

# USING GREEN AND DIGITAL TECHNOLOGIES TO REDUCE FOOD WASTE AT THE CONSUMER LEVEL

## CASE STUDY: BELGRADE, SERBIA

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### Consumer food waste in Belgrade

Serbia throws away 247,000 tons of food annually, or 35 kg per capita.<sup>1</sup> The country's food service sector generates about 40,000 tons of food waste annually; some 20% of that amount is kitchen waste, and 15% of the total amount of food served to consumers remains uneaten in the form of plate waste. Most of this waste is disposed of in landfills, while the remaining part is mainly used for composting and biogas production. The estimated value of the amount of food from retail sales was about \$57.5 million in 2019. Fresh fruits and vegetables take up the largest share, followed by perishable food, meat, meat products, fish and confectionery.

There is no data available on food waste generated in the capital, Belgrade, and the Statistical Office of the Republic of Serbia does not have data nor indicators for monitoring Sustainable Development Goal (SDG) Target 12.3 on food waste. Moreover, there is no system of separate collection of biodegradable household waste in Belgrade. Collected waste is currently being disposed of at a city-operated landfill together with other mixed waste; 90% of the municipal waste in Belgrade is collected and only 5% is recycled.<sup>2</sup>



**247,000 tons**

of food are thrown away  
annually in Serbia.



**Only 5%**

of the municipal waste is  
recycled in Belgrade.



Belgrade aims to increase the  
recycling rate of household  
waste to **25%** by 2025, and  
**35%** by 2030

<sup>1</sup> Environment Improvement Centre, 2019, "Koliko zaista bacamo hrane – Analiza istraživanja o bacanju hrane u domaćinstvima u Srbiji", [https://greenfest.rs/publikacije/Koliko-\(zaista\)-bacamo-hranu-Analiza-istrazivanja-o-bacanju-hrane-u-domacinstvima-u-Srbiji.pdf](https://greenfest.rs/publikacije/Koliko-(zaista)-bacamo-hranu-Analiza-istrazivanja-o-bacanju-hrane-u-domacinstvima-u-Srbiji.pdf).

<sup>2</sup> Local Plan for Waste Management in the City of Belgrade 2021-2030, [https://www.beograd.rs/images/data/ea6cc50b9bcf38c72ff941f7c7474a0\\_1691048761.pdf](https://www.beograd.rs/images/data/ea6cc50b9bcf38c72ff941f7c7474a0_1691048761.pdf).



## Tackling the waste problem

The current legislative framework at the national and municipal level in Serbia does not contain any law that deals directly with food waste. The newly adopted 2021-2030 Plan for Waste Management for the City of Belgrade takes positive steps in recognizing food waste as a separate category of communal waste, and recognizes SDG Target 12.3 and its aim to halve per capita food waste. The city has set a number of targets for improving waste management by 2022, including introducing a primary separation system of recyclable materials, placing garbage bins for selective collection of recyclable waste, and building six recyclable waste collection centres and four waste transfer stations, among others. It also aims to increase the recycling rate of household waste to 25% by 2025, and 35% by 2030.

Serbia's Law on Waste Management provides rules and standards for waste classification and waste management, as well as duties and responsibilities of the population and of the public and private sectors. Under the law, the food service sector is considered one of the generators of food waste, and thus has the responsibility to collect and sort generated waste. The law stipulates that food waste can be treated by aerobic digestion, for

compost, and anaerobic digestion, to produce methane.

Civil society groups also have a role to play. Food Bank Belgrade, for example, collects food at the end of its shelf life from companies, the agro-industry and food retail chains, and distributes it to vulnerable groups. Charity Coalition has called for a working group to improve the legal framework for donating surplus food. The project "Towards better food waste management in the Republic of Serbia", led by German development agency GIZ, has worked to improve the framework for the collection and recycling of food waste, including a proposal to change provisions under the Law on Waste Management and a draft rulebook on bio-waste. The project "The Food Shifters: A Voluntary Scheme for Sustainable Food Waste Management" – implemented by UNDP Serbia and the City of Belgrade – has established a voluntary scheme for food waste from main food waste generators in Belgrade to redistribute food surplus, and has enabled easy access to food, especially for vulnerable groups. The Environment Improvement Centre (EIC) in Belgrade has been actively working on household food waste through research, education and lobbying for an improved legal framework.



## Role of green and digital technologies

Launched in May 2021, the web-based platform FoodSHare connects food donors, recipients and volunteers to reduce food waste, aiming to streamline surplus food donations by facilitating communication and logistic processes. "Plate by plate" uses blockchain technology to connect Ahold Delhaize stores (the biggest food retailer in Serbia) with social and humanitarian institutions that cooperate directly with food banks. There is a huge potential to use combined technologies and data sources, artificial intelligence and big data services to monitor and process data on food waste.

Opportunities also lie in sustainable urban infrastructure for separation, collection and recycling of food waste.

One example is the Vinča landfill, which is in the process of being transformed into a new waste facility equipped with green technology.<sup>3</sup> The landfill received 1,500 tons of household waste daily before the project started. As a public-private partnership supported by the International Finance Corporation (IFC), the project will build a new sanitary landfill, a waste-to-energy plant and a construction waste recycling unit. It will also sell the electricity generated from the energy plant to offset some of the construction and operation costs.

<sup>3</sup> IFC, "One of Europe's Largest Landfills Gets a Makeover", May 2020, [https://www.ifc.org/wps/wcm/connect/news\\_ext\\_content/ifc\\_external\\_corporate\\_site/news+and+events/news/cm-stories/serbia-waste-to-energy](https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/cm-stories/serbia-waste-to-energy).



## The way forward

More efforts are needed to raise awareness and educate relevant stakeholders and consumers on food waste and SDG Target 12.3. National legislation and regulation could provide an enabling environment for consumer food waste reduction and prevention. There are several missing links in legislation that need to be in place to create a systematic approach. This includes requirements for reducing food waste and donating surplus food, changes in regulations regarding date marking to provide longer shelf life without compromising safety or quality, and guidance to food businesses and consumers on the difference between “use by” (safety concerns) and “best before” (quality concerns) labelling. National incentive schemes could include beneficial tax rates for food donations, and the introduction of separate food waste collection could facilitate the transition to anaerobic digestion of unavoidable food waste. More support is needed for research and development of new products, services and tools based on green technologies.



## Project partner



**ENVIRONMENT  
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Environment Improvement Centre (EIC) in Belgrade

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