

# Integrating Water-Energy-Food Nexus Approaches: Energy Perspective in Belize

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# AGENDA



**Why integrated resource planning matters in WEF Systems**



**Energy Systems as the enabling link**



**WEF Considerations in national energy policies and sectoral plans**



**Examples of relevant technologies in Belize**



**Key challenges in implementing integrated approaches**



**Support needed for improved integrated resource planning using WEF approaches**

# 01 Why integrated resource planning matters

## The Three C's

1

COMPLEX

2

COMPLICATED

3

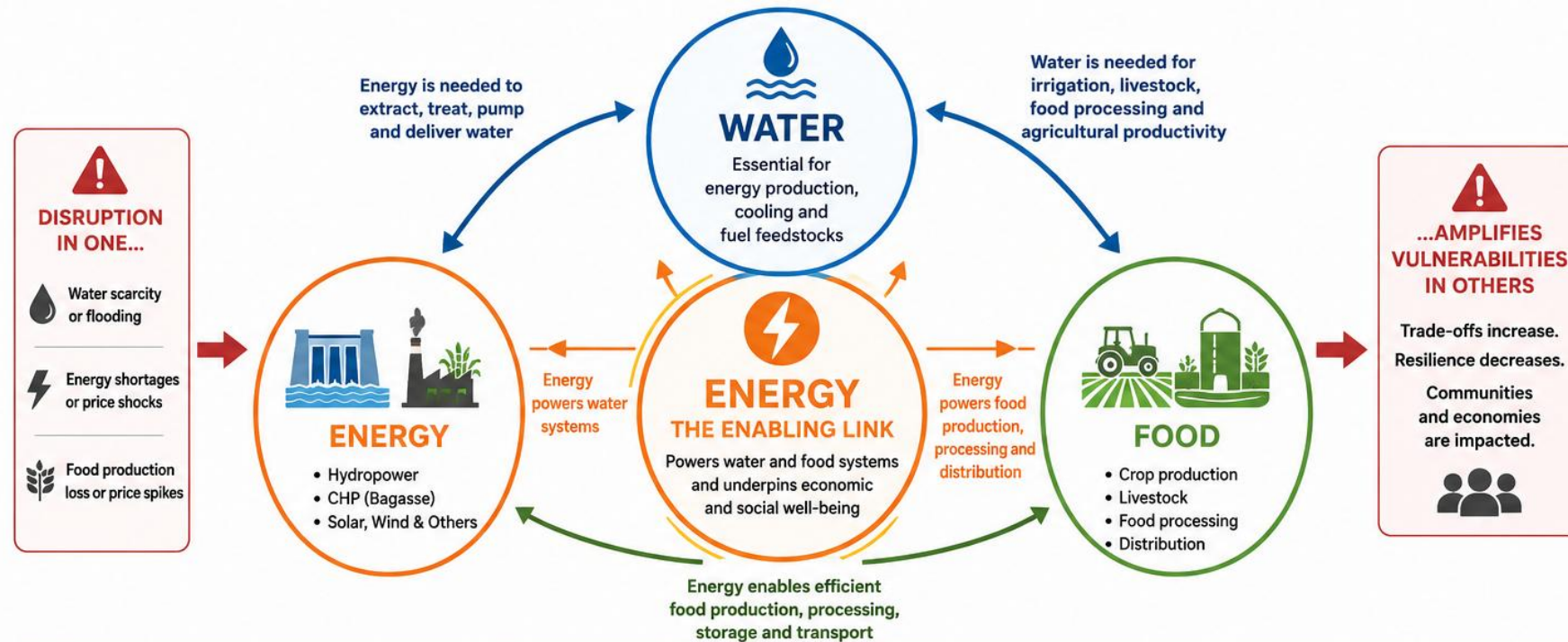
COMPOUNDING

Growing  
**COMPLEXITY:**

“Demand for food, water, and energy is rising rapidly – by 2050, food demand could increase by over 50%, energy by up to 19%, and water by up to 30%”, World Economic Forum (2025).

# 02 The WATER-ENERGY-FOOD Nexus:

 Energy is the engine that drives the Water-Energy-Food Nexus. Investing in sustainable, reliable, and accessible energy multiplies benefits across water security, food security, and climate resilience.



 Integrated planning across water, energy and food systems builds resilience, reduces trade-offs and strengthens Belize's sustainable development.

# 03 WEF Considerations in National Policy

## WEF Nexus Principles Are Increasingly Embedded Across National Policies

### National Development and Climate Frameworks

2022 - 2026

#### Belize Medium Term Development Strategy

- Sustainable development vision: alignment with national priorities and international development goals.
- Climate resilience priorities.

2021 - 2025

#### National Climate Change Policy, Strategy and Master Plan (NCCPSMP)

- Belize's principal climate governance framework.
- Central objective is to integrate climate resilience and low-emission development into national planning and investment decisions.
- Cross-sector adaptation measures
- Water-energy-agriculture linkages.

2025

#### Belize Nationally Determined Contributions 3.0

- Belize's newest and most ambitious climate policy submission under the Paris Agreement.
- Renewable energy expansion (targets).
- Resilience infrastructure.
- Integrated adaptation planning.

### Energy Sector Planning

2023

#### Belize National Energy Policy

- Renewable Energy Expansion
- Energy Efficiency
- Reduced fossil fuel dependence

Ongoing

#### Utility Sector Modernization

- Improving Grid Resilience.
- Distributed Energy Systems.
- Climate-proofing infrastructure.

Ongoing

#### Emerging Nexus Approach

- Energy systems supporting water and food security outcomes

# Technologies Supporting Integrated WEF Outcomes

*Energy-related Examples*



# RENEWABLE ENERGY EXPANSION



## Saudi Fund for Development and International Finance Corporation

*Saudi: Financing (\$77M USD) for the construction of a Solar Energy Plant.*

*IFC: Development of procurement guidelines and the construction of a utility-scale power plant with photovoltaic panels with a capacity of 50 to 80 megawatts (MW) by 2027.*



## Belize Energy Resilience and Sustainability Project (World Bank)

*Deploy state-of-the-art battery energy storage systems and renewable energy integration across four strategic locations in Belize.*



## Farmers Light Plant Corporation

*Utility-scale solar PV plant (3MW) to power a large farming community in western Belize (direct link from energy technologies to water and food operations).*



## Paradise Shrimp Farm

*Installation of a utility-scale solar farm to power operations at the shrimp farm and the integration of excess power flowing to Belize's National Electric Grid (Water – Energy – Food Nexus).*



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# Bioenergy Opportunities

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- ✓ Organic waste utilization
- ✓ Agricultural Residues
- ✓ Biogas Potential



# Implementation Barriers

## *INSTITUTIONAL*

- Limited permanent coordination structures
- Sector-specific mandates

## *FINANCIAL*

- High Infrastructure Cost
- Limited concessional financing

# Key Challenges to Scaling Integrated WEF Approaches

## *TECHNICAL*

- Limited integrated planning tools
- Data interoperability
- Capacity constraints for modeling

## *HUMAN CAPACITY*

- Lack of specialized expertise
- Staff turnover
- Limited long-term technical support

# THE WAY FORWARD

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## What Support Is Needed to Accelerate WEF Integration:

### Technical Assistance

- Integrated planning tools.
  - Land-use planning tool-kits.
  - Water Management planning tools.
- Nexus modeling support.
- Utility resilience assessments.

### Climate Finance

- *Scalable Pilot Projects.*
  - *Development of the Belize Least Cost Rural Electrification Plan.*
- *Infrastructure Resilience Investments*
- *Renewable Energy Financing or renewable energy deployment in cross-sectoral contexts*
  - *Support to water systems and food processing activities. \*Co-Benefits*

### Capacity Building

- *Cross-sector technical training.*
- *Knowledge Exchange.*
- *Regional collaboration.*
  - *Shared learning among SIDS and LAC region.*
  - *Technology transfer.*
  - *South-south cooperation.*

## In, Closing...



For Belize, the WEF nexus is ultimately about **coordination, resilience, and smarter infrastructure investment** across interconnected national systems.

# THANK YOU!



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