

Food waste is a significant global issue, involving the disposal of edible and inedible food throughout the supply chain. It's defined as the unnecessary discarding of food resources intended for human consumption, manifesting in various ways such as spoiling fruits and vegetables in supermarkets, unfinished meals at restaurants, and household food disposal. Despite the paradox of hunger coexisting with food waste, about one-third of all food produced globally, approximately 1.3 billion metric tons, is wasted each year.

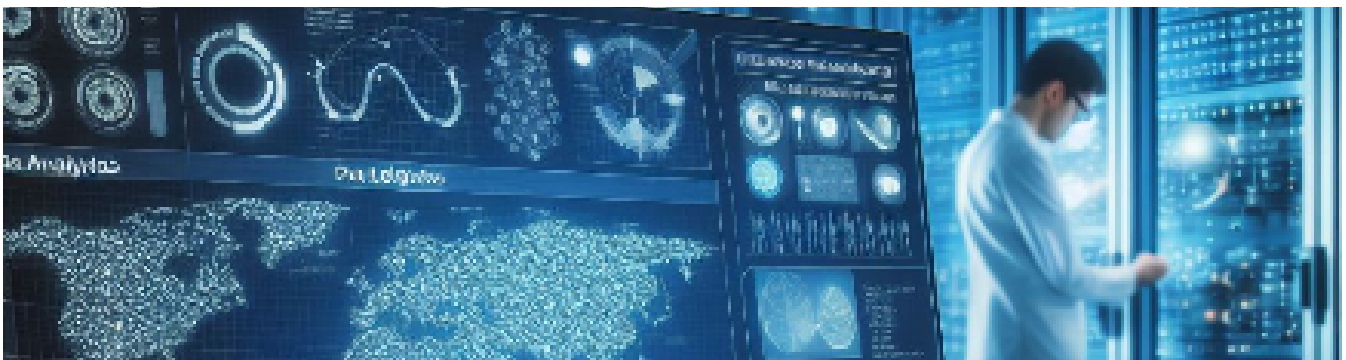
Discarded food wastes resources used in its production like water, energy, and agricultural inputs. Decomposition of food waste in landfills produces greenhouse gases, contributing to climate change. Food waste leads to financial losses for producers, retailers, and consumers, burdens governments with waste management and landfill operation costs, and perpetuates inefficiencies in the food supply chain, leading to increased consumer prices and disparities in access to affordable, nutritious food.

Technology-driven approaches to minimize food spoilage and losses during storage and transportation

Technological advancements are revolutionizing how food is stored and transported to minimize spoilage and losses. Here are four real-life examples:

Cold Chain Technologies:

Cold Chain Technologies are essential for preserving perishable goods. They use refrigerated trucks and storage facilities, often set to specific temperatures like 2–8°C for dairy products or -18°C for frozen foods. IoT-enabled sensors monitor temperature and humidity, alerting if values exceed set thresholds, such as 8°C in a storage facility. This real-time monitoring is vital for maintaining the cold chain's integrity.



RFID Tracking:

RFID Tracking is a key technology in supply chain management. It uses RFID tags to track food products, providing real-time updates on a product's location and condition. For instance, an RFID tag on a crate of apples could signal its arrival at a warehouse, or alert if the crate has been left unattended for too long, reducing spoilage risks. RFID technology provides real-time visibility into a product's location and condition, reducing the likelihood of spoilage due to delays or mishandling.

Data Analytics and Predictive Algorithms:

Advanced data analytics and predictive algorithms analyse data from various sources, including weather forecasts and historical sales data, to optimize inventory management and prevent overstocking or understocking perishable items. This reduces food spoilage caused by excess inventory or shortages.

Blockchain for Traceability:

Blockchain technology is increasingly used to enhance traceability in the food supply chain. It provides a transparent and tamper-proof ledger of a product's journey from farm to table. This traceability allows for quick identification and removal of contaminated or compromised products, reducing food losses due to recalls.

Food Waste Recovery Processes and Technologies

Food waste recovery encompasses a range of processes and technologies designed to divert discarded food away from landfills and convert it into valuable resources. These methods vary in complexity and scale but share the common goal of reducing waste and minimizing environmental impact.



Insect Bioconversion:

Insect bioconversion, a novel waste management strategy, is being leveraged by a Canadian startup, Enterra. They utilize Black Soldier Flies to consume food waste and convert it into a protein-rich insect biomass.

The organic waste from food manufacturers serves as the feed for these flies, which in turn transform it into a sustainable protein source. This protein source is then used for animal feed, presenting an innovative and eco-friendly solution to waste reduction and sustainable feed production. This process not only manages waste effectively but also contributes to sustainable agriculture.

Composting:

Composting is a scientific process that transforms organic waste into nutrient-rich compost under aerobic conditions. Key parameters include the Carbon-Nitrogen ratio (25:1 to 40:1), moisture content (40% to 60%), temperature (35°C to 40°C), particle size (3.1 mm to 12.7 mm), and pH level (5.5 to 8). Microbial activity drives the process, and other factors like germination index, cation exchange capacity, humic substances content, and ratios of $\text{NH}_4^+ -\text{N}$ and $\text{NO}_3^- -\text{N}$ also play a role. These parameters ensure the production of stable, nutrient-rich compost that contributes to soil fertility.

Anaerobic Digestion:

Anaerobic digestion, a biological process, is employed by UK food retailer Waitrose to transform food waste from its stores into a valuable resource. In this oxygen-free environment, microorganisms decompose the food waste, generating biogas, primarily composed of methane, and a nutrient-dense byproduct known as digestate. The biogas is then harnessed for the generation of electricity and heat, demonstrating a sustainable approach to waste management and energy production.

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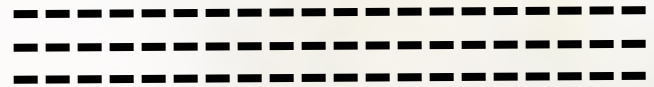
Sustainability Healthcare



Quality healthcare is not just a service; it's a fundamental human right crucial for the development of any society. It's about ensuring that every individual, regardless of their background, has access to the care they need to live a healthy, fulfilling life. This right is intertwined with the broader goals of sustainable development, aiming to create a world where everyone can thrive today while ensuring future generations can do the same.

The concept of sustainable healthcare, a visionary approach that recognizes our health is deeply connected to the environment around us. It's about more than just treating illnesses, it's about preventive care, reducing waste and making the entire healthcare system more efficient and less harmful to our planet. The goal is to find a harmony between improving human health and preserving the natural world, ensuring one doesn't thrive at the expense of the other.

However, this noble goal presents its challenges in the fast-paced, resource-intensive world of the 21st century. It places a significant responsibility on states and healthcare providers to innovate and implement solutions that are not only effective but also environmentally friendly. Achieving sustainable healthcare is a complex, urgent task that requires cooperation, creativity and commitment to both people and the planet.



Sustainability in Reproductive Health

Female health is at a pivotal moment of change. Improvements in healthcare have brought significant advancements, yet the journey towards fully sustainable systems that support their well-being throughout life continues. A cornerstone of this journey is family planning, a critical element not just for individual health but for sustainable development at large. Effective family planning empowers women, reduces poverty and promotes gender equity, laying the foundation for communities to flourish.

The socio-economic benefits are profound. By allowing women and families to decide the number and spacing of their children, family planning leads to better health outcomes for women and children, higher levels of education and more robust economic growth. This empowerment leads to a ripple effect of benefits, including increased participation in the workforce and greater investments in children's education.

Moreover, prioritizing reproductive health can dramatically lower maternal and child mortality rates and significantly reduce the incidence of unplanned pregnancies. This, in turn, minimizes the prevalence of unsafe abortion practices and sexually transmitted infections, creating healthier families and communities. By embedding these standards into healthcare systems, we not only elevate the health and status of women but also take crucial steps toward a more sustainable and equitable world.