Integrated Pest Management CASE STUDY

"Getting people involved, growing lots of great food"

Project jointly produced with:

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Soil Association

PESTICIDE ACTION NETWORK UK

COFARM TOGETHER WE GROW

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CoFarm Cambridge produce

"Getting people involved, growing lots of great food and creating a space where nature is absolutely bouncing back in as well. It feels great!"

Gavin Shelton, Dominic Walsh, Peter Wrapson - CoFarm Cambridge

Farm size and soil type: CoFarm Cambridge is a 2.83 ha Community Farm located on Barnwell Road, Cambridge. The farm rents privately-owned agricultural land alongside Coldhams Common – a much loved area of local greenspace in Cambridge. The soils are chalky clays which vary in texture across the site.

History: From the mid-1800s food shortages following the Napoleonic Wars focused attention on novel fertilisers. This part of Coldhams Common was mined between 1850s-1890s for coprolite – the fossilised faeces of dinosaurs. Most recently the land was used for intensive arable production.

Crops Grown: 55 varieties of vegetables, fruits, spices and herbs are grown including some Heritage varieties.

Each variety is chosen for flavour, nutrition and disease resistance. Wildflowers, grasses and native shrubs surround the horticultural area supporting pollinators, beneficial predators and a wide range of birds and mammals. A new heritage orchard has also been established.

Regenerative Agriculture and Integrated Pest Management: Every aspect of land management contributes to the regeneration of soils, biodiversity – and people. Volunteers thrive through enjoyable social contact and engagement with nature. Their careful attention to detailed 'hand husbandry' underpins high yields through a successful approach to Integrated Pest Management (IPM).

COFARM
TOGETHER WE GROW

Gavin Shelton CoFarm Cambride (Sam Mellish)

Setting the context and stating the issues.

Reflecting over many years on the big drivers behind biodiversity loss, climate change and health inequalities helped Gavin Shelton to conclude that: *"all roads take us back to food and fixing the food system. We need to create sustainable, hyper-local food systems that involve communities and reposition food production to be at the heart of the community as it once was".*

The location of this exemplar project is important. Cambridge is a city of contrasts. An internationally-prestigious university city thriving and expanding at the centre of 'Silicon Fen', Cambridge also contains areas of shocking deprivation.

"Where we are in Abbey Ward is in the lowest 20th percentile in the country in terms of the government's Indices of Deprivation data. Even pre-pandemic, food poverty was already a very significant issue. The need for access to emergency food is escalating as more people become financially-insecure. Cambridge wears lots of crowns, but it is also the most unequal city in Europe. There is a ten-year life expectancy gap between Abbey and Newnham - a more affluent ward just a mile and a half away from here."

"So the starting point for CoFarm has been to make sure that sustainably grown seasonal food is not a fringe interest for a small number of people that have the resources to afford that luxury."

By working with local people to genuinely co-design this new model, Gavin and horticultural co-leads Peter Wrapson and Dominic Walsh, have demonstrated that by sparking people's enthusiasm and enabling their volunteer effort - it is possible for human labour to create a successful horticultural enterprise using integrated pest management.

"By involving people we're doing something quite holistic, growing food in a really sustainable way that doesn't rely on any chemical inputs or synthetic fertilisers. We have just gone back to basics really, but involving people in that process. So restoring biodiversity and natural capital in a way that supports people's health and wellbeing."

Q: Can you explain what CoFarm Cambridge does.

Gavin explains the way the farm works:
"Our response to the pandemic has been to donate everything we have grown. That's over 12 tonnes of fresh food so far. Several times a week the volunteers pick whatever's ready. We do forensically monitor the yields to capture the value of our produce at Soil Association farmgate prices. Over £52,000 worth has been donated so far. Cambridge City Council take the produce to a central distribution hub run by Cambridge Sustainable Food Community Interest Company where it gets distributed to eight community food hubs across the city which were set up as part of the Covid emergency response."

Many hands make light work (Sam Mellish)

"Then people experiencing food insecurity go to their local hub to access the food. We identify with the Community Food Hub model because it's not means tested. Nobody has to prove that they are in need to access the food. There is a lot of dignity in the fact that you are not asked lots of questions. You are trusted that if you are there to collect food - it's because you need it. That feels appropriate.

"The demand for this food is much higher than we can meet. In business terms, we can demonstrate the model can wash its face economically but we have just chosen a different way of financing it as part of the Covid response. We will be moving to a subscription based scheme with an annual membership fee of £66/year. That was the magic number that everyone was happy to pay when we conducted our initial consultation and co-design phase with the local community. Local businesses and donors will cover the subscription fees for households who are unable to pay it."

CoFarm volunteers hard at work (Sam Mellish)

Q: How did you get started on this journey to IPM?

The starting point for CoFarm Cambridge was to co-design, then co-create, an agroecological community farm capable of restoring nature, delivering fresh produce and generating a sense of hope and optimism.

"We wanted to do something that gave people a real sense of hope - because we've got some agency over these 'larger than self' challenges such as climate change and biodiversity loss. Just getting involved and transforming a field, into a really thriving market garden that produces lots of food where nature is absolutely bouncing back in as well."

The speed at which the ecosystem regenerated was a surprise.

"Seeing that it can happen really quickly, it IS happening really quickly! It just feels really important that people, especially in the pandemic, can see that this approach works. The mainstream media is very focused on everything that's wrong in the world, but this is a place you can see how to change that. We've all got the power to do that. Arguably, if sustainably grown food can't become the norm, then we are in big trouble."

Q: Do you have examples of where IPM has worked well on your farm?

The team describe two case studies where IPM has been essential to food production on the farm.

Volunteer-based Integrated Pest Management:

Ideally, arable land should provide a clean slate free from pests and diseases. Dominic Walsh explains *"We had hoped that because this was a new site for growing veg and fallow for a few years, it would take a while for pests to find the site. But a couple of hundred metres away is a long established allotment. The prevailing wind has brought a whole range of issues including white fly and aphid mostly - but also flea beetle, carrot fly and allium leaf miner."*

The impact of pest attack in terms of disease, physical damage, loss of distributable yield and quality are very serious - potentially leading to the loss of the entire crop.

"Aphids suck the sap out of the plants and make a mess. There's faecal matter everywhere - the honeydew which they excrete gets mouldy. If they damage the growing tip of brassicas when they are very small the leaves fold up or grow in a contorted way.

"A large proportion of the crop can be damaged, and unusable because of the number of insects on it. Either the eggs or the larval stage but also the whiteflies themselves. You can't serve that up to somebody. Chefs won't use it - It can't be used."


Pricking out seedlings

Pesticides are not used at CoFarm to avoid toxicity to the environment or people. Several IPM approaches are used to protect crops including physical barriers (e.g. nets), hand eradication of insects and close attention to crop hygiene through the removal of pests and diseased plant material. Well-maintained nets provide effective barriers against insect or pigeon attack. This is particularly important when plants are small and vulnerable. Two grades of net are used at CoFarm with larger mesh protecting against cabbage white butterfly and white fly and smaller grades excluding flea beetle and whitefly.

"Nets last between five and ten years depending on how they are handled, weed control and how stable they are in UV. It's unavoidable to have a few holes but butterflies find even a short run in a net and get under. Once you notice holes in the leaves, volunteers go through the plants systematically, turn over the leaves, look for the caterpillars and squash them. They will also be washing white fly off, washing aphids off by hand."

Disease control also relies on careful cultural control to remove any source of infection, explains Pete:

"The cultural control for tomato blight is to pick everything off that is 'blighty'. Mulching with straw or compost holds a lot of the spores down when it rains or you water - so they don't splash up onto the plant and reinfect it.

"Having a green bridge can be a problem, but controlling that is about cleanliness as well. So when we pick the leaf brassicas, we pull off the old leaves or those infected with white fly or aphid - they could be hibernaculum for the whitefly to hibernate in. They get buried in the compost heap and covered to prevent further spread. It's low tech but it works. Anything blighted we will burn. We are really good on cleanliness – that's something that we really focus on – pretty much every session."

Finally, Gavin adds that CoFarm's IPM approach makes the most of human labour in ways that benefit both the environment and the volunteers.

"By having so much human input – over 8,500 hours from 500 co-farmers in our first two seasons - that negates the need for fossil fuels or chemical inputs. We are using human labour in a way that's really beneficial to people's mental and physical health. So, we get the health benefits for those people, but we also get the benefits of not using harmful pesticides that would harm biodiversity and natural capital."

Biological Pest Control Using Beneficial Predators.

Whilst volunteers work to remove harmful pests from crop plants during volunteer sessions, beneficial predatory insects work every waking hour throughout the season to protect crops against both pests and diseases.

CoFarm release Green lacewing *(Chrysoperla carnea)* and native ladybirds *(Adalia bipunctata)*. Through the active creation of adjacent habitat - the farm also encourages hoverflies and parasitic wasps to perform pest control, explains Dominic.

"The larvae that we deploy are Chrysoperla carnea the green lacewing. That's the only lacewing that overwinters in this country. We put them out in November. Volunteers make lacewing boxes out of pallets which have a kind of louvered front. They are put up on a post with straw inside plus a pheromone block of the male lacewing to attract the females to overwinter there."

Volunteer co-farmer Alex watering the leeks

By encouraging lacewing to overwinter on the site the larvae are ready to control pests from the start of the season.

"The trick to successful IPM is knowing when your pests are there and having the beneficials ready for them. When whitefly emerge the lacewing larvae will be roving around eating things. Normally the first few larval stages are the most voracious. Last year, we deployed two and a half thousand lacewing larvae. They were first and second larval stages – that's more effective.

"We apply 10 lacewing larvae per plant. Just get a bit of cardboard, make a sort of 'v' and tap them into the centre of the plant."

To focus control and provide protection, the lacewings are released under nets. *"They're all under the netting, so they don't escape as readily as they would in the open. Plus they're also slightly sheltered inside the netting, it does afford some protection from the frost."*

Native ladybirds are also released on site and they have proved to be effective at controlling severe infestations of aphids and whitefly.

"For the biological control, we deployed about a thousand native two-spot ladybirds last year. It's most efficient if you deploy larvae and adults working together."

When numbers of ladybirds are high, volunteers can boost numbers of ladybirds to control infestations.

"In a good year for ladybirds there are huge numbers of them. Volunteers collect both adults and larvae and let them out under the nets. We had bad infestations on small (15-20 cm) brassicas and they completely cleaned the problem up really quite quickly. They grew away fine. It was really quite obvious that it had worked."

In terms of saleable/distributable yield of crops the IPM approach is cost-effective. Last year CoFarm spent £250 on lacewing and ladybird larvae which protected the considerable investment in seeds and crops.

There is additional investment in the habitat surrounding the horticultural plot. *"Because we've sowed the around 4.5 acres around our market garden block with meadow mixtures - that surrounding habitat helps the predators. In three, four years, there's going to be an amazingly biodiverse meadow all the way around the outside with at least 39 species of flowers and 17 meadow grasses. That supports hoverfly and they predate aphids and whitefly. Not using sprays is also encouraging a lot of other things. We had parasitic wasps with cocoons underneath the kales, and they parasitise cabbage white caterpillars."*

The approach developed by CoFarm re-builds every part of the ecosystem to support the cropping *"So it's about having the whole ecosystem, having the habitat and encouraging the right beneficial insects as well as deploying them if you have to."*

Peter Wrapson and Dominic Walsh, horticultural leads for CoFarm Cambridge

Q: What have been the main benefits of using an IPM approach?

Social benefits: *"repositioning food and farming at the heart of our communities"*

- Donating high quality nutritious food to people suffering financial insecurity and poverty:
- Creating a sense of community cohesion: 500 volunteers with a core group of people highly committed to the site - plus local people feel included.
- Providing a safe haven through the pandemic to *'stop people going crazy at home'.*
- Countering mainstream media focusing on what is wrong in the world.
- Building agency and hope: people can see that this model really works.
- Running a successful co-design approach: providing a template for other projects to use.
- Tackling social isolation and forging stronger bonds and friendships between people who may not otherwise have met.

Economic benefits: *"driving more economic inclusion at a local level"*

- Securing corporate and charitable funding and translating this into free fresh, sustainably produced food.
- Delivering over £52,000 worth of food to Community Food Hubs close to people's homes throughout Cambridge.
- Tackling health inequalities and food insecurity.
- Generating volunteer labour to care for crops, to watch and protect the site.

Environmental benefits: 'nature bouncing back'

- Demonstrating the speed of recovery that is possible with sensitive land management.
- Creating habitat for beneficial predators and pollinators to maximise yields in the absence of any pesticides.
- Strengthening people's relationship with nature: volunteers enjoying the opportunity to watch wildlife and immerse themselves in nature.

Increasing the number of birds:

- Restoring greenfinches whose numbers have declined due to disease.
- Supporting goldfinches who feed on numerous seed heads on the site.
- Attracting top predators such as sparrowhawks and foxes that deter pigeons.

Q: Do you have any Top Tips for other Farmers who want to start this approach to IPM within CoFarming?

Use word of mouth to find your site and be flexible in your approach.

- Each CoFarm will be different depending on the land and the people who live there.

- Be prepared to change your approach depending on the site you find.

Invest time and effort to genuinely co-design our project.

- Understand the social context of the area in which you are working.
- Using multiple means of communication, find out what local people need and work to ease the pressures that affect their lives.
- Engage constantly and informally with people already using the site to understand how they use and value that land.
- Ask people how they want to FEEL on the site and how to provide that feeling.
- Ensure the 'visuals' illustrating the concept include people to allay fears that regular users might be excluded from the site.
- Choose what to grow through community consultation. Choose varieties for flavour and nutrition that are suited to the multi-cultural mix of the neighbourhood.
- Build a sense of ownership of the site.
- Form a group of local people and stakeholders to discuss, refine and agree the approach.
- Finally, check once again with local people that the final plan is what they want to do.

Choose the right pace for each task.

- Be slow and patient with listening – check you have understood correctly.
- Deliver improvements and action on the ground at speed.
- Volunteers.
- Get to know each individual volunteer so you can choose work to suit each person.

Empower people with hope.

- Create and promote a message of hope to counter mainstream media gloom over biodiversity loss. Help people to believe that they CAN do this – and that they will see the benefits very quickly.

Reposition food to be at the heart of community.

- Use food as a focus to bring people together around global issues of sustainability and climate change.
- Work to increase community cohesion whilst also driving economic inclusion as well.
- Re-build the relationship between the producer and the consumer of food.

Use an IPM approach to food production led by professional growers who know what they are doing.

- Don't rely on chemical or synthetic inputs. Avoid harming your land with pesticides.
- Instead, use human labour to replace inputs in a way that builds fertility and restores biodiversity.
- Really focus on crop cleanliness to reduce disease and pest pressure.
- Be alert. Watch your crops closely for pests and diseases.

Volunteer Co-Farmer Chermayne harvesting French beans

Look at this lovely lot!

Monitor all the benefits you create.

- Measure yields and economic value; understand the value added by volunteers. Monitor the increases in biodiversity and soil health.
- *"Ideally, use a set of common standards for assessing and monitoring biodiversity and natural capital, health and wellbeing, economic inclusion and community cohesion. This is something CoFarm Foundation is very focused on, so we can create a 'distributed estate' with others keen to adopt the CoFarm model."*

Engage possible donors from the outset.

- Corporate donors have assisted with funding food production and distribution – perhaps more effectively than the market.
- Seek donors for pro bono assistance (e.g. architects providing the Masterplan), core funding and donated goods (e.g. greenhouses, polytunnels).
- Charitable status helps this approach

Work with a specialist insurer who understands your approach and can cover the full range of risks.

- Include public liability, employee and volunteer cover.

Finally, spread the Word!

- Cambridge was a great place to start a CoFarming pilot. But the CoFarm model has been designed to scale up so spread the word and get in touch with CoFarm if you'd like to explore adopting the model on your farm! **www.cofarm.co**