

# WHAT IS A RESILIENT FOOD SYSTEM?

Resilience in Food Systems means that the food systems can adapt and transform themselves in such a way that no matter what the future looks like, they can still produce enough healthy food to which everyone has access, avoid environmental damage, and contribute to livelihood generation. Prof Johan Six



**FOOD**  
FUTURES

NORTH LANCASHIRE'S SUSTAINABLE FOOD NETWORK

Dr Rod Everett  
Backsbottom Farm Roeburndale,  
Lancaster

**This is a talk revolves around 13 criteria that can help us move towards a resilient sustainable food system.**

### **Soil Health**

**Encourage** a regenerative farming system that builds soil over time.

A rich biological soil with a rich complex of micro-organisms including bacteria and fungi, protozoa, nematodes, arthropods and earthworms.

**Build** the natural soil fertility

**Allow** small amounts of mineral rich material that will balance the soils range of elements.

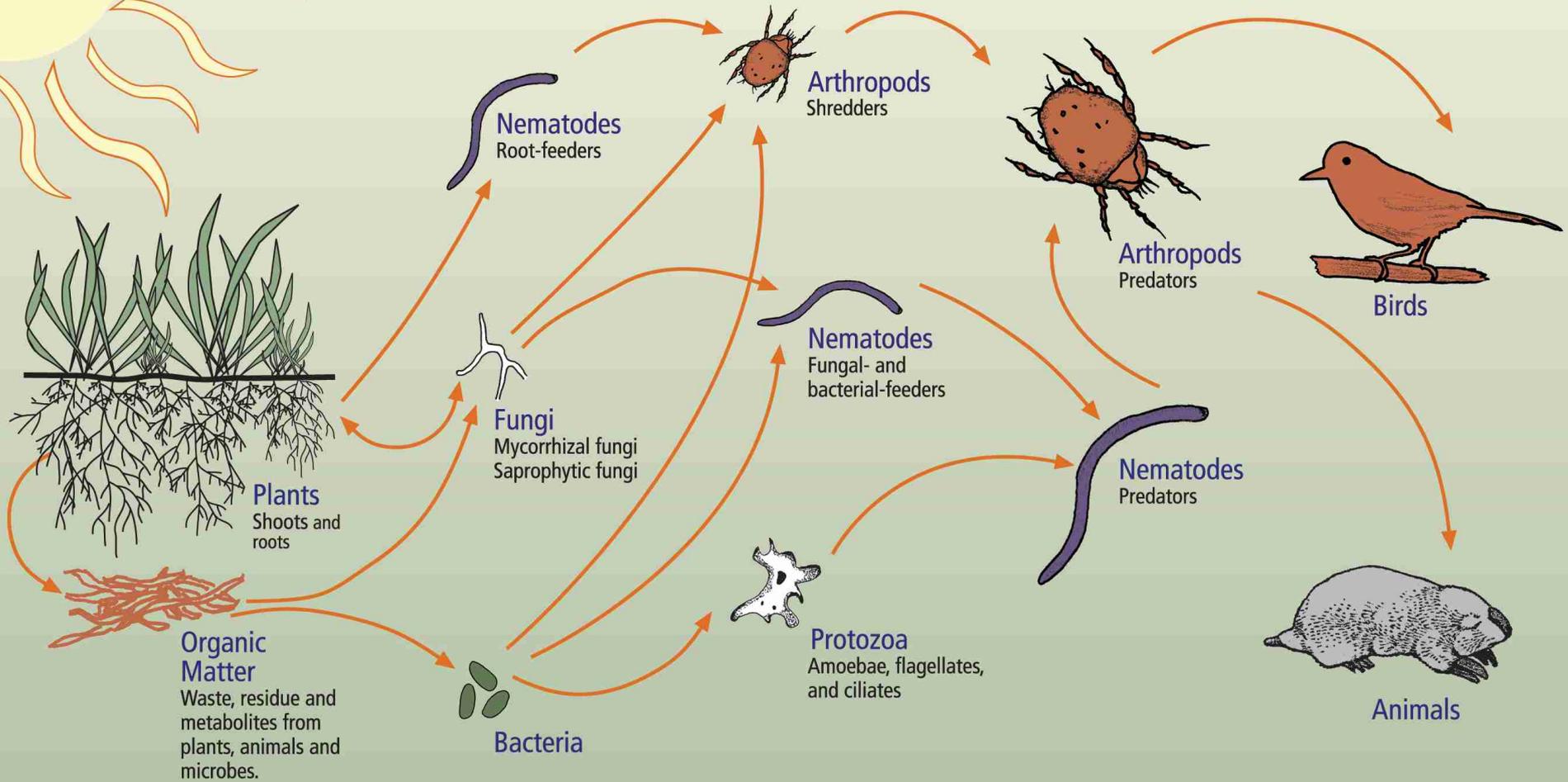
**Support fertility** created from local natural abundant resources, composted waste stream, green manures, organic manures, compost made from the waste products of the growing system, anaerobic and aerobic fermentations



A rich biological soil with a complex of micro-organisms, including bacteria, fungi, nematodes arthropods earthworms

# The Soil Food Web

Image courtesy of USDA Natural Resources Conservation Service



**First trophic level:**  
Photosynthesizers

**Second trophic level:**  
Decomposers  
Mutualists  
Pathogens, Parasites  
Root-feeders

**Third trophic level:**  
Shredders  
Predators  
Grazers

**Fourth trophic level:**  
Higher level predators

**Fifth and higher trophic levels:**  
Higher level predators



Community garden composting.  
composing

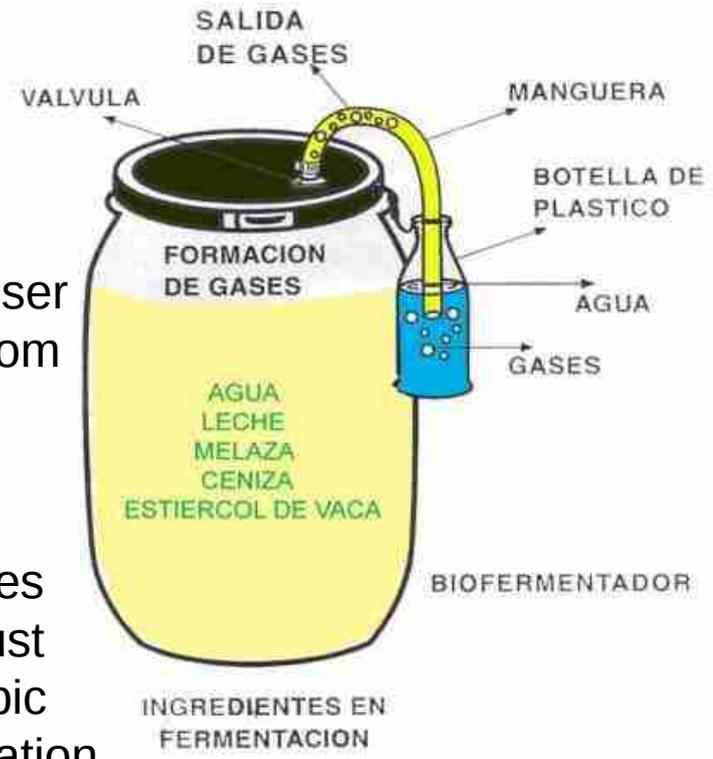


Commercial  
from green waste bin.



EM Bokashi anaerobic compost

Biofertiliser  
Made from  
Cow  
manure  
Milk  
Mollasses  
Rock dust  
Anaerobic  
fermentation



## Ecological footprint

**Phase out** production leads to soil structure damage and erosion. Soil carbon is reduced by repeated cropping. Production or processing produces harmful waste that pollutes the environment. Production leads to release of greenhouse gases.

**Allow** land that is stable during food production but doesn't improve in quality.

**Ensure** no greenhouse gasses are released.

**Support** a system where there is no ecological damage or harmful waste streams during the primary food production. **Support** regenerative agricultural methods that used that leave the land in better health year after year increasing organic matter and soil carbon.

Herb rich hay meadows full of bees and butterflies.

Birds foot trefoil is a nitrogen fixing legume and helps worm sheep!

Backsbottom Farm





## *Local Heritage Apples from Backsbottom Farm, Roeburndale*

*Our organic farm has a collection of over 200 varieties of mainly traditional apples varieties from Lancashire, Yorkshire and Cumbria. It helps maintain their rich genetics. It is nestled in the wooded valley alive with wild flowers, and pollinating insects.*

*No herbicides, pesticides or artificial fertilizers are used on the farm crops. We let nature's diversity protect the crops.*

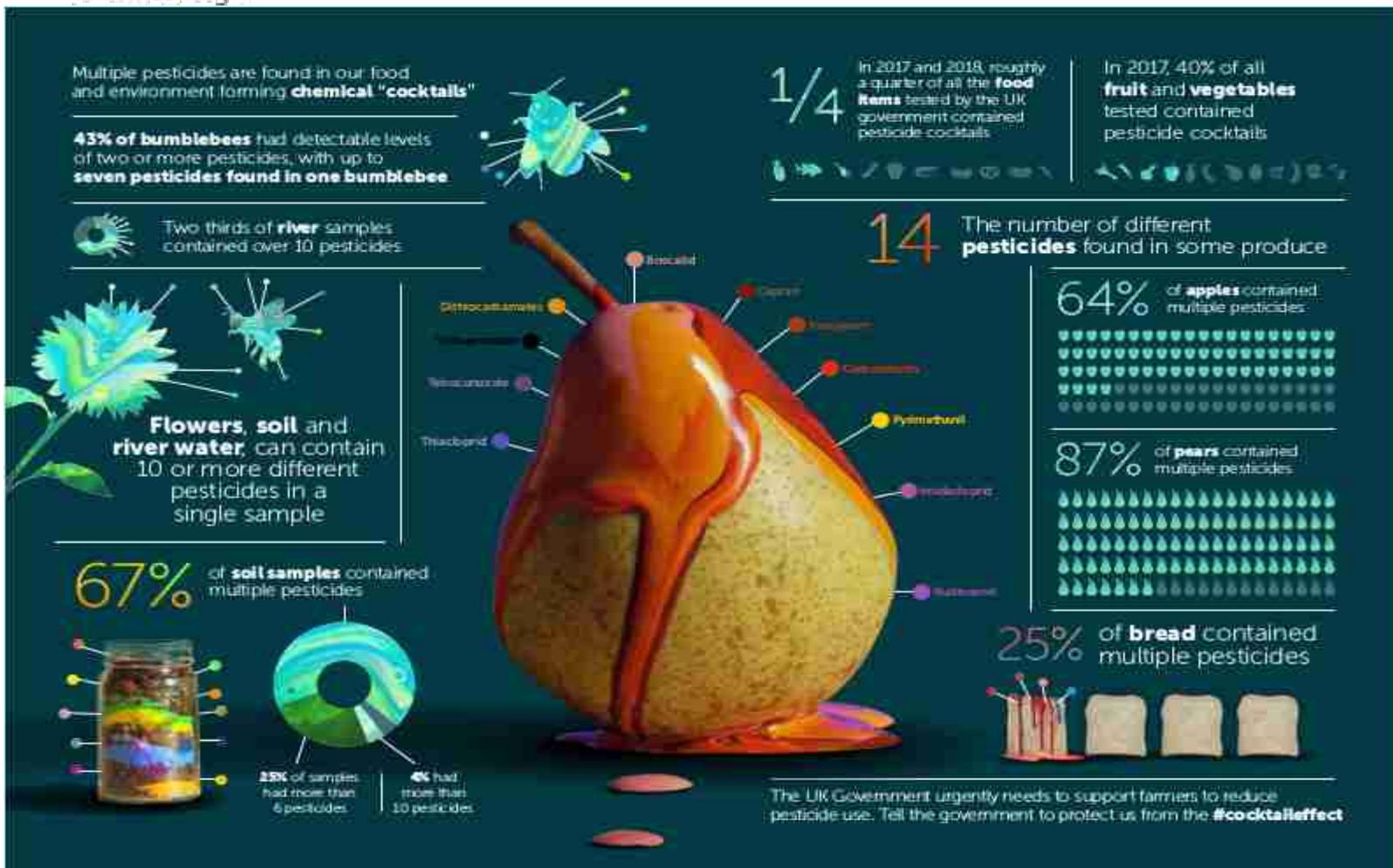


# Supports Natural diversity

**Ban** a food system that destroys wildlife locally or abroad or has destructive production process

**Support** a system that helps maintain a basic healthy wildlife. Waste streams support wildlife eg W.E.T. waste water treatment.

**Encourage** a food system that creates a thriving wildlife with abundant diversity.



Our current food system based on harmful chemical cocktails

A year of chemicals on a 530ha arable farm in the year 2017/18



- Fungicide
- Herbicide
- Molluscicide
- Insecticide
- Growth regulator

Key:

Font size corresponds to the size of the treated area

Cocktail

The typical range of chemicals used in farming.

The unnoticed apocalypse

**23**  
BEE AND FLOWER-VISITING  
WASP SPECIES HAVE GONE  
**EXTINCT**  
IN THE UK SINCE 1850



**APPROXIMATELY**  
**3/4** OF THE CROP  
TYPES GROWN  
BY HUMANS  
**REQUIRE**  
POLLINATION  
BY INSECTS

UK "WIDER COUNTRYSIDE" BUTTERFLIES  
**DECLINED 46%**  
AND HABITAT  
SPECIALISTS BY **77%**  
between 1976 and 2017



NUMBER OF PESTICIDE  
APPLICATIONS HAS  
APPROXIMATELY  
DOUBLED OVER  
THE LAST **25**  
YEARS

A SURVEY OF HONEY SAMPLES  
FROM AROUND THE WORLD  
REVEALS THAT **75%**  
CONTAIN  
NEONICOTINOID INSECTICIDES

UK POPULATIONS OF THE  
SPOTTED FLYCATCHER  
FELL BY **93%**  
BETWEEN 1967 AND 2016

Other once-common insectivorous birds  
have suffered similarly, including

THE GREY PARTRIDGE **-92%**  
NIGHTINGALE **-93%**  
AND CUCKOO **-77%**



THE RED-BACKED SHRIKE,  
A SPECIALIST PREDATOR OF  
LARGE INSECTS, WENT  
**EXTINCT**  
IN THE UK IN THE 1990S

**UN Report 2019:  
Nature's Dangerous  
Decline  
'Unprecedented';  
Species Extinction  
Rates 'Accelerating'  
75%: terrestrial  
environment "severely  
altered" to date by  
human actions.  
\$100 billion: estimated  
level of financial  
support in OECD  
countries (2015) to  
agriculture that is  
potentially harmful to  
the environment**

Figures taken from UK Government data:<sup>6</sup>

	<b>Area treated ha 1990</b>	<b>Area treated ha 2000</b>	<b>Area treated ha 2016</b>	<b>% increase in area treated from 1990 to 2016</b>
<b>All pesticides</b>	44,981,520	59,063,553	73,172,193	+63%
<b>Fungicides</b>	21,471,678	27,298,559	36,369,847	+69%
<b>Herbicides</b>	14,438,110	20,287,443	23,099,598	+60%
<b>Insecticides</b>	5,926,245	5,084,694	5,126,906	-13%

Cocktail

7

Number of applications (including repeat treatments) for four staple crops

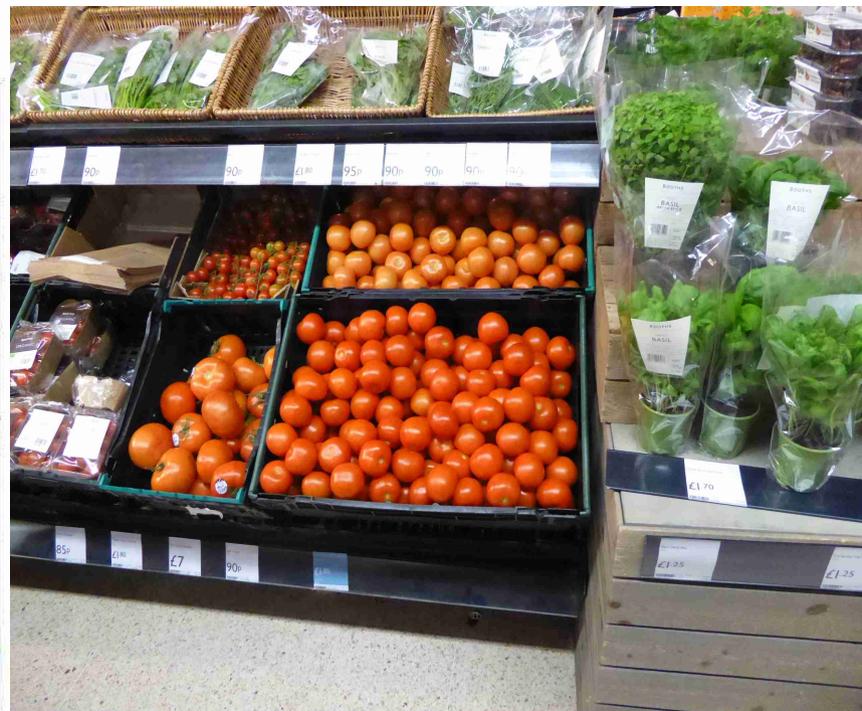
(Source: Application data from government pesticide surveys and includes repeat treatments (tables 4a-4c) <https://secure.fera.defra.gov.uk/pusstats/surveys/> )

Many Spanish workers find it too hot to work there, so most of the staff are immigrants from Africa and Eastern Europe - either legal or illegal.



© Rod Kirkpatrick/F Stop Press

**Garden of England:** The majority of the fruit and vegetables grown in Almería are exported to the UK and elsewhere in Europe



An analysis of HM Revenue & Customs data on food items imported to the UK between January and June 2018. Data sourced from UKtradeinfo.com

## Where do your tomatoes come from?

Our main import from Spain is fruit and veg grown in Almería.

Very damaged soil with agrochemical polluted soils washing into the sea. Sea of plastic.

The UK's reliance on European markets has been exposed



## Claver Hill

Organic growing, no dig, local food.

Soil rich in biology with good bacteria and fungi.

Community based growing project

**Support** Regenerative Agriculture that leave the land in better condition year after year.



In the U.S., several crops are almost entirely genetically modified. These include corn, soybeans, canola, sugar beets, cotton, papaya and, to a lesser extent, alfalfa. It is estimated that up to 80% of processed foods contain GMOs.

Meanwhile corn and soy constitute the bulk of the feed consumed by cattle, hogs and poultry, while alfalfa is a major component of feed for dairy cows. In other words: most of the animal products you eat depend on GMOs.

## The Real Seed Company

60% of the world's commercial seed owned by 5 companies

Most farming in the United States today relies on proprietary seed stocks, whether simply hybrid (F1), or plant variety protected (PVP – a limited patent), or genetically modified (GMO)

You'll find no F1 hybrids or genetically modified seed here - just varieties that do really well and taste great when grown on a garden scale - a catalogue of **real** seeds for **real** gardeners wanting to grow **proper** vegetables. Because all are open-pollinated (non-hybrid), you can even save your own vegetable seed for future years, using the instructions we supply. There's no need to buy new seed every year. Real Seed Co

## Seeds of cereals, vegetables and grazing land

**Support** local seed varieties adapted

To climatic conditions.

**Encourage** local varieties, open Source, open pollinated, non patented and organic seed



Genetic diversity that belongs to everyone & breeds true-to-type, so you can save your own seed  
Demeter



## Wakelyn's Agroforestry Project

Prof Martin Wolfe developed YQ wheat from a diverse range of wheats. It is considered that every plant in the field will be genetically distinct allowing the crop to adapt to local conditions and climate change. This also helps give a resistance to disease and insect attack.

## Community Food skills

**Minimise** fully processed food that require no skills needed to cook and eat.

**Support** food cooking with minimal waste.

**Encourage** a “Can do confidence” in cooking and eating food. Supported by local community. All waste streams are productive within a circular economy.



LESSONS LEARNED  
IN ORGANIZING  
COMMUNITY FOOD  
SKILLS WORKSHOPS  
A FACILITATION GUIDE

[https://www.ecologyaction.ca/files/images-documents/file/Food/Our\\_Food\\_facilitation\\_guide.pdf](https://www.ecologyaction.ca/files/images-documents/file/Food/Our_Food_facilitation_guide.pdf)

In UK 51% of family food purchases are ultra processed foods. In France 14% and in Italy 13%

## Human Health

**Phase out** Food damaging to human health due to forced speed of growth, the presence of residual agrochemicals, the presence of residual medications that might increase human susceptibility to disease. Food tasteless and uninteresting.

**Ban** Food containing additives that may have adverse effects on human health.

**Minimise** Food with weak cell structure often high in water content.

**Use** Food generally healthy but lacking in micronutrients

**Encourage** food that supports excellent human health throughout the year.

Food contains no residual agrochemicals. Food provides mental and emotional stimulation when eaten.

Grab an organic apple and eat it while you're making dinner. That fresh, crunchy apple will help you lose weight, feel good, and be healthy!



Diet is a key element in a healthy human gut microbiome. The gut microbiota disruption links to obesity, gluten intolerance parkinson's disease, Crohn's disease, anxiety, depression and autism.

Antibiotic use in intensive farming of poultry and beef contributes to human gut microbiome disruption. It is suspected that pesticides in food damage the gut microbiome. "The adverse effects on the microbiome of drugs and food additives can no longer be ignored." (reference BMJ 361 supplement)

# **National Food Strategy**

**Henry Dimbleby**

“18 of the largest food and drink companies rely on portfolios of food and drink of which 85% are so unhealthy as to be regarded unsuitable for marketing to children under World Health Organisation guidelines.”

Our gut microbiome (Rob Percival) flourishes when we eat a diet of diverse, fresh foods, including fibrous plants.

Each year, more than 250 million pounds of glyphosate are sprayed on American crops, primarily on “Roundup-ready” corn and soybeans genetically engineered to withstand the herbicide. But when it comes to the food we eat, the highest glyphosate levels are not found in products made with GMO corn.

Increasingly, glyphosate is also sprayed just before harvest on wheat, barley, oats and beans that are not genetically engineered. Glyphosate kills the crop, drying it out so that it can be harvested sooner than if the plant were allowed to die naturally.

A new report found glyphosate, a weed-killing chemical that some health authorities link to cancer, in a number of popular breakfast foods and cereals marketed to children. The study by the non-profit Environmental Working Group (EWG) discovered trace amounts of the most widely used herbicide in the country in oats, granolas and snack bars. Thirty-one out of 45 tested products had levels higher than what some scientists consider safe for children.

Recently, some scientists, doctors and activists around the world have worked to keep glyphosate out of crops due to concerns that it is a dangerous carcinogen.

A chemical glyphosphate, found in the world’s most widely used weedkiller can have disrupting effects on sexual development, genes and beneficial gut bacteria at doses considered safe, according to a wide-ranging pilot study in rats

It shouldn’t be happening and it is quite remarkable that it is,” Mandrioli said. “Disruption of the microbiome has been associated with a number of negative health outcomes, such as obesity, diabetes and immunological problems.”

### Oat based cereals and granola Bars – Glyphosphate detected

	Conventional	Organic
Samples Tested	45	16
Glyphosate Detects	43	5
Detects Above EWG's Health Benchmark (160 ppb)	31	0



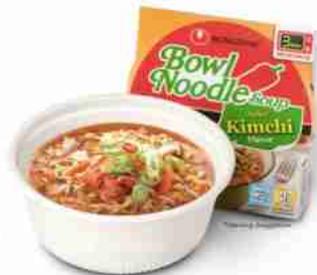
Common food  
Additives



High levels of Aspartame  
Sucralose, aspartame, and saccharin have  
been shown to disrupt the balance and  
diversity of gut microbiota



MSG high levels  
affects glutamate receptors which may lead to  
neurotoxin release leading to MS, brain  
tumour,  
schizophrenia, dementure and other effects.





By eating healthy food that is full of natural nutrition we can support our gut biome and reduce ill health.

“We have been asked to set out what needs to be done – across all departments of government and in society more broadly – to build a robust food system that provides good affordable food to everyone; restores the environment; maintains our countryside; brings good jobs to our communities – rural and urban; **and stops making us sick.**

**In short, a system that we would be proud to leave for our children.**

**Sufficiently large numbers of us are overweight enough to cause serious health problems and a strain on our National Health Service..**

**As the amount of food being produced from a given area of land increased, so the amount of other life occupying that same area of land decreased.”**

**Henry Dimbleby UK Food Strategy 2020 Oxford Farming Conference.**

# Did you know?

OUR OVERNIGHT WHITE LOAVES TAKE AT LEAST **14 HOURS**

**WE BAKE 1000 LOAVES A WEEK**

**WE SWAP OUR BREAD FOR YOUR PRODUCE**

Our delicious apple and hazelnut sourdough is only possible because our wonderful customers bring their home grown apples every Autumn!

WE USE ORGANIC FLOUR. IT MAKES DELIGHTFUL BREAD  
**AND IT'S GOOD FOR THE BEES**

EVERY SOURDOUGH CULTURE IS SPECIFIC TO THE BAKERY IN WHICH IT LIVES **LIKE A PET, WE FEED OURS EVERY DAY**

**WE DON'T ADD** TO OUR STAPLE RANGE **SUGAR, FAT OR DAIRY OF BREADS**  
WHY? BECAUSE WE DON'T NEED TO

**WE DON'T WASTE GOOD BREAD**  
WE UPCYCLE IT, OR DONATE IT WHEREVER WE CAN

Filberts Bakery  
Lancaster.  
Looking after  
Human Health  
and Wildlife

## Packaging and farm materials

**Ban** single use plastic packaging especially when there are multiple layers. **Ban** glossy polluting inks. **Ban** the use of materials that are absorbed into food and may damage human health. **Ban** short life plastics used in farming system.

**Use but consider long term impacts** of long life plastics such as polytunnel. **Support** a system that uses low energy recyclable container, such as deposit bottles. Production buildings use natural materials.

**Encourage** no packaging, refillable personal containers, natural buildings and natural materials in processing.



Organic but with 3 layers of single use packaging



Loose cereals and nuts etc. in Single Step

## **Food Additives and Child Health**

The American Academy of Pediatrics warns about these harms.

### **Bisphenols**

They can act like Hormone oestrogen and interfere with puberty and fertility.  
Can increase body fat and cause nervous and immune problems.  
Found in lining of food and soda cans. Plastics with No 3 or 7.

### **Phthalates**

Act like hormones interfere with male genitals, Increase risk of obesity and cardiovascular disease. Found in plastic packaging garden hoses.

### **Perfluoroalkyl chemicals PFGs**

Low birth weight, Problems with immune system, thyroid and fertility.  
Found in grease proof paper, cardboard packaging, nonstick pans.

### **Perchlorate**

Interferes with thyroid and can disrupt early brain development.  
Found in some dry food packaging.

### **Artificial food colours**

Increase deficit hyperactivity disorder or ADHD.  
Found in all sorts of food products. Especially those marketed to children.

### **Nitrates and Nitrites.**

Can interfere with thyroid and bloods ability to deliver Oxygen to body. Can increase risk of cancers. Used to preserve and enhance food, especially processed meats.



Food in the nude' is a New Zealand campaign to end plastic packaging for fresh produce in supermarkets. Foodstuffs have signed the NZ Plastic Packaging Declaration which is committed to making all store and private label packaging 100 percent reusable, recyclable or compostable by 2025.

## Animal Health

**Phase out** routine use of antibiotics and medication to counteract unhealthy living conditions, leading to resistance to medications. Restricted movement and living space. Feeding that relies on imported, GMO and exploitative crops designed for forced growth or forced productivity.

**Reduce** feeding that relies on imported industrial feeds, over-stocked land and reduce regular use of multiple medication.

**Support** a healthy system that doesn't need routine use of multiple medications.

**Encourage** free range that are fed UK based organic feed

**Ensure** that livestock can self medicate by using natural plants. Allow full natural behaviour enabled with no suffering. Encourage systems where all feeds are grown on the farm. Eg Pasture Fed Livestock Association, Holistic management and rotational Mob grazing.

The omega-6 : omega-3 ratios were, respectively, 0.95, 2.28, and 5.77 in grassmilk, organic, and conventional milk. (US research)

A ratio of 15:1 is common in Western diet and leads to many health problems.

Grain feeding of farm animals is leading to this high levels of Omega 6 fats.

A historic diet would have been nearer to 1:1

Current research at Lancaster University is working with the Pasture Fed Livestock Association to assess Sustainable economic and ecological grazing systems - learning from innovative practitioners. Such as mob grazing.



## Mob Grazing photo Cotswold Seeds.

With mob grazing the animals are moved daily to new pasture and don't come back to the same land for at least 30 days – in some cases over 6 months.

Grazing pasture enhances unsaturated fatty acids omega 3 in milk compared with conserved forages. The systematic literature reviews analysed data from around the world and found that organic milk and meat have more desirable fat profiles than conventional milk and meat © Seal

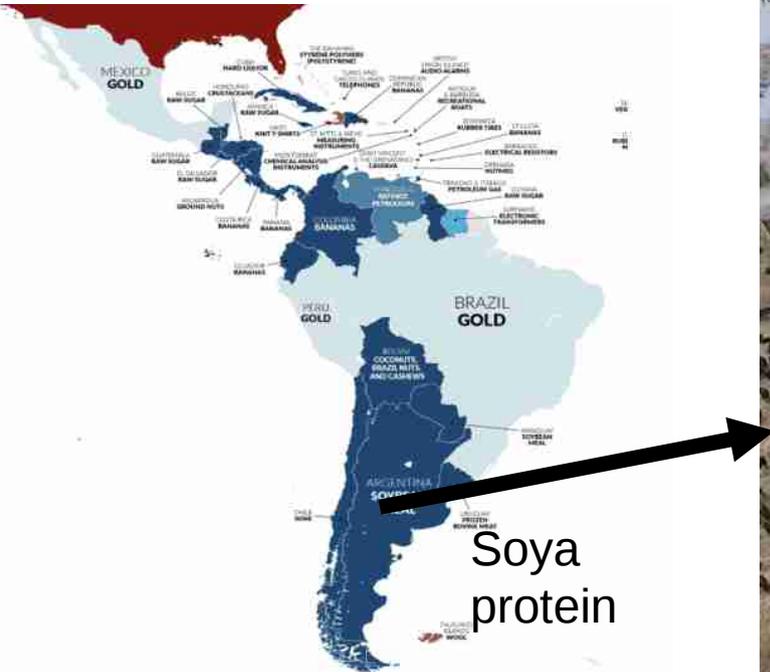


**Euro Group For Animals  
New report demonstrates detrimental  
impacts of intensive broiler chicken  
farming on public health and the  
environment, besides animal welfare  
October 2018**

The Co-op, Lidl and Waitrose, are among those found to be sourcing beef from UK intensive industrial scale farms.

Source The Guardian 2018

According to the European Feed Manufacturers' Association (FEFAC), at least **85%** of the EU's compound feed production is labelled to indicate that it **contains GM** or GM-derived material.



## Abattoir and markets

**Support** a farming system that uses local abattoir within 1 hour journey from farm. Direct sales from farm or local processor.

**Encourage** mobile abattoirs coming to farm. Direct sales from farm.



Swedish  
mobile  
abattoir.

## Energy Use

**Massively reduce** high energy use fertilizer synthetic NPK, Using fossil fuels to heat and dry foods or animal feeds. Relies on long term damaging nuclear fuel.

High use of energy consumption in cultivating land.

**Support** a system where no use of fossil fuels in production and processing. Using solar, wind, or hydro power.

Continued fertilizer demand has further implications since practically all synthetic fertilizers are derived from fossil fuels. Processing of these fuels results in emission of greenhouse gases (GHGs) such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).

In England fertilizer consumption 2018

808000 tonnes Nitrogen, 131000 tonnes Phosphate, 174000 tonnes Potash

Energy cost (natural Gas) in production 48 Million BTU or 51 GJ per Ton of Nitrogen

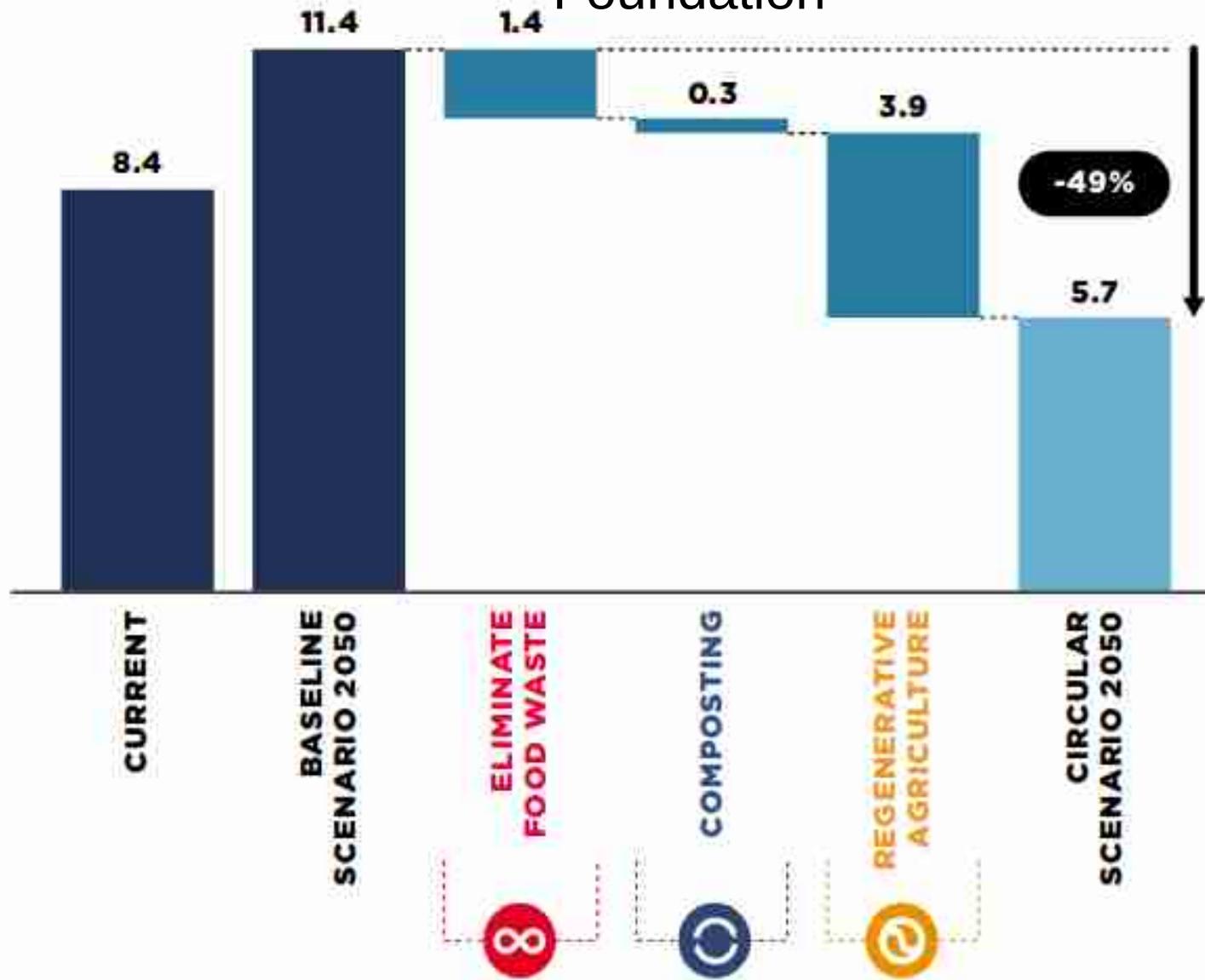
Releases 3.5 ton CO<sub>2</sub> per Ton of Nitrogen Yarra Fertilizer Industry Handbook Oct 2018

Agriculture and food industry responsible for 24% of Greenhouse Gas Emissions COMPLETING THE PICTURE HOW THE CIRCULAR ECONOMY TACKLES CLIMATE CHANGE ELLEN MACARTHUR FOUNDATION (2019)

**Nitrogen fertilizer in UK releases over 2.8 million tons of CO<sub>2</sub> and uses 41 million GJ of energy (2018),**

**Emissions from the global food system**  
Billion tonnes of CO<sub>2</sub>e per year

Ellen MacArthur  
Foundation





## Transport

**Minimise** high energy transport, by air, by vehicle carrying small item only and from abroad

**Reduce** vehicle delivering over 100 miles and transport by boat from abroad

**Support** full vehicle delivering regionally 100 miles.

**Encourage** full vehicle delivering locally 15 miles and local walking, pedal power or draught animal and renewable energy vehicles.

“The high standards of British farming are the backbone of our biggest manufacturing sector – food and drink – that exports £22bn to over 200 countries.

We’ve opened burgeoning markets for sheep meat in India and Japan, and put British beef back on Chinese plates for the first time in 20 years.”. T.Villiers DEFRA Minister 2020





## Primary Producer

Support primary producer supported by local processor or marketing group.

Encourage direct sales from primary producer.

# Lancaster Food Trail

Growing Our Local Food Economy



**LANCASTER LOCAL FOOD DIRECTORY**

Find local food in Lancaster District

[www.lessuk.org/directory](http://www.lessuk.org/directory)

Lancaster Autumn Food Festival

**Lancaster Autumn Food Festival**

30th October (Tuesday) Lancaster University Campus

Food, talks, workshops, films and tours

Repairing our broken food system

Finish the night with a nutritional nightclub

GET INVOLVED

LANCASTER UNIVERSITY STUDENTS' UNION

LESS

green

FEED BACK

REAL CHANGE

LANCASTER'S MIDSUMMER MARKET

FRIDAY 21<sup>ST</sup> JUNE 10:00-17:00

LANCASTER MARKET SQUARE

CELEBRATE THE MIDSUMMER WITH LOCAL FOOD AND DRINK, LOCAL CRAFTS, LIVE MUSIC AND MORE.

## Primary producer, processor and sales income

**Phase out** exploitative system that provides no long term support for those involved in its production, processing and sales.

**Minimise** farming that provides minimum income and no security. Supported by subsidy.

**Allow** a system that provides a short term living wage for all involved in the production process.

**Support** a system that provides farmer, processor and final sales with a regular ongoing living wage that is enough to support a family lifestyle from generation to generation without the need for subsidy.



North Aston micro dairy with 16 cows on 40ha. £130,000 income employs 2 full time and 2 part time workers. Profits milk 79p/l, yoghurt 99p/500ml cream 1.11/250ml, Ice Cream 3.49/700ml.

Plaw Hatch Community Farm  
£1.8 million turnover

## Creates local community

**Phase out** impersonal food system where there is no cooperation just competition.

**Minimise** high prices make food unavailable to the vulnerable community.

**Support** a system where good food is available to everyone. One that is available to low income, unemployed, homeless and vulnerable. Farmers, processors and marketing are encouraged to cooperate together and with each part of the food production. **Ensure** enough income generated. Direct links to consumers such as Community supported agriculture. **Concentrate** on seasonal food.

Community potatoe harvest  
breakfast in Romania after  
working with the community

Swillington organic

farm

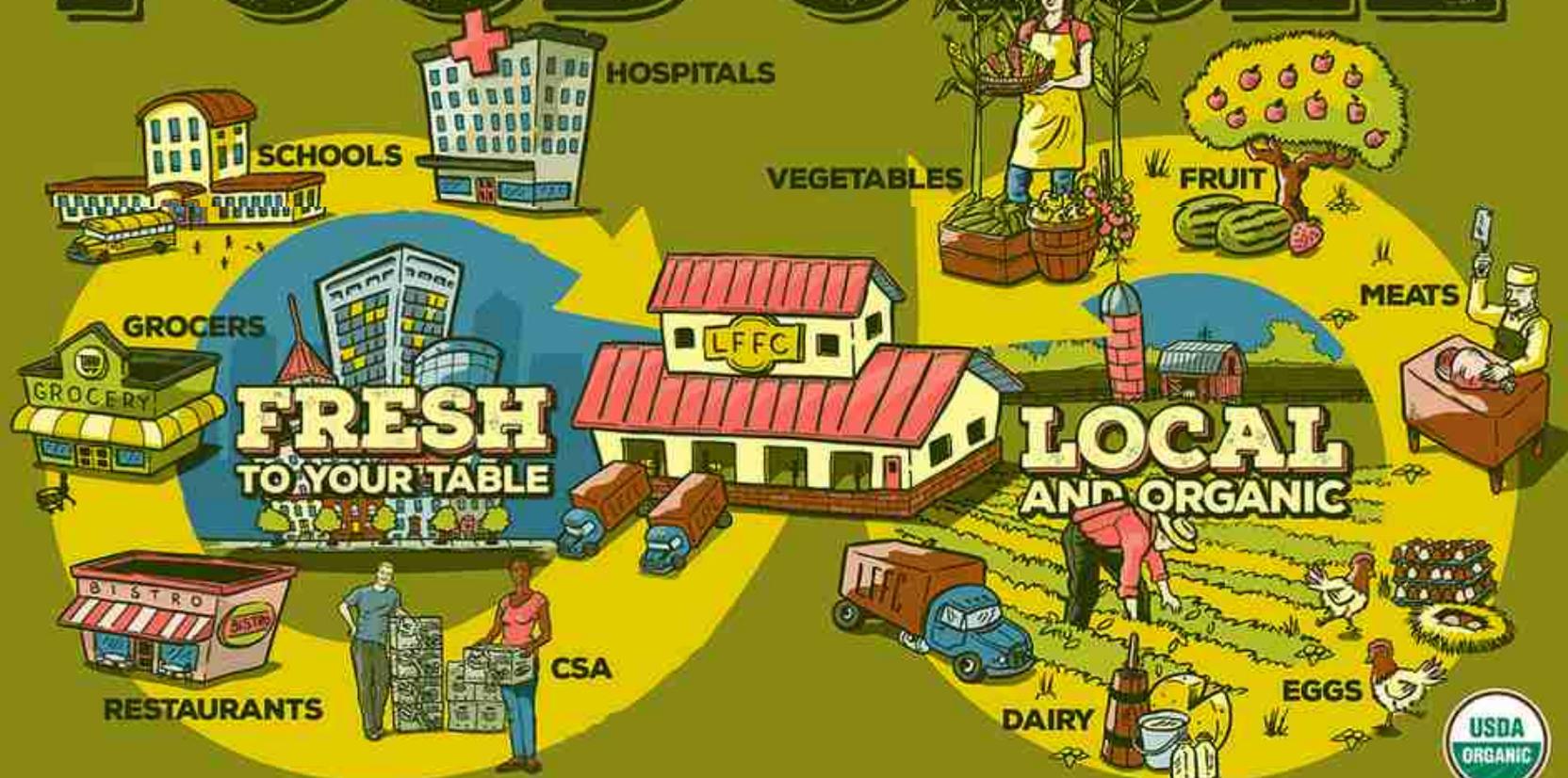
Fruit, vegetables, salad, flowers, eggs, beef,  
chicken, duck, turkey, pork, lamb and honey.



Could Lancaster Pennsylvania act as a model for Lancaster UK?

The Lancaster Farm Fresh Cooperative supplies local organic food to schools, restaurants, university, hospital and the local community.

# LANCASTER FARM FRESH COOPERATIVE COMMUNITY DRIVEN FOOD CYCLE



## FRESH TO YOUR TABLE

### CSA

NUMEROUS CSA SITE LOCATIONS THROUGHOUT THE MID-ATLANTIC REGION. CUSTOM WORKPLACE AND WELLNESS MINDED CSA PROGRAMS.

### RESTAURANTS

FARM-TO-TABLE, FINE DINING, BISTROS, VEGETARIAN AND ANIMAL PROTEIN BASED.

### GROCERS

INDEPENDENT GROCERS, NATURAL FOOD CO-OPS, CHAIN STORES.

### SCHOOLS/HOSPITALS

HOSPITALS, COLLEGE CAMPUSES, HEALTH CENTERS, DAYCARE CENTERS.

## LOCAL AND ORGANIC

### VEGETABLES

HEIRLOOM AND OPEN-POLLINATED VARIETIES, RARE AND UNUSUAL PLANTS, ETHNIC AND COMMON VEGGIES.

### FRUIT

HEIRLOOM, TREE FRUITS, MELONS, STRAWBERRIES, RASPBERRIES, KIWIBERRIES, BLACKBERRIES, BLUEBERRIES, ORGANIC AND IPM METHODS.

### MEAT

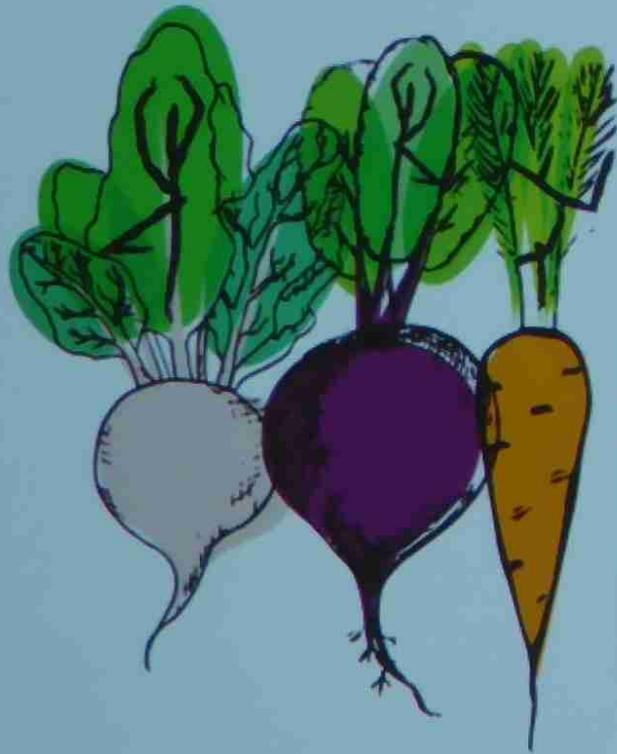
GRASS-FED MEATS, HUMANE STANDARDS, ORGANIC AND PASTURED POULTRY, NON-GMO GRAINS.

### EGGS

PASTURE-BASED CHICKENS, DARK YELLOW YOLKS. CHICKENS ARE NOT DEBEAKED AND FORAGE FREELY FOR INSECTS.

### DAIRY

GRASS FED COWS, ORGANIC AND HORMONE FREE, FRESH, NUTRIENT DENSE.



# FOOD FUTURES

NORTH LANCASHIRE'S SUSTAINABLE FOOD NETWORK

<http://www.lesuk.org/blog/>

**Tackling our many 'crises' through food: a local perspective**

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