Crop Cycle

Controlled Environment Agriculture Community Project
Delivery & Progression
April 2021

English version
(Full Welsh to follow in due course)

Foundational Economy Challenge Fund

Ariennir gan Lywodraeth Cymru
Funded by Welsh Government

bicinnovation

Social Farms & Gardens
Ffermydd a Gerddi Cymdeithasol

Contents

Executive Summary

Crop Cycle has been funded by the Foundational Economy Challenge Fund, one of 52 projects supported, and one of 5 food-based projects. The project has been led by Social Farms & Gardens, project managed in conjunction with BIC Innovation, supported by Welsh Government's NutriWales cluster and their CEA Special Interest Group.

The objective of the project being to provide a test bed for the inclusion of Controlled Environment Agriculture (CEA) growing systems in community settings to provide sustainable, hyper local, nutritional crops for the benefit of the population and to develop the infrastructure for the continued supply of secure foods.

The project scope was to introduce CEA solutions into 3 sites with different considerations to compare and contrast the impact and benefits of integrating such systems into the community. The project initially included Ty Pawb, Wrexham which due to a number of challenges was replaced by Cultivate, Newtown, alongside two Valleys locations - Welcome to our Woods in Treherbert; Greenmeadow Community Farm, Cwmbran, and finally Xplore! Science Discovery Centre, Wrexham as a demonstration and educational arm to the project. Through a Sell2Wales tender process, the following CEA providers were engaged to work on the project supported by digital specialists: Welcome to our Woods: LettUs Grow and Growstack consortium; Greenmeadow: Digital Farming; Newtown: Digital Farming and LettUs Grow collaboration; Xplore!: Farm Urban

The sites chosen had different considerations with regard to infrastructure, required preparation and site team engagement to enable the evaluation of most suitable and beneficial locations for future CEA system inclusion. Across the sites a number of different CEA systems have been introduced covering hydroponics (3 different formats), aeroponics (2 different formats) as well as simple self-irrigation structures for both inside and outside walls.

The project has demonstrated the feasibility of incorporating CEA into the community setting. Evaluation over the coming weeks will sense check the business models and through the continued work with the CEA SIG there is the opportunity to build on the learnings from implementation to optimise the benefits of introducing CEA across Wales. The modelling estimates an average minimum revenue of £50,000 and profit £16,500 p.a. per site, with a RoI of 2.8 years achievable.

To support the introduction of the CEA systems into the sites the project has been supplemented with demonstration equipment to drive engagement and the development of a comprehensive educational programme covering from primary school age through to adults. The outcomes of these programmes will be evaluated as they are delivered, with the first programme starting in May. The project has been supported with a suite of illustrations and a social media programme to raise awareness and drive engagement.

Project Overview | Objective

The project objective was to provide a test bed for Controlled Environment Agriculture (CEA) in the community setting – the very heart of the Foundational Economy.

CEA solutions to provide the communities with a source of hyper local, nutritious and healthy crops grown in a sustainable manner, with the intention for the growing and supply of crops to become self-sufficient for the community with the added benefit of providing educational opportunities about local food growing and healthy eating.

The project was led by Social Farms & Gardens, managed in conjunction with BIC Innovation, supported by Welsh Government's NutriWales Cluster and their Controlled Environment Special Interest Group (SIG) as well as the Horticulture Cluster group.

With the support of the CEA SIG, the project focused on using Welsh-based CEA and technology businesses where feasible to design and help install the infrastructure, ensuring it was suitable for each of the sites' areas of uniqueness. As part of the tender process the brief included the requirement for the successful businesses to provide a level of on-going support to the projects as the technology is installed, trialled, and moved into production.

Project Overview | Scope

The project started in November 2020, with an end date of March 2021.

The funding was utilised to deliver the following:

- Housing structures for the CEA systems (new containers, modification of existing space)
- Site preparation & readiness (infrastructure, services)
- Installation, commissioning and training for CEA production systems across the sites
- CEA demonstration equipment
- Educational programmes and toolkit creation, train the trainer and pilots delivery
- Additional equipment to supplement the CEA systems, e.g. polytunnels
- Creation of branding, illustrations and marketing campaign
- Consumables for the sites to utilise over the first 6 months
- Software subscriptions for CEA system management for first year of production

Project Overview | Sites

Three sites were initially identified for inclusion in the project, two in the Valleys and one in Wrexham. The two Valleys sites:

Greenmeadow Community Farm - one of only two 'city farms' in Wales, and one which connects people to food and farming in a very public way. It is owned and operated by Torfaen County Borough Council, bringing with it a high-level partnership. The farm already welcomes thousands of visitors through its gates and connects locally through a number of schools and college partnerships – making it an ideal 'showcase' location for this pilot.

Welcome To Our Woods (WTOW), nestled in the heart of the Rhondda Valleys this proactive community group has been actively engaging with its communities through partnerships with the Green Valleys CIC and their joint 'skyline' project. This partnership and ground up way of working has led to several funding investments in the region looking to explore community ownership of land and the benefits that can be brought about by allowing the community to utilise some of their surrounding natural green assets for the betterment of the environment, and the local communities. This makes it a unique and perfect fit for this pilot.

A new site was introduced in to the project in January to ensure the project objectives were delivered within the project timescales.

Pen Dinas, Newtown where Cultivate manage the food growing elements of this diverse community garden space. Cultivate is a cooperative, run by volunteers and employees who are dedicated to supporting a resilient local food economy, with a supporting infrastructure of Deli, box scheme, community café space and more recently the introduction of a high street building location that will enable CEA demonstration. Cultivate support the community by nurturing local businesses, promoting sustainable land management and connecting people to local food.

Originally specified site: Ty Pawb Community Hub, Wrexham, situated in the centre of Wrexham, this recently refurbished site boasted a monthly footfall of 50,000 pre-COVID, with around 25 clubs (including gardening and well-being) using the facilities as a meeting place. One of the key players in the successful regeneration of the town, with the exception of the proposed CEA unit, all units are let. There were also proposed links with the community rooftop garden where Welsh Heritage Fruit trees have been planted. Its facilities include an art gallery, stage area for concerts and rooms for educational visits and community clubs. It is directly opposite the new Xplore! Science Discovery Centre and adjacent to the Tourist Information Office which plans to sell local produce. Xplore! became a project partner to maintain presence in Wrexham when the Ty Pawb became unviable for this project.

Project Delivery

With the tight timescales involved initial focus was placed on visiting the sites, meeting the teams and understanding the individual site requirements and options for developing the infrastructure and CEA systems. This was to enable us to maximise the opportunities for successfully introducing local crops to the communities. Weekly virtual site meetings commenced in mid-November and continued throughout the project, bringing in the relevant parties as tasks progressed.

Tender documents for Sell2Wales were created to enable a competitive tender process for the CEA solutions at all sites and a separate quick quote was listed for the delivery of an educational programme and demonstration of CEA to drive engagement. The main Sell2Wales tender process was completed in mid-December and contracts were awarded ready for a January start date for the CEA providers, the quick quote was undertaken in February.

A range of demonstration equipment was sourced and areas have been created to engage visitors and community members with the project. These areas have been supplemented with promotional toolkits and interactive collateral to engage with and for use by visitors and customers. A virtual all-site event was held in March to learn more about CEA, discuss ideas and agree cross-site collaboration plans. Train the Trainer has been delivered for sites to be able to run their own educational workshops, either on site or at schools. Sites and CEA providers have liaised with schools, colleges and other community organisations to create awareness and start to gain interest in participating in the educational programmes.

The project team developed branding, a set of illustrations and launched accounts across social media platforms. The project has been promoted throughout the project focussing on community engagement and the sites have supported communications by promoting on their own accounts.

Routes to market and crop usage were identified for all sites ranging from use in on site cafes (either fresh or as part of menu items) and sales through site shops; supply to local care homes and schools as well as selling opportunities into local hospitality and retail outlets. Additionally crops will be used in existing and planned box schemes.

The CEA systems providers liaised with sites to ensure a smooth installation and commissioning process. Testing of equipment was carried out by both engineering experts and plant scientists, with support from technology software companies. Site teams were trained on the systems and provided with operational plan manuals and associated flow diagrams to support the learning process.

By the end of March 3 of the sites had progressed through installation, commissioning and started to grow and harvest initial crops. Welcome to our Woods delivery was delayed by the requirement for a longer than anticipated process for planning permission, site review and services introduction. At the time of writing (end of April) the CEA container and internal systems were in place ready for commissioning and first crop growing.

Welcome to our Woods Case Study

Location

Tappers Garage (ex-petrol forecourt, decommissioned in 2008) on Treherbert high street providing total immersion in the community. Land had previously been transferred from RHA to WtoW for community use. Brown field site on two levels with residential properties either side and behind the site. Previous hard landscaping work had been completed.

Site Requirements

Services – routing and connection of water, sewerage, electricity, internet.

Planning permission required, including proof of decontamination work previously completed and site analysis for current status. Groundworks for structures.

Site & System Details

Shipping container with LettUs Grow (8m2 aeroponics) and Growstack (4m2 hydroponics) CEA systems providing both hydroponic and aeroponic systems across 4 racks plus preparation and packing room.

Inclusion of a polytunnel to enable germination and propagation using CEA and then planting out, providing additional mainstream crops suitable for the community.

Addition of a welfare unit for staff and workshop use.

Edible wall for demonstration, crop (64 plug sites for herbs or leafy greens) and workshop use. Provision of an aquaponic produce pod for demonstration and school workshops.

Crops

Initial crops to be grown: peashoots, sunflower shoots, micro radish, micro red cabbage, lollo rosso, lollo verde, mizuna, oak leaf lettuce. The plan is to propagate nursery stock for the polytunnel e.g. tomatoes, peppers, cucumbers and look at heritage crops and higher value crops to offer a local USP.

Welcome to our Woods Case Study

Cost Model Headlines

Year 1 (May-Mar)

Farm Average Monthly Revenue (£/Month)	£2,009.75
Farm Average Monthly OpEx (£/Month)	£2,016.66
Farm Average Monthly Profit (£/Month)	-£6.91
Farm Annual Revenue (£)	£24,117.00
Farm Annual OpEx (£)	£24,199.95
Farm Annual Profit (£)	-£82.95

Year 2

Farm Average Monthly Revenue (£/Month)	£2,981.00
Farm Average Monthly OpEx (£/Month)	£2,016.66
Farm Average Monthly Profit (£/Month)	£964.34
Farm Annual Revenue (£)	£35,772.00
Farm Annual OpEx (£)	£27,083.52
Farm Annual Profit (£)	£8,688.48

Assumptions: Labour covers CEA system management only; with initial sales only from July 2021 and 90% crop utilisation from September. All sales at £23/kg through retail packs so packaging costs high. No revenue included for edible wall or polytunnel crops. Costs based on standard electricity supply.

Revenue & Customer Streams

Local hospitality and retail outlets
Local care homes & schools
Pay As You Feel Community Cafe
Introduction of a Rhondda Skyline food box scheme
Living salads format
Addition of a further container

Collaborations

Rhondda Skyline – Climate Action Fund 'Local Food Growing' Workstream
Severn Wye Biochar Project
Valleys Regional Park/BBB Scheme

Education & Engagement

Site launch event in June 2021
Funding of 3 primary schools Aquaponics Challenge – workshop plus 6-week in school programme

Cost Improvement Options

Micro CHP and solar power energy provision
Income from workshop delivery
Use of biochar as a growing medium

Welcome to our Woods Case Study

Successes

Immediate involvement and engagement from WtoW team, Green Valleys CIC, Rhondda Housing Association

Broader engagement with Valleys Taskforce, BBB scheme and other stakeholders with the region

Positive community engagement, generating new volunteers

Use of a site manager to co-ordinate tasks

Management of planning application with input from architects to provide drawings, SF&G CLAS support to manage process and liaise with planning officers

Successful engagement with residential neighbours around the site

Use of wider social media accounts, e.g. Rhondda Skyline, to promote the project

Challenges

Planning permission process within the timelines

Requirement to consider any contamination issues from historic petrol forecourt garage use

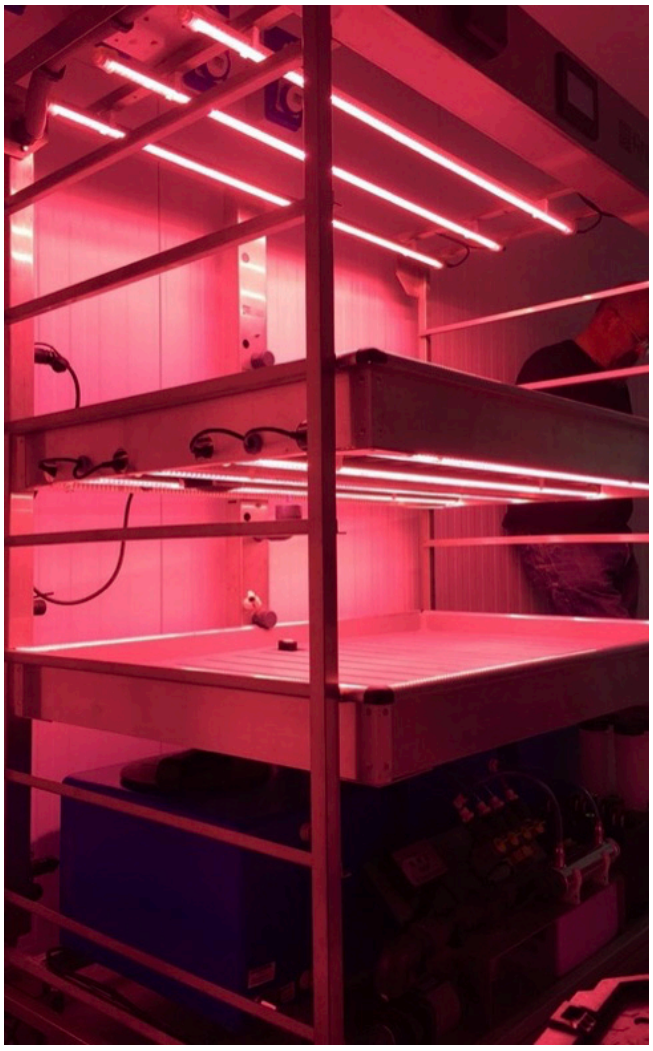
Lead times for services connections

Engagement with end users for business planning purposes and with educational establishments due to lockdowns

Extended lead times on container resulted in need to change supplier mid-project

The business model has been based on 100% retail packs initially and the growing meterage of the systems chosen is lower than other sites. This drives a less attractive RoI compared to the other sites due to the cost of packaging and yield achievable, however the use of the CEA system for growing on crops in the polytunnel will improve this position as will the introduction of route to market alternatives other than retail packs.

Welcome to our Woods Case Study



Greenmeadow Farm Case Study

Location

Greenmeadow community farm in Cwmbran.

Incorporated into the farm infrastructure, on the site of an old stable base. A location on the farm that has high footfall and was able to utilise an area that already had services available for connection.

Site Requirements

Services connection – water, electricity and internet all available but needed connection.

The old stable block base needed replacing and a soakaway was created for waste water.

A new CCTV camera and a cabled internet connection.

Site & System Details

Shipping container with 2 Digital Farming hydroponic CEA systems (1 x flood & drain racking system – 4.5m2 and 2 x nutrient film technique racking system – 10.9m2) across 3 racks. Plus a simple manual irrigation system with LEDs to maximise growing meterage and preparation & packing room.

An edible growing wall attached to the outside of the container for slower growing crops, e.g. culinary herbs, strawberries.

In the restaurant an old bar was converted to incorporate a demonstration area for the site with an edible wall (64 plug sites for herbs or leafy greens), an aquaponic produce pod and some table-top hydroponic systems.

10 PV solar panels fitted on to the top of the container.

Crops

Initial crops grown: microgreens and leafy greens including peashoots; mustard leaves, micro radish, micro red cabbage, baby gem lettuce, kale, pak choi, basil, sunflower shoots, watercress.

Greenmeadow Farm Case Study

Cost Model Headlines

Year 1 (April-Mar)

Farm Average Monthly Revenue (£/Month)	£3,735.82
Farm Average Monthly OpEx (£/Month)	£2,624.86
Farm Average Monthly Profit (£/Month)	£1,146.62
Farm Annual Revenue (£)	£44,829.84
Farm Annual OpEx (£)	£31,498.32
Farm Annual Profit (£)	£13,759.42

Year 2

Farm Average Monthly Revenue (£/Month)	£4,602.76
Farm Average Monthly OpEx (£/Month)	£2,769.21
Farm Average Monthly Profit (£/Month)	£1,833.55
Farm Annual Revenue (£)	£55,233.12
Farm Annual OpEx (£)	£33,230.52
Farm Annual Profit (£)	£22,002.60

Assumptions: Labour covers CEA system management only; with initial limited sales from May 2021 and 90% crop utilisation from July. All sales at £13.50/kg and replacement of bought in salad volumes at £7/kg. Third of crops used on site not requiring packaging. Crude revenue figures used for cafe sales, which will be refined as the menu evolves. Limited revenue included for additional edible wall added to the container in April. Costs based on standard electricity supply.

Revenue & Customer Streams

On site cafe and food to go
On site shop
Local care home
Local hospitality
Supply of produce with current meat boxes
Addition of a further container feasible

Education & Engagement

Substantial demonstration area in site cafe created
Organised primary schools workshops on site driving income stream for the farm
Aquaponics Challenge 6-week in school programme
Interactive toolkits for visitors (quizzes, information sheets, banners and educational boards on the container)

Greenmeadow Farm Case Study

Successes

An established site with employed resource resulted in the smooth introduction of the capital equipment.

With the farm closed to the public throughout the project it enabled staff to focus on supporting the CEA introduction, though required the management of staff availability as they weren't always on site.

Support from Torfaen Borough Council with regard to quote generation, access to resource to plan and deliver contractor work requirements. As well as support in provision of solutions to optimise the implementation.

Container and CEA systems installed and commissioned in just 11 weeks from CEA provider being awarded the contract, with crops harvested 2 weeks later.

One CEA provider, with one system and one software provider enabled a more efficient set-up and an easier process to manage than a consortium approach.

Welsh start-up CEA provider (Digital Farming) gained vital insight and knowledge throughout the project, enabling the delivery of a more effective and efficient process if the initiative is rolled out.

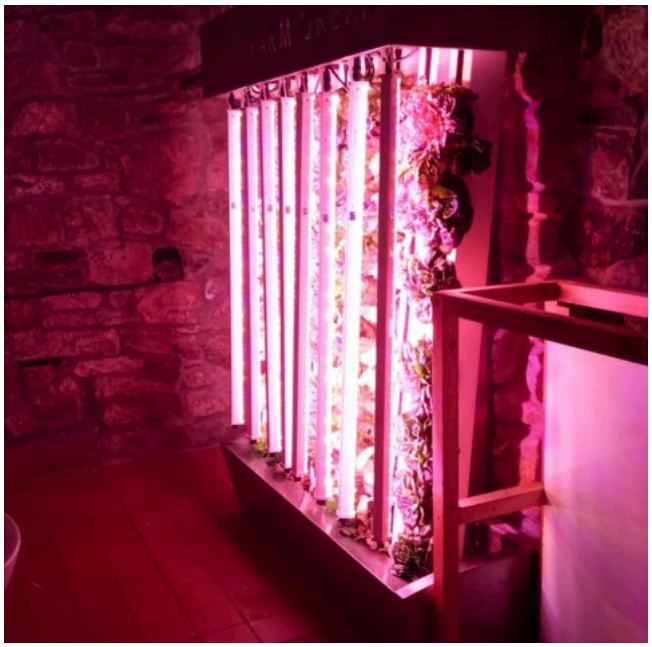
Welsh start-up software provider, Agxio, able to create, implement and test a suitable sensors and app package for future use.

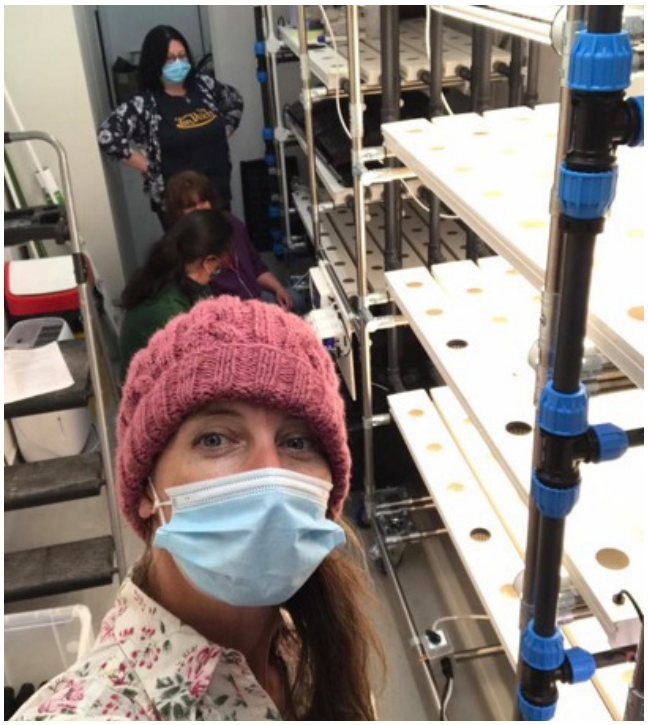
Challenges

Lead times for services support for IT due to the logging process for any projects delayed the use of a hardwired internet connection, however the use of 4G data enabled a short term solution.

Engagement with end users for business planning purposes and with educational establishments due to lockdowns.

Greenmeadow Farm Case Study





Newtown Case Study

Location

Pen Dinas site in Newton (owned by NPTC group of colleges). An existing site part managed by Cultivate that incorporates traditional growing, a Deli and in the process of converting an onsite bungalow to a food processing facility & community Café.

Site Requirements

Conversion of an existing site shipping container to incorporate a growing room, germination room and, due to full length windows, the introduction of an edible wall without LEDs.

Services connection – water, electricity.

Site & System Details

LettUs Grow (6m2 aeroponics) and Digital Farming NFT (10.9m2 V-Farm NFT hydroponics) CEA systems providing both hydroponic and aeroponic systems across 4 racks. Plus a preparation and germination room.

Plantbox wall with a simple hydroponic, manual- irrigation system, situated on outside of the grow wall to make use of the full length windows on the side of the container.

Edible wall for demonstration in alternative high street location, crop (64 plug sites for herbs or leafy greens) and workshop use. Complemented by a number of table-top hydroponic units.

Provision of an aquaponic produce pod for demonstration and school workshops.

PV solar panels added to bungalow roof.

Crops

Initial crops to be grown: microgreens and leafy greens including peashoots, micro basil, mustard leaves, sunflower shoots, micro radish, micro red cabbage, kale, watercress. Plus culinary herbs in the Plantbox wall.

Newtown Case Study

Cost Model Headlines

Year 1 (April-Mar)

Farm Average Monthly Revenue (£/Month)	£3,716.42
Farm Average Monthly OpEx (£/Month)	£2,969.37
Farm Average Monthly Profit (£/Month)	£746.82
Farm Annual Revenue (£)	£44,596.98
Farm Annual OpEx (£)	£35,632.44
Farm Annual Profit (£)	£8,961.89

Year 2

Farm Average Monthly Revenue (£/Month)	£4,580.22
Farm Average Monthly OpEx (£/Month)	£3,051.87
Farm Average Monthly Profit (£/Month)	£1,528.35
Farm Annual Revenue (£)	£54,962.64
Farm Annual OpEx (£)	£36,622.44
Farm Annual Profit (£)	£18,340.20

Assumptions: Labour covers CEA system management only; with initial limited sales from May 2021 and 90% crop utilisation from July. All sales at £13.50/kg and replacement of bought in salad volumes at £7/kg. Third of crops used on site not requiring packaging. Crude revenue figures used for cafe sales, which will be refined as the menu evolves. Limited revenue included for additional edible wall added to the container in April. Costs based on standard electricity supply.

Revenue & Customer Streams

Cultivate food products – salad mixes with allotment salad crops (Welsh, Italian, Spicy mixes)
Cultivate Deli
Local care home
Local hospitality

Education & Engagement

Demonstration area in high street location
Aquaponics Challenge workshop and 6-week in school programme
Edible wall positioned in FE college
Cultivate developing a CEA growing module in conjunction with the college for Level 1 & 2 Horticulture courses starting in September

Newtown Case Study

Successes

An established 'growing and food' site with existing resource resulted in the smooth introduction of the capital equipment with a short turnaround after a change of site location in January.

CEA solutions were scoped out to fit within the site requirements through a collaboration between Digital Farming and LettUs Grow, showing the benefit of having existing relationships through the NutriWales CEA Special Interest Group.

Implementation from agreeing specifications to delivery was 7 weeks.

Working with Circular Economy Mid-Wales to provide an energy solution incorporating solar panels.

Efficient management of budgets to enable the inclusion of CEA at Xplore! to ensure a presence remained in Wrexham after being unable to proceed with the Ty Pawb site plans.

Support and engagement with the NPTC Group of Colleges resulting in a collaboration to deliver CEA modules with new Level 1 & @ Horticulture courses from September.

Challenges

Unable to put the demonstration wall into the high street location during building work, so was temporarily housed in the container on site which impacted on the growing room environment, requiring additional monitoring and management by the site team and the CEA providers. Edible wall was moved to the college reception to promote the new courses and the initiative in general.

Access to end customers during lockdown, but Deli opening at the end of April to enable further promotion, with in store posters and flyers.

Newtown Case Study

Xplore!
Case Study

Location

Xplore! Science Discovery Centre is located in the centre of Wrexham, having opened in October 2020, in a redundant department store.

The CEA system will be the first living exhibit in the centre.

Site Requirements

Site did not require any work to be done prior to installation.

The centre has been closed throughout the various lockdowns so awaiting opening date.

Site & System Details

Edible wall for demonstration, crop (64 plug sites for herbs or leafy greens) and workshop use.

A 16-tower, climate controlled growing wall to service the display wall to ensure it remains fully-stocked and to be able to demonstrate the growing cycle phases.

Provision of an aquaponic produce pod for demonstration and school workshops.

Provision of a range of table top hydroponic units for further demonstration purposes.

Crops

A range of lettuce-heads, leafy greens and herbs delivering maximum impact for the exhibit.

CEA provider provided seedlings for initial set-up and a planting plan.

Xplore!
Case Study

Cost Model Headlines

Year 1 (April-Mar)

Farm Average Monthly Revenue (£/Month)	£945.00
Farm Average Monthly OpEx (£/Month)	£374.34
Farm Average Monthly Profit (£/Month)	£570.66
Farm Annual Revenue (£)	£11,340.00
Farm Annual OpEx (£)	£4,492.08
Farm Annual Profit (£)	£6,847.92

Year 2

Farm Average Monthly Revenue (£/Month)	£1,230.00
Farm Average Monthly OpEx (£/Month)	£374.34
Farm Average Monthly Profit (£/Month)	£855.66
Farm Annual Revenue (£)	£14,760.00
Farm Annual OpEx (£)	£4,492.08
Farm Annual Profit (£)	£10,267.92

Assumptions: Based on known costs for the CEA system from previous installations. Includes Xplore! Staff costs to manage.

Education & Engagement

Year 1: 2 school workshops per month; 50 additional visitors per month. First primary school workshop 11th May.
Year 2: 3 school workshops per month; 50 additional visitors per month
Estimated target of 2,160 primary school children and 300 secondary school children each year.
Further revenue streams available through Future Foods Challenge secondary school programmes which run over a term covering multiple subjects and skills.
Celebration events to be held at Xplore! for schools, parents and the local community. To include Dragon's Den style of presentation for secondary schools and guest speakers.
The project includes the delivery of one pilot programme for each of the primary and secondary school initiatives supported by the CEA provider as well as train the trainer provision.

Xplore! Case Study

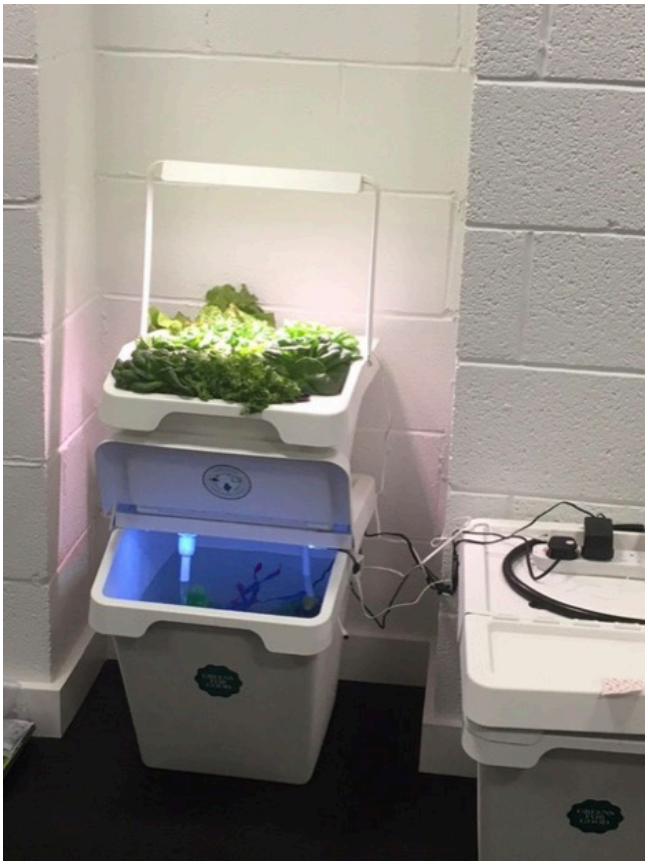
Successes

Engagement with Xplore! enabled the retention of presence for the project in Wrexham, through the consideration of a engagement & educational solution rather than growing for sale.

First living exhibit in the centre. Providing a shop window for community engagement.

Ability to evaluate the benefits and showcase the opportunities to offer educational programmes. Providing a test bed for consideration to immerse such activity into the curriculum.

Support the success of the centre through delivering increased revenue and to drive visitor footfall.



Xplore!
Case Study

Outcomes | Delivery

- 3 out of 4 sites installed with CEA structures and systems by the end of March with required groundworks completed.
- WtoW delayed due to planning application timelines, site preparation and services connection, but in place by the end of April.
- Successful CEA delivery with multiple providers and systems using a competitive tendering process.
- Inclusion of two software systems to evaluate optimal solutions for future instalments.
- Training of site teams through a grow cycle to manage the CEA systems, including the monitoring and adjustment of controls, system maintenance, germinating, propagating and harvesting.
- Creation and provision of operational guides and planting plans for the sites.
- Engagement of an experienced provider of educational programmes to create bespoke packages for each site.
- Train the trainer sessions to enable delivery of future educational workshops and programmes.
- Development of branding, marketing collateral and use of social media accounts for promotion.

Outcomes | Benefits

- Deeper understanding of system set up and usage for relatively new start-ups, including Welsh-based companies, in this rapidly growing sector
- Building deeper collaborations across the CEA network
- Insight into required system improvements for better crop growth and yield; more effective system usage; technological advancement
- Piloting of software and system elements benefitting stakeholders for future opportunities
- Increased volunteer participation within the communities and opportunities for employment (Growing Manager at WtoW), including the use of Kickstart scheme (Newtown)
- Additional skills for employed site staff through training and on the job experience (8 employees)
- Creation of operational plans and flow diagrams ready for future instalments
- Showcase* of CEA within the region resulting in:
    - enquiries from farmers, local authorities, start-ups
    - collaboration with colleges to introduce new course modules
    - enquiries from institutions to collaborate on funding bids
    - requests for expertise for advisory boards

(* from virtual engagement and promotion to date – further benefits expected from practical viewing and experience)

Next Steps

- Complete WtoW site growing cycles and training
- Obtain detailed feedback on software platforms and CEA systems
- Facilitate activities planned to promote project:
  - launch event at WtoW site
  - celebration event at Xplore! post initial school workshops
  - inclusion of edible wall in Newtown college reception

- Run school pilot workshops across all sites as soon as restrictions allow – first workshops starting in mid-May
- Promote site activities through social media throughout May to drive further awareness and engagement
- Close out meetings between CEA providers and sites

Project Evaluation | CEA Providers & Site Feedback

What Worked Well

- Open and ongoing dialogue with, and support from, SF&G
- Clarity on project requirements
- Collaborative approach from SF&G and CEA operators
- Enthusiasm and capability of community organisations - left with a sense that they will do everything they can to make this work
- Quick and straightforward tender application process
- Quick and straightforward payment process
- Opportunity to meet and work alongside other CEA operators
- Straightforward and ran smoothly
- Weekly meetings

Challenges?

- Short timescales
- Installing systems with temporary services supply resulting in repetition of some tasks
- Site works resulting in intermittent electricity supply affecting grow cycles
- Training budget limited for Xplore! to cover all staff
- End user & community engagement during Covid-19 restrictions

Do Different Next Time?

- More time for planning
- A group stakeholder meeting with all sites and providers earlier in the process
- Site visits pre-installation in the project
- More structured meetings (sometimes difficult with volunteers)
- Simplify with one system per site (use evaluation to determine 'best' system
- Use experience gained!

'An absolutely incredible job, recruiting the right providers and the right community organisations, we have thoroughly enjoyed delivering the project and are excited to work with the sites over the coming months.'

'Thanks everyone. It has actually been quite straightforward so far (especially with some good training from Katia).'

'The enthusiasm and commitment from all of the partners has been fantastic!.'

'My dinner was amazing last night with the lettuce and microgreens...I was so hungry I forgot to get a photo!!'

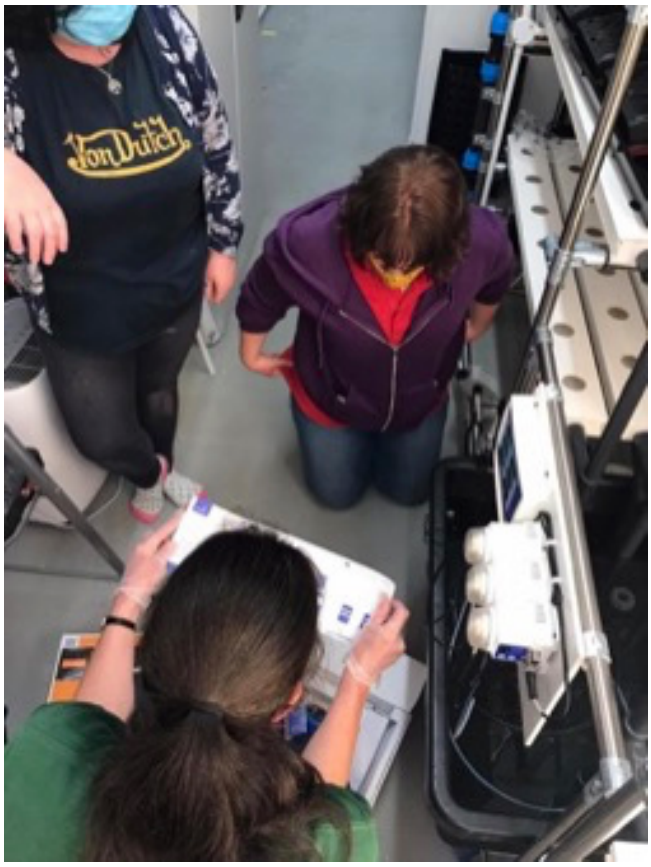
'The project has been extremely well received by our staff and we are really looking forward to opening to be able to show them off to visitors as well as to get the school programme underway.'

Recommendations | Costs

- Review cost model v real life results, incorporate seasonal demand at sites for visitors and customer sales
- Further work required on reducing energy costs and utilising more sustainable solutions - light cycles & electricity tariffs; combined heat & power systems
- Explore cost improvements in more detail – use of latent heat; use of nutrient waste; more affordable system hardware
- Feasibility of designing and manufacturing hardware within Wales
- Review benefits of increasing growing capacity on existing sites – increase local supply, improve RoI through economies of scale
- Introduce additional added-value revenue streams, e.g. further processed foods linked to food hubs, such as pesto
- Future opportunity to trial new crops, new consumables (utilise waste products or natural resources), integration with traditional agriculture – feasibility of nursery stock provision for tree saplings for timber, orchards or allotments

Recommendations | Community

- Evaluation of various aspects of the project, especially community feedback and benefits
- Undertake evaluation of impact on communities through questionnaires/ surveys
- Identify impact on knowledge and engagement with healthy food choices - potential to engage with new ESRC PhD studentship the NutriWales cluster is supporting, 'Community acceptability of sustainable food consumption amongst diverse populations'
- Further explore potential to collaborate with partners to utilise the CEA community sites to enable the delivery of further benefits (Carmarthenshire CC ; BBB scheme; Cardiff University ASTUTE; Future Foods Programme; NutriWales cluster and the CEA Special Interest Group; potential RDP programmes)
- STEM and agriculture school curriculum consideration – 'farmers of the future'



Further Evaluation

Further evaluation required once the sites are established in producing, harvesting and selling to end users:

- Operational costs
  - Water & electricity usage
  - Benefits of solar power
  - Benefits of growing cycles – e.g. lights at night to utilise cheaper electricity
- Ease of system usage
- System type analysis
- Impact of multiple system inclusion at one site
- Ease of software applications
- Crop yield and quality
- Best crop varieties for growing and selling
- Routes to market: customer base and selling prices, pack formats
- Capture visitor feedback for Xplore! & Greenmeadow
- Educational programme feedback from sites and schools
- Value v price - social & environmental benefits

'On another note entirely my son ate a whole head of lettuce this morning after breakfast🙂 We really want to set up an aquaponics station at home😍

Appendix 1: Social Media & Marketing Support

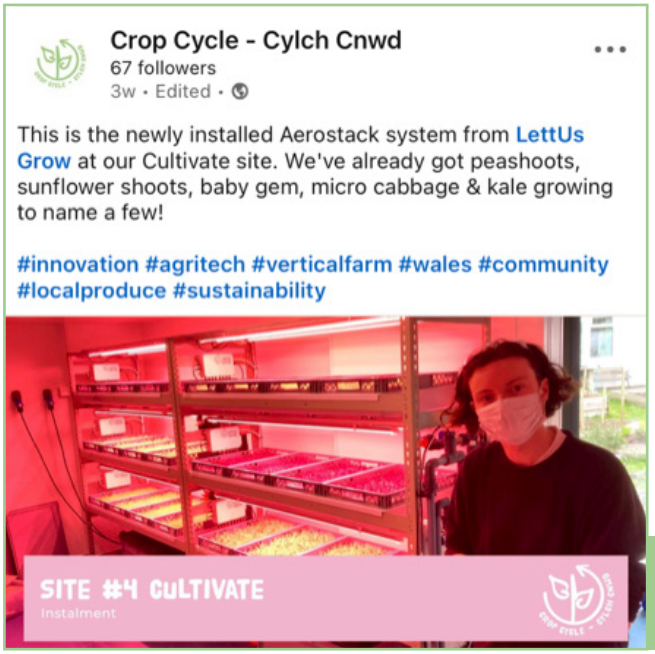
Instagram: @crop_cycle
Twitter: @CropCycle

Facebook: @cropcycle.cylchcnwd
LinkedIn: Crop Cycle – Cylch Cnwd

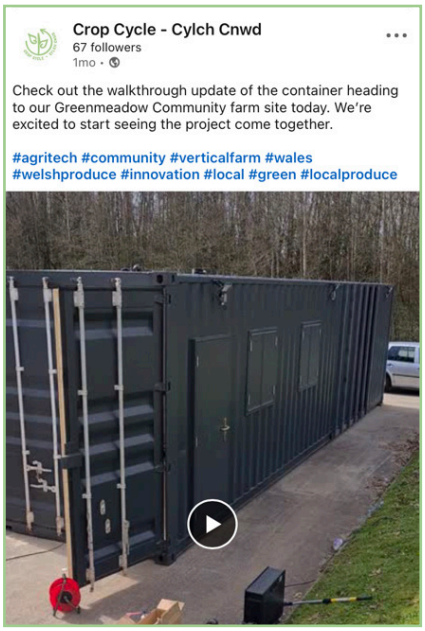
LinkedIn

68 Followers

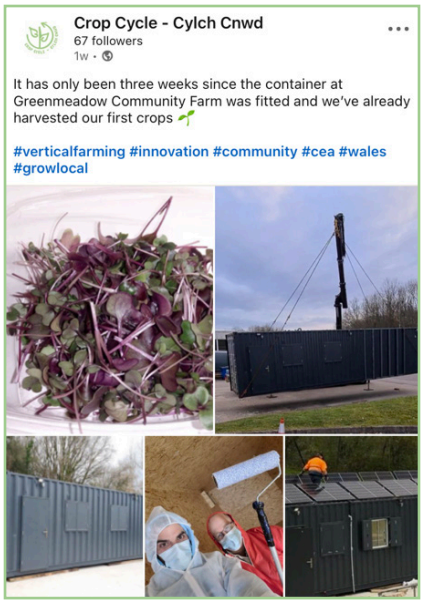
Avg. 3.2k Impressions per month



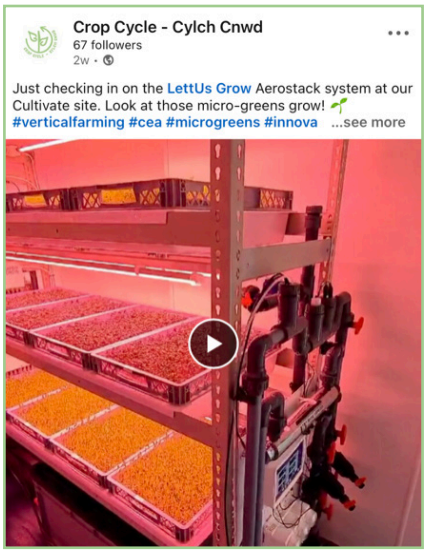
238 Impressions
30 Engagements



251 Impressions
29 Engagements



1044 Impressions
79 Engagements



278 Impressions
83 Engagements

Appendix 1: Social Media & Marketing Support

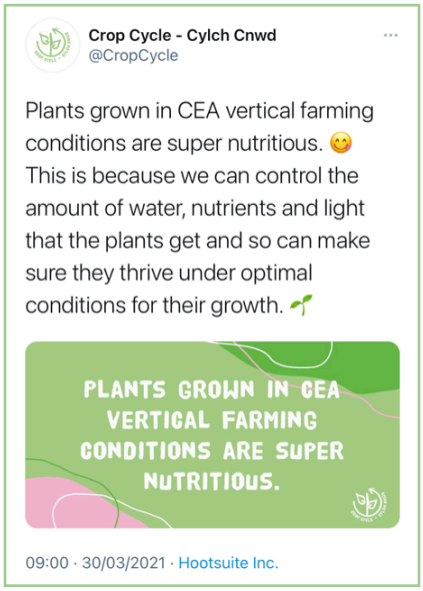
Twitter

43 Followers

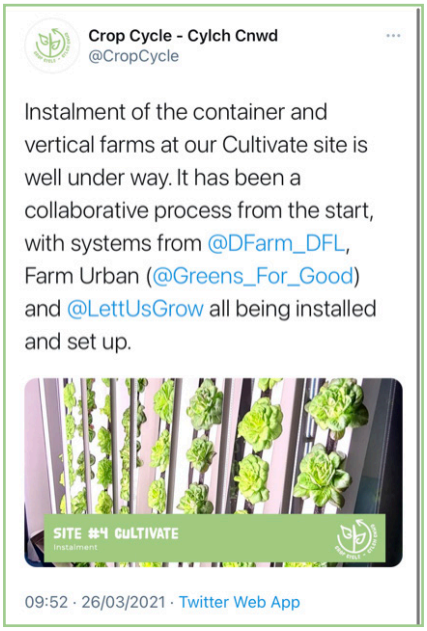
Avg. 8.8k Impressions per month

578 People Reached
13 Engagements

497 People Reached
17 Engagements



741 People Reached
15 Engagements



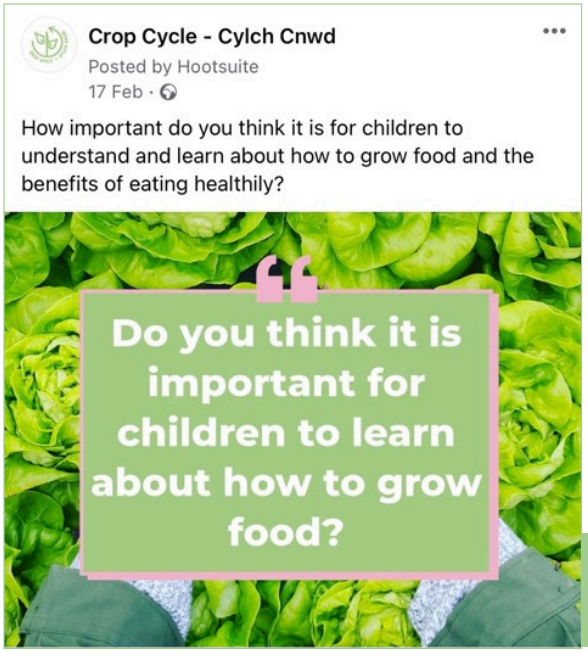
904 People Reached
45 Engagements

Appendix 1: Social Media & Marketing Support

Facebook

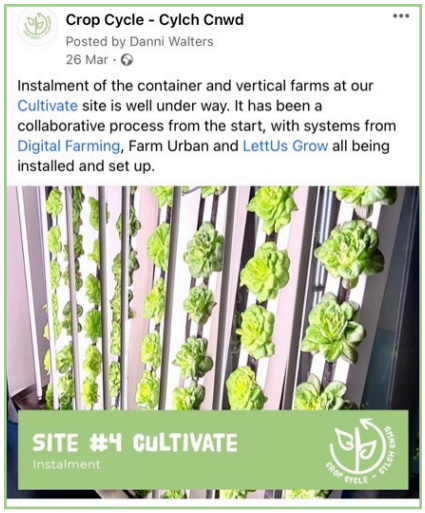
63 Followers

Avg. 747 People Reached per week



2219 People Reached
81 Engagements

1688 People Reached
24 Engagements



343 People Reached
20 Engagements

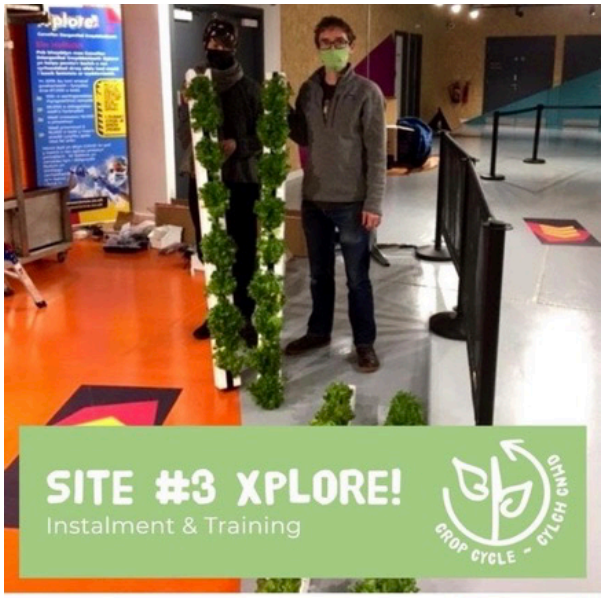
2645 People Reached
91 Engagements

Appendix 1: Social Media & Marketing Support

Instagram

86 Followers

Avg. 400 People Reached Per Week



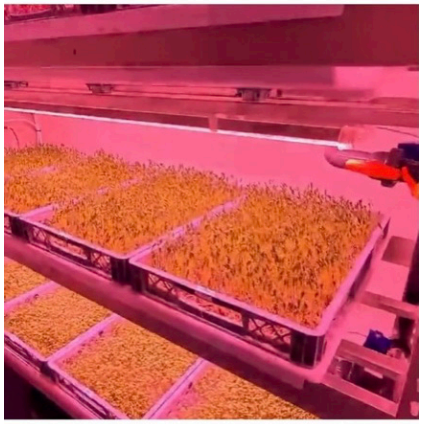
View Insights Promote

Liked by pocket_rockets_microgreens and 8 others

crop_cycle The @xplorescienceccentre site has now had the living wall and 'pods' installed and had a training workshop for the education programme with the thanks to the team at Farm Urban (@greens.for.good).

"The Xplore! team are excited to be part of the project and the wall and pods have had some great responses from other staff who've seen them as well. We all want to go and make our own pods now!" - Katie, Xplore!

crop_cycle



View Insights Promote

111 views · Liked by pocket_rockets_microgreens and cultivatenewtown

crop_cycle Just checking in on the @lettusgrow Aerostack system at our @cultivatenewtown site. Look at those micro greens grow! 🌱

#verticalfarming #cea #microgreens #innovation #sustainability #agritech #community #green

crop_cycle

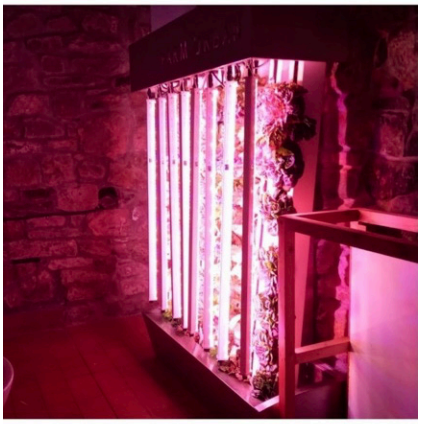
View Insights Promote

Liked by pocket_rockets_microgreens and 14 others

crop_cycle It has only been three weeks since the container at @greenmeadow_community_farm was fitted and we've already harvested our first crops 🌱

#verticalfarming #innovation #community #cea #wales #growlocal

crop_cycle



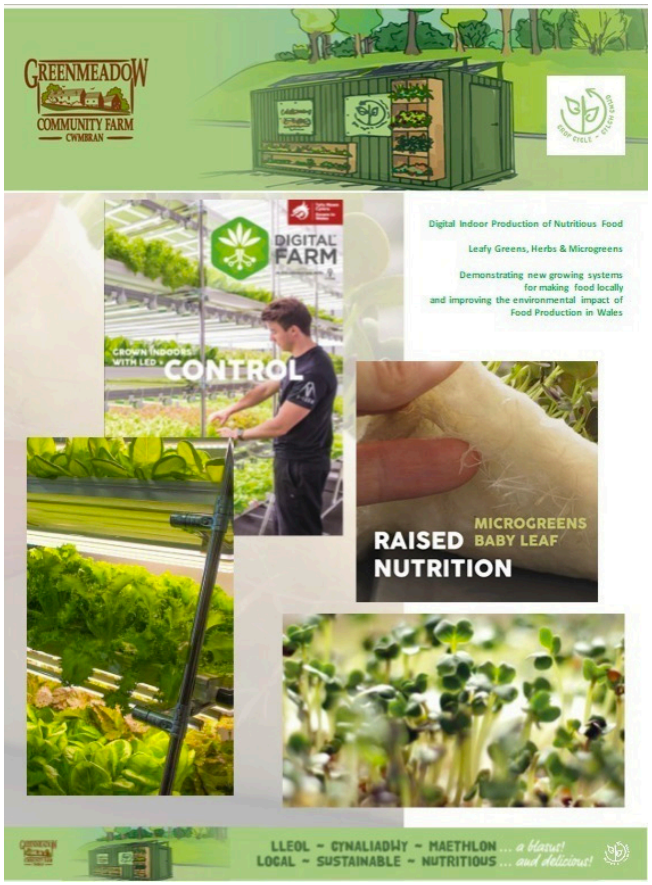
View Insights Promote

Liked by greenmeadow_community_farm and 16 others

crop_cycle This is the demo edible 🌱 wall from Farm Urban (@greens.for.good) at the @greenmeadow_community_farm site.

#verticalfarming #cea #lettuce #growlocal #crops #agritech #agriculture #LED #innovation #community #wales

Appendix 1: Social Media & Marketing Support



Container Poster

Creation of Crop Cycle logo

WtoW Promotional Video
https://youtu.be/Fq81p39RaG4

Poster for Deli

Banner for Demo Area

Media Coverage

'Welsh Government Funding to Root Food Production Project'. 2.04.21
https://businessnewswales.com/welsh-government-funding-to-root-food-production-project/

'News in brief: Minister claims public backing for cautious reopening of Wales'. 22.03.21
https://nation.cymru/news/news-in-brief-minister-claims-public-backing-for-cautious-reopening-of-wales/

'Welsh Government funding to root food production project in communities as Foundational Delivery Plan is published'. 21.03.21
https://gov.wales/welsh-government-funding-root-food-production-project-communities-foundational-delivery-plan

'Ian Thomas and Welcome to Our Woods'. 18.03.21
https://revisitingbritain.substack.com/p/ian-thomas-and-welcome-to-our-woods?utm_campaign=post&utm_medium=web&utm_source=facebook&fbclid=IwAR0YRZMNxKIiDm-x7QfNPhhTvyEme8LNfa2tJaBjwrzKxyXgj01lEs3GuT8

'Greenmeadow Community Farm Becomes A Test Bed For Exciting New Crop Cycle Project'. 27.01.21
http://news.wales/news/31190-greenmeadow-community-farm-becomes-a-test-bed-for-exciting-new-crop-cycle-project.html