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Red Jacket Orchards X Cornell Students

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Introduction:

Red Jacket Orchards recently changed the bottles used for its signature, cold-pressed juices to a recycled PET product, which uses 79 percent less water to produce compared to virgin PET bottles. The decision was made under the recommendation of undergraduate students from Cornell Dyson School's Grand Challenges course, a capstone course for all Dyson School students. All Grand Challenges courses are built around the United Nations Sustainable Development Goals (SDGs), with this project addressing aspects of goals 6 (Clean Water and Sanitation), 9 (Industry, Innovations and Infrastructure), 12 (Responsible Consumption and Production), 13 (Climate Action) and 17 (Partnerships for the Goals).

Red Jacket Orchards is a third-generation, family-run, juice business based out of upstate New York. And in the fall of 2024, Red Jacket asked Cornell students Adrian D'Souza, Angela Lai, Elaine Park, Ellie Zhang, and Samantha Zheng to find a new source of plastic packaging for its cold-pressed juices.

Founded in 1958, Red Jacket began as a local fruit farm producer of fresh and healthy foods. Red Jacket currently focuses on producing cold-pressed, all-natural juices and has an extensive distribution network extending from the Northeast to Florida. While maintaining its own juice label, Red Jacket Orchards also has a growing private-label segment of products to cater to various grocery store chains, such as Wegmans and Publix.

Numerous growers and manufacturers have sustainability pledges as a way to reduce costs, improve brand image, and strengthen their business model from future physical climate risks. Furthermore, numerous suppliers face upward pressure from their customers and are required to report on sustainability metrics to serve customers who expect them to maintain high standards.

A growing option within sustainability efforts is to use alternative packaging materials to reduce single-use plastics. For example, various juice brands are exploring eco-friendly packaging alternatives that optimize space, bolster protection of the product, and minimize food waste. Red Jacket Orchards approached the Dyson Grand Challenges program with a complex question, how can Red Jacket Orchards transition its fresh juice from plastic packaging to a more sustainable alternative without compromising on key features, such as packaging durability and favorable customer perception?

The Project:

A core component of the project was in-depth market research to identify key sustainable packaging alternatives that are currently in the marketplace. Students also investigated suppliers for Red Jacket Orchards. They identified that Red Jacket's current supplier provided Red Jacket with 100% PET bottles that create plastic pollution and lack recyclability features. After conducting a thorough analysis of the market, the following five packaging alternatives were identified:

1. Bioplastics
2. Recycled PET
3. Paper
4. Glass
5. Aluminum

Besides conducting research on the alternatives available, the team also sought to connect Red Jacket Orchards with packaging companies that are innovators within the industry. For example, one company was located in close proximity to the production facility, and students were able to provide physical samples of a bio-based packaging product for consideration. Additional suppliers were also contacted that were mostly based within the United States or Europe.

On campus, the team also conducted a survey of preferences for sustainable packaging among the undergraduate population. The survey consisted of various questions, but the most insightful answers revolved around the visual appeal of packaging alternatives and the willingness to pay for sustainable packaging. Regarding visual appeal, recycled PET and glass received the most favorable visual appeal ratings out of the five options. Additionally, 62.8 percent of participants were willing to pay up to $1.00 more for a Red Jacket juice bottle compared to the current market price seen within grocery stores.

Another key aspect of the project was taking a tour of Red Jacket's production facility in Geneva, NY. Through the process, the team observed important, physical assets that uniquely fit to the shape and size of the firm's existing plastic bottle. For example, the machine that fed the plastic bottles into the production line was custom designed for Red Jacket, and many of the parts used to fill each bottle were specifically constructed for the PET bottles. The tour highlighted that although sustainable packaging alternatives were readily available, implementation in an established production line can often be costly and involve new capital expenditures.

Over time, the team discovered that while sustainable packaging is an intriguing segment for the food and beverage industry, it presents a large upfront cost, can leach chemicals into the product, and might reduce the freshness of the juice. Bioplastics were a product category heavily researched by the team, and these packaging materials have seen high product acceptance at the customer level. For example, Tetrapak is well-known within the food and beverage space for its eco-friendly design. However, the biodegradability of bioplastics depends on the availability of certain conditions and few established suppliers exist in this sector. Glass was a second viable option given the transparent packaging, allowing customers to view the fresh juice as they are shopping. While glass has the image as a more sustainable packaging material compared to plastic, it often emits more carbon emissions due to its production and transportation. Paper and aluminum packaging were the final potential options for Red Jacket Orchards; however, many of the paper products were quite nascent in the market and aluminum cans were not compatible with the current production line at the Red Jacket Orchards facility.

Ultimately, the team recommended that Red Jacket Orchards pursue a recycled PET product, which uses 79 percent less water to produce compared to virgin PET bottles. The main advantage of this product is that it can be easily incorporated into the existing production line, allowing for minimal disruptions to the facility. From a cost perspective, recycled PET bottles were less expensive than glass and bioplastics and were widely available across many suppliers. Furthermore, many large companies already have adopted rPET bottles, such as Danone, Coca Cola, and Pepsi. Besides the market availability of rPET bottles, this recommendation also aligned with Red Jacket's top three criteria: packaging durability, customer perception, and sustainability of packaging. Following our presentation to the Red Jacket Team, the company spoke to their core bottle supplier and who is now sourcing PET bottles with 30% recycled content for all fresh juice products.

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