Entocycle

Entocycle take waste food and produce a sustainable and ethical 'insect based' alternative to fish & soya meal as animal feed. They are using animals fed on manure-bred maggots to make meat more sustainable. They identified inefficiencies that occur within farming systems and developed a product which will hopefully address the rising demand for fish and meat with our growing population.

They have used the development of technology and improved management systems to breed and farm Black Solider Fly as a new protein sources for farm animals. The flies are fed on food waste, and farmed animals such as fish, chickens, and pigs eat the insects reducing/avoiding requirement for land to grow other types of animal feed, e.g. soya. They are taking a potentially problematic human waste stream and converting it into a protein source for more sustainable meat production.

The driving force behind Entocycle was a desire to reduce environmental damage caused by our current lifestyles and way of doing things. They believe that intensive human farming and agriculture are killing our planet. They developed the idea of using natural food chains to take a different approach meat prodcution. Their founder and CEO Keiran Olivares Whitaker states that nature doesn't believe in waste, and neither do the company.

In traditional agriculture, large areas of land and resources and used to produce soya products and fishmeal which get fed to the livestock. Entocycle's idea of rearing maggots on food waste and feeding directly to livestock uses much less land and resources as well as making used of a waste product: food waste. Farming is the most damaging activity humankind has ever invented, as although there have been many improvements in modern farming, there are still many negative impacts on local environments. The current system is completely dependent on protein from dwindling fish stocks and land-intensive soya to produce the animals humans eat.

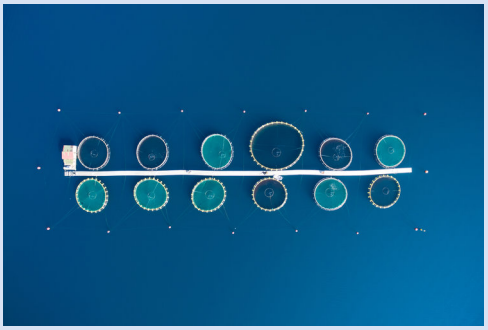
The inefficiencies that occur as a result of this system are having massive economic, social and environmental impacts. With an anticipated 70% increase in global demand for meat and fish by 2050, these impacts will only worsen. The population of the UK will be the largest in Europe by 2050, overtaking France and Germany, mainly due to an ageing population and immigration (Office of National Statistics).

In contrast, the insects farmed are have a higher nutritional value than other products such soya meal and fishmeal, whilst being unaffected by growing environmental issues such as drought or dwindling food supply. It is therefore a healthy alternative which has many benefits over traditional protein sources.

Current Problems

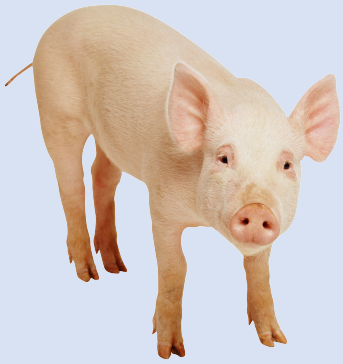
The amount of land required for agriculture

It is estimated that 80% of the agricultural land we use is for animal production. With a rising population more land would be required to meet current demands. We could potentially run out of space. To feed a larger, more urban and richer population in the future, food production must increase by 70%



Fish Stocks Decline Over Time

It is estimated that around 50% of marine fish stocks have collapsed since the 1970s. Researchers say technological developments and the exploitation of new fishing grounds have served to mask the "extraordinary" decline of fish in British waters. Conservationists blame intensive trawl fishing for severely depleted UK fish reserves.



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The destruction of Rainforests

Around 4m Hectares of rainforest are destroyed each year for the production of soya. The major increase in soybean cultivation is a direct response to growing demand for food production. To grow soybeans, vast expanses of land are needed. Production is overtaking huge areas in fragile ecosystems such as the Brazilian Cerrado, the Amazon, the Chaco, and the Atlantic Forests of South America.

Growing Demand for Protein

As a planet we will be 60m tonnes short of protein by 2030. Insects are the natural food for farmed animals, yet have been largely overlooked until now. 14 per cent of the world's ocean fish catch is fed to farm animals. With the global population set to exceed 9 billion by 2050, current farming methods look increasingly unsustainable.

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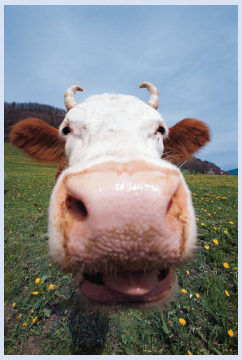
Food Waste in Production and by disposal

One-third of all food produced gets lost or wasted in food production and consumption systems.
UK households binned £13bn worth of food in 2015 that could have been used in other ways. 4.4m tonnes was deemed to be "avoidable" waste with most being edible at some point before being put I the bin or waste caddy. This means in 2015 the average UK household wasted £470 worth of food. The avoidable food waste generated 19m tonnes of greenhouse gases over its lifetime.



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Climate Change

Organic waste inflicts a host of environmental impacts, including unnecessary greenhouse gas emissions and inefficiently used water and land. One-third of all food produced worldwide, worth around US$1 trillion, gets lost or wasted in food production and consumption, resulting in unnecessary and avoidable effects on the planet.

Food chains

Food chains are an arrangement of the organisms (animals and plants) of an ecological community according to the order of predation.

Waste is an important source of energy at the start of a natural food chain:
- Producers rely on the energy and nutrients available from waste.
- Primary consumers then eat these producers, and then may be eaten themselves by secondary consumers. This can be followed by tertiary consumers eating the secondary consumers.
- Eventually after death of the final consumer, decomposers return energy back to soils where it is use again by producers.

Food Chain Terms

- **Environment -** All the conditions that surround a living organism.
- **Habitat -** The place where an organism lives.
- **Population -** All the members of a single species that live in a habitat.
- **Community -** All the populations of different organisms that live together in a habitat.
- **Ecosystem -** A community and the habitat in which organisms live.
- **Producer –** an organism that makes its own food, usually a plant.
- **Consumer –** an organism that eats other living organisms. Can be primary, secondary or tertiary.
- **Decomposer –** an organism that breaks down dead material to cause decay, releasing energy and nutrients.

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Lessons from Nature Principle Supported;

- Solar income – the processes of Entocyle support natural energy flow cycles we find in nature. Energy derived from the sun (solar energy) which has been utilised by plants is now being passed onto the solder fly larva who are in turn making it available for further plant growth.
- Multiple benefits – Entocyle are using the functioning of one species to improve the ecosystem of other environments, through decreased deforestation and by providing nutrient rich alternatives for farming.
- Waste = Food – The waste being used as feed for the soldier fly larvae is providing food not only for the animal species which eventually eat them, but also further down the chain when new plants can be grown from manure and death. Entocycle are using the larvae as metabolists who are constantly gathering and processing materials from the waste material before releasing them back to the environment/soil.

Image: Hermetia illucens. Black Soldier Fly. gailhampshire, 13/09/2012, Flickr, Creative Commons 2.0 Generic (CC BY 2.0) https://creativecommons.org/licenses/by/2.0/legalcode

Black Soldier Fly (***Hermetia illucens***,)

The black soldier fly, is a common and widespread fly in the UK. Black soldier fly larvae play a similar role to that of redworms, as essential decomposers in breaking down organic substrates and returning nutrients to the soil. The adult fly, which measures about 16 mm, has a life span of 5 to 8 days. They quickly reduce the volume and weight of would-be waste: The larval colony breaks apart its food, churns it, and creates heat, increasing compost evaporation.

Useful links and articles;

http://circulatenews.org/2016/05/insects-spawning-farming-innovation/

https://www.entocycle.com/

https://www.youtube.com/watch?v=Es89eHPSnVI

https://www.theguardian.com/environment/2010/may/04/fish-stocks-uk-decline

http://wwf.panda.org/what_we_do/footprint/agriculture/soy/consumers/

"Nature does not believe in waste, neither do we"

— Keiran Olivares Whitaker, founder and CEO

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Entocycle are **Green Alley Award 2015 Finalists**

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