



FoodTuristic

Work Package 2: Technical Reports and Site Visits



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Executive Summary

This report summarises 34 sites visited and technologies trialled by the project partners for the Erasmus Key Action 2 funded Vocational Education and Training project FoodTuristic, which runs November 2023 – November 2025. Project partners include Lyceé Hotelier de Dinard (France), the Institute of Tourism Studies (Malta), Višja strokovna šola za gostinstvo in turizem Maribor (Slovenia) and Munster Technological University (Ireland). The project is led by Technological University of the Shannon (Ireland).

This project addresses the lack of green technology curriculum in European culinary and hospitality schools, which primarily focus on gastronomy and hospitality management skills. The project aims to develop digital resources for educators and students in hotel and culinary schools across four partner countries to reduce food waste, develop circular economy skills, and localise food production.

To ensure we had the latest information on available technologies before installation and testing we visited as many local and regional sites to our university which utilised technologies, both high tech and low tech, in food production, food waste reduction and repurposing of food waste. On these visits, where possible, we were accompanied by our students who gained both technical and transversal skills from the visits.

Each visit is documented below, including lessons learned, important technical information, any barriers and opportunities for implementation of the technologies in the hotel schools and photographs to evidence the visits and provide information and visuals about the sites.

We commence the technical report with a Strengths, Weakness, Opportunities and Threats analysis (SWOT) before moving to profiling each of the individual projects and sites.

For further information please visit www.foodturistic.com or view the video explainer for the project at <https://www.youtube.com/watch?v=12G9PjwiiCQ> or read a sample of blogs we published about the visits at <https://www.foodturistic.com/news>.

Executive Summary



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Introduction

The Technical Report on Results phase involves creating a report based on feedback from experts who tested the purchased equipment during the pilot testing and evaluation phase. The report includes an introduction, methodology, results, discussion, conclusion, and recommendations. This report provides critical information to project partners on the efficiency and effectiveness of the equipment, identifies areas that need improvement, and ensures that the project is making the most cost-effective investments in equipment to reduce food waste and localise food production.

Nine recommendations are made at the conclusion of the report, with each one explained in detail.



Methodology

In the process of creating a comprehensive set of case studies, the project partners implemented a structured methodology to engage various network partners. The targeted network partners included small and medium-sized enterprises (SMEs), chambers of craft and commerce, agricultural businesses, food producers, associations, hotels, B&Bs, tourist farms, soup kitchens... The methodology was designed to ensure a diverse representation of perspectives and practices, fostering a rich and informative collection of case studies, because we literally tried to cover all aspects of the food chain, from small, to large, boutique, mass, key opinion makers/leaders...

Step 1: Identifying and categorizing potential network partners

The first step involved identifying potential network partners from various sectors relevant to the project's objectives. Each partner went through their lists and networks. Names and entities were double-checked during one of the project meetings in order to ensure a wide selection. ***Suggestion for further activities, resulting from the obtained case studies: Regional Mapping.*** Mapping out geographical regions to project the diverse range of locations, represented in the case studies.

Step 2: Initial Outreach and Engagement

The next step was to establish initial contact with the identified network partners. This involved personalized invitations: sending personalized emails to potential partners, explaining the project's objectives, the importance of their participation, and the benefits of being featured in the case studies. Follow-Up calls: making follow-up phone calls to provide additional information, answer questions, and gauge interest.

Suggestion for further activities, resulting from the obtained case studies: organizing webinars and in-person meetings to present the project, discuss the methodology, and outline the participation process.

Step 3: Building Collaborative Relationships

Once initial contact was established, the focus shifted to building strong, collaborative relationships with the network partners. This might – in the next step – also include regular communication through emails, phone calls, and meetings to keep partners informed about project progress and



next steps, and at project end: resource sharing - providing partners with resources such as templates, guidelines, and examples of successful case studies to support their participation.

Step 4: Data Collection and Case Study Development

With network partners engaged, the next phase involved collecting data (templates were used for that) and developing the case studies: conducting in-depth interviews with partners to gather detailed information about their experiences, challenges, and successes. This was also supported with site visits to observe activities first-hand, gather contextual data, and capture visual content such as photographs and videos.

Documentation Review – by the group: Reviewing relevant documents, reports, and publications provided by the partners to supplement the primary data collected – activity conducted during an online meeting of all partners with the basics discussed at the TM2 in France.

Step 5: Drafting and Reviewing Case Studies

The information collected was then used to draft the case studies. A template was used within the partnership to enable a valid comparison of data. Once initial drafts of the case studies were created, highlighting key findings, insights, and best practices, the group reviewed the approach during a partner meeting for review and feedback, ensuring accuracy and completeness. Necessary revisions were then made based on partner feedback and additional data, refining the case studies for final publication.

By following this structured methodology, the project partners were able to effectively engage a diverse range of network partners and create a comprehensive set of case studies. This approach not only ensured the collection of rich and varied data but also fostered strong relationships with partners, enhancing the overall impact and reach of the project.

Site Visits and Technologies

1. Bonny Bo

What is it?	Report on an innovative local milk selling approach – a visit to the Bonny Bo self-service milk vendor
Participants	Tony Johnston, Alex Yu, TUS
Date	8 th of February 2024
Environmental benefits	Reduced food miles



Visit Summary

What is it?

A local farm nestled in the countryside of Clonbonny, Athlone, Ireland is selling its milk directly to customers through milk vending machines. This unique and innovative approach to selling milk emphasises reduced food packaging, enhanced taste, preserved nutritional value, and streamlined logistics. Under the label of Bonny Bó, the farm has successfully implemented self-service reusable glass bottles and milk vending machines, transforming the way milk is distributed and consumed in the local community.

Some benefits:

- Reduced food packaging –

Traditional milk packaging often involves plastic bottles or cartons, impacting the environment negatively. This innovative milk-selling approach Bonny Bó adopted reduces food packaging by providing consumers with reusable glass bottles. This eco-friendly practice not only reduces plastic and paper consumption but also promotes sustainability and environmental consciousness within the community.

- Enhanced taste and preserved nutritional value –

Unlike mass-produced milk that undergoes extensive processing, Bonny Bó milk is pasteurised but not homogenised, preserving its natural flavour and nutrition. On the other hand, Bonny Bó milk is charged at a premium price – 2 Euros per litre, which is considered to be pricy compared to mass-produced milk that supermarkets and shops sell. However, if this milk-selling approach is promoted and widely adopted by more farms, it would encourage fair competition which will eventually bring down the cost and the price.

- Reduced Logistics Costs and Contamination Risks –

By selling milk directly to consumers through self-service vending machines, Bonny Bó Farm has minimized the logistical challenges and costs. Bonny Bó also utilizes technologies to reduce the risk of contamination, for example, the vending machine goes through a steam clean after each use to

ensure hygiene. This farm-to-consumer model not only ensures the freshness and quality of the milk but also reduces the carbon footprint by cutting unnecessary logistical transportation.

In conclusion, the Bonny Bó milk vending machine is a perfect case study for the FoodTourist project, it emphasises food packaging reduction, promotes local food production and consumption within the local community, and achieves carbon footprint reduction.



Figure 1 Entering the vender



Figure 2 Buying reusable bottle



Figure 3 Getting the milk



Figure 4 Taking out the bottle with milk

2. Food Cloud

What is it? Report on a digital platform that matches food donators with people who need food

Participants Alex Yu, TUS

Date 4th of March 2024

Environmental benefits Reduced food waste



Visit Summary

FoodCloud is a digital platform that connects businesses, such as supermarkets, restaurants, and hotels, that have surplus food with local charities and community groups. According to its website, it “tackles climate change and food insecurity” and “leverages the power of technology” to streamline the process of food distribution by matching the supply side with the demand side to reduce complexity.

How does FoodCloud Work?

The “Foodiverse” platform

According to the website, the Foodiverse platform works in the below 3 steps:

- The food donor uploads to Foodiverse an estimate of its good quality, unsold food.
- A local community group volunteer receives a notification about the available food as well as when and where to pick it up. They accept the offer so that the donor knows to prepare the food for donation.
- The volunteer arrives to pick up the food at which point the donor confirms that the food has been collected which triggers a real-time update of reports. The local community group can then use the food to serve its community instead of the food going to waste.

Businesses that are using the Foodiverse platform include Tesco, Lidl, Aldi, KFC, BOOKER, Nando’s, and so on.

The FoodCloud’s Hubs solution

FoodCloud also offers FoodCloud’s Hubs solution to food businesses that have large volumes of surplus food, such as farms, manufacturers, and distributors. These businesses can deliver the surplus food directly to FoodCloud’s Hubs in Cork, Galway and Dublin. In other circumstances, FoodClouds can also collect from food businesses daily or weekly with their national fleet of refrigerated vans.

Businesses that are using FoodCloud’s Hubs solution include BWG Foods, Kellogg’s, Keeling’s, Sysco, and so on.

What are the benefits that FoodCloud brings to the businesses and community?

- **Food Waste Reduction:** the surplus food which would otherwise be binned now goes to the hands of the people who need it.
- **Social Impact:** food poverty and alleviation of hunger were addressed, and vulnerable individuals and families in the community were supported.
- **Cost Savings for Businesses:** Participating businesses benefit from reduced waste disposal costs and optimization of inventory management.
- **Community Engagement:** community involvement was enhanced by partnerships between businesses, charities, community groups and individuals.

The Tesco Case Study

Tesco in Ireland is an example of a business leveraging FoodCloud to reduce food waste, optimize order intake and save costs. According to the insight shared by a volunteer who collects surplus food for a local charity from Tesco and distributes the food to individuals in Athlone, Tesco utilizes FoodClouds and benefits from the technology offered by FoodClouds. By using FoodCloud's platform, Tesco can track and manage surplus food inventory. The data provided by FoodCloud enables Tesco to identify trends and patterns in food surplus, including less popular items or those nearing their expiration dates. With this information, Tesco can adjust its ordering practices to reduce overstocking of less popular items, thereby minimizing food waste and optimizing inventory management. Moreover, Tesco's partnership with FoodCloud is a practice of exercising its corporate social responsibility, demonstrating its commitment to reducing food waste and addressing food poverty in local communities.

3. Too Good to Go

What is it? Report on the Too Good to Go mobile app – a visit to The Wandering Elk Athlone who uses the app



Participants Alex Yu, TUS

Date 1st of February 2024

Environmental benefits Reduced food waste

Visit Summary

What is Too Good To Go?

Too Good To Go is a website and a mobile app that helps coffee shops, bakeries, restaurants and supermarkets reduce food waste by offering surplus food in the form of surprise bags with a discount price, it allows the customers to purchase food items that would otherwise be discarded with 1/3 of the original price. According to Too Good To Go, more than 1/3 of the food is wasted every year, this is more than 2.5 billion tonnes of food which costs \$1.2 trillion, and this food waste is responsible for 10% of greenhouse gas emissions. Too Good To Go is a technology that connects customers with shops and restaurants, matches demand with supply, and encourages the shops, restaurants and customers to “rescue” food and help the planet by preventing food waste.

The visit to the Wandering Elk

It was 2:30 in the afternoon, a perfect time to pay a visit to a small local coffee shop located in a corner of the town centre and ask them a couple of questions about their experiences of using the Too Good To Go app – not too busy and not too late for a cup of coffee and a doughnut.



Figure 5 Coffee and doughnut from the Wandering Elk

I received a warm welcome from the gentleman who works in the shop the minute I walked in, I ordered a flat white and a doughnut, and they tasted good. The Wandering Elk opens at 8 am except on Sundays (opens at 9 am on Sundays) and closes at 4 pm. They are very busy for breakfast and lunch. Their specialities are a good selection of coffee, doughnuts, cupcakes, cookies, cakes, and slices. On average, they offer 2 surprise bags per day but on some days, there is nothing left to be included in the bags. What usually goes into the surprise bag? Doughnuts if they can't sell them within the same day of making them; cupcakes and cookies usually last for 2 or 3 days and then go into the bag. Therefore, customers do not need to worry about the quality of the food in the surprise bags. Do those surprise bags go quickly? Yes, for 4.99 euros, the customers can get a bag of food worth a minimum of 15 euros, and they would get a refund if they bought the bags on the app but can't pick them up. The Wandering Elk has high comments on using the Too Good To Go app, it is free to use for small businesses, it helps them to reduce food waste, and it generates some extra revenue for these small businesses which does make a difference.

How does Too Good To Go help business?

According to the Too Good To Go website, the Too Good To Go app benefits the business in 3 ways – 1. reducing food waste, 2. earning back money on stock that would have been thrown away, 3. attracting new customers – 76% of customers who discover a store through Too Good To Go will return as full-paying customers. For businesses, it is free to sign up for Too Good To Go, however, when businesses start to sell food on the app, an annual fee will be charged, and a commission will be charged on each Surprise Bag sold. According to their Impact Report 2022, Too Good To Go expanded fast since it was founded in 2016. 20 million new users were registered, and they worked over 80,000 new stores in 2022. A total of 79 million meals were saved in 2022, avoiding nearly 200,000 tonnes of CO2 emissions.

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Figure 6 Table of contents of the Too Good To Go impact report 2022

4. Positive Carbon

What is it? Report on the Too Good to Go mobile app – a visit to The Wandering Elk Athlone who uses the app



Participants	Alex Yu, TUS
Date	1st of February 2024
Environmental benefits	Reduced food waste

Visit Summary

On the 29th of November 2023, partners from the FoodTuristic project paid a visit to the Hodson Bay Hotel in Athlone, Ireland. The hotel uses artificial intelligence food waste bins to track and reduce food waste. The Commercial Director and the Head Chef of the hotel showed the partners the bin and explained to us how the bin works to reduce food waste. The hotel found the technology to be useful in terms of monitoring, tracking, and reducing food waste, and costly to run at the same time.

An overhead camera positioned above the bin and a scale beneath it transmit data to a mobile application. Utilising machine learning, the app provides information to the chef/ other hotel staff with access about the specific food items discarded. This empowers kitchen managers to optimise their ordering and meal preparation, preventing the generation of surplus quantities of frequently wasted food.

For example, if the bin camera scanned patterns of repeated waste of a product, such as meat, the chef could then adjust portion sizes, reduce orders, or make other process changes to reduce the amount of this specific item going into the bin.

Positive Carbon, the brand of this particular bin, has developed a system based around brown food waste bins which helps commercial kitchens cut that by up to 60%. Information about the product can be found here: <https://www.positivecarbon.org/>. Some of the key metrics the company advertises include, average savings of €250k per year in food waste, average staff time saved of 71 hours per year and reduced CO2 emissions of 510 tonnes.

The company advertises that its product features:

- Food Waste Monitoring
- View Trends
- Real-Time Alerts
- Automated Onboarding
- Mobile Apps
- SMS & Email Reporting

- Learning & Development
- Detailed Forecasting

Positive Carbon which is an Irish company, designed and developed this system that helps hotels and restaurants not only reduce food waste but also achieve sustainable goals through reducing the negative environmental impact. The system comprises a brown food waste bin, a camera above the bin, a weighing scale below the bin, and an app that gathers information and generates reports on what and how much goes into the bin. This valuable information generated by the system will allow the hotel and restaurants to adjust the ordering and preparation to optimize food production.

This new technology and system attracted investment and funding domestically and from the EU. The company plans to use the funds raised for research and development and will expand its operations across the UK and the EU. Positive Carbon currently has the system operating in 50 locations around Ireland, including the Hudson Bay Hotel Athlone, the Radisson Blu hotel in Sligo and so on.

Positive Carbon's ambition for its technology is beyond a tool for reducing food waste, it aims at using the technology and system to "foster a sustainable ecosystem that benefits businesses, the environment, and society at large".



Figure 7 Positive Carbon bin in the Hudson Bay Hotel kitchen



Figure 8 FoodTuristic partners visiting the Hudson Bay Hotel kitchen



Figure 9 Positive Carbon bin in the Hudson Bay Hotel kitchen



Figure 10 Briefing delivered by Hodson Bay Hotel Commercial Director and Head Chief

5. Hyatt Regency

What is it? Report on Orbisk connected scale – a visit to the Hyatt Regency Paris Etoile Hotel

Participants Eric Le Duigou, Executive Chef of the Mayo Restaurant, FoodTuristic Partner in LHD

Date 23rd January 2024

Environmental benefits Reduced food waste. Behavioural change.

LYCÉE HÔTELIER
DINARD
YVON BOURGES

Visit Summary



Figure 11 Hyatt Regency Paris Etoile Hotel

One of the largest hotels in Paris (34 floors; 995 rooms), located between the La Défense business district and the Champ-Élysées. It is a 4-star hotel. 400 employees work here all year round to welcome business and leisure guests.

The hotel has several food and beverage outlets:

- Restaurant Mayo: offering buffet-style breakfasts and lunches, and à la carte service for dinners;
- Mayo Market: takeaway service;
- The Club Regency, reserved for guests who have booked a Club room or Suite. It offers snacks and drinks. Located on the 34th floor, it offers a panoramic view of Paris.

Two bars are available:

- Windo Skybar: located on the 34th floor: cocktail and tapas bar
- Mayo café: located on the ground floor in the lobby: bar and tapas.



Figure 12 Hyatt Regency Paris Etoile Hotel bar

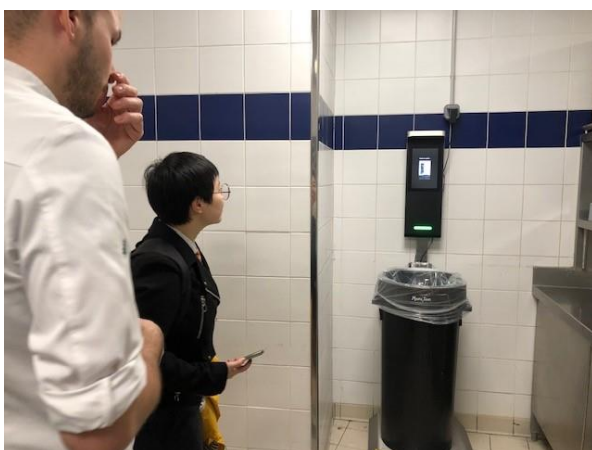


Figure 13 Hyatt Regency Paris Etoile Hotel Kitchen

Since June 2023, the Mayo restaurant has been using an Orbisk connected scale.

The aim is to reduce food waste from the restaurant's buffets.



Figure 14 Screenshot of the food waste going into the bin

The process is as follows: at the end of each service,

- the dishwashers scan the dishes served at the buffet
- the application identifies the type of food products thrown away and counts the weight by type of product.

The dashboard shows the monitor data:

- the total weight of food waste thrown away (eliminating inedible waste such as fish skin, paper, etc.);
- the total weight of waste thrown away per guest;
- the average cost of food wasted;
- times and photos of what is thrown away.

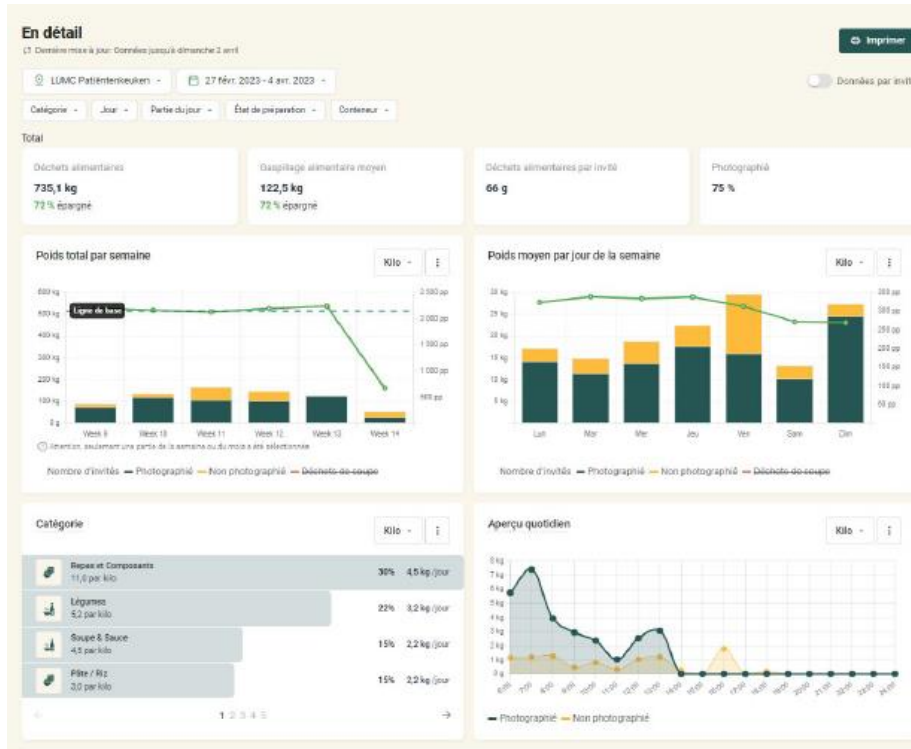


Figure 15 Dashboard on the website

Positive impact for Hyatt Rengency Paris Etoile

Identify which of the dishes served from the buffet to the end of the service can be recycled or reused instead of being thrown away:

- raw (uncooked) foods such as cherry tomatoes or butter, which can be reused (returned to the kitchen)
- raw but cut-up food, such as slices of grapefruit or lemon, which can be reintroduced into production.

Some waste is unavoidable: hot products are thrown away (like scrambled eggs: production = 60kg / waste = 5kg)

The monitor is fairly effective: 90% of products are recognised, with a good distinction between edible and non-edible waste.

To help the teams with this sorting, the chef has set up a system of coloured stickers on the different products identified by this connected scale. (Blue for food to be reused; yellow for food to be reprocessed; red for food to be thrown away).

Recording times helps to manage buffet refills. (A photo of a complete dish of mushrooms thrown away at the end of the breakfast service even though it had been refilled 15 minutes earlier).

Recording the photos makes it possible to visualise the "mistakes" and share them with the teams to raise collective awareness and encourage changes in behaviour.

The financial impact (return on investment) will be measured after one year

But : This connected scale is only used for buffet service. For à la carte evening service, plate returns cannot be valued. So it's not necessary to quantify them.

Analysing the data takes time, as does training the dishwashers. Regular awareness-raising during briefings

This connected scale will reduce waste but not eliminate it completely, given:

- the diversity of the clientele and the variability of attendance (between 15 covers and 200 on a lunch service),
- the hotel's positioning: the range of meals on offer cannot be reduced, as the catering must remain consistent with that of a 4-star hotel. The buffet must be available until closing time.

<https://orbisk.com/>

<https://www.hyatt.com/hyatt-regency/fr-FR/parhr-hyatt-regency-paris-etoile>



Figure 16 Orbisk Intro picture

6. La Petite Boucle

What is it? Report on a food waste collection and recycling solution – a visit to the La Petite Boucle's warehouse in St Malo



Participants FoodTuristic Partner in LHD, 15 students from the OGEHR Professional Licence "Animation d'un projet durable", Alexandre Euzenat – founder of La Petite Boucle association

Date 17th January 2024

Environmental benefits Reusing food waste.

Visit Summary

We visited La Petite Boucle's warehouse in St Malo (3 rue du Bois Aurant), with 15 students from the OGEHR Professional Licence "Animation d'un projet durable". We met Alexandre Euzenat, who set up the association two years ago.



Figure 17 Visiting La Petite Boucle's warehouse

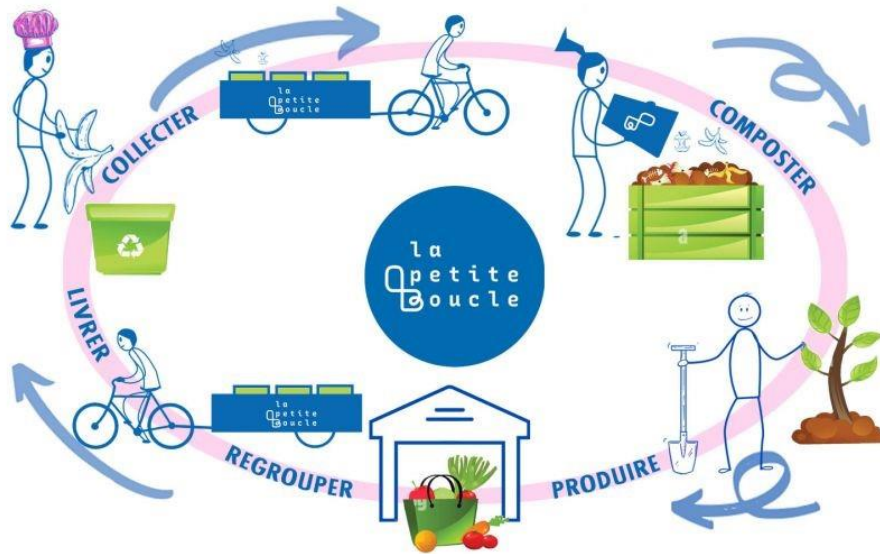


Figure 18 La Petite Boucle cycle

What is it about?

The association is proposing a solution for hotel-restaurants in St Malo to collect and recycle their food waste. (St Malo is a fortified town with difficult access and limited space).



Figure 19 St Malo

What is the process?

The hotel-restaurants in the tourist town of St Malo deposit their bio-waste in a bucket provided by the small loop. (At present, around fifty restaurants and hotels are members of this association).



Figure 20 Associated Restaurant



Figure 21 Deposit bio-waste in a bucket



Figure 22 Bio-waste collection buckets

It is collected by someone from La Petite Boucle using a cargo bike (3 people work for the association (2 FTEs)).

Mardi	Jeudi	Vendredi
Compagnie le	Panof	Kanel
Ateliers	Boulonnat	Derna
Comp Bio	La Gorniche	Bouffette
	Carlingue	Carin
Nirouelle Yoga	Karad	
Tandemart	Melina Sofie	Bistrot du Rodeo
Café Mignon	Bercant	Terrasses
Etravailson	Fax	Clémenceau
Carrousel city	Atelier	Bar de l'Église
Lomb	Paul	Bergamote
Ilis style Bar	Paul	Armandine
Théâtre	Créative Plateau	Blanchette
Plus budget	Compagnie	Bar de Jean
Compagnie	Comp Bio	Suzanne
Inter	Quarant	Compagnie
	Olivier	Maison Suzanne
	39	50
		40

3 PZKcy4trw
1123,92
06 41 81 20 72
#1234567
#1234567
#1234567

La Petite Boucle

Bonne nuit!
1000 offres
Suzanne
Bon weekend!

Salut

Figure 23 Whiteboard with data



Figure 24 Waste collection cargo

The waste is added to the compost (windrow composting technology):



Figure 25 Adding waste to the compost

= Composting is a technique that consists of stacking organic matter or biodegradable waste in long rows. This method is suitable for producing large volumes of compost. (The small loop produces 300 tonnes a year).

It collects 200 tonnes of organic waste a week. And it supplements the compost with dry matter (wood shavings) obtained from a local joinery.

This compost is sold to a market gardener who has just set up a business a few kilometres from Saint Malo and from whom some restaurant owners can obtain their vegetables.

Some of the restaurant owners grow their own aromatic herbs and can recover the compost free of charge.



Figure 26 Compost packed and ready to be shipped to local restaurants

Cyclo supply chain: Last-mile management to optimise the supply chain.

In addition to collection, La Petite Boucle handles deliveries to restaurants in the inner city. This is the most expensive and polluting last-mile service, given the difficulties of accessing the centre of this walled city.

A three-wheeled cargo bike with a 1,500-litre capacity emits 85% less CO² than an internal combustion vehicle of the same capacity.

What is the link with the Food Turistic project?

Restaurants pay for the collection of this bio-waste by La Petite Boucle. On average, the cost to the restaurant owner is 2 to 5 euro cents per meal.

They are therefore encouraged to reduce the volume of bio-waste to cut the cost of collection.

The small loop produces compost that can be used to grow vegetables locally and supply restaurants. Knowing what happens to the waste produced, and indirectly contributing to local vegetable production, helps to make restaurant owners more aware of their responsibilities and to change their behaviour and reduce food waste.

<https://lapetiteboucle.bzh/>

autres sources :

<https://www.ecologie.gouv.fr/plan-national-developpement-cyclologistique>

7. Micro-pousses Ferme crapaudel

What is it? Report on Micro-sprout technology – a visit to the Crapaudel farm in Vern sur Seiche

Participants FoodTuristic Partner and 12 students of LHD, Mathilde Vanderdopre of Crapaudel farm

Date 24th January 2024

Environmental benefits Localised growing.



Visit Summary

We had a visit to the Crapaudel farm in Vern sur Seiche, with 12 students. We met Mathilde Vanderdopre who, with JS Fréreux, has taken over part of the family farm to specialise in **micro sprouts (and microgreens)**, edible flowers and aromatic herbs.

What is it about?

Already well known in the world of gastronomy, micro-sprouts are the first double leaves that make up the seed, also known as cotyledons. These are vegetable or herb shoots harvested very early (depending on the variety and the season, from 7 to 30 days after sowing the seeds).

The farm cultivates these 3 types of production in a short circuit and favours organic production.



Figure 27 Flower grown in Crapaudel farm



Figure 28 Herbs in Crapaudel farm



Figure 29 Herbs in Crapaudel farm

Their customers are mainly restaurants in the Rennes region and wholesale companies. The demand is growing. They are gradually developing their production as part of an ecological transition: several tests are sometimes necessary before they are successful (process and profitability).

What is the process?

For micro-sprouts, winter production takes place under polytunnel for a total of 21 days (from germination to final sprouting). It only takes 7 days at other times of the year.

Edible flowers are grown outdoors from March to November (often sold from mid-summer to late autumn).

Aromatic herbs are grown in open fields.

Mathilde took us through the different stages in the production of microgreens: from germination to washing, drying and packaging.

Everything is done in a way that respects the environment and optimises quality.



Figure 30 Seeds bought from an organic seed company



Figure 31 Seeds sown on trays



Figure 32 Plates then placed in the heated germination room (15-20°C) (made of wood with insulation)



Figure 33 Germinating plates (lasting a few days depending on the plant and the weather)



Figure 34 Plants placed in the polytunnel until they reach maturity



Figure 35 The micro sprouts are harvested by cutting the stems ((kebab knife is the best for the job)



Figure 36 They are placed in trays and weighed



Figure 37 And stored in cold storage until sale (maximum 2 days), to stop germination

The waste is composted but not reused for microgrower production, as too many bacteria would prevent profitable production. A trial was carried out but was inconclusive (20% yield). The plants are therefore grown on organic 'sterile' soil, using organic seeds purchased from a seed company.

What is the link with the FoodTuristic project?

Micro-sprout technology is easy to set up in a catering school. The germination room can be replaced by a simple insulated wooden box placed in a room at room temperature (to be tested). As the production cycle is short, it allows students and teachers to test, adjust and validate the entire process before using the microfoams in the cooking workshops. Pupils will be encouraged to take care of the plants they use in their recipes. In the kitchen, they will also be able to explain and promote their approach to customers.

This production of micro-sprouts can also be carried out using aquaponics technology. (To be continued...)

To test this out, we recommend starting with radish microgrowth, as this is the simplest production method.

<https://lafermecrapaudel.bzh>



Figure 38 Students in the farm

8. Reusable Coffee Mugs

What is it? Report on Reusable coffee mug and mini dishwasher – a visit to the TUS canteen



Participants FoodTuristic Team (1st visit); TUS Canteen manager, Tony Johnston, Alex Yu (2nd visit)

Date 28th of November 2023 (1st visit); 23rd of January 2024 (2nd visit)

Environmental benefits Removing food packaging.

Visit Summary

Reusable coffee mugs and mini dishwasher washes the mugs don't reduce food waste, but they help to reduce food packaging.

TUS canteen sells TUS branded logo reusable coffee mugs at the canteen checkouts, when a reusable mug is purchased, it goes with 2 coffee/tea vouchers which can be used in the canteen. 20c off applies at every purchase of the coffee or tea using the reusable mugs. This encourages the staff and students to reduce the use of disposable cups, which helps in protecting the environment.

There are 2 mini dishwashers placed in the canteen beside the water dispenser. The mini dishwashers are very easy to use – placing the mug upside down on the rack, and pressing the button once, the rotation tray will rotate 180 degrees, and then the washing starts. The washing takes around 30 seconds, the tray rotates again when the washing completes, and a washed, clean, and warm mug can be then taken out from the rack. The mini dishwasher uses eco-friendly detergents which also help in protecting the environment.

The canteen manager advised that there is an app linked to the washing machine that tracks the number of washes, detergents and water usage, this information gives the canteen management visibility of how much and how often the machine is used and helps the canteen management with cost analysis.

The brand of the mini dishwasher is FreshCUP, and information about this brand and its products can be found at the website <https://www.freshcup.ie/>. FreshCUP advertises its mini dishwasher to be revolutionary – it is compacted and small so it can fit small surfaces, ideal for office, on-the-go quick service retail space or cafe/coffee shops; it can wash reusable cups, cutlery, and saucers; it is easy and quick to use and does the cleaning and sanitising in 30 seconds. FreshCUP also advertises its patented BIOCLEANSER detergent as being effective and eco-friendly –

- Destroys bacteria and germs while cleaning and shining

- Environmentally friendly
- 100% Biodegradable
- Recyclable cartridges
- Economical – washes 500 mugs or 1000 espresso cups per detergent and rinse cartridge
- Approved by Health Authorities around the globe
- Stringent quality control

The combination of the logoed reusable mugs, the mini dishwasher with the eco-friendly detergent and the promotion in the canteen formed a good technology-based strategy to reduce food packaging, hence protecting the environment.



Figure 39 Reusable mug placed on the mini dishwasher before the wash



Figure 40 During the wash

9. Aquaponics farm

What is it? Report on greenhouse aquaponics farm in the Cotentin region

Participants Stéphanie and Laurent QUEFFÉLEC who build the greenhouse, 4 teachers and 20 students of Lycée Hôtelier de Dinard.

Date 21st of February 2024

Environmental benefits Localised food growing.



Visit Summary

We met Stéphanie and Laurent QUEFFÉLEC, who have been building this greenhouse aquaponics farm for 5 years. It took them 2 years to think about their approach, then 2 years to launch the project.

Their customer base covers a catchment area of around 15km (80% of customers live within 5km), as well as restaurants in the Cotentin region.

There are around fifty aquaponic farms in France, and it's not a widespread practice because it requires a lot of work, but from a sustainable development point of view, it's a very interesting one.

What is aquaponics?

Aquaponics is a method of growing fish and plants in the same system. The waste produced by the fish is used as a source of nutrients by the plants, maintaining a healthy environment for the fish. Aquaponics therefore refers to any system that combines conventional aquaculture (rearing aquatic animals such as snails, fish, crayfish or prawns in tanks) with hydroponics (growing plants in water) in a symbiotic environment.



Figure 41 How does Aquaponics work

Aquaponics truly mimics what happens naturally in ponds, lakes and streams. This method uses the natural nitrogen cycle to maximise the efficiency of plant and fish culture, while minimising waste.

The technique involves cohabiting 3 cultures (fish, bacteria and plants) with clay balls that reach their maximum development under different light and temperature conditions.

Bacteria are crucial for converting ammonia into nitrite and then nitrite into nitrate, involving two groups of bacteria: Nitrosomonas and Nitrobacter. The bacteria multiply in contact with ammonia.

It is important to note that the system works less efficiently below 10°C and with an inadequate pH. A pump pumps the water up into the tank, and the water returns by overflow, so the water has not changed since the start of the installation, except for the addition of water that has been evaporated.

For 20 tonnes of water, there are 300 kg of fish. Finally, the aim is to reduce the impact on the environment by producing both vegetables and fish.

What types of fish?

Different types of fish can be used, although goldfish are commonly used, but in Cherbourg they have sturgeon and trout.

It is advisable to choose large fish that eat well so that they produce more nitrite. (sturgeon, carp, goldfish)

Why isn't a rainwater harvesting system suitable for this type of installation?

Rainwater has a more acidic pH than mains water, and its temperature changes with the seasons (colder in winter and hotter in summer).

On a philosophical level, Laurent explains that rainwater doesn't belong to him and that he doesn't want to use it to the detriment of other farmers.



Figure 42 *Haricot Nain Yin Yang* évolution



Figure 43 *Growing*



Figure 44 Inside the greenhouse 1



Figure 45 Inside the greenhouse 2



Figure 46 Inside the greenhouse 3



Figure 47 Inside the greenhouse 4



Figure 48 Inside the greenhouse 5



Figure 49 Inside the greenhouse 6



Figure 50 Inside the greenhouse 7



Figure 51 Inside the greenhouse 8

10. Harp Renewables

What is it? Report on the Harp home composter and the bio-digesters – using the Harp branded home composter; visiting the Harp Renewable manufacturing site



Participants Tony Johnston, Alex Yu, TUS

Date 20th March 2024; 16th April 2024

Environmental benefits Composting.

Summary

Harp Renewables Ltd. was established in 2014 to provide a renewable and sustainable solution for the treatment of organic waste. Harp Renewables claims to be a global leader in thermophilic aerobic digestion and waste treatment solutions.

Harp Renewables manufactures and sells a range of Harp Bio-Digesters that convert food and other organic waste into a dry, safe, nutrient-rich, bio-fertiliser within a 24-hour period. According to the company website, the composter reduces the weight and volume of organic waste by up to 75-85%.

The desired benefit of using Harp bio-digesters and the home composter

- Environmental Benefits

Reduction of organic waste: using of bio-digester or the home composter allows businesses and households to compost organic waste to reduce the amount of organic waste going into landfills which decreases the environmental footprint.

Nutrient-rich compost: The compost turned by the bio-digester or the home composter from the organic wastes is rich in nutrients, the compost could be used as organic fertilisers to enhance soil health and promote plant growth. This nutrient-rich compost can be used in gardens, lawns, and potted plants, reducing the need for chemical fertilisers.

- Economic Benefits

Savings on waste disposal costs: By composting organic waste at premises or at home, businesses and households can save money on waste disposal costs, such as garbage collection fees.

Reduction in purchased fertilizers: the compost produced by the bio-digester, or the home composter can replace fertilisers, saving businesses or households money on purchasing fertilisers from the stores.

- Health Benefits

Reduced chemical exposure: By using compost produced from the bio-digester and home composter, staff and households can reduce their exposure to harmful chemicals in fertilizers.

Improved air quality and reduced contamination risks: Composting organic waste reduces the time the waste is unattended at premises or home, reduces the production of odour and risks of contamination of bacteria grown from the waste.

Using the home composter

TUS bought a Harp home composter, and the unit was delivered to TUS by Gerry McDonnell – sales manager of Harp Renewables on the 20th of March. The machine comes with a bag of enzyme which will act as a catalyst in speeding up the composting process of the food waste with the right temperature. The machine was plugged in, the enzyme was poured into the machine, and 500ml water was added into the machine as well to mix with the enzyme. The cover was then closed, and we waited for 24 hours before adding food waste into the machine. Compared to the much longer traditional composting process, the Harp renewable home composter can efficiently transform the majority of the food waste into nutrient-rich compost within 24 hours. Then the compost can be scooped out and used in the garden or plants.



Figure 52 Gerry McDonnell delivered the Harp home composter to TUS



Figure 53 Open the bag of enzyme



Figure 54 Pour the enzyme into the machine



Figure 55 Pour 500ml of water in the machine



Figure 56 close the lid and turn on the machine

Visiting the Harp Renewable manufacturing site in Co. Meath

On the 16th of April, Tony and Alex visited the Harp Renewable manufacturing site in Co. Meath, we had a meeting with Gerry and Joe in the office.

Harp Renewable produces the bio-digesters (for business use) in Ireland, and the components of the home composter (for home use) which was launched last year are produced in Korea.

Harp Bio-digesters is a range of aerobic food waste digesters which are capable of digesting 1,000 up to 50,000 litres/5.5 tons of food waste a week, reducing it's volume by an average of 70%. In a short 24-hour period, the bio-digesters produce a nutrient rich output that can be used as a soil enhancer, biomass fuel or anaerobic digestion feedstock. The Harp bio-digester process retains the nutrients in the compost that would otherwise be lost to the breakdown and decay of food waste in bins or at landfills, as methane and Carbon Dioxide are released into the air. Instead, the valuable end product which is the compost is used to replenish soils, replacing the carbon, ammonia and phosphorus in the soil.

There are six different Harp bio-digester models available in the range. Businesses can choose from these 6 models based on their demand and the amount of food waste produced.



Figure 57 Having a meeting with Gerry and Joe working in Harp Renewable



Figure 58 Visiting the manufacturing site



Figure 59 Looking at the CX 1 model

11. Shelfy

What is it? Report on using Shelfy – a device that filters the fridge air and removes bacteria.



Participants Tony Johnston, Alex Yu, TUS

Date 23rd April 2024

Environmental benefits Enhanced shelf life.

Visit Summary

Shelfy is a product under the VITESY brand. Featuring a washable filter that doesn't need to be changed, Shelfy is a device that slows down the ripening process of fruits and vegetables by removing bacteria, microorganisms, and odours from the refrigerator. It is a product that increases the life of food in the refrigerator by up to 12 days longer utilizing its purification technology that reduces both bad odors in the fridge and pollutants that promote the process of food decomposition.

The technology used by Shelfy is called photocatalysis: a natural chemical process that takes place in its filter, where light from a few visible band LEDs activates special safe, lab-tested nanomaterials that purify the air of pollutants that affect the rate at which the fruits and vegetables ripen. The pollutants include viruses, bacteria, and VOCs (Volatile Organic Compounds).

According to its website, the key features and functions of Shelfy includes –

Double the shelf life –

Make the vegetables and fruits in the refrigerator last longer. Shelfy helps preserve the freshness and flavour of the produce.

-80% of odours –

Shelfy reduces odours and keeps the fridge smelling clean. It also minimizes the mixing of odours, so the food in the fridge won't taste like last night's leftovers.

-98% of bacteria –

Shelfy reduces bacteria and decreases possible contamination, so the food stored in the fridge stays fresher.

Using the Shelfy device at home

Before putting the Shelfy device in the fridge, I connected the device to my smartphone via Bluetooth and Wi-Fi. There is an app called Vitesy Hub that I can download from app stores, this app allows me to monitor the Shelfy device's performance and my fridge's temperatures.

The Shelfy device has 3 modes that I can select from the app, "Crisper" mode can be selected when the device is in the crisper; "Eco" mode allows low fan power but maximum battery life; and "Performance" mode allows maximum fan power but uses up the battery quicker. The app also tells me the temperature of my fridge, records the temperature, and shows me how the temperature of the fridge fluctuates over time through a chart. The app also tells me how many times I open the door and how long the door kept open over a period of time. The app also reminds me how many days are left before I should wash the filter and how many days are left before I should clean the fridge. I can also find tips in the app on how to store different types of food in the fridge.

After putting the Shelfy device in the fridge and functioning for 24 hours, I smelled fewer odours compared to before the device was put in the fridge.

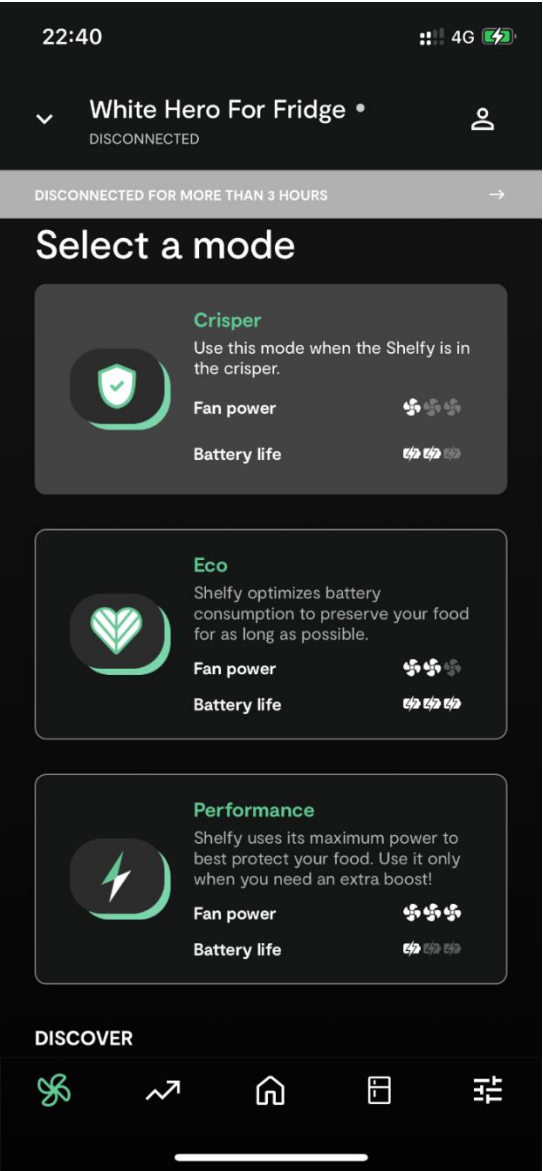


Figure 60 Three modes that you can choose from the app

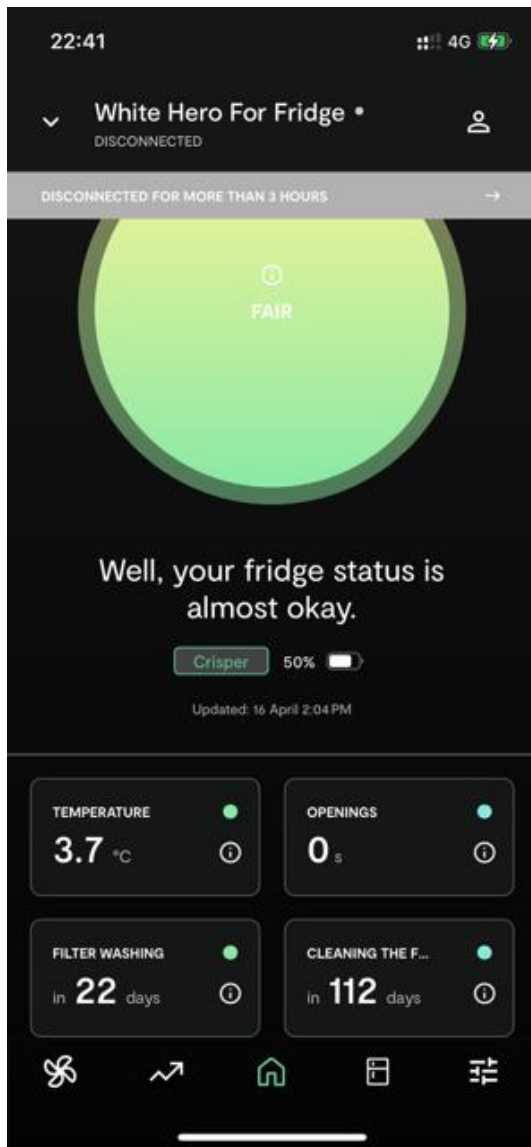


Figure 61 screenshot of the mobile app tells you the temperature and openings of the fridge

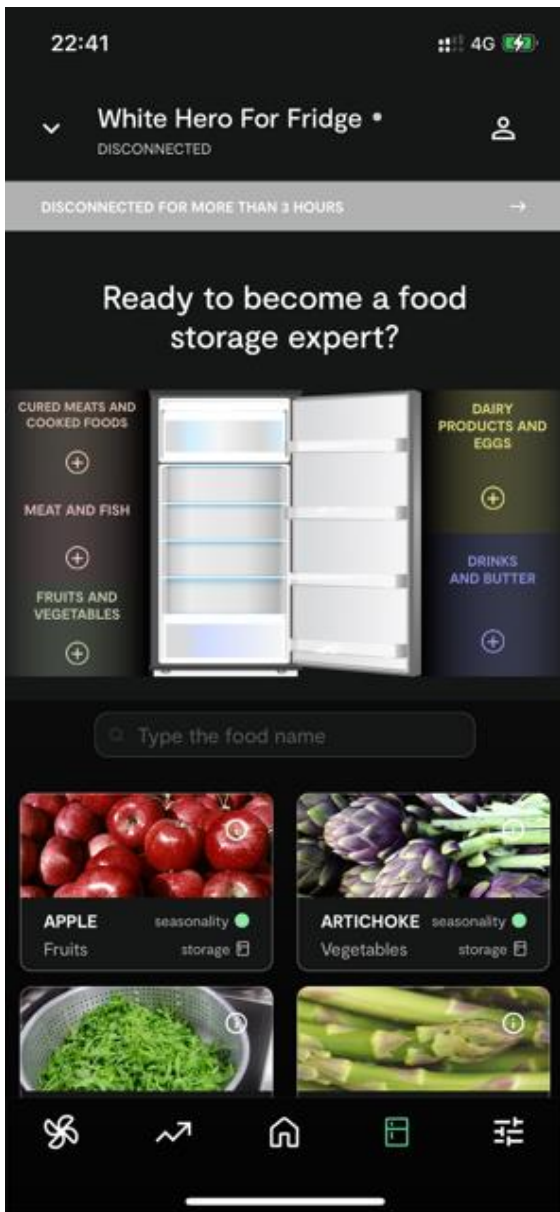


Figure 62 screenshot of app with tips on how to store food

12. VR Headset

What is it? Report on leveraging VR technology for food waste reduction



Participants Tony Johnston, Alex Yu, TUS

Date 25th April 2024

Environmental benefits Educational tool to show policy implications and case studies.

Visit Summary

The issue of food waste is a significant global challenge, according to the Food and Agriculture Organization (FAO), approximately 1/3 of all food produced for human consumption worldwide is lost or wasted each year. Efforts to mitigate food waste are gaining momentum globally. Leveraging technologies such as Virtual Reality (VR) is an innovative way to raise awareness, educate people, and foster behavioral change in tackling this issue.

Virtual Reality (VR) refers to a computer-generated simulation of an environment that allows users to interact with and experience a three-dimensional, immersive world. VR technology typically involves the use of a VR headset or goggles, along with specialized software and peripherals.

Although there is still very limited content available for VR headsets, the applications of VR in food waste reduction could bring the following benefits -

Training and Education –

VR can provide engaging and interactive training modules for various stakeholders involved in the food supply chain, including producers, retailers, and consumers. These modules can cover topics such as proper food storage, portion control, meal planning, and creative ways to repurpose food scraps.

Behaviour Change –

Immersive VR experiences can evoke empathy by placing users in simulated scenarios highlighting the consequences of food waste, such as environmental degradation, hunger, and economic losses. By eliciting emotional responses, VR has the potential to motivate individuals to adopt more sustainable consumption habits.

Virtual Tours –

VR technology enables virtual tours of food production facilities, farms, and distribution centers, offering insights into the journey of food from farm to fork. These virtual experiences can enhance transparency in the food system and promote appreciation for the resources involved in food production, thereby reducing waste.

Consumer Engagement –

Retailers and food service providers can utilize VR to create immersive experiences that educate consumers about sustainable food practices, product labelling, and the importance of minimizing food waste at home. Interactive VR applications can empower consumers to make informed purchasing decisions and adopt mindful consumption habits.

Despite its potential, the wide use of VR for food waste reduction faces several challenges, including cost barriers, technological limitations, and the need for content development expertise.

13. Case Study on Cork Urban Soil Project (CUSP)

What is it?	Converting food waste into soil for urban growing
Participants	Colum Gibson, MTU
Date	2 April 2024



Environmental benefits Reusing food waste.

[Visit Summary](#)

What is Cork Urban Soil Project (CUSP)?

CUSP is a community based initiative based in Cork city aimed at testing the use of waste food scraps to create soil to grow food in an urban location. The first test was undertaken in association with local vegan food business My Goodness who used an aerobic Joraform-branded biodigester to create compost. CUSP wanted to use this trial to stimulate conversation around:

- What if all of our food waste in Cork City was converted to high quality compost (or bioenergy) with as few fossil fuel inputs as possible?
- What if the compost produced was then used to grow more nutritious food?
- And could the compost also support tree planting, the reduction of flooding impacts and erosion, improve water quality, and remediate polluted soils within the community?

How does CUSP Work?

The CUSP Circular Economy Innovation Grant Project

With support from a Circular Economy Innovation Grant from the Department of the Environment, Climate and Communications, in 2022, CUSP modelled a community-scale circular food system - ‘Grow, eat, compost, repeat’. The project encompassed the following:

- 18 tonnes of food scraps and paper/cardboard waste were composted.
- An urban garden was founded where the compost was utilised to grow vegetables, flowers and herbs. 15 modular movable raised beds have been created using upcycled items such as pallets and old election posters.
- One type of small-scale composting technology (using an aerobic biodigester) in an urban setting was tested.
- Public awareness raising was undertaken to build knowledge of the circular economy (and closed loop systems evident in nature) by showing and demonstrating the process of the experiment.
- Careful records of the process and product were maintained to document the project and generate a community of interest around community-scale composting and circular food systems in Ireland.
- Other ways that circularity is built in on-site includes: the use of harvested rainwater to water the plants and filter it to make fermented drinks (e.g. kefir and kombucha) and the use of leftover vegetables to make food products (e.g. pickles, preserves and ferments).
- Neighbouring businesses have taken part in the experiment: The Franciscan Well Brewery contributes used beer mats to fuel the biodigester and leftover botanicals from Rebel City Distillery are added to the mix.
- Groups of corporate volunteers and interested people in the community have assembled on-site to contribute to the build and maintenance of the project.

Project impact

- 10,200 kg of food waste diverted
- 8,000 kg of cardboard diverted
- 6,000 litres of compost produced
- 1,000 people reached

Project outcomes and findings

- The biodigester can process 700 kg (of food, coffee grinds, cardboard) weekly, for four weeks to produce 350 kg of compost.

- Challenges to widespread adoption of automated microscale biodigestors includes purchase costs (the machine used in this experiment was donated by MTU Cork), operational costs (including human resources), and space limitations.
- Further research and development is needed to develop similar systems at a lower cost.
- Pilots of larger scale aerobic digestors would be worthwhile.
- Trials of low tech community composting systems were recommended as, through outreach, such interest was noted locally.
- There is a need for legislation appropriate to support community-scale composting, where existing legislation has been identified as expensive, technical, and time-consuming to complete for non-profit community based organisations.
- There is a need for pilot projects of this nature to link with local horticultural producers.
- It is recommended that further models of composting in Irish urban settings be undertaken with links to water quality, trees and bioremediation of contaminated sites.

Conclusion

The CUSP Circular Economy Innovation Grant project provided a unique opportunity to test one type of community-scale composting technology, to explore means of creating circular food systems using underutilised land in urban areas, to build public awareness of the concept of the Circular Economy, and to meet other stakeholders who are interested in creating circular food systems and circular urban economies. The overall finding of the project is that there are ample opportunities in Irish cities, towns, and villages to capture the valuable resource provided by food scraps at the community level and to stop 'wasting our waste'.

14. Case Study on FoodSpace

What is it? Tracking Waste Bills

Participants Colum Gibson, MTU

Date 3 April 2024



Environmental benefits Using data to reduce food waste

Visit Summary

What is FoodSpace?

FoodSpace is an on-site food service & hospitality management company, part of the Apleona group of companies.

What did FoodSpace Do?

Previous system in operation

FoodSpace took over the running of 4 different cafés on the National University of Ireland Galway (NUIG) campus in 2016. The waste management system used at these locations had been in place for 10 years, and, in many ways, was no longer fit for purpose.

After reviewing their waste management services, they quickly realised the old system had too many mixed waste bins and not enough segregated options. They also identified the need to gather weight-based waste data so they could track how much waste they were generating.

Technology based solution

A new waste service contract was put in place which included weekly/monthly waste data presented in a graphical manner that allowed trends to be easily tracked. From this waste data it was apparent that, at times, staff weren't fully engaging with the new system. This meant training and formalising of the system was needed and this quickly resulted in improvements. This change took up to a year to fully implement.

Key changes include:

- To treat waste and food waste as an opportunity
- Improve access to accurate information
- Open dialogue with staff and management

Results

1. Improvements took place over a year and involved putting their waste data to work for them.
2. Working with and training staff improved environmental awareness which benefits all involved.
3. Linking what is being wasted to what happens inside facilitates constant improvement.
4. Reduced waste.
5. Savings for the company.

15. Case Study on ISS

What is it? AI Tracking to minimise food waste

Participants Colum Gibson, MTU

Date 3 April 2024



Environmental benefits Using data to reduce food waste

What is it? AI Tracking to minimise food waste

Participants Colum Gibson, MTU

Date 3 April 2024



Environmental benefits Using data to reduce food waste

Visit Summary

What is ISS?

ISS is an international food service and catering provider with 14 sites in Ireland.

What did ISS do?

In an effort to address food waste, ISS started using [Winnow](#) to help tackle the problem of food waste across their business.

Winnow Technology

Winnow provides artificial intelligence (AI) tools to help chefs run more sustainable and profitable kitchens. The system automatically identifies food as it is wasted (disposed of in the food bin) and

sends the data to the cloud to be aggregated before returning to chefs in the form of useful insights.

The Process

Building on success in other global sites, ISS installed Winnow Vision in two of their Irish sites during 2021. After this successful trial in early 2021 to establish baseline levels of waste, the systems became fully operational in June 2021.

The Outcome

The initial feedback was very positive - chefs get information on the types and volumes of food waste generated and, by enabling teams to track and analyse this information, they have started to cut costs and run more sustainably.

More importantly has been the engagement of all kitchen staff members and implementing the insights from the reports. These reports allow discussion around key waste streams and identify opportunities to reduce them.

Future Targets

While the sites have only recently established their baseline level of waste, they are working towards an internal improvement target of reducing waste by at least 30%.

16. Case Study on Keenan’s Restaurant

What is it? Internal measurement of food waste brings instant improvements

Participants Colum Gibson, MTU

Date 3 April 2024

Environmental benefits Using data to reduce food waste



Report

Keenan’s Restaurant

For more than 150 years Keenan’s of Tarmonbarry, County Roscommon, has been in the ownership of the Keenan family. They run a pub, restaurant and hotel.

What did Keenan’s do about food waste?

Intervention

With assistance from Roscommon County Council, for one week initially, the management at Keenan’s agreed to examine, in detail, their food waste and record the number of people served (covers) over that time. This process led staff to become more involved in changing some of their work practices.

They used a basic scales and recording sheet and assigned food wastes to where they came from within the food services provided.

Food waste monitoring results

The results showed the main areas of food waste were:

- 50% plate waste
- 35% preparation waste
- 15% kitchen waste

Follow up changes implemented

Based on these results, and after internal discussion between staff, the initial change made was reducing the amount of bread served to customers prior to meals. Instead of full baskets of bread for each table, staff offered a choice of breads from a main tray.

“This led to a reduction in plate waste as customers didn’t fill up on bread and so ate more of their main meals.”

Other changes made by staff included:

- Switching to salad dressings on the side
- Providing a choice of mash or chips with steaks
- Reducing the size of side salads
- Using smaller serving bowls for pastas & chowder
- Allowing patrons a few minutes to digest before offering more food

Additional benefits:

These staff-led improvements significantly decreased the food waste generated per cover over a 2-3 month period, without any huge changes or investments. The food waste per cover benchmark for the restaurant decreased from 450 grams of food waste per cover to 150 grams of food waste per cover in this short period.

17. Case Study on Common-Sensitarian' Diet by Jezeršek

What is it? Sustainable gastronomy provider model

Participants Mojca Polak, VGST

Date 1st December, 2023

Environmental benefits Diet, education and wellbeing.



Location: Sora 1a, 1215 Medvode

Website: <https://common-sensitarian.com/>

Email: info@jezersek.si

Visit Summary

Jezeršek Catering is a family owned company with 30 years of tradition and experience in the field of HORECA. Headquartered in Sora near Medvode. Jezeršek catering annually cater more than 2,500 events.

The company owns Dvor Jezeršek, a boutique hotel with an inn, restaurant and congress halls, located on an idyllic location in the embrace of the Kamnik-Savinja Alps, operating from 2015 also the Bled Castle Restaurant.

In 2017, The House of Culinary Arts Jezeršek, which has been hospitably welcoming its guests since 1996, has become a multifunctional facility and now serves as a core for all other activities.

Currently, Jezeršek family is working actively as an important game changer in hospitality. They are transforming their business model into sustainable gastronomy provider model.

Martin Jezeršek, the organiser and the Managing Director of Jezeršek Catering, is the author of The 'Common-Sensitarian' Diet Manifesto. The manifesto was drafted by a wide range of experts, not only in the field of gastronomy, but also in the social sciences, agronomy, psychology and business. The New Common Sense Food Culture addresses not only the individual needs of the consumer, but our society as a whole. It is not extreme and is based on common sense, while incorporating many aspects, including environmental ones. Martin Jezeršek encouraged participants to join the movement and sign the manifesto to actively contribute to change. In the spirit of Common sensitarian diet, there are several rules to follow:

THE "COMMON-SENSITARIAN" DIET is not a diet that restricts me in what I can and cannot eat. It is both a personal moral commitment and an appeal for social, economic and political change. It

respects planetary boundaries and is necessary for restoring sustainable food systems with a lower negative impact on the climate and the environment.

THE “COMMON-SENSITARIAN” DIET is a mindset that helps me to develop a positive attitude towards food and makes me aware of the moral implications of my food choices. It is a guide for informed food choices for individuals, food providers, chefs, businesses, NGOs and policy makers that will benefit the climate, the natural environment and human health.

THE “COMMON-SENSITARIAN” DIET is respectful, responsible and inclusive. It is satisfying because it is good for my body, my soul and our planet, and it is respectful to all stakeholders in the food and beverage supply chains. It is based on a diverse foundation of natural, social and human sciences.

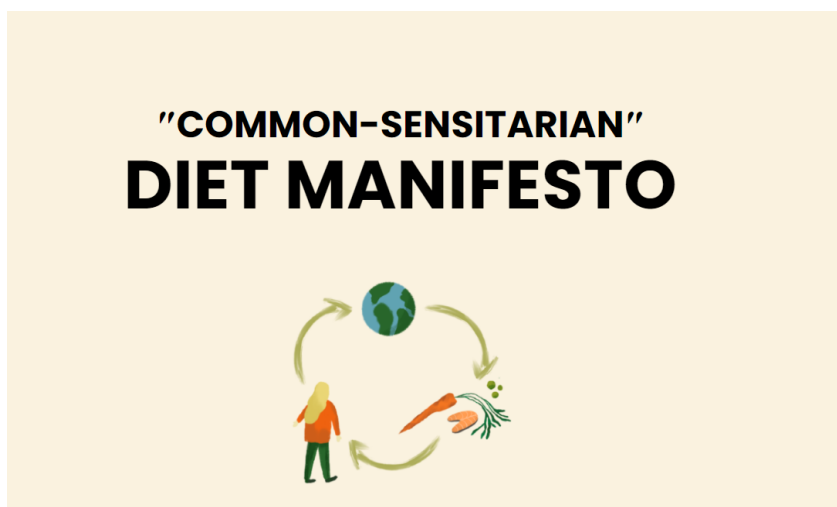


Figure 63 Logo



Figure 64 Meeting

18. Case Study on ISTENIČ ZERO WASTE BALSAMIC VINEGAR

What is it? Repurposing unsold wine as vinegars

Participants Mojca Polak, VGST

Date 1st December, 2023

Environmental benefits Reusing food waste



Location: Stara vas 7, 8259 Bizeljsko

Website: <https://www.istenic.si/sl/>

Email: office@istenic.si

Visit Summary

Janez Istenič was a passionate athlete in his youth, and after graduating in enology, he successfully embarked on a career as a winemaker in one of the Yugoslav state wineries in the 1960s.

He was fascinated by bubbles in wine from the very beginning, and the turning point was when he received a scholarship to study in France, which took him to the Champagne region.

Upon his return, he found that his father-in-law's vineyard, which produced wines with "characteristic freshness", was similar to the vineyards in Champagne, where grapes with a high acid content grow.

With his savings, he was able to buy some land and equipment.

Janez Istenič became the first private producer of sparkling wine produced by classical method.

The idea to produce balsamic vinegar originated from the desire to use wine that could not be conventionally marketed. Unsold wine is transformed into premium balsamic vinegar with a high added value according to the classic method and 6 years of maturation.

With additional ripening at Istenič, higher quality balsamic vinegar is also produced, which is marketed under the Defrutum brand.



Figure 65 Balsamic Vinegar



Figure 66 Barrel of vinegar

19. Case Study on Luka the fermentation wizard

What is it? Fermentation for preservation

Participants	Mojca Polak, VGST
Date	1st January, 2023
Environmental benefits	Reducing food waste.



Location: Šentjošt nad Horjulom 24d, 1354 Horjul, Slovenia

Website: <https://gric.si/>

Email: info@gric.si

Visit Summary

Luka is a chef of Michelin star rewarded restaurant Grič, that started as a family run traditional Slovenian inn. When Luka took over the kitchen of family run inn in 2009, Mom and Dad reluctantly watched his experimental journeys through exciting culinary concepts of Scandinavian, Japanese and Basque traditions. While Luka still likes to consider ideas from abroad and incorporates them into his culinary philosophy, he wisely combines the acquired knowledge and open-mindedness with the familiar taste of the home environment. He now uses avant-garde approaches and refined techniques with the premium ingredients from the garden, where his sister Barbara reigns, seeing that it stays green even in the midst of winter.

He stays loyal to the ancient art of foraging and keeps developing new takes on traditional and modern techniques of storing, pickling, drying, salting, smoking and fermentation. His first certified organic duck farm in Slovenia, which he devised with famous Swedish breeder Peter Blombergsson and his father-in-law, presents examples of good duck breeding practices, where the animals' general well-being is the main priority. Together with local breeders and growers, fish farmers, hunters, wild catch experts from the Adriatic coast and other supporters of natural farming approaches and bio-dynamic wine production, he created a community of like-minded suppliers dedicated to a greener future. The wonderful people working at Grič share this same love for nature and all that it offers. This lovely team of caring individuals helps create memorable combinations of tastes, paired perfectly with a selection of creative beverages, chosen by Nejc, Benjamin and Lucija.

Luka also shows a responsible attitude towards food with many ways of preserving it. Beef halves are matured in their own ripening room for at least 3 months, fish for up to 2 months.

His passion is fermentation. He uses a lot of Asian fermentation methods. Among them, the following are the most interesting:

- Fermenting fish or meat trimmings in garum
- Lacto fermentation of excess of fruit and vegetable in brine
- Nuka: fermenting vegetables in different types of bran

Restaurant Grič also uses a self-designed composter for composting all the food waste and reusing the compost in the vegetable garden.



Figure 67 Fermenting the carrots



Figure 68 selections of jars with fermented vegetables



Figure 69 Chef preparing food with fermented carrots

20. Case Study on Polygonal Greenhouse

What is it? Polygonal greenhouse

Participants Mojca Polak, VGST

Date 1st January, 2024

Environmental benefits Localised growing.



Location: Botanični vrt Univerze v Mariboru, Pivola 90a, 2311 Hoče

Website: <http://botanicnivrt.um.si/>

Email: botanicni.vrt@um.si

Visit Summary

The area of the botanical garden in Pivola has a long and interesting history. The parts of which it is composed tell diverse stories, which visitors get to know on guided tours.

Since the exotic plantation is in the immediate vicinity of the Pohorski dvor estate, which is managed by the Faculty of Agriculture and Biosystem Sciences, it was also the reason for the start and establishment of the botanical garden at this place.

Later on, the garden was internationally recognized and accepted into the association of botanical gardens (Botanic Gardens Conservation International). Despite the construction of the garden, education, research and preservation of plant species were already carried out. Collections of local endangered plant species, wild economically important forest plants, the first drafts of a gene bank and the promotion of nature tourism were created. Former military facilities were converted into usable spaces. Hiking trails, restrooms for visitors, and multi-purpose spaces for lectures, workshops, and exhibitions were arranged.

The garden manager paid special attention to growing edible plants in the vegetable garden. In doing so, they invested in the construction of an innovative polygonal greenhouse. This type of greenhouse provides optimal sunlight and warmth inside the greenhouse.

During the vegetation period, it is therefore necessary to pay a lot of attention to ventilation.



Figure 70 Garden



Figure 71 Inside the Greenhouse



Figure 72 Garden with greenhouse



Figure 73 Inside the Greenhouse 2

21. Case Study on Savour Food

What is it? Fermentation for preservation

Participants Tony Johnston, Alex Yu, TUS

Date 18th April 2024

Environmental benefits Reducing food waste.



Visit Summary

What is Savour Food

Savour Food is a locality-based support programme for Irish foodservice businesses. The core aim of Savour Food is to help businesses reduce food waste and save money through a combination of in-person training and online supports.

What does Savour Food Do?

Savour Food started as a locality based collaborative training and support programme for food businesses throughout Ireland. Through collaborating with local institutional stakeholders (e.g. local authorities and local development companies) it initiated programmes that brought businesses on a journey that explored the real reasons behind, and costs of, their food waste. With the impacts of Covid, and the shift to more online interaction with businesses, Savour Food developed a range of digital supports for the food service industry.

E-Training

Every business has the power to change how they deal with waste and, in doing so, to make a huge improvement on our overall carbon footprint and help Ireland achieve the climate targets that are so important for us all. In order to do this, everybody involved in foodservice businesses needs to be actively involved. The Savour Food e-Training Certificate provides an easy way to get all employees up to speed and actively engaged and provides them with a CPD type micro qualification for their CV.

The e-Training course is broken into different sections including:

- Information on the issue of food waste,
- Waste and food waste management best practices,
- The importance of food waste measurement,
- Taking action,
- And keeping up that momentum for lasting change.

<https://learn.savourfood.ie/>

Food Waste eTools

Savour Food also provides a number of simple e-Tools to support businesses. Often, just getting started on something like addressing food waste can be the hardest part and these eTools are designed for food service businesses who wish to take steps to reduce food waste

and measure progress in doing so. There are three eTools:

[Bins: The Basics](#)

Waste management is an essential part of good business. By reflecting on the current practices in a business and going through some simple questions this tool provides some simple tips on how to improve your current systems.

[The Cost of Food Waste](#)

With the value of avoidable food waste in a brown bin being typically around €250 this simple tool allows businesses to estimate how much food waste may be costing them.

[The Quick Fixes](#)

Finally, this tool provides some “no-cost” and “low-cost” changes businesses can make straight away to reduce food waste with them asked to make a commitment to undertake at least one in their business today.

See: <https://savourfood.ie/e-tools/>

22. Case Study on SUSTAINABLE MUSHROOM FARM SLAPŠAK

What is it? Sustainable Mushroom Farm

Participants	Mojca Polak, VGST
Date	1 st December, 2023
Environmental benefits	Localised food growing



Location: Padež 5, Laško, Slovenija

Website: <https://lasko.info/ponudnik/kmetija-slapsak/>

Email: slapsak.jernej@gmail.com

Visit Summary

Laško is a town in Slovenia that is associated with the beer brewing tradition and spa tourism. The demanding relief does not allow intensive agriculture.

Smaller family run farms mostly make a living by selling wood, raising livestock and growing fruit and vegetables.

The local community quickly recognised the importance of networking and certifying local produce.

For the past five years, providers have been competing with their crops and products to obtain the collective brand Okusiti Laško, which guarantees a local supply chain, sustainable business and consideration of local traditions.

Decades ago, Jerne Slapšak's family bought a small farm that included an abandoned mercury mine. The mine had no economic value. Due to the source of drinking water, the members of the family cleaned the trenches and started using the water from the spring. Jernej activated his artistic talent in the production of unique wooden products. The cave started to become a tourist attraction. And it is a part of forest educational trail, and visitors enjoy the circular trail just as much as in the cave. What impresses them the most is simply what is Laško's greatest advantage: peace. Here, where lead was once mined for military purposes, people come for peace.

Then the idea of growing mushrooms was born. At first, abandoned burrows were used for this purpose. Then, next to the farm, they set up an innovative mushroom farm where they grow first-class (certified) oyster mushrooms.

Jernej transferred the idea of sustainable business to all stages of mushroom cultivation. High-quality compost is now produced from the used mushroom mycelium.



Figure 74 Mushroom farm



Figure 75 inside the mushroom farm



Figure 76 picking the mushroom

23. Case Study on THE TASTE OF LEŠNIK SUSTAINABLE GARDEN

What is it?	The taste of Lešnik sustainable garden
Participants	Mojca Polak, VGST
Date	1 st December, 2023
Environmental benefits	Removing food waste.



Location: Gostilna in motel pri Lešniku, Dupleška cesta 49, Maribor, Slovenia

Website: <https://www.prilesniku.com/>

Email: info@prilesniku.com

Visit Summary

Gostilna Pri Lešnik is aware of the importance of healthy food for the well-being of its guests. That is why their vegetable garden has been a pillar of their offer for a century. With biotic diversity and natural food production in their garden, they also support this philosophy in the selection of other local suppliers.

The innovative production, sale and promotion of locally grown food from its own vegetable garden and orchard is used as a key USP of the inn. In doing so, the inn insists on the cultivation of old varieties and a strong seasonal offer of dishes, so that the Zero Waste business principle can be followed. The kitchen always practices zero waste methods. Stale bread is used to make breadcrumbs for fried chicken. Fruits and vegetables are being preserved.

The heart of the garden is a 12 m long greenhouse, which is used for growing tomatoes in the summer. In other seasons, for growing different types of leafy vegetables. They use rainwater from the reservoir for watering. They sow their own seeds. They enrich the soil with house compost made from eggshells and other vegetable waste.



Figure 77 Products of the sustainable garden



Figure 78 Food prepared by the kitchen



Figure 79 Garden with greenhouse

24. Case Study on VALORISATION OF PEAR THAT NOBODY WANTED

What is it?	The taste of Lešnik sustainable garden
Participants	Mojca Polak, VGST
Date	10 th January, 2024
Environmental benefits	Reusing food waste



Location: Domačija Firbas, Cogetinci 60, 2236 Cerkevjak, Slovenija

Website: <https://firbas.com/>

Email: info@firbas.com

Visit Summary

Domačija (farm house) Firbas has started intensively communicating the importance of naturally produced local food in the area of the Slovenske Gorice destination. In doing so, they insist on 90% self-sufficiency in food from all groups (milk, eggs, meat, vegetables, fruit, wine, grain products). When growing vegetables and fruit, they rely on the cultivation skills of the past and avoid phytopharmaceutical preparations

The sustainable approach to the operation of the farm is felt at all levels. The farm is almost entirely self-sufficient. Help on the farm is represented by the local population. The materials used in the construction of the farm's support units are from its own forest mass. Father is an amateur restaurateur who, with his knowledge, constantly improves the value of the inventory already used up, so that only this can be used again and again. The farm has its own electric bicycles, which are offered for rent to guests. The farm intensively connects with other local stakeholders. Domačija operates as a family business. The young owner of the farm was nominated for the most innovative farmer in Slovenia in 2020.

Company employs people from the home environment who transmit a sense of heritage and hospitality through their work. The animals on the farm graze freely, while at the same time they also take care of the didactic role of the farm (handicraft and agricultural skills), which visitors can learn about through various forms of animation.

A young farmer, Bojan Firbas, quickly recognized the need to increase the added value of farm produce. The biggest challenge was the pear orchard and pears left behind, without any marketing strategy. With the help of food technologists and a marketing agency, Bojan developed an excellent

pear juice. Because of the attractive packaging, quality and story, the juice is marketed at a 40% higher price than competing juice. Firbas pear juice can be found in all Michelin restaurants in Slovenia. Due to high demand, the farm started buying pears from neighboring farms.



Figure 80 Bojan Firbas



Figure 81 Firbas Pear juice



Figure 82 Restaurant that offers Firbas Pear Juice

25. Case Study on Valorisation of side product in pumpkin oil production

What is it?	Case Study on Valorisation of side product in pumpkin oil production
Participants	Mojca Polak, VGST
Date	10 th January, 2024
Environmental benefits	Reusing food waste



Location: KOCBEK OIL MILL, Gorazd Kocbek s.p., Stara Gora 1, SI-9244 Sv. Jurij ob Ščavnici

Website: <https://kocbek.si/en/>

Email: info@kocbek.si

Visit Summary

Gorazd Kocbek adapted the operation strategy of the family oil mill to the conditions on the Slovenian and global gastronomic market. Due to its increasing popularity on the market, pumpkin oil often began to lose its original taste and quality. Traditionally produced pumpkin oil has been losing the battle with cheap pumpkin oil imported from China. In the field of gastronomy, due to the extremely successful promotion of the Mediterranean diet, the use of olive oil prevailed. Oljarna Kocbek thus decided to expand its range of oils and other products made from side products in oil production.

For traditional pumpkin oil, which is a pillar of Slovenian cuisine, we need 4 to 5 kg of dry pumpkin seeds for 1 L of pumpkin oil. During the production itself, 70% of the by-product, from the seed coat, which is called prga, is produced after the oil is extracted. Prga was sold cheaply for animal feed. Gorazd Kocbek took advantage of the challenge. In cooperation with the school restaurant Sedem, he developed a macaron made of prga and gourmet chips. Both products became bestsellers in the company's online store.



Figure 83 Pumpkin oil product 1



Figure 84 Pumpkin oil product 2



Figure 85 Pumpkin oil product 3



Figure 86 Visit to the pumpkin oil product shop



Figure 87 Try the pumpkin oil products

26. Report on using Hydroponic Towers

What is it? Analysing the introduction of Tower Garden Hydroponics over an academic year

Participants Sinead Clancy & Maeve Murphy, MTU

Date 10th January, 2024

Environmental benefits Local food growing



Date: April 2024

Visit Summary



Figure 88 Hydroponic Tower

The Department of Tourism & Hospitality in MTU Cork, introduced aeroponic towers since September 2023, thanks in bulk to N-Tutorr funding, applied for under the education for sustainability theme. The department has engaged in various other sustainability initiatives prior to and since purchasing the towers, such as starting an in-house sustainable shop, raised beds, greenhouse, community garden, anaerobic digester and donating food to Feed Cork. This new introduction furthers the education and hands on experience students receive in relation to sustainability and food waste reduction.

MTU, Cork's Bishopstown Campus culinary students are in kitchen tutelage throughout the academic year. Modules are delivered in areas such as bakery & pastry, larder, Gastronomy, food production, global & Classical cuisine, and live restaurant service encapsulating a range from QQI springboard level 6 to specialism courses at the top of the QQI framework. Students within certain culinary modules devise their own menu from farm to fork, utilising local sustainable produce where possible and they cook/serve to the public in our onsite training restaurant, bar, and event dining hall. Both Bar & Hospitality service courses also use herbs, botanicals, and distillations within their courses. As a result, there is a steady flow of sustainable ingredients into our onsite kitchen classrooms and nutritious sustainably packed saleable food out from our kitchens, sold through another enterprising honesty box food shop. These towers will not only educate our students on the growth and harvesting of produce but will reduce our purchasing orders and the carbon footprint associated with these ingredients.

Initial cost

	Total
4 Tower Garden Towers @ €659 each	€2636
4 LED light kits @ €301 each	€1204
Green Towers set up & staff training fee @ €250 per tower	€1000
128 started seedling pack @ €2 per seedling	€256
<u>Vat @ 14%</u>	€687.96
Sustainability project total cost	€5,783.96
Cost after funding received	€783.96

The four ‘Tower Garden’ branded hydroponic towers were sourced from Green Towers Cork. The funding from N-Tutorr of €5,000 covered almost all associated setup costs with this sustainability project.

What are Hydroponic towers?

Aeroponics is a subset of hydroponic growing. In aeroponics, plants are grown with their roots dangling in the air. Below the roots are small emitters that drip the roots regularly, providing them with microdoses of water and nutrients, this differs from conventional hydroponics, whereby the roots of the plants grow in a substrate and are always immersed in a constant flow of nutrient water. Comparing water efficiency of aeroponics and hydroponics with that of soil-based growing, hydroponics saves between 80% and 90% and aeroponics saves over 95%. Tower gardens are vertical growing towers, allowing for growth of salad vegetables, fruit, and herbs in urban or smaller environments. It has 32 pods on the tower, which conveniently only takes up less than 1 m², over 90% less space than traditional farming methods. MTU Cork chose to add LED lights to allow for indoor growing, however these towers can also be set up outdoors, whereby sunlight is sufficient for a variety of crops. The tower cuts out the transportation links therefore cutting down CO² emissions and reducing food waste by only harvesting what is required at any given time. The growth potential can be three times quicker than by traditional gardening and the LED light system allows for a wider harvest range compared to the limitations of their climate. Urban soil can also be contaminated with varying pollutants like heavy metals, asbestos, petrochemicals so as the Tower Garden is a soilless growing system, it eliminates the cause for concern about contaminated soil. The use of the towers indoors reduces the effects of climatic change and eliminates the competition from weeds, reducing the stress that the crops go through, naturally increasing their quality and resistance to pests. The towers can be harvested by cutting the whole plant or else trimming and cutting only what is desired.

In the initial weeks

Green Towers Cork initially set up the towers and trained a couple of key staff members and students in early September. The initial seedlings were purchased from Green Towers; lettuce, kale, chard, basil, and flat leaf parsley. The first few weeks were spent working on getting the pH balance of the water correct. At the outset, the four towers were in the main foyer, which unfortunately was

too open with a lot of pedestrian passers-by pulling young plants and both direct sunlight and draughts coming through open doors and windows caused some soft leaf damage. Unfortunately, the first crop was then infested by greenfly, which we believe was transported from one of the seeding trays initially purchased, this then spread throughout all four towers due to their proximity to each other.

Findings about the crops

- Parsley grew successfully and met the large quantities required, however its higher-level placement on the towers inhibited some of the lower growing herbs due to its growth downwards, we realised it should be grown on lower levels or a separate tower to prevent smothering of other crops.
- Basil was the second most plentiful herb; its aromatic fragrance filled the hallways and complemented many dishes within the kitchens.
- The chives crop seemed a little delicate and was prone to bruising, therefore further training is necessary for the correct pod positioning/ utilising the scissors to reduce the pulling of the plant from its pod position.
- Coriander is another nutritionally enriched herb that fared well within the towers and is used extensively within the college.
- Mint used by bar, hospitality, and culinary modules, was also very productive and boasted a lovely fresh minty aroma in its vicinity.
- Both dill and fennel plants were deemed fragile and might be better suited on a tower with less strong plant crops.
- Sorrel didn't grow adequately; it is a more cold-loving herb so could be grown more effectively in our outdoor raised beds/ greenhouse.
- Oregano and its cousin marjoram again hadn't grown to their optimisation.
- Thyme grew quite well, again this potent herb contains natural antibacterial properties, and used extensively within all cooking modules. Equally thyme grew ferociously in the raised beds so will be grown outside going forward.
- The trial run period outlined that we should be growing each herb/crop in clusters rather than sporadically placing different seedling pods on each tower, thus allowing optimal growth and not inhibit its neighbours.
- There should be 2-3 seeds placed within each rockwool pod and strong root structure present on all four sides of the rockwool prior to placing into tower net pods.
- After the growth cycle, the rockwool cubes will be reused or composted.

Key learning

Site Location

The site location in the main foyer did not work well in the first few weeks, the location and dispersion of the towers along our corridors, near the culinary kitchens worked better. There was no direct sunlight, no draughts, and less non culinary student traffic, so the crops were touched and hindered less.

Training & Education

The growing towers came at the start of a busy semester, regrettably there seemed to be not enough emphasis on the importance of seedling placement, plant growth cycles, minimising bolting, trimming of roots, optimising seed harvesting, maintenance/care, and H&S aspects of the towers due to the initial low level of staff trained and involved.

Pre-requisite training is necessary for both lecturers and students through our online CANVAS in-house training portal to delineate correct seeding, planting, maintaining handling and harvesting, whereby one will learn not to cut the top leaves, which would only promote bolting of the plant. Also noted was picking flowers in bloom, unfortunately allowed some seeds to be scattered onto the ground therefore it is imperative that bolted plants are removed to the glasshouse for seed retrieval, or some plastic bags placed over bolted plants which will allow the seeds to be collected for future planting.

Keeping a sharp dedicated scissors attached to each tower is critical when combined with training will ensure that correct cutting methods occurs, therefore previous pulling and tearing herb bunches will no longer loosen the pods positioning, which is required for its nutrient drip feeding.

Currently, there are two towers out of action due to damage to the pumps from mishandling, although the pumps are insured and can be repaired, this regrettably led to two towers of wasted crops.

Competent staff trained in the use of the complex chemicals should tend to the towers and balance the towers' pH levels fortnightly. Nevertheless, constant monitoring of the pH at least triweekly can be assigned to students as the pH kit is very user-friendly, an easy task for students tending to the towers as a colour chart may be used to check pH levels of the water in the reservoir. The water level also needs to be topped up fortnightly and checked weekly due to the absorption by the crops.

The root systems growing downward within the tank must be trimmed biweekly, this trimming will further enhance plant leaves and furnish better plants.

The department hope to implement a QR code on the towers linking students to a checklist to be completed for their sustainability badge with various jobs and observations to be ticked off and signed off on is another initiative the department hopes to roll out next semester.

Planting & Crops

The knowledge gained this past year has guided us to concentrate our growing our high frequency crops over three towers that will reduce the purchasing of these herbs through the stores and one tower/two half towers will remain an exploratory tower where the following herbs will be grown to see the synergy between the various plants and to utilise the system to its best potential.

Our additional micro herbs and the upcoming seedlings for the towers grow well in the luminaire emitted from the LED lights of 35°C when the flexible lights are used with a dual purpose by being placed over a nearby table.

Aeroponics yields are also deemed more productive, whereby they have a more natural enhanced stronger root structure, better overall growth due to its intermittent nutrient supply through the aeroponic drip, mist system Additionally, the absence of rooting media and the separation of plant-to-plant contact reduces the risk of root and plant diseases.

Potential trials on the fourth tower

- Lavender should grow easily as would borage for their decorative flowers.
- Swiss chard, should be trialed again and with the improved training and labeling of the tower plants, will allow the plant to become established without being plucked and picked before its harvest time.
- Sage will grow very well outside in the raised beds but a few plants in the tower will supplement orders through the winter.
- The department’s new sustainability committee will concentrate on growing bay, thyme, fennel, sage, rosemary, sorrel, and rhubarb in our raised beds instead of the hydroponic towers allowing space on the towers for the cost-effective herbs based off our orders and growth experience.

	Calculated by Energenie plug in meter	Expected energy usage
Power rating	144.6W (averaged)	148W
Watts per day	1.673kWh	1.888kWh
Price for day when 24c from one tower	€0.40152	€0.45312
Week	€2.81064	€3.17184
2 semesters (26w) plus 6 weeks – 36 weeks	€101.18304	€114.18624
For 4 towers	€404.73	€456.74
Running cost		



Figure 89 Plug in kWh Meter

The running cost has been calculated using a plug in kWh meter over a two-day period and averaged over 24 hours, and through the figures given in the manual for expected energy usage. The lights are set for 14 hours a day, and the water pump is in operation for a 3 min on and a 12 min off cycle, which amounts to 6 hours a day. It is recommended to have the towers on a month prior to commencement of semester 1, and then on over the term breaks, midterm x 2, Christmas & Easter totaling 36 weeks. We established our energy costs and calculated the costs off the manual power ratings. Therefore, the kWh usage was slightly lower than the power rating given so we found the towers to be even more energy efficient than initially thought.

Each year, the enclosed water drip system uses two,1 litre bottles of chemical/mineral blend costing €30 each. These are essential to give the crops a healthy plant that can better protect themselves from disease and pests. As MTU Cork is a commercial premises, it is charged water rates, we suggest harvesting rainwater from the greenhouse roof into a collection barrel to reduce our water fees and rainwater is naturally more suited pH wise reducing the requirement for us to wait for chlorine in the tap water to dissipate.

The expense of the seedlings can prove expensive overtime, at €2 each. Instead, staff have started to plant and propagate seedlings into the rockwool cubes to reduce the need for seedling pods. The rockwool for 98 rockwool cubes costs only €19 and 30 net pods for €19 so a major reduction in ongoing costs.

Chosen crops for next academic year

Herb	Quantity	Unit price (per kg)	Total
Parsley	22kg	7.05	€155.10
Basil	8kg	22.50	€180

Coriander	5kg	22.50	€112.50
Chives	4.5kg	20	€90
Mint	4kg	22.50	€90
Total savings			€627.60

We wish to concentrate on the main herbs that are used in the kitchens. Each year we purchase 22kg of Parsley (mix of curly & flat), 8kg of Basil, 5kg of Coriander, 4.5kg of Chives, and 4kg of Mint. The cost savings on these herbs alone can be seen on the below table. We have a few suppliers, but the cheapest price we can source for each has been used below to highlight true savings.

One tower will consist of flat and curly parsley which will fully meet our requirements for the year, the second tower would be predominately basil, third a combination of coriander and chives, and the fourth with mint and other herbs we will trial.

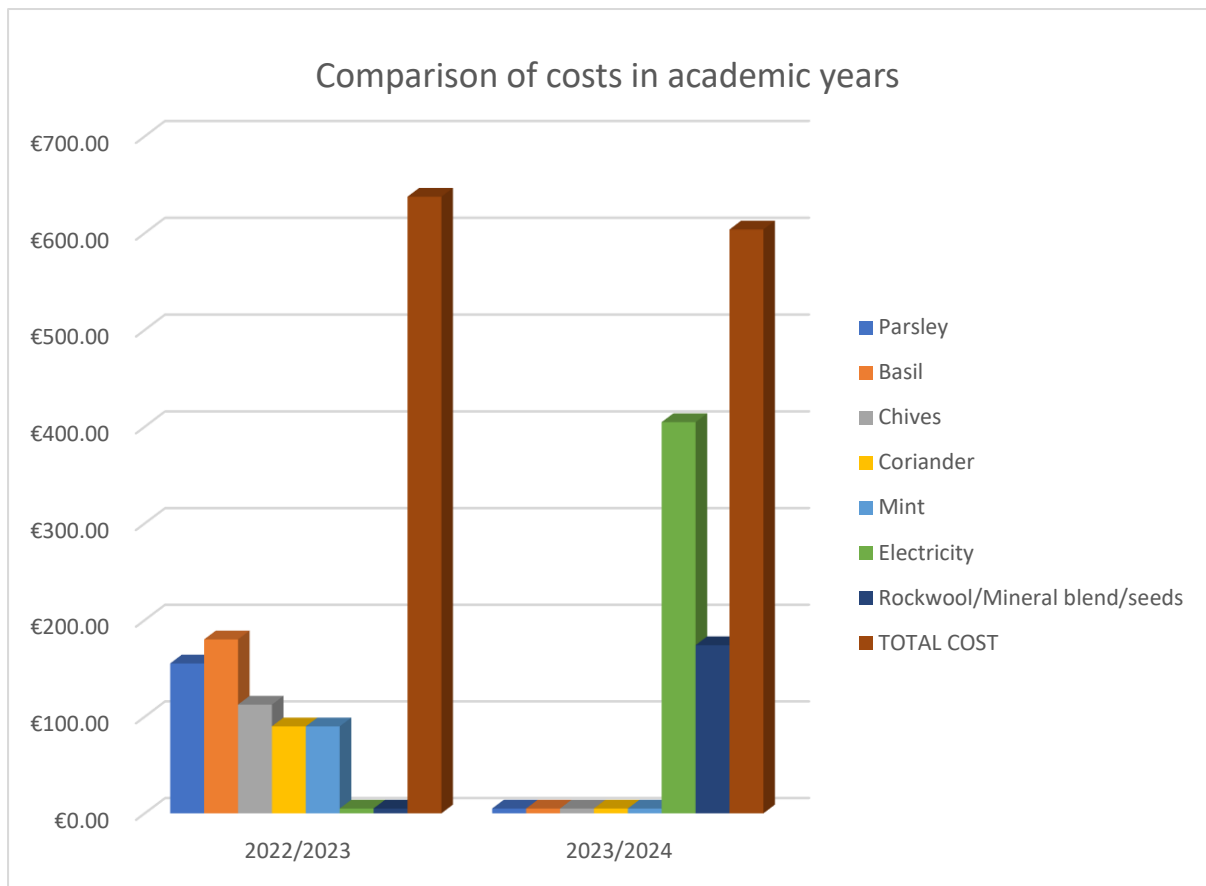


Figure 90 Comparison of costs

Conclusion

The aeroponic towers have been a welcome asset to our department, not only visually in the corridors but practically wise in terms of reducing food waste, airmiles and the financial cost of purchasing herbs. The clean, nutrient tense tastier herbs have been a great educational resource

this past year as students have been more curious about the herbs and lecturers have been utilising them as live resources in their kitchen classrooms.

In the past year alone, we have saved €627.60 on the named herbs/crops by not having to purchase from supplies. Considering the low running costs of the aeroponic towers, we will still have a surplus of €62.87 each year compared to buying the herbs listed in the table, making the introduction a money-saving mechanism for the department before we even reach the full growth potential of all four aeroponic towers. The non-cost benefits reduces food waste, more access to plants not able to be grown outdoors or in winter months, access to home-grown nutrient dense herbs and crops, more aromatic, colourful and tasty herbs and crops for our students to implement in their dishes, better learning opportunities for students, minimal water and land consumption and on-site storage of produce, the tower gardens are low maintenance, clean systems that allow for convenient growing indoors, and reduction in our carbon footprint by eliminating the transportation required by traditional purchasing methods.

27. Case Study on “The Cake and Supper Club”

What is it? The Cake and Supper Club

Participants Ann O’Connor & Patricia Madden, MTU

Date 10th January, 2024

Environmental benefits Reducing food waste



Location: Munster Technological University (MTU) Bishopstown Campus

Introduction

Sustainability is the ability to maintain and support a process overtime. This may be categorised into three pillars: economic, environmental, and social. The United Nations Sustainable Development Group (UNSDG), previously the United Nations Development Group (UNDG), is a consortium of thirty-six United Nations (UN) funds, programmes, specialised agencies, departments, and offices that play a role in development. The 2030 Agenda for Sustainable Development adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for all countries, developed and developing, in a global partnership. The department of Tourism and Hospitality at MTU, Bishopstown Campus has committed to UNSDG’s by adhering to responsible consumption and production, quality education and reduction of food waste. ‘The Cake and Supper Club’ has proved to be a successful mechanism for the department, where the food prepared in the learning environment by students is blast chilled, packaged, labelled, and sold. The department operates over thirty teaching and learning practical classes a week. This can vary from a lecturer leading a butchery or cookery demonstration, individual students preparing and cooking in class sizes of up to sixteen or student led events in a production kitchen (preparing lunch or dinner) in conjunction with a hospitality service class. Students prepare a variety of foods, depending on the level, the semester, and the time of the year.

Sustainability and Food Waste Initiatives in the Department of Tourism and Hospitality

The department has assessed a variety of food waste initiatives over the last decade, with varying degrees of success, these include:

- Selling the food to the wider college community using a cashless system, which was operated by students who packed the food and maned a pop-up shop. The students received an hourly rate of pay for this work.
- Selling food to the main campus canteen which was regenerated for lunch service.

- Allowing the students to purchase the items they prepared and cooked for a nominal fee per semester.
- Five years ago, the department settled on the most successful initiative and rebranded food sales as 'The Cake and Supper Club.'

The Success of the 'Cake and Supper Club' at MTU

- 'The Cake and supper Club' was created by the department in 2019 and now operates on a self-service and honesty box system. An email detailing the food items of the day and the cost per item is distributed by support staff to all subscribed members up to twice a day. The customer selects their chosen food from a double door fridge in the main corridor and places cash in the envelope provided. They write the total spend and their name on the envelope and may place the items purchased in a bag provided. The club encourages the customer to bring their own reusable bag where possible.
- An administrative staff member audits the honesty box twice a semester and it is often found to have additional cash. This is attributed to the person not having the correct cash amount and customers stating that 'its such good quality food' that they like to pay a bit extra.
- Food sales from 'The Cake and Super Club' have increased significantly in the last two years, and most packaged food items sell out quickly. The department believe this is in part due to the cost-of-living crisis and positive consumer feedback.
- The introduction of the new viewing top packaging feature has allowed the buyer to inspect/view the food easily and therefore not disturb the packaging. Previously, customers were opening the lids to view the food, and this resulted in contamination of food and items that were deemed not fit for sale by the technical team.
- The photographing of certain food items (attached to the cake and supper clubs' email) has been useful – in cases where the box needed to be sealed and has no window view e.g. cakes and entremets.
- The renaming of food dishes has been a remarkable success in terms of sales – often food was not purchased as the buyers did not recognise the French or classical name of the dish.
- The labelling of food and identification of food allergens is a positive addition to food sales and three members of staff have successfully completed labelling training with the Nutritics software system.
- Certain classes undertook a **zero-waste initiative** (at the end of the semester two, 2023, 2024) and produced items for sale using only available stock. This is an area which could be developed further and will assist students in the management of food waste in the workplace.

- Classes produce soup and trifles from trimmings which are sold at a low cost to cover the ingredients and packaging. This demonstrates to the students the importance of using up food and turning it into a saleable product.
- All the containers and packaging associated with 'The Cake and Supper Club' are sourced from ethical producers and are made from compostable and recycled materials. This is 95% compostable and 5% recycled materials. The packaging for food sale is purchased in bulk and the larger packaging containers cost between forty and fifty cent per item. Many items are less than this.

Examples of Food Items Available for Sale

- Soup, salads, vegan and vegetarian starter, and main course dishes with sides.
- Meat and fish dishes with sauces, sides, and garnishes.
- A wide range of farinaceous dishes.
- Irish, global, and classical dishes.
- Baked items: Breads, laminated goods (croissant & Danish pastries) filled pastries, biscuits, and cookies.
- Cakes, desserts, entremets, trifles, and tarts.
- Confectionery items: chocolates, pralines, petit fours, and pate de fruit.

The Cost of Culinary Classes and the Revenue Achieved by the Department

Due to several reasons (Covid-19, war, natural disasters, etc) the cost of food commodities has increased at an alarming rate in recent years. The expense of operating culinary programme before any of these factors was always high when compared to the operation of most other programmes at MTU. Therefore, it is vital as a department that these food costs are supported by food sales through 'The Cake and Supper Club.' Although, the cost of each class is not always offset by the amount of food sales, the department is striving towards this.

Example of Food Sales over a Two-Day period in Semester one -2023

Class Group	Higher Certificate in Arts Culinary Studies. (Year 1)	Bachelor of Arts (Honours) in Home Economics and Business. (Year 2)	Bachelor of Business Culinary Arts. (Year 2)
Cost of Class	168	92	48.80
Sales	52	117	30

Class Group	Higher Certificate in Arts. Springboard A	Higher Certificate in Arts. Springboard B	Higher Certificate in Arts Culinary Studies. (Year 2)
Cost of Class	51.58	50	63
Sales	60	50	80
Class Group	Bachelor of Arts in Culinary Arts. (PT) (Year 3)	Bachelor of Business Culinary Arts. (Year 3)	Higher Certificate in Arts. Culinary Studies. (Year 2)
Cost of Class	110	40	100
Sales	78	18	95

Cost of Food: €723.38

Food Sales: €580.00

The rationale as to why certain foods produced in the Tourism and Hospitality Department are unsuitable for packaging and sale in the ‘The Cake and Supper Club’:

- There are a variety of valid reasons as to why finished class materials are not suitable for sale. These often include breakfast items, such as grills, most egg dishes including brulee and souffles. To offset food waste, the department minimises the amount of these items produced.
- The department is required to follow approved culinary syllabi/modules and reach all the learning outcomes of these modules. Therefore, there are occasions where certain processes and cooking techniques which are covered in culinary class which do not result in food for sale. Examples: Display showpieces, butter sculptures, Easter chocolate displays, sugar pieces etc
- Sandwiches (high-risk food) are not packed for food sales as the department has not conducted enough shelf-life testing, therefore, students are permitted to consume the sandwiches after the class has ended.
- Sushi as it is an extremely high-risk food, therefore generally does not go to food sales.
- Items such as fresh cream cakes have a noticeably short shelf life and if produced in the afternoon class may not be suitable for sale the next day.
- Baked items such as cakes and pastries may be required for another event e.g. a charity coffee morning or an awards event.
- Butchery and larger items, remain in a raw state and are sent to another class for completion.

- Lamb dishes are not popular and sell poorly. Any food which does not sell goes to the charity **Feed Cork** which is a local organisation that helps families and individuals struggling with food poverty.
- Food items which are deemed by the technical team unfit for sale due to incorrect processing or handling, this is a rare occurrence.

Conclusion

The Cake and Supper Club has gone from strength to strength since it was initially established by the Tourism and Hospitality department. It has reduced food waste in the department, supports sustainable endeavours and is of added value to the students of the department, in the learning of allergens, labelling and the packaging of food. The revenue generated from the club goes towards the inflated cost of commodities the department incurs. There are plans in place to further develop the food sales in the coming semesters with the establishment of a new sustainability committee (June 2024), as a mechanism for managing and governing sustainability within the department of Tourism and Hospitality. It is envisaged that this committee will be made up of stakeholders from management, lecturers, technical support staff and students.



Figure 91 Cake and Supper Club Double Door Fridge



Figure 92 Cake and Supper Club Honesty Box



Figure 93 Cake and Supper Club Packaging

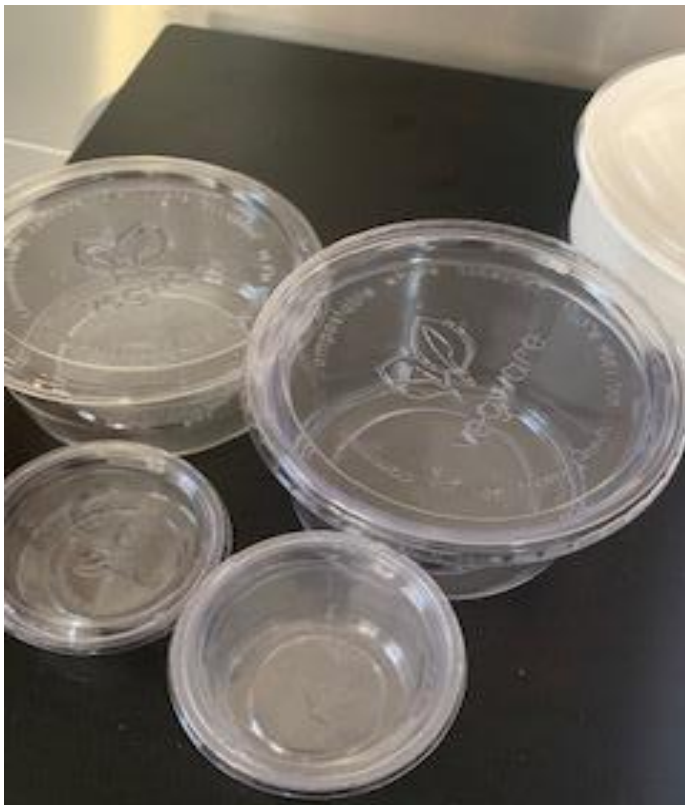



Figure 94 Cake and Supper Club Packaging



Figure 95 Examples of Packaged Labelled Foods

 **MTU**
Ollscoil Teicneolaíochta na Mumhan
Munster Technological University

BEEF SHORT RIBS WITH TENDER STEM BROCOLI

Batch: 106 L.H. SPB2
Prepared: **16/04/24**
Use By: **19/04/24**

INGREDIENTS:
BEEF SHORT RIBS [Beef Short Ribs, Oil, Red Wine (**SULPHITES**), Beef Stock (Beef Bones, Carrot, Leek, **CELERY**, Onion, Bay Leaf, Peppercorn, Parsley, Thyme, Tomato Paste), Garlic, Salt, Pepper, Tomato Puree, Lardons, Mushrooms],
BROCOLI AND POMMES PONT NEUF [Brocoli, Salt, Butter (**MILK**), Pepper, Potatoes, Oil, Salt]

ALLERGY ADVICE: For allergens, see ingredients in CAPS & **bold**

Store in the in the fridge bellow 5C Reheat thoroughly to reach a core temperature of 75C

Figure 96 Examples of the Cake and Supper Clubs Food Labels



LIME AND WHITE CHOCOLATE CAKE

Batch: 101 A.OC Apps4
Prepared: **10/04/24**
Use By: **12/04/24**

INGREDIENTS:
White Chocolate (**MILK, SOYA**), Caster Sugar, Ground **ALMOND**, **PISTACHIO, EGG**, Lemon, Cream (**MILK**), Gelatine, Kefir, Matcha, Gold Leaf

ALLERGY ADVICE: For allergens, see ingredients in CAPS & **bold**

Store in the Fridge below 5C

Figure 97 Examples of the Cake and Supper Clubs Food Labels



GNOCCHI PALERMINTAINE WITH SAUCE ITALIANNE

Prepared: **22/02/24**
Use By: **25/02/24** Batch: 52 L.O. SPB1B

INGREDIENTS:
Gnocchi PALERMINTAINE [**MILK**, Semolina (**WHEAT**), Parmesan Cheese (**MILK**), Butter (**MILK**), **EGG** Yolks, Ground Nutmeg], SAUCE ITALIANNE [Butter (**MILK**), Shallots, Mushrooms, Ham, Knorr Demi Glace Sauce 3x1.45 KG [Maltodextrin, Modified Corn Starch, Beef Fat, Sugar, Salt, Vegetables (tomato Puree Powder, Onion Powder, Beetroot Powder), Flavour Enhancer (monosodium Glutamate), Corn Starch, Caramel Syrup, Palm Fat, Flavourings, Thickener (guar Gum), Lactose (**MILK**), **MILK** Proteins, Spices (lovage Root, Fenugreek Seed, Paprika, Pepper, Cloves), White Wine (**SULPHITES**) Extract, Acidity Regulators (sodium Acetates, Calcium Lactate), Acids(citric Acid, Lactic Acid), Antioxidant (extracts Of Rosemary)], Tomato Sauce, Parsley, Thyme]

ALLERGY ADVICE: For allergens, see ingredients in CAPS & **bold**

Store in the in the fridge bellow 5C Reheat thoroughly to reach a core temperature of 75C

Figure 98 Examples of the Cake and Supper Clubs Food Labels



Figure 99 Pastry items produced from available stock as part of the department Zero waste initiative at the end of semester 2023 and 2024



Figure 100 Pastry items produced from available stock as part of the department Zero waste initiative at the end of semester 2023 and 2024



Figure 101 Pastry items



Figure 102 Pastry items produced from available stock as part of the department Zero waste initiative at the end of semester 2023 and 2024

28. Case Study on The Cashel Palace

What is it? The Cashel Palace - food waste digester reduces food waste by 66%

Participants Donagh Davern, MTU



Date January, 2024

Environmental benefits Reducing food waste



Figure 103 Case site location

Dating back to 1732, the Cashel Palace was meticulously restored by its current owners reopening in March 2022 and offering 42 bedrooms. The hotel has expansive gardens looking towards the Rock of Cashel and its facilities include a Spa, the Guinness Bar, The Bishop’s Buttery, The Queen Anne Room, a Cocktail Bar and a Banqueting Suite. Led by Director of Culinary Stephen Hayes, the food offering is primarily locally sourced from the surrounding pastures of the Golden Vale and its Bishop’s Buttery Restaurant achieved 1 Michelin Star in 2024. Gerard Moylan is the dedicated Sustainability Manager.

Food Digester

A *Harp Renewables* food digester was installed when the hotel opened in March 2022 and it is located in a separate building close to the hotel kitchens. A dedicated wash area for composite bins is located in this room, as is a storage area for the bins (both full and empty).



Figure 104 Harp Renewable food digester



Figure 105 Processing food waste inside the digester

How it Works

Food is segregated in the kitchen and is transported via the composite bins to the Food Digester. The cycle for the unit takes 24 hours and the unit automatically dumps out the finished product into a receptacle. The resulting compost can be used on the flower beds in the hotel gardens, but a new initiative closes the guest sustainability circle. As the hotel has calculated that each guest leaves approx. 700g of food waste, on the guest's departure, a bag of the compost produced by the digester is left in their car, with relevant instructions on usage, to be used in their own garden. In terms of the packaging of this compost, a brown bag is used, the label on the bag uses special glue which breaks down quickly and even the ink used on the label is biodegradable.

Small receptacles are used in each station in the kitchen to collect compostable food waste and signage has been produced with clear photographs to aid staff members. This has been translated into 10 different languages to mirror the nationalities of the staff in the hotel. Training is also provided on the system to all staff. Green Ambassadors are also in place throughout the hotel to promote sustainable initiatives and a Green Committee is in place.

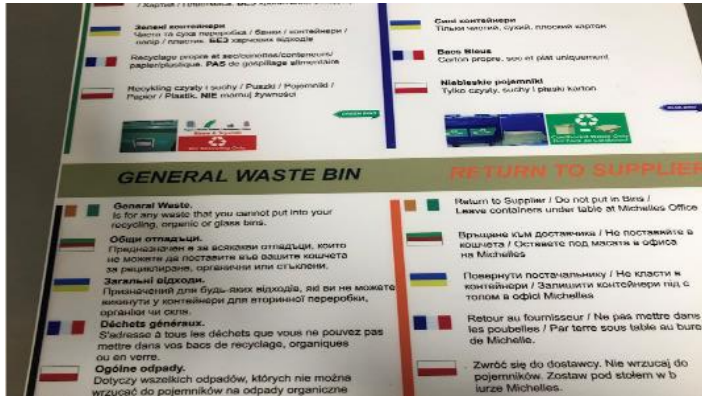


Figure 106 Instructions



Figure 107 Bin for food waste

Issues to Address

The initial compost produced by the digester was tested by *ALS Life Sciences* in Clonmel to elicit the levels of Nitrates, Phosphorus and Potassium (NPK). It was discovered that high nitrogen levels present were affecting its effective use in the garden as a compost. The Kitchen Team were instructed to blanch all raw items before putting them in the compost bins and raw items were removed from the system. The compost product also has to be mixed with soil on a 1:7 (soil) ratio before use.

The finished product wasn't fine enough for garden bed usage.

The resulting compost can not be used on fruit plants in the weeks before picking due to the potential Salmonella and E.coli threats which this would pose. This is noted on the label of the compost bag given to the guest.

Benefits

- The hotel has closed the circle on guest food waste production.
- Reduction in bin costs – weight and volume by up to 66%
- To market the hotel’s sustainability credentials
- Odourless process



Figure 108 Label on Guest take-home pouches of compost



Figure 109 Label on Guest take-home pouches of compost

Relevant Websites

www.cashelpalacehotel.ie

www.harprenewables.com

29. Case Study on onsite herbal garden & composting in ITS

What is it? Institute of Tourism Studies (ITS) Gozo Campus, Qala, Gozo, Malta
Onsite herbal garden & composting



Participants Ronald Briffa, Arianna Mangion, Jesmond Borg

Date April, 2024

Environmental benefits Reducing food waste



Figure 110 Painting of Traditional Maltese Clothes and Dancing



Figure 111 ITS Gozo Campus Training Restaurant

Subsequently this year, the Institute of Tourism Studies in Gozo, decided to take on the issue of composting and food waste as their main project. Composting is one of the best solutions to eliminating most of the waste while benefitting the environment. Compost enriches soil and improves plant growth by providing nutrients to the soil. A lot of the food waste can be composted. The Institute of Tourism Studies in Gozo believes that if more restaurants start to compost their food waste, not only will this reduce the pressure from landfills, but it will also help to enrich our soil and give us better produce in the future.

Thanks to other similar projects, the Institute came up with the idea to study the food waste generated and put it to good use. Thus, the food scraps from the organic bins of these classes could be used to revive an old compost bin as well as buy new ones. The bins were placed in a place where sunlight and soil were very saturated allowing the compost's nutrients to start leaching into the soil, going to all the plants and trees surrounding the area.



Figure 112 Organic Waste of composting



Figure 113 Natural Compost Bin

The food waste generated from these classes mostly included: fruits, fruit peels, vegetables, sandwiches, and leftovers from the restaurant. Composting is easy and affordable and is very beneficial. Composting cuts down on trash being placed in landfills and reduces carbon emissions while the nutrients stay. These enrich the soil which reduces the need for fertilizers. Compost also increases the soil's ability to retain moisture to stop erosion and improves the all-around soil health. The healthy soil will allow plants to grow more rapidly.

Compost is finished when it has a dark rich colour, crumbles when held, and cannot be picked apart into its original components. Compost contains nutrients such as nitrogen, phosphorus, and

potassium. The varied materials put into the compost bin will produce more nutrients. These nutrients are not let out at a very high rate but at the rate plants need them. Crumbly soil has a good structure. The structure holds water on their surfaces making plants have a big source of water.

As part of the project, the Institute of Tourism Studies in Gozo did not stop at just measuring the food waste and starting a composting system but also reached out to the parents to educate them on portion control. It also shared with other educational schools to teach them about composting.

Besides to composting, the Institute of Tourism Studies in Gozo also has a herbal garden whereby they plant herbs, vegetables and fruits which are used during the food preparation within the training restaurant's operations. Planted herbs include, bay leaves, mint, parsley, rosemary, coriander, rosemary, and fennel, whereas fruits range from lemon, and lime to oranges. Vegetables such as onions and olives, as well as spices such as curry are also planted on-campus and are used during the operations of the training restaurants.

ITS Gozo Campus Herbal Garden



Figure 114 Lime Tree



Figure 115 Lemon tree



Figure 116 Curry



Figure 117 Mint



Figure 118 Onions



Figure 119 Coriander

30. Case Study on Soup Kitchen, Valletta, Malta

What is it? Soup Kitchen, Valletta, Malta

Participants Ronald Briffa, ITS

Date February, 2024

Environmental benefits Reducing food waste



General Information

The Soup Kitchen is situated at 40 St. Ursula Street, Valletta. Fr. Marcellino Micallef set it up at the Franciscan Friary in Valletta. The project of feeding the needy started in August 2021. The Soup Kitchen operates from Monday to Friday, and lunch meals are provided free of charge, with daily takeaway meals provided for the supper meal. Toilets and shower facilities are also available for the users. The 150/200 persons who attend daily to the Soup Kitchen are those suffering from a low income, those going through financial crises, others without a roof over their heads, and those who have finished their prison sentences or are suffering from drug addiction. The receivers are mainly Maltese however about 18% are from foreign/ Muslim communities.

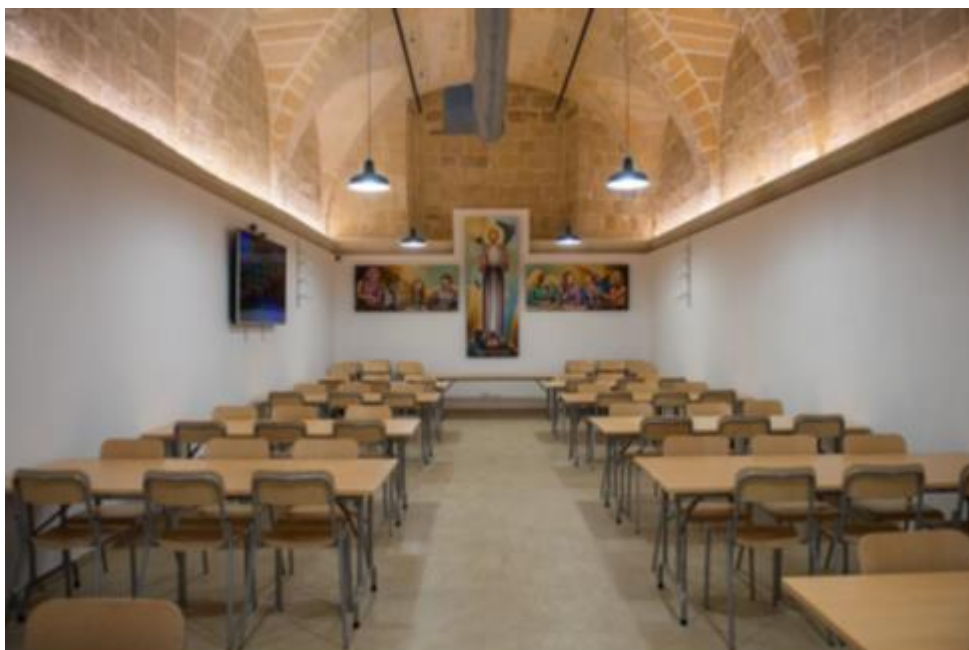


Figure 120 Inside of the Soup Kitchen

Operations and facilities

The Soup kitchen receives support from many benefactors including mainly companies in the food import and catering industry and the **Pitkali** (Fruit and Vegetables Market) who donate surplus fruit and vegetables. The Soup Kitchen is run by Fr. Marcellino Micallef together with an experienced head chef who is the manager of the Soup Kitchen. The rest are all volunteers. There are about 120 women and men from all walks of life who daily attend on a roster system to do all that is needed to keep this excellent organization running. Every volunteer sends in his name to the coordinator informing him he/she can attend the following week. Eight to ten volunteers are needed daily to assist in the running of the Soup Kitchen.

Soup Kitchen OFM Valletta provides a hot, nutritious, well-balanced meal 3 times a week in the first phase. Shortly they will offer meals 5 days a week, from 11.30 am to 1.30 pm. Although they only serve for two hours, the day at the soup kitchen is much longer than that. Volunteers arrive at 7.30 am to prepare the meal for the guests they will feed on the day. Serving begins promptly at 11.30 am when the doors open and the first of the guests begin to stream in. Each guest picks up a tray from the food line, stops at the beverage station for a drink, and takes a seat at one of the tables set up in the beautiful old Franciscan refectory built in 1584. After or before lunch, guests can take advantage of one of the other programs on offer, such as reading, meditation, computer classes, or on-site health services. By 1.00 pm the last of the guests have received their meals, and clearing and cleaning takes till 4.00 pm.



Figure 121 Food preparation

Platform Distribution of ‘Save the Food’ App

Amongst many The Malta Food Agency has teamed up with Soup Kitchen in the ‘Save the Food’ app, an excellent initiative to help reduce food waste and support local communities. Through this app, fruit and vegetables that remain inside the Pitkalija (Fruit and Vegetables Market) will be donated to entities distributing food to those in need. This initiative goes hand in hand with the agency’s strategy to reduce food waste and the digitalization strategy so that the agency continues to operate transparently and effectively with new technologies. In a country that wastes millions of kilos of food each year, it’s almost shocking that anyone in Malta goes hungry. Many don’t believe that this is a reality in our country. Yet every day, some children and adults do not get the meals they need to thrive. Apart from working 7 days a week to get nourishing food – from farmers, manufacturers, and retailers – to people in need, they also seek to help the people they serve to build a path to a brighter, food-secure future.



Figure 122 The “Save the food” app

31. Case Study on Farm-to-fork concept in TUTA

What is it?	TUTA Agro Tourism, Kerċem, Gozo, Malta
Participants	Ronald Briffa, Arianna Mangion, Stephan Tabone
Date	April, 2024
Environmental benefits	Localised Growing



General Information



Figure 123 TUTA Agrotourism extended accommodation area



Figure 124 TUTA Agrotourism main entrance

Tuta Agrotourism is a flourishing enterprise nestled in the heart of the rural countryside, offering visitors a unique blend of agricultural experiences and hospitality. Approximately 50 kilometres from the nearest urban centre, Tuta Agrotourism is in the picturesque countryside, surrounded by verdant fields and rolling hills. Its location offers visitors a tranquil retreat from the hustle and bustle of city life.

Operations, Facilities and Activities

Designed to cater to the needs of its guests, TUTA agrotourism boasts a range of facilities. These include cozy accommodations, providing visitors with a comfortable stay amidst the countryside's natural beauty. Additionally, Tuta Agrotourism offers guided tours of its farm, allowing guests to immerse themselves in the agricultural practices and processes firsthand.

One of the highlight activities at TUTA Agrotourism is its diverse range of activities aimed at providing guests with an authentic rural experience. Visitors can participate in activities such as fruit picking, vegetable harvesting, and animal feeding, gaining insight into the workings of a working farm. Additionally, guided nature walks and birdwatching tours are available for those keen on exploring the natural surroundings.



Figure 125 Sheep and goats



Figure 126 Maltese chickens

Culinary Experience & Community Engagement:



Figure 127 Inhouse sourced sheep milk

Food is central to the agritourism experience at Tuta. Guests have the opportunity to savour delicious farm-to-table meals prepared using fresh, locally sourced ingredients. Cheeses, milk, eggs, cheese lets, tomatoes, herbs, amongst other ingredients are inhouse sourced and are served to the customers within the farm-to-fork concept meals when visiting the onsite restaurant. Cooking classes and culinary workshops are also offered, allowing visitors to learn traditional recipes and cooking techniques from skilled chefs. Besides the farm-to-fork concept, Tuta Agrotourism is deeply committed to fostering community engagement and sustainable practices. The venture collaborates with local farmers and artisans, supporting the regional economy and promoting cultural exchange. Furthermore, initiatives such as organic farming methods and conservation efforts are integral to Tuta's mission of responsible tourism.



Figure 128 Prickly pears to be used for prickly pear jam

Collaboration visit



Figure 129 Mr. Tabone giving an educational tour and explaining to the students about food growing, especially tomatoes

While visiting Tuta Agrotourism Farm in Gozo a class of primary school students were having an educational tour integrated with a lesson on tomatoes. Mr Tabone was explaining to the children that a tomato is a juicy fruit, usually red, that looks like a big berry. Most tomatoes grow on vines,

though a few kinds grow on shrubs. Many people think the tomatoes grown on vines taste much better, and those types are much more common. Tomato is cultivated in tropical and temperate climates in open fields or under greenhouses in temperate climates. The tomato greenhouses that are on the farm are often used for large-scale production during winter times. We had the opportunity to experience the production of tomatoes first hand when we visited the greenhouses. The individuals in charge explained the delicate care they take on the daily basis, as well as informed us of the whole process from beginning to end.



Figure 130 Tomato greenhouse



Figure 131 Tomato greenhouse



Figure 132 Tomatoes in the greenhouse



Figure 133 Tomato vines in the greenhouse



Figure 134 in the greenhouse

After the tour, Mr Tabone instructed the children to take a piece of sourdough bread, which was already prepared on the tables, to slice the in-house sourced tomatoes in half through the middle rather than top to bottom. Children learnt how to spread the tomato halves on the bread until they literally fell apart and were only left with the skins. The skins which were also added to the bread for their enjoyment to eat. A drizzle of olive oil was added together with a sprinkling of rock salt and pepper.



Figure 135 Mr. Tabone explaining to the students

32. Case Study on REBAKE – INOVATIVE MODEL FOR REUSE OF LEFTOVER PASTRY DOUGH

What is it?	Rebake – Innovative model for reuse of leftover pastry dough
Participants	Mojca Polak, VGST
Date	May, 2024
Environmental benefits	Reusing food waste



Visit Summary

High school students in Slovenia are making a difference in pitching great business ideas in the sector of zero waste food products. In this year competition Junior Achievement Slovenia for best student business idea, a great innovative food product popped out – reBake pastry shells that are produced from leftover pastry dough.

The pastry shells can be filled with savoury or sweet fillings and be ready in a minute for an appetizers, snack or finger food.

The team of four high school students (future food engineers) stumbled upon the idea when thinking about all the leftover dough when producing pies and other pastries. Together with their teachers they have started to optimize the process of reusing the already baked dough in the form of pastry shells. They are getting the main ingredient – leftover puff pastry from the nearby bakery. The production is going on in the school pastry shop, where the reBake pastry shells are already available for buying.



Figure 136 reBAKE products



Figure 137 reBAKE logo

33. Report on using Ohaus Ranger 7000 bench top scales

What is it? Goods Ohaus R71MD3,
Bench Scale

Participants Maeve Murray, Noel
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Date May, 2024

**Environmental
benefits** Removing food waste



Figure 138: Ohaus Ranger Bench Top Scale

Price:

€2,014.75 inc vat

Goods Ohaus R71MD35 (35kg x 0.5g) bench scale with RS232 cable for SPDC software PC connection

Goods In use cover, R71 (FOC)

Delivery Delivery & calibration

Service Installation & on site training

Supplier: The scales were supplied and commissioned by Atlas Weighing Ltd. This company will also undertake calibration annually.

Installation: 24th May 2024

Rationale: Ability to store weights under category names

Project: Food waste measuring, reporting and reduction in culinary operations

Overview

In the Tourism and Hospitality department of MTU all food waste coming from student culinary classes, student production kitchen and student training restaurant is weighed. The weights are recorded and the records transmitted to lecturing staff, students and the HACCP manager.

Food waste bins from technicians, food stores and wash up are also weighed.

The weights are manually recorded at the point of measurement in the bin area with paper & pen (food bins are standardized so the tare is taken care of).

These handwritten records are then entered into an excel file and the weights are communicated to lecturers & students so they can see how much food was wasted in their class. With this information lecturers can adjust their recipes and future orders. In the production kitchen & training restaurant plate waste is recorded to use as a guide for better portion control.

Data is extremely important in food waste reduction, or other sustainability minded projects. Without measurables it is difficult to encourage or enforce change.

Background

The recording and transmission of food waste weights is a very important part of our wider food waste reduction strategy. This strategy started in earnest 3 years ago with the introduction of a new approach to ordering food from suppliers as a result the food stores operates efficiently with much lower par levels than before. Secondly, an appeal was made to lecturers to review their standard recipes with critical eyes to ensure the accompanying ingredients orders were accurate. This resulted in less food being ordered, unused and wasted. Following this, other measures were put in place, for example, the food stores are now constantly manned and are 'closed' i.e. food cannot be taken out without permission. Unnecessary waste is also avoided with strict and enforced rules on how ingredients are returned to stores, i.e. they must be temperature checked, sealed, labelled, and dated.

Food produced in class is blast chilled and meals are packaged in attractively labelled compostable take-away packaging. The meals are then sold to students and lecturers using an honesty box system. This project called "The Cake and Supper Club" commenced 5 years ago and is very popular. Any delicious but 'unpopular' dishes (eg lamb or anything with offal) or high-volume items such as soup are packaged and donated to a local charity kitchen.

The culmination of these activities has resulted in large monetary and food waste savings. However, a focused look at what was being thrown out was still needed. Accountability and helping to create a culture of food waste reduction in an education institution is hugely important. This was when weighing food waste was introduced. Students reacted very positively in fact and were very engaged, using it as an opportunity to create dishes or condiments from food that would previously have been dumped in order to reduce their bin weights. We frequently now have soups, marmalades, chutneys, trifles/verrines for sale in The Cake and Supper Club fridge, all produced from food that would otherwise have been binned. There is also increased communication between

classes with semi-finished items being passed on to the mirror class or the restaurant class for use (eg left over clarified butter, egg white or frangipane and so forth).

Rational for new scales

Upgrading the weighing scales to one that had the capability to store weights under pre-saved class names will mean that data can be more easily and more efficiently transmitted. The Ranger 7000 scales will store all weights per class for the week. The scales can then be connected to a laptop and the data downloaded directly into an excel file. This will be a significant time saver as inputting class names and weights for 40 classes each week takes time. While this isn't necessarily a huge amount of data entry it is time-consuming as the records are handwritten, often with gloved hands, and are not always easily legible. Also students tend to title their class names differently to the official programme titles so when entering the data one has to search the list or timetables frequently to find the match before entering the data. The use of paper is also eliminated. Lastly, being more efficient means that the task of disseminating the weekly waste weights can be more easily handed over to a colleague in the case of absence.

Set up

As a food production unit, we have a segregated bins area. This space is dry and has power and light already. There was sufficient space beside the sockets to install a small table on which to put the Ranger 7000 scales. The food bin is near the table. On using the scales students will search for their class group name and save their bin weight under it, they will then dispose of their bin or put it through the macerator.

Training

Training was provided by the suppliers Atlas Weighing Ltd. The training involved the section head of culinary operations & the technicians team (all food handlers & HACCP manager). A simple sign will be mounted beside the scales with directions of use for students ahead of their return in September and the content will also be included in the mandatory onboarding & food safety training that all students undertake prior to participating in practical classes. Lecturers will be notified of the change of scales and new recording method before the end of this current semester.

Obstacles to set up

In 2023 MTU suffered a very serious cyber-attack. As part of steps to mitigate the risk of anything like this happening again *all* activities that require a computer must be screened before they are allowed to be used. The data sheets and operating manual for the scales had to be sent to our IT department (who then passed it to an outside consultancy in IT services) to ensure that the proposed set up provided no risk to the integrity of IT services on the campus. As the scales don't require network connection and the downloading of the data to an excel file can be done by cable/usb it was deemed suitably low risk and we were granted permission to proceed with the purchase and installation.

Not quite an obstacle but an item to bear in mind for setting up was the fact that from semester 1 24/25 each kitchen will have 2 food bins. One bin is for food waste that goes into our macerator and anaerobic digester, the other bin is for composting via our university contracted waste collection company. When setting up the pre-saved class names each class will need to set up a 'tare' so that

students can, in one weighing capture 2 values (firstly for the compost bin, then for the digester). This split in weights is important information to capture as it will allow lecturers to further understand their waste as only edible waste can go in the digester- therefore posing the question should it have been waste or could it have been used? It also provides good macro level information on how much food we sent via the macerator to the digester and thus how much bio-gas and liquid fertilizer we reclaimed for our vegetable greenhouse as a result.

Conclusion:

Data, and the transmission thereof, is key to successful strategy design and implementation when introducing change. However, it is also important that the gathering of this data doesn't interfere but rather enhances the focus of our operations- education.

The purchase and installation of the Ranger 7000 scales will allow the department to continue its drive to reduce food waste through measurement, monitoring and reporting- three crucial elements when instigating change. With these new scales we will be more able to report values in a timely manner, standardizing the format of the report and cutting the data processing time for the responsible person by a great deal. This is particularly pertinent now that we have the macerator food bins as well (in effect doubling the data entry required by students and person creating the master records).

Finally, we will be able to get more detailed data from the technicians as stores, food technicians and meal packing areas can all have their own code as well. Allowing us to see where food is wasted in those areas as well.



Figure 139: Training and set up with Atlas Weights



Figure 140: Scales with tare shown

34. GEME Electric Composter Review /Analyses-Institute of Tourism Studies.

What is it? Electric Composter

Participants ITS

Date June, 2024

Environmental benefits Composing food waste



Figure 141: Composters installed in ITS

I became aware of the first electric composter a couple of years ago and now there are at least twelve brands on the market. They are promoted as an eco-friendly way to deal with food waste. Just put your waste in the device and it will compost the material in a few hours. The material is reduced in volume by 90% and is a perfect fertilizer. Some models suggest the addition of microbes to help with the composting process. The new version models are smaller in size and don't require the addition of coir or microbes. In our study, we used the GEME microbe-based electric home composter.

GEME operates with the addition of coir and microbes. Food scraps are placed in a bucket, and the unit is closed and turned on. An automated cycle dries the material and "grinds" it. The time needed for this depends on how much you put in and how wet it is, but it took approximately 3 to 5 hours. At the end of the process, you have something dry but still kind of resembles the food you put in.

Some items turn into brown powder while others stay quite chunky and fibrous. There is a bit of odour, but it is not unpleasant. The bucket takes approximately 12 kg of food waste.



Figure 142: The process in action

Do GEME Composter, Compost? I have my doubts. The machine runs for 5-6 hours taking into consideration that you are speeding up science. The only science it is speeding up is the drying of food. The machine runs hot at approximately 120 C. When I open it during a process, it is not that hot, but it does have to be over 100 C to drive off the moisture. A hot compost pile is limited to 66 C

so that the microbes are not killed off. The steam plus high temperature will sterilize the food scraps.

Although the machine claims to “grind” the food as it’s heated, the blades in the unit are not sharp nor is the space between the blades and the fixed bar, small enough to grind food. They rotate once per minute and at best this can be called agitation or mixing. This also becomes evident when you look at the results. The material is not finely ground as advertised in the brochure and contains a lot of larger pieces, but this depends a lot on the material being processed. Until the material starts to decompose, most of the nutrients are not available for plants. The machine manufacturers show how easy it is to take the dry material from their unit and apply it to potted plants, but we were advised by a professional gardener not to do that. It was recommended to us to delay planting following the application of the dehydrated food waste byproduct to soils to allow sufficient time for decomposition to take place and to ensure that germination is not inhibited by the decomposition.

Dehydrated food waste byproduct is more of a good description of the material produced. I would not describe it as fertilizer, but gardeners use the term in a very general way to refer to anything that releases plant nutrients. The food waste is reduced by weight and volume due to a loss of water. All the organic matter that was there at the beginning, is still there at the end of the process. The unit use about 1 kWh per cycle, so the energy use is small, and does not take any charcoal filters like other similar machines.

Is an electronic composter eco-friendly? In my view, I can think of only one scenario where an electronic composter is eco-friendly. If you don’t compost and you don’t have access to municipal composting, then an electronic composter makes sense provided you collect the dehydrated waste and give it to someone who can use it. Even spreading it in the fields is better than sending it to a landfill, but that really should not be done. This device may also be appealing to people who live in cold climates where they can’t compost in winter. You can use it in winter to dry the food scraps, store them dry, and then compost them in summer.

Discussion - Strengths, Weaknesses, Opportunities and Threats

The ideal way to structure a discussion on the above visits is to present it as a SWOT analysis. This is presented below with Conclusions and Recommendations presented on the following pages.

Strengths

- Some of the technologies are low-cost, easy to implement and have good learning potential for VET students
- Diverse range of technologies available, from rapid indoor food composters, to smart air filters, localised food growing technologies, and specialist items, for example mushroom growing equipment.
- Positive feedback from students – there was excellent learning for the students who participated in site visits and this has enhanced their interest in decarbonisation and food waste reduction, their employability, and their transversal skills.

Weaknesses

- Some of the technologies lack full transparent data on impact (e.g. on CO2 reduction)
- Some items are beyond the price range of hospitality educators – e.g. one unit could cost €50,000+.
- There are complexities with the installation of some projects and items. E.g. some may need new electricity or plumbing regulations to install. Some may need new certifications.

Opportunities

- We saw many low-cost and easy to implement solutions. The examples within provide many opportunities for other schools to explore depending on their needs.
- Students engaged very well with the site visits and trials – this gives opportunity to integrate beyond hospitality and culinary curriculum (e.g. with food science, nutrition, business management, IT, engineering, social care).
- Excellent opportunities for online and in-person demonstration of the technologies as many are small, portable and have strong learning potential.

Threats

- Some of the technologies rely on 3rd parties (e.g. cloud subscriptions, which can leave school vulnerable to changing costs).
- Maintenance and other specialist expertise may be needed with some projects and technologies (e.g. IT/ engineering/ servicing) which could be time consuming.
- Risk of putting more emphasis on technological as opposed to behavioural based solutions (e.g. portion reduction) which may lead to poor practice in food preparation.



Conclusions and Recommendations

When hotels and culinary schools aim to implement and test zero-waste principles, it's crucial to consider geographical factors that can significantly impact the purchasing and utilisation of equipment. Based on testing we recommend the following considerations for any hotel and culinary school purchasing equipment:

1. Geography

Local Supplier Availability

- **Support Local Economy:** Prioritize sourcing equipment from local suppliers to support the local economy and reduce transportation emissions.
- **Cost Efficiency:** Local suppliers can offer cost savings on shipping and delivery.
- **Service and Maintenance:** Local suppliers often provide quicker and more efficient service and maintenance options, minimizing downtime.

2. Climate and Environmental Conditions

Choose equipment that is suitable for the local climate and environmental conditions to ensure longevity and efficiency. For example, high humidity areas may require rust-resistant materials.

3. Cost

The cost of purchasing such equipment can differ quite strongly from country to country. Our cases, shared within the project group that spans from Ireland via France and Slovenia to Malta showed double the amount needed for purchasing.

Opt for energy-efficient equipment, considering the local energy costs and availability of renewable energy sources.

Evaluate the cost-effectiveness of equipment within the context of the local economy and budget constraints. Look for local grants, subsidies, or incentives that support sustainable and zero-waste initiatives.

4. Ease of install

Ensure that the local area has the necessary technological infrastructure to support advanced zero-waste equipment.

If applicable, consider proximity to innovation hubs or research institutions that can provide support, training, or collaboration opportunities.

5. Ongoing maintenance and servicing

Establish strong, long-term relationships with reliable suppliers who can provide ongoing support and updates on the latest zero-waste technologies. Ensure suppliers offer comprehensive training and support for the staff to effectively use and maintain the equipment.

Maintenance can be provided by the school janitor, another person to check on the instalment regularly and in case of need, contact the provider for maintenance.

6. Time required to install

Use the approach: durability and simplicity. Select durable, low-maintenance equipment that can withstand local environmental conditions.

7. Time required to use

Assess the **time required for the delivery of equipment**, especially if sourced from distant locations. Plan purchases well in advance to avoid delays in implementation.

Consider the **time required for installation and setup** of the equipment. Ensure that sufficient time is allocated for these activities to avoid disruption of operations.

Allow **time for staff training on new equipment** to ensure proper use and maintenance. Schedule training sessions that do not conflict with peak operational periods.

Integrate the procurement and implementation of zero-waste equipment into the overall project timeline. Coordinate with all stakeholders to ensure timely execution of each phase.

Consider seasonal variations that might affect delivery, installation, and operation of the equipment (applicable in case of outdoor equipment)

8. Learning value

Regional waste management practices and compliance with local regulations: Ensure that the equipment complies with regional waste management and environmental regulations.

Consider equipment that aligns with local cultural practices and preferences in waste management and culinary techniques. Engage with the local community to understand their practices and gain support for zero-waste initiatives.

9. Impact on decarbonisation and food waste reduction

Select equipment that can integrate seamlessly with the local waste management infrastructure (e.g., composting facilities, recycling programs).

Aim to minimize the carbon footprint associated with transporting equipment by selecting closer manufacturers or distributors.

Ensure that the transportation routes for delivering equipment are feasible, especially in remote or hard-to-reach locations.



For further information please visit www.foodturistic.com

