

2025 SIDS NDE Joint Programme

Introduction to Water Energy Food
Nexus and Buildings and Infrastructure

PRESENTER

CTCN Secretariat



Water Energy Food Nexus

Relevance of Water Energy Food Nexus in SIDS

- The WEF Nexus approach addresses the **complex interdependencies between water, energy, and food sectors, which are critical for sustainable development in SIDS** facing climate change impacts SIDS experience heightened challenges such as freshwater scarcity, energy supply vulnerabilities, and food security threats exacerbated by climate change and population growth, making integrated management of these sectors vital
- This **nexus approach enables systems thinking** that can lead to more efficient, equitable, and climate-adapted solutions in SIDS, addressing trade-offs and maximizing synergies between water, energy, and food sectors under increasing climate stresses
- **CTCN supports SIDS through technical assistance** in deploying sensors to improve crop resilience, enhancing water management and productivity, and using digital technologies to better understand and manage nexus trade-offs



Water Energy Food Nexus– Key insights

1. Agriculture is the largest consumer of freshwater; water is used to produce myriad forms of energy; and agriculture is of course dependent on energy.
2. Demand is rising rapidly for all three, driven by an increasing global population which is quickly urbanizing, alongside changing diets, economic growth, and rising living standards.
3. Feeding a global population expected to reach 9 billion people by 2050 will require a 60 percent increase in food production (FAO, 2022).
4. Benefits accrued are beyond reduction in emissions, benefits, such as use of locally produced green building materials, reducing electricity loads, and transforming the roles of small and medium enterprises.
5. Governments play role from leading in policymaking, regulations and standards that may incentivize sustainable financing, to supporting research and development of promising cooling technologies through partnership and collaboration.



CTCN recent WEF Portfolio in SIDS

Country	TA title	Type of Assistance	Stage
Fiji	Technical capacity enhancement for climate-resilient agriculture through the revision of national policies and the improvement of data management systems	Capacity Enhancement	Bidding
Suriname	Enhance the resilience of Suriname's water supply system by modelling drought risks and developing a roadmap of prioritized alternatives for aquifer recharge.	Sectoral roadmaps and strategies	Implementation
Jamaica	Enhancing multi-scalar mapping and research on food security risk due to the impacts of climate change on rural and urban environments	Sectoral roadmaps and strategies	Completed
Dominica	Technical and economic feasibility of solar units and water storage on public buildings in Dominica	Feasibility study	Completed
St Kitts & Nevis	Improvement of water supply management through a GIS-based monitoring and control system for water loss reduction in Saint Kitts and Nevis	Decision Making tools	Implementation



Examples of Future Technical Assistances

Deployment of sensors and digital technologies to enhance crop resilience and improve precision agriculture, enabling better water and energy use efficiency in food production

Development of enhanced collaboration platforms and tools focused on agri-food technology development, transfer, and learning to promote integrated WEF management.

Assistance in developing national policies, strategies, and regulatory frameworks to mainstream WEF nexus approaches for climate-resilient development

Improved water management strategies including accounting, productivity enhancement, and sustainable water resource management for agriculture and communities

Support for innovative climate-smart technologies such as solar-powered irrigation systems and renewable energy integration to boost agricultural productivity and water-energy efficiency

Promotion of sustainable agricultural practices that address soil degradation within the nexus framework, including conservation agriculture, agroforestry, and integrated soil-water management.

Facilitation of multi-sectoral partnerships and knowledge sharing to enable inclusive, just, and equitable access to water, energy, and food resources, particularly empowering vulnerable groups like women and indigenous communities.



Buildings and Infrastructure

Relevance of Buildings and Infrastructure

- The building and construction sector accounts for almost **one-third of total final energy consumption and 15% of end-use sector direct CO2 emissions, and its share of emissions rises to around 30% if indirect emissions from the electricity and heat used in the buildings** are included.
- Climate technology and innovation including the new design, retrofitting and the redesign of existing infrastructure combined. Opportunity to integrate adaptation strategies into development.
- Nature-based Solutions (NbS) and grey infrastructure, has a key role to play to align energy efficiency and emissions reduction within the sector. **Smart solutions can ensure buildings and infrastructure are adapted for climate change and greater resilience and safety of the populations utilizing them.**
- Estimates show that the net benefit of investing in resilient infrastructure in low- and middle-income countries would amount to **\$4.2 trillion, which is a \$4 in benefit for each \$1 invested.**



Buildings and Infrastructure – Key insights

1. The buildings sector represents one of the largest energy consuming sectors in most of the regional economies; it often consumes over one third of final energy in countries,
2. Benefits accrued are beyond reduction in emissions, benefits, such as use of locally produced green building materials, reducing electricity loads, and transforming the roles of small and medium enterprises.
3. Governments play role from leading in policymaking, regulations and standards that may incentivize sustainable financing, to supporting research and development of promising cooling technologies through partnership and collaboration.
4. Access to finance was identified as one of the main challenges to implementation of climate technologies, including smart cooling.



Examples of Future Technical Assistances

Net zero emission buildings and green infrastructure, green building materials

Application of IoT for building management

Digital public goods and community-based solutions and resource pricing.

Climate Resilient Smart Cities

Longer lead time based Early warning systems for drought, floods etc.

Real time systems for monitoring and management of floods.

Use of remote sensing and UAVs for Urban planning through nature-based solutions.

Integrated Coastal zone management through nature-based solutions.

Integrated water management systems and Smart water and waste-water networks

