



Boxes



Farm



Compost

**A Response to the Challenging
Recycling Market**

By Ayodeji Oluwalana

The COVID-19 global pandemic has affected many businesses, particularly the recycling industry. Unfortunately, its effects might last for quite a while, and we all have to brace for what the future holds. Nevertheless, disruptions like COVID-19 are not new to the recycling industry, which has undergone many mutations in the last few years. For example, China's "National Sword" policy, which was enacted in January 2018 and banned many recyclables from entering that country, has forced several nations to find new places to dispose of their waste. Changes such as these have altered how materials recovery facilities (MRFs), municipalities, cities, and schools process recyclables and have limited, changed, or completely halted recycling services/programs.

Municipalities, cities, and educational institutions are only beginning to grasp the realities of the struggling recycling market, which is resulting in the collapse of recycling programs, landfilling of more materials than desired, and reallocations of already stretched waste diversion budgets. Colleges and universities in Iowa—to name one example—and other regions with diverse populations have had to address this changing landscape, which

has significantly affected their recycling programs. Due to rising costs, most institutions are either paying more to continue recycling or completely ending recycling.

Iowa State University (ISU) is committed to promoting sustainability and has continued to recycle despite the challenging market and increased associated costs. In our mission to continue promoting sustainability efforts and also ensure fiscal responsibility, ISU's Facilities Planning and Management Department has explored innovative ways to minimize cost and promote recycling efforts on campus.

As a land-grant university with a student population of over 30,000 students and nearly 6,000 faculty and staff, the ISU campus receives many packaged items daily—the majority in cardboard boxes. Generating an average of between 60 and 80 tons of cardboard monthly, the university spends the majority of its recycling budget on this material. This expense was somewhat offset when cardboard was a genuine commodity (profit-making venture) a few years ago.

One outcome of exploring other recycling options resulted in an innovative partnership among key campus stakeholders,



Photos by Christopher Gannon.

Student employee Tristan Holden with a pile of shredded cardboard being used as cattle pen bedding at Iowa State's Ruminant Nutrition Farm.

including Recycling Services, Procurement Services, and the ISU Beef Nutrition Farm. (The Beef Nutrition Farm is one of several farms run by the College of Agriculture and Life Sciences and used by ISU faculty members for teaching, research, and extension, where students receive hands-on education.) Their solution is to reuse campus-generated cardboard for animal bedding, replacing currently purchased corn stover. As a pilot project, cardboard boxes were shredded into balable strips, which allowed for easy transportation using tractors/skid loaders and grapple buckets to carry them to the animal pens for bedding. After use, the shredded cardboard boxes were composted for soil amendment to increase soil nutrients.

The pilot project, which was begun in August 2019 and completed in November 2019, provided a way to compare the shredded cardboard bedding option with the standard corn stover option. The pilot demonstrated that cardboard had better absorbent characteristics and that the animals appeared more comfortable on cardboard bedding than cornstalk bedding.

What started as only a pilot project, however, may prove very successful and have several possible benefits: The use of cardboard for animal bedding may significantly reduce cardboard recycling costs at ISU, and cardboard could prove to be a less costly bedding option for farm animals, as it is always readily available on campus and within the community. It is a consistent source of bedding with an added benefit: Baled corn stalks aren't available year-around and require large storage facilities until used. Cardboard bedding can be an on-demand option requiring little if any storage. In addition, it is environmentally safe and healthy for animals, it reduces molds and dust, and animals will not eat it. When the shredded cardboard is returned to the soil, it will also contribute to soil amendment efforts, as mentioned previously. Finally, this innovation will be a big win for our zero-waste efforts at ISU.

The plan is to scale up the project by establishing partnerships with grocery stores/outlets/restaurants, small- and large-scale farmers, and school districts within and around the ISU community to utilize cardboard for bedding and compost and ensure that these materials do not end up in the landfill.

As a result of the pilot, a collaboration has begun with an industrial engineering senior class capstone design course at ISU that will help develop a viable business model for the project as well as a sustainable operational/logistics process model to ensure its long-term sustainability (economically, socially, and environmentally). This collaboration will also present huge opportunities for the students to provide real-time solutions to everyday problems—allowing them to demonstrate the skills



Photos by Christopher Gannon.

needed in businesses and operations and helping to make them employment-ready.

The project is in line with the “Sustainable Materials Management – Vision for Iowa” program begun by the Iowa Department of Natural Resources. It mainly focuses on a regenerative, circular-economy approach aimed at sufficiently addressing the problem of an unsustainable “extractive” culture in a campus environment—a problem that has been exacerbated due to challenging recycling markets. In addition, the project is an integral component of ISU’s goal to reach its target of 85 percent waste diversion and zero waste by the year 2025.

Overall, we anticipate that this initiative will inspire a systemic shift away from an extractive mindset on college campuses and help to build systems that have long-term resiliency regardless of recycling market projections. It is a model that can potentially generate economic opportunities and self-perpetuating sustainability programs while also delivering environmental and societal benefits. The uniqueness of this project is that it illustrates an innovative approach to waste diversion, looking inward and utilizing the institution’s current infrastructure and settings, and going beyond the status quo of materials management.

The project is expected to formally begin in spring 2021, making ISU the first U.S. university to use its campus-generated cardboard for animal bedding and compost. The university is also open to industry partnerships and sponsorships. 

Ayo Oluwalana is recycling and special events coordinator at Iowa State University, Ames, IA. He can be reached at aoluwala@iastate.edu. This is his first article for *Facilities Manager*.

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