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WORKING PAPER - CLIMATE RESILIENCE
(As on 11th April, 2023)

Executive Summary

As the likelihood of exceeding the 1.5°C global warming level increases, resulting impacts are more likely to pose significant risks to people, particularly those in low-income households and countries, and indigenous communities, nature, and infrastructure in India and the U.S. While the U.S. faced eighteen separate billion-dollar weather and climate disaster events in 2022[1], India experienced extreme weather events 314 out of the 365 days[2].

Therefore, Climate Resilience is a critical component for long-term global response to climate change to protect people, livelihoods and ecosystems. For that reason, it is imperative that Climate Resilient Development (CRD) is prioritized, which can enable the implementation of adaptation strategies that increase social, economic, and ecological resilience to climate change, while also contributing to reductions in greenhouse gas (GHG) emissions.

The latest IPCC Sixth Assessment Report - Working Group II report defines Climate resilient development as *"reducing exposure and vulnerability to climate hazards, cutting back greenhouse gas emissions and conserving biodiversity are given the highest priorities in everyday decision-making and policies on all aspects of society including energy, industry, health, water, food, urban development, housing and transport[3]."*

This development is complex, given its cross-cutting nature – impacting several aspects of society including energy, industry, health, water, food, urban development, housing and transport. Therefore, climate resilience strategies and actions have to be country-driven, equitable, gender-responsive, participatory and fully transparent, considering vulnerable groups, communities and ecosystems.

Given the significant roles that the U.S. and India are expected to play in achieving the Paris Agreement targets, the two nations must leverage their strategic collaboration to advance the green agenda, ramp up green finance flows, and create market mechanisms that will help to accelerate the transition to a sustainable, low-carbon, and climate resilient future.

The U.S. and India should assess and reinvigorate its existing programs and create new programs, building on the past U.S.-India Joint Working groups and 2016 Joint Statement: The United States and India: Enduring Global Partners in the 21st Century. Key priorities for climate cooperation are (as outlined below):

- **Climate Proofing Urban and Rural infrastructure**- The U.S. and India can explore developing innovative risk financing instruments for Disaster Risk Infrastructure (DRI)/Climate Risk Infrastructure (CRI). *Both countries can also leverage existing collaborations such as Mission Innovation and Coalition for Disaster Resilient Infrastructure (CDRI) to foster climate resilient infrastructure innovation.* Both countries should also leverage rapidly-evolving new technologies such as big data, remote imaging, drones and unmanned aerial vehicles, and Internet of Things (IoT), etc. Both countries could pilot projects that explore the viability and effectiveness of different DRF instruments like insurance and bonds.
- **Promote "Just" and Green Energy Transition** –A U.S.-India Green Transition Finance Initiative could be jointly launched by the two nations to raise private funding for India's sustainable transition. Given that the U.S. has some of the largest supply pools of private capital and that India presents one of the largest markets for international green capital, a U.S.-India Green Transition Finance Initiative (that enables private capital to flow into green projects between the two countries) would signal the leadership of the two countries and the crucial role they must play in advancing the global energy transition in a way that enables skill development and jobs creation.
- **Sub-National Climate Actions**: The U.S. and India could potentially develop a program with meaningful funding to create opportunities for cross-country learning, capacity building and implementation - at the state- and city-levels.
- **Sustainable Lifestyle and Reducing Emissions Footprint**: The U.S. and India could partner to continually identify and build capacity to implement Mission LiFE for their respective populations. Both countries could look at furthering the 'Circular Economy', while incorporating local/traditional knowledge and public engagement/awareness to bring down resource consumption.
- **Loss and Damage** - The U.S. and India could have more in-depth bilateral discussions to understand respective country positions and possibly discuss solutions to operationalize the loss and damage fund as soon as possible.
- **Nature, Biodiversity and Climate Resilience** - The U.S. and India could jointly develop a program that can support both government institutions, Multilateral Development Banks (MDB), international financial institutions (IFIs), and the private sector to scale up biodiversity finance and reduce finance flows that harm biodiversity. The U.S. and India could jointly organize regional workshops to capitalize experience, disseminate good practices, and mobilize U.S. and Indian expertise on wildlife and nature conservation.
- **Private Sector Financing for Wetland Restoration and Protection -** The U.S. and India could jointly develop an adaptation-oriented project preparation facility to attract private sector investment at scale. The two countries could create a national adaptation investment plan to list a portfolio of projects that are open to funding from domestic and foreign public or private entities. The two could jointly execute pilot/demonstration

projects by supporting individual projects to execute the transaction, by helping to coordinate project financing with relevant investors for projects that are ready for investment and providing technical assistance.

- **Green Buildings** - U.S. and Indian counterparts should work together to scale up ECBC adoption and implementation. The focus could also be on promoting Net Zero public buildings and supporting reforming public procurement practices.

Climate Resilience– State of Play in the U.S.

According to a new Washington Post analysis of federal disaster declarations, more than 40% of Americans reside in counties hit by climate disasters in 2021[4]. There were 18 different billion-dollar weather and climate disaster incidents in 2022. These incidents included: three tropical cyclones (Ian, Fiona, and Nicole), the Kentucky/Missouri flooding, the late-December Central and Eastern winter storm/cold wave, the Western and Central drought/heat wave, and the Western wildfires. There were also eleven severe storm events (tornado outbreaks, high wind, hailstorms, and a derecho). For the U.S., the year 2022 was the third most expensive year on record, behind 2017 and 2005, due to the overall cost of these events, which came to $165 billion. In five of the last six years (2017-2022), billion-dollar disasters have cost more than $100 billion annually, with 2019 being the lone exception. Around $1 trillion has been spent in the past seven years (from 2016 to 2022)[5].

The U.S. has taken measures to improve the country's resilience to the severe impacts climate change has on our communities, infrastructure, economies, and other factors as climate-related extreme weather events become more frequent and dangerous. After rejoining the Paris Agreement, the Biden Administration issued two executive orders that re-engaged the federal government in addressing climate change, through both mitigation and adaptation. The first was Executive Order 13990[6]—Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis - this executive order was more focused on mitigation than adaptation. And the second EO was issued a week later, Executive Order 14008[7]—Tackling the Climate Crisis at Home and Abroad. This order established as federal policy *"that climate considerations shall be an essential element of United States foreign policy and national*

security," and it articulated specific steps that the administration would take to re-engage with the international community on climate change.

Domestically, the order created the White House Office of Domestic Climate Policy and the National Climate Task Force, which was the first-ever National Climate Task Force, with more than 25 Cabinet-level leaders from across agencies working together on national goals[8]:

- Reducing U.S. greenhouse gas emissions 50-52% below 2005 levels in 2030
- Reaching 100% carbon pollution-free electricity by 2035
- Achieving a net-zero emissions economy by 2050
- Delivering 40% of the benefits from federal investments in climate and clean energy to disadvantaged communities

The Executive Order 14008 extensively focuses on climate change adaptation. For example, U.S. federal agencies have to submit draft climate adaptation plans[9]. The U.S. administration has recently launched two key pieces of legislation – (1) The Infrastructure Investment and Jobs Act (IIJA) or Bipartisan Infrastructure Bill and (2) the Inflation Reduction Act of 2022 (IRA). The IIJA[10] raised funding for Army Corps and FEMA flood risk reduction programmes, granted $50 billion for climate resilience and weatherization, and provided NOAA with funds for wildfire modeling and forecasting in order to support climate adaptation. Expanded access to clean water was funded with an additional $55 billion, while $21 billion was earmarked for polluted site cleaning and capping abandoned oil and gas wells. The IRA 2022 also allocates considerable amounts of money for grants to tribes and to state and local governments for climate adaptation projects, notably for example, with $2.6 billion allocated for coastal communities and climate resilience projects [11].

Engagement of sub-national governments **-** Under the U.S. federalist system, sub-national governments (states) retain the most basic governing authority. As a result, state and local governments are key players in climate change adaptation in the United States. State and local governments have played increasing roles in climate change adaptation governance. As of September 2022, 19 states and the District of Columbia have state-level adaptation plans finalized, while another five states had plans in progress[12].

U.S. net zero target –The U.S. submitted its long-term strategy to the UNFCCC in November 2021[13], officially committing the U.S. to net zero emissions by 2050 at the latest. The net zero target covers all greenhouse gas (GHG) emissions, makes assumptions on CO2 removal by land-based and technology-based solutions, and specifies several key components for comprehensive planning.

Loss and Damage - In 2022 at the annual U.N. Climate Change Conference (COP27), countries agreed to establish funding arrangements responding to climate-related losses and damages. Maintaining its position, established by the Kyoto protocol in 1997[14], the U.S. initially refused to establish the mechanism necessary to get loss and damage funding flowing to the Global South's climate-battered countries. However, the U.S. ultimately agreed to it when the European Union agreed to establish it. In 2023, countries are expected to produce

recommendations on how to operationalize this new loss and damage fund through a Transitional Committee. A member of the Office of the Special Envoy for Climate (SPEC) at the U.S. State Department is likely to represent the United States on the committee[15].

International Climate Finance - As per a recent article published by NRDC, the U.S.'s spending package for fiscal year 2023 fails to deliver on its international climate finance commitments. The package includes slightly over $1 billion in direct climate finance—only $900,000 more than its 2022 spending package. Experts argue that this under commitment to international climate finance will severely damage the U.S.'s ability to spur greater climate action from other major emitting countries, and continues to put the most vulnerable on the front lines of climate impacts. Furthermore, with this level of funding, it will be extremely difficult to achieve President Biden's climate finance pledge of $11.4 billion annually by next year[16].

Climate Resilience – State of Play in India

India is vulnerable to the impacts of climate change. For India, 2019 was the seventh warmest year on record since 1901, and 11 out of 15 warmest years were recorded during the fifteen years from 2005 to 2019[17]. The duration of heat waves over central and northwest India has increased by about five days over the past 50 years[18]. India's average surface air temperature has risen by around 0.7°C during 1901–2018, largely on account of GHG-induced warming, and is estimated to rise by 2.0-2.8°C under Representative Concentration Pathway (RCP) 4.5 relative to the recent past (1976-2005 average), by the end of the century[19]. The sea level rise in the North Indian Ocean by the end of the century is projected to be 300mm relative to average over 1986-2005 under the RCP 4.5 scenario[20].

Alongside such physical impacts, several expected impacts are projected to affect vulnerable ecosystems and human-managed systems, for example wildfires are projected to increase, about 36% of country's forests are highly prone to fires[21]; Rain-fed rice yields in India are projected to reduce marginally (<2.5%) in 2050 and 2080 and irrigated rice yields by 7% in 2050 and 10% in 2080 scenarios[22].

Climate change is expected to increase the frequency and intensity of heat waves, which may affect outdoor labour productivity and deepen exposure to adverse health outcomes in urban and rural areas[23]. As per the Climate Transparency Report 2022[24], India suffered an income loss of USD 159 billion, 5.4% of its gross domestic product, in the service, manufacturing, agriculture, and construction sectors due to extreme heat in 2021. Heat exposure in the country led to the loss of 167 billion potential labour hours, a 39% increase from 1990-1999. While, it may lose 3-10% GDP annually by 2100 due to climate change[25].

India has frequently made ambitious commitments at the UNFCCC and its Paris Agreement, the two most significant global institutions for tackling climate change, and has a proven track record of keeping its promises.

India's NDC - The government has recently updated Nationally Determined Contributions (NDC) submitted by India to UNFCCC under the Paris Agreement. These include targets to reduce the

Emissions intensity of its GDP by 45 percent by 2030, from 2005 level; to achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF); and create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030[26]. In conformity with these commitments, the GDP emissions intensity of India has already decreased by 24% from 2005 levels until 2016, and more than 40% of the country's installed electricity generating capacity is based on non-fossil fuel sources.

India's Net Zero Target – During COP26, India also announced its pledge to achieve the target of net zero emissions by 2070. Furthermore, India also submitted its Long-Term Low Emission Development Strategy (LT-LEDS) to the United Nations Framework Convention on Climate Change (UNFCCC), during the 27th Conference of Parties (COP27)[27].

Climate Adaptation and Resilience Actions - India is undertaking a variety of adaptation actions across sectors and scales. India unveiled its National Action Plan on Climate Change (NAPCC) in 2008, which details current and upcoming policies and initiatives addressing climate mitigation and adaptation. The Action Plan lists eight main 'National Missions'[28]. Along with this, several sectoral action (programs and initiatives) have been also launched and implemented for example – Disaster management (National Disaster Management Plan (NDMP), National Disaster Relief Fund, and National Disaster Management Authority); Water (Namami Gange programme, Jal Jeevan Mission, National Water Policy); Cities (Atal Mission for Rejuvenation and Urban Transformation, Smart Cities Mission, National Mission for Sustainable Habitat); and Health (National Action Plan on Climate Change and Health), etc.[29].

Engagement of Sub-national governments – In India, three tiers of government—the national government, the states, and local governments—share responsibility for adaptation. India's States are in charge of a number of key adaptation sectors, including administering local government, agriculture, and the use of water. This has led to a variety of adaptation-related policies to be implemented across the States. State Action Plans on Climate Change[30] (SAPCC), which are created by the States and specify regional risks and policy measures to address them, frequently include such measures.

The National Adaptation Fund for Climate Change (NAFCC)[31], which was established to provide project-specific grants to address State-determined risks, is a significant financing source for adaptation governance. Improvement in disaster preparedness and other climate-related issues have received more attention from the Finance Commission[32], which is charged with making recommendations regarding the devolution of funds to the States. In various Indian cities and states, Heat Action Plans (HAPs) have been implemented in an effort to increase resilience against rising heat stress. Currently, 23 State-level HAPs exist today in various states of development[33].

Climate (Mitigation & Adaptation) Finance - To undertake adaptation measures in agriculture, forestry, fisheries, infrastructure, water resources, and ecosystems between 2015 and 2030, India had presented a preliminary estimate of USD 206 billion[34] (at 2014-15 prices) in its NDC

in 2015. However, the cumulative total expenditure for adapting to climate change in India is expected to reach INR 85.6 trillion (at 2011–12 prices) by the year 2030, according to a more recent research by a sub-committee of the Indian Ministry of Finance[35]. Parliamentary panel on finance is analysis India's investment requirements for sustainable growth, particularly for climate adaptation and mitigation. Based on its estimates, India needs an additional investment between $50 billion - $100 billion annually to meet its 2070 net-zero carbon emissions goal[36]. The effects of climate change are anticipated to get worse over time. India will therefore need to step up its adaptation efforts, which would result in higher adaptation expenses than initially anticipated. Given huge financial requirements for implementing adaptation actions, there is a significant opportunity to leverage private sector financing for climate adaptation for example through developing bankable Nature Based Solutions (NbS). These bankable solutions will provide economic returns through diversified income opportunities for the local communities, reduced economic losses due to disasters, etc. This could potentially enable market led large scale adaptation actions, especially in wetlands management.

Loss and Damage - India engaged constructively and actively on the subject of loss and damage, which refers to destruction caused by climate change-induced disasters, during the course of discussions at COP27. The establishment of the L&D fund was appreciated by the Government of India[37]. India would be eager to play a more constructive role in UNFCCC's Transitional Committee for operationalization of the L&D fund.

The LiFE Mission, which was initially put forth by Prime Minister Modi at COP26 in Glasgow, focuses particularly on the impact that personal behavior and consumption patterns can have on the environment and promotes the adoption of environmentally friendly lifestyles. The Indian Government officially launched Mission LiFE in October 2022[38], with an aim to put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation through a mass movement as a key to combat climate change. Under Mission LiFE, it is targeted to mobilize 1 billion Indians to become Pro Planet People, 5.15 lakh Indian villages to become LiFE Villages, 3700 ULBs to become LiFE ULBs and 766 districts to become LiFE districts over the time- period of 5 years[39]. Sustainable lifestyle was included in the Sharm El-Sheikh Implementation Plan, it noted the *"the importance of transition to sustainable lifestyles and sustainable patterns of consumption and production for efforts to address climate change"[40].*

Considering their current state of development, certain regions/countries are more inclined (or forced) to place more emphasis on economic growth, poverty and inequality reduction, and in order to strengthen their capacity for short term climate action and long-term low-carbon development. On the other hand, developed nations with strong economies and high levels of resilience might give climate action first priority in order to modernize their energy infrastructure and cut GHG emissions.

India is a developing country that is dealing with a number of socio economic issues that make its population more vulnerable to the effects of climate change. Indian policymakers have clearly articulated on many national and international platforms that developing resilience

involves addressing specific vulnerabilities as well as strengthening the socio-economic capacity of people and communities to adapt to long-term changes in the climate.

India is a key global climate player and what happens in India will have significant implications on the achievement of global climate targets. India also continues to lead the representation of developing countries in global climate negotiations, while wielding considerable influence on the cohort and their positions.

The U.S. continues to be one of the key leaders of the climate negotiations and influences several aspects of climate mitigation and adaptations such as climate finance, technology transfer, etc.

Given this, a meaningful and strategic dialogue between the U.S. and India would have a positive and compounding effect on the pace and scale of climate action, both domestically as well as internationally.

With its given mandate of fostering constructive, civil-society dialogue focused on climate change and clean energy, the platform (U.S. India Track II Dialogue) is well placed to positively impact how the two countries interact bilaterally, while also demonstrating genuine leadership on climate change.

Existing Partnerships/Collaborations

I. **USAID**[41]: India has been a key partner in advancing USAID's shared objectives to support clean energy, environment, climate challenges, health, open and inclusive digital ecosystems, inclusive economic growth, and the COVID-19 response in India and across South and Central Asia and the Indo-Pacific region.
    A. Foster Climate Adaptation in Hazard-Prone Areas[42] - In India, USAID is implementing resilience-building activities with increased focus on vulnerable communities in natural hazard-prone regions across India. USAID supports the Coalition for Disaster Resilient Infrastructure to help foster disaster and climate-resilient infrastructure.
    B. Clean Energy Solutions- In partnership with the national government, USAID is accelerating large-scale and distributed renewable energy deployment, grid flexibility for large-scale renewable energy integration, the transition away from coal, off-grid energy access through renewables, and energy efficiency in buildings, industries, and appliances.
    C. Supporting Sustainable Landscapes: USAID programs are also supporting and strengthening forest and natural resource management for increased carbon sequestration, long-term water security, and improved livelihoods.
    D. Building Partnerships to Reduce Risks of Pollution: USAID is partnering to facilitate market-driven solutions, build partnerships with the private sector to leverage finance, expertise and other resources; and promote awareness and

behavioral change at the community and industrial levels to reduce risks that pollution poses to people's health.

E. Since 2016, USAID/India has enhanced energy access for 5 million people, helped deploy 6,000 megawatts of renewable energy, which is enough to power 3.9 million households, and has leveraged more than $2 billion for clean energy investments, and helped India reduce greenhouse gases by 13 million tons — the equivalent of removing over 2.5 million cars from the road for a full year.
F. India's Ambitious Clean Energy Targets: USAID is working with the Government of India to help achieve its goal of shifting the power sector to 50 percent non-fossil sources by 2030.
G. Implement Energy-Efficient Solutions: USAID supported the first large-scale rollout of electric vehicle public-charging infrastructure with 60 public charging stations installed in three Indian cities in 2020. USAID support also helped the Government of India develop a national energy-conservation building code and increased the energy efficiency of over 10,000 buildings.
H. Support Private Sector to Enhance India's Transition to Clean Energy: USAID is fostering an enabling environment to support private sector participation in the energy sector. This includes conducive policies and regulatory frameworks, access to finance, partnerships for demonstration and pilots, other useful products such as business models and innovative tools.

II. **U.S.-India Climate and Clean Energy Agenda 2030 partnership**[43] - During the April 2021 Leaders' Summit on Climate, President Biden and Prime Minister Modi announced a high-level U.S.- India Climate and Clean Energy Agenda 2030 Partnership, to accelerate progress toward shared climate and clean energy goals. The Agenda 2030 Partnership includes two tracks of engagement: 1) the Strategic Clean Energy Partnership (SCEP), and 2) the Climate Action and Finance Mobilization Dialogue (CAFD). The U.S.-India SCEP builds upon a longstanding bilateral energy dialogue focused on energy security and innovation. The SCEP was earlier established as the Strategic Energy Partnership in 2018 and had replaced the U.S.-India Energy Dialogue, the previous intergovernmental engagement for energy cooperation. The revitalized SCEP will continue to advance energy security and innovation with greater emphasis on electrification and decarbonization of processes and end uses, scaling up emerging clean energy technologies, while finding solutions for hard-to-decarbonize sectors. Engagement with the private sector and other stakeholders will remain a priority. One of the key pillars under the CAFD is - Adaptation and Resilience. As part of this pillar, the two countries will collaborate in building capacities to "measure and manage climate risks".

III. ***U.S.-India Joint Working Group on Combating Climate Change****[44]:* Recognizing the critical importance of increasing energy access, reducing greenhouse gas emissions, and improving resilience in the face of climate change, President Obama and Prime Minister Modi committed in September 2014 to a new and enhanced strategic partnership on energy security, clean energy, and climate change. *Through the U.S.-India Joint Working*

Group on Combating Climate Change and related fora, the United States and India continued to advance bilateral cooperation on climate change.

IV. **Partnership for Climate Resilience (2014)**[45]: In support of the U.S.-India Partnership for Climate Resilience, NOAA and the Indian Institute of Tropical Meteorology (IITM) collaborated to model future climate conditions in India at high resolution, to assess climate risks at the sub-national level in India and to support actions that promote climate-resilient sustainable development. Also under this Partnership, NASA released its NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP) dataset that provides downscaled climate model data for the Indian subcontinent. The U.S. and India can reinvigorate this initiative - In light of recent climate modeling advances, U.S. and India experts can focus on the development and use of downscaling tools for seasonal forecasting and multi-decadal climate risk assessment.

V. **Trees Outside Forests in India** (TOFI) is a five-year joint initiative by the United States Agency for International Development (USAID) and the Ministry of Environment, Forest and Climate Change (MoEFCC) of the Government of India launched in 2022. With the united force of eight consortium partners led by Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF). The initiative is committed to expanding the area under trees outside forests for the benefit of livelihoods and the ecosystem and will be implemented in seven states including Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu, and Uttar Pradesh. Through agroforestry, or integrating trees into farming systems, the program intends to improve the resilience of farming systems while increasing the income of farmers.

VI. **Water MOU**[46]: A Memorandum of Understanding was signed between India's Ministry of Jal Shakti and the U.S. Geological Survey to promote technical cooperation in water resources management and water technology. Both sides will be cooperating in the area of management of river basins, flood management and forecasting, water management, water quality, waste-water recycling and capacity building in testing and instrumentation. The cooperation will span across Government agencies, universities, research centers, institutions, private sector companies etc. This MOU could have great relevance for India's Jal Shakti Abhiyan.

The United States and India should assess the programmes to reinvigorate and create new programmes, building on the past U.S.-India Joint Working groups and 2016 Joint Statement: The United States and India: Enduring Global Partners in the 21st Century. Key priorities for climate cooperation are (as outlined below):

<u>Thematic Focus Areas</u>

1. **Climate proofing urban and rural Infrastructure** – Every facet of our lives is largely dependent on infrastructure. These infrastructure systems can be disrupted with disastrous results. In 2021, many people were killed and two hydropower facilities were

damaged by a glacier burst in Uttarakhand, and residents of Texas were left without heat, water, or electricity for days due to a rare Arctic vortex.

India's position as the seventh most vulnerable country to climate change[47], and the third largest emitter in the world puts us in a unique position. Along with improving our economic trajectory and strengthening climate change mitigation, India is also tasked with a deeper challenge of adaptation and resilience – of ensuring every community has access to water, shelter, livelihoods, and food, in the face of climate risks and environmental risks such as groundwater depletion, loss of topsoil cover. 75% of India's districts are vulnerable to increasingly unpredictable and extreme weather events[48], and India might be one of the first places in the world to break the human survivability limit, with extreme heat waves. India's annual adaptation costs are an estimated $45.3 billion (over ₹3.7 trillion), and loss and damage from floods and storms alone cost India $7.6 billion (over ₹62,000 crores) in 2021[49]. Over 100 crore people have been affected by natural disasters since 2001; losses amount to over ₹13 trillion, nearly 6% of India's GDP (adjusted with 2021 prices) [14].

In this context, India must climate-proof its rural and urban infrastructure by adopting strategies that reduce the impact of droughts through forestry; agroforestry, use crop diversification with a focus on resilient varieties; promote and deliver agriculture and climate insurance: and adopt flood- and heat stress control in cities. India has already proposed using the Mahatma Gandhi National Rural Employment Guarantee Act to conduct drought-proofing and afforestation activities and the move has been applauded by climate scientists as it is expected to reach the most vulnerable populations across the country.

- **The U.S. and India can explore developing innovative risk financing instruments for Disaster Risk Infrastructure (DRI)/Climate Risk Infrastructure (CRI). Both the countries can also leverage existing collaborations such as Mission Innovation and Coalition for Disaster Resilient Infrastructure (CDRI) to foster climate resilient infrastructure innovation. This could include leveraging rapidly-evolving new technologies such as big data, remote imaging, drones and unmanned aerial vehicles, and Internet of Things (IoT), etc.**
- **A policy dialogue between the U.S. and India could be initiated to explore the relevance and need for a comprehensive Disaster Risk Financing (DRF) strategy. Both countries could pilot projects that explore the viability and efficacy of different DRF instruments like insurance and bonds.**

2. **Climate Finance for "Just" and Green Energy Transition Raising India's climate ambitions** will require new, additional, and climate-specific financial resources and support. As per CEEW estimates, India would need clean energy investment of around USD 1.4 trillion till 2070[50], which equates to an average annual value of USD 28 billion

over the next 50 years. A separate assessment places India's financial requirement to be around $900 billion over the next 30 years to transition to a green economy[51].

In India, around 13 million people are directly and indirectly employed in coal mining, transport, and associated industries[52]. Around 70% of the workers in this sector are off-contract and often not even counted in official estimates. Therefore, for India, the energy transition has to be 'Just', 'inclusive' and 'equitable'.

- **A U.S.-India Green Transition Finance Initiative could be jointly launched by the two nations to raise private funding for India's sustainable transition. Advancing India's green transition would have a significant impact on the fight against climate change, spur economic growth through the creation of jobs, enhance public health, lower air pollution, and provide long-term positive returns on investment. Using all available means to meet these difficulties is something that both the U.S. and India are interested in. Given that the U.S. has some of the largest supply pools of private capital and that India may present the largest demand/market for international green capital, a U.S.-India Green Transition Finance Initiative that enables private capital to flow into green projects between the two countries would signal the leadership of the two countries and the crucial role they must play in advancing the global energy transition in a way that enables skill development and job creation.**
- **A Skilling Fund can also be set up with the financial contributions from the U.S. and India. To protect jobs during the transition process by encouraging skilling, up-skilling, and re-skilling of workers in the existing sectors to enable them to transition towards the new and renewable energy sectors or other green sectors of the economy.**

***Private Sector Financing for Water and Wastewater infrastructure* –** Water and Wastewater infrastructure service delivery is suboptimal in India, particularly in rural areas. Climate change is exacerbating the problem. Therefore, it is critical to invest in measures to adapt to worsening climate risks, since these actions typically pay for themselves in the long run in terms of avoided costs.

Water efficiency, energy efficiency, green infrastructure, and wastewater reuse, etc. are all important components of Climate Resiliency. Investing in climate-resilient development, particularly in the water and sanitation sectors, has significant benefits and is a top priority for India.

Private sector participation is critical for accelerating investment and innovation in identifying climate change risks, developing robust adaptation measures, and designing, building, and operating climate resilient waste and waste water infrastructure. It is

therefore important to create a more conducive environment for private sector investment by lowering risk and making investment options more appealing.

- **The U.S. and India can build capacity to create a pipeline of 'bankable' climate focused water and wastewater infrastructure projects with a solid plan that investors can get behind quickly.**

3. **Fostering subnational climate action at the state-** and city-levels between US and India: The Paris Agreement clearly highlights the need for involvement of sub-national governments in climate resilience. There are Cities and State governments in both, India and US have taken proactive steps to formulate their own targets and implementation actions.
    - **The U.S. and India could potentially develop a program with meaningful funding to create opportunities for cross-country learning, capacity building and implementation on the ground. Support and investments could be focused towards promoting 'Digital Governance' at the sub-national levels like development of digital public infrastructure (DPI), etc. This would be in-sync with the Government of India's 'Digital India' programme.**
4. **Sustainable lifestyles** - If compared, the electricity consumed at home by an average American[53], it is 10 times more than an average Indian[54]. Or the number of motor vehicles—890 Americans per 1000 population as compared to just 59 Indians per 1000. Collective action and sustainable consumption are critical for tackling climate change. India has rich experience in implementing large-scale behavioral change programmes. While the world is focusing on policy and regulatory measures to address the environmental crisis, India has demonstrated success in harnessing the power of collective action to solve complex problems. The recently launched, LiFE builds upon India's environment-friendly culture and traditional practices, intends to nudge individuals to undertake simple acts in their daily lives that can contribute significantly to climate change when embraced across the world[55].
    - **The U.S. and India could partner to continually identify and build capacity to implement Mission LiFE for their respective populations. Both countries could look at furthering 'Circular Economy', while incorporating local/traditional knowledge and public engagement/awareness to bring down resource consumption.**
5. **Loss and Damage**: Last year at the annual U.N. Climate Change Conference (COP27), countries agreed to establish funding arrangements responding to climate-related losses and damages[56]. The agreement represented a historic win for climate-vulnerable countries who have been fighting for acknowledgement and compensation for losses and damages since the 1990s. This year, countries will produce recommendations on how to operationalize this new loss and damage fund through a Transitional Committee. In these discussions, the U.S. could champion climate justice and center the needs of the most vulnerable communities, offering solidarity, constructive negotiating positions, and credible financing Solutions. The Biden administration's stated priority of climate justice[57] should extend beyond U.S. borders, recognizing that climate change impacts amount to a global crisis. Addressing loss and damage is an opportunity for the United

States to take up the mantle of climate leadership and realize a safer and more prosperous world for all.

With the establishment of a loss and damage fund, the U.S. will have the opportunity to lead in the negotiations to establish institutional arrangements through the Transitional Committee[58]. As countries experience the devastating losses and damages of climate change, the U.S. should strive for the efficient and effective development and implementation of the fund. By finding alignment with leading allies, centering the needs of the most vulnerable, and engaging with opportunities to increase loss and damage funding and reform the International Financial Institutions (IFIs), the country can demonstrate its commitment to global climate justice, creating a safer and more prosperous world for all.

- **The U.S. and India could have more in-depth bilateral discussions to understand respective country positions and possibly discuss solutions to operationalize the loss and damage fund as soon as possible. India with its influence on parties from Least Developing Countries (LDC) and Developing Countries, could be a great ally for the U.S. in the global climate negotiations. The U.S. and India enable private sector investment in fast track L&D. The avoided L&D can provide initial RoI and subsequently the resilience action pays back through enhanced ecosystem services.**

6. **Nature, Biodiversity and Climate Resilience** - Nature is a critical ally in the fight against climate change and nature loss. Evidence shows that strong, healthy natural ecosystems can help to fight climate change as well as build resilience and help us adapt to climate impacts. It is vital we decarbonize our economy as well as promote and support these "nature-based solutions." Nature is a non-negotiable part of the solution to the climate crisis. IPCC science shows it has absorbed around 54% of human-related carbon dioxide emissions over the past decade[59].

   India and the U.S. are two of the most biologically rich regions of the planet – home to several critical hotspots of marine & terrestrial biodiversity. However, various activities such as illegal logging, forest conversion for agriculture and over-exploitation of marine and terrestrial resources present a serious and increasing threat to the rich biological diversity.

   - **In view of the above, the U.S. and India, both members of the High Ambition Coalition for Nature and People[60], should develop a strong, innovative and multi-dimensional partnership aiming to halt the accelerating loss of species,**

and protect vital ecosystems that are the source of economic security for both the countries.

- **The U.S. and India could look at supporting nature-based solutions; align their actions on climate, biodiversity and development; and direct finance into projects that support these goals and away from harmful activities.**
- **The U.S. and India could jointly develop a program that can support both government institutions and the private sector to scale up biodiversity finance and reduce finance flows that harm biodiversity. The program could promote innovative or blended financing options for biodiversity conservation, Ecosystem Based Adaptation (EbA)/Nature Based Solutions (NbS). This would also need more peer to peer exchange and exposure visits, etc. between stakeholders from US and India.**
- **The U.S. and India could jointly organize regional workshops to capitalize experience and disseminate good practices; mobilize US & Indian expertise on wildlife and nature conservation. By building on their strong bilateral cooperation in the field of biodiversity conservation, Indian expertise and US developmental assistance, India and the U.S. can reinforce efforts aimed at biodiversity conservation at regional level.**

7. Private sector financing for Wetland Restoration and Protection

The recent IPCC AR6 WGII assessment report clearly indicates that adaptation finance needs to be scaled up urgently. Developing countries, which are frequently the most vulnerable to climate change and also the least able to secure and allocate financial resources for adaptation. Therefore, we see repeated emphasis on more financial support for climate adaptation, so that they can continue to achieve economic development despite rising climate impacts. Public resources are important, but it's not enough to meet the adaptation finance requirements.

Wetlands – its peat bogs and mangrove swamps, salt marshes and river floodplains are an underutilized solution for climate resilience. Protection and restoration of wetlands can provide a major source of nature-based solutions (NbS) to climate change, while helping countries achieve their net-zero greenhouse gas emissions. Wetlands also provide ecotourism opportunities and food, purify water, buffer runoff and river discharge, and serve as habitat for a variety of species—which in turn helps sustain local communities and traditional cultures. As per estimates, conserving and restoring mangroves globally could yield a return on investment of US$3.7 billion per year based on their carbon values alone[61].

Domestically, India's 2023-24 budget announced new schemes for mangroves and wetlands[62] – (1) Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI), which will take up mangrove plantation along the coastline and on salt pan lands, wherever feasible, through convergence between MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Scheme), CAMPA (Compensatory Afforestation Fund Management and Planning Authority) Fund and other sources and (2) Amrit

Dharohar – to promote the unique conservation values of local communities in wetlands preservation, encourage optimal use of wetlands, and enhance biodiversity, carbon stock, ecotourism opportunities and income generation for local communities.

Investing in climate adaptation companies can help investors balance risk in their portfolios by acting as a hedge against exposure to climate events. However, much remains to be learned about how to unlock and enable private capital to help finance national and local adaptation priorities, as well as how to build the business case for adaptation, especially for wetlands.

One major reason private funds have been hesitant to invest in wetland adaptation businesses thus far is uncertainty about the viability of business models. Investors may also perceive wetlands projects as being high-risk investments; this is not helped by the relative dearth of demonstrated success stories. However, the number of successful case studies is growing. Some examples are as following:

- Ecosystem Investment Partners, a private equity firm based in Baltimore that has raised more than $200 million and is financing restoration of more than 43,000 acres of wetlands[63].
- Coastal wetland investment projects in Colombia[64], Kenya[65].
- As part of a USD 100 million global initiative, HSBC is working on promoting nature-based solutions and the NBS Accelerator. Through this initiative, HSBC with local implementation partners is supporting more than 20 projects globally to protect and revitalize wetlands, mangroves and forests, and to promote sustainable agriculture[66]. In India, the project is trying to develop bankable NbS solutions focused on Sundarbans Mangroves and Urban Wetlands in and around Bangalore.

Research to date has indicated that to unlock private sector investment there is an urgent need to provide an enabling policy and regulatory environment and create a pipeline of bankable projects that offer attractive investment opportunities. **There U.S. and India collaboration could look to:**

- **Jointly develop an adaptation-oriented project preparation facility, needed to attract private sector investment at scale.**
- **Create a national adaptation investment plan to list a portfolio of projects that are open to funding from domestic and foreign public or private entities.**
- **Jointly execute pilot/demonstration projects - support individual projects to execute the transaction, including help coordinate project financing with relevant investors for projects that are ready for investment, including through technical assistance.**

8. Climate Resilient Urban Habitat

Various studies indicate that cities consume 60-80% of energy production globally and account for 70% of CO2 emissions[67]. A review of greenhouse gas (GHG) inventories of

167 cities globally found that just 25 cities were responsible for 52% of all urban emissions[68]. In building the sector, both embodied carbon (from the production of materials) and operational carbon (produced from use of energy to run or operate equipment inside buildings or fuel used in transport or for delivering municipal services) are important in the Indian context since our cities are still growing. By 2040, India is expected to add 270 million people to its cities[69]. What is more, ongoing rapid urbanization would mean that over half the country's population would be living in cities in less than two decades, from less than one-third in 2011 (31.7%). The floor area of residential buildings alone is expected to grow from 15.3 million square metres in 2017-18 to 21.9 million m2 by 2027-28[70]. India's buildings were responsible for 31% of all electricity consumed in 2017-18 and by 2040, this is expected to rise to half of all power consumed in the country[71]. In cities, measures to mitigate emissions from the building sector can yield significant benefits like improved productivity, better air quality, reduction in urban heat islands and strengthening resilience to climate impacts.

And yet, building sector actions in Indian cities are too few and not enough. In the 2021 assessment of 126 smart cities on the Ministry of Housing and Urban Affairs' (MoHUA) Climate Smart cities assessment framework, only one city scored five stars (the highest) for their performance on criteria on thematic area- ''green buildings and energy''[72]. The indicators evaluate the implementation of actions to promote energy efficiency and clean energy in buildings.

- Building energy efficiency has been a focus of successive USAID programs in India since the year 2000. USAID supported the Government of India to develop a national energy-conservation building code and increased the energy efficiency of over 10,000 buildings.
- U.S. and Indian counterparts should work together to scale up ECBC adoption and implementation. The focus could also be on promoting Net Zero public buildings and supporting reforming public procurement practices.

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