



Yara International: Upcycling cities' food waste into nutrients for nearby farms

The Nutrient Upcycling Alliance is a circular food economy initiative started in January 2019 by crop nutrition company Yara International and waste management firm Veolia, hosted at the Ellen MacArthur Foundation. Its London pilot project, launched in early 2020, aims to demonstrate that food waste collected from the city can supply local farms with organic-based fertilizer, shifting farmers toward regenerative agriculture techniques. The pilot project objectives are:

- Help increase organic waste collection and upcycling from 2% currently to 25% by 2030
- Proof of concept for an organic-based fertilizer made from city food waste
- Serve farms with tailored solutions around London, representing 350,000 hectares of farmland

The impetus

Cities consume a lot of food and generate the bulk of food waste. By 2050, about 80% of food will be consumed in cities, but less than 2% of the nutrients in food waste are recovered for compost or transformed into other useful products. What's more, roughly 30% of food waste is composed of inedible parts, making it 'unavoidable'.

Meanwhile, farms on a city's outskirts are key suppliers to urban food systems. If these farms are to practice regenerative agriculture, restore soil biodiversity and reduce their use of pesticides, farmers need safe, high-quality, accessible and sustainable fertilizers. Can urban food waste be upcycled into organic-based fertilizer and connect agriculture, food consumption and food waste in a circular economy model?

These new crop nutrition products have had much interest from farmers within 30 km of London's outer boundary. The Alliance invited these farmers to test the performance of the new products to ensure that the right nutrients are available to grow high-quality crops. By integrating organic-based fertilizers into their routines, farmers get additional solutions to embrace regenerative methods that can help restore soil biodiversity, keep carbon in soil and improve crop resilience.

To build on the Alliance's work to date and to scale the pilot project, additional partners have been recruited from across the food value chain, ranging from technology companies to retailers like Waitrose. The partnerships are rich and varied in terms of expertise, perspectives and resources, and they are getting positive attention for demonstrating how different players can work together around circular models and waste transformation.

The solution

Since the launch of the Nutrient Upcycling Alliance's pilot project in London in early 2020, members of the Alliance have started to analyze the possibility of recycling valuable nutrients contained in the city's food waste for the benefit of peri-urban agriculture.

Through high-tech composting and anaerobic digestion, partners have proved that collected food waste can be turned into nutrient-rich organic-based fertilizer pellets. Yara's experts have assessed their quality and carried out lab and field trials to ensure fertilizers spread well on crops, are safe to use, and are free from contamination.

Three key learnings

1. **An innovative alliance must have strong leadership, dedication and resources from Founding Partners to drive progress:** Yara and Veolia dedicated specific resources to the Alliance and pilot project. They recruited additional partners by identifying a value proposition that resonated across the food value chain in the UK and was widely relevant to many food businesses. They also considered carefully how each partner's representatives could contribute most effectively and inclusively.

2. Farmers need a business case for change: Forward-leaning farmers are interested in organic-based fertilizers, but it must be economically viable for them to choose this solution. In other words, farmers, as business owners, need the price of the fertilizer and the yield to be comparable to alternatives. This remains a challenge for the Alliance as the technology to produce it is not yet at commercial scale, and no subsidies or incentives currently exist for upcycled food-waste products.

3. Local institution and government support is essential: A successful project aimed at urban and peri-urban food systems must work with local authorities, whose buy-in, regulations and enforcement can help or hinder progress. For example, if a city collects a high proportion of its municipal food waste, or if businesses are required to separate and collect food waste, this can help a waste upcycling project collect enough waste and produce enough fertilizer to be economically viable. The key role of these local institutions is to guide innovative alliances through the local regulations, implement strategies and incentives that promote a shift to regenerative outcomes and attract external funding to the local area.

What's next?

The Nutrient Upcycling Alliance's pilot has been spotlighted as an innovative example of real action on the ground towards nature-positive practices in the food chain. There has also been significant interest and traction from other regions for the potential of these sustainable products. Yara is committed to develop circular products to provide more choices for its clients — the farmers of tomorrow — and bring decades of expertise to innovate regenerative solutions that will enhance the company's competitive edge and address critical environmental challenges. Yara and Veolia aim to create commercial circular economy models for food and completely transform the food value chain. Currently, Yara is evaluating the sustainability and profitability of the pilot project and examining other cities where the project can be duplicated. Ultimately, it seeks to make the circular food model commercially viable at scale: to turn urban food waste into organic fertilizers that can be sold to and used by farmers in and around cities across the world.

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OP2B Pillar 1:

Scaling up regenerative agriculture

This pillar defines specific actions within the value chains of OP2B members on regenerative agriculture. Scaling up alternative farming practices will leverage the power of plants to keep carbon in the soil (carbon sequestration) and increase the capacity of soils to hold water. It will further enhance the resilience of their crops, support the livelihoods of their farmers, and regain the nutrient density of food while decreasing reliance on synthetic inputs. OP2B has carried out a series of case studies of regenerative agriculture initiatives by member companies. This case study falls under pillar 1.