



APCTT
Asian and Pacific Centre
for Transfer of Technology

Consolidated Reply

Query 1 -

Digital Public Infrastructure for Climate Action and Environmental Sustainability

**Community of Practice (CoP)
on Climate Technologies**





Community of Practice (CoP) on Climate Technologies

Shared Experiences, Smarter Solutions for Climate Action and Resilience

The Community of Practice (CoP) on Climate Technologies launched by the Asian and Pacific Centre for Transfer of Technology (APCTT) is dedicated to addressing the multifaceted challenges posed by climate change in the Asia-Pacific region through technology solutions. By leveraging the region's rich innovation capacities and good practices, the CoP aims to enhance access to critical knowledge on climate technologies. The Community connects professionals engaged in delivering technological solutions to climate change.

The objective of this Community of Practice is to:

- Promote collaborative problem-solving and policy-relevant dialogue
- Support the localization and transfer of innovations suited to national priorities
- Enhance institutional capacities for climate technology governance
- Enable matchmaking between solution providers and implementers

The Community is driven by a participatory and adaptive model that combines knowledge generation, engagement, and access to resources through the following mechanisms: monthly Query-Response Consolidated Reply (CR) cycle, webinars and interactive discussions, knowledge repository and much more.



**Original Query: Mr. Surinder Pal Singh, Joint Secretary,
Department of Scientific and Industrial Research, Ministry of
Science and Technology, Government of India.**

07 Jan 2024

Posted: 23 April 2024

The Government of India has on 22nd April 2024 conducted a side event at the 80th Commission session on the role of Digital Public Infrastructure (DPI) in sustainable development. A number of presentations in this session showcased how DPI is used for various applications by various stakeholders and governments.

We would like to expand this discussion further to the design and adoption of climate technologies. We therefore request other member States and stakeholders to please send us your responses to the following questions:

- Please share examples where DPI solutions have been deployed for climate action or environmental sustainability?
- What have been the challenges in the same?

Your responses will help other countries (including India) in better designing and implementing DPI for their populations.



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1. Summary of Responses

Digital Public Infrastructure (DPI) is a critical enabler of sustainable development, influencing sectors such as public health, education, financial inclusion, governance, and supply chain management. The [G20 Digital Economy Ministers meeting](#) in August 2023 underscored DPI's role in fostering inclusive, sustainable, and human-centric digital transformation, particularly in low and middle-income countries. The G20 Ministers defined DPI as shared, secure, and interoperable digital systems built on open standards and governed by frameworks promoting development, inclusion, innovation, and respect for human rights.

DPI is built around three essential components: technology, governance, and community. Technology ensures interoperability across sectors, governance fosters trust through strong rules, and community engagement drives innovation through collaboration between the public and private sectors.

DPIs are increasingly emerging as essential tools for climate action and environmental sustainability, offering solutions to global challenges. Platforms such as [Climate.gov \(US\)](#), [Copernicus Climate Change Service \(EU\)](#), and the [World Bank's Open Data for Resilience](#), provide stakeholders with comprehensive datasets to track climate trends. Early warning systems such as the [Global Disaster Alert and Coordination System](#) and [NOAA Weather Radio](#) deliver real-time alerts, while initiatives such as the [Global Carbon Project](#) and [SIPAM](#) leverage satellite imagery, AI, and IoT for environmental monitoring.

Country examples of Governance related DPI applications such as Singapore's [Digital Twin Technology](#), the [Alba Iulia Smart City](#) program in Romania enhance policy action and resource management, as also seen with [ICLEI's Climate Resilience Toolkit](#) and Singapore's [Intelligent Transport System](#).

These platforms, along with initiatives like [Jal Jivan Mission \(India\)](#) and South Korea's [National E-Waste Recycling Program](#), contribute to global sustainability efforts.

DPIs also promote inclusive, accessible, and responsive approaches. Platforms like [MyCoast](#) USA empower users to report coastal climate impacts, while networks like [Climate Action Network International](#) connect grassroots movements. Citizen-driven initiatives, such as the [Black and Smelly River](#) in China and the [Indigenous Peoples' Knowledge and Leadership Network](#), demonstrate how DPIs foster participation and preserve traditional knowledge. The [Green Digital Cities](#) of the C40 Cities network further exemplifies the role of DPIs in enhancing urban sustainability and community engagement.

[India's](#) experience with DPI, particularly through platforms like the [Unified Payments Interface](#) and [RuPay](#) offers key lessons in adapting financial inclusion frameworks to climate action. The scalability of UPI can serve as a model for developing platforms to facilitate green finance and improve access to climate funds worldwide. [India's Digital India initiative](#) can also support real-time, data-driven governance for climate monitoring.

[Other examples](#) of DPI applications for climate action include smart grids, used in countries like Germany and the US to optimize energy efficiency by integrating renewable resources. In agriculture, platforms like India's Digital Green help farmers by monitoring soil health and optimizing water usage, thereby reducing agriculture's carbon footprint. In urban planning, cities like Singapore and Amsterdam use IoT sensors to monitor air quality, manage waste, and streamline traffic flow. Blockchain-based DPI solutions are used to track sustainable practices across supply chains, ensuring carbon accountability and offering consumers transparency about the environmental impact of products.

[Russia's](#) experience underscores DPI's role in environmental management. Russia has developed digital ecosystems that monitor renewable energy

usage and address environmental issues, with plans to expand across sectors by 2024.

Despite DPI's effectiveness in fostering climate action, challenges persist. Key issues mentioned in the [responses](#) include protecting sensitive data, ensuring interoperability and scalability, high implementation costs, and maintaining skilled professionals ([Thailand](#)). Critical to success is the integration of DPIs into existing systems without causing disruptions, along with ensuring the availability of high-quality, standardized data and maintaining systems for long-term resilience. Additional hurdles include developing trust in DPIs, infrastructure gaps, and lack of an incentive structure for participation in DPIs ([India](#)).

2. Relevant Experiences

India

Smart Water Management in India: [The Jal Jeevan Mission](#)

By: Mishra, A., and Gupta, P., Government of India, Ministry of Jal Shakti
The Jal Jeevan Mission (JJM) aims to provide safe drinking water to all rural households in India by 2024 through individual tap connections. Leveraging digital public infrastructure, JJM employs real-time monitoring, data analytics, and innovative technologies like IoT and GIS for efficient management and accountability. Community engagement is integral, with digital tools enabling citizen participation and promoting water conservation practices.

[Unified Payments Interface](#) (UPI): UPI is a real-time payment system developed by the National Payments Corporation of India (NPCI). Launched in 2016, UPI has revolutionized digital transactions by enabling users to link multiple bank accounts to a single mobile application, allowing seamless transfers of funds 24/7. Its interoperability, security, and ease of use have made it the backbone of India's cashless economy. Beyond financial inclusion, UPI's architecture can be adapted to create platforms that enable

green finance by providing individuals and businesses access to climate funds, micro-loans, and sustainable investments globally. UPI's success has spurred interest in replicating this model to facilitate eco-friendly financing and sustainable development initiatives across the world.

RuPay: RuPay is India's domestic card payment network, launched by the NPCI to enhance financial inclusion, particularly in rural areas. RuPay cards have been widely adopted due to their affordability and access to financial services, even in remote regions. The system supports both online and offline transactions, enabling millions of unbanked individuals to participate in the digital economy. RuPay's robust digital infrastructure can be leveraged for climate-smart financing, providing a mechanism to channel investments into sustainable projects, such as renewable energy and climate-smart agriculture. This could further empower rural communities to adopt environmentally sustainable practices while improving their economic resilience.

Digital India: The Digital India initiative is a flagship program launched by the Government of India in 2015 with the vision of transforming the country into a digitally empowered society and knowledge economy. The initiative focuses on digital infrastructure, services on demand, and digital literacy. Its data-driven governance model provides a foundation for climate action, allowing real-time monitoring of resource usage, emissions, and environmental data. By fostering transparency and efficiency in governance, Digital India helps stakeholders implement climate solutions that are scalable, sustainable, and accessible across the country, even in its most remote areas. This framework serves as a model for other countries aiming to integrate digital solutions for environmental and social good.

Digital Green: Digital Green is an innovative platform that leverages technology to empower smallholder farmers and promote sustainable agricultural practices. Founded in 2008, the platform uses videos and data-sharing tools to provide farmers with information on sustainable farming techniques, climate-resilient crops, and efficient resource management. By promoting real-time agricultural data analysis and knowledge sharing,



Digital Green helps reduce the carbon footprint of farming while improving productivity and resilience to climate change. This platform exemplifies how digital infrastructure can be effectively deployed to address both environmental sustainability and economic growth, particularly in rural and agricultural communities.

United States of America

Climate.gov by [National Oceanic and Atmospheric Administration \(NOAA\)](#)

Climate.gov provides resources like real-time monitoring, educational materials, and scientific reports to support informed decision-making. It uses interactive tools and visualizations to help users explore climate trends and impacts. By promoting transparency and knowledge sharing, the platform empowers communities to tackle climate challenges and enhances climate literacy and resilience.

National Oceanic and Atmospheric Administration (NOAA) [Weather Radio](#)

NOAA Weather Radio provides real-time weather updates and severe warnings across the U.S. through a network of radio stations. It ensures communities receive timely alerts, helping them prepare for hazardous weather and protect life and property. This service highlights the role of digital tools in enhancing public safety and weather preparedness.

[MyCoast](#)

MyCoast USA is a Digital Public Infrastructure that allows citizens to report and monitor coastal conditions and hazards. Using user-generated data and mapping tools, it tracks coastal erosion, flooding, and climate impacts in real-time. The platform enhances public awareness and aids authorities in responding to coastal challenges, integrating local observations with scientific research.



Singapore

Digital Twin Technology: Virtual Singapore By: [Singapore Land Authority and Government Technology Agency of Singapore](#)

Virtual Singapore uses Digital Twin technology to create a detailed 3D model of the city-state, integrating real-time data and simulations. This platform supports urban planning, infrastructure management, and disaster response, enhancing decision-making and resource allocation. It fosters collaboration among stakeholders to address urban challenges, showcasing the potential of digital twins in advancing smart city solutions.

Singapore's Intelligent Transport System (ITS) By: [Land Transport Authority of Singapore](#) (LTA)

Singapore's Intelligent Transport System (ITS) uses real-time data and advanced analytics to optimize urban mobility and traffic management. It enhances traffic flow, reduces congestion, and improves transportation efficiency through sensors and digital platforms. By coordinating various transportation modes and stakeholders, ITS supports a sustainable and efficient urban transport network, highlighting digital innovation's role in smarter cities.

South Korea

National E-Waste Recycling Program By: [South Korean Ministry of Environment](#)

The National E-Waste Recycling Program uses digital tracking and management systems to efficiently handle electronic waste. It supports collection, sorting, and processing of e-waste, alongside awareness campaigns for responsible disposal. By providing resources and leveraging data-driven insights, the program promotes sustainable recycling practices and reduces environmental impact, showcasing digital solutions' effectiveness in waste management.

Brazil

SIPAM (Sistema de Proteção da Amazônia) By: [Brazil Ministry of Defence](#)

SIPAM (Amazon Protection System) is a digital public infrastructure in Brazil that monitors the Amazon rainforest using satellite imagery, radar, and data analysis. It helps in environmental protection, detecting illegal activities like deforestation and fires. SIPAM integrates various technologies to provide real-time information to government agencies, supporting sustainable management and conservation efforts in the Amazon.

Romania

Alba Iulia Smart City 2018 program By: [Ani Matei and Mădălina Cocoşatu](#)

The Alba Iulia Smart City 2018 program aims to transform the city into a technologically advanced and sustainable urban environment. It integrates digital solutions and smart technologies in traffic management, energy efficiency, and public services. By leveraging data analytics and IoT, the initiative improves city operations and residents' quality of life, positioning Alba Iulia as a model for smart city development in Romania.

China

Black and smelly waters: [How citizen-generated transparency is addressing gaps in China's environmental management](#) By: Hsu A., Weinfurter A., Tong J., Xie Y.)

China's Black and Smelly Waters initiative tackles severe urban water pollution using advanced monitoring and data analytics. It identifies and manages pollution sources like untreated sewage and industrial discharge, enabling targeted interventions and improvements in water treatment. The program enhances transparency and public awareness, demonstrating the role of digital tools in achieving cleaner water systems and sustainable urban environments.

European Union

Copernicus Climate Change Service (C3S) by [European Centre for Medium-Range Weather Forecasts](#) (ECMWF)

The Copernicus Climate Change Service (C3S) provides comprehensive climate data across Europe using satellite observations and climate modeling. It offers detailed insights into climate trends, projections, and impacts, supporting policymakers, researchers, and the public. By ensuring open access to high-quality data and tools, C3S enhances climate resilience and informed decision-making.

Global

Global Disaster Alert and Coordination System (GDACS) managed by the [United Nations Office for the Coordination of Humanitarian Affairs](#) (OCHA)

The Global Disaster Alert and Coordination System (GDACS) provides real-time alerts and coordination for global disasters using data from satellites and sensors. It delivers timely information on events like earthquakes, tsunamis, and hurricanes, supporting disaster response and coordination among aid organizations and governments. GDACS enhances global preparedness and emergency management, highlighting digital tools' role in improving disaster resilience.

ICLEI's Climate Resilience Toolkit by [ICLEI](#)

ICLEI's Climate Resilient Cities Action Plan (CRCAP) Toolkit provides cities with tools and guidance to enhance climate resilience. It helps urban planners and policymakers assess sectoral emissions, existing and future climate risks and develop mitigation and adaptation strategies that can improve urban resilience. The toolkit promotes global knowledge sharing and collaboration, emphasizing digital tools' role in advancing climate resilience and sustainable urban development.

[Climate Action Network](#) (CAN)-International developed and supported by a global network of NGOs and civil society organizations CAN International



(Climate Action Network International) functions as a vital Digital Public Infrastructure for climate change by coordinating global climate advocacy and knowledge sharing. It provides a platform for stakeholders to exchange information, strategies, and best practices on climate action. The network supports collaborative efforts to influence climate policies, enhance public awareness, and drive collective action. Through digital tools and resources, CAN International fosters global cooperation and strengthens efforts to address climate change.

Green Digital Cities by [C40 Cities Climate Leadership Group](#)

The program helps cities adopt green technologies and smart systems to cut carbon emissions and improve environmental performance. It provides a platform for sharing best practices, data, and innovations, enabling effective climate strategies and enhanced urban resilience. By fostering global collaboration, the initiative leverages digital tools for sustainable urban development, integrating technology with climate action for greener cities.

G20 2023 by G20 by [Ministerial Meeting](#)

The G20 Digital Economy Ministers meeting focuses on advancing Digital Public Infrastructure to boost economic growth and public services. Key topics include modernizing digital infrastructure, enhancing cybersecurity, and addressing data governance and digital inclusion. Policymakers discuss regulatory frameworks and best practices to drive innovation and tackle digital economy challenges, aiming for aligned strategies and global digital resilience.

Open Data for Resilience by [World Bank](#)

The World Bank's Open Data for Resilience initiative provides open access to datasets and tools to enhance global resilience to climate and disaster risks. It supports informed decision-making and planning for disaster preparedness and response, helping improve infrastructure and manage risks. By fostering transparency and collaboration, the initiative highlights the role of open data in building resilient systems and addressing environmental challenges.



The Global Carbon Project by Future Earth and World Climate Research Programme

The Global Carbon Project provides vital data and insights into global carbon emissions and their climate impact. It integrates and analyzes worldwide datasets to offer detailed reports on carbon sources, sinks, and trends. This information supports climate strategies and progress tracking, enhancing transparency and international collaboration. The initiative underscores digital tools' role in addressing carbon emissions and environmental impacts.

The Indigenous Peoples' Knowledge and Leadership Network by World Economic Forum

The Indigenous Peoples' Knowledge and Leadership Network amplifies and preserves indigenous knowledge and leadership by providing a digital platform for sharing insights on sustainable management, cultural heritage, and environmental stewardship. It facilitates cross-cultural exchange and collaboration, enhancing the global impact of indigenous knowledge. The network supports integrating traditional wisdom into policy and conservation efforts, underscoring the importance of digital tools in supporting indigenous perspectives and rights.

3. Related Resources

Relevant Documentation

ICLEI ACCCRN Process IAP Toolkit Document - A guide for local governments on climate adaptation and resilience planning from ICLEI (Local Governments for Sustainability) and ACCCRN. (<https://southasia.iclei.org/wp-content/uploads/2021/08/ICLEI-ACCCRN-Process-IAP-A-toolkit-for-Local-Governments.pdf>)

Copenhagen Adaptation Plan Document - Details Copenhagen's strategies and actions for climate adaptation from the City of Copenhagen. (<https://international.kk.dk/sites/default/files/2021-9/Copenhagen%20Climate%20Adaptation%20Plan%20-%20202011.pdf>)



UNDP E-Waste Policy Brief - Discusses strategies for managing electronic waste in South Korea.

(https://www.undp.org/sites/g/files/zskgke326/files/migration/seoul_policy_center/USPC-SDG-Policy-Brief-7-E-waste.pdf)

Sustainable Smart City Administration Research Paper by Ani Matei ORCID and Mădălina Cocoșatu ORCID, Faculty of Public Administration, National University of Political Studies and Public Administration, 012244 Bucharest, Romania - Explores sustainable practices in smart city management in Romania

(<https://www.mdpi.com/2071-1050/16/16/6749>)

Global Methane Tracker 2023 Report by International Energy Agency (IEA) about methane emissions and impacts due to it on global rise in temperature.

(<https://www.iea.org/reports/global-methane-tracker-2023>)

UNEP presented various reports on Artificial Intelligent solutions for the Environment and prototypes that can contribute to achieving environmental goals.

(<https://www.unep.org/topics/digital-transformations/digital-accelerator-lab/ai-solutions-environment>)

Relevant Organizations

National Oceanic and Atmospheric Administration (NOAA)- US scientific and regulatory agency charged with forecasting weather, monitoring oceanic and atmospheric conditions, charting the seas, conducting deep sea exploration, and managing fishing and protection of marine mammals and endangered species in the US exclusive economic zone. (<https://www.noaa.gov/>)

Copernicus Climate Change Service (C3S) supports society by providing authoritative information about the past, present and future climate in Europe and the rest of the World (<https://climate.copernicus.eu/about-us>)



The Bureau of Meteorology is Australia's national weather, climate and water agency. Its expertise and services assist Australians in dealing with the harsh realities of their natural environment, including drought, floods, fires, storms, tsunamis and tropical cyclones.

(<http://www.bom.gov.au/>)

Japan Meteorological Agency (JMA) - focuses its efforts on monitoring the earth's environment and forecasting natural phenomena related to the atmosphere, the oceans and the earth, as well as on conducting research and technical development in related fields. JMA also engages in international cooperation activities regarding both meteorology and seismology

(<https://www.jma.go.jp/jma/en/Background/mission.html>)

GDACS is a cooperation framework between the United Nations and the European Commission. It includes disaster managers and disaster information systems worldwide and aims at filling the information and coordination gaps in the first phase after major disasters.

(<https://gdacs.org/About/overview.aspx>)

Federal Office of Meteorology and Climatology MeteoSwiss- office observes the weather around the clock, creating weather forecasts and alerting authorities and population, when strong winds, heavy rainfall, storms or heat waves are forecast.

(<https://www.meteoswiss.admin.ch/about-us/contact.html>)

Pep Canadell, CSIRO Oceans and Atmosphere GPO Box 1700 Canberra, ACT 2601, Australia and GCP Tsukuba International Office Centre for Global Environment Research National Institute for Environmental Studies (NIES) Onogawa 16-2, Tsukuba Ibaraki, 305-8506, Japan - The Global Carbon Project is a Global Research Project of Future Earth and a research partner of the World Climate Research Programme.

(<https://www.globalcarbonproject.org/about/index.htm>)



Jacques Cousteau Coastal Center 130 Great Bay Blvd. Tuckerton NJ- Worked on The National Estuarine Research Reserve System (NERRS) is a system of 29 reserves around the country (and Puerto Rico) developed to protect the biologically, ecologically, economically, and aesthetically important areas along our coasts known as estuaries.

(<https://jcnerr.org/about.html>)

Climate Action Network-International (CAN) is the world's largest environmental network of over 1,800 non-governmental organisations in over 130 countries fighting the climate crisis.

(<https://climatenetwork.org/>)

Climate Centre for Cities (C-Cube)- has been established at NIUA to create synergy across all climate actions which are being undertaken in Indian cities by various stakeholders.

(<https://niua.in/c-cube/content/climate-centre-cities-c-cube>)

National Jal Jeevan Mission (NJJM), Department Of Drinking Water And Sanitation Ministry Of Jal Shakti- Jal Jeevan Mission, is envisioned to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India.

(<https://jaljeevanmission.gov.in/>)

Grid Deployment Office (GDO) under US Department of Energy, works to catalyze the development of new and upgraded electric infrastructure across the country by maintaining and investing in critical generation facilities; developing and upgrading high-capacity electric transmission lines nationwide; and deploying transmission and distribution technologies.

(<https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program>)



Relevant Websites

Climate.gov Website- Provides climate data, tools, and information from NOAA (National Oceanic and Atmospheric Administration), USA Government. (<https://www.climate.gov/>)

Copernicus Climate Change Service (C3S) Website- Offers climate data and information from the European Union's Copernicus program. (<https://climate.copernicus.eu/>)

Australian Climate Service (ACS) Website - Delivers climate data and insights from the Australian government. (<https://www.acs.gov.au/>)

Japan Meteorological Agency (JMA) Website - Provides weather, climate, and seismic information from Japan's national meteorological agency. (<https://www.jma.go.jp/jma/indexe.html>)

GDACS (Global Disaster Alert and Coordination System) Website - Provides real-time alerts about natural disasters from various global sources. (<https://www.gdacs.org/>)

National Weather Radio (NWR) Website- Offers emergency weather alerts and information from the National Weather Service in the U.S. (<https://www.weather.gov/nwr/>)

India Meteorological Department (IMD) Website - Delivers weather forecasts, warnings, and climate data for India. (<https://mausam.imd.gov.in/>)

MeteoSwiss Website - Provides weather forecasts and early warning systems from Switzerland's national meteorological service. (<https://www.meteoswiss.admin.ch/#tab=forecast-map>)

Global Carbon Project Website - Provides data and analysis on global carbon emissions and their impact. (<https://www.globalcarbonproject.org/>)

CENSIPAM (Centro Gestor e Operacional do Sistema de Proteção da Amazônia) Website - Monitors and manages environmental data related to the Amazon in Brazil. (<https://www.gov.br/censipam/pt-br>)



National Satellite Meteorological Center (NSMC) of China Website - Offers satellite-based meteorological and environmental monitoring data from China. (<http://www.nsmc.org.cn/nsmc/cn/home/index.html>)

Urban Observatory Newcastle - Provides data and insights on urban climate and environmental conditions from Newcastle University's Urban Observatory. (<https://newcastle.urbanobservatory.ac.uk/>)

Los Angeles County Climate Action Plan - Outlines climate action strategies and goals for Los Angeles County's long-term planning. (<https://planning.lacounty.gov/long-range-planning/climate-action-plan/>)

Japan Climate Network (JCN) Website - Provides information and resources on climate change issues and advocacy in Japan. (<https://jcnerr.org/>)

Climate Network Website - A platform for global climate action and advocacy through various networked organizations. (<https://climatenetwork.org/>)

C-Cube Climate Practitioners Network (NIUA) Website- Connects climate professionals in India for collaboration and knowledge sharing through the National Institute of Urban Affairs. (<https://niua.in/c-cube/climate-practitioners-india-network>)

Jal Jeevan Mission Website - Aims to provide safe and adequate drinking water through household tap connections in rural India. (<https://jaljeevanmission.gov.in/>)

Grid Resilience and Innovation Partnerships (GRIP) Program Website - Supports innovation and resilience in the U.S. electrical grid from the Department of Energy. (<https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program>)

Virtual Singapore Website - A digital twin technology platform providing



3D models and data for urban planning and simulation in Singapore. (<https://www.sla.gov.sg/articles/press-releases/2014/virtual-singapore-a-3d-city-model-platform-for-knowledge-sharing-and-community-collaboration>)

DETER (Deforestation Detection) Website - Monitors and detects deforestation in Brazil using satellite data. (<https://plenamata.eco/en/verbete/deter/>)

China National Environmental Monitoring Center (CNEMC) - Offers data and monitoring on air quality across China. (<https://www.cnemc.cn/>)

Intelligent Transport Systems (ITS) Singapore - Provides information on advanced transport technologies and systems in Singapore.

(https://www.lta.gov.sg/content/ltagov/en/getting_around/driving_in_singapore/intelligent_transport_systems.html)

Deforestation Prediction Tool (UNEP)- Uses AI to predict deforestation risk areas, aiding conservation efforts.- [UNEP AI Solutions for the Environment] (<https://www.unep.org/news-and-stories/story/how-artificial-intelligence-helping-tackle-environmental-challenges>)

Freshwater Ecosystems Explorer (UNEP): Monitors changes in freshwater ecosystems using geospatial data - [UNEP AI Solutions for the Environment] (<https://www.unep.org/resources/report/ai-solutions-environment>)

Global Forest Watch (WRI): Provides real-time forest monitoring tools and data to combat illegal deforestation.- [Global Forest Watch] (<https://www.globalforestwatch.org/>)

Project Drawdown's Climate Solutions: A platform mapping and measuring climate solutions across various sectors.- [Project Drawdown] (<https://www.drawdown.org/>)



Geospatial Digital Twins for Urban Planning (Singapore): Uses digital replicas of cities for sustainable urban planning.- [Singapore’s Digital Twin] (<https://wgicouncil.org/digital-twinning-a-country-singapore/>)

Precision Agriculture with IoT (India): Implements IoT devices for efficient and sustainable resource use in agriculture.- [Precision Agriculture for Development] (<https://precisionag.org/>)

Global Methane Tracker (IEA): Tracks methane emissions globally to inform policy and support mitigation efforts.- [IEA Methane Tracker] (<https://www.iea.org/reports/global-methane-tracker-2023>)

AI for Monitoring Air Quality (AirVisual): Utilizes IoT and AI for real-time air quality data to improve public health.- [IQAir AirVisual] (<https://www.iqair.com/>)

Blockchain for Climate Action (Climate Ledger Initiative): Employs blockchain technology for tracking carbon credits and ensuring transparent climate finance.- [Climate Ledger Initiative] (<https://climateledger.org/>)

Smart Water Management (Israel): Features digital infrastructure for efficient water resource management to address water scarcity.- [Israel’s Water Management] (<https://smartwater.group/>)

Digital MRV Systems (UNDP): Provides digital platforms for measuring, reporting, and verifying climate actions.- [UNDP Climate Action Digital Tools] (<https://climatepromise.undp.org/research-and-reports/mrv-practice>)

Carbon Tracker (UK): Offers tools for tracking carbon emissions and managing carbon budgets and targets. – [Carbon Tracker Initiative] (<https://carbontracker.org/>)



Open Data for Climate Resilience (World Bank): Grants access to climate data to support policy-making and community adaptation.- [World Bank Climate Data]
(<https://data.worldbank.org/topic/climate-change>)

Digital ID for Climate Refugees (UNHCR): Implements digital identity systems to aid climate refugees in accessing services and protections.- [UNHCR Digital ID] (<https://www.unhcr.org/in/news/announcements/unhcr-welcomes-commitments-id4africa-2024-digital-identity-gains-displaced>)

Sustainable Digital Finance (UNEP): Develops governance frameworks to align digital finance with sustainable development goals.- [UNEP Sustainable Digital Finance]
(<https://www.unepfi.org/publications/>)

AI-Powered Environmental Governance (China): Utilizes AI for enforcing environmental regulations and monitoring pollution in real-time.- [China's Environmental AI]
(<https://www.sciencedirect.com/science/article/abs/pii/S0959652620323295>)

Digital Public Goods for Climate Action (DPGA): Promotes open-source software and data for climate resilience.- [Digital Public Goods Alliance]
(<https://digitalpublicgoods.net/>)

Citizen Science Platforms (Earthwatch): Engages communities in environmental monitoring and data collection for climate research.- [Earthwatch Citizen Science]
(<https://earthwatch.org/>)

AgriDigital Platform for Farmers (Australia): Connects farmers with climate-smart agriculture practices through a digital platform- [AgriDigital]
(<https://www.agridigital.io/>)



Indigenous Knowledge Systems (Amazon Basin): Preserves and integrates indigenous knowledge for climate resilience using digital platforms.- [Amazon Conservation] (<https://www.amazonconservation.org/>)

Green Digital Cities (C40 Cities): A network of cities using digital tools to enhance sustainability and reduce carbon footprints.- [C40 Cities] (<https://www.c40.org/>)

Digital Platforms for Disaster Risk Reduction (UNDRR): Engages communities with digital tools for preparing and responding to climate-induced disasters.- [UNDRR Tools] (<https://www.undrr.org/>)

Sustainable Development Solutions Network (SDSN): Leverages digital tools to promote sustainable solutions and achieve the SDGs.- [SDSN] (<https://www.unsdsn.org/>)

Local Climate Action Platforms (Climate-KIC): Supports local governments and communities in implementing climate action plans via digital platforms.- [Climate-KIC] (<https://www.climate-kic.org/>)

Digital Innovation Hubs for Climate Startups (EU): Provides resources and tools for climate tech startups to innovate and scale.- [European Digital Innovation Hubs] (<https://digital-strategy.ec.europa.eu/en/activities/edihs>)

4. Responses in Full

[1. Mr. R N Nagaraj Prasad, Intellect Design Arena Limited, Thailand](#)

[2. Dr. Vipin Chandra Shukla, Department of Scientific and Industrial Research, Govt. of India](#)

[3. Ms. Anastasia Ryabukhina, Russian House of International Scientific and Technical Cooperation](#)

Responses:

1. Mr. R N Nagaraj Prasad, Intellect Design Arena Limited, Thailand

Dear members, following is my response to the two questions in the Query

a. Examples of DPI for Climate Action

1. Smart Grids for Energy Efficiency

Digital Public Infrastructure (DPI) has been leveraged to create smart grids that optimize electricity consumption and distribution. By integrating DPI in energy systems, utilities can better manage demand, reduce wastage, and increase the efficiency of renewable energy sources like wind and solar. Countries like Germany and the US have been pioneers in deploying these technologies.

2. Agricultural Monitoring Systems

DPI solutions have been deployed to monitor soil health, predict weather patterns, and optimize water usage in agriculture. This helps farmers adapt to climate change and reduces the carbon footprint of agricultural activities. Platforms like India's Digital Green and other DPI-enabled systems support real-time agricultural data analysis.

3. Urban Planning and Smart Cities

DPI solutions in the form of sensors and IoT technologies have been incorporated in smart city projects. These help monitor air quality, manage waste, and optimize traffic flow to reduce emissions. Cities like Singapore and Amsterdam have demonstrated the use of DPI for environmental sustainability.

4. Blockchain for Sustainable Supply Chains

Some organizations are using DPI-based blockchain solutions to track the sustainability of products throughout their supply chains. This ensures accountability in carbon emissions and helps consumers make informed choices.

b. Challenges Faced

Following are some challenges in implementing DPI for Climate Action:

Infrastructure Gaps

The effectiveness of DPI relies heavily on robust digital infrastructure, which can be a challenge in developing countries or rural areas where internet connectivity and access to digital tools are limited.

Data Privacy and Security Concerns

DPI solutions often require the collection and analysis of large datasets, including sensitive personal and environmental data. Ensuring the security of this data while maintaining transparency and trust has been a significant challenge.

High Implementation Costs

Initial costs for deploying DPI solutions can be high, especially for climate-sensitive sectors like energy and agriculture, where the cost-benefit ratio might not always be immediately clear.

Interoperability Issues

DPI solutions often need to integrate with existing systems and technologies. Ensuring that these new systems can communicate with old legacy systems without causing disruption can be a significant hurdle.

Regulatory and Governance Barriers

Governments may lack clear regulations for DPI-enabled climate solutions, and multi-stakeholder cooperation is often needed, which can be difficult to achieve in fragmented policy environments.

2. Dr. Vipin Chandra Shukla, Scientist ‘G’, Department of Scientific and Industrial Research, Government of India

Based on India's experience in building robust digital financial infrastructure, DSIR would like to share relevant insights for the questions.

a. Examples of DPI for Climate Action:

1. Unified Payments Interface (UPI) for Sustainability: The UPI system, which has successfully expanded beyond India into countries like Bhutan, Nepal, UAE, and recently even France, showcases how a well-designed DPI can promote financial inclusion and provide seamless transactions globally. A similar approach could be applied to climate technologies by building interoperable digital platforms that facilitate green finance and sustainable investments, enabling easier access to climate funds and green bonds across the world. This would encourage individuals and businesses to invest in sustainable practices.

2. RuPay for Financial Inclusion in Rural Areas: The RuPay card network, developed under India's DPI framework, played a pivotal role in providing financial access to marginalized communities. Similarly, a green financing mechanism could be built within the DPI to support climate-smart

agriculture and renewable energy projects in rural areas. Digital financial technologies, like UPI and RuPay, could be adapted to channel investments directly into environmentally sustainable projects, incentivizing climate action at the grassroots level.

3. Digital Technologies for Resource Efficiency: India's Digital India

initiative has set a solid foundation for data-driven governance, which can be expanded to environmental sectors. By leveraging the data infrastructure built through digital financial systems, we can develop climate-monitoring platforms that track resource usage and carbon emissions in real-time, helping governments and businesses reduce their carbon footprints while ensuring compliance with sustainability standards.

b. Challenges Faced

1. **Trust and Adoption in Digital Systems:** Initially, India faced significant challenges in fostering trust in digital payments. This same trust-building process will need to be replicated for climate technologies deployed through DPI, ensuring that citizens and businesses trust the systems being put in place to tackle environmental challenges.

2. **Infrastructural Gaps:** While DPI systems like UPI have scaled efficiently, gaps in high-speed network infrastructure still exist in some regions, especially in rural areas. This could pose a challenge when deploying digital

solutions for climate monitoring and action, as reliable and fast connectivity is essential for real-time data collection and dissemination.

3. **Incentivizing Participation:** Just as digital financial services were incentivized through simplified products and reward systems, there is a need to design incentives that encourage both public and private sector participation in green technologies. This may include tax rebates, subsidies, or digital credits for those who adopt sustainable practices.

In conclusion, India's experience with building DPI, particularly through systems like UPI and RuPay, offers valuable lessons for applying similar frameworks to climate action. We believe this approach could help address both environmental challenges and promote sustainable development globally.

3. Ms. Anastasia Ryabukhina, Russian House of International Scientific and Technical Cooperation, the Russian Federation

The Russian House of International Scientific and Technical Cooperation strongly supports the idea that scientific and technical cooperation is vital for fostering sustainable development across the Asia-Pacific region. Such collaboration not only drives economic growth but is also essential in achieving the Sustainable Development Goals. The absence of a unified digital platform for sharing innovations and technological solutions often prevents the full achievement of the potential.

The proposed Asia and Pacific Technology Transfer Platform (APTTP), under discussion with APCTT, is expected to create an opportunity to enhance the usage of technological advancements across various sectors, including healthcare, environmental protection, and energy. Notably, the Russian Federation has demonstrated leadership in the development of digital ecosystems, with approximately 350 platform solutions expected to be developed or upgraded at the federal level by 2024.

The proposed APTTP is likely to incorporate best practices from Russia's experience in creating digital ecosystems. It will address key objectives in scientific and technological collaboration, offering new avenues for attracting investment flows into high-tech projects. Participants of the

platform will have access to cutting- edge technologies and innovations across the Asia-Pacific region, thereby fostering innovation projects and commercialization of scientific research.

One of the key aims of the proposed APTTP is to create an inclusive environment where scientists, professionals, and entrepreneurs from diverse countries can exchange best practices and experiences. This will serve to strengthen innovation efforts and enhance the competitiveness of participating nations within the global scientific and technological landscape.



Furthermore, RHISTC and its partners are currently analyzing the application of digital tools and modules that shall enable the implementation of a wide range of strategic tasks consistent with the objectives of the government sector.

Russia's positive experience in developing digital economy can serve as a valuable model for enhancing scientific and technological cooperation in the region, ensuring the best possible outcomes for international collaboration. A pivotal component of this initiative is the deployment of cutting-edge platform solutions tailored to tackle regional issues by fostering continuous communication and cooperation among member states. We hope this helps other member states in using DPIs for various development objectives including climate change.

Many thanks to all who contributed to this query!

The Community of Practice on Climate Technologies aims to foster technology cooperation and transfer through enhanced knowledge exchange and cross-border collaboration in Asia Pacific.

If you have further information to share on this topic, please send it at apctt@un.org.

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The Consolidated Reply is a systematic compilation of all responses received and additional desk research. It has been compiled by the Research Team at APCTT: Pankaj Kumar Shrivastav, Programme Management Officer, APCTT and Pallavi Garg, Intern, APCTT.



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