

The Pathway to Building and Sourcing Upcycled Products for Food Service.



FOR THE PEOPLE FOR THE PLANET®

Learnings from a Food Service Pilot

Matriark Foods, an upcycled food company, helps lead the way to make measurable and impactful food waste reduction through collaborative design and adoption of upcycled vegetable ingredients.

This summary describes an 18-month pilot between Matriark Foods & food service companies to co-develop systems for scaling the use of upcycled products utilizing farm surplus. Products are co-developed with farmers, chefs and food buyers starting with surplus identification, R&D, re-menuing, and then upon successful creation of a delicious product, operationalized.

The Matriark Food Service Pilot maps a future for food development and production that paves a way for climate & health-forward products while bringing back regional resilience.

There is a common goal to reduce food waste by half by the year 2030.

The first-ever domestic goal to reduce food loss and waste was announced in September 2015 by the U.S. Department of Agriculture (USDA) and Environmental Protection Agency (EPA). According to the EPA, this target was set to “reduce climate and environmental impacts associated with food loss and waste while improving security and saving money for families and businesses.” [Source: [EPA.gov](https://www.epa.gov)]

With less than 7 years left to reach the food loss & waste goals outlined by the UN SDGS for 2030, the roadmap to achieve these targets is still in development at a national, state and corporate level. Ecosystem players are testing new methods. However, collectively, **key stakeholders need to accelerate the pace of change to reach the reduction targets.**

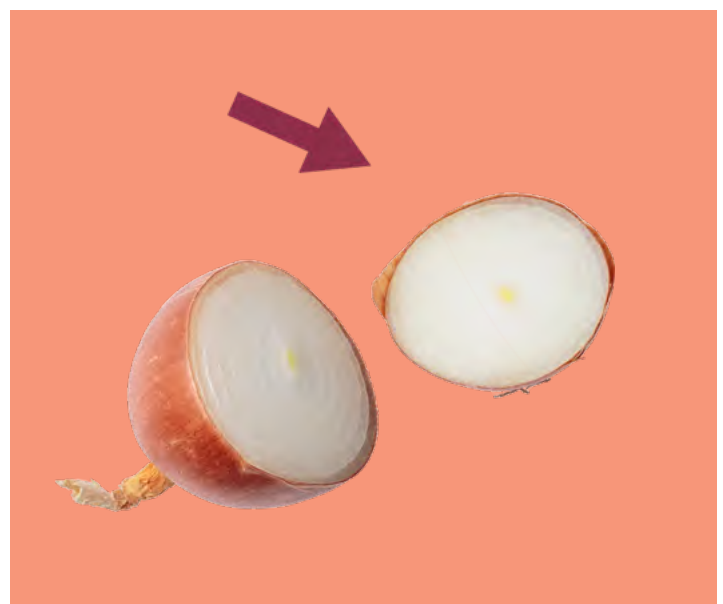
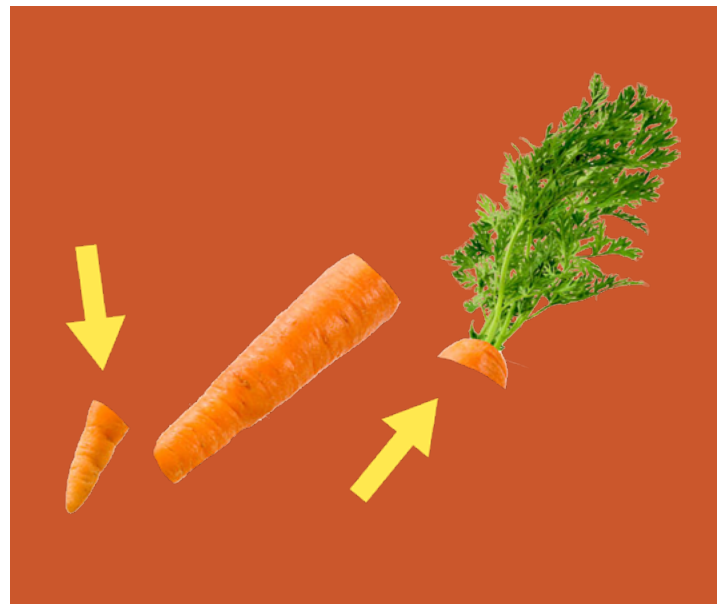
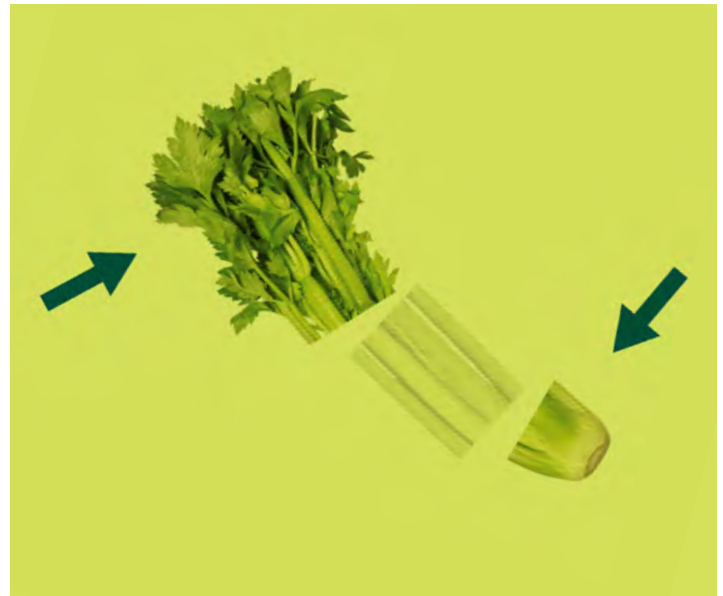


Why Upcycled Foods?

One-third of all food is lost or wasted globally which equates to 1.3 billion tons per year, worth approximately \$1 trillion. [Source: [World Food Programme](#)] All along the supply chain from the farm level to the factory, perfectly good food is tossed for a variety of reasons from size to ripeness. 20-40% of all food grown never leaves the farm gate. Farmers inherit these losses mostly through surplus due to low market prices, high harvest costs, strict cosmetic standards, and labor shortages causing a vast majority of the crops left in the fields and tilled under. In addition, 19M tons of manufacturing byproducts (whole vegetables and off cuts) are sent to landfill every year.

When food goes to the landfill, it produces methane—a greenhouse gas more toxic than carbon dioxide. The World Wildlife Federation estimates that approximately “6-8% of all human-caused greenhouse gas emissions could be reduced if we stop wasting food.” **In the United States, while households represent the largest source of food waste, farms represent the second largest source at 17% & manufacturers at 14%. [Source: ReFED]**

Fortunately, there are companies like Matriark Foods, with a mission to develop products that utilize surplus and byproducts. Anna Hammond founded Matriark Foods, a triple bottom line (profit, people, planet) business that upcycles farm surplus and fresh cut vegetable remnants into healthy shelf stable products, to address food loss and waste, create additional markets for farmers, and reconfigure food manufacturing to ensure that all food grown is put to its highest use: feeding people.



Food Service Industry Adoption is Critical to Effect Change

Food service represents a majority of where food is consumed and therefore lies at the heart of the catalyst for change in food systems. Working with foodservice chefs to address and solve these food systems problems is the needed step to transform what's possible with the challenges that face us all.

“Foodservice is where over 50% of meals are eaten in the United States. A small change in foodservice can have an enormous impact,” Anna Hammond, founder & CEO of Matriark Foods.

Shifting how food is produced & what food is purchased can be a key lever for many forms of change including positive environmental impacts through solving on-farm food loss, increasing equity & revenue for farmers, increasing access to healthy food, and creating regional resilience.

A new take on food production & procurement is critical to effect utilization of our natural resources and it starts with the food service industry.

Food Service Pilot Overview

Matriark Foods in collaboration with the Google Food Team agreed to “stop talking about the problem and instead start doing something about it.”

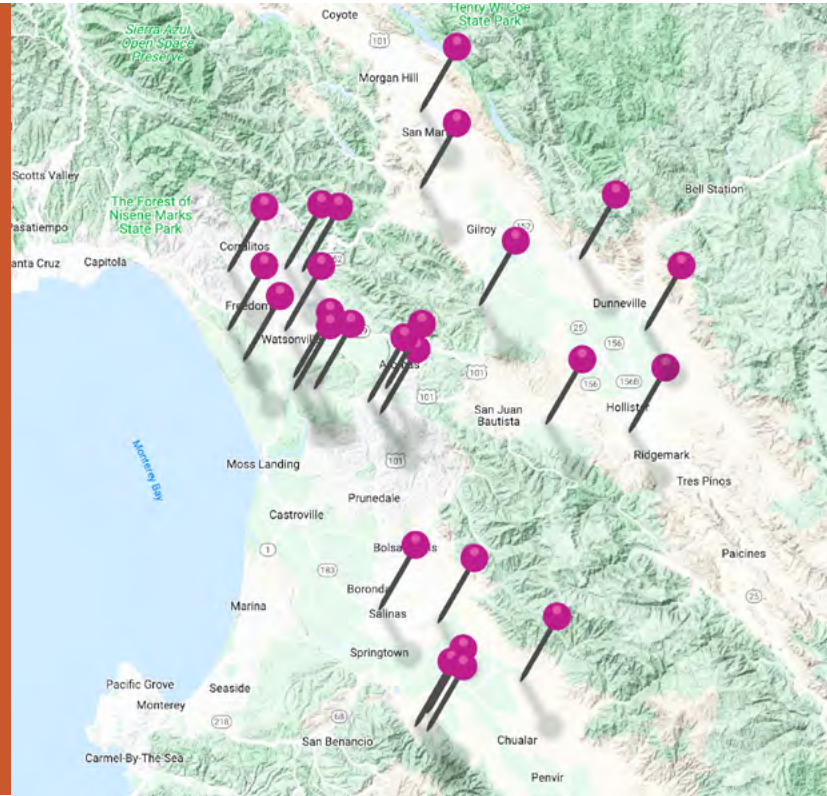
In March of 2022, Matriark Foods, in collaboration with the Google Food Team, launched a pilot to test out a co-development process for integrating upcycled products into food service menuing that could, at scale, realize positive environmental impacts through the reduction of food loss and waste, create regional resilience, and support BIPOC and Regen farmers in the Bay area through providing markets for surplus produce. The initiative tracks to [Google's public pledge](#) to reduce food loss and waste.

The following shares the learnings and successes of an 18-month pilot to develop the supply chain with co-developed products subsequently tested and menued to understand the market conditions for regionally produced upcycled products targeted towards institutions based in the Bay area.

Pilot Set Up

Key Details:

- **Who:** 40+ small and mid-sized BIPOC & Regenerative farmers in California's Salinas Valley region & 3 food service companies.
- **Key System Change Experts:** 30+ experts across chefs, agriculture & sustainability experts, food buyers, product developers, manufacturers, distributors, architects and more.
- **What:** 3 products were developed based on vegetables with significant surplus volumes including tomatoes, cauliflower and kale.



Supply Forecasting

In partnership with Heather Nieto-Friga from SupplyChange, vegetables with the highest anecdotal surplus at the farm level were identified to ensure the crops selected would have the highest impact. Crop plans were then gathered and analyzed, and interviews conducted with producers to understand their biggest challenges from labor to getting fresh products to market, informal loss analysis, and a list of crops most likely to be lost in volume due to spec and difficulty of getting products to market. The crop plans now form the baseline for future analysis and data collection on loss. Added-value processing as a solution to creating market stability was consistently cited as a solution.

Demand Forecasting

The Drexel Food Lab led a series of product ideation sessions and chef & food buyer interviews to narrow down the initial products based on crops identified as having significant surplus volumes. Food service chefs collaborated through product ideation sessions along with qualitative & quantitative surveys to gather demand, usage and potential utilization to ensure market viability.

The team chose 3 crops that farmers identified as commonly having large volumes of surplus due to market conditions and spec (tomatoes, kale, and whole cauliflower) and then developed 3 products that might have enough use cases through a variety of menuing opportunities to result in a significant volume of waste reduction.

Products Developed:

The group developed products from the surplus vegetables including tomatoes, kale & whole cauliflower that could be used in many dishes including soups and sauces.

UPCYCLED PASSATA+

Upcycled Tomato Puree, in aseptic Scholle bags, with a hint of roasted garlic and salt made from a trove of tomatoes bound for landfill.

This product is now in the process of rolling out across select food service buyers.

UPCYCLED KALE PUREE

Kale was pureed in a frozen form to work with a crop often high in surplus quantities with limited secondary markets.

This product was divested due to kale's unique toughness to process into a consistent puree form.

UPCYCLED WHOLE CAULIFLOWER SAUCE

Made from whole heads of surplus cauliflower.

This product is currently in the R&D phase with several food service operators and is showing good promise.

Products were manufactured in relatively small volumes (3,000 lbs) for initial testing.

Most added-value shelf-stable vegetable products are produced by large manufacturers using very narrow specifications on ingredients combined with additives to extend shelf life. All of the pilot products commercialized are all-natural, USA-made, Non-GMO verified, no sugar added, and Upcycled certified. The Passata+ additionally has had a full LCA done by Planet FWD and to date, carbon credits are being paid through Tradewater.

CLIMATE NEUTRAL IS DELICIOUS

UPCYCLED PASSATA+

Each year roughly 33 million tons of nearly perfect vegetables never make it to your plate. That's a colossal waste of food and water and creates massive amounts of greenhouse gases. Matriark works to solve this problem by upcycling the high-quality, nutritious, US-grown tomatoes that are in this delicious passata made from upcycled tomatoes.

Each 2.5lb bag -

16.6	2,000	43.5
gallon of water saved	gallon of gas saved	gallon of paint saved

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

MTRIARK

Matriark Foods upcycles farm surplus and fresh-cut remnants into delicious, healthy products that are better for people and our planet. We partner with farmers and businesses to build better food systems.

The first commercial Upcycled Passata (Upcycled Tomatoes) comes with a hint of roasted garlic and salt. Made with upcycled plum tomatoes - a fresh, versatile heirloom variety, versatile soups, and all tomato-based soups, sauces and stews. Or use it on any pizza.

- 100% plant-based
- Provides a safe resource stream for US farmers
- Highly nutritious and antioxidant-rich
- Certified Non-GMO Verified
- Carbon Neutral and Upcycled Certified

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

Nutrition Facts

Servings per container 10 (200g)

Calories 20

Total Fat 1g 2%

Total Carbohydrate 4g 8%

Total Protein 1g 2%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

Total Fat 1g 2%

Total Carbohydrate 4g 8%

Total Protein 1g 2%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

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SAVE TIME. FIGHT FOOD WASTE

UPCYCLED KALE PUREE

Each year roughly 33 million tons of nearly perfect vegetables never make it to your plate. That's a colossal waste of food and water and creates massive amounts of greenhouse gases. Matriark works to solve this problem by working with local farmers to upcycle the high-quality, nutritious kale that is in this bag.

Each 2.5lb case -

20	2,386	62
gallon of water saved	gallon of gas saved	gallon of paint saved

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

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The first commercial Upcycled Kale Puree for foodservice. Made with upcycled kale sourced from Progressive Farmers.

Matriark Foods Upcycled Kale Puree is a smooth puree made from lightly blanched kale. It can be used as a base for soups, stews, pasta, pizza, and more. It is also a great addition to smoothies, soups, and dips. Simply add it to your favorite recipe, bring to a boil, and you're done. Use the listed amount of puree, cook for about 5 minutes at 100°F/212°F and build your recipe from there.

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

Nutrition Facts

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Calories 20

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Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

SAVE TIME, FIGHT FOOD WASTE.

UPCYCLED WHOLE CAULIFLOWER SAUCE

Each 2.5lb bag -

1.6	164	2.4
gallon of water saved	gallon of gas saved	gallon of paint saved

Nutrition Facts

Servings per container 10 (200g)

Calories 60

Total Fat 1g 2%

Total Carbohydrate 12g 24%

Total Protein 2g 4%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

Total Fat 1g 2%

Total Carbohydrate 12g 24%

Total Protein 2g 4%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

MTRIARK

Matriark Foods upcycles farm surplus and fresh-cut remnants into delicious, healthy products that are better for people and our planet. We partner with farmers and businesses to build better food systems.

The first commercial Upcycled Vegan Cauliflower Sauce for foodservice.

- Perfect for vegan, vegetarian, flexitarian, and all other diets
- Excellent for soups, dips, and other vegetable-based dishes
- Great as a pizza topping
- Add it to your favorite recipe, bring to a boil, and you're done
- Using fresh, locally-sourced, high-quality ingredients and plant-based seasonings
- Every pound of product (about 0.75 lbs of vegetable from landfill)

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

Nutrition Facts

Servings per container 10 (200g)

Calories 60

Total Fat 1g 2%

Total Carbohydrate 12g 24%

Total Protein 2g 4%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

Total Fat 1g 2%

Total Carbohydrate 12g 24%

Total Protein 2g 4%

Sodium 10g 20%

Total Fiber 1g 2%

Total Sugar 1g 2%

UP CYCLED CERTIFIED

WOMEN OWNED

PLANET FRIENDLY

Made in U.S.A.

Tasting & Menuing

Under the direction of Chef Michael Kann, Global Culinary Strategy & Development Lead at Google, each product followed a multi-step process which included Ideation, Initial Formulation, Reformulation Feedback, and finally Implementation. Below are the key learnings from the developed Standard Operating Procedure (SOP) which created conditions for success. See the Appendix for additional details per SOP step applied in the pilot.

Ideation

- It was important to have the chefs involved. By giving them a seat at the table, they embraced the process and discovery and felt ownership.
- The ideation stage included developing different iterations of products to determine the one that would have the most usage through purchasing volume and menu versatility resulting in the highest impact.

Reformulation Feedback

- Empowering the chefs to give feedback was a critical component to the change track. It also included making tough decisions to skip over high surplus crops such as kale that lacked viable processing refinements and deliciousness.

Implementation

- Finding solutions that gave volume impact was seen as a core driver. For example, the Passata+ product, produced from upcycled tomatoes, became the standard pizza sauce for all Americas operations which shifted to a higher volume impact while reducing labor and increasing consistency.
- Tracking usage at a high level (quarterly once the pilot was over) shows visibility and senior level support.

Becoming standard item / ingredient

- Making the Passata+ the standard for pizza sauce created volume impact. In addition, it makes the items consistently available in the cafe storerooms. Since it is already being ordered and is on hand, the goal is to motivate culinary staff to expand usage and creativity.

Procurement Principles Tested

- Upfront purchasing quantities were committed to at the onset of the pilot to ensure what was produced would be utilized.
 - » *Monthly tracking of usage was mapped to maintain committed volumes were being utilized evenly to avoid an end of pilot sprint. This ensured that product was being utilized consistently to avoid having to suddenly use 50-60% of the committed to volume in the last few weeks. This also ensured attention to consistently integrating upcycled products in menuing, raising consciousness overall.*
- Chefs & food buyers identified where pain points existed within their operations which included labor costs, sourcing responsibly with better alternative substitutes for commonly used ingredients and ease of new product integration.

Key Pilot Insights

The key innovation discovered through this pilot included involving the end user throughout the food production process. **Co-development combined with culinary leadership motivated to shift food production towards healthier & environmentally foremost products are the driving forces behind the pilot's success.**



It is important to offer products that resolve a need.

For example, the Passata+ helps speed up aspects in the kitchen by requiring less cooking time while adding a consistent and high performing product. The cauliflower puree appears to solve flavor and texture needs in many vegan recipes.

Making it easy, delicious, and approachable are the key drivers for change in a kitchen. Once those three hierarchies of need are met, then the storytelling can help motivate chefs towards even greater impact. BUT—if it is not delicious, no one is coming on the journey with you.”

Michael Kann, Global Culinary Strategy & Development Lead at Google

Product Development

Co-development from the R&D stage is critical.

The mission of upcycled products aligns with most company's strategic direction therefore the key to adoption is deliciousness, which is paramount.

Identifying products whereby supply matches demand will drive the greatest impact.

The balance of what crops are most in need of rescue due to their farm level surplus abundance (“supply”) combined with what chefs & consumers are seeking (“demand”) needs to be matched at the onset.

Food Procurement

Culinary leadership will help drive the sell through.

“We aren't just doing lip service. We love the product & love the vision. It has really helped us level up our game in what we call ‘speed scratch.’”

–Bill Billenstein, Senior Director of Culinary, Bon Appetit @ Google

Impact Reporting is a key differentiator to attach buying behavior with outcomes.

“We shared an impact report with the chef team. This report shows specifically the amount of CO2 emissions we diverted, and how many pounds of waste we saved from landfill. It's very eye opening.”

–Eric Tosh, Executive Development Chef Bon Appetit @ Google

Key to scaling impact includes swapping items that serve every day uses.

These items are typically used daily at scale. Budget & keeping costs close to neutral is important when working to substitute new sustainably manufactured products.

Complexity of distribution cannot be underestimated.

Once a product is developed and approved minimum quantities are required for distribution centers to stock. In addition, there are formal processes for getting products on capital managed order guide (MOG). Through this pilot we were able to break through some of these barriers but there is still a long way to go in terms of operationalizing distribution for large volumes of products to get through the antiquated system which privileges big food companies.

Summary of Impact Achieved

The pilot goal involved utilizing 30K lbs of products across 3 buyers. To date, the pilot has sold 61K+ lbs and growing. The first product, the Passata+, has been a success. In a blind taste of one of the pilot partner's pizza sauces between Matriark and their previously purchased sauces, a sauce made with the Passata+ was deemed best in class. It is now being rolled out as the base for the standard pizza sauce in all Google cafes across the U.S. In addition to the pizza sauce, one food service provider developed 8 soup recipes that can be served on their own or combined to make new soups and 7 different broth concepts for utilization with noodle dishes.

Beyond proving deliciousness & universal uses, the pilot has sold 1,523 x 40lb cases of upcycled Passata+ diverting 50,568 lbs of tomatoes from landfills, 6.2M gallons of water saved and a reduction of 132,501 lbs of greenhouse gas emissions.

Ensuring Changes are Measurable & Delivering Impact

Impact reporting has been an important step as chefs socialize these changes through their food service organizations. Matriark Foods works with the Upcycled Food Association and Planet FWD. All products are Upcycled Certified and have full LCAs (Life Cycle Analyses). Carbon credits are paid through Tradewater.

In addition, the key to scaling impact involves swapping items that serve every day uses for more sustainable products & ingredients. Bill Billenstein recommends, **“Get it in as quickly as you can in the places you will use it the most.”**

IMPACT REPORT



Your purchase made an impact:

30,000 LBS Upcycled Passata+	25,200 pounds of tomatoes diverted from landfill	3,005,100 gallons of water saved	65,359 pounds of greenhouse gases saved
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Source: ReFED
Manufacturing byproduct
utilization metrics

1 lb food diverted = 119.25 gallons of water saved = 2.5936 lbs GHG reduced

Thank you for being part of the solution.



What's Next

Matriark Foods is just at the beginning of operationalizing this model of building multi-sector relationships across food production & procurement, driving early successes hand in hand with culinary leadership that food service can build on to drive change at scale and to create the framework for determining the necessary infrastructure to bring regional, environmental and economic resilience through the delicious food necessary for a viable future.

In addition, the following key measures are underway.

- 1. More products:** Additional upcycled tomato & cauliflower products are under R&D with plans to keep adding new products based on demand matched supply. Additional crop plans are being captured and analyzed with a majority of the farmers involved in the pilot to aid in scaling measurement and production.
- 2. Ensuring Changes are Measurable & Driving Impact:** All of Matriark Foods' products are certified upcycled by the Upcycled Food Association and carbon neutral certified by Planet FWD. In addition, Matriark Foods is using the ReFED impact calculator, to measure environmental benefits such as waste diverted, GHG emissions reduction and water saved. To bolster measurement, Matriark Foods has plans to develop additional levels of impact across environmental, social and human through the "true cost of food" methodologies with guidance from the leaders in this space, TMG Think Tank for Sustainability.
- 3. Processing Infrastructure:** In parallel with the food production business, Matriark Foods, in collaboration with its contributors, is in development of a systems solution to address on-farm produce surplus by designing & building a nimble regional processing facility to produce upcycled products at scale. The building of this processing infrastructure will take place in the West & East Coast close to the farming centers they represent. For example, California produces nearly half of U.S. grown fruits, nuts and vegetables [Source: CalPoly]. The aspiration is that the model we build in one market in the U.S. can be replicated into other markets and then scaled into other countries.

The aforementioned pilot is at the tip of the iceberg of the catalyst needed to pave a way for bringing back a level of regional resilience to benefit people and the planet. The food waste milestone of 50% reduction by 2030 is around the corner, the time to act is now.

Get Involved

Follow Matriark Foods:

matriarkfoods.com

[Instagram.com/matriarkfoods](https://www.instagram.com/matriarkfoods)

To obtain information on how to purchase Matriark Foods upcycled products for food service, wholesale, food banks and emergency food providers, visit matriarkfoods.com/foodservice.



Appendix

Below are additional details per Standard Operating Procedure step applied during the pilot by the Google Food team. The pilot included three upcycled products from tomato, kale and cauliflower.

Ideation:

- The first tomato product was more of a paste. It was immediately clear that the volume and change impact was going to be minimal.
- Shifting to the Passata+ gave a value component to sauce by reducing cooking time. Chefs immediately saw value in this as well as the bulk pack size.
- When ideating the Kale, very few solution streams were found. Smoothies would be viable, but would not create any scale for use.
- The cauliflower puree has been a positive ideation. The consistency and moderate flavor has made this approachable. Numerous concept ideas are being worked on: base for vegan aioli; additive to make creamy polenta; gratin various items.

Reformulation:

- The kale was an example where the chefs felt they had no solutions. Rather than force it, we moved quickly to the cauliflower puree.

Implementation:

- Once something is easier, such as the Passata+ which rolled out across the Americas, chefs quickly embraced it.
 - » However, there were some stumbles in regions that had not gone through ideation or reformulation.
 - * *We addressed this by conducting blind tastings. Using in-house cooked batches over several days as well as other purchased products that were similar, Passata+ was the clear winner in a blind taste test.*
 - * *Interesting finding was that the in-house sauces over several days of production were very inconsistent due to production personnel being different as well as the natural differences in ingredients.*
 - * *We used this finding as an example: commercial processing standards require complete consistency in shape, color, and brix in order to produce exactly the same product over and over and over again—this also is the reason for massive amounts of waste. Upcycled products accept variabilities due to seasonality, shape, and size which contributes to slight variabilities on flavor—just like nature, cooking with vegetables in season. By having that conversation with the chefs, they immediately saw the value of the variance in the Passata+ product.*