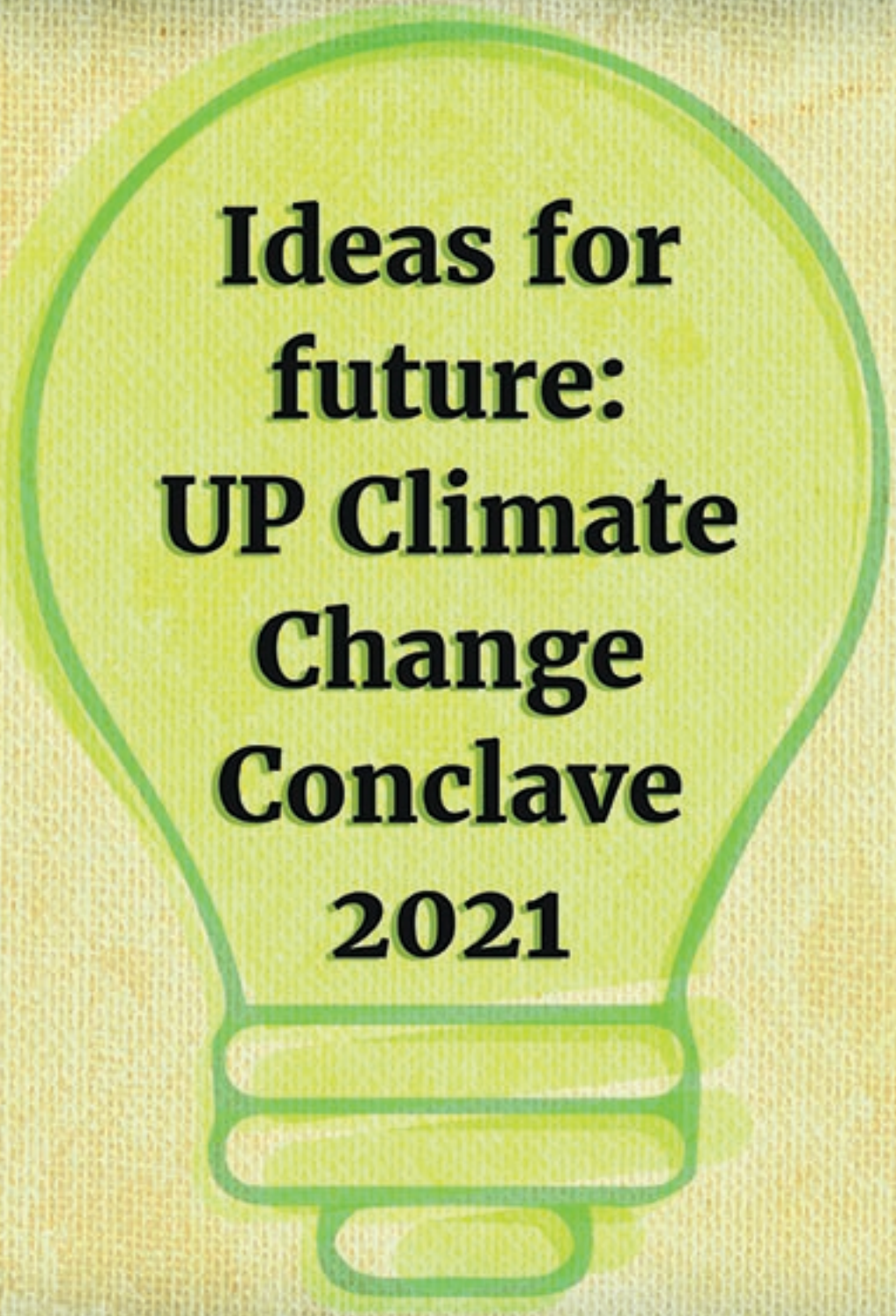
Ideas for future: UP Climate Change Conclave 2021



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Foreword

The latest assessment by Intergovernmental Panel on Climate Change (IPCC) has noted that global net-zero by 2050 was the minimum required to keep the temperature rise to 1.5°C. The report also sets the stage for the United Nations Conference on Climate Change (CoP 26) at Glasgow in November 2021. We are all aware of the Paris Agreement, introduced in 2015 that reflects resolve of countries world over to strengthen the global response to climate change by promoting sustainable development that supports achievement of sustainable development goals and at the same time promote low carbon development. Sub-national actions are going to play an important role towards that resolve.

Formulation of State action plans on climate change has been an important milestone in developing domestic policies around sub-national action on climate change and the now revision of these plans provide an opportunity for integration into sectoral development plans. As part of its commitment, Government of Uttar Pradesh is remodeling its development planning process with the objective promoting climate resilience, clean environment, and low carbon economy and SAPCC is going to be key driver of that. Partnerships and multistakeholder engagement are an essential element of climate action and implementation of the 2030 Agenda on Sustainable Development. An increased engagement across Government agencies, private sector, financial institutions, and civil society will ensure an effective implementation of climate policies.

Ahead of 26th Conference of Parties to UNFCC (CoP26 at Glasgow in November 2021, the Department of Environment, Forest and Climate Change, Government of Uttar Pradesh in technical collaboration with the German Agency for Development Cooperation (GIZ) organised a two-day 'UP Climate Change Conclave 2021' at Lucknow on October 28-29, 2021. The event focused on urgency of sub national action and its alignment with India's Nationally Determined Contribution and 2030 Agenda of Sustainable Development.

With the motto of प्रकृति रक्षति रक्षितः and the theme "Working towards 1.5°C, the Government of Uttar Pradesh has initiated a multi-stakeholder platform aimed at responding to the urgency of climate crisis with participatory and collective action. The UP Climate Change Conclave 2021, Lucknow marked launch this platform as an annual flagship event by Department of Environment, Forest & Climate Change, Uttar Pradesh Government to promote multi stakeholder engagement on climate action. Hence forth the Conclave will act as a forum for knowledge network stakeholders, to share knowledge and best practices, and to work together to address common and emerging challenges. It will also connect government officials, private sector professionals, and development practitioners for climate action.

While the UP Climate Change Conclave will work as a platform to facilitate dialogues towards action-oriented solutions from a diverse range of stakeholders, the Conclave also resulted in a comprehensive Charter of Climate Action in the state of Uttar Pradesh. The Charter will allow to prioritize areas of action.

— Mr Manoj Singh, IAS, Additional Chief Secretary,
Dept of Environment, Forest & Climate Change, Govt of Uttar Pradesh

Preface

The UP Climate Change Conclave 2021 was inaugurated by Honorable Chief Minister of Uttar Pradesh Yogi Adityanath, the Conclave provided a multi-stakeholder platform for meaningful dialogue towards action-oriented solutions on climate change and clean environment. These included government officials, academicians, practitioners, researchers, scientists, policymakers, jurists, legal experts, bilateral/ multilateral agencies from India and abroad.

Accordingly, the Conclave included technical sessions based on State level priorities. The session on "Climate Science – Decoding 1.5°C and Climate Vulnerability in Uttar Pradesh" deliberated on impacts of climate change under a 1.5°C scenario. The national and sub-national climate action plans and policies have clear strategies and sectoral goals for enhancing the resilience and transitioning to a low carbon economy. The session on "Climate Change – Policies and Governance for adaptation, mitigation and Green Energy" focused on discussing concrete examples of such initiatives and deliberate upon strategies for a low carbon development and growth in Uttar Pradesh.

Building resilient communities needs integrating climate and disaster risks into development planning and budgeting. As Gram Panchayats are the first level of decentralized governance system, the session on "Integration of CCA and DRR in Developmental Schemes/planning" focused on Gram Panchayat Development Planning process an opportunity for strengthening community resilience. Such engagement also provides opportunity for "Nature Based solution to Climate Change & Natural Disasters", a dedicated technical session.

The concept of circular economy is fast becoming a new model for low carbon growth in developing countries. The session on "Circular Economy, Resource Efficiency and Cleaner Production for Climate Mitigation" focus on how to make climate mitigation agenda a reality in Uttar Pradesh through circular economy approaches, resource efficiency and cleaner production mechanisms.

Any response to addressing climate change requires strong knowledge base. The session on "Research, Knowledge & Information needs for addressing Climate Change and Air Pollution" focused on downscaling assessment to village level and finding synergies between action on clean environment and climate and sustainable development goals. Similarly, the session on "Establishing coherence between Air Pollution and Climate Change: Challenges, Opportunities and Future Prospects" focused on deconstructing the intricate relationship between air pollution and climate change.

Addressing climate change requires collective action and engagement of all the stakeholders including public. The session on "Sustainable lifestyle and Carbon footprint" called upon people, government, and businesses to support positive behavior change, and develop new business models to make sustainable living a default option. Similarly, the session "Role of Media in Climate Advocacy & Awareness" highlighted need for effective climate change communication in mainstream media, digital platforms, and social media. An important aspect of response to climate change is legal framework. The session on "Role of Environmental Legal Framework in Climate Action" emphasized how existing environment related legal framework can come handy to support climate action in addition to separate legal framework on climate change.

Several studies have suggested need for substantial additional financial resources for climate action. The session on "Financing Climate Action: Opportunities and Challenges for Public and Private Sector" explored possibilities of financial and technical cooperation and opportunities in mobilizing resources by unlocking private and public capital to fund climate action.

— Mr Ashish Tiwari, Secretary, IFS,
Dept of Environment, Forest & Climate Change, Govt of Uttar Pradesh

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PROLOGUE

Nature Protects if She is Protected

YOGI ADITYANATH, CHIEF MINISTER, UTTAR PRADESH

The United Nations has recently warned the world that the pace of global warming is devastating and if it goes unchecked, the entire human civilization will have to pay the price.

Globally, India may be the 4th largest emitter of Carbon after China, USA and EU, but our per capita emission is much lower than a lot of countries, which need to act almost immediately to prevent a climate catastrophe.

But this does not mean India can sit back and relax. In fact India has taken some very bold steps, which are globally relevant, to counter climate change, all by its own. And within India, we completely understand the role and relevance of Uttar Pradesh in this context. Being the most populous State, it has a significant responsibility. Realizing that, we have been taking relevant measures to supplement the national efforts.

Talking about rising temperatures, I have a personal experience from the Dudhwa forests, where in June last, the temperature was almost 7-8° C lower than what it was in Lucknow. Impact of forests is clear and that's why the UP government has taken up forestry as tool to mitigate climate change. Every year, between the 1st and 7th of July, we celebrate the Forest Preservation festival. In the first year, we first planted about 5.5 crore plants, mostly Eucalyptus and Poplar. But people needed indigenous varieties, so saplings like peepal, banyan, and neem, mangoes, jamun, and other medicinal trees like amla and drumsticks, in dedicated nurseries. The entire exercise aims at increasing UP's carbon sequestration capacity, provide livelihood, nutrition, and medicine. For long terms benefits and greater sustainability, we need to integrating rural economy with the climate change agenda.

We need to look at the crisis holistically. Also, we should consume only what we need and not what we want. Because when we work towards the welfare of nature, we receive much more in return.

In 2019, while we banned plastics with thickness of less than 50 microns in, we even worked on developing alternatives. Then, we established the Pottery Craft Board as potters rued scarcity of clay and inability to access technology, due to which their products were

costlier than the plastic alternatives. So, we got them solar-powered turntables and allowed them to freely collect clay from all the rural water bodies. This eventually led to creation of a competitive alternative to plastics and thermocol. And, in the process we even managed to desilt a large number of water bodies.

At times, in addition to modern solutions, we must also consider conventional wisdom. Compost is one such solution, which was quite popular in the past when every village used to have a waste pit, at a distance from population. All the waste dumped in it, would turn to fertile manure in a year's time and the entire village would get to use it. Taking a cue from this best practice of the past, we have now ensured that every gram panchayat in UP gets a similar waste pit away from the population.

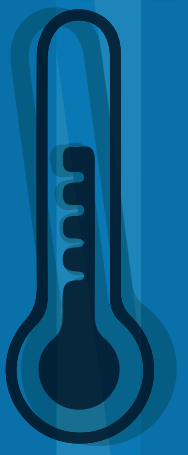
Talking about energy sector, it is worth mentioning that in 2017 UP produced 250 MW of solar energy but the same has now increased to almost 2000 MW. And by March next, it'll increase by 1000MW. Apart from renewable energy generation, we are working on energy conservation as well. One such initiative is installation of over 16 lakh LED streetlights in UP.

And amid all this, we have agencies like the judiciary and National Green Tribunal, which immediately point out if the Government efforts require course correction. For instance, crop residue burning has also been a climate concern. If we manage to create conducive conditions for more production of biofuels, crop residue can become a resource for that. Farmers need to be sensitized about such solutions.

We need to realize that as climate change is a multifaceted complex problem; its solution cannot be achieved solely by a single agency, like the environment department. It in fact needs a coordinated effort by all departments.

Likewise, we cannot only think of human beings while looking at the climate crisis. Nature has a life cycle complete with all plants and animals. We need to respect that lifecycle if we want real sustainability.

CLIMATE NOW



CLIMATE CHANGE INDIA

Decoding 1.5°c Rise for India

DR. SANDHYA RAO, INRM CONSULTANTS PVT. LTD. NEW DELHI

The Sixth Assessment Report (AR 6) by the Intergovernmental Panel on Climate Change (IPCC) squarely blames humans for increasing the intensity of global warming and subsequently driving climate change. At a global level, average surface temperature has already increased by 1.1°C from what it was in 1900. And now, everybody is talking about the 1.5° C rise because the Paris Agreement put a spotlight on it.

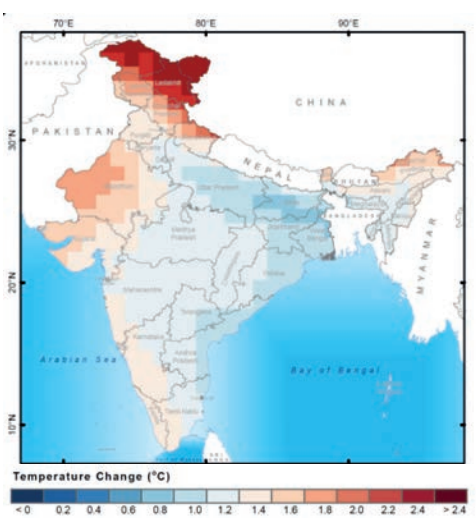
But, this rise of 1.5° C does not actually mean anything as this is just a global average increase in temperature. There are regions in India which have already experienced temperature rise beyond the 1.5° C threshold, vis-à-vis the pre-industrial era. (Refer map). The Himalayas are already warming up at an alarming rate, and that's not good as three major glacier-fed rivers originating from there, are our primary source of water. On the other hand, Rajasthan and the West coast have also experienced a temperature rise of more than 1.5° C. The Indian Meteorological Department (IMD) has also substantiated that many of these regions have already experienced a 1.5° C rise in the last 100 years. So, there is little in merit looking at only the mean temperature.

A sizeable population in India depends on agriculture and that makes it crucial for us to focus on the trends in minimum and maximum temperatures. It is interesting to note that in India, the minimum temperature, as compared to the maximum temperature, is increasing at a faster rate, which means that the minimum and maximum is attaining a kind of equilibrium. This should serve as nothing less than a warning.

At the current pace, this will result in long spells of dry days followed by sudden and intense rainfall spells. Heavy rainfall prone regions might experience an equally intense spell of dry days. There'll be relatively more days with temperatures above 40°C and heat waves will become frequent and intense.

These were just some of the implications. However, in a 1.5° C rise scenario, what you are getting to experience just once in 50 years; might happen 9 times in the next 50 years.

Projected Change in Mean Temperature for India in 2021-2046 relative to 1850-1900



UP needs targeted strategies to deal with climate impacts

DR. SUMANA BHATTACHARYA, SENIOR ADVISOR, IORA

For India to achieve its Nationally Determined Contributions, the contribution of UP is crucial and shall play a deciding role. But while doing so, it also has to take care of a large population that depends on agriculture for livelihood. This large population of marginal land holders, among other things, also suffers a lack of access to the know-how for improving farm productivity.

Further, agriculture, like forestry, is heavily dependent on the suitability of climatic conditions. Leave aside agriculture or the life in rural UP; urban lifestyle is also impacted by the climate change. Which is why it is important to understand how the climate has been in the State for the last four or five decades. On the basis of that, climate projections can be made and subsequently a kind of understanding of the future can be developed.

In UP, the average temperature, most of the time, is hovering around an average (of 66 years) of 31.5° C. While this is the maximum temperature, which is largely stable, the minimum temperature is increasing at twice its rate.

The minimum temperature rise is mostly happening in the Eastern part of the State, which is very rich in water resources.

Further, as many as 15 districts in UP have witnessed an increased intensity of heavy rainfall in the last 4 decades. But at the same time, the pattern is almost static in many others.

Likewise, there are 10 districts which receive the most heat. Then, an assessment of trends in floods and droughts reveals that many of the districts in central and west UP are drought prone, and they continue to be so. Similarly, the cases of hailstorms and lightning strikes are also on the surge due to the changing climate.

To conclude, in order to design our adaptation strategies, it is important to consider such changes that are happening and are likely to happen in the future. Therefore, the need of the hour is to have targeted strategies to deal with climate change impacts.

It is important for us to understand how the climate has been in the State for the last four or five decades so that we can make climate projections and understand the direction we are heading towards.

"It is very important for every one of us to understand, why are we talking about 1.5 Degree C and Climate Vulnerability in Uttar Pradesh. The population of UP is high, the regions, areas, and districts are vulnerable to climate change facing extreme events. It's important to know how climate change will affect UP and the need to have greater collaboration and coordination among stakeholders."

— Dr. Akhilesh Gupta , Senior Advisor and Scientist-H, Department of Science and Technology, GoI

"For Indian scenario IMD carried out various studies at state level on global climate change trends using data from 1951-2010 and few states like UP, showed decreasing rainfall trends which falls in Indo-Gangetic Plains."

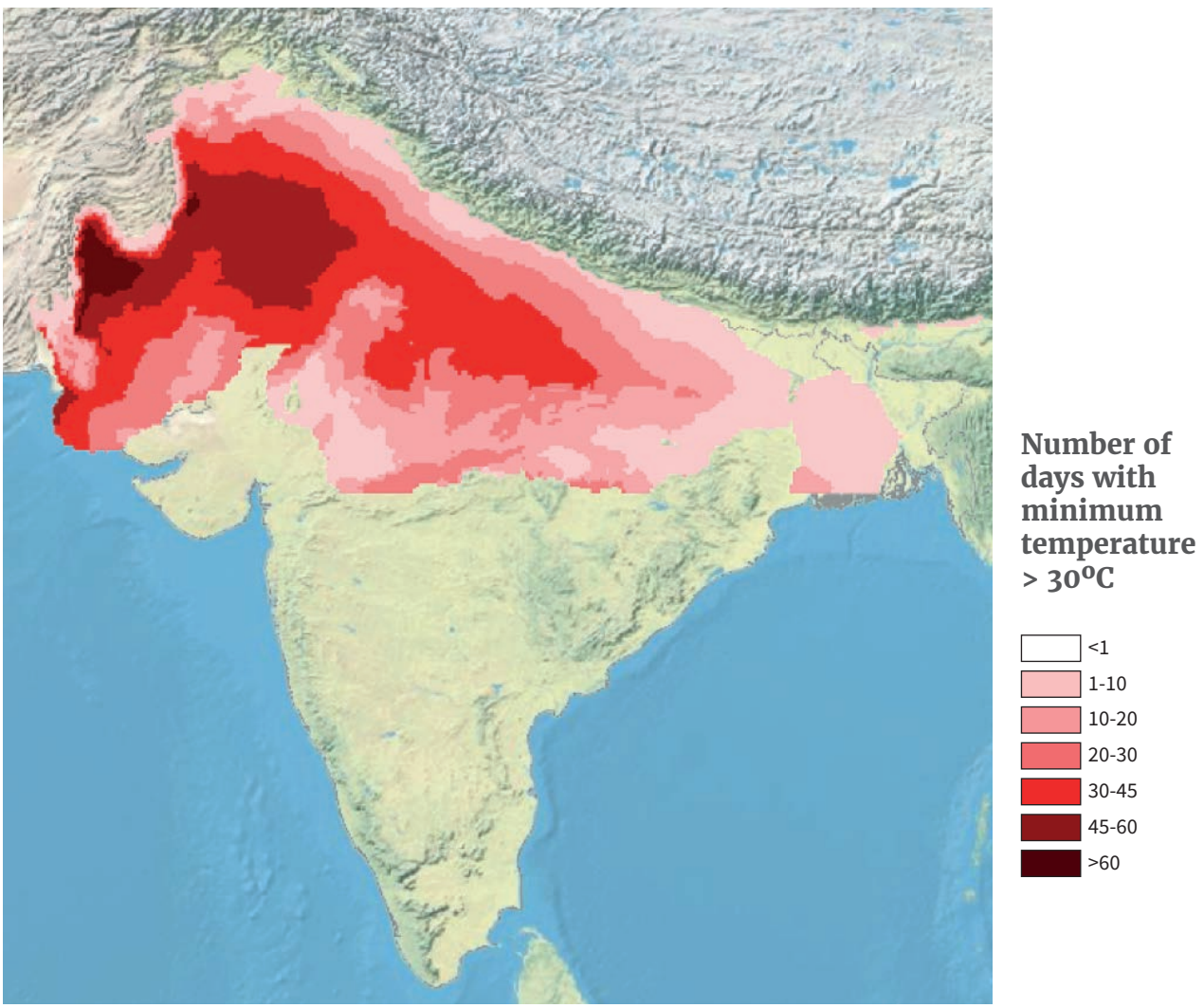
— Dr. S D Attri, DGM, IMD

Clear implications of Climate Change for UP

DR. ANJAL PRAKASH, RESEARCH DIR & ADJ ASS PROF, INDIAN SCHOOL OF BUSINESS

Some very recent studies, published between 2018 and 2021, establish how climate change brings serious implications for the State of UP. In fact all the climate change reports produced by the IPCC give a similar message but it would be prudent to focus on three key aspects: melting glaciers, rising sea levels and increasing CO2 concentration.

The Hindu Kush Himalayas, also known as the water towers of Asia, are the source of 10 major rivers, including the Ganges, which serve a population of 3.1 billion people in the South Asia region. However, a comparative look at images from 1921 and 2009 reveal that glaciers



A comparative look at images from 1921 and 2009 reveal that glaciers are shrinking and by the end of this century, two-thirds of them will disappear leaving the snow-clad Himalayas almost barren.

in this region are shrinking. It is being believed that by the end of this century, two-thirds of the glaciers will disappear and the snow-clad Himalayas will be almost barren.

So, what does this mean for UP, which is one of the major basins for the Ganges?

Firstly, the frequency and severity of floods will increase. In fact the first take home message from the AR6 report is that more and more floods are expected in Uttar Pradesh.

Secondly, temperatures are going to soar. If nothing much is done, the earth is going to warm up to 1.5°C by 2050, making the next two decades crucial. The heat map of India grimly showcases how intense heat waves will be affecting UP.

Thirdly, all of this is going to impact the livelihood of the poor. For many in UP, which is home to 230 million people, of which a majority is poor, it will be a question of life and death. Fourthly, the adaptation process has to be equity and gender sensitive. In fact this is where we need to address the social inequities or else we miss the bus.

And lastly, as satellite imagery, that forms the 'Earth observation data', suggests that the urbanization rate in UP is 66%, which is almost thrice the estimate of Census data; urban and peri-urban areas in UP must be a priority of a resilience planning exercise. ■

AIR POLLUTION

Combat air pollution to mitigate climate change

MR. ASHISH TIWARI, SECRETARY, DEPARTMENT OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, GOVERNMENT OF UTTAR PRADESH

Consider these following facts:

- 80% percent of urban population are exposed to air quality worse than the standard set by the WHO
- By 2030, 50% of the global population will be urban, which means 40% of the global population will be breathing bad air.
- Air pollution has been ranked as one of the top 5 global risk factors for mortality by Health Effects Institute.
- Particulate matter caused 1.1 million premature deaths in India in 2017, of which 56% was due to outdoor air pollution and the rest caused by indoor air pollution.

SDGs 3.9 and 11.6 directly raise air pollution as an important sustainability concern. Sustainability specialists see a clear improvement in air quality from increasing energy efficiency. In a way, combating air pollution has a major co-benefit for mitigation of climate change. But there is an urgent need to review policies, fill the knowledge gap, mobilise resources and strengthen governance issues to combat air pollution, specially in industrial development and urbanisation.

There is an urgent need to review policies, fill the knowledge gap, mobilise resources and strengthen governance issues to combat air pollution, specially in industrial development and urbanisation

As urbanisation is growing, it has become very important to focus on proper zonal planning to reduce mobility demand. On the other hand, short term solutions for mobility by improving road infrastructure and shifting the congestion should be replaced by long term solutions of public transport and promotion of non-motorised transport systems. Cities should retrofit road infrastructure to accommodate bicycle and pedestrian tracks.

But for Uttar Pradesh, located in the Indo-Gangetic Plain (IGP), air pollution is not just an urban problem. The Indo-Gangetic Plain is a hotspot for anthropogenic aerosol production in South Asia. The specific geographic location of IGP also contributes to the intensity of PM2.5 concentration. The source specific inventory points out other neighbouring states and regions contributing to the pollution load of UP. Given all of these issues, UP has been pioneering an airshed approach to combat air pollution.

Air pollution is a complex issue. There is an urgent need to deploy a coordinated effort with synergy between all sections of the society and the government to formulate policy and ensure strict implementation of those policies.

PUBLIC HEALTH & ECONOMY

Air pollution takes a toll on health and economy

MR. VAIBHAV CHOWDHARY, CLEAN AIR FUND

Air quality, climate, and health; together form a trio that has a direct impact on the economy. An intervention in any of the three elements results in impacting the other two and the overall trio.

A closer look at a few numbers in this context reveal that, globally, over 4 million people die an untimely death due to air pollution and of these; almost 40% are from India. And within that 40%, almost 90% are those from the lower echelons of the society. This in itself is a big issue, which needs to be addressed.

There is ample evidence to support this fact that India is indeed suffering from air pollution. In fact there have been researches done in India and abroad that go on to substantiate the fact that air quality in India is adversely impacting human health in India. The Lung Care Foundation studied the impact of air pollution on children and found that around 30% of the children attending school were suffering from asthma.

In April last, the Confederation of Indian Industries (CII) released a report, which established the fact that air pollution adversely impacts the economy. The report, led by Dalberg Advisors in partnership with CII and Clean Air Fund, estimates that toxic air set Indian businesses back by USD 95 billion per year (or 3% of the country's GDP) in 2019.

Now, that the problem is pretty clear, it is about time to focus on solutions.

Well, the solution can be found in technology, it can be found in behavior change nudges, or some sort of demand creation for better air quality. Most importantly, for a growing economy like ours, some of the solutions could be market driven as well.

Solutions can be found in technology, in behavior change nudges, or some sort of demand creation for better air quality. Most importantly, for a growing economy like ours, they could be market driven too.

RESPONSE

POLICY

Leading the climate commitment

MR. MANOJ SINGH, IAS, ADDITIONAL CHIEF SECRETARY, DEPARTMENT OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVERNMENT OF UTTAR PRADESH

The best part of climate action in India is that it has a well-established and comprehensive climate policy and matching governance system

Uttar Pradesh is home to one-sixth of Indians. What impacts State of UP, relevant with respect to vulnerability of the State to the impacts of climate change, also affects India in a big way. Hence, it establishes relevance of Uttar Pradesh when it comes to framing and implementing policies and governance structure for climate change adaptation and mitigation in India.

India's National Action Plan on Climate Change (NAPCC) reiterates the focus on sustainable growth and aims to exploit the co-benefits of addressing climate change along with promoting economic growth. Further, as part of its commitments to the Paris Agreement, India has already announced its mitigation and adaptation strategies that would contribute to the 1.5 degrees goal through its Nationally Determined Contributions.

In achieving NDC commitment, NAPCC through its missions and State Action Plans on Climate Change (SAPCC) will be the key drivers. Similarly, in the state of Uttar Pradesh, its State Action Plan on Climate Change, which has some very robust and innovative mitigation and adaptation strategies, is going to be key guiding document to address climate change and at the same time contribute to India's NDC goals and other relevant climate and sustainable development priorities.

What makes things exciting and promising in the State is the commitment and leadership the State has showcased in areas such as harnessing solar energy through promotion of solar water heating systems, setting up of megawatt-scale solar power plants. State's consideration of hydrogen as a fuel can go on to be a national best practice and be a game changer. Further, the State has invited industry majors to manufacture affordable electric vehicles in the State.

A shift towards carbon neutral and/ or low-carbon development from a carbon-intensive economy is an arduous task. This can be achieved only with participation of all stakeholders, including government, private sectors and citizens.

POLICY

State Action Plan for Climate Change a Game Changer

MR. KIRTIMAN AWASTHI, SENIOR POLICY ADVISOR - CLIMATE CHANGE, GIZ INDIA

Climate change and development are integrally linked-- Development as a driver of carbon emissions and climate change undermining achievement of development goals. We need a development pathway that focus on low-carbon growth path as well as climate-resilient development path.

On climate action, India has a comprehensive climate policy and evolving governance system to translate policy into action. In this direction, State Action Plans on Climate Change (SAPCC) will play the role of a game changer. However, this requires strengthening key enablers to support operationalisation of SAPCCs. Some of these include—creating a robust evidence base on climate change impact, risk and vulnerabilities; integration of climate concerns in development plans; Capacity building at all the level of administration and governance; Climate finance and Multi-stakeholder engagement.

We need a development pathway that focus on low-carbon growth path as well as climate-resilient development path

Additional requirement of financing is an important aspect of accelerated climate action. Mitigation efforts have provided business opportunities such as on solar and waste management and have attracted private sector financing. Effort on adaptation is still dependent on additional public financing such as National Adaptation Fund on Climate Change for pilot and demonstration projects. One opportunity financing is to leverage from existing budgetary provisions by integrating climate adaptation objectives into sectoral development plans and policies such as State's Mahila Kisan Sashaktikaran Yojana (MKSY) and watershed management programmes as well as mobilize cross sectoral synergies such as between forestry, medicinal and aromatic plant-based livelihood diversification, solar energy. Such an approach has potential to improve the resilience of development strategies, decrease vulnerability to climate change impacts, and safeguard investments in development and poverty alleviation programmes.

Revision of SAPCCs as undergoing including that in Uttar Pradesh focus on such integration. The process includes review existing developmental programmes/ schemes; Recommendations for incremental activities based on identified vulnerabilities; and follow an integrated approach for adaptation and sustainable development. Revised SAPC also provides for bringing different stakeholders together and building institutional and human capacities for climate action. Implementation of SAPCC in the right spirit, will allow accelerate climate action and contribute to national climate goals.

JURISPRUDENCE

Look around for the best!

DR. HUMAYUN RASHEED KHAN, HJS, ADD. DIR. (RESEARCH), JTRI, LUCKNOW

Among the many things Mahatma Gandhi said, the most relevant in the context of climate change was probably when he said, "One must care about the world one will not see". In just ten words, he summed up the entire premise of climate action. Also, the father of nation beautifully showcased the essence of inter-generational equity with these words.

Inter-generational equity articulates the concept of fairness amongst all generations in the use and conservation of the environment and its natural resources. It can be defined as 'Meeting the needs of the present without compromising the ability of future generations to meet their needs.' This is something even contemporary scholars are talking about. However, our culture, as a tradition, has always talked about equality of all living beings.

In India, climate legislation was introduced in the Lok Sabha in 2015 but has still not been enacted. Despite us having acquired more scientific knowledge over the years, our environmental legislations are rooted in the understandings of the 1970s and 1980s

But sadly, we have breached all boundaries and things have come to such a pass that the changing climate has become a concern. So achieving fairness calls for comprehensive legislation to tackle climate change and is the most important question staring at us, as India does not have a specific climate legislation.

If we look outside India, we get to see that we have 30-odd countries that have enacted separate climate legislations. In New Zealand, it is called 'The Climate Act of 2002". This comprehensive Act of 270 sections addresses largely all aspects of the environment. In fact there are 8 Schedules to directly recognize Kyoto Protocol and the decisions made at UNFCCC. These sections also have provision for severe punishments for individuals and corporations that violate the Law. And these punishments vary from NZ$ 4,500 - 75,000 (INR 2,25,000 – 37,50,000). This covers the Environment Protection Authority, all emission trading systems, liquid fossil fuel, stationary energy, forestry and agriculture.

In India, climate legislation was introduced in the Lok Sabha in 2015. It has still not been enacted. All our environmental legislations are rooted in the understandings of the 1970s and 1980s. However, much has changed and evolved in the world and we have acquired relatively more scientific knowledge by now, as compared to that era.

It's about time we look outside India to identify relevant best practices and enact a progressive Climate Act.

"India's Environment Protection Act and the enabling power under this act is broad and sufficient to manage a large number of issues. We must remember that climate change is a consequence of our activities. If all acts and rules are maintained, we can achieve a lot. In addition, we must remember the Supreme Court judgement about treating sustainability principles agreed in international conventions as domestic laws."

— Justice Adarsh Kumar Goel, Chairperson, National Green Tribunal

JURISPRUDENCE

Finding space for climate action in existing judicial frame work

MS. STELLINA JOLLY, ASST. PROF FACULTY OF LEGAL STUDIES, SOUTH ASIAN UNIVERSITY

The framework around climate change management in India is largely policy driven. So in the absence of enabling legislation, it makes sense to review the existing legislation and see how far it is an enabler and if it offers an entry point for Climate Change. To begin with, be it the Air Act or the Water Act or the Environmental Protection Act (EPA), the entire set of legislation precedes climate change, leaving it as a peripheral issue. Further, the process of Environmental Impact Assessment (EIA) in India lacks an explicit focus on climate change. However, in Europe, climate change is included as an essential parameter in terms of EIA.

The good news meanwhile is that the Government is considering consolidation of the Air Act, Water Act, and EPA. But the big question here is if there is an entry point for climate change, without a need for any amendment or looking for an exclusive climate change law?

The existing Biological Diversity Act can be analysed to see whether payment for ecosystems can be protected under the Act for indigenous communities

A close look at the Forest Conservation Act will reveal that it has provisions to seek permission from the Central Government under certain circumstances. It can serve as a wonderful entry point for climate change. The Green India mission and the REDD (Reducing Emissions from Deforestation and Forest Degradation) mechanism, which is the overarching policy mechanism of the Government of India in this context. The Green India Mission clearly talks about Joint Forest Management (JFM), tenure rights, and the role for the Gram Sabha among other things. For the success of this Mission, a successful enactment of the Forest Rights Act in India is crucial. The REDD mechanism is an enabler that helps communities and encourages a sort of monetization from the ecosystem. Again, since it is policy driven, there is no accountability. There is an existing Biological Diversity Act, which can be analysed to see whether payment for ecosystems can be protected under the Act for the indigenous communities.

One of the advantages of legislation could be that, since policy-driven climate change mechanisms lack accountability, it can all be sorted out with a legislative framework.

Having said that, despite all the limitations of the present system, globally we rank 6th when it comes to managing climate change. So, in a way, we are performing brilliantly and one may argue that we may not require much legislative assistance to perform better. But yes, the problem is that if a particular goal of an NDC is not met, there is no accountability. A comprehensive climate legislation will ensure right climate actions.

"According to the provisions of Article 21, read with Article 48A of the constitution of India, 'right to life' includes 'right to have fresh air, a healthy environment'. Nobody has the right to create pollution endangering the lives of others on the ground of commercial activities."

— Hon'ble Justice S.K Singh, Member Judicial, NGT, Bhopal

"We need strict compliance of environmental laws and rules framed by the legislature. Fast track courts should be established in order to conclude the trials in a better and fast manner."

— Sri Manmeet Singh Suri, HJS, Additional Director Training, JTRI, Lucknow

TECHNOLOGY

Decarbonising India's Power Sector: Renewable holds the key

MS. AMMI RUHAMA TOPPO, DIRECTOR, INTEGRATED RESOURCE PLANNING, CENT ELECTR AUTHORITY

The Energy sector in India is one of the major contributors of the total CO2 emissions in the country. It also includes the power sector, which is basically the prime emitter.

The all India picture tells that not only our Renewable Energy capacity has been increasing, its generation is also increasing, vis-à-vis the total generation mix. Here, it may be noted that in the year 2021, renewable energy sources have only contributed about 11% in the total generation mix. However, in order to mitigate climate change and decarbonize power sector, the Government has first set a target of having 175 Gigawatts of installed renewable energy capacity by the year 2022 and then, it aims at having an installed capacity of 450 Gigawatts by 2030.

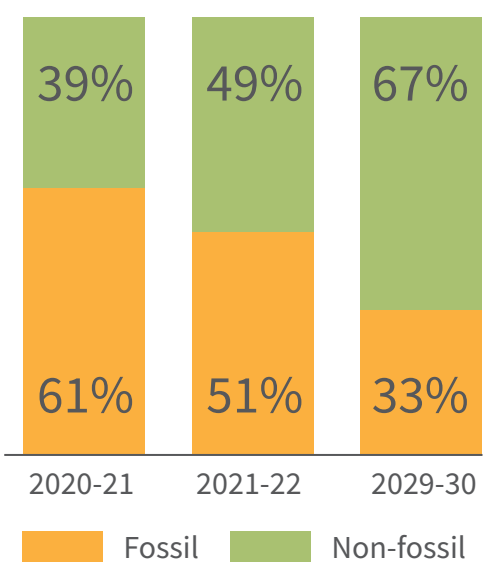
Likely energy contribution from renewable sources at an all-India level is likely to increase to 31% and contribution from thermal energy sources will most likely fall to 55% from the current 75% by 2029-30. The projected installed capacity mix of fossil vs non-fossil sources, as of now, the non-fossil fuel capacity is around 39%. But, this is likely to increase to around 49%, and subsequently with 450 GW of installed capacity, share of non-fossil fuel capacity will increase to 67%.

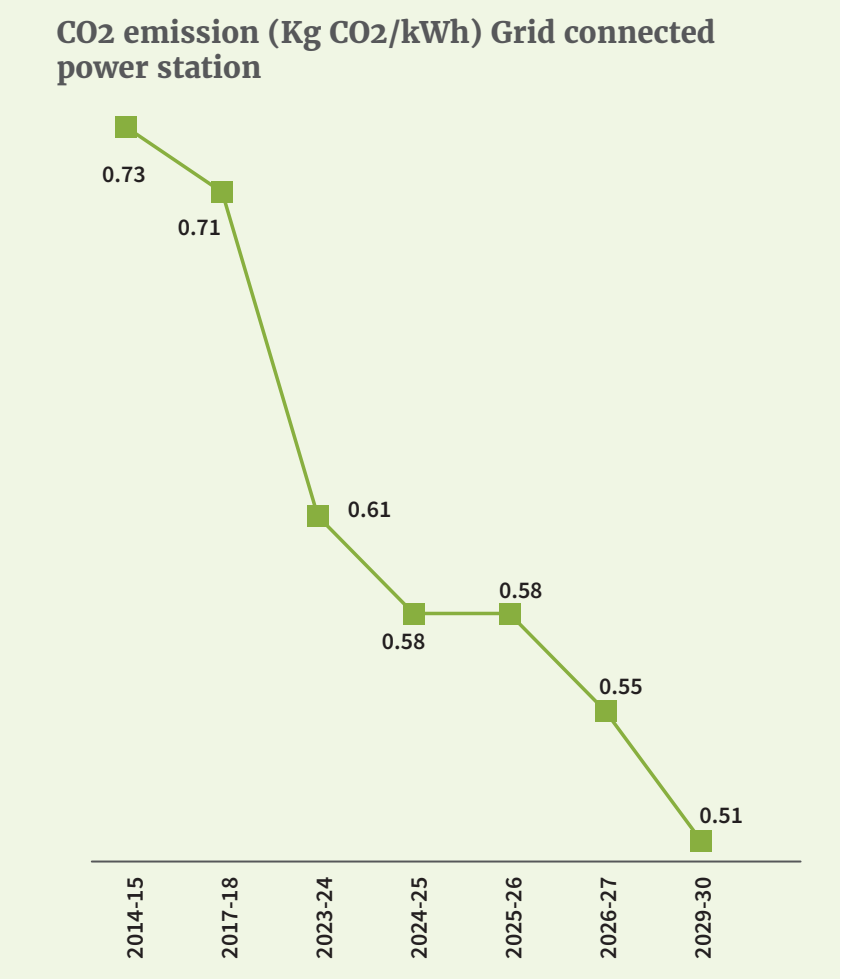
Data modeling suggests that in the year 2030, there'll be days when around 50% of the energy requirements would be met by renewable energy sources and on any given day, at least, 30% of the energy will be from renewable sources.

The Government has taken a slew of measures to promote energy efficiency, with the Perform, Achieve and Trade (PAT) Scheme being most noteworthy. It reduces specific energy consumption in energy-intensive industries, with an associated market-based mechanism to enhance cost-effectiveness through certification of excess energy saving, which can be traded.

This scheme has saved 86 million ton of CO2 emission. Efforts to retire old and inefficient coal based power plants and installation of

Projected installed capacity mix of fossil vs non fossil





ultra supercritical power plants has also bore fruits. Also, owing to the stricter environmental norms, thermal power plants now have to install flue gas desulphurization systems.

Data about emissions from coal fired plants suggests that although there has been an increase in the absolute volume of CO2 emissions, the Compound Annual Growth Rate has been shrinking consistently. It is anticipated that it will most likely reduce to 1.2% from the earlier 4.6%. Also, the per kilowatt hour CO2 emissions will also reduce from 0.73 kg CO2/kWh in 2014-15 to 0.51 kg CO2/kWh in 2029-30.

TECHNOLOGY

Hydrogen: From hype to hope

MR. SUBRATA CHAKRABARTY, SENIOR MANAGER, CLIMATE CHANGE, WRI

Hydrogen has the potential of transforming India from an energy-deficient to an energy-rich country. In fact it can even make India a net exporter of energy. It is considered one of the most sustainable fuels of the future because when it is burned, it only emits water vapour, with no residue or any adverse impact on the climate. Its potential has been known for decades. There has been a lot of hype around it as well. But only recent innovations and technology developments have made it possible for Hydrogen to go from hype to hope.

The landscape of Hydrogen energy in India is largely occupied by the government. The Ministry of New and Renewable Energy has been supporting a broad-based Research Development and Demonstration (R&D) programme on Hydrogen Energy and Fuel in various industrial, academic, and research institutions In the context of use of Hydrogen in transport sector, major work is being done by the Banaras Hindu University, IIT Delhi, and Mahindra & Mahindra. This has resulted in development and demonstration of internal combustion engines, two wheelers, three wheelers, and mini buses that could run on hydrogen fuel.

Proactive industrial collaboration is an important requisite in order to accelerate the hydrogen deployment across sectors and bring in much needed finance

So, in order to further accelerate deployment of Hydrogen energy, the need is to come up with some conducive and forward looking and policy framework, like the ones we have for solar energy. Also, as hydrogen is a fuel that can be used across the sectors, it is important to think of ways to bring different stakeholders on one platform, cutting across the divides of State-level ministries, academia, and industry. Then, an important requisite is to have a proactive industrial collaboration in order to accelerate the hydrogen deployment across sectors as well as bring the much needed finance for it. But finance will get a push once deployment is accelerated.

As of now, the industrial and transport sector seem to be the best entry points for an accelerated growth of Hydrogen energy deployment in India.

TECHNOLOGY

Knowledge exchange to de-carbonize Transport Sector

MR. AMIT BHATT, EXECUTIVE DIRECTOR, INTEGRATED TRANSPORT, WRI

Transport sector is one of the 3rd largest contributors to carbon emissions and has also been growing at a fast pace. Almost 90% of the emission from this sector comes from surface transport. So, it is extremely important to focus on the road transport sector. The Government of India has launched several schemes to address this issue, and one such scheme is the National Mission on Transformative Mobility and Battery Storage. Under this mission, electric mobility is the mainstay.

But the main question here is that, if electric mobility is the desirable primary mode of motorized mobility in our cities; how do we go about it? To promote electric mobility, the entire ecosystem of road transport needs to be overhauled. This will require all stakeholders to make concerted efforts towards ensuring a smooth and green transition to electric mobility.

Recently, a forum was launched in collaboration with NITI Aayog, which among other things, aims at bringing together relevant stakeholders, on the same platform. Because if a change in ecosystem is expected, each constituent of the ecosystem has to change. Towards this end, the way this forum works is that all stakeholders meet frequently and regularly, everyone picks up one or two specific themes, and then they try to learn from each other. Such knowledge exchange facilitates peer-to-peer learning.

Many a time it so happens that the private sector wishes to do something but is faced with a lot of challenges. So the actors can bring them up before the forum in anticipation of a solution. Then, a very significant aspect is that of capacity building. It has been noticed that the private sector is often not aware of the policy landscape and on several occasions it is noticed that the Government also has certain gaps that need to be filled. So, knowledge exchange via this forum is of great help to all stakeholders and in fact goes on to build capacities.

A similar State-level forum in UP can be formed to reap dividends of its structure and relevance.

To promote electric mobility, the entire road transport ecosystem of needs to be overhauled. Stakeholders have to make concerted efforts towards ensuring a smooth and green transition to electric mobility

TECHNOLOGY

Five steps to de-carbonize UP's Power Sector

MR. PANKAJ KUMAR, IAS, MD, UPPCL

It is roughly said that about 60-70%, some studies say even 75%; of our coal emission is from coal fired power plants. That's indeed a concern and de carbonizing the sector would be in public interest.

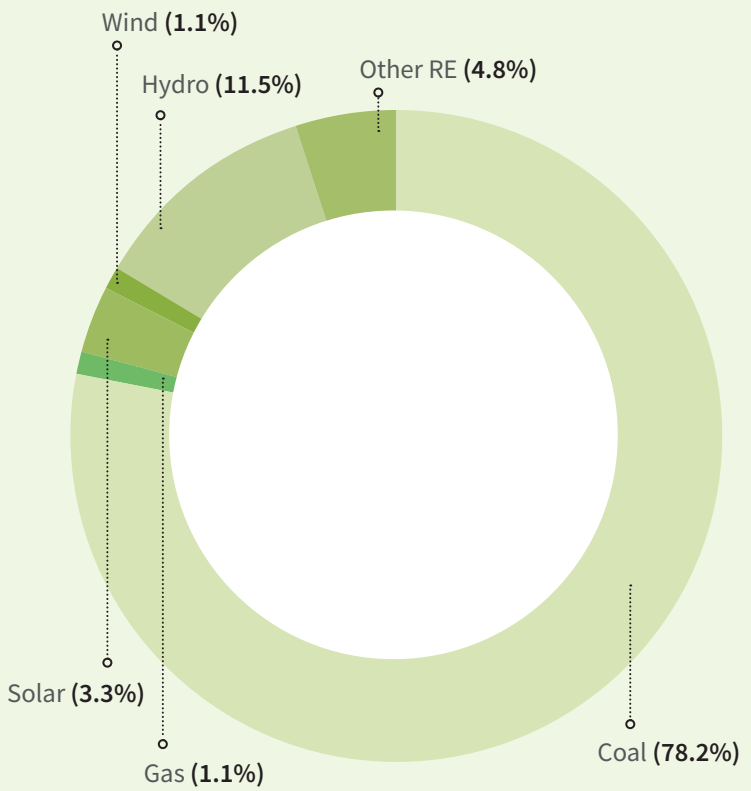
It is important to note that energy requirement of UP is only second to Maharashtra with a demand of approximately 9.75% of the all India energy demand. At the same time, the consumption per capita is very pretty less in UP.

An assessment of the installed energy capacity in UP reveals that approximately 78% of consumption is from coal-fired plants.

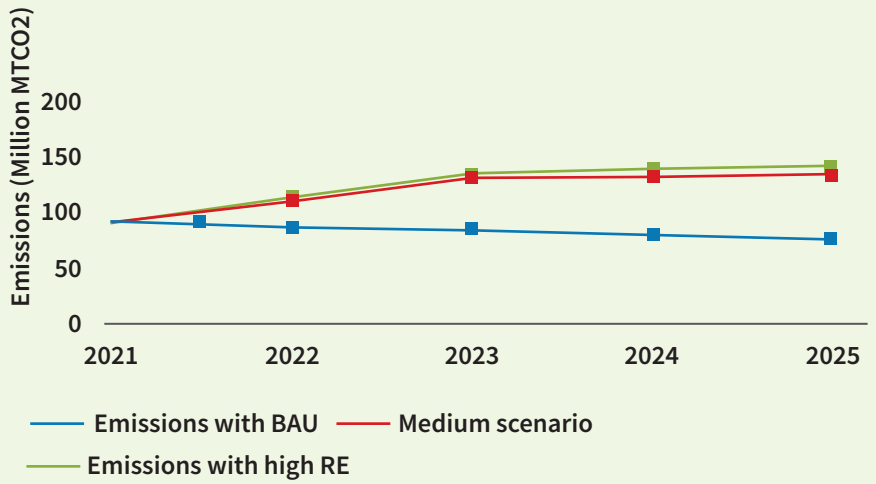
Given the complexity of the Power sector in UP, de-carbonizing it would require a five step approach.

Step 1: Prioritize Renewable Energy owing to the massive cost reduction over the last decade, which has fuelled growth.

Consumption mix of energy in UP 2021



Carbon emissions trajectory of UPPCL



Step 2: Focus has to be on efficiency and loss reduction. The amount of electricity generated is always greater than what is consumed because most of the electricity produced is lost owing to line losses or pilferage.

Step 3: System flexibility and smart distribution grid form the third step. A smart grid enables two-way flow of electricity. Then, big data analytics, IoT technologies, Energy Audit Tool, and 100% smart metering will improve the overall load forecasting capacity of discoms –optimizing the use of thermal power plants, so as to reduce CO2 emission.

Step 4: Promote technology. Innovations, over the last decade, have led to a decrease in the cost of renewable technologies. Continuous efforts are required for the development of carbon neutral Technologies to be used in high emissions sectors, such as the industrial sector.

Step 5: Regulation and Policy. A few measures that may be considered could be feed in tariff and feed in premiums for the costlier renewable sources, phasing out of old thermal power plants, time of day feed in tariffs for consumers who are installing de-centralized renewable power plants and providing support to discoms in peak hours.

Other than these five steps, the most crucial is citizen participation, because that can be a game changer, when it comes to achieving carbon neutrality.

TECHNOLOGY

Air shed management for a clean air scenario in UP

MR. JOSTEIN NYGARD, WORLD BANK

There is a clear link between air pollution and climate change. And that's precisely why clean air scenarios can have tremendous positive impacts on climate change.

It is pertinent to take note of the fact that the Indo-Gangetic plain, of which UP is a significant part, experiences one of the highest concentrations of air pollution in the world.

Though this may be a grim scenario as of now, but let us not forget that the very same region also has the highest potential for positive outcomes through implementation of clean air scenarios. So, the focus as of now is to set a vision that by 2030, or maybe 2040, the spotlight should be on diluting and subsequently eliminating this particulate matter. This is very much doable on the basis of evidence, knowledge, and the International experience we have.

Crop burning is considered the culprit for air pollution, but the fact is that the usual emissions, combined with ammonia emissions specific to agriculture, account for about 40% of the particles in the air

There is evidence that if clean air scenarios are implemented in UP, the region could witness a fall in CO2 levels by as much as 40 per cent in the next 15-20 years. Proper planning for clean air scenarios and aggressive uptake of modern techniques can ensure a reduction in emissions by as much as 80-90%. If we look globally, there's much we can learn from the Mediterranean region where simple efforts go on to reduce emissions by almost 30%.

In the context of the agriculture sector, where crop burning is considered the culprit for air pollution, the fact is that the usual emissions, combined with ammonia emissions specific to agriculture, account for about 40% of the particles in the air across the Indo-Gangetic Plain. These particles are a result of how ammonia reacts to the agricultural usage here. So, the problem is not really with burning of crop residue.

This is precisely why there has to be an absolute clarity on what exactly is the source of a problem. Nonetheless, the institutional collaboration of the Government of UP with the World Bank is focusing on ensuring clean air scenarios using the airshed management approach.

As the policy environment in India seems conducive, it would be prudent if present policies are reviewed and course correction, wherever necessary, is done in larger public good.

"To respond to climate change, there are opportunities for private sectors, there are economies which are focused on low carbon technologies from solar thermals, wind power, battery assistant etc. There are many opportunities for technological development for industries which are focused on these areas but at the same time quantum of financing is a huge challenge both for India as well as for the global communities."

— Dr. Pradipto Ghosh, Ex Secretary MoEFCC, Distinguished Fellow, TERI

LOCAL GOVERNANCE

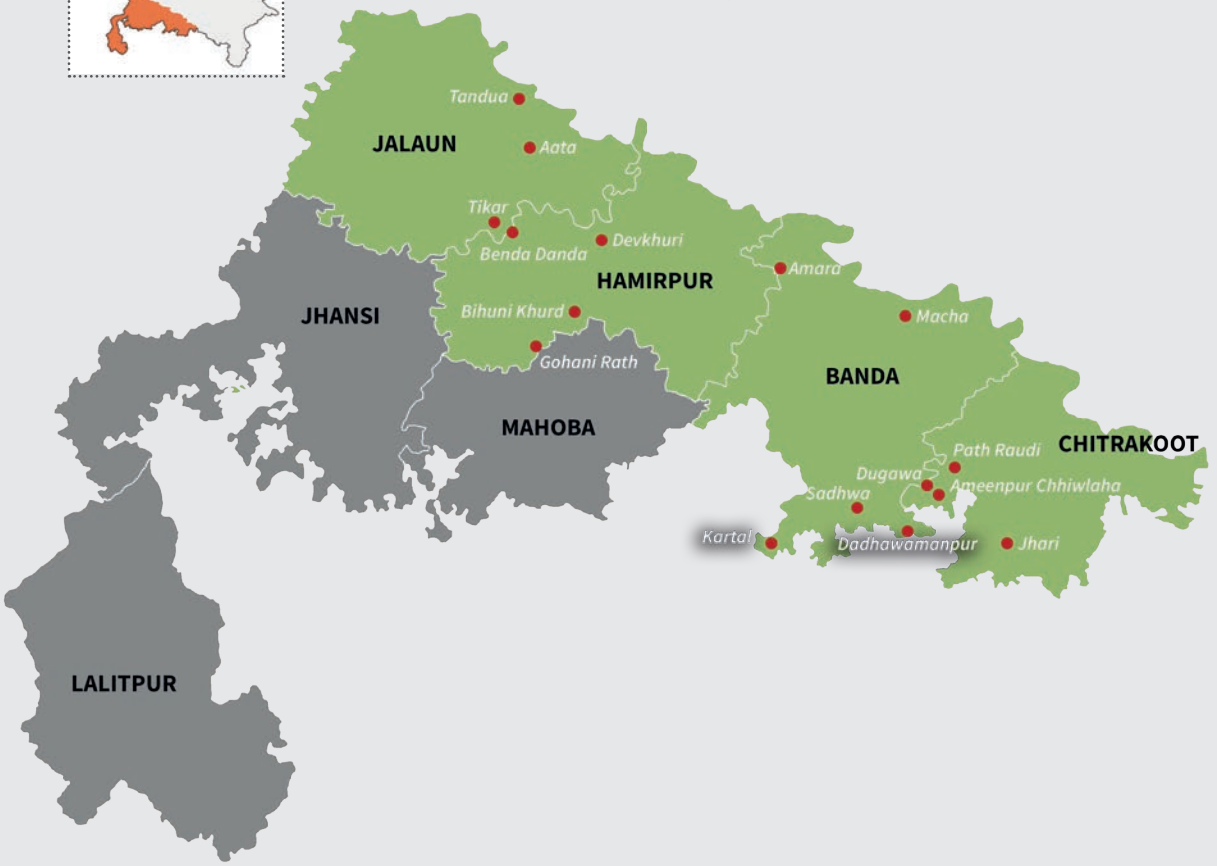
Community led Eco-restoration

MR. ANJANI ACHARYA, IFS, ADDITIONAL PCCF
MR PP SINGH, IFS, CCF

The Forest department of Uttar Pradesh initiated an ecosystem-based adaptation project in Bundelkhand under the National Adaptation Fund for Climate Change (NAFCC). The project has already completed three out of four stages.

Four districts of Bundelkhand were identified for this, namely Jalaun, Hamirpur, Banda, and Chitrkoot. While Jalaun, Hamirpur, and Banda are ravenous and rocky, Chitrakoot is the most rocky and ravenous region. A total of 16 villages, where Joint Forest Management Committees (JFMC) already existed, were identified for this. Around 5000 hectare of forest, 1000 hectare of wasteland and pasture land, and approximately 12000 hectares of other different kinds of land were identified for this project. The project area is home to roughly 11,000 households with a population of approximately 60,000.

NAFCC Project villages in Bundelkhand



The weather is hot and semi-humid with high temperature variation (6°C to 48°C). The region experiences erratic rainfall of 750-1250 mm annually. The rate of groundwater recharging is very poor. In fact, 5 districts in the region are known to be drought-prone. The project area was selected on the basis of its severe climate vulnerability.

Since the objective of the project was to find nature-based solutions for climate change adaptation, it was designed to utilise all available natural resources in a synchronized manner. Forest ecosystem restoration was primarily managed by the community. Restoration of the common and grazing land is being done through agroforestry. There is a focus on maintaining soil moisture. Water conservation structures are already in place in JFMC areas and other land within the same watershed. And above all, providing livelihood options for the participating community was a primary goal. That's why the project promotes climate resilient crops and has developed an agro advisory to reduce risks.

Providing livelihood options for the participating community was a primary goal which is why the project promoted climate resilient crops and developed an agro advisory to reduce risks.

The result so far has been positive as income from wild tulsi was Rs 80,000 per hectare while beneficiaries of pisciculture earned Rs 2 lakhs. Women engaged in rope-making made a profit of Rs 70,000.

It is evident from the pilot project that eco-restoration as adaptation is possible and can also generate livelihood for the community.

LOCAL GOVERNANCE

Micro planning, Major Gains!

MR VISHNU SINGH, IFS, APCCF
MR SANJAY SHRIVASTAVA, APCCF

Planting a sapling, watering it, nurturing it, and monitoring its growth can be an extremely soothing and satisfying experience. But when it comes to planting almost 300 million saplings, with an intention to create a carbon sink of 2.5 to 3 billion tons by the next ten years, the experience can't be that innocent.

It involves a lot of planning and innovation and coordinated effort to ensure that a plantation drive of such magnitude is a success.

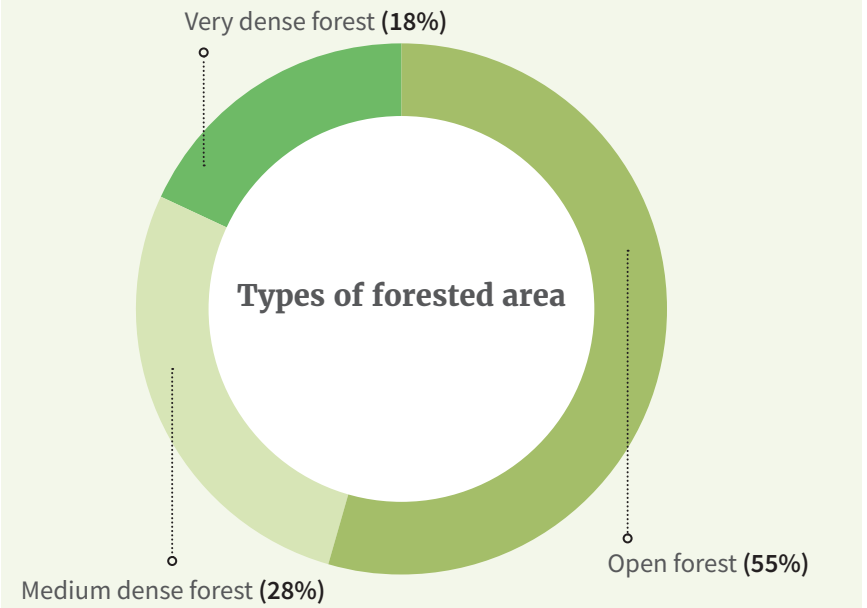
What makes a plantation drive of this magnitude special and a success is the use of GIS technology for plantation, even at the Gram Panchayat level. That's not all. In this project, GIS has been used not just for geotagging. In fact, it has been used to perform real time monitoring of the drive. Each stage of plantation, right from site selection to survival has been monitored and this is something that has never been done before. Also, initiating a plantation drive is not the real challenge. The real challenge is ensuring that the plantation survives.

Initiating a plantation drive is not the real challenge. The real challenge is ensuring that the plantation survives and that is where the project's challenge lay

So, how did UP manage to pull off this mammoth task?

Almost 30 crore saplings have been planted with the help of 26 Departments and support of 60,000 gram panchayats. Gram Panchayat level planning was the most crucial. In this context, the Gram Panchayat Development Plan (GPDP) came to the rescue. The first step was micro planning for this in GPDP. This eventually helped the government figure out the potential of plantation and the kind of plants required. After procurement of these saplings, 30 crore saplings were distributed among these gram panchayats through these 26 departments. District-level plantation committees were established to implement the drive every year.

While in most locations it was done by the close coordination of the Forest and Rural Development Department, in other locations it was done by the villagers themselves. Farmers, who did not have land of their own, were issued land along the expressway or the canal by the Gram Panchayat. Likewise, in urban areas as well, a strategic approach, with the help of citizens and government authorities, was chosen to deliver results.



Then, the Government used MIS and generated QR Codes. So, every time someone came over, anywhere in UP, to collect the saplings for plantation, he/she had to scan the QR code. The centralized monitoring center would record in real time, what is the outward flow of saplings, which variety is being taken, which geography has it been collected from, and other relevant details. Then, there is a third party monitoring as well by the Forest Survey of India.

All of that is no doubt important, but the crucial bit is to ascertain how many of these plants survived. To ensure proper monitoring and promote due care of the saplings, software named ArcGIS was developed. Officers monitoring the plantation would go to the project sites and would take photographs, write instruction reports and other details about survival status. Then all of this information would be uploaded using the app and would be available to the central team in the state capital.

This process ensured the entire monitoring activity to take place on the ground and be done with complete transparency. It was the GIS technology that added credibility to the entire process of plantation and the results were good as expected.

This was a one-of-its-kind initiative where micro planning right up to the gram panchayat level was done and a synergy of over two dozen departments ensured such a success of this mammoth task.

What makes a plantation drive of this magnitude special and successful is the use of GIS technology for plantation, even at the Gram Panchayat level

LOCAL GOVERNANCE

Wood is good

MR ANUPAM GUPTA, APCCF

There is this general perception that if we wish well for the planet, we should not cut trees at all. But if we do not cut a tree, how will we get the furniture we use?

It is due to this mindset that India, despite being a resource-rich country, still imports wood resources worth Rs. 20,000 Crore every year. This large sum could have been spent for the welfare of the agriculture sector.

So, it is about time we realize that wood is good. By not using wood, we end up using alternative materials, which only add to the emissions. On the other hand, if we start using wood more, there'll be relatively less carbon emission. In fact, by using wood products, carbon emissions go down by almost 20%.

We either spend revenue to import more or we grow more trees and promote wood-based industries in order to benefit farmers and build a revenue generation model

But, if we switch to wood, we need to have more trees. And more trees mean more carbon is absorbed and there is less concentration of it in the atmosphere, which eventually contributes to mitigation.

It is to be noted that we are meeting only 3% of our wood requirement from our national forests and the remaining is coming from farmers. So, if we promote wood production from such sources, our farmers stand to benefit.

While we are producing 48 lakh cubic meters of timber, our requirement is 57 lakh cubic meters, which is going to increase to 97 million cubic meters in the next 10 years.

Do we have a plan to meet this demand?

Well, we have two options. We either spend revenue to import more or we grow more trees and promote wood-based industries in order to benefit farmers and build a revenue generation model. Farmers in UP stand to benefit the most as 95-96% wood is with farmers in UP, outside the forest area.

So, the policy focus should be on incentivizing farmers to produce more wood, as, if done in a scientific and sustainable manner, that will save foreign exchange, increase Indian farmers' income, and sequester more carbon.

"One can visualize what impact people would have due to variations in rainfall, extreme events, drought events. We need to have effective preparedness to deal with all type of impacts make our communities more resilient with reduce risk due to climate change."

— Professor Sachchida Nand Tripathi, IIT, Kanpur

"REDD+ goes beyond simply deforestation and forest degradation and includes the role of conservation and sustainable management."

— Mr. Atul Jindal, Addl MD, UP Forest Corporation

LOCAL GOVERNANCE

Mainstreaming Climate Change Adaptation and Disaster Risk Reduction

DR SHIRAZ WAJIH, PRESIDENT, GEAG

There is a clear link between climate change and disaster risk reduction (DRR). Increasing intensity and frequency of extreme weather events in future are likely to spike the number and impact of disasters, while at the same time, the existing methods and tools of disaster risk reduction indeed provide powerful capacities for climate change adaptation.

So, it is important for development planning to factor climate change and disaster risk reduction. In other words, risk informed development planning is the need.

If we look at the relevance of this in States like UP and Bihar, where 75% of the population is rural, it can safely be said that risk informed development planning is of great relevance and of much need.

The best aspect about village folk, in this context, is that they are generally open to opting for safe behaviour. They are largely self-reliant in terms of handling disaster shocks and at the institutional level; they have access to the administrative structure of a panchayat, which helps in analysing the risk.

If village communities become self sufficient and line departments start working towards promoting this, then this convergence can be a game changer for development planning process

In UP, we need to focus on how to integrate climate change and DRR in the Gram Panchayat Development Planning (GPDP). It may be noted that Panchayats have been mandated for the preparation of GPDP, utilizing the resources available to them, for economic development and social justice. The GPDP planning process has to be comprehensive and based on participatory process which involves the full convergence with Schemes of all related Central Ministries / Line Departments related to 29 subjects enlisted in the Eleventh Schedule of the Constitution.

Having said that, as a first step, the need is to assess the needs of village folk, understand their priorities, and identify available resources, which may be used in the GPDP process. The idea is to promote a participatory development planning at the village level, where everyone gets to contribute and understand the GPDP process.

So, it will indeed be a significant achievement if we manage to integrate DRR and climate change adaptation in GPDP. If the village community becomes self sufficient and line departments start working towards promoting this, then such a convergence can turn out to be a game changer in the overall development planning process.

LOCAL GOVERNANCE

Prioritizing community based water resource management

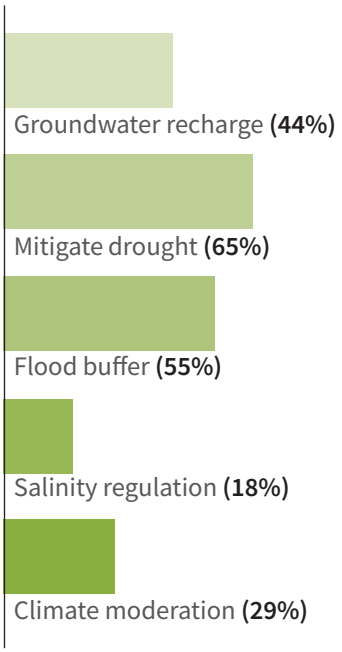
MRS. SWAPNI SHAH, STATE HEAD, RAJASTHAN,
UNNATI ORGANIZATION

While piped water may have its own convenience, but talking about environment conservation, the idea of community based water resources management needs to be preserved and promoted as it has multiple benefits, like moisture retention and prevention of soil erosion.

But, there is a general neglect in the management of common property resources (CPR), particularly traditional water harvesting bodies like small ponds, their catchment, community forests, grazing land, etc. If management of CPR is not done right, it will have the potential to adversely impact the fragile ecology of the arid areas, subsequently leading to desertification, increased wind velocity, and heat waves. All of these are a clear indication of a changing climate. Repeated spells of droughts compel the poor to migrate and abandon their cattle and fall in a debt trap.

To avoid all of this, the role and potential of Gram Panchayat (GPs) and community based organizations (CBOs) in management of water bodies needs to be tapped. Towards this end, the Gram Panchayat Development Plan (GPDP) is a good starting point. It is a decentralised planning instrument for the gram panchayats. As part of the planning, CBOs assess the structure and functionality of water bodies. In a study conducted in Bhachau covering 10 GPs (268 respondents) it came to the fore that revival of water bodies has the potential to contribute to groundwater recharge (44%), mitigate drought (65%), create a buffer against floods (55%), salinity regulation (18%) and moderation of climate (29%). Though it is early to assert that revival of the water bodies has contributed to growth of tree coverage, moisture retention, reduction of speed of surface wind causing fly of sand; however, it has reduced the expenses on purchase of water when piped water supply is not available.

Percentage of respondents attributed Revival of Waterbodies to:



LOCAL GOVERNANCE

Disaster Risk Reduction: Community preparedness holds the key

DR. KAMAL LOCHAN MISHRA, EXEC DIR, ODISHA STATE DISASTER MANAGEMENT AUTHORITY, ODISHA

Orissa, being a coastal State, has been affected by four severe cyclones in the last 12 years. But those cyclonic disasters are not the real issue. The real issue is that people were affected in these disasters. Thankfully, disaster preparedness can significantly reduce impacts of disasters on people and the success story of these two coastal villages in Odisha goes on to prove that.

These two villages, Noliasahi in Jagatsinghpur district and Venkatraipur in Ganjam district, have been declared the first two 'Tsunami Ready' villages in the Indian Ocean Region by the Intergovernmental Oceanographic Commission (IOC) of UNESCO for the preparedness of the local community against tsunamis.

Tsunami Ready is a community performance-based programme to promote tsunami preparedness through active collaboration of public, community leaders, and national and local emergency management agencies. The main objective of this programme is to improve coastal community's preparedness for tsunami emergencies, to minimize the loss of life and property and to ensure a structural and systematic approach in building community preparedness through fulfilling the best-practice indicators.

The story of these two villages beautifully showcases the value and relevance of disaster preparedness. The story also makes a case for other vulnerable regions along the coast to emulate such preparedness measures.

It's basically about communicating with the community and ensuring micro and macro level planning. Technology also plays a role in ensuring the communication is timely, far and wide, and continuous. Language of communication also plays a major role in it hence it has to be such which is understandable by the local population. In the case of these two villages, community members here were provided with all the relevant information and technological inputs and all of that gave them the required confidence to be 'Tsunami Ready'. A key factor for preparedness is that the community should be mobilized to react to every warning, even if it's a rumor. Such instances serve as mock drills, which anyway build capacity and preparedness of the entire community.

So, this example from Odisha can very well serve as a model for others to emulate. Even if UP does not have a coast line, community preparedness can anyway be promoted for other relevant disasters native to UP.

WAY FORWARD FOR COMMUNITY MOBILISATION

ACCURACY OF FORECAST ID BEST WAY TO BUILDING TRUST ON DISASTER EARLY WARNING

COMMUNITY WITH WELL ESTABLISHED DISASTER SUB CULTURE ABSORBS EARLY WARNING EFFECTIVELY

PEOPLE TO BE MADE AWARE THAT AN INACCURATE EARLY WARNING IS ALSO TO BE BELIEVED AND OBEYED.

COMMUNITY NEED TO BE TALKED TO EARLIER TO LISTEN TO THE EARLY WARNING AT THE TIME OF DISASTER.

"People can stay alive for a few days without food, few hours without water. But if you do not get oxygen for a few minutes, the game will be over. We have no option but to plant more trees for clean air. We have done more destruction than development. Can we take a pledge to plant 50 trees each in our lifetime?"

— Padma Shri Himmata Ram Bhambhu, Environmental activist, Rajasthan

NATURE BASED SOLUTION

Offering a win-win solution

MR. KAMLESH KUMAR, APCCF, PROJECT TIGER
SANJAY PATHAK, CCF

In order to ensure our climate action is relevant and precise, India has a target of creating an additional (cumulative) carbon sink of 2.5–3 GtCO2e through additional forest and tree cover by 2030 in our Nationally Determined Contribution (NDC). To meet this nature-based solution for climate change mitigation, India needs to almost double its forest cover. Towards this end, India aims to restore 26 million ha of degraded and deforested lands.

2017-2023

ADDITIONAL CARBON SEQUESTRATION ESTIMATED = 3.4 LAKH TONNES PER YEAR

CARBON FINANCE AT VOLUNTARY CARBON MARKET = $4-$6/TONNE

TOTAL BENEFIT EXPECTED FOR VILLAGERS AND CONSERVATION PURPOSES = RS. 10 CRORE (MIN)

Such nature-based solutions, in a way, are a win-win for everyone as they involve protecting, restoring and sustainably managing ecosystems to address society's challenges and promote human well-being. These may involve, creating more carbon sinks, managing our forest ecosystems, restoring degraded forest land, increasing biodiversity, promoting climate-smart agriculture, conserving mangroves, creating sustainable drainage systems, and substituting fossil fuels with renewable energy sources.

The Dudhwa Forest Reserve serves as a good case in point to showcase the potential of nature-based solutions. Among the various kinds of forests thriving here, the Northern Tropical semi-evergreen type, have the maximum carbon stock, followed by the Indian moist deciduous forest, and the tropical swamp forest. The total CO2 equivalent storage capacity of the Dudhwa forests is approximately 54 million tonnes.

Other than these forests, Dudhwa has several lakes, which have immense potential of carbon sequestration through algae. As compared with standard plantation, micro algae can sequester 100 times more carbon dioxide. The total CO2 equivalent storage in wetlands of Dudhwa (if even one fifth area out of total approx. 5000 ha. is considered as potential area @ 723 tonnes/ ha) is almost 2.64 million tonnes.

Additional carbon sequestration via micro algae makes a lot of sense and the success of this approach is evident in the ongoing Carbon Finance Project in the Dudhwa Tiger Reserve. Through this project, an additional fund of Rs 10 crore per year can be obtained and will be utilised for improving livelihood of rural communities around the forest while reducing deforestation and creating additional Carbon sinks.

NATURE BASED SOLUTION

Forestry as a cost-effective climate solution

DR. J V SHARMA, DIRECTOR, LAND RESOURCES, TERI

When it comes to tackling climate change, technology-based solutions come at a significant cost. Just one-third of these solutions cost almost 130 billion dollars. However, nature-based solutions are virtually free-of-cost and a wonderful means to mitigate effects of climate change.

In fact, nature-based solutions can contribute to 30% of mitigation needed by 2030 in a cost-effective manner that will stabilize warming to below 2°C. Interestingly, 17% of NDCs have current/planned actions involving nature-based solutions for mitigation. Unbelievable it may seem, but nature-based solutions cost no more than $10 to mitigate a ton of carbon dioxide.

In the light of this, agroforestry is a great opportunity and has about 2/3rd potential to contribute towards helping India achieve its forestry sector NDC. Also, the carbon credits generated from agroforestry can be sold off in the carbon markets, which can be considered an incidental bonus.

Unbelievable as it may sound, nature-based solutions cost no more than $10 to mitigate a ton of carbon dioxide

It becomes prudent to consider Carbon financing in this context. The general idea is to measure the avoidance and sequestration of carbon dioxide and prove additionality to obtain the VER (Verified Emission Reductions) credits. This is made possible by a combination of REDD (Reducing Emission from Deforestation & Forest Degradation) and ARR (Afforestation, Reforestation & Revegetation). The VER credits so obtained can then be traded in the international market through various voluntary carbon trading platforms.

There are broadly two kinds of carbon markets available. The first is the compliance market, which generates and trades greenhouse gas emission reductions known as Certified Emission Reductions (CERs) that are regulated and directly initiated under the Kyoto Protocol's Clean Development Mechanism (CDM). The second kind of market is the voluntary carbon market. Here, trade in greenhouse gas emission reductions that are not regulated or directly initiated by the Kyoto Protocol and known as Verified Emission Reductions (VERs) is done.

TERI has significant experience in this domain and it has undertaken projects to generate carbon credits in four Tiger Reserves, namely Dudhwa Tiger Reserve, Pench Tiger Reserve (Maharashtra), Periyar Tiger Reserve and Sundarbans Tiger Reserve.

To sum it up all, the good news is that UP has immense potential to develop a wide range of profitable models with an estimation of around 1000 crores VERs annually.

It will be prudent to look at underwater kelp forests, large brown seaweeds that grow all along the temperate and polar coastlines for carbon sequestration. When mixed with basalt, Kelp forests can have accelerated carbon absorption that is much more than that of land forests. India has a long coastline, and Kelp as a highly dynamic ecosystem can support restoration of other marine organisms as well as fast carbon sequestration.

— Mr Anand Singh, Ex. Director Operations, Coal Mining Co, Indonesia

GREEN LIVELIHOOD

Future of employment for the youth

MS. KAVYA RAMAN, CLIMATE CHANGE & ENVIRONMENTAL SUSTAINABILITY EXPERT, UNICEF

As impacts of climate change intensify exponentially over time, it is the children and young people of today who will face the worst consequences. But far from being passive victims, it is not surprising that young people all over the world have begun to press for climate action using whatever tools they get access to, be it education, technology, science or law.

Amid all the gloom of climate change, the good thing is that far from being passive victims, the youth has begun to fight back on a scale never seen before. From young people suing the US Government for climate inaction to a 9-year-old from Uttarakhand filing a case against the Government of India for the same reason; from Greta Thunberg's movement to various other youth-led climate action groups-the youth has upped the ante in this fight against climate change.

As an organization, UNICEF is committed to helping young people take action to protect the future of our planet. In fact, UNICEF's Climate Change and Environmental Sustainability strategy positions youth as change makers. One of the most important tasks is to prepare today's youth with knowledge and skills to combat the future. In this context, Green jobs for youth and nature-based solutions can play a crucial role that will help them with new livelihoods to protect their future environment.

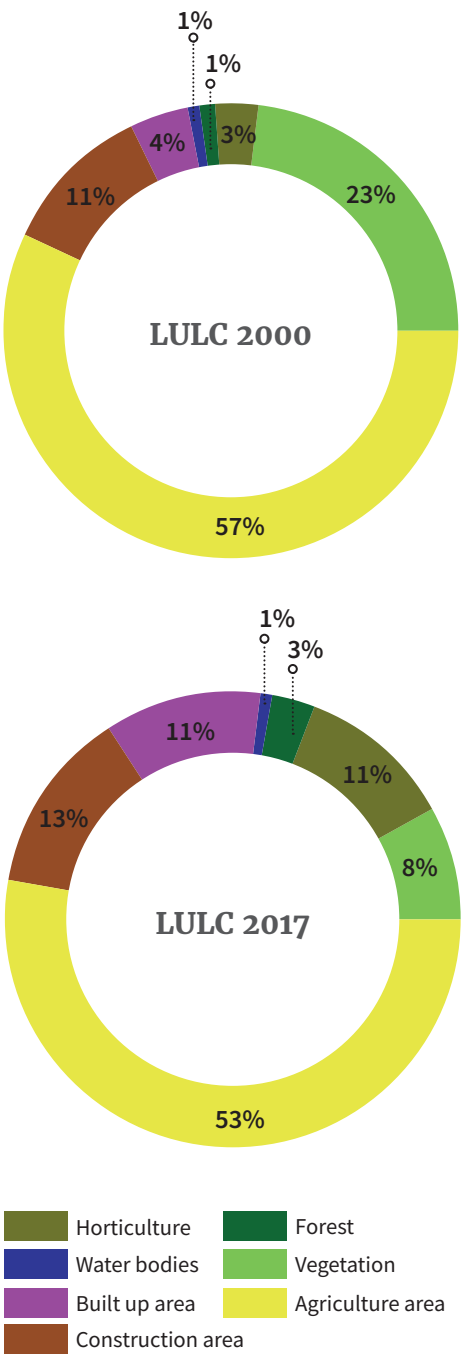
To achieve this goal, UNICEF conducted a stakeholder mapping exercise in which 80-odd stakeholder groups were interviewed to understand what kind of support the youth is looking for, in order to contribute to climate action. By the end of this exercise it came to the fore that, among other things, the youth actually wanted to know what kind of green jobs they should be doing.

So, a Green job series was organized by UNICEF, UNEP, and UNDP, in order to help the youth understand the nuances of eco- advocacy and eco entrepreneurship, so that eventually they are prepared to venture into the domain of Green jobs with a special focus on nature-based activities.

BUILT ENVIRONMENT

Urbanization: From greys to green

DR. VANDANA SEHGAL, DEAN, DEPARTMENT OF PLANNING & ARCHITECTURE, AKTU, LUCKNOW



In the name of urbanizing our towns and cities, we have consistently been compromising with nature. So much so that a comparative look at our landscape from the past and present suggests our landscape is now largely grey, as compared to the past, when it was relatively greener. We need to think of ways and means to make the grays turn green.

A good entry point for this can be through green infrastructure, which although is a relatively new concept but, is quite effective and worth consideration for our urban scenarios.

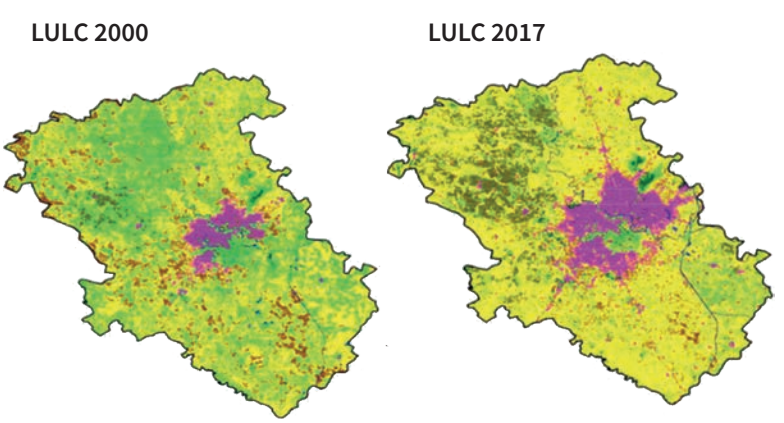
It is a simple solution, which is about introducing green elements in our urbanscape. By introducing such simple changes in our urbanscape, we can improve our immediate atmosphere and subsequently impact the earth positively. Miyawaki forests can work wonders in our urban settings where land is at a premium.

Then we need to relook our drainage system, which can control the run of water and urban flooding. Water roofs, which help in water recharging, also need to be looked at along with urban creeks, which actually bring down temperatures in an effective way. Growing green walls has now become part of the architectural vocabulary. It also helps in bringing down the temperature in a big way.

So, our urban landscapes need to be retrofitted with such elements in our urbanscape. This needs a kind of methodology and a framework, with the help of micro-planning involving NGOs, municipalities, and through people themselves.

Also, a lot of scientific data is needed to actually retrofit our cities.

Increase in forest area



BUILT ENVIRONMENT

Green Building Code: A holistic look at resource management

MR. VASUDEVAN SURESH, NATIONAL CHAIRMAN, INDIAN GREEN BUILDING COUNCIL

The urban population of India would be approximately 600 million by 2030. Urban development has no option but to factor this while planning and managing the resources for this population and think of reduced carbon footprint by a larger population.

A good entry point could be via Net Zero, where consumption of resources is brought down, waste is managed, and green cover is expanded. Most of the time, we imagine emissions from operational use of energy in transport, lighting, heating and cooling of buildings as urban carbon footprint. But while imagining Net Zero in an urban context, we must include the footprint embedded in the materials used for urbanisation. There are almost 250 materials used in construction of buildings and they have enormous emission footprints. Much of that can be saved using the right design and alternative resources.

Then we need to think in a more holistic manner including land, water, energy, and building materials as a resource. There is an urgent need to think of how to optimally, efficiently, and economically utilise all these resources without adversely impacting the environment.

We need to see how water consumption can be reduced by around 25 to 35% and energy is saved by around 40 to 50%. Also, we need to see how waste is being managed. In a developing country like India, a waste to wealth, refuse to resource, and trash to cash approach can work wonders.

The Green Building Code has already established a rating system that covers all aspects of buildings and the built environment. Still, it will be difficult to achieve a net zero urbanisation by 2050 if water, electricity wastage are included. We should be in a position to at least put in place some short term plan by 2025, a medium term plan by 2030, which coincides with the sustainable development goals for 2030, and then we get our long term plan for 2050. We may not go for an absolute net zero, but we can at least try for a near net zero approach.

There are good Indian examples in front of us. Let us take the case of CII- Sohrabji Godrej Green Business Centre in Hyderabad, a net zero energy building that does not require even one kilowatt of energy from outside. It is self-sustaining and in fact gives back energy to the grid. Likewise, a building should also achieve zero liquid discharge as well.

We should be in a position to at least put in place a short term plan by 2025, a medium term plan by 2030, which coincides with SDG 2030, and then a long term plan for 2050

Look at the air conditioning trap. We are into a vicious loop where we're trying to cool the temperature, but the cooling is really increasing the overall temperature of the earth. There are 1 billion AC units in the world now which are likely to rise to 4.5 billion by 2050. Air conditioning system consumes almost 70 to 80% of a building's energy consumption. Instead of adopting standards specified by BEE, we should look at active comfort, and at passive technologies of how buildings can be cooled down rather than pouring in so much energy.

— Mr Anupam Bansal, Principal Architect, ABRD Architects

BUILT ENVIRONMENT

Smart decisions for smart cities

MR. NICOLAS EI HAYEK, PROGRAMME MANAGER, SWISS DEVELOPMENT COOPERATION (SDC)

Climate change is affecting humanity in an unparalleled way and the impacts of global climate change will remain for long.

No matter how rich or adaptable one is, one just cannot compensate for the land lost to rising sea levels, recurrent heat waves, and other catastrophic events of increased magnitude and frequency. Adaptation and mitigation are two intrinsically linked processes and that's why we need to work on both of them together and make the right choices now. That will not only make us more resilient but will also allow us to avoid high adaptation costs later on.

Let us focus on one such initiative promoted by the Swiss Development Cooperation (SDC). This project has established Limestone Calcined Clay Cement (LC3) as an affordable and cleaner general use cement. Usage of LC3 can cut CO2 emissions by up to 30% while offering the same strength of structural bonding.

LC3 is relatively cheaper to produce and in a country like India, which is the second largest cement producer in the world, the potential is immense. Also, as cement is responsible for 8% of global CO2 emissions, imagine a scenario in which LC3 usage is promoted and adopted. Talking about the construction industry, it becomes pertinent to mention that passive design measures can reduce energy consumption of a building by up to 45% during the entire life of the building and at no additional cost.

So, in order to make space for such innovation and showcase alternative solutions, we need to nurture international collaborations. We do have the tools to adopt new and clean solutions so there's no reason to not adopt. In fact, the co-benefits of investing in a true green energy transition are countless. It promises cleaner air and better health for everyone, energy security through energy efficiency, economic growth through green jobs creation. These are just a few examples of how India is already and will continue being a global leading player reinforcing its position as an attractive innovation hub.

Smart technologies are available. What we need now are smart decisions.

The co-benefits of investing in a true green energy transition are countless – promising cleaner air and better health for everyone, energy security through energy efficiency, economic growth through green jobs creation

BUILT ENVIRONMENT

Built Environment as a Whole System

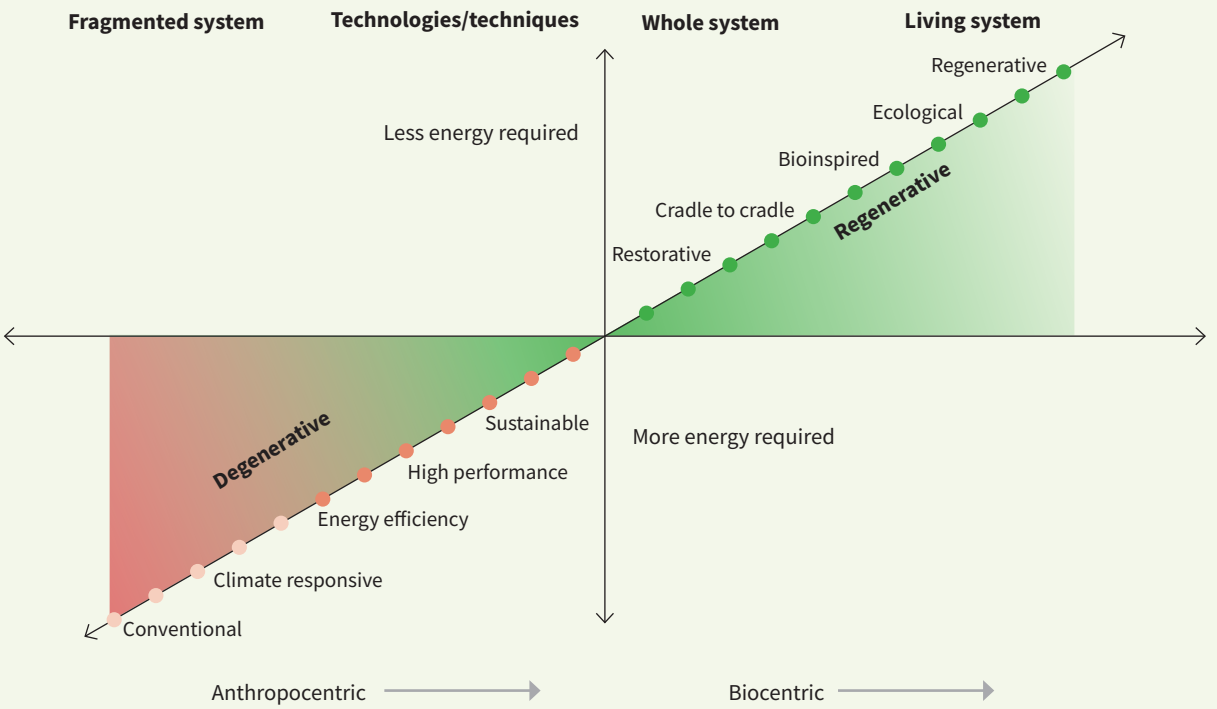
DR CHITRAREKHA KABRE, PROF. OF ARCHITECTURE, SPA, NEW DELHI

Our built environment is designed, constructed, renovated and demolished using enormous amounts of water, energy and natural resources. The system also produces solid and liquid waste, air and noise pollution and heat islands. All of these, together, compromise public health, degrade the environment and deplete resources. The intensity of climate change is forcing us to rethink our strategy for urbanization and greening methodology.

Our current strategy of built environment is based on a fragmented system relying only on technologies. This system does not allow builders, architects and construction companies to achieve large reduction of carbon footprint. According to Bill Reed's analysis of eco-centric design, this method of construction is degenerative and uses more energy. We need to abandon anthropocentric approach and adopt a bio-centric approach that calls for looking at the whole system to reach regenerative buildings making positive impacts.

We need to integrate our forgotten bio-centric traditional know-how to achieve a design model that will translate environmental, social and economic goals of urbanization into objective design.

Ideal model for urbanization



"We have a mission to achieve Net Zero concept by reducing carbon footprint. We need to make a shift towards sustainable lifestyle by accepting sustainable products as individuals. It's our responsibility to contribute meaningfully to deal with the climate change."

— Shri P.K Sharma, IFS, PCCF, Wildlife, Department of Forest & Wildlife, Government of Uttar Pradesh

"Public opinion should be generated to arrest the over-consumption of natural resources by the rich rather than putting extra pressure on poor."

— Prof. Rajive Kumar, IFS (Retd.) Chairman , State Expert Appraisal Committee, Uttar Pradesh

LIFESTYLE

Reducing carbon footprint of the food we eat

DT. AISHWARYA JAISWAL, SENIOR DIETITIAN, APOLLO MEDICS HOSPITALS, LUCKNOW

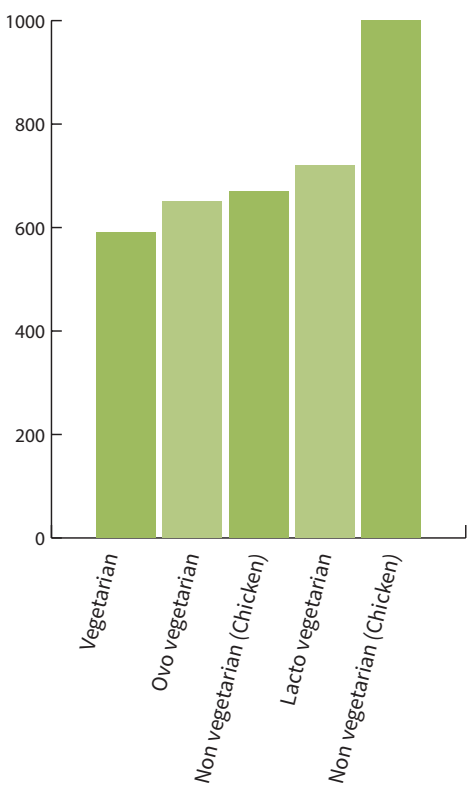
We are all slowly becoming conscious about healthy food, but time has come where we also look at what food is right for the health of planet earth too. Having a meal may seem like the most harmless of human activities, but our food has its own set of carbon footprints, which eventually cause harm to the earth.

Among the Indian food habits, a mutton-centric non vegetarian diet emits the largest amount of greenhouse gasses, which is 1.8 times more than an average vegetarian meal. Interestingly, rice in a vegetarian diet contributes 49% of the total dietary greenhouse gasses. So, on the basis of available data, it can be concluded that shifting from animal-based to plant-based protein can help us reduce our carbon footprints. It is also important to slowly move away from dairy-based products as milk constitutes 22% of emissions from a vegetarian diet.

At times, changing diet can be a win-win situation. For instance, adding more fibers in your diet will surely reduce carbon footprints. But it also has health benefits like lowering blood pressure and maintaining sugar levels. Switching to plant-based protein also makes a huge difference and can compensate for the animal protein we stop consuming.

Also, consuming locally sourced food has a smaller carbon footprint as it saves a large quantity of emission from transportation. It also provides the possibility of fresh food. And last but not the least, we should all try to grow our own food, without chemicals, depending on the space we can avail of. Apart from getting fresh food, the practice helps us to reconnect with nature.

Carbon footprint in daily diet



All the countries have been discussing climate change. But it is sad that no concrete steps are being taken to alleviate the consequences. There is an urgent need to promote sustainable agriculture to manage climate change. The use of chemicals in the agricultural field not only harms soil, but water bodies too. Therefore, people should be encouraged to adopt organic farming. Along with the general public, it is the duty of religious leaders as well as traders to discharge their responsibility towards society and climate change.

— Sri Sri Ravi Shankar, Founder, Art of Living

LIFESTYLE

Waste segregation as an urban culture

MS. SONIA GARGA, DIRECTOR, SAHAS

With the impending climate crisis, there is a buzz about adopting a sustainable lifestyle. Though it is argued that the Indian lifestyle, by default, is much more sustainable than that in the developed countries, the rising income levels and aspiration are driving us too into a high consumption unsustainable lifestyle.

The first thought around adopting a sustainable lifestyle is usually around not using single-use disposables and opting for green alternatives to achieve a lower carbon footprint. But, in reality, everybody faces the problem of unavailability of cost-effective sustainable options. Eventually, adopting a sustainable lifestyle becomes impractical. This is precisely why we have less people moving to sustainable lifestyles as compared to an unsustainable lifestyle because of 'convenience' and unaffordable alternatives.

In the light of climate change, this is catastrophic, as we do not have the luxury of waiting. We need to act now. We need to think of a starting point, which is simple and doable but generates a larger value to sustainability at a scale.

Easily adaptable with no cost, source segregation has immense benefits. Its a societal endeavour that can contribute to a changed outlook on waste. In contrast, zero waste lifestyles have a low benefit – it is just personal choice.

It seems that waste segregation at source has that element of a larger impact in terms of not only reducing carbon footprint, but also as a take-off point for a cultural shift towards urban sustainability. Segregation of waste at source does not involve any major cost or infrastructural investment, but it however requires behavioural change.

In fact when people start segregating waste, they become mindful of the waste they create and become conscious about reducing their waste. This triggers the thought around choosing a sustainable lifestyle.

Once this trigger is released, seeds of the idea of composting can also be sowed, which is a great way to nurture nature. It is a significantly sustainable lifestyle choice, which has a long term positive impact on the environment. At a macro level, more non-organic waste can be recycled easily and pressure on urban landfill is reduced. So, if such a campaign around segregation of waste at source is implemented, it will have a favourable impact on efforts to mitigate effects of climate change. And experience shows that the idea has better result when waste is managed at neighbourhood level.

DESIRED FUTURE

CIRCULAR ECONOMY

Promoting a circular economy

MS. DEEKSHA VATS, SENIOR PRESIDENT, ADITYA BIRLA GROUP

In simple terms, a circular economy is one where markets give incentives to reusing products. Rather than scrapping them and then extracting new resources, it promotes reusing them. In such an economy, all forms of waste, such as textile, metal and obsolete electronics, are returned to the economy or used more efficiently. So, rather than getting virgin pulp for new fibres, it's about time to find practical solutions to make fibre from old clothes, thus contributing to less cutting of trees.

There is a specific perception about waste and not recycling it for reuse. So, if we change that perception and take waste material as an alternative material, it will go a long way in promoting the cause of sustainability.

Private companies somehow still find it challenging to view plastic waste management as their responsibility – it is a mental block that needs to be tackled

There is a need to look for solutions that facilitate decarbonisation in an economically friendly fashion and in the process solve environmental challenges. Emphasis needs to be laid on the importance of developing circular business models because that would ensure a smooth transition to a circular economy. In fact, the circular economy approach can play an important role in decarbonizing the aluminium, cement and textile business of Aditya Birla Group. The recycling of aluminium cans is a promising method to decrease the carbon footprint of the aluminium industry. Similarly, the use of red mud and the use of old clothes to make new fibres are both methods to reduce the carbon footprint in cement and textile production, respectively.

On a different note, there is this mental block pertaining to waste that needs to be tackled by private organisations. Private companies somehow still find it challenging to view plastic waste management as their responsibility. Though there are transitions that are taking place in this perception, the same needs to be further strengthened with alternatives. We also need to identify solutions across the waste spectrum and with all stakeholders involved in plastic waste management. The two fundamental areas that need to be addressed are designing products so that they can be reused and competitive cost for making alternatives and redesign. To conclude, we must consider using alternative materials, and adopting solutions that work on multiple fronts, resource scarcity and carbon reduction can be addressed.

Uttar Pradesh has been managing plastics waste since 2019. Apart from using these wastes for making roads in Lucknow, Kanpur, Meerut and Jhansi, an average of 30 tonnes of waste is co-processed by the cement industry daily. Under EPR, 77 brand owners and producers have disposed 9,74,709 tonnes of plastic since 2019

— Mr Ajay Kumar Sharma, Member Secretary, UPPCB

CIRCULAR ECONOMY

Trash to cash

MR. PRANSHU SINGHAL, KARO SAMBHAV

Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products.

Until now, our economy has been traditional and only about creating certain products from certain materials, without any focus on bringing those products back to their material forms. In the fight against climate change, such an economy is a big challenge.

We get to realize the enormity of the situation when we look around. Is there anything around us that's going fully circular? Probably not!

The problem at hand is how do we create better recycling systems that avoid downcycling, where recycled materials are used to create new items of inferior relevance or value

So, if we wish to bring a massive change, we first need to ensure there are proper collection systems for these products to come back into the production system. We need to drive a large consumer movement where consumers actively contribute to recycling.

The irony is that today, when recycling is a need, it is considered more of a charity or an option of 'good deed'. However, recycling should be a duty that should be ingrained in our minds.

But even if we collect these products, how do we recycle them? This forms the second roadblock in the path for promoting a circular economy. Are we really pushing for a higher demand on recycling? Is the recycling happening in the best possible way? Are we able to extract 100% of the materials and are able to put them to new use?

So, the problem at hand is how do we create better recycling systems that avoid downcycling, where recycled materials are used to create new items of inferior relevance or value. We are not necessarily creating the same products. So, effort should be on finding a solution to this problem.

Then, the third roadblock for a circular economy is about creating a market for secondary materials. If the products have to go circular, we need to have a very strong market, which is accessible to a producer and the manufacturer.

To sum it up all, for a circular economy, we need better collection systems, improved recycling systems, and an accessible market.

KNOWLEDGE

FINANCE

Climate Finance: Innovation is the solution

MS. NEHA KUMAR, INDIA MANAGER, CLIMATE BONDS

Every time we talk about climate finance, it is assumed it would be about public finance. But, the fact is that it can also be about raising money from the market. Given the volume of money that's required to tackle climate change, it is absolutely necessary to look at innovative ways to raise capital towards this end.

If we wish to achieve the NDCs and SDGs by 2030, we'll need anything between 2.3 trillion dollars to 3.4 trillion dollars. But, if we look at the amount of finance that has been coming our way since 2016 and till 2019, the average has been $20 billion per annum.

Given the volume of money that's required to tackle climate change, it is absolutely necessary to look at innovative ways to raise capital towards this end

So, to raise capital via some other route, Green Bonds can be a good choice. A green bond is a fixed-income instrument designed specifically to support specific climate-related or environmental projects.

Interestingly, the market for these Bonds is also picking up. Reason being, investors in emerging economies are making good money from it. Green bonds gain instant attraction because they are easy to buy and make sense.

In fact they are getting oversubscribed. What they are doing is that they give you a broader pool of investors so you can price your deal better. Subsequently, there are cost and pricing advantages, and the best thing is that there is an investor demand, though not yet in India but certainly in overseas markets.

In this context, a State can do two things as of now. Firstly, the State needs to understand and identify what all green projects are active in the State. Then, the State can consider issuing Bonds to finance projects that generate environmental benefits. Then, Government-backed entities can raise money from off-shore markets from abroad. But that calls for a scrutiny as the State's fiscal and governance health will matter to investors in order to build their confidence in investing in you.

There is a lot of money that can be generated for climate change mitigation and this is precisely where a State can take lead to fund adaptation and resilience measures across sectors.

"NABARD has taken up a study to know the feedback from different banks that how they are looking at the green finance or to what extent they are aware of green finance and in the findings, the major highlight was that banks are already doing green finances, but there was lack of awareness about what defines green financing."

— Dr. Sriram Appulingam, DGM, BIRD

"There was a misconception in 2012 that carbon markets don't work because there is no demand, but there is demand from the voluntary markets. If one has to go to net zero one will need carbon offsets because carbon residual emissions are still here that one needs to compensate for and for that carbon credits have to be bought."

— Mr. Sandeep Roy Choudhury, CEO, VNV Advisory Services

SCIENCE

Zooming in to climate problems to find solutions

PROFESSOR A.R. RAMACHANDRAN, CENTRE FOR CC AND ADAPTATION RESEARCH, ANNA UNIVERSITY

Realizing the impact of climate change, political leaders from across the globe are working towards reducing emissions and climate impacts. However, we are at the receiving end in this rolling problem.

Matters get worse in a populous and vulnerable State like UP. The number of rainy days is reducing with consistency but at the same time the intensity of rainfall is increasing alarmingly. This implies that our water bodies and surface irrigation system will not be able to handle the almost sudden and intense surge of rainfall leaving the valuable resource as a waste.

With wastage of water comes its scarcity and subsequent shortage of food. We are a country of 130 billion people and ensuring food for all is a challenge. The consumption pattern of food is different in various regions of the earth. From volume to variety, the differences are manifold and there is no set pattern of food consumption. The quantity and quality of food consumed in developed countries have larger footprints in terms of both water and carbon emissions than that of developing and least developed countries. So, climate change should also be looked at from this lens, factoring in all the disparities.

Using the technology, a user can virtually zoom into a district and understand specific weather variables for the location and relevant future projections. It also projects water availability, agricultural production, situations for forestry, urbanisation and so on, at the district level

This brings to the fore the fact that using generalized data cannot be used to make proper decisions regarding resilience planning of an Indian district. Relevant planning would require data that's specific to geography, demography and economy of the location. Interestingly, Anna University has a Climate Studio, with a supercomputer and can create climate projections for India at district levels. Using the technology it has developed, a user can virtually zoom into a district and understand specific weather variables for the location and relevant future projections. This technology can project water availability, agricultural production, situations for forestry, urbanisation and so on, at the district level.

The real vulnerability is measured by looking at various indicators of socio-economic development, poverty, and SDGs. But the important thing is to zoom into smaller administrative boundaries to get the right and relevant specific information and make right choices for development and suitable adaptation plans.

This tool, available with Anna University, is of extreme relevance in a country like ours and should become the backbone for development and financial planning when it comes to managing climate change.

"Research knowledge and information are three important components of any sustainable system. In case the actions plans are to be implemented we need to have correct knowledge and information in hands."

— Mr. K.P. Dubey, PPCF

"We need data as to assess the status of hydrological health and environmental health of a basin, which is essential for assessment of availability of water resources, assessment of demand imposed and simulation of the processes under present and climate change scenarios."

— Prof. A. Kumar Gosain Emeritus Professor,
Civil Engineering Department Indian Institute of Technology Delhi

SCIENCE

Setting up a knowledge network on climate change

DR. KIM VAN NIEUWAAL, ADVISOR, CLIMATE CHANGE ADAPTATION SERVICES, NETHERLANDS

The quality of life for the poorest and most vulnerable to climate change can be greatly enhanced by combining knowledge, research, and technical advisory. This, simply put, forms a knowledge network, for various stakeholders to benefit from, when it comes to climate action.

Given the role and relevance of Knowledge Networks in Climate Change mitigation and adaptation, it becomes prudent to emulate the global best practices in larger public interest. Among other things, there are a few dos and don'ts that need to be taken care of when setting up a knowledge network for climate change.

- Do work with users to understand their needs, capacities, and preferences. This is essential for developing a platform that is both useful and used.
- Do explore current platform offerings and plan to add value, not duplicate. You may be able to enhance your collective services through collaborating with other platforms.
- Do think long-term as users' needs evolve, policies are updated, and more data and knowledge become available. Platforms need to continuously develop and have the resources to do so.
- Don't assume if you build it they will come. Building a user base takes time and effort. Working closely with users creates buy-in and agency, and champions who in-turn promote the platform.
- Don't develop for development's sake. Development should be driven by users' needs and take into account their capacities.
- Don't forget about funding! Maintaining an up-to-date, relevant, and useable platform over time requires substantial resources and longevity helps build reputation and trust with users.
- Don't forget about monitoring, evaluation, and learning! User feedback and impact is crucial for improving the platform (and gaining donors' interest).

Don't forget about monitoring, evaluation, and learning! User feedback and impact is crucial for improving the platform and gaining donors' interest

Other than the dos and don'ts, there are also a few unavoidable steps for establishing a knowledge platform

1. Establish a governance structure.
2. Create a vision and strategic plan
3. Based on the vision and strategic plan, co-develop an initial value proposition
4. Establish and build a team
5. Ready communication and measurement, reporting and evaluation (MRE) support
6. Rollout the plan

SCIENCE

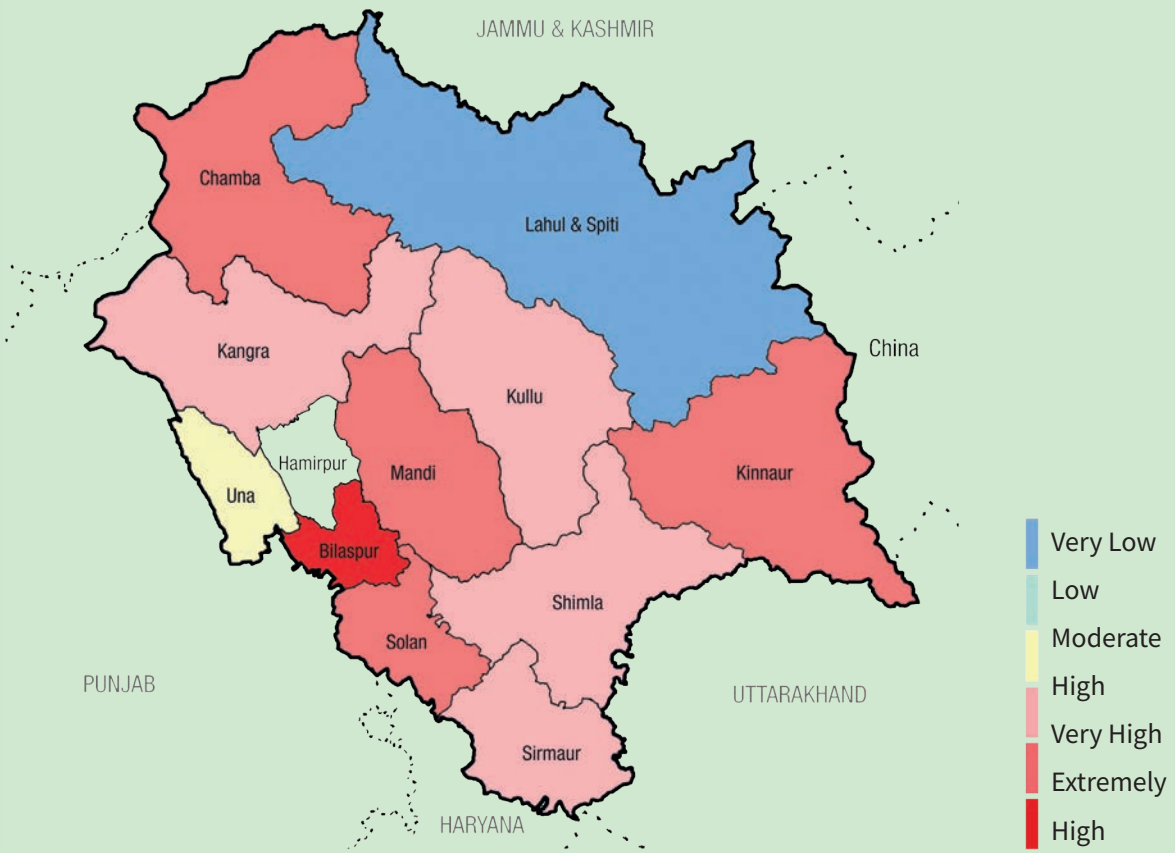
Climate knowledge must reach the community

DR. SURESH ATTRI, PRINCIPAL SCIENTIST,
GOVT. OF HIMACHAL PRADESH

Climate change is a serious threat to socio-economic development globally and in India. Adapting to the present and future impacts of climate change is crucial to secure hard won gains and increase the resilience of the vulnerable communities, in particular for those living in villages.

Vulnerability to climate change is the degree to which a system has the capacity to sustain the damage due to climate change, including climate variability and extremes. And the process of identification, quantification and prioritization of vulnerability in a system is referred to as vulnerability assessment.

Mid-century vulnerability of Himachal Pradesh



So, we need to work with communities to understand their vulnerabilities and devise action plans to take care of those vulnerabilities. Sustainability of any such plan depends upon the level of its localization.

Talking about the vulnerability assessment of Himachal Pradesh, it can safely be assumed that climate change is likely to pose a serious threat to both rural and urban development and livelihood practices in Himachal Pradesh.

The rain fall is high in rainy season which adds to the problems of soil and water conservation, where water scarcity is experienced in other seasons. Analysis of temperature trends in the Himalayas and vicinities shows that temperature increases are greater in the uplands than the lowlands. Climate change impacts on water resources will likely include; (i) increased frequency of heavy precipitation; (ii) increase in extreme rainfall intensity; (iii) increased variability in rainfall patterns; (iv) increased likelihood of water shortages/drought (v) reduced levels of precipitation as snow; (vi) loss of glacier volumes; (vii) earlier snow melt; and (viii) increased temperature.

Adapting to the present and future impacts of climate change is crucial to secure hard won gains and increase the resilience of the vulnerable communities, in particular for those living in villages

Consequences of climate change are expected to critically impact water resources, ecosystem services, and agriculture dependent rural communities.

In order to reduce vulnerability, it is important to first identify the most vulnerable section of the society. A vulnerability assessment revealed that small and marginal farmers, including rural women, are the most vulnerable to climate impacts.

So, in order to reduce the vulnerability and improve the adaptive capacity of this section, a long term programme, in combination of climate smart farming technologies along with required behavioural change, was initiated.

It is expected that this vulnerability assessment process would lead to institutionalization of climate change adaptation planning process at a micro level and for effectively meeting the challenge of future climate impacts.

The practical knowledge so gained at the micro level will subsequently help in micro-level planning.

MEDIA

Training: Need of the hour

EXCERPT FROM AN INTERACTIVE SESSION BETWEEN SENIOR ENVIRONMENTAL JOURNALISTS AND COMMUNICATORS.
DINESH C SHARMA, Veteran Science Journalist and Jawahar Lal Nehru Fellow ● **SUDHIR MISRA,** Senior Editor, Navbharat Times ● **DR SEEMA JAVED,** Climate Communicator and Journalist ● **MEENAKSHI KANDWAL,** News Anchor, Times Now ● **PRANSHU MISHRA,** Bureau Chief, CNN-Network 18 ● **ROHAN DUA,** Founding Editor, The New Indian

Behavior change is a crucial driver in the fight against climate change. Towards this end, when it comes to mitigating anthropogenic causes of climate change, media plays a pivotal role in creating awareness and inducing behavioral change among people. In fact, Mass Media is immense in promoting climate change and sustainable development.

Having said that, there are a host of popular misconceptions about climate change that need to be addressed before any meaningful step could be taken to mitigate its adverse consequences. But a very basic challenge the society faces in this context is the absence of 'environment' as a beat, especially in the mighty electronic media of India. Also, there's this sad trend of treating a natural disaster as just an event to be reported, while the need is to delve deep into the dynamics of such disasters, which is usually rooted into a changing climate.

Reality is that climate change is a clear and present danger, and could no longer be ignored. The magnitude and frequency of natural disasters, witnessed in recent years, only establish this reality. What we need is to make the people aware about the core issues of climate change, so that there is a collective effort of making a positive change through the use of media. There's also a need to mainstream the issue in non-English, vernacular media.

Lastly, it is about time media looks beyond TRP and circulation considerations and focus on issues like this to bring out a real change in society. Also, domain-specific training of journalists is the need of the hour.

"Roadmap drawn by India will help the country to achieve the Sustainable Development goals with collaborative efforts of the public and the government."

— Mr. Ashwini Kumar Choubey, Union Minister of State for Environment, Forest and Climate Change

"Environment and climate change go hand in hand and it is important to mainstream these issues in all sectors including agriculture, water, rural development etc. It is important that advisory is followed by all departments and only then the change is possible."

— Shri Faggan Singh Kulaste, Hon'ble Union Minister of State for Steel and Rural Development, Govt of India

POSTSCRIPT

Urban mobility needs an e-push

MR. AMITABH KANT, CEO, NITI AAYOG

In the last decade, weather-related disasters have affected around 4.1 billion people across the globe, rendering them homeless and vulnerable. In fact India is among the most vulnerable countries in this context. A World Bank report has stated that climate change will shave off 2.8% of India's per capita GDP by 2050. Furthermore, climate change will increase the stress of the country's natural ecosystem and agricultural output, apart from escalating damages to infrastructure. This will have severe consequences for India's food, water, and energy security, apart from impacting public health.

Having said that; India recognizes the urgency of strong climate actions and has, hence, been making enormous efforts to tackle the problem, without seeking any support, whatsoever, from the developed world.

Uttar Pradesh, which is India's most populous State, is among the most important states in the national grain basket. Being an agricultural economy, UP is significantly vulnerable to the vagaries of climate change.

Hence, the need is to plan and prepare and be more resilient. But UP, with a population of over 240 million, has the requisite wherewithal to achieve majorly on this front. Also, there is finance available for climate change adaptation, domestic as well as international. UP has already initiated adaptation projects using domestic funds.

The State Government should also consider adopting zero waste natural farming, which would be a big help in the context of adapting to climate change, as that would involve relatively less use of water and less use of fertilizers.

On the urban front, mobility demand is increasing, and there is an urgent need to promote electric mobility. NITI Aayog will be happy to partner with UP in this regard.

The Government in UP should take steps towards promoting electric mobility and providing a great shift towards battery operated two and three wheelers in the next few years.

Beyond the government, the private sector is an important partner in climate management. We all know, in this new reality, valuation of companies go up when they go green. NITI Aayog will be very happy to partner with willing members of the private sector in UP, to help them go green.

We all know, in this new reality, valuation of companies go up when they go green. NITI Aayog will be very happy to partner with willing members of the private sector in UP, to help them go green

"There is a need to extract good practices, lessons and apply them sector-wise, and bring global challenges in an 'imaginable' manner at the local level."

—Mrs Kalpana Awasthi, IAS, Principal Secretary

CHARTER OF CLIMATE ACTION

All scientific projections, on climate change, without doubt point at the vulnerabilities of Uttar Pradesh. In fact, the State needs urgent and consistent measures to address these vulnerabilities. While the northern part of the State suffers an increasing vulnerability from floods, the southern districts are prone to drought and water shortage.

The Government of Uttar Pradesh is committed to ensuring leadership and working with all stakeholders to promote climate action, implement the SDG Vision 2030 agenda for sustainable development and contribute to India's Nationally Determined Contribution (NDC) and the Net Zero goal.

The State Action Plan on Climate Change (SAPCC) forms the primary source of guidance for climate action at the State level, covering aspects of mitigation and adaptation through coordinated efforts of Government Departments and agencies with participation of academic and research institutions, non-governmental organisations, and the private sector.

It is imperative that all stakeholders join hands for achieving goals and objectives of climate action in Uttar Pradesh and make it climate resilient. Also, while focusing on protecting populations and regions vulnerable to impact of climate change and disasters, it is important to promote a low carbon development strategy for Uttar Pradesh.

On the basis of the experts opinions & stakeholders consultations held in the various technical sessions during the Conclave, it was decided that the charter of Climate Action for the State of Uttar Pradesh must fulfill the broad objectives and vision of Climate Change but also it should be more focused upon addressing various Climate issues specific to the State of Uttar Pradesh. The Charter adopts the principle of Think Globally Act Locally. It was felt that the main challenge in mainstreaming climate change is absence of local viable solutions for climate change mitigation and adaptation. The State of Uttar Pradesh may make further issue based deliberations in details to carve out a Climate Action Plan for the State. The Lucknow Charter for Climate Action adopts mission wise well synergized actions.

SUSTAINABLE AGRICULTURE

- Relook agricultural practices to promote irrigation efficiency, livelihood diversification, agro-forestry, medicinal and aromatic plants-based agriculture systems as adaptation strategies.
- The area specific Climate resilient agricultural practices to be promoted and be made more profitable for its easy and speedy adoption. The innovative benefit sharing mechanisms namely carbon financing in agro-forestry sector through voluntary markets may be explored.

WATER RESOURCES

- Promote water harvesting and water budgeting in high drought vulnerability areas through community involvement.
- Strengthening and capacity building of Community Organizations doing water harvesting and management

SUSTAINABLE LIFESTYLE AND HABITAT

- Contribute to the promotion and understanding of principles of sustainable lifestyle through preferred, acceptable and popular environment education and awareness programmes as means to achieving sustainable development practices and contributing to climate goals.
- Urbanisation and transport continue to be a big contributor to green-house gas emissions. Besides expressways and other transport infrastructures high priority be given to affordable and comfortable bus and railway service with last mile connectivity.
- In view large population using non-motorized transport, the high priority to be given for building and retrofitting of infrastructure for cycling and walking.
- Ensure proper planning for urban transport system and last mile connectivity for optimum ridership and to promote land use based urban transport planning.
- Promote design audits and retrofitting of existing crossings and ensure proper architectural design inputs in the new urban transport infrastructure projects for ensuring optimum traffic flow.

ENERGY EFFICIENCY AND RENEWABLE ENERGY

- Promoting energy efficiency and clean energy is imperative for achieving climate goals. Research, development and adoption of global best practices to reduce emission intensity of fossil-based energy generation; promotion of non-renewables at war footing; creating a culture of conserving as much energy as possible; promoting energy saving electrical gadgets and illumination devices.
- Create a strong legislative and policy framework that incentivizes Green buildings and energy efficiency in buildings. Capacity building for green building consultancy and services along with capacity building for ensuring effective implementation of the Code.
- To promote energy efficiency in Heating Ventilation Air Conditioning (HVAC) sector including the Potato Cold Chains by energy efficient practices and alternative technologies.
- To give high priority to Rooftop Solar Systems especially in residential and commercial sector along with time of day power tariff mechanism to boost power consumption in off peak hours.
- To promote research and transfer of know-how for low cost energy efficient housing for rural areas.

HUMAN HEALTH

- Extensive and continuous public campaigns to promote the practice of segregating dry and wet waste at source. Building infrastructure for centralised and decentralised processing of waste using low carbon waste management solutions. Creating wealth from waste using principles of circular economy and promotion of the 7Rs: Rethink, Refuse, Reduce, Reuse, Repurpose, Rot and Recycle.
- To promote consumption of low carbon climate resilient healthy food for providing impetus to the sustainable agriculture.
- In order to minimize the health impacts of air pollution, ensure paradigm shift for control of air pollution from city centric approach to airshed centric approach. Ensure planning, appropriate policy interventions and execution of airshed action plans and augment resources and regional/sub-regional co-operation for its effective implementation.

DISASTER MANAGEMENT

- Strengthen the knowledge base of vulnerability assessment at the village level and downscaling SAPCC into district-level plans aiming at promoting integration of climate and disaster risks through risk informed sectoral plans and gram panchayat development plans.
- Mainstream climate change and disaster risk into the Gram Panchayat Development Planning process through intensive participation of and strengthening capacities of local governments to manage climate change and disaster risk.
- Strengthening an enabling environment for development of climate-resilient infrastructure, in order to build resilience, protect communities and the environment and contribute to sustainable development.

GREENING AND NATURE BASED SOLUTIONS

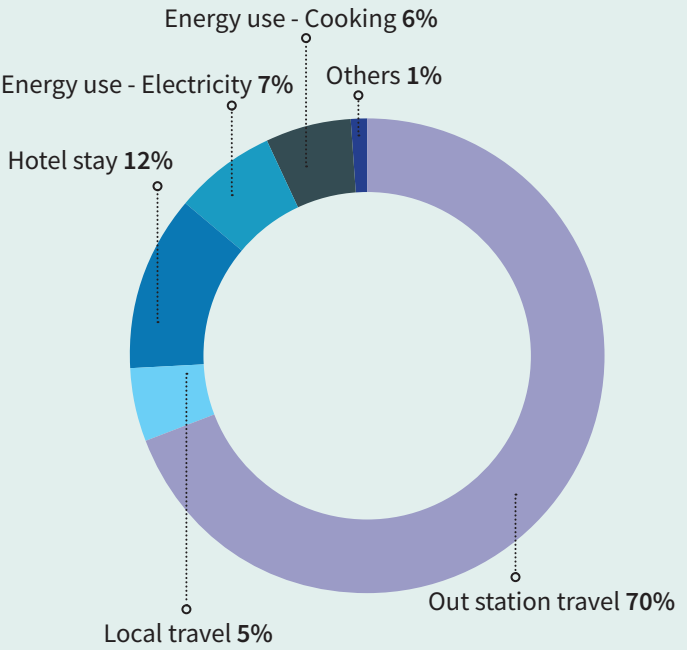
- Utilize the potential of nature-based solutions for adaptation, mitigation, disaster risk reduction, and biodiversity conservation with participation and inclusion of all stakeholders.
- Promotion of forestry as a mitigation strategy as nature-based solutions are cost effective and beneficial to local communities.
- To explore and utilize the Voluntary Emission Reductions (VERs) potential of the State from nature-based solutions for benefit sharing with the most vulnerable community/ target group for taking up climate resilient practices.

STRATEGIC KNOWLEDGE

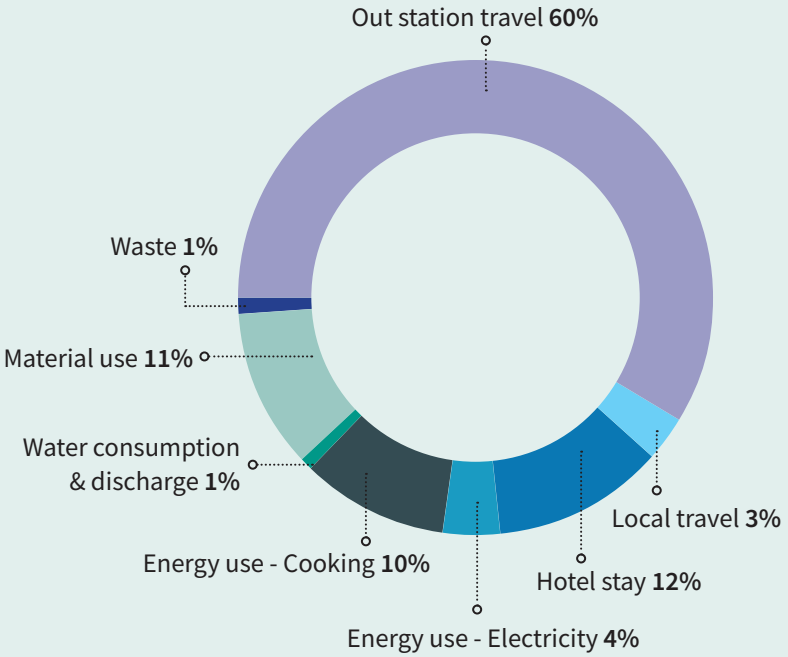
- Mobilizing additional finances for climate action—adaptation and mitigation through public and private sources and promoting innovative financial and risk transfer instruments as risk management options.
- Capacity building is key to coordinated effort and accelerated action on climate change. Capacity building programme needs to cover all aspects of administration horizontally and all levels of governance machinery vertically. All Government officials, from across departments and levels, should be educated and updated constantly with climate information.
- Develop a multi-stakeholder knowledge platform/network for scientists, policy makers and practitioners to convene and engage in participatory and coordinated climate action.
- To promote research and demonstration on climate change adaptation and mitigation through the knowledge network in the State especially in view of finding need based and gender inclusive solutions to local challenges of climate impacts.
- To promote the research on the impact of bio-diversity of the vulnerable regions due to climate change as most of the high vulnerability regions in the State coincide with natural forests/genepools.
- Demonstrating leadership by engaging in national and international initiatives to address climate change and disaster risk management.

TURNING THE CONCLAVE CARBON-NEUTRAL

PRE-EVENT ESTIMATION:
Estimation was done assuming 400 attendees for 2 days, including 100 outstation speakers with air travel and hotel stay. In addition, an estimated staff of 60 working for the conclave for 5 days was also included.
Estimated emission: 69.29 tCO2e

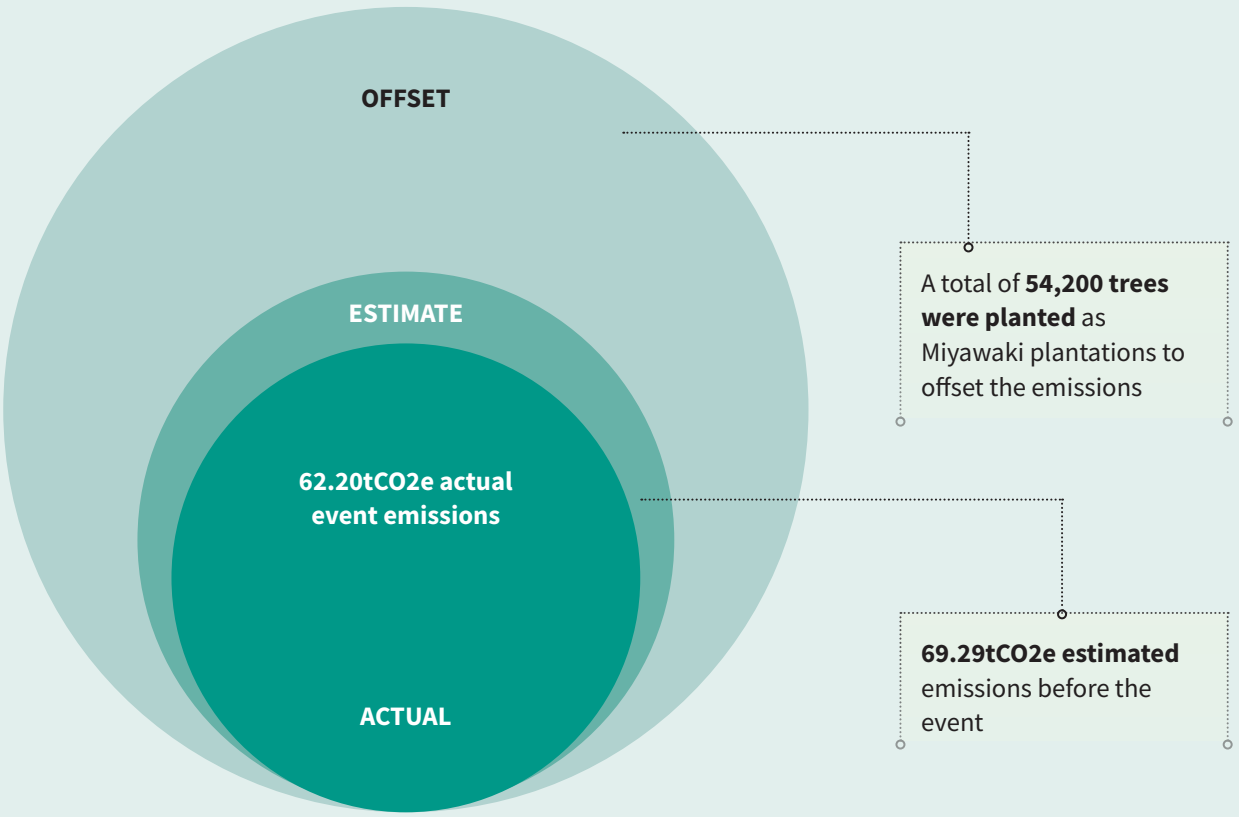


POST-EVENT ENUMERATION:
Data was collected during the event to calculate actual emission. The actual event was attended by more than 1000 persons for 2 days. During the event, outstation attendee's air tickets and all invoices were examined. Actual emission was less than what was estimated.
Actual emission: 62.20 tCO2e



OFFSETTING THE EMISSION:

Offsetting was planned through Miyawaki forest plantation, as they are 20 times more biodiversity rich and grow 10 times faster than conventional plantations. To offset 62.20 tCO2e, 54,200 trees were planted over an area of 1.62 hectare in Lucknow and Varanasi. The Government of Uttar Pradesh has a commitment of maintaining these forests for at least 3 years.



**All calculations were made according to the principles of GHG protocol and ISO 14064. All data has been made available to the public for verification and transparency.*