



From Director's Desk

NABARD has made pioneering contribution to implementing Natural Resource Management (NRM) based projects over the past three decades. The rich experience gained through the Watershed and Tribal Development programmes implemented across the country has established the importance of people's participation in implementing and ownership of these programmes. Recent developments have brought forth a series of interventions in the form of climate proofing, sustainable development plans, aggregation with enhanced community involvement and new marketing avenues through collectivisation. Most significant is the visible role of women in the growth trajectory witnessed through these interventions.

Today Climate Change calls for urgent action. It is a serious challenge that threatens sustainable development - not only posing threat to lives of people but also affecting their livelihoods. The daily life of people is getting hampered due to frequently occurring events such as heavy rains, storms, drought, floods and cyclones besides the ill-effect of zoonotic diseases such as COVID-19 which has attracted the attention of policy makers-globally. Strategies to address climate change aspects have to factor in, issues of rainfed farming, over-dependence of rural population on agriculture and predominance of small and marginal farmers, all of which pose a big challenge to agricultural sustainable farming. Hence there is a need to adopt a multi-pronged strategy to maintain robust growth trajectory in the sector. NABARD is working with the Government for framing policies and implementing programmes for adaptation and mitigation to promote climate resilient agriculture.

NABARD in the capacity of National Implementing Entity (NIE) for three important funds namely Adaptation Fund (AF), National Adaptation Fund for Climate Change (NAFCC) and Green Climate Fund (GCF) aims to channelize finance for adaptation and mitigation activities. NABARD's efforts have led to whopping cumulative disbursement of ₹.868.50 Crore to Climate Change projects sanctioned under various national and global funding arrangements, as on 31st March 2021.

To impart focussed attention on capacity development of the stakeholders and act as a think-tank, the Centre for Climate Change (CCC) established at BIRD, Lucknow is active by promoting collaboration, conducting capacity building programmes and developing training modules for Bankers, State Government officials and NGOs. There is a felt need to have a continuous stream of informative data on Climate change for the stakeholders through regular publications. I am glad to present to you - the BIRD's Climate Lens, a newsletter with the objective to provide information for lucid reading so as to equip the reader with better understanding on fast-evolving topics under Climate Change.

Shankar A. Pande
Director, BIRD, Lucknow

Sixth Assessment Report (AR6) 2021 of the United Nations' Intergovernmental Panel on Climate Change (IPCC)

The United Nations' Intergovernmental Panel on Climate Change (IPCC) has recently published the first part of its sixth assessment report (AR6), which will form the cornerstone of climate science for the years ahead. Summarising the "physical science basis" for climate change, the report pulls together the findings from more than 14,000 peer-reviewed studies.

What Is The IPCC Report? Why Is It Important?

The IPCC was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization. Its mission was to provide global policymakers with periodic, scientific assessments of climate change to guide national and global policies. The reports by IPCC assess the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. The findings of the IPCC reports state the "level of confidence" with which they are made. However, the reports usually do not make any policy recommendations. The last such assessment report by the IPCC was released in 2013.

What Does The New IPCC Report Say?

The IPCC's Sixth Assessment Report (AR6) 'Climate Change 2021: The Physical Science Basis' finds that averaged over the

next 20 years, global temperature is expected to reach or exceed 1.5°C of warming over the baseline scenario. The report also states that emissions of greenhouse gases from human activities are responsible for approximately 1.1°C of warming since 1850-1900. It further says that climate events like those caused by sea-level rise, which would happen once in a century earlier, could begin to take place once every year.

The report provided new estimates of the chances of crossing the global warming level of 1.5°C in the next decades and found that unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach. But it is not just about temperature. Climate change is bringing multiple different changes in different regions, which will all increase with further warming. These include changes to wet and dryness, to winds, snow and ice, coastal areas and oceans.

Potential Adverse Impacts

The report cited the following as possible changes that this global temperature increase can cause in weather cycles:

- Climate change is intensifying the water cycle - bringing more intense rainfall and associated flooding as well as more intense drought in many regions.
- Climate change is affecting rainfall patterns. In high latitudes, precipitation is likely to increase while it is



- projected to decrease over large parts of the subtropics.
- Changes to monsoon precipitation are expected, which will vary by region.
 - Coastal areas will see continued sea-level rise throughout the 21st century, contributing to more frequent and severe coastal flooding in low-lying areas and coastal erosion.
 - Extreme sea level events that previously occurred once in 100 years could happen every year by the end of this century.
 - Further warming will amplify permafrost thawing, and the loss of seasonal snow cover, melting of glaciers and ice sheets, and loss of summer Arctic sea ice.
 - Changes to the ocean, including warming, more frequent marine heat-waves, ocean acidification, and reduced oxygen levels have been clearly linked to human influence. These changes affect both ocean ecosystems and the people that rely on them, and they will continue throughout at least the rest of this century.
 - For cities, some aspects of climate change may be amplified, including heat (since urban areas are usually warmer than their surroundings), flooding from heavy precipitation events and sea-level rise in coastal cities.

The most important point from the IPCC AR6 report is that the mitigation and adaptation strategies submitted by nations (known as Nationally Determined Contributions or NDCs) through the Paris Agreement are insufficient to keep global surface temperature increase within 1.5°C or even 2°C limit. With the global mean temperature rise now going above 1°C, India is at a crucial juncture where we are already facing increasing extreme weather events such as cyclones, floods, droughts and heat-waves. Climate projections unanimously show that all these severe weather conditions will become more frequent and intense with temperatures going up since humans are not sufficiently curbing the emissions.

What Does This Mean For India?

The observations that the IPCC report makes for the weather patterns and its consequences in Asia is of particular importance in the Indian context. The most important of these observations, are assessments made about Asian monsoons, which could be telling about the monsoon patterns in India - a country where the monsoon season is a source of life and livelihood. The Report observes with a high degree of confidence that "The South and Southeast Asian monsoon has weakened in the second half of the 20th century". It further highlights the fact that, in the long term, South and Southeast Asian monsoon and East Asian summer monsoon precipitation will increase.

For South Asia specifically, the report outlines that both annual and summer monsoon precipitation would increase during the 21st century, with "enhanced inter-annual variability", i.e. monsoon patterns will be variable (and difficult to predict) from one year to the next.

As far as India is concerned, it is expected that South Asian Monsoons that hit India, would become stronger in the long run leading to heavy rainfall in certain areas, thereby causing floods and related extreme weather events.

The report also raises a massive warning sign for India's mountains. Increased rainfall has been predicted for the Tibetan plateau and the Himalayan region. Snow volumes are expected to

decrease in most of the Hindukush Himalayan areas.

For India, the predictions in this report mean people would have to labour in longer and more frequent heat waves, warmer nights for winter crops, erratic monsoon rains for summer crops, destructive floods and storms that disrupt power supply for drinking water or medical oxygen production.

Climate Negotiations at COP under UNFCCC - India's Response

Climate change has emerged as one of the most severe challenges that we are facing globally and a global response to the challenge is being seen as an effective mechanism to combat the threat of climate change. Hence strengthening the global response is of paramount importance and relevance at this stage and the Conference of Parties plays an important role in addressing this issue.

The United Nations Framework Convention on Climate Change (UNFCCC) which was adopted in 1992 and came into effect on 21 March, 1994, primarily aims to prevent anthropogenic interference in the earth's climate system and stabilize Greenhouse Gas (GHG) emissions.

The Conference of Parties (COP) is the supreme decision-making body of the Convention. All Countries that are Parties to UNFCCC Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements. With this aim, the Conference of Parties meets every year to assess progress and review documents by countries on their plans to combat climate change.

COP and the Paris Agreement

From the first COP meeting held in Berlin, Germany in March, 1995 there have been 25 meetings so far. The 26th COP meeting, 2020 was scheduled to be held in Glasgow, United Kingdom, but had to be postponed due to the COVID-19 pandemic, and is now scheduled for November 1-12, 2021.

The COP meetings have resulted in a number of landmark decisions and agreements. For example - COP 3 - held in December 1997 at Kyoto, Japan - led to the adoption of Kyoto Protocol, which called upon developed countries to reduce their GHGs and established legally binding obligations under international law.

Another equally important event was COP - 21, held at Paris, France in 2015 - which led to the Paris Agreement. The Paris Agreement has been adopted by 196 countries. It is a legally binding international treaty on climate change that aims to limit global average temperature to well below 2, preferably to 1.5 degree Celsius, compared to pre-industrial levels. However, the implementation of this agreement requires comprehensive economic and social transformation. It works on a 5-year cycle of goals and actions carried out by countries.

In 2020, countries were supposed to submit their plans Contributions or NDCs, which was postponed to 2021 in the COP



26 due to the pandemic. The NDCs are the goals and actions that the countries communicate as their plan to undertake to reduce their GHG emissions to reach the goals of the Paris Agreement.

What are India's NDCs?

India ratified the Paris Agreement a year after the submission of its Intended National Determined Contribution (INDC). Its NDCs for the period 2021 to 2030 are as follows -

INDIA	Main pledges and targets	
	Ratified	Yes
PARIS AGREEMENT	2030 unconditional target(s)	33% to 35% below 2005 emissions intensity of GDO by 2030 [413-445% above 1990 by 2030 excl. LULUCF] [146-161% above 2010 by 2030 excl. LULUCF]
	2030 unconditional target(s)	Non-fossil share of cumulative power generation capacity 40% by 2030 [371-373% above 1990 by 2030 excl. LULUCF] [126-127% above 2010 by 2030 excl. LULUCF]
	Coverage LULUCF	Not specified Additional (cumulative) carbon sink of 2.5-3 GtCO ₂ e by 2030
LONG-TERM GOAL(S)	Long-term goal(s)	Per capita emissions never to exceed those of the develop world.

Union Budget 2021-22 & Climate

To achieve the above goals, India has been taking up a number of initiatives, especially in the renewable energy sector - by focussing on the objectives of promoting a variety of renewable energies, such as - introduction of newer, more efficient and cleaner technologies in thermal power generation, reduction in emissions from industries, transportation sector, buildings and appliances, waste etc.

The implementation of the Green India Mission remains a priority. This Mission is a comprehensive program towards sustainable environmental development through which the country can protect, restore and enhance forest cover and other afforestation programmes, along with planning and implementation of actions and schemes to enhance climate resilience and reduce vulnerability to climate change.

Some of the key proposals to enhance India's comprehensive environment protection efforts, which found prominent mention in the Union Budget 2021-22 include:

Purpose	Outlay	Highlights
Hydrogen Energy Mission	-	Generating hydrogen from green power sources
Capital infusion	-	Solar Energy Corporation of India
Capital infusion	₹1,500 crore	Indian Renewable Energy Development Agency
Clean Air Programme	₹2,217 crore	Air pollution control in 42 cities with a million plus population
Voluntary vehicle scrapping policy	₹141,678 crore over a period of five years from 2021-2026	To phase out old and unfit vehicles

Deep Ocean Mission	₹4,000 Crore	Focus on Blue Economy
Jal Jeevan Mission (Urban)	₹2,87,000 crore to be implemented over 5 years	universal water supply in all 4,378 Urban Local Bodies with 2.86 crores household tap connections, as well as liquid waste management in 500 Atal Mission for Rejuvenation and Urban Transformation (AMRUT) cities.

Means of implementation of India's NDCs

The Paris Agreement provides a framework for financial, technical and capacity building to the countries that require it. Climate finance is particularly important as it is needed for mitigation and adaptation efforts by the countries.

As such, the agreement reaffirms the need for developed countries to offer financial assistance to those needing it for reducing their GHG emissions and also in their pursuit of climate-resilient development. India's climate actions have mostly been funded by domestic resources.

However, to achieve the goals set forth, substantial scaling of the climate action plans needs to be complemented by financial resources and assistance from developed countries, which requires additional investments for strengthening resilience and disaster management.

The Paris Agreement also discussed about technological development and transfer for achieving the goals of the Agreement. India has advocated for global collaboration in Research & Development (R&D), with regards to climate change adaptation and mitigation, particularly in clean technologies. It has also advocated for enabling their transfer, and free Intellectual Property Rights (IPR) costs to developing countries.

The Agreement emphasizes upon climate-related capacity building for developing countries and exhorts the developed countries to extend their support for the same. In this area, India aims for a manifold scaling up of the country's renewable energy targets and India's climate change goals which are linked to the implementation of policies such as the programme on Smart Cities, Swachh Bharat Mission (Clean India Mission) and the cleaning of rivers.

COP 26, Glasgow, November 2021

India is on track to achieve two of the three components of its Paris target. First, India has already reduced emissions intensity by 21% given its target to reduce emissions intensity of GDP by 33-35% by 2030. Second, with 38% of non-fossil fuel capacity (including renewables, large hydro and nuclear), India is just 2% short of its 2030 target of 40% of installed non-fossil fuel electricity capacity. However, on the third component - to achieve 2.5 to 3 billion tonnes of carbon dioxide equivalent in forest cover by 2030, much more work is needed.

On the domestic front, India aims to install an ambitious 175 gigawatts (GW) of renewable energy by 2022 and 450 GW by



by 2030. India already has 90 GW of renewable energy, representing 24% of total installed capacity. In addition, India has some of the lowest solar tariffs globally, dropping to ₹2.36 (USD 0.032)/kWh and thermal capacity has declined from 70% in 2015 to 61% in 2020. The India Cooling Action Plan at the national level and progress on building efficient buildings and cool roofs at the state level are also driving efforts to save energy and reduce heat trapping hydrofluorocarbons (HFCs). The Government's FAME-II scheme provides ₹10,000 crore (USD 1.4 billion) is moving forward with electric vehicles.

On the international front, India is leading efforts with the International Solar Alliance (ISA), Kigali Amendment to the Montreal Protocol, International Coalition for Disaster Resilient Infrastructure (CDRI), and Leadership Group for Industry Transition. India recently created an Apex Committee for Implementation of Paris Agreement (AIPA). The aim of AIPA is to increase coordination among 14 key ministries and to engage business, stakeholders and the UN on delivery of the Paris Agreement.

However, a number of major studies have indicated that the current global commitments are not enough. The recent UNEP Emissions Gap 2020 report projects a 56% expected shortfall in emissions between the countries' commitments and progress toward 1.5°C (26% shortfall for 2°C).

In the lead up to the COP - 26 Summit, the European Union has taken a big step by committing to cut greenhouse gas emissions by 55% from 1990 levels by 2030. New Zealand and 32 countries declared "climate emergencies." China and 125 countries have committed to carbon neutrality by mid-century. Together, these represent 51% of global greenhouse gas emissions. The percentage could increase to 63% with the re-affirmation to Paris Agreement by USA.

Towards climate Change: State Action Plan on Climate Change (SAPCC)

With climate change becoming increasingly central to policy, planning and implementation at various levels, there is an urgent need for coherence between climate change strategies at the national, sub-national and district level. In India, formulation of State Action Plan on Climate Change SAPCCs has been an important milestone in developing domestic policies around climate change, and the SAPCCs are the guiding document for planning climate change actions for all the state departments.

In view of the advancement in science, evolving climate policy context- both nationally and internationally such as through commitments under NDC and other priorities of the Government, SAPCCs are being updated and strengthened. The key aspect of SAPCCs is to mainstream climate change action into local level planning. Mainstreaming climate change is contextual having relevance to influence the socioeconomic fabric of the locals. Today the need of Action plan at local-village/block level is crucial in view of frequent climate change witnessed in the country. It is further important that mainstreaming adaptation is inevitable and one which will ensure accountability and enhance our understanding to mitigate Climate change in a way that provides essential security to the farmer/villager witnessing such

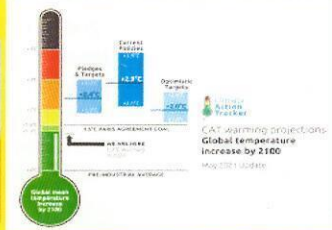
drastic weather conditions. The State governments since a decade have developed, implemented and have tested approaches for mainstreaming climate change adaptation at many a levels of governance based on the SAPCC document. These plans that have been implemented are unique involving dynamics between communities, NGOs, governance mechanisms.

Landmark COP 21 at Paris: Significance

The Paris Climate Conference which was held from 30 November to 12 December 2015 at Paris with participation of parties to the UNFCCC has 195 nations and European Union as the participating parties in COP 21.

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The COP 21 brought forth a new International Climate Agreement involving all countries with a common aim to **contain the Global warming at 1.5° C to 2.0° C.**

The international response to climate change began at the Rio Earth Summit in 1992, where the 'Rio Convention' **included the adoption of the UN Framework on Climate Change (UNFCCC)**. This convention set out a framework for action aimed at stabilising atmospheric concentrations of greenhouse gases (GHGs) to avoid "dangerous anthropogenic interference with the climate system."

The main objective of the annual Conference of Parties (COP) is to review the Convention's implementation. The first COP took place in Berlin in 1995 and significant meetings since then have included COP3 where the Kyoto Protocol was adopted, COP11 where the Montreal Action Plan was produced and COP17 in Durban where the Green Climate Fund was created.

Impact on Agriculture : Urgent action is required to address climate risks to food security and to mitigate greenhouse gas (GHGs) emissions from all sectors, most prominently under the umbrella of the Paris Climate Agreement. Agriculture is at cross-



road at present and more than a hundred countries pledged emission reduction from agriculture, forestry and other land uses. According to IPCC assessment, key food commodities such as rice, maize and wheat are projected to decrease both in quantity and quality owing to reduction in the amount of protein and mineral concentrations. These impacts threaten the vulnerable populations, especially the small and marginal farmers. Hence, shifting from conventional high-external-inputs dependent agriculture towards sustainable systematic planned production is the need of the hour.

Climate Smart Agriculture (CSA) is gaining attention as a response to Climate Change, supporting the transformation and protection of the agricultural sector. CSA is defined as an approach that supports efforts at local, State and national levels to address these challenges through three core components: (i) sustainably increasing productivity, (ii) climate adaptation and (iii) checking or reducing GHGs emission. While the main focus is on new practices and technologies at pilot and farm level, strategic planning and implementation to integrate with climate change - adaptation and mitigation measures is of critical importance.

Farm practices and technologies that contribute to the achievement of the three pillars outlined above can be considered climate-smart. An example to achieve the potential CSA through three point agenda is to conserve sustainable farm-practices through combination of minimal soil disturbance (reduced tillage or no-till), permanent soil cover (mulch) and crop rotation. If the three principles of conservation agriculture are implemented, they have the potential to contribute to all the pillars of CSA by i) increasing productivity ii) reducing erosion as well as increasing water storage capacity and quality and iii) enhancing soil carbon sequestration compared to conventional practices, i.e., through minimum tillage practices.

There exists a wide range of CSA practices which can contribute to the three aims, including for example diversification or rotation of crops, improved irrigation and residue management, land contouring and terracing as well as agroforestry. Another example highlighting the potential economic benefit of CSA practices is introduction of drought tolerant rice variety that would increase financial benefit in drought prone areas.

Yet the adoption rate of many beneficial CSA practices is rather low. For example, despite clear evidence over more than two decades, the proportion of total farmland under organic cultivation/natural farming etc. remains low. The NRM based interventions of NABARD over the years have established that the general eco-system contribute to sustainable farming with better resource management.

Towards responsible and sustainable growth

Environmental, Social and Governance : ESG is simply, Environmental, Social and Governance aspects of any entity. ESG forms integral part of reporting and has impact on financing of any activity or business concern. In recent years, adapting to and mitigating climate change impact and transitioning to sustainable development have emerged as crucial concerns, across the world. ESG issues impacts every company. SEBI mandated under LODR regulations (Listing Obligations and Disclosure Requirement) Regulations 2015 for Business/corporate's responsibility in

reporting on ESG - Environment, Social and Governance aspects. In particular, entities-the listed companies, have to disclose business responsibility and sustainability reporting.

ESG is a three core measuring theme for sustainability and societal impact of an investment in a company - the ESG term was first coined in 2005 based on a study initiated by the United Nations, titled Who Cares Wins. The ESG criteria are important in determining the future financial and ethical performance of a company.

The ESG has 3 components namely (i) Environmental issues ranges from climate change, carbon emission, waste recycling, natural resource management strategies and conservation of biodiversity (ii) Social issues inclusive of labour issues, deliverables, data security and use of digitization mode and its impact on the social capital (iii) Governance aspects comprise of organizational practices, enterprise risk framework and disclosures of the entity on ESG aspects.

Adoption of ESGs in undertaking business or any activity in a right way, maintaining a balance between income generation/livelihood and the upkeep of natural resources is on an increase. Today the way a business or enterprise views ESG has shifted from just a formal sets of disclosures to a responsibility-driven investment in environment-safe activities. ESG is driving investors, enterprises and concerns globally as an essential integral part of implementing a project or starting any venture. Hence, ESG has to be viewed as a continual process in any organisation.

The pandemic has brought in the need for social commitment, environmental concerns and efficient Governance of organizations' across the world for revisiting the impact on environment.

Net Zero Emissions: The term Net Zero Emissions (NZE) is used since the Paris Agreement in 2015, where signatories agreed to their commitments to achieve Net Zero Emissions by 2050. Simply put- Net Zero means the Green House gases released into the atmosphere as a result of operations/activities and those taken out or removed or reduced through mitigation or climate change adaptation measures. Countries that commit to NZE, have to revisit and take a fresh look into the way the economy is growing, the impact of growth trajectory on the environment especially the stage of NRM exploitation and how to manage it scientifically. Stipulations towards NZE are tightening and this may lead to stringent/tougher regulations with penalties for companies/organisations not meeting set standards.

Social Acceptability: Transparent disclosure are essential to maintain accurate information on key sustainability measures of any concern. Social Capital through involvement of local communities through education and acceptance of the changes of practices recommended targeting sustenance of the NRM will ensure social acceptability levels/social license for any project. These need to be included at the stage of planning, much prior to commencement of the project. The Legitimacy, Credibility and trust based social impacts have to be brought in at every stage and operation of the entity. Hence, social acceptability of the operations of the entity has to be a full time engagement, leading to mutual respect and high probity.



The guiding principles of any initiatives matter and not the project cost outlay, when it comes to ESG interventions and monitoring. To start with the ESG component has to make a cultural effort that will require a top-down approach, since it is still in a nascent stage in our country. The firms that rate ESG are also emerging which will further strengthen and provide an enabling eco-system for imbibing, implementing and reporting. There is a felt need for a global framework with standardized benchmarks that address environmental concerns.

Common Benchmarks to access ESG growth: Measuring the growth under ESG is essential for incremental works and progress, this will be largely based on correct/accurate and scientific-base data. Standardisation and common benchmarks are expected to bring in the much needed transparency. Both qualitative and quantitative hallmarks have to be built in for ESG ratings. It is a complex subject and to the most committed organisation also to bring in all the ESG concerns at once may not be possible, initially. The main point is to understand the environmental risks that are getting impacted and bears adverse effect on ESG standards. Climate change is impacting future of business as well as future-business. Hence with the ESG standards gaining momentum high level specialist are being brought in at Board level with an aim to deliberate on issues such as Society expectations, aligning brand to ESG objectives, various risks of global/country level.

Only when the stakeholders work in tandem with clear laid down standards in all 3 core will lead to ESG success or an ESG based way of life. However the ESGs will vary with the activity of the concern. Generating awareness at every level and involving as many stakeholders as possible is necessary. NRM involving social concerns and acceptability through multi-dimensional programs with Stakeholders involvement will build and place success driven sustainable and impactful ESG results.

Natural Resource Management: Major initiatives of NABARD

Since its inception in 1982, NABARD has been pioneering a number of interventions focused on agriculture and rural development which forms the back-bone of the Indian Economy. Keeping pace with the changing requirements NABARD has been fostering development through a number of interventions focused on climate related aspects, some of which are

Participatory Watershed Development Programmes

The WDF created in 1999-2000 with an initial corpus of Rs.200 crore was augmented over the years by the interest differential earned under RIDF and the interest accrued on the unutilized portion of the fund. Under these projects NABARD as on date has implemented projects covering 23.07 lakh ha through the Indo-German Watershed Projects (IGWDP) while 13.57 lakh ha. have been implemented through the Participatory Watershed development program. Cumulatively area covered under watershed is to the tune of 36.65 lakh hectare that has been treated. The financial outlay of these projects is to the tune of Rs.1,822 crore.

List of projects are :

- (a) Participatory Watershed development projects
- (b) Sustainable development plans in completed watershed projects
- (c) The soil restoration and Rehabilitation of degraded soils programmes to ensure food security under the climate proofing soil projects through 'One world, No Hunger' of KfW, Germany
- (d) WDF: Climate proofing
- (e) Springs based watershed development projects in NER and hilly region
- (f) Integrated water management scheme

The Sustainable Development plan, designed as ventures - post treatment of watershed to address the crucial issues of technology transfer, agriculture extension, credit intensification, integrated pest management, promotion of FPOs ascertains continuity of efforts towards natural resource management with active participation of locals. As on date more than 466 SDPs have been sanctioned with total financial outlay of over Rs. 47 crore.

Tribal Development Fund

The Tribal Development Fund (TDF), created in 2003-04 with a corpus of Rs.50 crore, has established program that provides sustainable livelihoods to tribals through wadi or orchard development thus helping in checking the migration of tribals to urban areas in search of jobs. Since 2020-2021, other components such as sericulture, apiculture, animal husbandry and SHG-enterprise are also covered under TDF. The projects have proven to ensure management of natural resources mainly water and soil, increase in gross cropped area, enhanced adaptation during drought/famine and improved adaptability/resilience to vagaries of nature as also visible increase in ground water levels. In addition the role played by women has also ascertained their participation in livelihood based activities. A number of farmer producer companies are emerging in completed wadi projects.

Facilitate Mitigation and Adaptation to Environment- NABARD's Climate Change Projects

NABARD has a pivotal role in implementing climate based projects under the (I) National Implementing Entity (NIE) for the Adaptation Fund (AF) under the United Nations Framework Conventions on Climate Change and the National Adaptation Fund for Climate Change (NAFCC) of Government of India

- **Adaptation Fund (AF):** There are as on date 8 Projects on Natural Resources Management (NRM) inclusive of Coastal management, food security and forestry projects. **Grant sanctioned: Rs.59 crore.**
- **National Adaptation Fund for Climate Change (NAFCC):** There are 30 projects as on date, covering NRM, climate resilient farming, coastal management, forest and livestock management projects. **Grant sanctioned : Rs.847.5 crore.**

- (ii) The Green Climate Fund, being the Direct Access Entity to GCF.



There are 2 projects on the following with **combined outlay of Rs.913.58 crore:**

- "Create economically viable solar roof top model" 250 MW project
Implementing agency: Tata Clean Tech Capital
- 'Construction of 10,000 tanks in tribal areas of Odisha'
Implementing Agency: Government of Odisha
- (iii) National Action Plan for Climate Change alongwith the State Action Plan for Climate Change to develop climate action plans.
- (iv) Currently, there are 40 climate change projects underway with a total **financial outlay of Rs.1,822 crore**

NABARD's Climate Finance Initiative - Addressing Vulnerability of Water Sector in Sikkim

A project to address the Climate Change Vulnerability in Water Sector for 13 drought prone blocks consisting of 421 villages in South and West Sikkim was implemented by **'Rural Development Department, Government of Sikkim,'** with support of **'Ministry of Agriculture, Government of India,'** under **'National Adaptation Fund for Climate Change (NAFCC)'** through NABARD as 'National Implementing Entity (NIE)' in convergence with **'MGNREGA'**

The primary source of water in the rural areas of Sikkim Himalaya are springs, streams and small rivers through the surface and sub-surface water flows originating mostly from the unconfined aquifers. Springs occur, where sloping ground and impenetrable rocks interacts with the ground water table.

Nearly 80,000 rural households of the State depend on these springs as a source of drinking water. Over the years many of these springs started drying up in the dry belts of Sikkim especially in the southern part. As a consequence, villages in these areas started facing a severe shortage of drinking water. These areas were essentially in dry belts and face severe domestic water shortage and thus conservation of seasonal water sources/ natural springs by using traditional/ ecological/ scientific technologies were the immediate interventions required in the area. However, the capacity of local level institutions on water management and conservation of natural resources are lacking.

In view of these significantly important challenges, this project was taken up to address the drinking water issues in vulnerable blocks of Sikkim through as-is situation assessment, identification of problems, formulation of recommendations and subsequent implementation including infrastructural development. The primary objectives of the project were (i) Development of Village Water Security Plan (VWSP) through identification of issues related to drinking water in each Gram Panchayat; assessment of dependency for drinking water to local springs; analysis of gravity based water supply systems and estimation of current water requirement, state of water governance and sanitation status of the Gram Panchayats; (ii) Formulation of recommendations for each of the Gram Panchayats as a fallout of Village Water Security Plan; (iii) Implementation of recommendation including infrastructural development in each Gram Panchayat.

Based on the vulnerability analysis on water sector done by the Rural Management and Development Department, 421 villages

of 74 Gram Panchayats in 13 blocks of South and West Sikkim were identified as water stressed area for project implementation. The project covered 45000 households and benefited rural population of 2,00, individuals.

The project initiatives included (i) community mobilization on water conservation and climate resilient activities, (ii) training on preparation and implementation of VWSP, (iii) preparation of VWSP, feasibility assessment and budget estimation, (iii) implementation of activities under VWSP - rooftop water harvesting structures, community water reservoirs and construction of solid waste recovery system and, (iv) support services viz. fodder and horticulture development.

After the implementation of the project, the visible project impacts have been (i) Creation of additional drinking water storage capacity of 17.07 million litres across 13 drought prone blocks, helping 45,000 families gain access to clean drinking water. (ii) Revival of Suke Pokheri spring towards Sribadam helped the rainbow trout fish farmers and ensured regular supply of water, (iii) The revival of Poison Lake helped springs to discharge consistent water towards SangaDorjee and Rinchenpong Bazar, (iv) Cardamom plantations provided an income of Rs.36 Crore @ Rs 1.00 lakh per hectare after third year, (v) Fodder plantations created additional livelihood options for villagers in dairy, piggery and goatery sectors.

NABARD's New initiatives to bridge the regional gap in Infrastructure: Rural Infrastructure Assistance to State Government (RIAS) in the Eastern region of the nation - Focus on 5 J

The motto of Jan (people), Jal (water), Jameen (Earth), Janwar (animals) and Jangal (forests) knits the coherence between all actors ensuring an all-inclusive development. One of the key measures to enhance adaptability to the impacts of climate change is to reduce economic inequality. Since no one is immune to climate change, it becomes crucial that regional disparities are reduced.

1. A new product has been introduced by NABARD aiming to develop rural infrastructure in the Eastern region that are designed to support livelihoods. The Eastern region is deficient in physical and social infrastructure
2. The scheme also aims to provide opportunities of employment through infrastructure development, in view of the reverse migration of labourers to the Eastern States, in the wake of the pandemic-lockdown situation .
3. Infrastructure Loans will be focus on Jan, Jal, Jameen, Janwar and Jangal-the five "J"s. Some key features are listed as follows :
 - (a) Some projects that can be considered cover spice-production through organic farming, drinking water projects for communities' habitats adjoining forest areas coupled with Dairy development and Goatery etc.
 - (b) Water storage tanks, soil conservation programs through integrated farm development covering fisheries, small



- orchards and vegetable cultivation.
- (c) The rich biodiverse flora and fauna needs to be preserved through State Governmental efforts with local tourism industry to reap the benefits of the rich natural resources.
 - (d) Common facility centres for providing agri-tools for farming to the local farmers.
 - (e) Skill development on minor forest produce-Good Collection Practices (MFP-GCP), tea-blending industry, masala making, perfume based floriculture units etc.
 - (f) Micro-food processing units and common infrastructure requirement for such units
 - (g) Vegetable cultivation, scientific packaging and exports or cater to domestic urban markets within the country.
 - (h) FPOs-value based supply chain infrastructure network through skill development.
 - (i) Promote infrastructure and programs/ventures on cluster-based approach that converges with activities of SHGs/SHG-federations through RIAS
4. The State government will borrow within the borrowing limit under Article 293(3) of the Constitution of India and with the approval of the State legislature under article 293(1) of the Constitution of India. In the wake of the announcements made by the Hon'ble Prime Minister regarding investment of Rs. 100 lakh crore in infrastructure with the objective of making India a \$ 5-trillion economy by FY 2024-25 and unveiling of report of the Task force on National Infrastructure Pipeline (NIP) by the Hon'ble Union Finance Minister, the RIAS product is introduced to augment resources for investments in rural infrastructure.
 5. RIAS envisages to provide financial assistance to State Governments to hasten the process of securing critical rural infrastructure which will promote rural livelihoods and in turn the local economy. In particular the infrastructure deficiency is observed in irrigation, electricity, connectivity, drinking water and sanitation etc. in the eastern regions
 6. The first tranche under RIAS is 15000 Crore, and will be for the eastern UP, Assam, Bihar, WB, Odisha, Chhattisgarh and Jharkhand. After the operations under RIAS-I are stabilised the aspirational districts will also be covered
 7. Rural Infrastructure projects related to livelihoods and those designed to enhance the social well-being and improvements in human development index will be supported. Projects largely benefiting rural areas / population and impacting livelihoods will be preferred

River Revival: Infrastructure development through farmers

An innovative water resource development project of "stream or river revival" sanctioned under Rural Innovation Promotion Fund (RIPF) of NABARD and UPNRM - financial component, grant was completed successfully in Wardha. It has been replicated with renewed interest both by the farmers and the State Government and promises to be a Game-changer under

community led use and management of water resources in villages.

- River revival is a cost-effective model of reviving streams/streams through widening and deepening measures, involving excavation of river-beds and creating embankments to help channelise the water from the natural stream. The flow of the water is checked through reverse slope of about one meter in the water tanks created in the streams.
- Project was implemented through NGO - Kamal Nayan Jannalal Bajaj Foundation (KJBF) with total project cost of Rs.20 lakh, for reviving 2 km stretch with community participation. KJBF is a CSR backed foundation headed by Shri Shishir Bajaj of the Bajaj Group of Companies.
- Project work design is based on topography of the stream, involving deepening/de-silting works of 10 to 10.2 mt width and 1.6 to 2 mt depth. The excavated soil, is piled up forming a slope on the banks of the river/stream, forming a natural barrier between the stream and adjoining farmlands.
- Treatment cost varies with the topography and levels of de-silting, the average cost is between Rs.10 to 12 lakh per km of stream.
- Farmer's participation by way of shramdaan and contribution towards part-cost, is in-built in the project. Farmers provided 17 to 20% of the project cost and the demand for the project led to replication in other villages. It was also included in UPNRM project as financial component (grant) implemented through Vidarbha Kokan Grameen Bank. The State Government of Maharashtra through the Agriculture Department implemented with the NGO - treatment of the Yashoda basin revival in Deoli block of Wardha.
- There is demand for treating 300 km of the stream/river length within the district of Wardha itself. This would require fund to the tune of Rs.30 crore for the infrastructure in the district. Similar works can be successfully undertaken in all the 11 districts of Vidarbha region where availability of irrigation water in the summer months is crucial and affects the lives of the SMFs of the region.
- Farmers having agri-land adjoining the stream are more interested in implementation of the project.





Key Lessons: The innovative low cost project of river revival is a soil and water conservation model that has established the following:

- (a) Strategic management of soil and water through stream revival.
- (b) Prevention of water logging in farm-land adjoining the stream/river during monsoons.
- (c) Extension availability of water beyond monsoon.
- (d) Reduction of stress of farmers having farm-land adjoining streams through better natural resources management & prevention of floods .
- (e) Due to water resource management- more crop area has come under cultivation .
- (f) Increase in cropping intensity and productivity.
- (g) Increase in ground water levels through collective water management with active community participation.
- (h) Fodder grass and tree plantation on banks to strengthen embankments.
- (i) Development of sustainable water, soil conservation in villages.
- (j) Promotion of ecological balance and biodiversity.
- (k) Improvement of the overall landscape of the treated area.
- (l) Facilitating State Government to bring-in funds to the tune of Rs.100 crore for Yashoda river revival of which to the tune of Rs. 17 crore is through farmers contibution.



India's Energy Conservation and Renewable Energy Initiatives

Indian renewable energy sector is the fourth most attractive renewable energy market in the world. India was ranked fifth in wind power, fifth in solar power and fourth in renewable power installed capacity, as of 2019.

Installed renewable power generation capacity has gained pace over the past few years, posting a CAGR of 17.33% between FY16-20. With the increased support of Government and improved economics, the sector has become attractive from investors perspective. As India looks to meet its energy demand on its own, which is expected to reach 15,820 TWh by 2040, renewable energy is set to play an important role. The government is aiming to achieve 227 GW of renewable energy capacity (including 114 GW of solar capacity addition and 67 GW of wind power capacity) by 2022, more than its 175 GW target as per the Paris Agreement. The Government plans to establish renewable energy capacity of 523 GW (including 73 GW from Hydro) by 2030.

Market Size

As of February 2021, installed renewable energy capacity stood at 94.43 GW. The country is targeting about 450 Gigawatt (GW) of installed renewable energy capacity by 2030 - about 280 GW (over 60%) is expected from solar. From April 2015 to February 2021, India has added 117.9 GW of power generation capacity, including 64.5 GW of conventional source and 53.4 GW from renewable sources. By December 2019, 15,100 megawatts (MW) of wind power projects were issued, of which, projects of 12,162.50 MW capacity have already been awarded. Power generation from renewable energy sources in India reached 127.01 billion units (BU) in FY20. With a potential capacity of 363 GW and with policies focused on the renewable energy sector, Northern India is expected to become the hub for renewable energy in India.

Recent Government initiatives

Some recent initiatives by Government of India to boost India's renewable energy sector are as follows:

- Launch of India Renewables Dashboard to provide detailed operational information on renewable energy (RE) projects in India by the Central Electricity Authority (CEA) and CEEW's Centre for Energy Finance (CEEW-CEF).
- Release of draft National Electricity Policy (NEP) 2021 by Ministry of Power (MoP). March 2021 - Approval of Memorandum of Understanding (MoU) in the field of renewable energy cooperation between India and the French Republic.
- Announcement of scheme in Haryana for 40% subsidy for 3 KW plant in homes to encourage solar energy in the state . For solar systems of 4-10 KW, a 20% subsidy would be available for installation from specified companies.
- Launch of Gram Ujala - an ambitious programme to include the world's cheapest LED bulbs in rural areas for Rs. 10 (US\$ 0.14), advancing its climate change policy and bolstering its self-reliance credentials.
- Allocation of Rs. 5,753 crore (US\$ 788.45 million) and Rs. 300 crore (US\$ 41.12 million) for the 'Green Energy Corridor' scheme to Ministry for New and Renewable Energy in the Union Budget 2021-22.
- An additional capital infusion of Rs. 1,000 crore (US\$ 137.04 million) to Solar Energy Corporation of India (SECI) and Rs. 1,500 crore (US\$ 205.57million) to Indian Renewable Energy Development Agency.
- Customs duty on solar inverters has been increased from 5% to 20%, and on solar lanterns from 5% to 15% - to encourage domestic production.



- November 2020 - launch of production-linked incentive (PLI) scheme worth Rs. 4,500 crore (US\$ 610.23 million) for high-efficiency solar PV modules manufacturing over a five-year period.
- The Government of India has announced plans to implement a US\$ 238 million National Mission on advanced ultra-supercritical technologies for cleaner coal utilisation.
- Indian Railways is taking increased efforts through sustained energy efficient measures and maximum use of clean fuel to cut down emission level by 33% by 2030.

Road Ahead

Government of India is committed to increased use of clean energy sources and is already undertaking various large-scale sustainable power projects and promoting green energy heavily. In addition, renewable energy has the potential to create many employment opportunities at all levels, especially in rural areas. The Ministry of New and Renewable Energy (MNRE) has set an ambitious target to set up renewable energy capacities to the tune of 227 GW by 2022, of which about 114 GW is planned for solar, 67 GW for wind and other for hydro and bio among other. India's renewable energy sector is expected to attract investment worth US\$ 80 billion in the next four years. About 5,000 Compressed Biogas plants will be set up across India by 2023.

It is expected that by 2040, around 49% of the total electricity will be generated by renewable energy as more efficient batteries will be used to store electricity, which will further cut the solar energy cost by 66% as compared to the current cost. *Use of renewables in place of coal will save India Rs. 54,000 crore (US\$ 8.43 billion) annually. Renewable energy will account for 55% of the total installed power capacity by 2030.

As per the Central Electricity Authority (CEA) estimates, by 2029-30, the share of renewable energy generation would increase from 18% to 44%, while that of thermal is expected to reduce from 78% to 52%.

According to the year-end review (2020) by the Ministry of New and Renewable Energy, another 49.59 GW of renewable energy capacity is under installation and an additional 27.41 GW of capacity has been tendered. This puts the total capacity of renewable energy projects (already commissioned or in the pipeline) at ~167 GW.

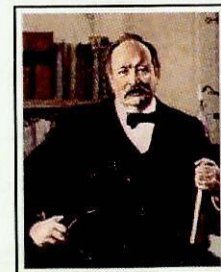
Government of India wants to develop a 'green city' in every state of the country, powered by renewable energy. The 'green city' will mainstream environment-friendly power through solar rooftop systems on all its houses, solar parks on the city's outskirts, waste to energy plants and electric mobility-enabled public transport systems.

SNIPPETS

World Sustainable Development Summit

The World Sustainable Development Summit (WSDS) is the annual flagship event of The Energy and Resources Institute (TERI). The WSDS 2022 will be held under the umbrella theme of 'Towards a Resilient Planet: Ensuring a Sustainable and Equitable Future'. The upcoming edition will be held as a hybrid event scheduled from 16- 18 February, 2022 in New Delhi, India. The World Sustainable Development Summit brings together Nobel laureates, political leaders, decision-makers from bilateral and multilateral institutions, business leaders, high-level functionaries from the diplomatic corps, scientists and researchers, media personnel, and members of civil society; on a common platform to deliberate on issues related to sustainable development.

Post the adoption of the Sustainable Development Goals and the signing of the Paris Agreement, the World Sustainable Development Summit aims to provide long-term solutions for the benefit of the global community by assembling the various stakeholders on a single platform and initiating a step in the direction of achieving constructive action in combating issues pertinent to the future of humanity.



Svante Arrhenius, Nobel Laureate

Svante Arrhenius (1859-1927) was a Swedish scientist who was first to claim in 1896 that fossil fuel combustion may eventually result in increased global warming. He proposed a relation between atmospheric carbon dioxide concentrations and temperature.