The NEPAT

NExus Policy Assessment Tool

Developed by

NEXOGENESIS STREAMLINING WATER RELATED POLICIES & eurecat

TRL

TRL1 → TRL5

Tested in

5 case studies

Thematic Area: WEFE Nexus, Policy, Future scenarios, Informed decision making, AI

Challenges

The NEPAT addresses the complex challenges arising from the interconnectedness of the Water-Energy-Food-Ecosystem (WEFE) nexus. Traditionally, policies in these sectors have been developed independently, often leading to unintended negative consequences. For example, increasing water extraction for agriculture can reduce hydropower generation and harm aquatic ecosystems, while expanding renewable energy infrastructure may compete with land needed for food production. Additionally, climate change, population growth, and shifting consumption patterns further intensify the strain on these interconnected resources. Addressing these challenges is essential because isolated policy decisions can lead to resource inefficiencies, environmental degradation, and conflicts among stakeholders. For example, poorly coordinated policies can exacerbate water scarcity, increase food insecurity, and escalate tensions between sectors competing for the same resources.

The NEPAT offers a comprehensive framework that enables policymakers to evaluate the cross-sectoral impacts of their decisions, ensuring that actions in one domain do not negatively affect others. By identifying trade-offs, synergies, and potential unintended consequences, NEPAT supports the development of integrated strategies that enhance sustainability, resource security, and the well-being of both communities and ecosystems. This holistic approach fosters balanced resource management across sectors and builds resilience against future challenges.

The NEPAT solution

How it works

The NExus Policy Assessment Tool (NEPAT) is an interactive platform designed to evaluate the complex interconnections between Water, Energy, Food, and Ecosystems (WEFE). By simulating different climate and socioeconomic scenarios, The NEPAT helps policymakers, researchers, and stakeholders anticipate policy impacts, trade-offs, and synergies. Through AI-powered recommendations, users can explore optimal policy measures tailored to different future conditions, ensuring sustainable resource management. The platform also fosters collaboration by offering data visualisations, scenario simulations, and reporting tools for informed decision-making.

Technology & Methodology

The NEPAT integrates advanced modelling techniques with climate (RCPs) and societal (SSPs) projections to provide dynamic simulations of policy outcomes. It leverages artificial intelligence to analyse vast policy options and recommend strategies that optimise resource use across the WEFE nexus. Built as a collaborative decision-support system, the NEPAT enables users to import, export, and report policy simulations, facilitating transparent policy discussions. The tool's interactive interface and real-time scenario analysis make it an essential asset for developing resilient and future-proof policies.

Users

The NEPAT is designed to serve a diverse range of users involved in policy assessment, decision making, and research within the Water, Energy, Food, and Ecosystems (WEFE) nexus. The platform accommodates different expertise levels by offering both high-level strategic insights and advanced analytical tools.Therefore, potential users are policymakers and government agencies, NGOs and civil society organisations, scientists and researchers, consultants and analysts, students and educational institutions, any interested user.

Key benefits

Environmental impact:

The NEPAT supports environmentally sound decision-making by enabling users to explore the interconnections within the Water, Energy, Food, and Ecosystems (WEFE) nexus. It helps identify policies that reduce resource overuse, improve water quality, promote ecosystem conservation, and enhance climate resilience through scenario-based planning.

Economic benefits:

While the NEPAT does not perform direct economic evaluations, it helps users identify resource-efficient strategies that may lead to cost savings and improved resource allocation. By visualising trade-offs and synergies, it supports more informed planning that can reduce risks and avoid costly unintended consequences.

Social benefits:

The NEPAT helps design policies that promote equitable and sustainable resource use, enhancing the ability of communities to withstand possible future scenarios. The tool fosters collaboration among diverse stakeholders—government agencies, NGOs, researchers, and the public—by providing accessible, transparent data and decision-making frameworks. This inclusivity leads to greater trust and shared ownership of policies. Additionally, through its interactive interface and scenario analysis, the NEPAT enhances users' understanding of the WEFE nexus, building local and institutional capacities for integrated resource management and long-term planning. Finally, educational institutions and civil society groups can use the NEPAT to raise awareness and teach systems thinking, encouraging more informed and engaged citizens.

Scalability & replication potential

The NEPAT's modular design and use of global scenario frameworks (such as RCPs and SSPs) make it adaptable to various regions and contexts. It can be replicated and scaled across different geographic levels—local, national, and transboundary—offering a versatile foundation for future case studies and regional applications. However, the NEXOGENESIS approach (from scenarios simulation and policies and goals definition, to nexus modelling and finally AI-driven decision-making) is required to provide the requirements needed to include a new case study.

🌍 Learn how to use NEPAT in practice with the NEPAT Guidebook: here

🔗 Access the tool directly here: https://nepat.nexogenesis.eu/#/login

🟦 Explore the full project: https://nexogenesis.eu/

📱 Stay tuned for updates and results on our social media channels!

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The NEXOGENESIS consortium

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