16th International Conference on Biomedical Ontology (ICBO 2025)

Food, Waste and Sustainability: Synergizing Ontology Efforts

Briefing note for Panel discussion

November 14th 2025, 4-7 pm CET.

The panel discussion is part of 3-hour workshop that takes food loss and waste as a starting use case and aims at synergizing ontology efforts supporting food systems transformation toward performance, resilience and sustainability, while supporting human health, wellbeing and prosperity. By fostering data annotation, organization, and interoperation, ontologies ensure that datasets, systems, and people can be interconnected, serving as bridges to effective human-human, human-machine, and machine-machine interaction and semantic interoperability. By grounding different data sources (via mappings) in proper metadata models (including domain ontologies), one can allow for flexible data integration (known as OBDA - ontology- based data access). This is a critical step to effectively deal with complex food, health and sustainability challenges such as food loss and waste.

Chair: Prof.Laurette Dubé

Panelists:

- Prof. Andrea Borghini
- Damion Dooley
- Elena Milivinti
- Nicola Piras
- Magalie Weber

The panel discussion follows two sessions that respectively featured ongoing efforts in representing food and food waste and examining challenges, possibilities and consequences of synergizing food, food waste, sustainability and health ontologies across communities by harmonizing and interconnecting existing conceptualizations and representations of food systems, including both the food it produces, loses and wastes. The panel discussion will explore further connection and build synergy between this work and others in moving toward the ontology federation between top-middle-domain ontologies that is needed to support real-world solutions at scale.

After introduction to the session and to the panelists by the Chair, in a first round of comments, panelists will be invited to make initial 3-5 min statement addressing, from their respective perspective, one or more of the suggested discussion points below. The aim is to advance a unifying framework for what an ontology federation can contribute to real-world solution at scale to food waste challenges. Such a framework would have to foster the interoperability of different representational models and to aid in harmonizing and comparing information in order to rethinking how reports and information on food and food waste could be structured and shared. This call for a balance between pragmatic everyday uses and theoretical needs, selecting the most salient aspects of the expression for the purposes of scientific explanation, practical purposes and for enabling meaningful exchanges between different users and in different contexts.

Sound ontologies:

- Strategies to construct logically and semantically consistent ontologies, frameworks, and models for sustainability and health that can match and reflect stakeholders' needs, meanings, and approaches, especially with regard to food and plastic waste in food systems.

- Ontology contributions to reduce food system waste and loss, upscale and upcycle wastes in such systems.
- Discussions over FAO definitions of food waste vs loss
- Aligning existing standards in waste management, e.g. EU waste catalog.

Sound applications:

- From sound theories to applications: which paths to follow? What kind of applications, for whom, and for which purposes?
- Ontology, AI, and digital innovation: new horizons and ethical concerns.
- Possibility to create a core ontology for waste to interconnect existing initiatives.

Sound partnership:

- Possible strategies to implement to foster interconnection among ontology communities towards sounds and interconnected ontological representations of sustainability and health, especially concerning food systems waste.
    - Ongoing initiatives.
    - Required steps and milestones to achieve that.
- Possible general collaborations.
- Interfaces among ontologies.

In a second round of comments, panelists will be invited to comment (3-5 min) on key considerations in the design of an ontology federation that can help capture the dynamic aspects of food and food waste and account for multiple contextual factors, such as culture and the aims of the stakeholders. The Chair will then summarize the 2 rounds of comments in key next steps for development of the unified framework.