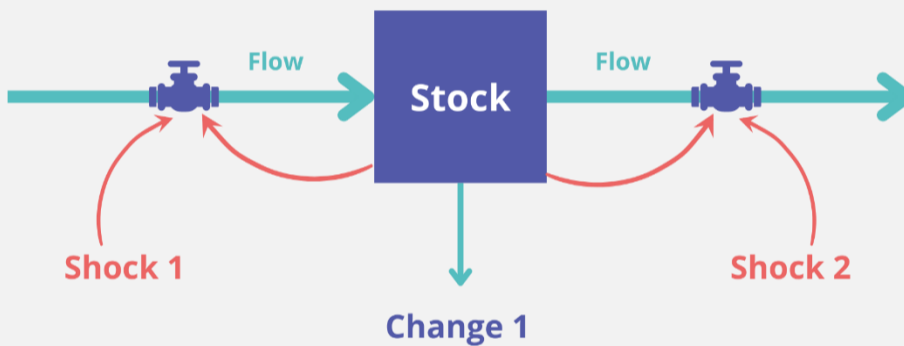


SYSTEM DYNAMICS MODELLING APPROACH

In the NEXOGENESIS project, the use of system dynamics modelling is critical in WEFE nexus analysis. But what is the system dynamics modelling approach? Here are some explanations.

What is the “system dynamics modelling approach”?

System dynamics modelling (SDM) is a way of modelling and assessing complex systems, such as the WEFE (Water-Energy-Food-Ecosystem) nexus. Developed initially for studying feedback in industrial systems, it has since been applied very widely in many disciplines. It is useful for assessing broad system behaviours and trajectories, and understanding why systems respond in the way they do to shocks or changes. SDM is based on the concepts of stocks (e.g. a bathtub), flows (e.g. a tap or overflow), and feedback (like a ‘runaway’ greenhouse effect). SDM allows for flexibility which is ideal when studying multi-sectoral systems such as the WEFE nexus. Through a graphical user environment not needing knowledge of computer coding, SDM is a great method when discussing systems analysis with non-expert stakeholders. The ability to create visual ‘dashboards’ which allow to intuitively alter model variables aids stakeholder interaction and participation.



The system dynamics modelling approach in NEXOGENESIS

In NEXOGENESIS, SDM is used to model the behaviour of the WEFE nexus in the 5 case studies to 2050. The behaviour and responses (e.g. of water resources, energy generation, greenhouse gas emissions) to climate and socio-economic change and policy implementation are assessed. Models are co-developed with stakeholders and local case study experts to ensure that what is being modelled represents local policy concerns accurately. The systems models are a critical element feeding the further development of artificial intelligence analysis within NEXOGENESIS because their structure and results are used in the artificial intelligence approaches.

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