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From a few assessment tools to a FEW assessment tool

A modular, stakeholder-based framework for the integrated assessment of the food, energy, water nexus

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SCIENTIFIC FORUM, Osnabrück

June 15, 2016

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Framing the „Food-Energy-Water“ Nexus

“A review of the current state of research on the **water, energy, and food** nexus”

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“The **water–energy–food** (WEF) security nexus: the policy perspective of Bangladesh”

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Framing the „Food-Energy-Water“ Nexus

Spatial scales of the FEW Nexus

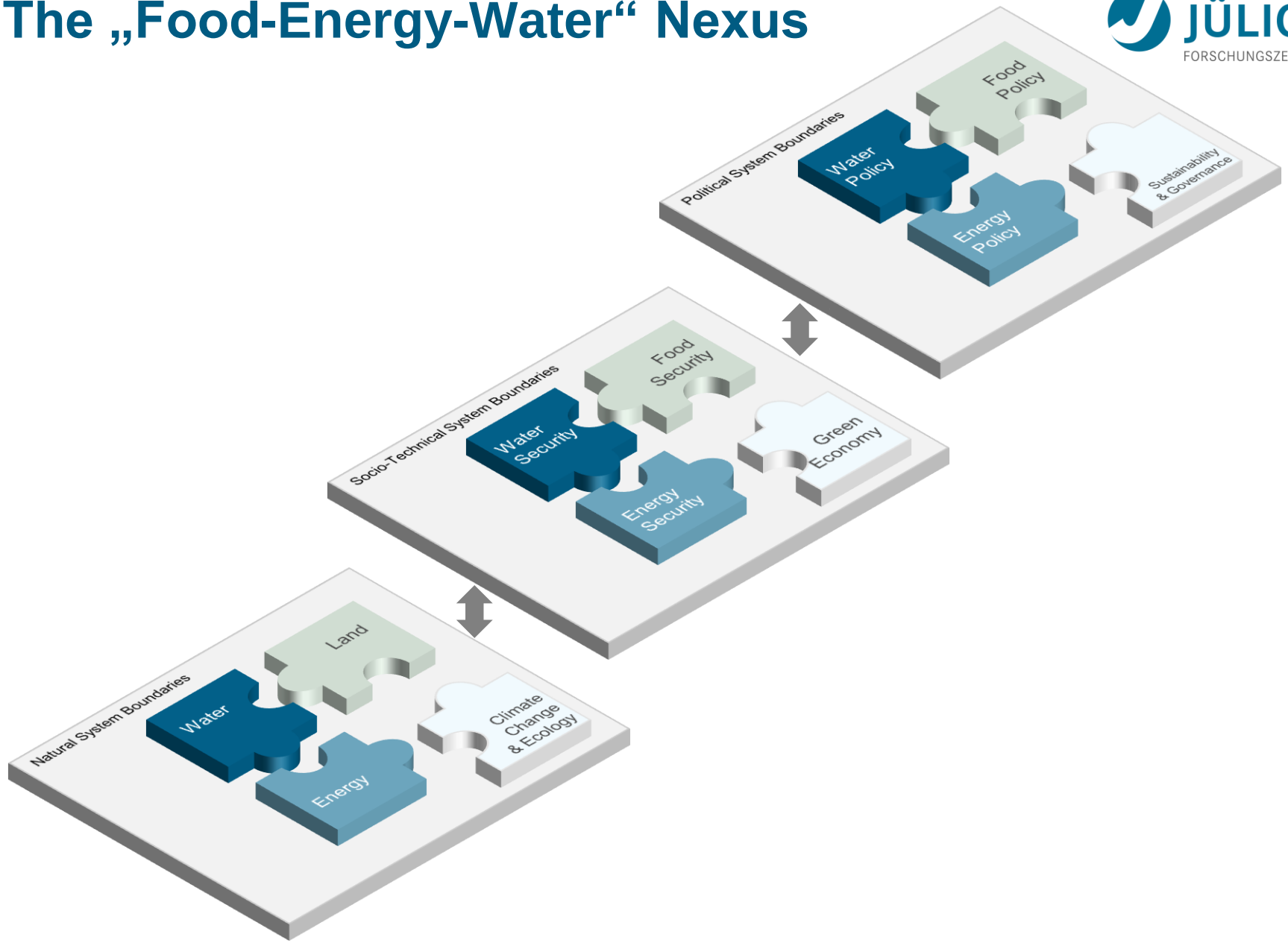
- “Human–environment interactions differ across **regions, cultures and ecosystems**. (Leemans, 2016)
- “**Water, energy and food security** and climate change are **global challenges** that manifest themselves **in local contexts**. **Sustainable development** necessitates seeing **local activities in their global socio-economic contexts** and identifying distant drivers of local resource challenges” (Müller et al., 2015)

System-based “scales”

- natural (resource) system boundaries
- socio-economic system boundaries
- political system boundaries

Leemans, R. (2016). "The lessons learned from shifting from global-change research programmes to transdisciplinary sustainability science." Current Opinion in Environmental Sustainability **19**: 103-110.
Müller, A., et al. (2015). "Towards a governance heuristic for sustainable development." Current Opinion in Environmental Sustainability **15**: 49-56.

The „Food-Energy-Water“ Nexus



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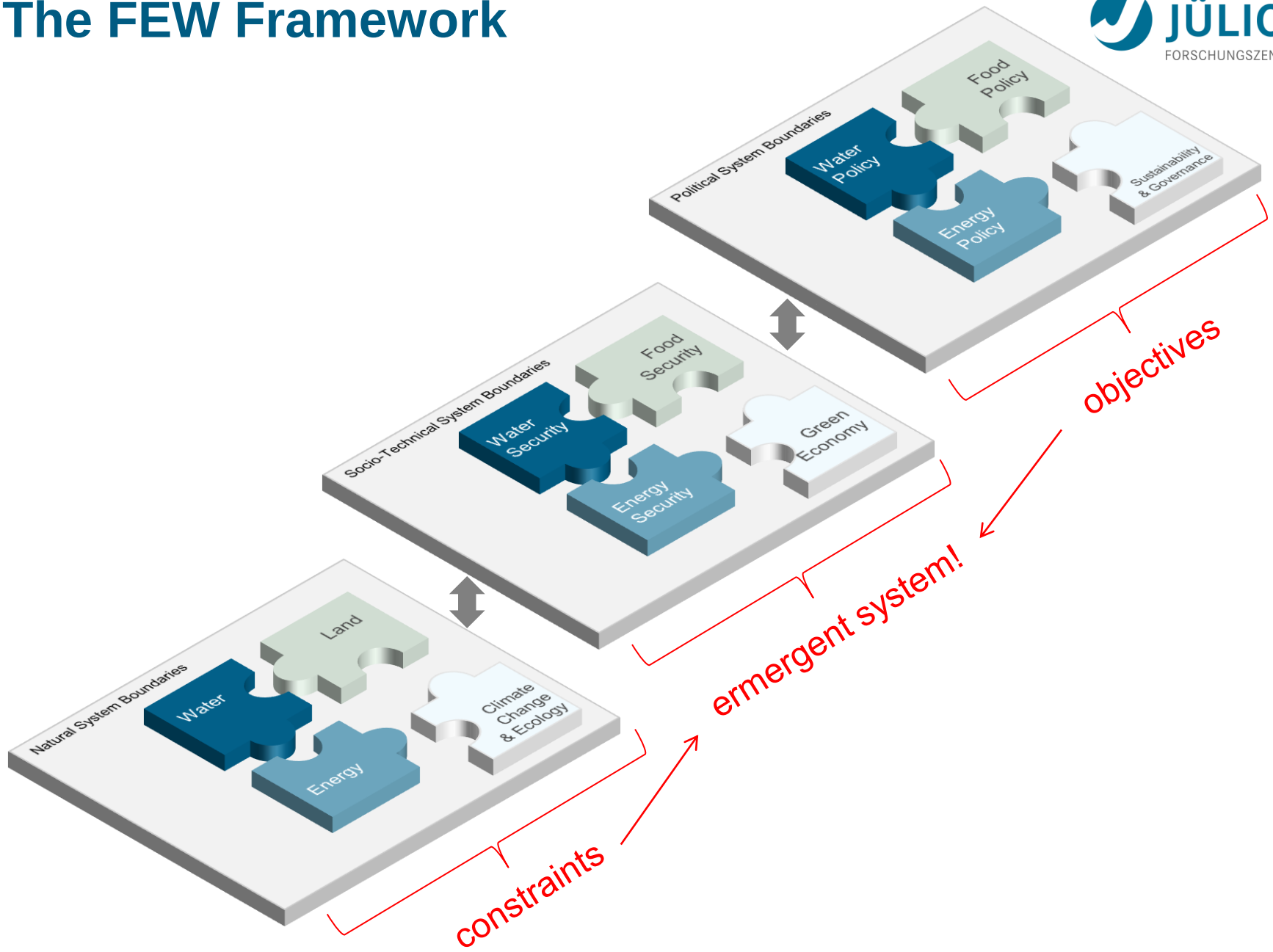
The FEW Framework



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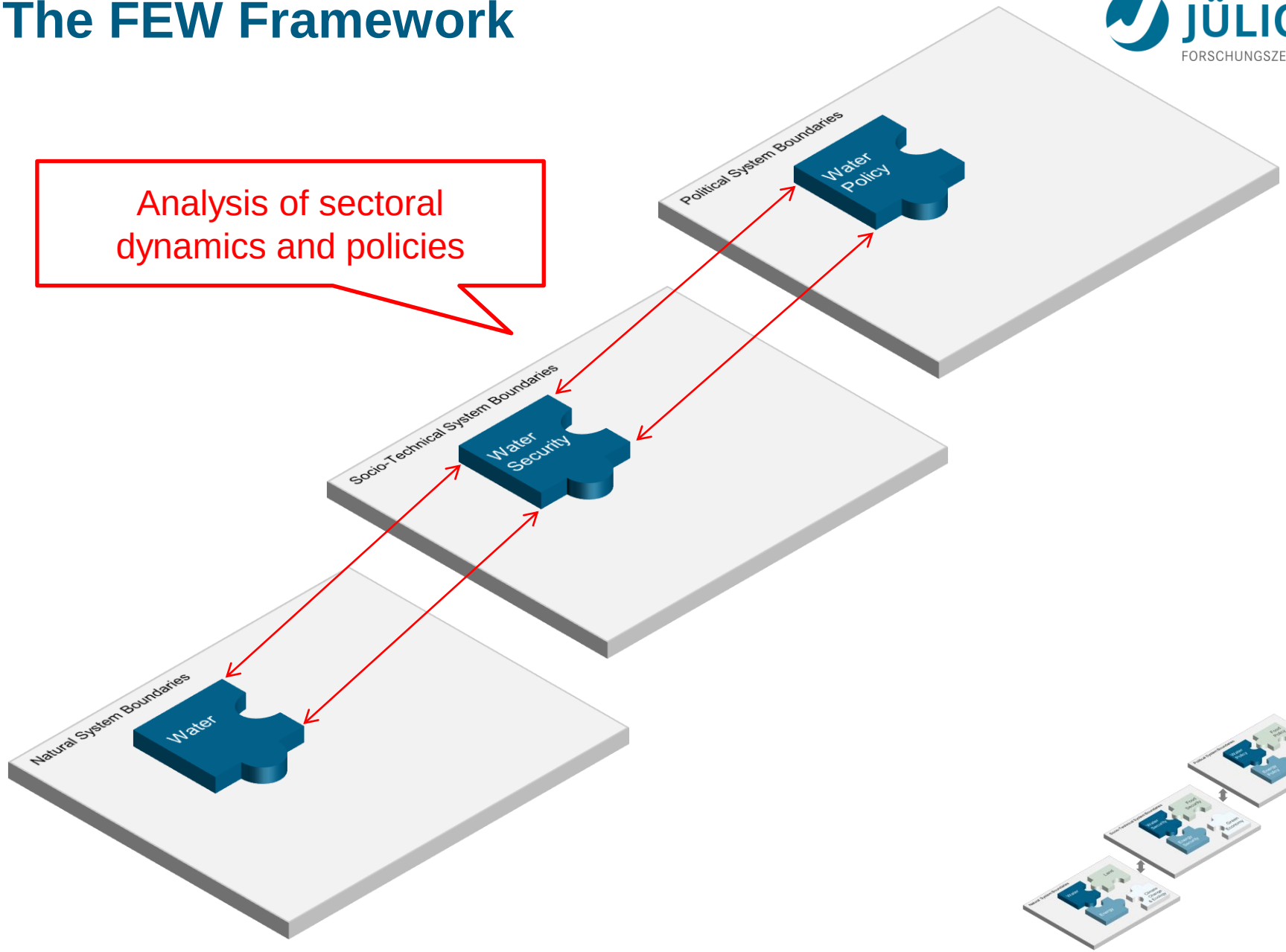

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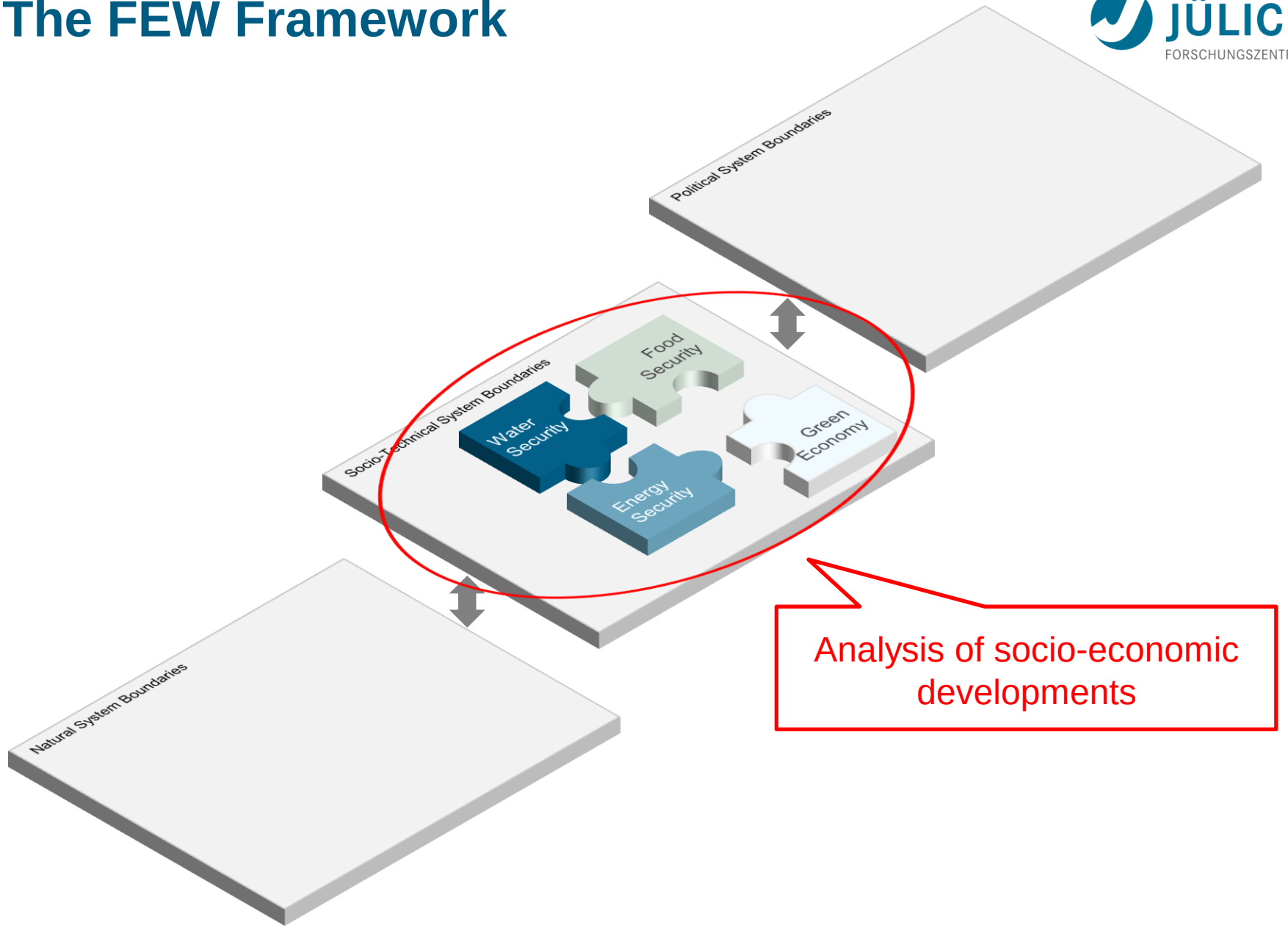

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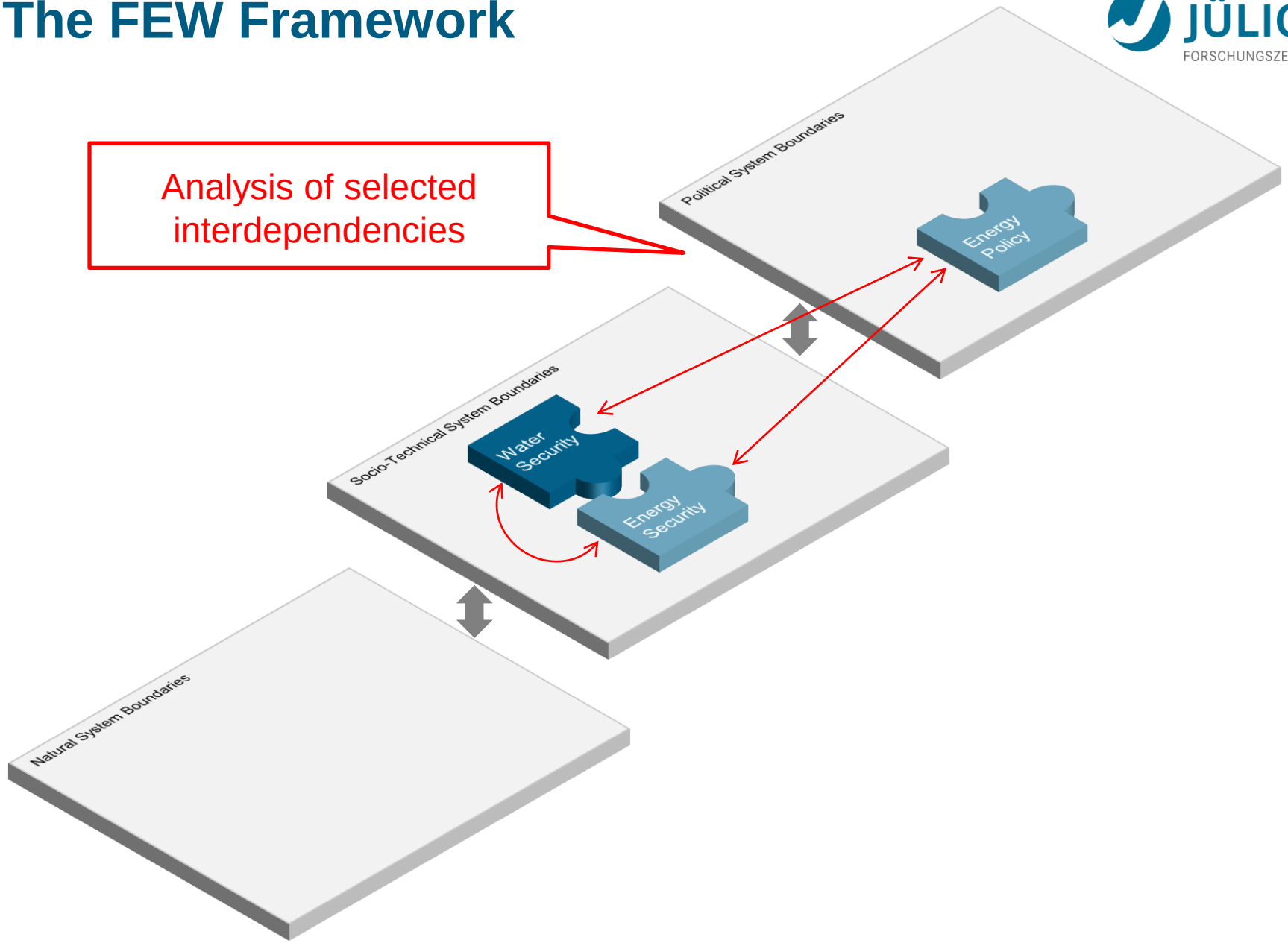

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The Scientific Approach

Objective

- develop a modular, stakeholder-based framework for the integrated assessment of the food, energy, water nexus
  - systematic operationalization of the complex, multi-dimensional challenges
  - translation into modular sub-systems to reduce complexity
  - index-based coupling of the different modules
  - ‚easy' adaptability to regional contexts
  - stakeholder-based model development

The Scientific Approach

Phase I: „Make it complex!“ – The Stakeholder Process

The UNEP Procedure for Indicator Identification:

(a) identification of potential issues and concerns,
(b) assessment of each issue and how it relates to the natural environment,
(c) analysis of underlying causes and interlinkages, and
(d) analysis of impacts on society, economy and environment

→ Paint the big picture!

Source: UNEP (United Nations Environmental Programme). Using Indicators for Green Economy Policymaking. 2014.

The Scientific Approach

Phase I: „Make it complex!“ – The Expert Process

Stakeholder Workshop Series:

- FEW Nexus Objectives Workshop
- Food Security Workshop
- Water Security Workshop
- Energy Security Workshop
- Nexus Integration Workshop

} different contexts & locations

Obectives:

- What are the nexus relevant challenges?
- What is the political nexus perspective?
- What can the model contribute to the political reality?
- What indicators are relevant to assess the objectives?
- What are the adequate methodical tools for assessment?
- How can the indicators be integrated into the comprehensive integrated assessment framework?

Source: UNEP (United Nations Environmental Programme). Using Indicators for Green Economy Policymaking. 2014.

The Scientific Approach

Phase II: „Make it simple!“ – Stakeholder-Based Regionalization

- stakeholders familiar with the regional *natural-geographic circumstances*
- stakeholders familiar with the regional *political circumstances*
- stakeholders familiar with the regional *socio-cultural circumstances*
- stakeholders familiar with (or responsible for) the provision of the FEW resources / infrastructure

→ Reduce the modules to their essentials

Source: UNEP (United Nations Environmental Programme). Using Indicators for Green Economy Policymaking. 2014.

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3) The scientific approach
4) Challenges

Challenges

- Reducing complexity without reducing the quality
- Identification of the relevant indicators
- Quantification of the relevant indicators and their interdependencies
- Choosing the right analytical tools
- Choosing the right stakeholders and workshop formats
- …

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