

Rethinking Waste:

How Recycling Data and Education are Shaping a Circular Future

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84%

25%

According to a 2021 survey¹ from the World Economic Forum, 84% of people globally agreed that it's extremely important for consumers to recycle. However, one quarter of people surveyed said they didn't know how to participate in recycling programs.

There is an obvious gap in recycling education. In a world where people want to do good but make mistakes, we need educational strategies so that people know what to do and how. In addition, transparency about our impacts – both positive and negative – is critical to staying on track and achieving circularity.

The power of data in education

The success of recycling depends on widespread support, gained through knowledge-sharing and education, and it requires a framework for gathering and leveraging data. Getting to a more sustainable future naturally means knowing where we are, and what we need to do next.

In this white paper, we will look at the impacts of using a data-driven approach to recycling education, and how this can ultimately help us achieve circularity.





The State of Recycling

Evidence of solid waste management can be traced back to London in the 18th century.² However, these early waste removal processes were motivated by the recovery of a single valuable resource: dust. Today, universal waste collection is primarily focused on a single objective - getting the garbage out of sight – and the system is highly effective at achieving this goal. You put your trash in the bin, and then you no longer have to think about it. As waste management has evolved, however, we've grown less and less effective at recovering as much value as possible from the waste stream.

It has been widely studied that wealthier countries generate the most waste³ and yet are often the least impacted by its negative consequences (pollution, water contamination, loss of habitat).

The gap between us and our waste impact has created detachment around recovery and recycling. To achieve a circular economy, we need a renewed focus on sustainable waste management.



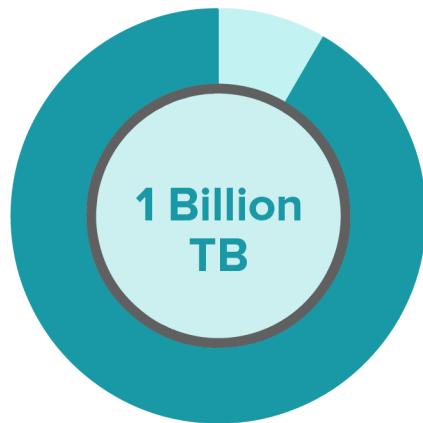
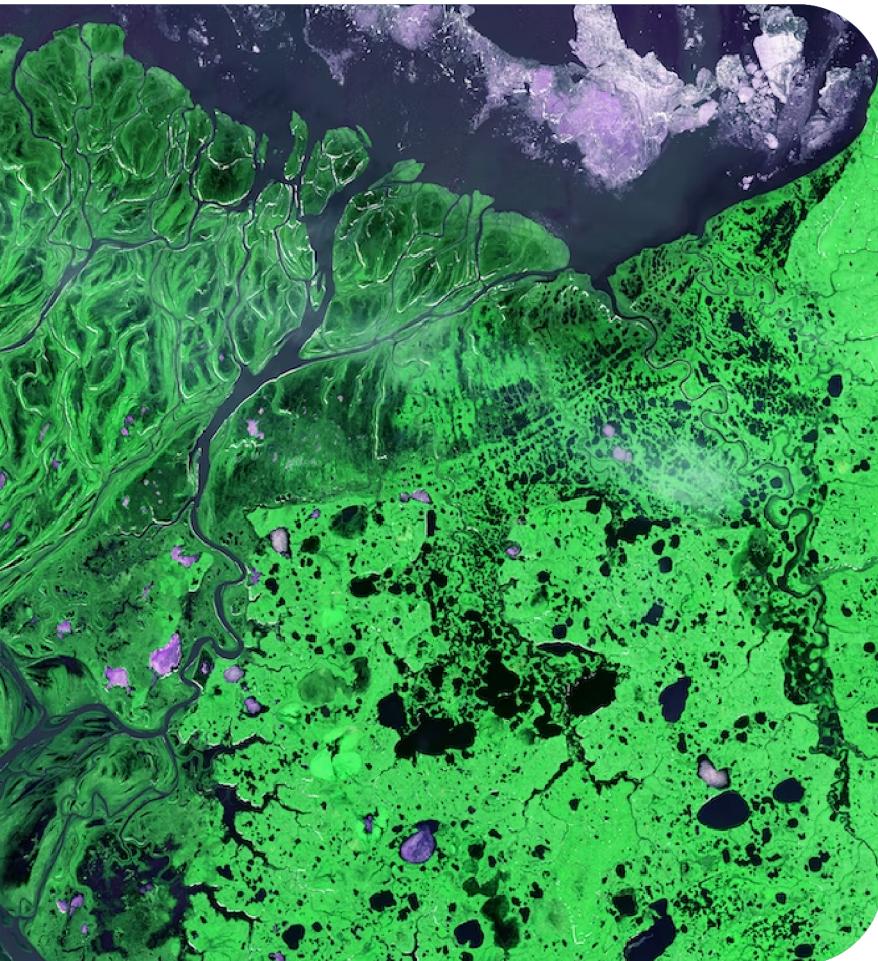
Education for Sustainability

There is a strong connection between awareness, responsibility, and impact, particularly when it comes to recycling. Simply understanding the positive aspects of recycling isn't enough to drive long-term behavior change; however, understanding one's own responsibility and impact on the environment does make a difference. In a study⁴ presented at the Biennial Meeting of the Society for Research in Child Development, children in grades 3 – 5 were assessed according to their attitudes toward the environment, as well as their feelings of control. The study revealed that children who feel they have control over and responsibility for their own actions and behaviors have strong pro-environmental attitudes.

Education for Sustainability (EfS)⁵ is an educational approach that aims to instill in students, schools and communities the values and motivation to take action for sustainability – in their personal lives, their community and on a global scale.

One of the key tenets of EfS is systems thinking, which is equipping people to understand connections between environmental, economic, social and political systems. Understanding the connection between the waste we produce, for example, and the waste ecosystem, as well as the connection between the waste ecosystem and its social and environmental impacts, can yield greater action from people because they have a personal stake in these systems.

Systems thinking promotes changing our habits to protect the environment, and by protecting the environment, we ultimately protect ourselves and each other.

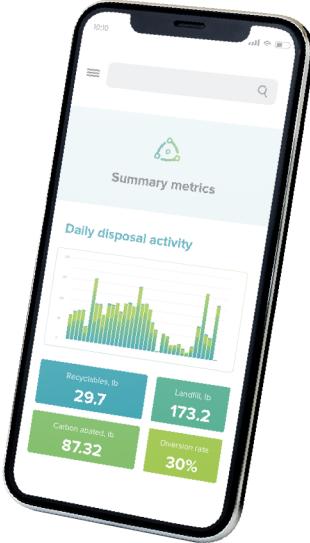


Data to get a
clearer picture

The use of data in our daily lives seems more commonplace than ever. Maryville University projects the annual data created worldwide will be one billion terabytes by 2025.

While a lot of the data produced is leveraged in e-commerce and other online applications, data is also being used toward environmental efforts. With data, we can assess what's currently happening with climate change, what efforts are most needed, and we can track progress.

A survey conducted in 2019⁶ and published by Nature showed that through airborne imaging, it was revealed that a small number of waste management facilities in California were responsible for a disproportionate amount of methane emissions. Data like this reveals an opportunity to pinpoint areas for reducing methane and upgrading waste management and landfill operations.



Setting a baseline for goals

In Apple's Environmental Progress Report for 2020, the company announced plans to become carbon neutral by 2030 for its entire footprint, from its supply chain to the use of its products. Apple had already become carbon neutral in its operations worldwide and used data it had been compiling every year to inform future initiatives. According to the report, Apple says, "To achieve our goal of carbon neutrality by 2030, we must first understand our carbon footprint today."

Data is powerful in that it can fill the gap between intention and action. Data can help pinpoint a strategic starting point, and then it can illuminate areas for intervention.

Tracking and optimizing

Data can reflect performance and highlight opportunities, as well as create models for replicating success. It can also help us identify weak points and prepare for them.

Did you know the state of the economy⁷ has a strong impact on consumption and waste generation? Waste generation increases during times of strong economic growth and decreases during times of economic decline. To achieve long-term impact, it helps to be aware of external factors and when we can expect such behavior changes.

Incorporating data projections into strategic planning initiatives is where we have the potential to measure our actions and their outcomes. But when it comes to climate change, we must do a better job of using the data we have to create a plan that can be agreed upon and executed by all. Project Drawdown is a nonprofit whose research and analysis presents 100 existing climate solutions for humanity to reach climate drawdown, the point at which greenhouse gas concentrations in the atmosphere begin to decline. Project Drawdown⁸ argues that while we have data showing the areas requiring investment and effort to reduce emissions, we aren't making the best use of the available solutions.

"What we've basically done is written a really good food book with lots of pictures showing you what could be...but what it isn't is a recipe book telling you step by step by step, what to do to make that beautiful thing a reality."

Project Drawdown executive director Jonathan Foley

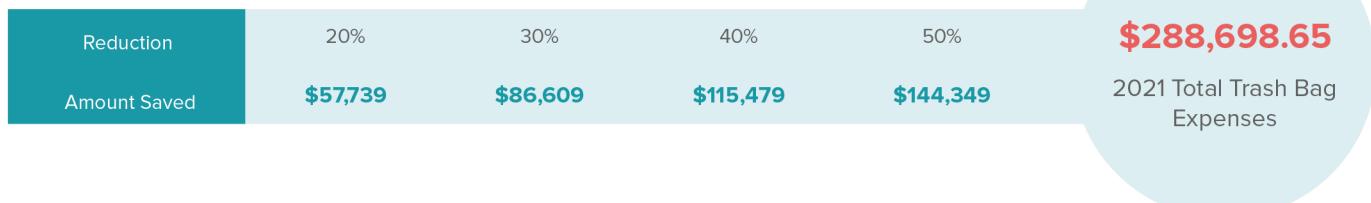
How data can drive sustainability action

TrashBot at DFW Airport

TrashBot was implemented for three months at one of the busiest airports by passenger traffic in the U.S. During its tenure, TrashBot gathered data on every item of waste that passed through its system. Using this data, we discovered that TrashBot could not only impact diversion, but also facility supply costs, like trash bags.

The Airport had previously used a manual process, whereby its custodians would check for trash bin fullness manually. With TrashBot in place, custodians received automatic fullness indication alerts, which reduced disposal frequency and saved the facility money on bag expenses.

Similar insights have been shown from TrashBot's data at other high-traffic facilities. TrashBot data has helped facilities save on labor costs, transition to more recyclable materials, and massively improve composting efforts.



Conclusion

Data-driven recycling education will yield a sustainable future

Educating for sustainability engages people in envisioning diverse, sustainable futures. Then, it motivates them to reflect upon personal experiences and world views and to think critically about their impacts and choices.

Participation at all levels is critical to the collective shift towards an environmentally sustainable society. Long-term partnerships and networks that share information will ensure we build upon a foundation of data and knowledge to advance the behavior changes that are needed.

Accessibility to knowledge and skills development must be a focus for educational programs. Democratizing data will ensure that people across cultures, geographies, and backgrounds will engage in systems thinking and take collective action to ensure a healthy future.



Data and knowledge



Access and mobilization



Systems thinking



Partnerships and networks



Sources

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