RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

INRAE

Bioeconomy for urban areas

Exploratory project
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NEWLINK

New link in the cold chain between collective catering and food aid associations: inventory, cost-benefit analysis and optimisation strategy

> Optimise the redistribution of unsold meals from collective restaurants to food aid associations and other populations in a given urban area, while guaranteeing the sanitary and environmental quality of the food

Context and challenges

A study carried out by ADEME on food waste from collective catering establishments in France showed that a restaurant that serves 500 guests on an average 200 days a year, produces between 15 and 20 tons of waste a year, or, in budgetary terms, between 30,000 and 40,000 euros in food waste annually (ADEME 2016). To combat food waste in collective catering, the EGalim law (Article 88 > Art. L. 541-15-3 from the *code de environment* and ordonnance 2019-1069 from 21 October 2019) requires establishments serving more than 3,000 meals a day to partner up with food aid associations to donate food. This strategy is part of an ethical and social approach (solidarity with the most underprivileged, fight against food insecurity) but also has environmental and economic benefits (reducing carbon footprints and curbing costs). However, this policy implies adding new steps to the management of the cold chain process (packaging, collecting, transporting, storing and distributing donations) in order to guarantee the safety and quality of foods collected by associations until they can be consumed.

Studies have highlighted the need to take the social and technical conditions of cities into account when choosing how to manage flows and reduce waste without compromising the safety and quality of foodstuffs to be redistributed and consumed. While many studies analyse the food supplies of cities and the entire urban system as a whole, very few look to what ultimately happens to purchases downstream: consumption, loss, waste and associated waste, their origins and their future. An urban metabolism approach, here defined as all the material and energy flows that come into play in human societies, enables reconnection of the supply and restitution of materials in the analysis of urban territories. The approach allows a better grasp of the issues in order to foresee, stimulate and promote the prevention and recovery of food waste, and hence optimise

the use of resources and raw materials. In this way, it is possible to explore how food waste reduction and recovery strategies can help transform the metabolism of regions, with a view to boosting sustainability.

Goals

NEWLINK brings together skills from different fields from process engineering and computer science to human and social sciences, and calls on both academic and professional players. The overall goal of the project is to optimise the redistribution of unused food from the collective catering sector to food aid associations and other populations in a given urban zone, while guaranteeing the safety and quality of food when it is finally consumed. Several questions have arisen:

- **How does the link between collective catering and food aid associations work?** Who are the players, what constraints influence the roll-out, what products are collected and where do they come from (traceability), what is their use-by date, which products are most frequently involved, how long does each step in the process take, what equipment (refrigeration and other) and staff is needed, and what are the critical points that could compromise the quality of products being processed and prevent their redistribution and ultimate consumption?
- **What are the benefits (solidarity: economic and social aspects, waste reduction and environmental impact linked to waste) and costs (economic and environmental costs associated with this new link due to the need for additional staff and equipment) in a given area?** Are solutions available to sustain the economic model of this new link and increase the benefits and/or reduce the costs while respecting the quality of products?
- **How will the results of the cost-benefit analysis be affected by optimisation of the redistribution of unsold food in a given region and by accounting for the presence of donor/recipient structures?** What is the potential for expansion? Should an expansion threshold, or, on the contrary, a limit, be set in order to achieve a favourable cost-benefit ratio? How will trends in the redistribution market influence these developments?

Project members

INRAE division	Units	Expertise and contributions
ACT	UMR SADAPT	Ecology, estimate of flows from surveys and database analyses, inter-disciplinary analysis of territorial metabolism
MICA	UMR SECALIM	Safety and quality of foods, microbiological lifespan, Predictive microbiology, Risk – benefit / multi-criteria assessment
TRANSFORM	UR FRISE	Multi-criteria analysis, energy and environmental impact of refrigeration equipment, cold chain, food quality