

G O N E X U S

*Integrated solutions for
water, energy, food and
ecosystems*



Introduction

As populations and economies continue to grow, the demand for water, energy and food is set to increase as well, placing a strain on ecosystems and challenging livelihoods and economic development. The effects of global climate change will further increase pressure on natural resources, and life as we know it will be left hanging in the balance.

GoNEXUS will work to re-balance water, food, energy and ecosystems to maximise our planet's sustainable development and wellbeing. Through in-depth case studies scenarios, and dialogues the project will create a future-proof toolbox and solutions to manage the WEF E nexus.

Case study areas

A total of six case study basins in Europe and Africa. Two additional studies will span Europe and the globe.



WATER

GoNEXUS will determine the impacts of changing temperatures and rain on water resource availability and management from global to local scales.



ENERGY

GoNEXUS will estimate the impact of shifts in energy demand and production and define solutions to guarantee sustainable energy production.



FOOD

GoNEXUS will assess agricultural water demands and crop-yield changes caused by climate change, as well as shifting global and local markets.



ECOSYSTEMS

GoNEXUS will investigate the impact of climate change and increased human pressures on the environment, which all profoundly affect ecosystems to provide context-specific results and insights.

> Danube River Basin

Shared by 19 countries, the most international river basin is challenged by its diverse ecosystems and increased usage for hydropower energy production.

> Lake Como

This popular tourist destination sees agriculture, tourism, drinking water supply and hydropower competing for resources.

> Júcar River Basin

In a precarious resource-demand balance, the different actors in this basin are faced with dwindling water availability under a changing climate.

> Tagus-Segura River Basin and water transfer

The largest inter-basin water transfer, bringing together two unique rivers to supply one of the most important agricultural areas in Europe, is now being challenged by growing demand, strong climate vulnerability and controversy.

> Senegal River Basin

Infrastructural developments and traditional resource uses are on a collision course in this river basin.

> Zambezi River Basin

Crossing eight states and serving 30 million inhabitants, this basin faces WEF E nexus issues and trade-offs including hydro-power, agricultural development and environmental protection.

> Europe

Studying WEF E trends on the continental level can unearth potential trends and solutions which can be used to achieve the objectives of EU environmental policies like the EU Green Deal.

> Globe

This case study will analyse global trends in the WEF E nexus and the impact of current global policies to determine possible cross-cutting solutions.

Future scenarios

Looking forward to 2030 and beyond, GoNEXUS will develop the following scenarios based on existing data and stakeholder inputs.



Land-use and socioeconomic scenarios (regional and global)

Land-use and socioeconomic scenarios will take into account the global/continental driving forces, such as climate projections, global and continental land use trends and policy drivers, as well as local factors of change.



Climate scenarios

Climate scenarios will project future climate conditions using a multi-model ensemble and data from an ensemble of General Circulation Models.

These scenarios will be done for both the river basin and local scales as well as global and continental scales.



Policy scenarios

Policy scenarios will theorise how current and future WEFE policies and strategies will align with climate, land-use, and socio-economic projections.

Our results

GoNEXUS will co-design solutions with stakeholders and develop a **solutions evaluation framework (SEF)** to ensure that the solutions are technically, socially and politically feasible, efficient, and sustainable.

Evidence and the Sustainability Assessment Framework (SAF)

The SAF will guide the processing of the raw scenario data and model toolbox results to understand nexus interlinkages and the effectiveness of solutions towards pressing nexus challenges.

The model toolbox

The model toolbox will be used to evaluate the current situation and provide the data used to assess the effectiveness of solutions to address the challenges caused by climate change and other projected changes. It will start from existing models, such as CAPRI, LISFLOOD-EPIC, PROMETHEUS, and GEM-E3.

The solutions will include:



Policy solutions that build on existing policies and reflect the interlinked nexus-related synergies and trade-offs



Technical and operational solutions to increase efficiency and suggest new methods for evaluating infrastructure developments



Risk-hedging instruments such as water pricing policies, water markets and index-based insurance policies



Institutional changes reflecting good practices for coordinated resource governance

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