

📅 29 AUG 2018

Tools // Water, Energy and Food Nexus Tool 2.0

Water, energy, and food are interconnected resource systems which face numerous challenges including a growing global population, economic crises, poverty and hunger, and climatic uncertainties. Meeting these challenges requires a paradigm shift in our conventional resource allocation model to account for the tight interconnections that exists among them. In working towards this goal, the authors have developed a resource allocation strategy assessment platform (WEF Nexus Tool 2.0) that aims to support decision-makers in identifying sustainable resource management strategies informed by the water-energy-food nexus.

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The Resource Management Strategy Guiding Tool

The WEF Nexus Tool 2.0 serves as a common platform that brings together scientific know-how and policy input in an effort to identify current and anticipated bottlenecks in resource allocation trends, while highlighting possible trade-offs and opportunities to overcome resource stress challenges. The tool is scenario-based and attempts to explicitly quantify the interconnections between the three resources, while capturing the effects of population growth, changing economies and policies, climate change and other stresses. It provides the user with the ability to create scenarios for a given country by defining the following inputs:

Food portfolio: identifying local food production levels versus imports, and technologies in agricultural production.

Water portfolio: identifying different sources of water and amounts needed of each.

Energy portfolio: identifying sources of energy for water, and energy for agricultural production.

Even though the water-energy-food framework is generic, scenarios created by the tool are site specific and defined by the local characteristics of the area of study. These may include local yields of food products, water and energy availability and requirements, available technologies and land requirements. The characteristics are defined by the user and allow for the creation of country-specific profiles. The WEF Nexus Tool 2.0[©] enables users to visualize and compare the resource requirements of their scenarios, and calculate the 'sustainability index' of each scenario.

The tool was recently included as part of the [United Nations Development Group's 'Sustainable Development Goals \(SDGs\) Acceleration Tool Kit'](#).

General

The tool allows the user to create different scenarios with varying food self-sufficiencies, water sources, energy sources, and countries of import. The output includes a summary of:

- Water requirements (m³)
- Local energy requirements (kJ)
- Local carbon emissions (ton CO₂)
- Land requirements (ha)
- Financial requirements (QAR)
- Energy consumption through import (kJ)
- Carbon emissions through import (ton CO₂)

The user is able to discover and visualize the amount of resources consumed by different proposed scenarios. The user would also be able to decide the importance of each of the systems (water, local energy, local carbon, land, financial, energy through import and carbon through import). According to input given by user, the tool calculates the “sustainability index” of each of the proposed scenarios.

Key concepts

- Food security
- Energy security
- Water security
- Water footprint
- Green water footprint
- Blue water footprint
- Carbon footprint
- Open field vs protected agriculture
- Sustainability index

Authors

Under the supervision of Dr. Rabi H. Mohtar, Bassel T. Daher developed the WEF Nexus tool during pursuing his MSE degree at Purdue University. The interface was later created at

Qatar Environment and Energy Research Institute and the first tool version was launched October 2013 and was publically available on the QEERI website.

The first tool version was accessed by users from more than 20 countries, coming from more than 50 institutions and governmental agencies worldwide. As a result of the feedback we got from users through surveys and direct communication, we are now introducing a new modified and more user friendly version of the WEF Nexus Tool with additional features.

Access

[WEF Nexus Tool 2.0 website](#)

Further reading

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This project is co-funded by the European Union



Federal Ministry for Economic Cooperation and Development

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