to people from all social strata including lower and middle income groups.



Dr. Pranab J Patar is a seasoned environmentalist and sustainability advocate, with an experience of over 2 decades in water resources, biodiversity, climate action, alternative livelihood and sustainable tourism issues in the non-profit sector. An ex-TERI employee, Dr. Pranab, has worked with multiple national and international bodies, including the Centre for Environment Education, WTI and Earthwatch Institute. He took over as the CEO of Global Foundation for Advancement of Environment and Human Wellness. He has been conferred the Green Future Leadership Award and Water Leadership Award for delivering innovative solutions to key socio-environmental challenges.

Q1. As an environment and sustainability advocate, what steps, in your opinion, can India take, in order for its lower and Middle income groups living in two and three tier cities to have a sustainable approach?

A large country with an even larger, diverse, complex population - India's road to sustainability is going to be a herculean task. Though many a times, we tend to push for radical approaches, we need more rational thinking than radical ones at this juncture. Nations with greater resources and stronger economies, things may be relatively different; in fact, those with limited challenges may also consider bringing about a drastic change over-night to suit the varying environmental considerations but not India. Abrupt change is not for us, whether we like it or not, at least for some time, India may have to stick to a safer, conventional route of - going slow and steady to win the race.

While on one hand, the deteriorating environmental conditions pose a serious challenge for the humanity ,on the other hand, our desperate attempt to salvage the situation, is unveiling a tremendous economic growth potential. As the world explores new alternatives in every other domain- be it energy or agriculture, water or industrial development - the demand for innovation is multiplying, opening up new business and job opportunities. There is a growing rush to adopt new technologies and an adaptive lifestyle to overcome environmental variations particularly climate change. Given the veracity of these changes we need multipronged approaches that will enable a quicker shift towards a green economy and a net-zero regime.

India's Smart City programme, though centred on making our cities smart, it obviously can and

should do more by going beyond the project areas and create a sustainable ecosystem around the concerned cities. We need both smart and sustainable habitats (rural and urban), keeping in view the population growth in the cities and their escalating needs. Though the priority at this stage may be urban-focused, our villages too, aspire to become developed if not completely developed, at least equipped with the basic amenities, accessible healthcare and quality education. For long, our villages have been deprived of growth and now it's time for them to break the shackles and become a part of India's growth story. The smart city initiative has huge scope for supporting the adjoining areas around the project cities. Incorporation of the 'Green Infrastructure' concept appears to be a viable way of making the project areas more sustainable, both environmentally and economically thereby creating better living conditions and livelihood opportunities. Rather than developing new provisions, many existing schemes such as Skill India, Jal Jeevan Mission, Swachh Bharat Mission 2.0 to name a few. collectively can do a lot if executed in a coordinated way for the wellbeing

Q2. What do you think could be the way forward for India, in light of the **IPCC report released in August 2021,** and the recently concluded COP26?

of our society and the environment.

While there has been a lot of buzz around maintaining the global temperature rise below 1.5°C, since the year 2015 following the Paris Agreement, our unsustainable practices coupled with aspirations so far hasn't helped us regulate or control this rise.

In fact, the latest IPCC report is indicative of the fact that the way things are, we are likely to go beyond 1.5°C in next 2 decades if the current trend persists unhinged. We aspire more than nature can withstand, our ambitions for growth in most cases are not sustainable and what we want is

not proportionate to what we can have. Increasing carbon emissions is far from sustainable and the atmospheric carbon dioxide (CO2) concentration has already touched the threshold and is likely to overshoot the threshold point in the current year.

It is a critical time for humanity, we are experiencing the worst ever environmental condition in the history. Experts indicate that reversing the current trend or slowing down the process of CO2 emission will be challenging and can be achieved if critical steps are taken globally to cut down emissions. For the time being, given our domestic needs, we may decide to stick to coal for our thermal power production that contributes to a fairly large percentage of carbon emission, but not until the situation compels us to shift to sustainable alternatives to replace coal-like ingredients once and for all. The writing on the wall is clear and loud - the humanity has no choice but to quickly and completely shift to zero-carbon energy alternatives.

today against changing anything tomorrow. Ecologically aligned.

While, India along with China, negotiated successfully to adopt a 'phase down' approach instead of 'phase out' at CoP26, the day is not very far, when we will have to increase our renewable energy capacity to the fullest to get complete freedom from fossil fuels to achieve net-zero in next 50 years. If we look at the latest IPCC report, this is our last chance to fix the chaos; despite multiple warnings, polluting sectors haven't changed their ways; the businesses too are taking longer than expected to go green and shifting away from fossil fuels. The discussions during the recent COP session, revealed that if we don't act climate, it might be too late to do

diverse countries like India are expected to take a lead in adopting better policy approaches for carbon reduction. The onus is on countries with bigger carbon footprint to take the lead wherein needs and wants are

Besides renewables, India can take leverage from its nature-based solution potential, which can help develop climate resilience rather at a faster pace on the ground and offer alternative livelihoods to vulnerable communities across geographies. On this note, India has already set forth a major land restoration initiative targeted at restoring 26 million hectares of degraded land by 2030 following our commitment at the UNCCD (United Nations Convention to Combat Desertification) CoP 14 held in India during 2019.



WALKING THE TALK: Revised targets and Plan of Action

THE Conference of Parties 26 (COP 26) concluded at Glasgow, UK, on November 12, 2021. The conference was keenly looked forward to, by many leaders, scientists, and activists, with each group of stakeholders having high expectations from it. The Intergovernmental Panel On Climate Change (IPCC) also, released its AR6 Working Group 1 report, in August 2021, and it has been termed as the "starkest warning yet", of irreversible climate changes. Keeping these in view, countries across the world are set to take concrete steps, with climate change posing an imminent threat to our planet.

Honorable Prime Minister Shri Narendra Modi also announced India's new climate action targets, through a fivepoint plan which he has called the amrit tatva, or the Panchamrit, in his National Statement at COP26. These indicate India's firm stance with regard to climate change and mitigation.

The Panchamrit- Five Nectar Elements

These five commitments represent India's revised targets, which include:

- Installing non-fossil fuel electricity capacity of 500 GW by 2030
- Sourcing 50% of energy requirements from renewables by 2030
- Reducing 1 billion tonnes of projected emissions from now till 2030
- Achieving carbon intensity reduction of
- 45% over 2005 levels by 2030
- Achieving net zero by 2070

These announcements go significantly beyond its current NDCs under the Paris Agreement. The move is laudable, but it brings with it great challenges and responsibilities.

 Installation of 500GW of non fossil fuel electricity capacity by 2030: India has committed to installing 500 GW of non fossil fuel energy capacity, higher than its current aim of 450 GW. This will help us in achieving the goal of making 60% of our power capacity, fossil fuel free, which is way beyond the initial target of 40% that India had committed to, under the Paris Agreement. Thus, this new goal, formalizes to reduce our dependence on fossil based energy sources in the coming years.

 Sourcing 50% of energy requirements from renewables by 2030: As of 2021, only 12% of our energy requirements are being met through renewable sources. Meeting half of the country's energy requirements through renewable sources requires our installed capacity to increase from the planned 450GW to 700GW, as was stated in an analysis by the Centre for Science and Environment (CSE).

 Reducing 1 billion tonnes of projected emissions from now till 2030: Our current CO2 emissions are 2.88 gigatonnes (Gt.). As per the projections made by the CSE, the emissions are likely to reach 4.48Gt by 2030, in a usual business scenario. To meet its new target, India will have to cut its emissions by 1 billion tones (1 Gt), thus our emissions would then be at 3.48 Gt in 2030. This implies that our goal should be to cut emissions by 22%.

 Achieving carbon intensity reduction of 45% over 2005 levels by 2030: The carbon intensity of an economy is the amount of carbon, by weight that is emitted per unit of economic activity. The measure of economic activity commonly taken is the Gross Domestic Product (GDP). In its initial Nationally Determined Contributions (NDCs), submitted in 2015, India had committed to reducing its emissions intensity per unit of GDP, by 33-35% by 2020. This target has been enhanced by PM Modi, and the goal is now to reduce this intensity by 45%, by the year 2030.

 Achieving net zero by 2070: Netzero refers to a state where the greenhouse gases released into the atmosphere, are balanced by removing exactly the same amount from the atmosphere. The IPCC warned in its recent report that global emissions must be halved by 2030 and should reach net-zero by mid-century. However, given the enormous amount of inequality in emissions by the countries, the major responsibility lies with the developed countries to reach this target, around 2030. India has



pledged to achieve its net-zero target by 2070. Being the third-largest emitter of greenhouse gases (GHGs), after China and USA, India had been under immense pressure to declare a net-zero target . This is, therefore, a significant step, for a country that meets more than 50% of its energy requirements through coal.

Challenges, Opportunities and the way forward

Meeting the above mentioned targets is going to be a big task, and tangible steps will have to be taken in this direction. The transfer of workers from the nonrenewable to the renewable sector will have to be taken care of too, thereby providing them with a genuine source of livelihood. Policies and action plans will have to be devised and implemented, so as to ease India's transition from a grey to a green economy. Balancing the net zero targets is going to be a tough task, as India is still in a developing stage. This means that the emissions can be expected to peak by 2030, thereafter backed by a huge push to renewables. Meeting the net zero targets is going to be a key strategy towards limiting the global rise in temperature to 1.5 degrees Celsius. Though the net zero target has still a longer timeline, the other four targets are to be achieved in a much shorter time frame. Hence experts have suggested that we need to come up with short term plans to achieve these.

The One Sun One World One Grid Declaration (OSOWOG) was released jointly, by Prime Minister Narendra Modi and UK PM Boris Johnson at COP26. Its objective is to develop a grid that will aid in transmitting clean energy, anywhere across the world, at any time of the day. We also need to adopt an eco system based approach, focusing on greening both supply and demand. There is also a need to work on





climate adaptation, making societies more resilient to climate shocks, and creating more carbon 'sinks'- areas that can store carbon- forests, wetlands, etc. Creation of carbon sinks is an important step towards the ultimate goal of reducing emissions.

The targets are bold and ambitious, but they also indicate India's seriousness to tackle the issue of climate change. Apart from announcing the country's new targets, PM Modi also held the developed nations accountable as they have failed to deliver on their promises to provide climate finance and are the historical emitters. He urged the developed nations to come forward and provide adequate amount of funds and technology to their developing counterparts, to meet their climate action plans. Climate finance is going to be of great importance to deal with the issue of climate crisis, and hence we cannot solely focus on mitigation.

While addressing the world leaders at COP26, PM Modi also highlighted the fact that it is majorly due to our lifestyle changes that the environment is in a miserable state. Thus he proposed a One-Word Movement for all, i.e., LIFE- Lifestyle for Environment and encouraged all to come together and take it forward as a campaign. Through the LIFE campaign, he has urged people to make conscious choices each day, and thus take mindful steps in the direction of environment conservation, which will enable us to leave a sustainable planet for our future generations.

An efficient and well functioning private sector will also be crucial in meeting our goals of sustainability and a green economy. The private sector of the country needs to work in collaboration with the Government, to design and implement clean energy systems, cutting down emissions, mobilizing funds for climate action and ensuring equitable growth for all

The Rapid Scale up to Net Zero A book excerpt

Namrata Rana is Director, Strategy and Brand at Futurescape. An alumni of IIM Ahmedabad and University of Cambridge (CISL), she has been working with governments, companies, and NGOs on net zero transition and green jobs.

Utkarsh Majmudar is a member of the Board of Governors, IIM Raipur. He teaches at leading business schools in India, has worked with several large corporations in India and writes extensively on sustainability issues.

Their new book SHIFT focuses on the transition that companies need to make towards a net zero economy, role of financial markets and clean energy technologies. An excerpt from the same:-

Scientists have been crying hoarse about climate change for the last two decades. Why are countries and companies suddenly accelerating the sustainability and climate change action now? There are three main reasons for this. First, new technologies exist that can make the shift to low carbon possible and economically feasible. Second, the risks of climate change are already causing damage and the financial system is taking heed, and third, governments are pushing the net zero agenda after realizing that this move can generate jobs.

The transition to net zero carbon dioxide (CO2) emissions requires significant investment in clean energy technologies. A wide range of fuels and technologies need to be deployed, tailored to

individual parts of the energy sector and to countryspecific circumstances. Some technologies exist and are in advanced stages of scale up. Wind and solar are scaling up very quickly. People are installing solar panels on rooftops, thereby reducing the need for accessing coal-based power from the grid. Improvements in storage technologies and lowering prices of solar panels will induce more people towards rooftop power generation. People are also gradually moving towards electric vehicles. At the same time, efforts are underway to enhance energy efficiency. We are living in a world that wastes a huge amount of resources in terms of loss of energy and by discarding goods that have been produced. It is estimated that between 20 to 30 per cent of the energy we generate is wasted due to transmission and distribution losses. The technical losses are due to energy dissipated in the conductors, transformers and other equipment used for transmission and distribution of power. This needs to be prevented. Further, buildings and industries around the world are using older technologies and end up wasting another 30 to 50 per cent of the energy they receive. Hence there is a massive gap that, if addressed, can make energy usage more efficient. The International Energy Agency (IEA) shows a potential of up to 40 per cent reduction of resources if we re-examine the ways we produce and consume electricity. Installing more efficient technology in buildings, energy efficient lighting, green roofs and smart sensors will create an all-electric, fully connected, flexible and adaptive infrastructure for tomorrow. Our cities and infrastructure will evolve to become

waste-free, energy-efficient and circular, connected by collaborative platforms. Increasing digitization of the energy grid and improvements in the way we design buildings, industries and cities will accelerate this need to create an efficient energy value chain. At the same time, the coming years will see more breakthroughs in battery, materials, biochemistry and digital innovation all of which have the potential to cope with the inherent issues related to a fast transition. In India, Schneider Electric's project with the HCL Foundation is one of the largest groups of rural micro-grids in Asia-Pacific, which supplies electricity to more than 6,000 households, in homes and for street lighting, micro- enterprises, schools covering more than 10,000 students, and several clinics. The micro-grids are connected to the Schneider Electric EcoStruxure for Energy Access platform, a remote, cloud-based, real-time monitoring and control solution, used to manage the load and the income generated by micro-enterprises. However, this kind of organic growth of renewable energy and increased efficiency is not enough to remove CO2 from the atmosphere. We need acceleration at scale to meet the CO2 targets and the sooner the better. Transformative changes are needed to enable this

Decisions for a Net Zero World

NAMRATA RANA TKARSH MAJMUDAR



through science, real world tools and scale. We need to find solutions for the 47 per cent high- intensity areas that contribute the remaining hard-to-abate emissions-heavy trucking, iron and steel, cement, shipping, and aviation. For these, hydrogen is being explored as a viable option. The next few years will see an interesting energy paradigm with new tech jostling for space and existing paradigms being upended. A new coalition called the Mission Possible Partnership, with backing from Jeff **Bezos's Earth Fund and the Bill Gates** founded Breakthrough Energy, is looking to find new energy solutions for the hard to abate emissions. A fund has been setup to support cutting-edge research and invest in new tech, but that's not all. The most important part of this coalition is their readiness to play the long game. The investment horizon is 20 years, unlike that of most funds who have a 5-7 year window. Carbon removal, that involves sucking emissions from the atmosphere, will be essential to tackle the growing climate crisis. Carbon capture methods exist, but most haven't scaled up or are in their infancy. There are only about twenty such projects operating commercially, in the US, Canada, Norway and China. But, efforts are underway to change that. A \$100 million competition hopes to spur the development of carbon capture technologies at scale. Adopting net zero emissions targets is not that simple. Zero carbon manufacturing and transportation technologies do not exist. Hence companies have to offset the carbon emissions-in effect, by buying the reductions from a third party. After announcing ambitious net zero targets, Microsoft announced the purchase of offsets from fifteen vendors around the world.

Sustainability is more than reducing carbon emissions and sounding purposeful; it is a systemic change in the ways of doing business. Simple statements about how bad things are, or what should change are past their sell-by date. We are in a climate emergency and it is a time to act, not a time to mouth platitudes. But more than a focus on any of this, we need structural changes so that these shifts towards clean energy and sustainability are scaled up.

DISASTERS IN THE PAST



MAY 2020

MAY 2021



Hit the Sundarbans, the world's largest mangrove forest straddling India and Bangladesh, in May 2020, displacing 2.4 million people in India and 2.5 million people in Bangladesh.



FEBRUARY 2021

CHAMOLI DISASTER

The 2021 Uttarakhand flood began on 7th February 2021 in the environs of the Nanda Devi National Park. The disaster left over 200 killed or missing. Most were workers at the Tapovan dam site.



ASSAM EARTHQUAKE

An earthquake of 6.4 magnitude on the Richter Scale jolted Guwahati and other parts of Assam on 28 April 2021, at 7:51 am. The earth cracked near the epicentre in the Sonitpur district, and so did walls and ceilings of people's houses, a hill broke down, and water seeped out of paddy fields.

APRIL 2021



CYCLONE TAUKTAE 💝



Extremely severe cyclonic storm Tauktae was a powerful, deadly and damaging tropical cyclone in the Arabian Sea that became the strongest tropical cyclone to make landfall in the Indian state of Gujarat on May 17, 2021. In total, 169 people had died in India as a result of Cyclone Tauktae, with at least 80 others injured with 56,846 house property damaged.



OCTOBER 2021

CYCLONE YAAS

This was a relatively strong and very damaging tropical cyclone that made landfall in Odisha and brought significant devastation to West Bengal in May 23, 2021, with a loss of approximately \$2.76

billion.





MAY 2021

JULY 2021

NOVEMBER 2021

worst affected places.



A series of floods took place across the Indian state of Maharashtra on 22 July 2021. Around 251 people have died and over 100 are still missing due to floods and landslides. Due to heavy rains, more than 1,020 villages are affected in the districts of Maharashtra and over 375,000 people have been evacuated

SEPTEMBER 2021

CYCLONE GULAAB

On September 24, 2021, Gulab made landfall in India's Andhra Pradesh, but weakened over land. The storm brought heavy rains and strong winds throughout India and the Middle East, killing at least 39 people.



Between October 12 and 20, 2021, after heavy rains caused rivers to overflow, cutting off towns and villages, 42 people died and 217 houses were destroyed. Kottayam and Idukki were two of the

TAMIL NADU FLOODS



On November 1, 2021 heavy rainfall and flooding in many parts of Tamil Nadu resulted in killing at least 41 people. Over 11,000 were displaced due to the incessant rainfall.

MOEFCC: SCHEMES AND OBJECTIVES





• National Solar Mission (MNRE): National Improved **Energy Efficiency Project (under the Ministry of** Power) Global Sustainable Environment Plan (under the Ministry of Housing and Urban Affairs) Global Water Project (MWR)

National Mission Sustaining the Himalayan Ecosystem (MoS&T) National Mission for Green India (MoEFCC) National Mission for Sustainable Agriculture (Ministry of Agriculture) National

Commission on Strategic Awareness for Climate Change (MoS&T): It is a framework policy issued by the Council of Prime Minister on Climate Change. The Indian government is also putting in place a special National Adaption Fund (NAF) to carry out adaptation measures in susceptible industries.

Enhancement of forest cover quality and ecosystem services in forests and non-forests, including moderately dense, open forests, degraded grassland, and wetlands (5 m ha).

Improvement of scrub, shifting cultivation areas, co deserts, mangroves, ravines, and abandoned mining locations through eco-restoration/afforestation (1.8 m

Increased forest and tree cover in urban/peri-urban areas (0.20 m ha)

Increased forest and tree cover on marginal agricultural lands/fallows and other non-forest lands

through agro forestry/social forestry (3 m ha)

Community institutions to manage public forest/nonforest areas (as part of the Mission).

 Adoption of improved fuelwood use efficiency and alternative energy devices by households in the project area.

Diversification of forest-based livelihoods for approximately 3 million people who live in and around forests.

The project will last six years and will focus on various landscapes such as Changthang (Jammu and Kashmir), Lahaul-Pangi and Kinnaur (Himachal Pradesh), Gangotri-Govind and Darma-Byans Valley in Pithoragarh (Uttarakhand), and Kanchenjunga-Upper **Teesta Valley in Kanchenjunga National Park**

• The project involves the protection of snow leopards and other endangered species, as well as their habitats and livelihoods.

Swachh - Nirmal Tat Abhiyaan Among the Farmers Through **Climate Resilience Building Crop Residue Management** Development Programme **Green Skill Wildlife Habitats Development of** ntegrated

To keep beaches secure and raise awareness about the importance of coastal habitats in coastlines along ten states / UTS

To reduce the effects of climate change and improve adaptation potential, as well as to offset the negative environmental impacts caused by stubble burning

Educating young Indians, particularly dropouts, and raising the pool of qualified workers

Provides financial and technical assistance to the state/territorial governments for wildlife conservation activities

- Following consultation with state governments, the campaign will be held on the beaches.
- Under the Ministry of Environment, the Environment **Education Division and the Society for Integrated Coastal Management (SICOM) will be in charge of its** implementation.
- The top three beaches will each receive a certificate of appreciation.

- The project will be introduced in stages.
- Activities will be carried out to raise awareness and build capacity in order to enable farmers to follow sustainable practices, which will also help diversify livelihood options and increase productivity.

- The Environmental and Forest Skills Development Initiative is intended to provide opportunities for employment and/or self-employment for India's youth.
- The National Skills Qualifications Framework (NSQF) must be met by both courses.
- The vast network and resources of the ENVIS Hubs / **Resource Partners (RPS) will be used.**
- Protection of Protected Areas (National Parks, Wildlife Sanctuaries. Nature Reserves. and **Community Reserves)**
- The scheme includes wildlife preservation outside of protected areas as well as rehabilitation projects for critically endangered species and habitats.





WG 2 contribution to the AR6 is set to be released in February 2022, titled "AR6 Climate Change 2022: Impacts, Adaptation and Vulnerability". It assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change and options for adapting to it.

WG 3 contribution, titled, "AR6 Climate Change 2022: Mitigation of Climate Change", will be released in March 2022. It addresses all aspects of mitigation including technical feasibility, cost and the enabling environments that would allow measures to be taken up. Enabling environments cover policy instruments, governance options and social acceptability.



Since the IPCC was created in 1988, 5 synthesis reports have been released so far. The AR6 Synthesis Report will synthesize and integrate materials, contained within the Assessment Reports and Special Reports that have been published during the cycle of preparation of the AR6. It will be finalized and released in September 2022.

In 2018, the IPCC's Special Report Global Warming of 1.5°C had estimated that two-fifths of the global population lived in regions with warming above 1.5°C.

KNOWLEDGE UPGRADE



The Sixth Assessment Report AR6 of the IPCC consists of contributions of each of the three IPCC working groups (WGs), of which WG1 contribution was released in August 2021. It was finalized on 6 August 2021 during the 14th Session of Working Group I and 54th Session of the IPCC. UN Chief, Antonio Guterres, termed this recent report, a 'code red' for humanity. In May 2017, a meeting took place in Addis Ababa, Ethiopia, where the draft outline of the Sixth Assessment Report was prepared and approved.

- Climate modeling is based on five shared socioeconomic pathway (SSP) scenarios which describe five alternative trajectories for future greenhouse gas emissions. Two of these scenarios - SSP1-1.9 and SSP1-2.6 - anticipate rapid decarbonization, leading to net removals of greenhouse gases from the atmosphere during the second half of the 21st Century.
- These contrast with SSP3-7.0 and SSP5-8.5 which anticipate continued growth in emissions, at least until the latter part of this century.
- India is the second highest contributor to global greening - i.e. the world's global green cover. However, most of this green cover is restricted to farmlands and not forests, as is required to contain carbon emissions.



IPCC AR6 Climate Change 2021: The Physical Science Basis

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