Implementing the WEFE Nexus and Achieving the Sustainable Development Goals

Date: 11/August/2021

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WEBINAR
The WEFE nexus approach
International experiences and potential for the Hindu Kush Himalaya

11 August 2021 | Online via MS Teams
14:00-16:20 NPT | 10:15-12:35 CET
WEFE NEXUS
Fundamental Principles
The WEFE NEXUS DEFINED

- **WEFE NEXUS** is an **approach** that **integrates management and governance** across the multiple sectors of food, energy, water and ecosystems.

- **WEFE NEXUS approach** is a way of ensuring **more integrated and sustainable use of resources** that both reaches beyond the traditional silos and can be applied at **all scales**.
Key Principles

• Recognise the interdependence between water, energy, food and ecosystems.

• Understand the Interdependence of resources within a system across space and time.

• Identify integrated policy solutions to optimize trade-offs and maximize synergies across sectors.

• Ensure coordination across sectors and stakeholders.

• Value the natural capital of land, water, energy sources and ecosystems.
A Successful WEFE NEXUS Implementation

- Consider the heterogeneity of the actors involved but also the high level of dialogue requested;

- Consider the strong competences and skills of the professionals involved together with a high level of governance and policy will to reach agreements;

- Consider the complexity and heterogeneity of the ground context: bio-physical, socio-economic, institutional, political, ...;

- Identify and agree on the actual issues, priorities, opportunities and needs to be addressed; and,

- Well define and implement effective mechanisms for exchanging, managing and monitoring information and data that strongly influence decision-making processes.
The WEFE NEXUS – The Data Flow Process
Feeding the NEXUS Dialogues

**EVIDENCE**

- Inventory of current status
- Identification of Development Priorities

**MODELLING PHASE**

- Understanding the Energy Balance
- Understanding the Water Balance-Quality
- Understanding “Climate Variability”
- Understanding “Food Security”
- Understanding Ecosystems

**NEXUS ASSESSMENT**

- Understand the WEFE Interactions Analysis
- Identification Collaboration & Points - Interest

**NEXUS POLICY DIALOGUE**

- Scenario Development
  - Strategic Framework for WEFE Nexus Security Development
  - Investment Plans and Dev. Measures
  - SCENARIO DEVELOPMENT - Feeding Policy Dialogues with Development Scenarios
    -> Strategic Development Docs.
The WEFE NEXUS
The Process for Intervention Project Identification

Analysis of the project portfolios, previous discussions and strategic development documents with a WEFE profile and establishment of a ranked list of priorities, issues, challenges and opportunities.

- Identification of potential Priority Intervention Areas
- Identification of potential activities, Approx. budget, ...
- Identification of past, current and future activities
- Identification of potential stakeholders in relation to the activities under consideration.

- NEXUS dialogues on potential activities with Stakeholders, States, RB Authority and Donors
- Identification of concrete activities in priority intervention areas
- Feasibility analysis of intervention actions
THE WEFE NEXUS
The e-NEXUS DSS Tool
The e-NEXUS DSS Tool (1)

E-Nexus tool

WEFE NEXUS COMPONENT-SPECIFIC MODULES

**Objective:** Different thematic modules to improve knowledge and identify gaps and opportunities in the different sectors.

**Climate Analysis Module**

Assessment of climate variability, frequency and return of extreme weather events

**Hydrologic Module**

- Quantify water availability in the catchment influenced by climate and management + understand the overall water quality pressure on aquatic ecosystems
- Monthly and annual water availability at sub-basin level
- Water discharge along the river (daily/monthly/annual simulated data)
- Reduction/increase of water availability across the river basin as affected by climate change, landuse change, crop management, water management
- Water quality indicator related to soil and land management such as:
  - Nutrient (N and P) concentration, Sediment yields loss as erosion, Pesticides

**Agricultural Module**

- Assess current agricultural productivity and simulate it under different scenarios, climate variability and management modes.
- Assess water and nutrient requirements. Identify spatially explicit agricultural strategies for fertiliser management and irrigation

**BioEnergy Module**

- Evaluate the potential of biomass (residues) for electricity production and analyse its impact on the WEFE
- Annual and seasonal crop residues production
- Bioenergy crop residue specific energy potential at regional level
- Energy demand satisfaction capability by using bioenergy residues resources:
  - Energy demand for irrigation (pumping and water movement)
  - Households and farmers energy demands
- To be included: Comparison with other renewable energy resources (PV and solar)
The e-NEXUS DSS Tool (2)

**E-Nexus tool (MOO)**

2. **Optimization Module/s Objective:** identifying optimal solutions taking into account multi-objective optimisation - MOO

- These optimisation modules are specifically developed according to local objectives, priorities and challenges of the WEFE
- Modules requires specific:  
  1. Setup,  
  2. Identification of objectives and constraints for the optimization  
  3. Data for the area of interest (Country, Subregion, Transboundary river basin, Continental scale)

**Module Optimization**

- a) Evaluation of Bioenergy and WEFE NEXUS optimization of water and cropland.
- b) Identification of optimal cropland allocation for food self-sufficiency
- c) Assessing future development scenarios and the impact of additional water demands (irrigation, livestock, urban, industrial) on water availability.

**Modularity:** thematic models & MOO
Conclusions
CONCLUSIONS

• Flexibility of approach: thematic models can be integrated for a thematic assessment;

• An ad hoc WEFE application can be developed by considering specific links between sectors according to identified priorities;

• The MOO methodology allows to provide answers and alternative solutions to policy makers by assessing long-term benefits with a long-term perspective on simulated indicators of crop productivity, energy production, water quality and quantity;

• A wide range of "optimal solutions" is proposed, allowing the final choice by decision-makers: these optimal solutions are of particular interest to feed the Policy Dialogue;

• MOO modules can benefit from other data and models providing results to integrate/complement/replace those already used by the system.
Thank you