Memo of MAGIC Webinar for the EEA: A new perspective on Water-Energy-Food Systems, in support of Sustainable Development Goal 2

Tuesday 2nd June 2020, Hosted online through Webex, 14:15-15:45 (GMT+1).

Report by Alba Juarez-Bourke.

This seminar was hosted by researchers at the James Hutton Institute. Kirsty Blackstock and Keith Matthews presented work carried out with other colleagues in the James Hutton Institute and the Autonomous University of Barcelona. Kerry Waylen hosted and chaired the seminar, and Alice Hague and Alba Juarez-Bourke supported the running of the event. There were 8 attendees: six people from the European Environment Agency, one person from the University of Duisburg-Essen and one from the Ecologic Institute. Some, but not all, attendees had some prior knowledge of the MAGIC project.

Rationale for seminar: There is growing recognition that we need systemic approaches to understanding and managing our world, in order to achieve the Sustainable Development Goals (SDGs). See for example, the new commission's mandate for a food systems strategy from 'farm to fork'. To achieve this, new tools and approaches may be needed. This seminar had three aims: (1) to explain the basic principles of a 'Societal Metabolism Analysis', (2) to illustrate its application to European agri-food systems, and (3) to discuss questions on the method, the findings, and any implications perceived for policy or other change.

The meeting followed with the agenda below. The set of slides that were presented at this meeting are available on www.hutton.ac.uk/research/projects/magic.

Agenda

14:15 – 14:45	**Welcome & Introductions** Overview of MAGIC project Explanation of Societal metabolism approach Queries about method
14:45 – 15:15	**A new perspective on SDG2 via Societal Metabolism Analysis** Analysing agricultural sustainability in terms of environmental flows within EU Analysing agricultural sustainability in terms of consequences beyond the EU Considering nutrition, food security & hunger
15:15 – 15:45	**Discussion** Queries and discussion on method and its application to SDG2 Implications for understanding and governing agri-food systems

Information presented by researchers: The researchers presented a brief precis of the MAGIC project (magic-nexus.eu), which responds to a call to work on the 'Water-Energy-Food-(Environment) Nexus'. MAGIC has a focus on how EU policies are linked together and to climate and sustainability goals, and the implications for the nexus.

Societal Metabolism Approach (SMA) is a method that allows holistic analysis of the metabolic patterns and interconnections of different systems. Central concepts are 'fund' and 'flows' of societal and environmental resources. In MAGIC, for any specific activity or system, the pattern of key flows and funds is represented in a 'processor' that can be connected with other processors in

sequential pathways. The results of SMA always characterise the state of the systems in terms of extent variables (e.g. land area,) and also intensity variables (e.g. rate of flow of water). Deciding what processes to represent, and how, depends on the question or problem to be analysed. For more information about the societal metabolism approach please see here.

Within MAGIC, societal metabolism is deployed within a broader process of reflection and stakeholder engagement that is called 'Quantitative Story-Telling'. As such, the seminar's focus on SDG2 arose from this process, and reflected prior engagement, interviews, discussion and analysis of policy documents, to identify salient themes and challenges. For more information about Quantitative Story-Telling, please see here.

The data presented result from a SMA of the pressures and impacts on the environment associated with agricultural production pathways. The presentation highlighted that some agricultural systems may be associated with adverse consequences for soil erosion and water quality. The presentation also explored the consequences of interconnections and dependencies on countries outside of the EU, by considering the imported inputs to agriculture. These inputs reflect embodied energy, water etc. used in systems outside of the EU. The consequences of re-internalising all these inputs was explored (e.g. growing all livestock feed within the EU), showing that large areas of land would be needed which may impact SDG15 and other societal goals. There would also be social consequences, not least in terms of workload. Lastly, the presentation discussed how commodities, supply chains and nutrition could also be considered and connected as part of a societal metabolism approach. The researchers finished by presenting what they perceived as the general implications of this work, and asked the participants for their views on implications, and any other feedback.

Discussion topics: Various questions discussed with participants:

- Data used for the social metabolism approach. In the examples presented we used data from existing datasets such as the Farm Accountancy Data Network, the EEA and PEGASUS project. Environmental data is aggregated to match the NUTS2 scale of the FADN data.
- Links between topics discussed in MAGIC, such as externalisation of environmental pressures and interconnections between systems, and the work carried out at the EEA.
- Whether the method can consider the evolution of policies and their impact over time. The method can be used to analyse either a 'snapshot' in time, or time intervals, allowing to understand a policy's 'direction of travel'. However, it will be challenging to link SMA to a specific policy instrument (e.g. Greening measures within CAP).
- Differences between social metabolism accounting and life cycle analysis. In a nutshell social metabolism analysis takes into account the context in which resources are used. Life cycle analysis shows the rate at which a resource is used, but not whether its use is sustainable.
- How social metabolism analysis can support policy making and implementation, e.g. SMA can inform how targets are set for the EU Biodiversity Strategy.

Next steps: The seminar and discussions were recorded with the consent of participants. The discussion – and any comments received subsequently from feedback forms sent to participants – will be incorporated in the report of this work related to SDG2, which will be produced in July. These ideas may also inform subsequent academic outputs. No outputs will contain individual names and any illustrative quotes will not be attributable to any individual.

Please contact Kerry.Waylen@hutton.ac.uk for more information about our work, its implications, or to discuss the method and other possible applications. For more information about our project you can also visit http://magic-nexus.eu/