



International  
Trade  
Centre



# Accelerating Digital and Green Transition

Compendium of Case Studies from  
Developing Countries

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Technical paper



## ABOUT THE PAPER

Anchored in the *Initiative on International Trade and Economic Cooperation Framework for Digital Economy and Green Development*, this report presents good practices in digital economy and green development, drawing on the case studies across countries, industries, and sectors. It highlights how context-driven, needs-based initiatives, ranging from renewable energy and smart agriculture to digitalization and sustainable manufacturing, can drive inclusive, resilient, and environmentally sustainable growth. The paper aims to provide actionable insights for policymakers, businesses, and development stakeholders seeking to advance digital and green solutions globally.

*Disclaimer: This technical paper has not been edited by ITC. The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the International Trade Centre.*

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# ACRONYMS

ADB	Asian Development Bank
AfCFTA	The African Continental Free Trade Area
ASEAN	The Association of Southeast Asian Nations
eBL	Electronic Bill of Lading
ePhyto	Electronic Phytosanitary Certificate
EPC	Engineering, Procurement, and Construction
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GEIDCO	Global Energy Interconnection Development and Cooperation Organization
GREAN	Global Renewable-energy Exploitation Analysis
GIS	Geographical Information System
ICC	International Chamber of Commerce
ICT	Information and Communications Technology
IoT	Internet of Things
IPPC	International Plant Protection Convention
ITC	International Trade Centre
IRRI	The International Rice Research Institute
MLETR	Model Law on Electronic Transferable Records
MSME	Micro, Small, and Medium-sized Enterprises
SDG	Sustainable Development Goal
SME	Small, and Medium-sized Enterprises
SWRO	Sea Water Reverse Osmosis
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNECE	United Nations Economic Commission for Europe
WTO	World Trade Organization
WPC	Women Producer Company

# INTRODUCTION

The digital transformation has become a defining force of global economy, reshaping industries and societies at an unprecedented pace. The number of Internet users increased from 1 billion in 2005 to 5.5 billion in 2024, rising from 16% to 68% of the world's population<sup>1</sup>. Driven by breakthroughs in artificial intelligence, blockchain, and big data, digitalization is reshaping nearly every aspect of economic activity.

Globally, digital trade expanded from \$4.59 trillion in 2020 to \$7.23 trillion in 2024, growing at an average annual rate of 12.1%, outpacing overall global trade growth of 9.7%<sup>2</sup>. The digital economy is projected to expand further in the coming years, an estimated 70% of new value created over the next decade will be based on digitally enabled platform business models<sup>3</sup>.

However, significant disparities persist. Only 27% of the population in low-income countries have access to the Internet, compared to 93% in high-income countries<sup>4</sup>. Although digital connectivity has been rapidly improving in recent years, at an annual rate of 8.5%<sup>5</sup>, the digital divide remains significant and potentially even widening, due to accelerated technological breakthroughs. Developed countries and major emerging markets continue to lead the global digital transformation, while many developing economies face constraints in basic infrastructure, uneven connectivity, limited access to finance and technology, regulatory complexities, and varying levels of digital literacy. Addressing these challenges presents a significant opportunity for inclusive growth.

In parallel, the shift toward green development has emerged as another major global trend. The world's per-capita use of natural resources is projected to rise by 70% by 2050, which can cause a significant burden on the planet<sup>6</sup>. Actions to support an inclusive transition to green economy is urgently needed, to address the increasing inequality, resource depletion, and environmental degradation, and ensure that green energy transition, carbon emissions reduction, and green financing works for development and sustainable growth.

Developing countries face both challenges and opportunities in green development. Bold climate actions could unlock at least \$26 trillion in economic benefits by 2030<sup>7</sup>, and the green transition is projected to create around 100 million jobs by 2030 across sectors such as food, energy, materials, cities, and health, areas in which developing countries could capture a substantial share<sup>8</sup>. However, to reap these benefits, developing countries need to overcome challenges such as limited funding, weak infrastructure, and technology and skill gaps.

Technical assistance and capacity building can play a key role in supporting developing countries in digital and green transition. On 18 October 2023, in the context of the Third Belt and Road Forum for International Cooperation, China, together with over 30 countries<sup>9</sup>, launched the *Initiative on International Trade and*

*Economic Cooperation Framework for Digital Economy and Green Development* (hereinafter referred to as the *Initiative*). The *Initiative* aims to strengthen the capabilities of developing countries to engage in the digital economy and promote green development, thereby fostering a coordinated approach to economic growth and sustainable development on a global scale.

The *Initiative* is structured around four parts and seven pillars.

**Part I: Digital Trade and Economic Cooperation**

- ◆ Pillar 1: Create an Open and Safe Environment
- ◆ Pillar 2: Improve Trade Facilitation
- ◆ Pillar 3: Overcome the Digital Divide
- ◆ Pillar 4: Enhance Consumer Trust

**Part II: Green Development Cooperation**

- ◆ Pillar 5: Create a Good Policy Environment for Promoting Green Development
- ◆ Pillar 6: Strengthen Trade Cooperation to Promote Green and Sustainable Development
- ◆ Pillar 7: Encourage Green Technology and Service Exchange and Investment Cooperation

**Part III: Capacity Building**

**Part IV: Implementation and Way Forward**

Since the launch of the *Initiative*, participating countries have strengthened collaboration on digital economy and green development, through experience-sharing and capacity building events.

As a tool to support capacity building and implementation effort in the context of the *Initiative*, this report presents a compendium of case studies of good practices in digital economy and green development across countries, industries, and sectors. The aim of the report is to:

- ◆ Facilitate exchange among the participants in the *Initiative*
- ◆ Showcase good practices implemented by developing countries in digital and green development
- ◆ Serve as a resource for policymakers and businesses and provide inspiration for building a more resilient, inclusive, and sustainable global economy

Anchored in the seven pillars of the *Initiative*, the cases span national strategies, regional partnerships, multilateral frameworks, and private sector innovations. They cover different sectors, ranging from Brazil's Digital Transformation Strategy and Chile's "Energy + Women" program to integrating green and digital technologies in development in Djibouti, Suriname, and Pakistan. International collaborations such as solar and wind projects show how coordinated action among the *Initiative*'s participants can address infrastructural challenges and foster growth and innovations. The cases also illustrate cutting edge technologies and applications that will reshape global trade processes, such as block-chain based electronic Bills of Lading and electronic phytosanitary certificate.

The case studies are compiled from the inputs provided by the participants in the *Initiative*, as well as through research on the latest developments in the digital and green fields. The case studies exemplify that digital and green solutions, when tailored to local contexts and aligned with broader development goals, can serve as powerful drivers of sustainable growth.

Cases are selected based on the following criteria:

■ **Balanced geographical coverage.**

The report features cases primarily from developing economies participating in the *Initiative* and underscores the importance of cross-border cooperation. They showcase how shared goals and joint efforts can accelerate digital and green transformation across regions.

■ **Multiple development goals.**

The report illustrates how digital and green solutions can be applied across industries and integrated to realize diverse development priorities. Topics cover key areas such as food security, women's empowerment, small business competitiveness, trade facilitation, sustainable manufacturing, renewable energy, etc.

■ **Practical and actionable insights.**

Drawing on first-hand examples from developing countries, the report emphasizes practical lessons more than theoretical models. The cases provide real-world references to policymakers, trade promotion organizations, and businesses. These needs-driven initiatives led by diverse stakeholders demonstrate how scalable, context-sensitive strategies can support inclusive and sustainable growth.

Overall, drawing on contributions of cases from governments, chambers of commerce, and think tanks, this report offers practical insights and forward-looking examples that may inform future policy and collaborations to support digital and green transition in developing countries.



Create an Open and  
Safe Environment for  
Digital Trade

## PILLAR 1

# Create an Open and Safe Environment for Digital Trade

To enhance participation of developing countries in digital trade, the *Initiative* identifies four pillars for digital trade and cooperation: *creating an open and secure environment, enhancing trade facilitation, overcoming the digital divide, and building consumer trust.*

On creating an open and secure environment, *Pillar 1* seeks to establish an open, inclusive, and secure environment for digital trade and economic cooperation. It calls for transparent and coordinated digital economy policies, encouraging collaboration on strategies, standards, and best practices in digital legislation and trade agreements.

To bridge the digital divide, *Pillar 1* calls for dialogue among governments, businesses, and academia to promote a fair and non-discriminatory digital landscape. *Pillar 1* also supports digital economy growth while accommodating each country's unique development needs. At the same time, it addresses data security through evidence-based management and policy coordination. It calls for secure and resilient global supply chains for ICT products and services.

This section presents two cases that demonstrate the importance of policy environments and collaboration in advancing digital development.

- ◆ *Brazil's Digital Transformation Strategy* reflects a decade-long national commitment to digital transformation, aligned with the SDGs and tailored to local contexts.
- ◆ *WTO–World Bank Digital Trade for Africa initiative* fosters continental collaboration to address the digital divide across Africa.



# Strategic Planning: Brazil's Digital Transformation Strategy

The *Brazilian Digital Transformation Strategy (E-Digital)* is a government-led initiative to guide the digital transformation plan for the country. It is coordinated by the Ministry of Science, Technology, Innovation, and Communications, and developed by an Inter-Ministerial Working Group with input from various government bodies, the private sector, academia, and civil society. The strategy focuses on using digital technologies to enhance government operations, boost competitiveness and productivity in the economy, and promote social inclusion.

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## *Pillar 1:*

### *Create an Open and Safe Environment*

*"Communicate and coordinate on development strategies, policies, rules and standards on digital economy, and share practices of digital legislation and supervision."*

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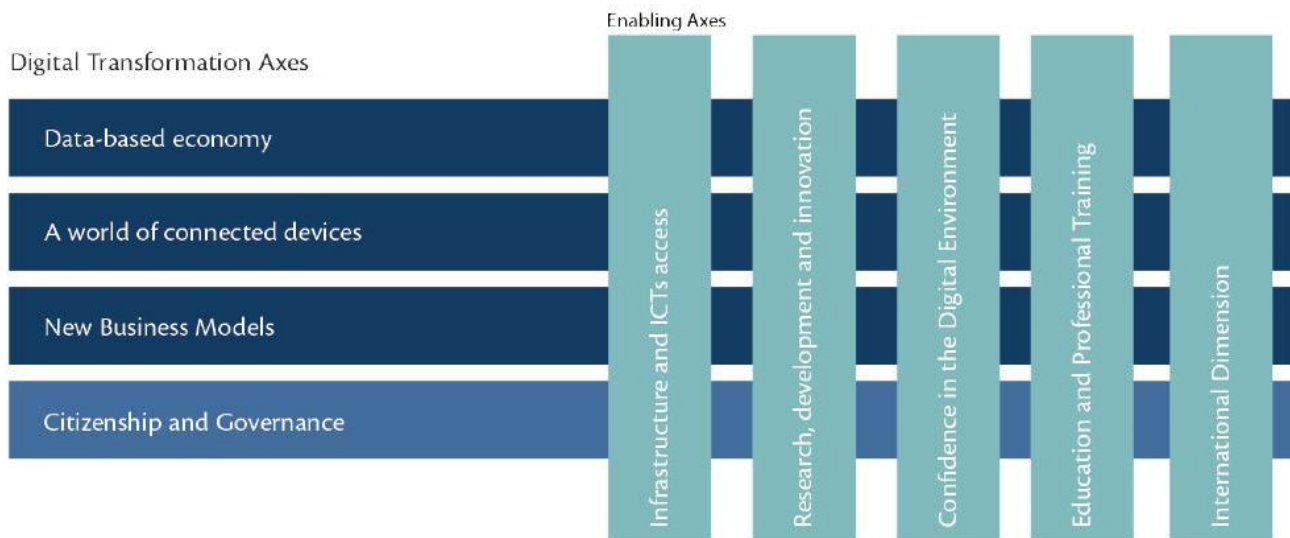
E-Digital is firmly anchored in the UN SDGs of the 2030 Agenda. Key focus areas include using digital tools to reduce poverty by enhancing financial inclusion (*SDG 1*), boosting agricultural productivity through Internet of Things (IoT) (*SDG 2*), improving healthcare access and remote diagnosis (*SDG 3*), advancing education through digital resources (*SDG 4*), expanding infrastructure for industry and innovation (*SDG 9*), and supporting climate action with sensor technology for disaster response (*SDG 13*)<sup>10</sup>.

The strategy has positioned Brazil within global digital benchmarks, monitoring progress against international indices such as the ITU ICT Development Index, the ITU Global Cybersecurity Index, the UNCTAD B2C E-commerce Index, and the UN E-Government Development Index<sup>11</sup>.

The strategy provides a structured framework comprising diagnostics, future goals, strategic actions, and progress indicators. To ensure coherence, it aligns diverse governmental initiatives within a unified approach to digital transformation. E-Digital was first designed from 2018–2021 which set the guidance. Its second phase (2022–2026) is now underway.

The strategy is organized around five enabling axes and four digital transformation axes, which together provide the foundation for advancing Brazil's digital economy, as shown in the diagram<sup>12</sup>. It emphasizes universal access to ICT infrastructure, including broadband expansion to remote areas, alongside investments in research and development in areas such as AI, IoT, and cybersecurity. The strategy prioritizes digital inclusion through education and professional training, preparing the society for new skills required by the digital economy. It also advances trust by reinforcing data protection, privacy, and cybersecurity, and encouraging legal frameworks that safeguard digital services. Internationally, Brazil seeks to enhance its role in global digital forums and support the competitiveness of its companies abroad.

Take the ICT as an example. In the first phase of the strategy, Brazil has advanced connectivity through several major initiatives. The release of the 700 MHz band and the reform of the Universalization Fund (Fust) expanded



Source: BRASIL, 2022e<sup>13</sup>

opportunities for broadband deployment<sup>14</sup>. The 2021 5G auction set clear obligations, including nationwide coverage, fiber expansion to unserved areas, and internet access in schools<sup>15</sup>. Connectivity was further strengthened by Conduct Adjustment Agreements, which financed backbone infrastructure in underserved regions, and by regional programs such as Norte Conectado and Nordeste Conectado<sup>16</sup>. They laid thousands of kilometers of fiber and extended networks to schools, hospitals, and research institutions. Internationally, the BELLA project connected Brazil to Europe via a high-capacity submarine cable, boosting research and data exchange across Latin America<sup>17</sup>.

The strategy also leads to significant steps in R&D with agriculture, cities, industry, healthcare, and technologies as the priority. The National Plan for the Internet of Things was issued and created the IoT Chamber to oversee and monitor the development of machine-to-machine communication systems<sup>18</sup>. The National Platform for Research Infrastructure (PNIFE) was launched to consolidate information on the research infrastructure of the country's Scientific, Technological, and Innovation Institutions, promoting shared access for both scientific and business communities<sup>19</sup>.

Brazil also made advancements in AI technologies. In 2022, a public notice provided R\$80 million in funding to support startups developing AI-based solutions to address federal technological challenges<sup>20</sup>. Complementing these initiatives, Decree No. 13.969 in 2019 and Decree No. 10.356 in 2020 strengthened industrial policy for the ICT and semiconductor sectors, enhancing legal and fiscal security<sup>21</sup>. The Brazilian Artificial Intelligence Strategy (EBIA), established by MCTI Ordinance No. 4.617 in April 2021, led to the creation of eight applied research centers<sup>22</sup>.

The Brazilian Digital Transformation Strategy serves as an outstanding example of a well-designed, initiated, and implemented digitalization process at national level. It is built on solid policy frameworks that align with the UN SDGs while being tailored to the local context. This strategic approach has significantly benefited Brazil's economy, demonstrating how a robust digital transformation plan can drive sustainable growth.



# Leave no one behind: WTO-World Bank Digital Trade for Africa Initiative

Despite growth in global digital trade, Africa represents only 0.9% of worldwide digital exports<sup>23</sup>. The continent faces persistent challenges, including a huge digital divide, with only 38% of the population connected to the internet as of 2024, limited use of digital IDs and transaction accounts, and slow adoption of digital technologies by traditional businesses<sup>24</sup>

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## *Pillar 1:*

*Create an Open and Safe Environment*

*"Promote equal participation in and access to the digital economy to overcome the digital divide."*

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To address these challenges and create an enabling digital environment, the World Trade Organization (WTO) and the World Bank jointly launched the "Digital Trade for Africa" initiative<sup>25</sup>. It is designed to help African countries overcome barriers, enhance economic competitiveness, and promote inclusive participation of small businesses, women, and youth in the global digital economy.

WTO and World Bank jointly released a policy note presented to African officials in July 2023. Entitled "Turning Digital Trade into a Catalyst for African Development", the note calls for the creation of an enabling regulatory environment for digital trade<sup>26</sup>. It emphasizes the need for a supportive digital trade ecosystem, including robust infrastructure, digital skills, payment systems, logistics, and regulatory frameworks.

WTO and World Bank also conducted "Digital Trade Needs Assessment" in Benin, Côte d'Ivoire, Ghana, Kenya, and Rwanda to develop a clear understanding of their digital trade needs and opportunities<sup>27</sup>. The assessment evaluates the digital trade ecosystems in the country, in areas like data protection, online consumer protection, and electronic payments. The project highlights the need to boost digital literacy and support SMEs to maximize the benefits of digital trade. Based on these findings, international support including capacity building and technical assistance will be extended to develop digital trade capabilities in aforementioned countries. Burkina Faso, Mauritius, Nigeria, and Togo express the interest to join the assessments with similar projects expected upon request<sup>28</sup>

The WTO-World Bank Digital Trade for Africa initiative exemplifies the combined efforts of international agencies, state governments, business support organizations, individual businesses, and professionals. It is a crucial initiative in ensuring that Africa is not left behind in the global shift towards the digital economy.





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Improve Trade  
Facilitation

## PILLAR 2

# Improve Trade Facilitation

*Pillar 2* focuses on enhancing trade facilitation through a range of practical measures, with paperless trade at its core. This includes the adoption of electronic documents and pilot programs aimed at improving efficiency. Other priorities include developing secure cross-border electronic payment systems, sharing regulatory and standards information, and promoting best practices in digital identity to strengthen connectivity. Cooperation in digital technologies is also encouraged to streamline logistics and customs clearance. The implementation of single window systems further supports the secure and efficient exchange of trade information.

This section highlights the role that electronic Bills of Lading (eBLs) and the electronic phytosanitary certificate could play in further expediting trade processes. Both initiatives could significantly reduce documentation costs, enhance data security, and contribute to environmental sustainability.

### *Pillar 2:*

#### *Improve Trade Facilitation*

*"Support the use of electronic bills of lading, electronic invoicing, electronic warehouse receipt and other electronic receipt and documents and relevant trade-related digital platform."*

## Expediting Trade through Electronic Bills of Lading (eBLs)

A bill of lading is a legally binding, transferable document issued by a carrier to a shipper. It provides details on the type, quantity, origin, and destination of goods, as well as a description of the shipment and its costs. Traditionally, paper-based bills of lading account for 40 percent of containerized trade transactions and 10 to 30 percent of trade documentation costs<sup>29</sup>

The transition from paper-based bills of lading to eBLs offers significant benefits. The most immediate gains are in time and cost savings. Paper handling, which can take days or even weeks, is replaced by digital processes that are completed within minutes. This shift improves efficiency across the supply chain, reduces errors, and accelerates shipment turnaround times. Estimates suggest that full adoption of eBLs could save traders around US\$6.5 billion in direct transaction costs and unlock an additional US\$30 to 40 billion in global trade<sup>31</sup>

SHIP FROM		SHIP TO		SHIP TO	
Name:	Address:	City/State/Zip:	SIID:	Name:	Location #:
THIRD PARTY FREIGHT CHARGES BILL TO:			THIRD PARTY FREIGHT CHARGES BILL TO:		
SPECIAL INSTRUCTIONS:			SPECIAL INSTRUCTIONS:		
CUSTOMER ORDER INFORMATION		CUSTOMER ORDER INFORMATION		CUSTOMER ORDER INFORMATION	
CUSTOMER ORDER NUMBER	# PRGS	WEIGHT	PALLETS (Est.)	DATE	ADDITIONAL SHIPPER INFO
			Y	N	
			Y	N	
			Y	N	
			Y	N	
			Y	N	
			Y	N	
			Y	N	
			Y	N	
GRAND TOTAL					
HANDLING UNIT		PACKAGE		CARRIER INFORMATION	
QTY	TYPE	QTY	TYPE	WEIGHT	N.M. (X)
COMMODITY DESCRIPTION				LTL ONLY	
				NMFC	CLASS
				RECEIVING STAMP SPACE	
GRAND TOTAL				COD Amount: \$	
				Fee Terms:	Collect: <input type="checkbox"/> Prepaid: <input type="checkbox"/>
				Customer check acceptable: <input type="checkbox"/>	
NOTE: Liability Limitation for loss or damage in this shipment may be applicable. See 49 U.S.C. § 14706(c)(1)(A) and (B).					
SHIPPER SIGNATURE / DATE		TRAILER LOADED:		CARRIER SIGNATURE / PICKUP DATE	
		<input type="checkbox"/> By Shipper <input type="checkbox"/> By Driver			
		<input type="checkbox"/> By Shipper <input type="checkbox"/> By Driver			
		<input type="checkbox"/> By Shipper <input type="checkbox"/> By Driver			

Source: Investopedia, 2024.<sup>30</sup>

Beyond efficiency, eBLs strengthen security. Digital signatures, encryption, and secure access protocols protect against tampering and unauthorized access. Real-time tracking and data transparency further reduce the risk of fraud, loss, or duplication, providing traders with greater confidence in the system.

The shift to eBLs also brings significant environmental benefits. Each eBL can eliminate up to 27.9 kilograms of greenhouse gas emissions compared to its paper equivalent<sup>32</sup>. Scaled to the industry's annual use of 15.8 million paper bills, this translates into potential savings of about 440,820 metric tons of CO<sub>2</sub> emissions<sup>33</sup>. Full adoption could also save nearly 28,000 trees every year, an area of forest roughly equal to 39 football fields<sup>34</sup>.

Despite these advantages, adoption remains uneven across countries. By August 2024, ten jurisdictions including Bahrain, Belize, France, Kiribati, Papua New Guinea, Paraguay, Singapore, Timor-Leste, the United Arab Emirates (Abu Dhabi Global Market), and the United Kingdom, have incorporated UNCITRAL's Model Law on Electronic Transferable Records (MLETR) into national legislation<sup>35</sup>. India has developed an electronic Port Community System to manage eBLs, while Russia issued its first test eBLs in 2024. Other major economies, including the United States, Netherlands, Brazil, South Africa, and Japan, are also advancing gradually. Widespread adoption still faces obstacles. Legal recognition of eBLs is fragmented, with significant variations among jurisdictions. Technical limitations and disparities in capacity, particularly for SMEs in developing countries, create further barriers. The lack of interoperability and standardization across private platforms also complicates efforts to integrate eBLs into global supply chains.

ITC produced a publication titled *Expediting Trade Through Electronic Bills of Lading in 2025*, examining the increasing use of eBLs in global trade, traces their evolution and explores their transformative impacts, as well as the efforts by governments, industry associations and international organizations to promote the adoption of eBLs.

## ePhyto: GeNS in Sri Lanka

The International Plant Protection Convention (IPPC) has developed the electronic phytosanitary certificate (ePhyto) solution to digitize and streamline the certification process. By replacing traditional paper-based methods, the system enhances efficiency, increases reliability, and enables fully paperless issuance of phytosanitary certificates.

Sri Lanka is one of three pilot countries in the world testing its Generic ePhyto National System (GeNS) under the global GeNS implementation project initiated by IPPC. It also made a remark as the first Asian country to “go live with GeNS”<sup>36</sup>.

To support the implementation of GeNS, Sri Lanka's Department of Agriculture, through its National Plant Quarantine Service (NPQS), has established 17 ePhyto working stations across the country<sup>38</sup>. An ePhyto National Committee, composed of 12 members including the Director General of Agriculture and the Additional Director of NPQS, has been formed to oversee the project<sup>39</sup>. In addition, a dedicated project office was set up to coordinate activities and ensure smooth operations.



Source: Department of Agriculture, 2024<sup>37</sup>

To raise awareness and understanding of GeNS, training sessions have been conducted for Sri Lankan inspectors and government officials. International experts also participated, including representatives from the United Nations International Computing Center, Australian ePhyto Steering Group, and the IPPC<sup>40</sup>.

The GeNS significantly reduces the time and costs associated with generating and exchanging ePhyto. Users can efficiently cross-check and authorize ePhyto within the system, minimizing manual documentation and enabling easy access to centralized data for informed decision-making. This transformation eliminates printing and reprinting costs while drastically reducing fraudulent incidents to almost zero. Additionally, the system simplifies record tracking and report generation, streamlining operations within institutions or enterprises.

The GeNS project exemplifies international collaboration in paperless trade. The NPQS is now working closely with ICC and UNESCAP to facilitate ePhyto exchanges with New Zealand, the United States, Chile, and Argentina<sup>41</sup>. Plans are also underway to extend the system to the European Union, aiming to reduce documentation costs for trade with European markets<sup>42</sup>.

At the global level, governments submit over 5,000 technical barriers to trade (TBT) and sanitary and phytosanitary (SPS) measures to the WTO each year. To help businesses navigate these complex and evolving requirements, UNDESA, ITC, and the WTO jointly launched e-Ping, an online alert mechanism that keeps users informed of changes in SPS and TBT measures in international markets. The platform allows users to browse notifications on new or updated product regulations, access information on trade concerns discussed in WTO SPS and TBT Committees, sign up for email alerts on products or markets of interest, locate enquiry points and notification authorities, and connect with national and international counterparts. By providing timely and accessible information, e-Ping supports enterprises in complying with international standards and enhancing their trade competitiveness.





PILLAR

OS

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Overcome the Digital  
Divide

## PILLAR 3

# Overcome the Digital Divide

*Pillar 3* focuses on overcoming the digital divide by promoting investment in digital infrastructure aligned with countries' priorities and encouraging the sharing of experiences. *Pillar 3* calls for integrated digital technologies and green solutions in enhancing basic infrastructure, leveraging exhibitions and city-to-city collaboration to enhance connectivity and ensure the benefits of the digital economy reach everyone.

The report features the following projects that showcase the potential of digital transformation and bridging the digital divide:

- ◆ Ethiopia-Djibouti Cross-Border Water Supply Project – using digital technologies for water supply systems
- ◆ Clean Electricity in Suriname – solar energy to power digital growth
- ◆ Rural e-commerce – Smart oranges in Zigui county in China
- ◆ Empowering MSMEs – ITC Digital Moonshots

## Ethiopia-Djibouti Cross-Border Water Supply Project

The Ethiopia–Djibouti Cross-Border Water Supply Project tackles the challenge of water scarcity in Djibouti, where limited reliable sources have long constrained economic and social development. Built on bilateral collaboration between Ethiopia and Djibouti, CGCOC Group Co., Ltd undertook the project integrating green and digital innovations to enhance water supply infrastructure in Djibouti. Its impact has been internationally recognized, with the United Nations Global Compact acknowledging it as one of the best practices in basic infrastructure aligned with the UN SDGs<sup>43</sup>

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*Pillar 3:*  
*Overcome the Digital Divide*  
*"Encourage investment in digital infrastructure based on respective priorities."*

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Advanced digital technologies are adopted in the new water supply system. Computers and network systems enable integrated management and control across all stages of the water transmission system. The project establishes a comprehensive information management framework that unifies scheduling, production, information streams, and supervisory control, optimizing coordination and efficiency. Dynamic production scheduling is facilitated through automatic data collection and real-time updates, transmitted via a wireless network. Key metrics such as water supply and discharge volumes, quality, energy consumption, and inventory are analyzed and displayed in intuitive charts or graphs, enabling management to make timely, data-driven decisions to guide production.

The project also integrates multiple green solutions to ensure a sustainable water supply and resource management. First of all, it strictly follows Ethiopian regulations to protect water source quality, employing chlorine flocculation for raw water treatment and regular cleaning of water hyacinths, while controlling pollution within protected areas. Secondly, sustainable resource utilization is prioritized through the recycling of construction materials, including concrete blocks, bricks, and steel formwork, and the reuse of water from pump stations and reservoirs for irrigation and livestock. Lastly, the project employs solar-powered systems for data collection and management. Photovoltaic cells combined with batteries provide the facilities to operate.

By replacing coal-fired power plants and other polluting facilities, the project has built a modern water supply system comprising 28 deep wells, 2 booster pump stations, 358 kilometers of pipeline, four reservoirs of 20,000 cubic meters each, one reservoir of 5,000 cubic meters, one of 3,000 cubic meters, and four of 2,000 cubic meters<sup>44</sup> The project supplies water to over 610,000 people, with the per capita water usage reaching the standard 100-135 liters per day<sup>45</sup> The coverage rate of the water supply network has exceeded 90%<sup>46</sup>. Additionally, the project has created over 1,500 jobs in both Ethiopia and Djibouti and enhanced the technical skills of the local workforce<sup>47</sup>



Source: China International Contractors Association, 2024

## Clean Electricity in Suriname

Suriname's energy infrastructure has long faced significant challenges, particularly in inland areas beyond the capital, Paramaribo. While the capital has relatively well-developed facilities, most of the population lived in small villages along the Suriname River, where electricity was scarce. These communities have relied on government-provided diesel generators, often receiving power for only 5 hours each day<sup>48</sup>. Without reliable electricity, residents had limited access to electric appliances such as washing machines, refrigerators, or televisions, as well as digital devices such as computers and cellphones. This lack of stable power underscored the urgent need to enhance infrastructure to bridge digital divide.

In response, PowerChina partnered with Suriname's Ministry of Natural Resources to deliver renewable energy solutions through the Suriname Village Micro-grid Project, implemented in two phases. The first phase, completed in May 2020, established a 650 kW off-grid photovoltaic (PV) system with 2.6 MWh of energy storage in Gujaba and Pikinslee villages<sup>49</sup>. The second phase, launched in 2021, expanded the system's capacity to 4.16 MW and 13.2 MWh<sup>50</sup>. It added five micro-grid power plants, a 66.45 km transmission line, and 2.3 MW of diesel generation capacity<sup>51</sup>. Together, these developments provided reliable 24/7 electricity for remote areas.

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*Pillar 3:*

*Overcome the Digital Divide*

*"Support businesses...to actively participate in digital, networked and smart upgrading of traditional infrastructure."*

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Several technological innovations were important to the project's success. Detailed load analyses were carried out to understand energy consumption patterns in each village, enabling an optimized micro-grid design that balanced solar, storage, and diesel power. A sophisticated energy management system was introduced, integrating load forecasting with solar generation predictions to improve reliability and extend battery life. To further ensure stable supply, the system automatically activated diesel generators when solar power was insufficient, preventing power outages before they occur.

Construction across remote and scattered sites required innovative approaches. Pontoon boats were employed to transport materials such as wooden poles across rivers, helping to reduce costs and overcome logistical barriers. In areas where heavy machinery could not be used, tripods were utilized to erect poles, ensuring steady progress even in difficult terrain.

As of April 2024, the project has delivered stable electricity to at least 50 villages across Suriname<sup>52</sup>. This enables households to use electronic devices, supporting education through multimedia virtual classes, and strengthening local economic activity. At the national level, the project has advanced Suriname's energy transition by increasing the share of clean energy in its power mix. Low-carbon sources now account for more than 48 percent of the country's electricity generation, reducing reliance on fossil fuels and contributing to a more sustainable energy future<sup>53</sup>.



Source: China Chamber of Commerce for Import and Export of Machinery and Electronic Products, 2024



## Rural e-commerce: Smart Oranges in Zigui County

Zigui County, located in western Hubei Province, China, sits at the eastern gateway of the Yangtze River Gorges. The unique microclimate shaped by the Gorges provides ideal conditions for cultivating late-ripening citrus varieties such as the Summer Orange. However, the location also presents challenges, especially for transportation and logistics.

Leveraging “digital + intelligent” technologies, Zigui has transformed its traditional orange industry into a model of smart agriculture and rural digitalization, earning recognition as a national digital rural pilot county. Today, the citrus sector stands as a pillar industry driving local economic growth through smart production, traceable digital platforms, and e-commerce integration.

Smart production practices have significantly expanded cultivation and improved efficiency. The county employs soil-testing-based fertilization and intelligent irrigation systems that integrate Internet of Things (IoT) monitoring for soil quality, moisture, pest management, and crop health. Mechanized harvesting and transport have been introduced, supported by 620 agricultural drones and over 40 kilometers of monorail orchard transport systems<sup>54</sup>. These innovations have increased operational efficiency by up to tenfold and reduced annual costs by around 30 million CNY.

To ensure knowledge transfer, local farmers receive technical training from agricultural experts, with certification programs recognizing their professional development. By 2025, Zigui’s orange output has reached 1 million tons, valued at nearly 20 billion CNY, alongside achieving 70% water savings, 40% fertilizer reduction, and 90% labor savings<sup>55</sup>.

Digital platforms play a central role in managing and optimizing the citrus industry. The Three Gorges Citrus Hybrids Data Center consolidates soil, climate, and remote-sensing data across over 400,000 plots<sup>56</sup>. Through a mobile application, farmers can access tailored recommendations on fertilization and cultivation. A digital supply chain platform connects more than 1,500 market entities, facilitating e-commerce transactions, financial services, and supply–demand matching.

Financial innovation has further supported growth: in 2024, the “Citrus Distributor Loan” program provided 5.5 billion CNY in online loans to local businesses without mortgage, improving access to and affordability of capital for small producers<sup>57</sup>.

Digital connectivity has boosted the marketing and sales of the orange industry. More than 70% of the county’s residents are engaged in the orange value chain, from cultivation and processing to packaging and online retail. The logistics system now spans county–town–village levels, with 18 dedicated distribution routes operated by major logistics providers. Over 2,000 e-commerce businesses sell Zigui oranges online, generating annual sales of 250,000 tons worth 4 billion CNY<sup>58</sup>.

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*Pillar 3:*

*Overcome the Digital Divide*

*"Support competent enterprises in creating online cooperation zones and industrial clusters that connect participating enterprises to upstream and downstream local businesses, producers, suppliers and distributors.."*

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Building on this momentum, Zigu is promoting its "Zigu Orange" brand through partnerships with leading domestic retailers and international distributors in markets such as Saudi Arabia, the Philippines, Thailand, and Malaysia<sup>59</sup>. These efforts aim not only to expand exports of fresh fruit but also to develop a diversified range of high-value processed products, advancing rural revitalization through digital innovation and sustainable agriculture.

## Empowering MSMEs: ITC's Digital Moonshot

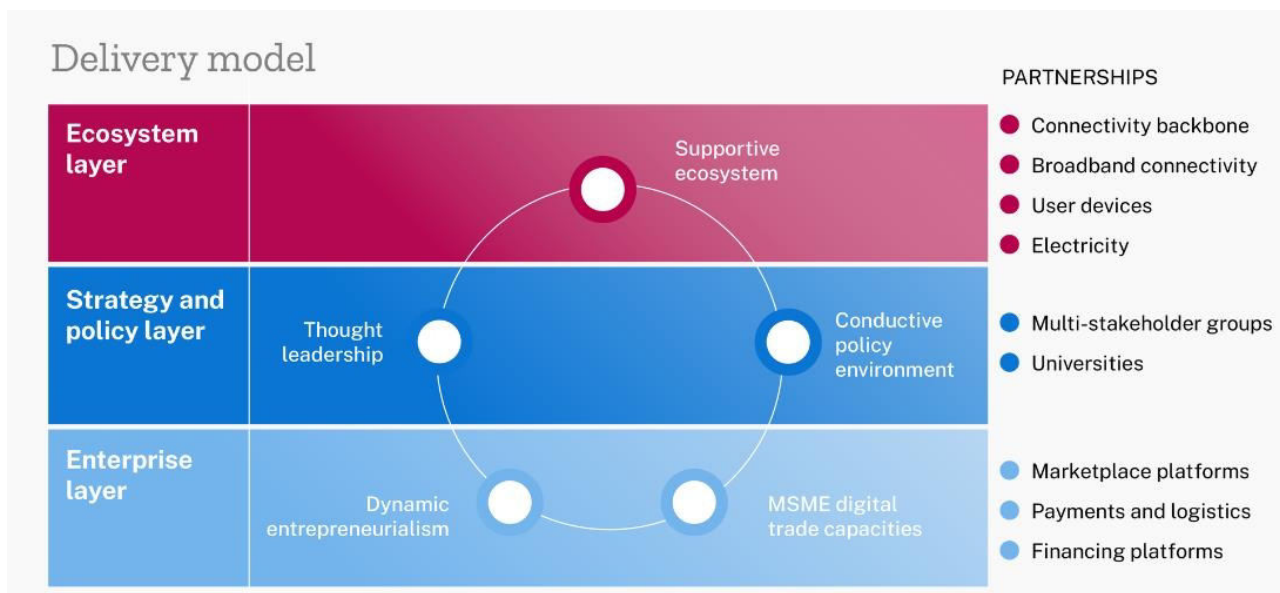
Digital connectivity is essential for economic growth, especially for small businesses. While digital trade can generate new revenue, create jobs, and attract investments, many small businesses in developing countries struggle to access affordable digital tools and lack the necessary skills. This digital divide is particularly severe for businesses in remote areas, limiting their ability to capitalize on digital opportunities.

To tackle the digital challenges faced by small businesses in developing countries, the International Trade Centre launched the Digital Moonshot initiative to provide comprehensive support to help MSMEs engage in global trade. The program's vision is to connect 20,000 small businesses from 17 countries to online opportunities by 2025, strengthen 4,000 digital entrepreneurs and reinforce a network of 30 business support organizations<sup>60</sup>. There are four focus areas<sup>61</sup>:

- ◆ Improved capacity of stakeholders to manage the implications of digital trade: ITC strengthens stakeholders' ability to navigate digital trade by leading collaborative initiatives and generating insights on emerging digital technologies, in line with the UN Global Digital Compact, to expand digital access and opportunities.
- ◆ A more supportive business ecosystem: The initiative promotes affordable and accessible digital connectivity through training programs for business support organizations and targeted support for digital entrepreneurs, with a focus on youth- and women-led startups. ITC aims to increase productivity across sectors such as agriculture, education, and healthcare.
- ◆ A more conducive policy and regulatory environment for small businesses: ITC engages with public and private sectors to shape policies that promote digital connectivity, advising governments on digital trade policies and equipping local organizations to advocate for improved digital services, driving meaningful reforms in developing countries.
- ◆ Improved capacity among small businesses to trade digitally: ITC helps small businesses build digital capabilities through an online community (EcomConnect) for learning and networking and establishing local support centers, guiding businesses in marketing and selling online, and fostering a collaborative environment for growth.

Capacity building:

"Enhance economic and technical cooperation and skills training in digital and green areas so as to promote technology dissemination and upskilling and encourage enterprises to carry out independent training schemes in relevant fields."



Source: International Trade Centre, 2024<sup>62</sup>

■ **EcomConnect Platform**<sup>63</sup>

EcomConnect provides innovative tools to help businesses unlock the potential of e-commerce. Its services range from detailed dashboards that analyze marketplace characteristics in Africa, Asia, and Latin America to assessments of e-commerce readiness, cost calculators, online payment solutions, and access to various marketplaces.

■ **Digital Export Enablement Program (DEEP) for ASEAN small businesses**<sup>64</sup>

ITC partnered with WIPO, ICC, and Google to create the DEEP initiative, leveraging partnerships and bringing together diverse talents to elevate small businesses in the digital trade arena. Through DEEP, over 1,000 entrepreneurs from the ASEAN have gained essential skills in market analysis and digital marketing. They have learned how to utilize multiple digital market analysis tools and strategies to enter new markets and understand regulations. In addition, businesses are using ecomConnect to exchange insights, build networks, and identify B2B opportunities, further enhancing their capacity to thrive in the digital economy.

PILLAR



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Enhance Consumer  
Trust

## PILLAR 4

# Enhance Consumer Trust

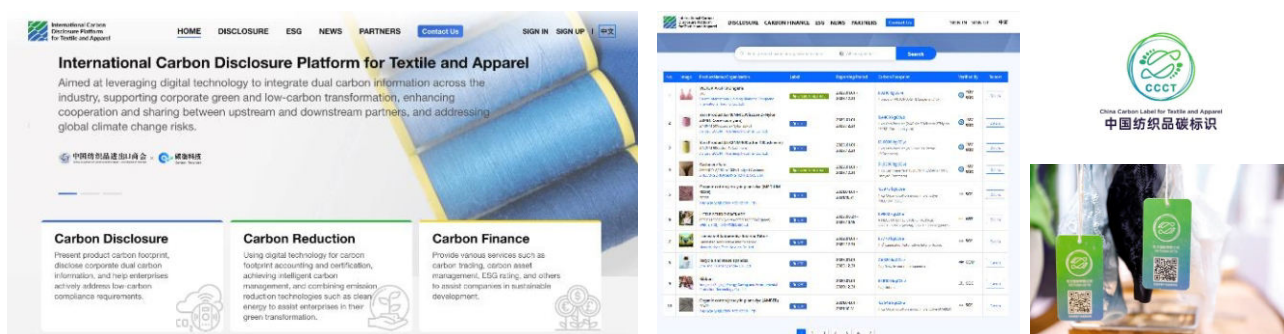
*Pillar 4* of the *Initiative* focuses on strengthening consumer confidence in digital trade. It promotes cooperation on online consumer protection and explores mechanisms for resolving cross-border disputes, providing consumers with multiple avenues for redress in line with national laws and international obligations. Protecting personal information is another key priority, with Initiative encouraging the development and refinement of regulatory frameworks to safeguard e-commerce users. It also facilitates the exchange of best practices to enhance compatibility and mutual recognition of personal data protection systems across countries. One good example is the International Carbon Disclosure Platform for Textile and Apparel, which improves transparency by providing data on carbon footprints throughout the supply chain.

## Disclosure and Transparency: Digitalization of Supply Chain in Textile and Apparel Industry

Amid global shifts toward a circular economy and sustainable development, international retailers and customers increasingly demand carbon footprint disclosures and environmentally responsible practices. Transparency has become essential for consumers' trust, enabling them to make informed and sustainable choices. For textile producers, the disclosure of carbon footprint helps them to maintain long-term growth and competitiveness in the textile industry.

To address this need, the China Chamber of Commerce for Import and Export of Textiles and Shanghai Carbon Newture Co., Ltd. launched the International Carbon Disclosure Platform for Textile and Apparel, the first initiative of its kind enabling transparent carbon reporting for garments, fabrics, accessories, and yarns. By offering standardized, verifiable, and easily accessible carbon information, the platform enhances traceability across the supply chain and strengthens consumer confidence in sustainable products.

The platform leverages advanced technologies, including IoT, Big Data, Blockchain, and Artificial Intelligence, to track emissions at every stage of production, providing real-time data and comprehensive analysis. Free to use and available in both Chinese and English, it serves domestic companies and international buyers alike.



Source: The China Chamber of Commerce for Import and Export of Textiles, 2024

The platform was launched at the Global Textile Carbon Neutral Summit 2023. Over 100 leading companies have registered on the platform, showcasing more than 200 compliant products<sup>65</sup>. Since then, the platform has attracted attention from government agencies, research institutions, and top-performing companies in industry such as Orient International and Jiangsu Guotai International Group<sup>66</sup>.

Companies can apply for the "China Carbon Label for Textile and Apparel" " and obtain the carbon footprint of their products through the unique QR code. The platform follows authoritative compliance standards common to the international textile industry, such as ISO14067, PAS2050, PAS2060, GHG Protocol, etc<sup>67</sup>. Its core features include:

◆ Carbon Footprint Query: Users can search for information by company or product, filter results, and access certification details.

◆ Product Carbon Disclosure: Enterprises disclose emissions data across production stages, supported by third-party certification reports. Information is free to download and accessible via QR code.

◆ Blockchain Data Security: All data is verified by certified organizations and recorded on the Carbon Balance Alliance blockchain, preventing tampering.

◆ ESG Services: Consulting and training support companies to align with ESG standards and improve decision-making in sustainable finance.

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*Pillar 4:*

*"Strengthen cooperation on online consumer protection... so that consumers have multiple options that could accommodate certain characteristics of e-commerce in accordance with...international obligations.*

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By enhancing supply chain transparency, the platform helps companies to meet international ESG standards and build stronger relationships with environmentally conscious consumers. As one company representative explained: *"The platform not only helps us meet international compliance requirements but also improves our operational efficiency by managing energy use more effectively."*

The platform's growing adoption is reinforcing consumers and companies' confidence in verified, traceable, and sustainable textile products. As more enterprises register and disclose their production, the platform contributes to a more trustworthy market environment. Over time, the platform is expected to become a practical tool for strengthening consumer trust, promoting fair competition, and supporting the textile industry's transition toward greener and more transparent production models.



PILLAR  
05

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Create a Good Policy  
Environment for Promoting  
Green Development

# Create a Good Policy Environment for Promoting Green Development

Part II of the *Initiative* focuses on advancing green development through three pillars. It calls for creating a supportive policy environment by fostering dialogue and coordination among stakeholders, while respecting national conditions to facilitate trade and investment. It emphasizes policy exchanges and dialogue on trade, low-carbon technologies, and biotechnology. It also encourages collaboration on innovative business models to promote sustainable consumption and production. The *Initiative* also promotes the exchange of green technologies and services, as well as investment cooperation, with a focus on clean energy, new energy vehicles, green finance, and green infrastructure development. It highlights the importance of environmental responsibility among enterprises and fosters innovation through collaboration and digital integration.

*Pillar 5* focuses on creating a supportive policy environment for green development by respecting national conditions, enhancing global cooperation, and sharing best practices. It encourages collaboration among governments, industries, and financial institutions to boost green development initiatives, while also promoting transparent policies, clean technology transfer, and streamlined procedures to facilitate sustainable trade and investment.

In this section, Chile's national framework on Green Hydrogen and the "Energy + Women" program set the vision for advancing renewable energy goals and reducing gender inequality in the energy sector over the next three decades. Meanwhile, China has developed the Global Renewable Energy Exploitation Analysis platform to enhance knowledge sharing and overcome data challenges in renewable energy assessments. On the collaboration front, the partnership between the International Rice Research Institute and agencies in Southeast Asia to address food security and reduce hunger in the region set a good example of partnerships.

## Chile's Energia+Mujer Initiative to address gender gaps in energy sector

As countries worldwide strive to balance carbon reduction with economic growth, Chile has emerged as a key player of renewable energy transition. Despite its longstanding reliance on fossil fuels and copper mining, Chile has made remarkable progress towards clean energy by leveraging strong political commitment, public-private partnerships, and innovative green technologies. It aims at converting 70% of its energy consumption to renewables by 2030 and achieve carbon neutrality by 2050<sup>68</sup>.

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Chile places green hydrogen production at its core. This clean energy source, generated by using renewable energy to split water into hydrogen and oxygen, is crucial to reducing carbon emissions in energy-intensive sectors like mining. Powerful winds in Patagonia and high solar radiation in the Atacama Desert provide Chile with favorable natural conditions to become one of the world's most cost-efficient green hydrogen producers.

The Chilean government has committed \$50 million to start six major projects on the green hydrogen infrastructure and innovation, partnering with domestic and international companies like GNL Quintero, CAP, and Air Liquide<sup>69</sup>. Chile is also co-hosting the United Nations Climate Change Conference COP25 in Madrid and initiating the "Americas for the Protection of the Ocean" at the 9th Summit of the Americas<sup>70</sup>.

## Energy + Women

While the growth of the sustainable energy sector releases enormous opportunities, women are disproportionately underrepresented in the renewable energy industry<sup>71</sup>. Recognizing the importance of a gender-responsive and just transition to sustainable energy future, Chile has prioritized gender equality in the renewable energy sector as a major focus in its political agenda.

### Pillar 5:

*Create a Good Policy Environment for Promoting Green Development*

*"Respect the national conditions as well as laws and regulatory policies of each participant... strengthen the alignment of green development strategies and policies communication...."*

The Ministry of Energy of Chile has conducted a detailed survey and recognized the significant gender gap in the industry. Women make up only 23% of the workforce and earn, on average, 24% less than men, particularly in managerial and administrative roles<sup>72</sup>. Leadership representation is also limited, with women holding only 18% of board seats, 10% of CEO positions, and 18% of management roles<sup>73</sup>.

To tackle the gender gap in energy sector, Chile launched the Energy + Women (or Energía +Mujer) initiative in 2018. It is a long-term project designed to make the energy industry more diverse, inclusive, and sustainable through a structured Action Plan.



Source: Ministry of Energy 2024

The Public-Private Plan "Energy + Women" is a collaborative effort that outlines 10 axes, 14 measures, and 40 specific actions, encouraging voluntary participation from institutions<sup>74</sup>. By 2023, over 70 companies, associations, and institutions from the energy sector have joined the initiative, impacting more than 26,000 employees<sup>75</sup>. Below is the summary of the plan:

Political management strategy	Explicit commitment to Senior Management with gender equity (inclined to Diversity and Inclusion, and Non-Discrimination)
Participation and insertion in the energy sector	Supporting the training of women in skills professionals and techniques demanded by the energy sector and promote their progressive insertion
Career (Selection, Promotion, etc.)	Develop recruitment and selection processes and hiring staff free of gender bias and stereotypes, Promotions and promotions policies sensitive to gender, and training in a gender approach applied to women characteristics of the functions that are carried out in the organization
Promotion of diverse leadership in chiefs and managers	Promotion of female leadership in leadership and management
Equality of labor compensation and benefits	Analysis and correction of wage inequalities between women and men
Work-life balance	Creating favorable institutional conditions in the development of women and men's working careers in conditions of equity
Violence, health, safety, and hygiene	Work environment free of violence and harassment (psychological, symbolic, physical), safe and with a work environment that favors the integral development of women and men in the organization; Implementation of Infrastructure Improvements gender-sensitive labour
Governance	Communication and internal marketing without bias or gender stereotypes, prone to Diversity & Inclusion; Participatory governance in implementation, monitoring, follow-up and updating of the Public-Private Plan
Community	Conduct and intend favorable measures and/or affirmative measures that enhance gender equity
Suppliers	Conduct and intend favorable measures and/or affirmative measures that enhance gender equity

Source: Ministry of Energy, 2024

By 2030, Chile aims to ensure that all medium and large energy companies adopt comprehensive gender equity policies and women's participation in critical sectors of energy industry reaches 30%. The country will train 18,000 individuals and certifying 9,000 women to lead in the growing field of clean energy<sup>76</sup> By 2040, Chile aims to close the gender pay gap entirely and achieve equal representation in senior positions, setting a powerful example of gender-inclusive growth within the global energy landscape.



## **Food Security: the International Rice Research Institute enhancing rice cultivation and rice science**

The International Rice Research Institute (IRRI) is a global agricultural research organization based in the Philippines, founded in 1960. It is dedicated to reducing hunger and enhancing food security, social equity, and sustainability in and through rice science.

The IRRI collaborates with national agricultural research systems, NGOs, and private sector partners to provide training, resources, and technologies that strengthen food security. Its scientists develop advanced rice varieties with higher yields and greater resilience to pests, diseases, and climate challenges such as flooding and drought. Today, more than half of Asia's rice-growing areas are planted with IRRI-developed varieties or their derivatives.

IRRI's research covers a wide spectrum, including plant breeding, genetics, agronomy, and post-harvest technology. It also provides tailored recommendations on rice varieties and agricultural practices suited to specific farm conditions and consumer preferences. This ensures that innovations meet both local needs and broader market demands.

In the Philippines, the IRRI partners with the Department of Agriculture to bridge technology gaps in rice cultivation. Through the WaterRice project, they have introduced modern practices such as mechanical transplanting, land leveling with mechanization, and ICT- and IoT-based tools for water and weed management<sup>77</sup>

To address pest outbreaks which account for an estimated 37% of farmers' annual losses, IRRI and the Department of Agriculture launched the Pest and Disease Risk Identification and Management (PRIME) project<sup>78</sup>. The initiative has established a national pest surveillance system and monitored more than 2,000 rice fields across the country. As a result, heirloom rice yields increased by 11%, and farmers' incomes rose from about \$100 to \$190 per hectare<sup>79</sup>

Farmers further benefit from the Rice Crop Manager Advisory Service provided by IRRI and the Department of Agriculture. It has generated 2 million online recommendations across 16 regions in Philippines with nearly 60% adopted by farmers<sup>80</sup>. In Madalag and Aklan, use of these recommendations increased yields from 3.2 to 4.2 metric tons per hectare<sup>81</sup>. Complementing this, IRRI has developed the NextGen E-Learning Course and trained more than 19,700 students as the next generation of rice science leaders<sup>82,83</sup>

IRRI has a global presence, carrying out transformative work in 17 countries<sup>84</sup>. It is active across South and Southeast Asia, including India, Cambodia, Indonesia, Lao PDR, Myanmar, Thailand, and Viet Nam. In Sub-Saharan Africa, it collaborates with farmers and research hubs to strengthen food systems. In East Asia, partnerships with China and Republic of Korea advance rice breeding, food systems, and youth training. Through strategic initiatives in rice farming, climate adaptation, and the empowerment of women and youth, IRRI significantly enhances the sustainability of rice-based agri-food systems across the region.

# China-Pakistan Wind Power Project

The China-Pakistan Economic Corridor is one of the six major corridors under the Belt & Road Initiative. The United Energy Pakistan JHIMPIR (99 WM) Wind Power Phase I Project is one of the priority projects. It is located in the Jhimpir region of Sindh Province, northeast of Karachi. The area is known for its abundant wind resources and its strategic importance as a regional hub in southern Pakistan.

China Gezhouba Group Co., Ltd. led the project as the Engineering, Procurement, and Construction (EPC) contractor for the wind energy project, delivering a full package from financing and design to installation, commissioning, and operation. Construction, however, faced major challenges in the desert environment, where dryness, extreme heat, and sharp temperature fluctuations complicated large-scale works such as wind turbine foundations. To address these obstacles, the project team applied several innovations, including cyclic structure wind turbine communication systems, large-volume concrete construction techniques, and an intelligent reactive power compensation system<sup>85</sup>.

The project began commercial operations on 31 July 2017. It now generates approximately 260 million kilowatt-hours of clean electricity annually, supplying Pakistan's national grid<sup>86</sup>. This contribution helps alleviate the country's persistent energy shortages while reducing reliance on fossil fuels.

The project also generated significant opportunities for the local community. Over 1,000 local workers were employed during construction, accounting for more than 70 percent of the workforce<sup>87</sup>. Technical training programs were provided to enhance skills and support long-term career development. Additionally, a localized talent certification system was established to standardize recruitment, training, and professional growth for local employees. These measures not only strengthened the project's operations but also promoted broader economic participation and capacity-building within the local community.

From 2013 to 2025, over \$25 billion has been invested through the China-Pakistan Economic Corridor (CPEC), supporting 38 projects in energy, transport, port infrastructure, and broader economic development<sup>88</sup>. Major initiatives include over 8,000 MW of electricity generation through Port Qasim, Sahiwal, Karot Hydropower, Thar Coal, and solar and wind energy projects, helping to address Pakistan's power shortages<sup>89</sup>. Strategic road projects, such as the Multan-Sukkur Motorway, Hazara Expressway, and KKH Phase 1, are also significantly improving connectivity and reducing travel times<sup>90</sup>.

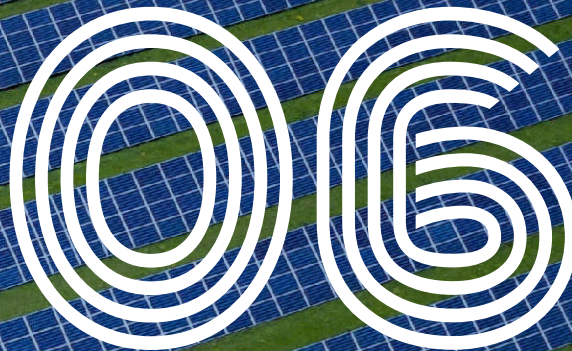
CPEC has contributed substantially to local job creation. According to the Pakistan Institute of Development Economics, by 2025, over 70,000 jobs have been generated across its projects, with long-term projections estimating up to 2 million direct and indirect positions<sup>91</sup>. The Pakistan government has emphasized technology transfer through vocational and technical training programs<sup>92</sup>. By 2025, over 50,000 Pakistan professionals have been trained in China, equipping the workforce with industry-ready skills<sup>93</sup>. With the inclusion of new projects under the CPEC long-term plan in sectors such as agriculture, tourism, mineral processing, oil and gas, and services, the employment portfolio is likely to expand significantly.



Source: China Chamber of Commerce for Import and Export of Machinery and Electronic Products, 2024



PILLAR



Strengthen Trade  
Cooperation to Promote  
Green and Sustainable  
Development

## PILLAR 6

# Strengthen Trade Cooperation to Promote Green and Sustainable Development

*Pillar 6* focuses on enhancing trade cooperation to promote green and sustainable development. It emphasizes improved communication on trade policies, the exchange of low-carbon technologies, and cross-border recognition of green standards. An innovative example is China's "photovoltaic sheep" model, which combines ecological restoration with local animal husbandry, contributing to both environmental sustainability and poverty reduction in surrounding communities.

*Pillar 6* also encourages the creation of low-carbon trade pilot sites and the adoption of resource-efficient practices. Notable examples include the China–Saudi Arabia Red Sea Project, which integrates sustainable tourism with environmental conservation, and the Thailand–Viet Nam collaboration on new energy vehicles, supporting the region's transition to cleaner transportation solutions.

## Rural Development: Photovoltaic Sheep

The Talatan area of Qinghai Province, located on the Qinghai–Tibet Plateau, is one of the most challenging environments in China. At nearly 3,000 meters above sea level, it is dominated by Gobi dunes, thin air, and a desertification rate exceeding 98%<sup>94</sup>. For local communities, animal husbandry has long been the backbone of livelihoods. At the same time, the region's long hours of sunshine make it a natural hub for solar energy development.

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*Pillar 6:*

*Strengthen Trade Cooperation to Promote Green and Sustainable Development*

*"Strengthen the exchange and cooperation on innovation business models for trade to improve sustainable consumption and production patterns."*

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### **Generating electricity on the panels, planting grass between the panels, and raising sheep underneath**

The photovoltaic industry in Talatan has adopted an integrated model of "solar power generation on the panels, grass planting between the panels, and sheep grazing underneath." This approach combines renewable energy production with ecological restoration and sustainable livestock farming.

Large-scale photovoltaic installations make use of the desert landscape, where the panels reduce direct sunlight and wind exposure. Their regular cleaning with water improves soil moisture retention, enabling grasslands to regrow. The vegetation acts as a windbreak, consolidates sand, and enhances the local ecosystem. Since the establishment of the photovoltaic park, wind speeds within the park area have decreased by 50%, soil water evaporation has fallen by 30%, and vegetation coverage has increased to 80%<sup>95</sup>.

To manage excess vegetation, which can reduce panel efficiency and increase fire risks in arid environments, local herders are encouraged to graze their flocks within the photovoltaic park. This practice has given rise to so-called “photovoltaic sheep,” which both maintain the grassland and contribute to the local livestock economy. The system now produces around 110,000 tons of pasture annually, with more than 10,000 sheep cultivated in the area<sup>96</sup>.

As of June 2024, the photovoltaic park has spanned 609 square kilometers and hosts 91 energy enterprises, including 63 solar power firms and 28 wind power firms<sup>97</sup>. The province has achieved a clean energy installed capacity of over 51 million kilowatts, out of a total of 55 million kilowatts<sup>98</sup>.

The model has also stimulated local socio-economic development. A photovoltaic ecological pasture pilot project covering 28,000 mu (about 18 square kilometers) was established, directly benefiting four village collectives and 771 farming and herding households<sup>99</sup>. The pasture supports 4,600 Tibetan sheep annually, generating income of 380,000 CNY (around \$53,000) and saving more than 700,000 CNY (around \$98,000) in feed costs each year<sup>100</sup>.

The initiative has fostered collaboration among cooperatives, herders, processing enterprises, energy companies, and government agencies. It is now helping the local livelihood industry build their brand in green farming. Overall, the project has created a circular, integrated model in which solar energy, ecological restoration, and animal husbandry reinforce one another, demonstrating a sustainable pathway that combines clean energy with ecological and rural development.



Photo: Comparison of the past and present of Talatan photovoltaic park.  
Source: Hainan Tibetan Autonomous Prefecture, Qinghai Province of China, 2024

# Sustainable Tourism: The Red Sea Project

The Red Sea Project, part of Saudi Arabia's Vision 2030, is located on the west coast between Al Wajh and Umluj, about 500 km north of Jeddah. Spanning 28,000 square kilometers, the destination encompasses an archipelago of more than 90 pristine islands, unspoiled beaches, and diverse natural landscapes, including dormant volcanoes, desert dunes, and mountain canyons<sup>101</sup>. The project is envisioned as a new model of sustainable tourism where luxury, sustainability, and innovation converge with a broader commitment to diversifying Saudi Arabia's economy. Upon full completion in 2030, the Red Sea Project will feature 50 resorts and 1,000 residential properties, create around 70,000 direct and indirect jobs, and contribute an estimated \$5.3 billion annually to the national economy<sup>102</sup>.

The Red Sea Project is recognized as the world's largest off-grid energy storage development powered entirely by solar energy and the first large-scale commercial utility to integrate multi-energy complementary technology. SEPCO3, serving as the EPC contractor, has delivered a comprehensive engineering solution to ensure stable and reliable power generation and operations in a fully off-grid environment powered solely by photovoltaic and energy storage systems.

Powered entirely by renewable energy, the project is able to generate up to 650 GWh annually from solar power. This avoids the use of fossil fuels and reduces carbon dioxide emissions by an estimated 500,000 tons each year<sup>103</sup>.

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#### *Pillar 6:*

*Strengthen Trade Cooperation to Promote Green and Sustainable Development*

*"Support interested participants in exploring cooperation in establishing low-carbon trade pilot sites"*

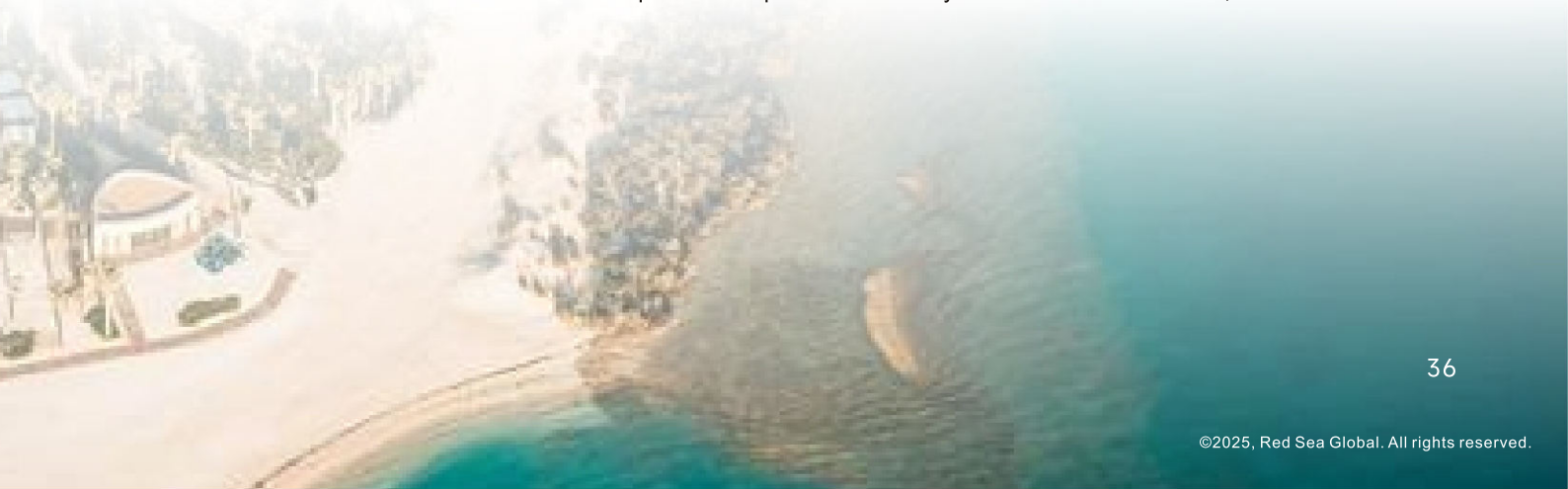
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To ensure a reliable supply in an off-grid setting, the project combines a 400 MW solar photovoltaic system with a 1.3 GWh energy storage system<sup>104</sup>. This configuration stabilizes the grid and maintains operations during disturbances. The system can restore voltage within milliseconds and supports a cold start of the network at the gigawatt scale, strengthening resilience.

In addition to energy systems, the project incorporates desalination and waste treatment technologies. Three seawater reverse osmosis plants provide clean drinking water, while a solid waste treatment facility processes up to 32 tons of waste daily, approximately 11,775 tons annually, converting waste into usable resources<sup>105</sup>.



Source: China Chamber of Commerce for Import and Export of Machinery and Electronic Products, 2024



# Capacity building for strengthening automotive value chains in Thailand and Viet Nam

The traditional automotive industries in Thailand and Viet Nam have faced mounting challenges in recent years. Declining orders, supply chain disruptions, and the impacts of the COVID-19 pandemic have weakened competitiveness<sup>106</sup>. At the same time, consumer preferences are shifting toward new energy vehicles (NEVs), driven by new designs as well as concerns over environmental sustainability<sup>107</sup>.

To respond to these changes, the Thailand Automotive Institute, with support from the Mekong–Lancang Special Fund, launched the project “*Capacity Building for Auto Parts Suppliers with Sustainable Development toward Transportation and Smart Mobility*” in 2023. The project seeks to strengthen regional supply chains and support the automotive industry’s transition toward cleaner and smarter mobility.

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## *Pillar 6:*

### *Strengthen Trade Cooperation to Promote Green and Sustainable Development*

*“...encourage the sharing and/or trading of low-carbon technology...enhance communication and sharing and accelerate the transition towards a low-carbon economy, sustainable consumption and production patterns.”*

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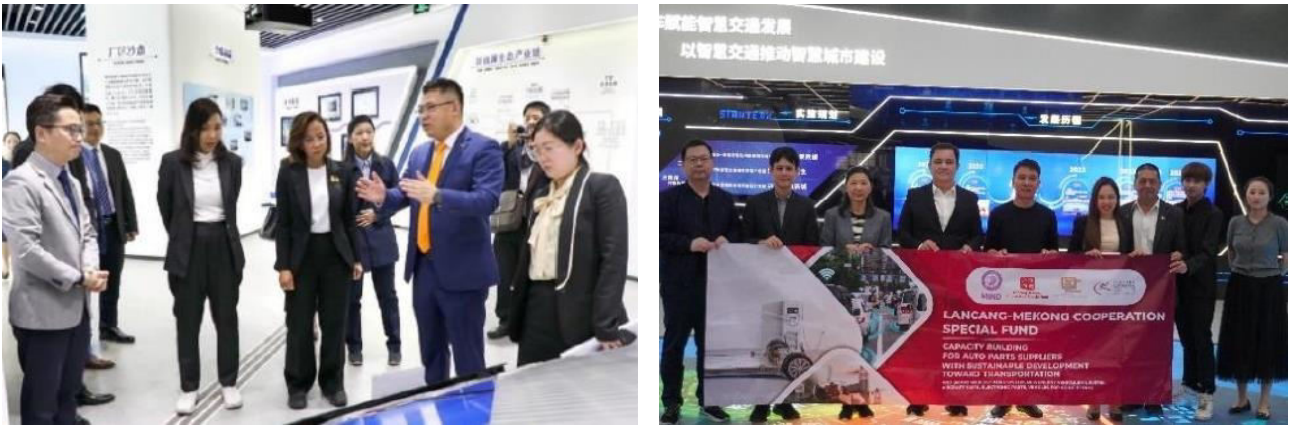
The initiative identified priority sectors, including next-generation automotive (NEVs, advanced driver assistance systems, and vehicles for aging populations), rail systems, and smart aviation. From January 2024 to June 2025, the project engaged stakeholders across the Mekong–Lancang region through coordination meetings, surveys, data collection, and site visits. In China, they visited leading battery manufacturers such as SVOLT, CATL, and Qing Tao Energy Development, as well as the Ministry of Industry and Information Technology<sup>108</sup>. In Viet Nam, engagement extended to market research firms, chambers of commerce, and technology companies such as FPT Software, Phenikaa-X, and Thanh Cong Group<sup>109</sup>. Focus group discussions explored collaboration strategies for advancing NEVs, smart mobility, rail systems, and unmanned aerial vehicles.

Site visits to key facilities and ongoing online dialogues have shaped plans for closer regional cooperation. Priority has been given to the automobile sector, emphasizing the development of transportation linkages, establishment of industrial clusters, and efficient allocation of resources across markets<sup>110</sup>. Financial support from bilateral and multilateral mechanisms, including the Asian Infrastructure Investment Bank, is being considered to strengthen production capacity and integration<sup>111</sup>.

The project’s findings highlight specific opportunities for Viet Nam. These include establishing joint research centers on automotive software, AI, and autonomous vehicles; creating regional training initiatives to build skills in engineering and software development; and harmonizing standards and certifications to facilitate cross-border collaboration<sup>112</sup>. Innovation hubs and technology parks are also envisioned to incubate startups and foster new solutions in the automotive sector<sup>113</sup>.

For Thailand, the project recommends the following. Key priorities include establishing a Mekong–Lancang Automotive Alliance, developing joint research and development centers, diversifying and localizing supply chains, and coordinating EV supply chain development<sup>114</sup>. Additional measures involve harmonizing EV standards and regulations, creating a regional training network, promoting knowledge transfer, and advancing green manufacturing and circular economy initiatives<sup>115</sup>.

Through these combined efforts, the project lays the groundwork for a more resilient, innovative, and sustainable automotive industry in the Mekong–Lancang region.



Source: Thailand Automotive Institute & Lancang-Mekong Cooperation Special Fund, 2024





Encourage Green  
Technology and Service  
Exchange and Investment  
Cooperation

# Encourage Green Technology and Service Exchange and Investment Cooperation

*Pillar 7* emphasizes the importance of green technology and investment cooperation. It promotes collaboration in clean energy, green finance, sustainable infrastructure, and energy transition. By encouraging innovation in energy conservation, resource efficiency, and remanufacturing, *pillar 7* supports accelerating their transition to low-carbon pathways. Ant Forest launched by Alipay serves as a pioneering example of bottom-up solution that digital technology incentivizes individuals to shift to low-carbon lifestyle.

*Pillar 7* also highlights the role of enterprises in adopting green practices, fulfilling environmental responsibilities, and advancing research through innovation centers. Strengthening dialogue between governments, industry, and the public is seen as essential to building trust and scaling sustainable solutions. The report highlights the Global Renewable-energy Exploitation Analysis, launched by the Global Energy Interconnection Development and Cooperation Organization, as a platform for building a comprehensive energy database and assessing renewable energy potential, alongside an innovative business solution using sugarcane by-products as biodegradable materials for packaging.

## Low Carbon Lifestyle: Ant Forest

Ant Forest, a recipient of the United Nations Champions of the Earth Award, is a pioneering example of how digital technology can mobilize individual action for climate change mitigation.

The initiative was launched in 2016 by Alipay, the online application with more than 1 billion users. It encourages users to adopt low-carbon lifestyles by earning “virtual green energy” through environmentally friendly behaviors. Examples include walking instead of driving, paying utility bills online, or refusing disposable tableware and plastic bags. This accumulated green energy can then be used to grow a virtual tree within the app. For every virtual tree grown, Ant Forest, in partnership with the China Green Foundation, Society of Entrepreneurs & Ecology Foundation, and etc., plants a real tree in ecologically vulnerable areas across China<sup>116</sup>.

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*Pillar 7:*  
*Encourage Green Technology and Service Exchange and Investment Cooperation*

*"Encourage enterprises to actively fulfill their environmental protection responsibilities, conserve and sustainably use biological diversity, adopt green design, green procurement, green construction, green production and green operation..."*

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The project has focused its efforts on regions severely affected by desertification. Approximately 90% of the trees are planted in priority zones of the “Three-North Shelterbelt Program,” covering provinces such as Inner Mongolia, Gansu, Qinghai, Shanxi, and Hebei. These regions are predominantly characterized by arid and semi-arid desert ecosystems.

To adapt to varying environmental conditions, a range of tree species, including Haloxylon, Mongolian Scots pine, poplar, sea buckthorn, and tamarisk, have been planted, with Haloxylon serving as the dominant species for desert control. As of August 2024, Ant Forest had planted 548 million trees across 13 provinces, covering approximately 5.8 million mu (around 386,000 hectares)<sup>117</sup>

According to assessments by the International Union for Conservation of Nature (IUCN) and the Research Center for Eco-Environmental Sciences of the Chinese Academy of Sciences, these forests have significantly contributed to wind and sand erosion control, climate regulation, carbon fixation, and water conservation<sup>118</sup>. The project has reduced atmospheric carbon dioxide, improved oxygen production, stabilized soil, reduced sedimentation and non-point source pollution, and improved air quality. The long-term impact of Ant Forest will depend on effective management and ecological restoration of existing forest plots. Measures such as irrigation upgrades, vegetation renewal, and improved maintenance can enhance forest survival rates and ecological resilience.

Beyond reforestation, Ant Forest has also worked on biodiversity protection by establishing 34 protected areas in 16 provinces that span 4,900 square kilometers<sup>119</sup>. It participates in biodiversity initiatives across 24 provinces to support the Kunming–Montreal Global Biodiversity Framework.

In addition to environmental impact, the initiative promotes social and economic inclusion by engaging local farmers and herders in forest management and protection. They are able to generate sustainable income through the processing of local products such as cistanche, sea buckthorn, and tamarisk. These products are marketed directly through Alibaba’s e-commerce platforms. From 2016 to 2019, Ant Forest had created around 400,000 job opportunities and 60 million CNY (\$8.4 million) in income for the neighborhood<sup>120</sup>.

Ant Forest’s influence has extended beyond China. Inspired by its success, GCash, the leading mobile wallet in the Philippines, launched “GCash Forest”<sup>121</sup>. By encouraging low-carbon behaviors among users, the project successfully reforested 75 hectares of the Ipo Watershed by November 2020, showcasing how digital innovation can catalyze global grassroots action toward environmental sustainability<sup>122</sup>.

## Global Renewable-energy Exploitation Analysis (GREAN)

Assessments on the potential of wind, solar, and hydropower often face challenges of incomprehensive data, inconsistent evaluation criteria, and a lack of investment cost forecasts. To address these issues, the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) has established the Global Renewable-energy Exploitation Analysis (GREAN).

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### *Pillar 7:*

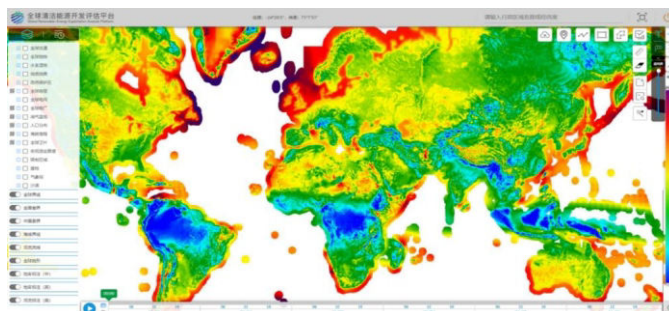
**Encourage Green Technology and Service Exchange and Investment Cooperation**

*“Explore high-level joint research through establishing technology innovation platforms such as research and development centers, innovation centers, laboratories, and business incubators.”*

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The Global Renewable Energy Assessment Network (GREAN) is a comprehensive digital platform designed to evaluate the development potential of wind, solar, and hydropower worldwide. It was created to address persistent challenges of inconsistent and incomplete data in renewable energy assessments. GREAN systematically answers key questions such as where resources are located, how much is available, how economical they are, and how to develop them efficiently.

The platform conducts systematic calculations and quantitative analyses of renewable energy potential at theoretical, technical, and economic levels. Its database spans 32 categories and 20 data types, including geographic, economic, and human activity indicators, with an hour-level time resolution and 100-meter spatial resolution<sup>123</sup>. GREAN also includes global power grid data, covering backbone transmission networks with voltages above 110 kV across 147 countries.



Source: The Global Energy Interconnection Development and Cooperation Organization, 2024

GREAN employs advanced methodologies to ensure accuracy and consistency. Its quantitative models use harmonized parameters, incorporating geographic information systems (GIS) and engineering survey data. Innovative tools such as parallel computing frameworks, ant colony algorithms, and neural networks enable precise assessments that can be performed online on the national scale.

The platform has delivered concrete results. To date, GREAN has supported the site selection of 35 hydropower bases, 94 wind power bases, and 90 photovoltaic bases, based on comprehensive analysis of development potential and resource characteristics<sup>124</sup>

Beyond resource mapping, GREAN also develops transmission schemes for major renewable energy bases worldwide. These plans consider supply–demand trends, the location of large-scale bases and consumption centers, and the need for interregional energy flows. They also emphasize inter-regional energy transmission, cross-time-zone and cross-seasonal complementarity, and global optimization of renewable energy allocation.

## Preventing deforestation: biodegradable Innovation in Manufacturing

Bagasse is a dry pulpy fibrous material that remains after crushing sugarcane to extract their juice. It has been generally used as a biofuel, but recent innovations have turned it into a natural packaging material.

To address the environmental challenges posed by non-degradable plastics in food, beverage, and medical industries, Zhejiang Zhongxin Environmental Protection Technology Group Co., Ltd a leading provider of pulp-molded packaging solutions in China, used bagasse to produce biodegradable packaging. Unlike conventional coated paper or bioplastics like PLA and PBAT, these nature-based products degrade naturally into carbon dioxide and water without additives or specialized composting, making them both cost-effective and environmentally friendly.



By relying on bagasse and other agricultural residues instead of wood, Zhongxin helps prevent deforestation while reducing carbon emissions. Since its founding, the company has processed more than 400,000 tons of bagasse pulp, equivalent to saving 10 million trees and fixing more than 20 million tons of carbon<sup>125</sup>.

Zhongxin invests in green production processes. Since 2017, it has replaced natural gas boilers with biomass boilers powered by agricultural waste such as sugarcane leaves, crop stalks, and bark. This transition has consumed over 1 million tons of agricultural waste, replacing 300,000 tons of standard coal and cutting 750,000 tons of CO<sub>2</sub> emissions<sup>126</sup>.

In addition, the company operates solar photovoltaic installations across 100,000 square meters of rooftop space, generating more than 10 million kWh annually and reducing emissions by another 7,850 tons<sup>127</sup>. Continuous equipment upgrades have lowered energy use per ton of product by more than 20%, saving an additional 10 million kWh each year<sup>128</sup>.

Innovation also extends to product design and logistics. For instance, by redesigning Chipotle's oval bowl to increase the number of units that fit in a shipping container, raising capacity from 660 boxes to 1,200 boxes per container, Zhongxin halved logistics costs and saved the client \$7.67 million annually, while cutting the carbon footprint of transportation<sup>129</sup>. The company's customers include major international retailers and food service companies such as Walmart, McDonald's, Costco, Starbucks, Metro AG, and Burger King.

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*Pillar 7:  
Encourage Green Technology and Service Exchange and  
Investment Cooperation*

*"...accelerate the innovation, development and  
application of digital and green integration technology."*

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Beyond environmental benefits, the company contributes to rural development by supporting farmer incomes. Rising demand for bagasse has led sugar mills to increase the purchase price of sugarcane from farmers, providing them with higher returns. At the same time, Zhongxin's biomass boilers which require large volumes of agricultural waste such as sugarcane leaves and tree bark, create new income streams for local farmers.



Photo: Sugarcane bagasse after extraction as raw material for products.  
Source: China Chamber of Commerce for Import & Export of Light Industrial Products & Arts Crafts, 2024



Photo: 100% degradable tableware.  
Source: China Chamber of Commerce for Import & Export of Light Industrial Products & Arts Crafts, 2024



Photo: Biomass boiler equipped with environmental protection facilities.  
Source: China Chamber of Commerce for Import & Export of Light Industrial Products & Arts Crafts, 2024

# CONCLUSION

The *Initiative on International Trade and Economic Cooperation Framework for Digital Economy and Green Development* provides useful guidance for participating countries to develop enabling policies for digital and green transition. It also offers a practical framework for strengthening international cooperation and aligning national strategies with sustainable development goals.

Analysis of the relevant case studies across regions and sectors highlights the following observations:

■ **First, countries are already taking concrete acts on digital and green transition.**

From Brazil's Digital Transformation Strategy to clean electricity initiatives in Suriname, the shift toward sustainable and digitally empowered development is happening on a global scale—not only in policy frameworks and strategy documents, but also through real projects that are transforming lives and advancing inclusive, sustainable growth on the ground. The digital economy and green development can also serve as mutually reinforcing drivers, with clean energy powering digital transformation, and digital innovation enabling more efficient, resilient, and sustainable economies worldwide.

■ **Second, trade is a central enabler in this process.**

It drives innovation and productivity, enhances access to technologies, capital, and know-how, and serves as a key channel for spreading digital and green development. At the same time, trade itself benefits from digitalization and the green transition. Digital technologies—such as paperless trade, online documentation, and cross-border e-payments—improve efficiency, lower costs, and reduce environmental impacts. However, ensuring that these benefits are inclusive requires addressing regulatory inconsistencies, hidden compliance costs, and unequal access to digital and green opportunities, particularly for developing economies, small enterprises, and women entrepreneurs.

■ **Third, international collaboration is essential to bridging gaps and supporting sustainable development.**

While many developing countries continue to face challenges such as the digital divide, limited access to finance, and technological constraints, strengthened trade, investment, and cross-border cooperation can help overcome these barriers and unlock new opportunities. Cross-border partnerships and multilateral initiatives—many of which are highlighted in this report—demonstrate the power of collective action in closing digital gaps at scale. Regional cooperation enables the exchange of technical expertise, the harmonization of standards, and joint policy innovation. Moreover, multilateral collaboration provides a platform to establish global benchmarks, foster greater coordination, and promote more inclusive, evidence-based, and development-centered policies.

Looking ahead, to further accelerate progress toward a digitally enabled and green global economy, the participants in the Initiative could consider further enhancing collaborations focusing on the following priority actions:

01

#### **Foster Practical Collaboration Through Project and Partnerships**

- ◆ Establish an open project pool to promote joint pilot programmes in areas such as clean energy, e-commerce, smart infrastructure, and digital public services. The project pool could connect supply and demand in technical assistance as well as commercial projects.
- ◆ Encourage public–private partnerships and regional initiatives that demonstrate scalable models for integrating digital and green solutions. Workshops with private sector partners could be organized to share innovations that could drive digital and green transition at scale.

02

#### **Enhance Policy Coordination and Cooperation**

- ◆ Organize regular policy dialogues among participating countries to foster exchange, coordination and collaboration on policies, strategies, regulations, and standards related to the digital and green transitions.
- ◆ Promote interoperability of digital systems, harmonization of trade procedures, and alignment of standards related to digital and green development.

03

#### **Expand Knowledge Sharing and Capacity Building**

- ◆ Develop targeted training programmes and institutional capacity-building to help developing economies take actions aligned with the Initiative to bridge digital and technological divides.
- ◆ Develop platforms for the exchange of policy experience, technical expertise, and good practices among governments, academia, and the private sector.

04

#### **Mobilize Financial and Technical Support**

- ◆ Work with international organizations, development banks, and partner agencies to enhance financial cooperation and mobilize investment in digital and green infrastructure.
- ◆ Facilitate technology transfer and innovation partnerships to accelerate adoption of clean and digital technologies.

05

#### **Promote Inclusivity and Global Alignment**

- ◆ Prioritize support for vulnerable groups—particularly women, youth, and small enterprises—to ensure equitable access to digital and green opportunities.
- ◆ Jointly advocate for inclusive and sustainable digital and green development in the international fora, such as at the UN, WTO, G20.
- ◆ Align efforts with major global and regional agendas, including the Global Development Initiative, the African Union’s Agenda 2063, and ASEAN Connectivity 2025, to amplify synergies and maximize development impact.

In conclusion, digital and green cooperation is not merely an option—it is an imperative for building a resilient, inclusive, and sustainable global economy. This report demonstrates that with innovation, collaboration, and shared commitment, transformative progress is already underway. The broader participation from governments, businesses, academia, and civil society to expand the scope of cooperation under the *Initiative* can unlock shared opportunities and contribute to economic and social development of the participating economies.

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Compendium of Case Studies from  
Developing Countries

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Technical paper

